



*Rochester Committee
for Scientific Information
Rochester, NY*

*RCSI Bulletin 137
Environmental Research in the Irondequoit Bay Watershed*

*By: Herman S. Forest & Graham Cox
March 1972*

THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
P. O. Box 5236, River Campus Station
Rochester, New York 14627

Bulletin #137 (W)
Water Pollution

March 1972

Environmental Research in the Irondequoit Bay Watershed
Introduction and Review

by

Herman S. Forest and Graham Cox

A joint report of the Monroe County Environmental Management Council
and the Rochester Committee for Scientific Information.

Contents:

- I Water Pollution
- II Physical Limnology (includes salt study)
- III Land Use
- IV Research in Progress
- V Environmental Impact and Management
- Appendix: Organizations with special interest in the Bay Watershed.

Foreword

The need for information on Irondequoit Bay was sharply expressed by public officials, citizens, and scientists at the conference organized on June 16, 1971 by Monroe County Legislator William C. Kelly (Rep. 2nd Dist.). No one is responsible for preparing summaries which would be accessible when decisions must be made. The scientist tends to publish slowly and in the journals of his specialty, and agency reports are not apt to be circulated widely or coordinated with each other. Consequently citizens and officials do not receive available information, and have very little access to skilled advice. The conference of June 16, demonstrated that scientists and non-scientists could exchange meaningful information. Since verbal exchange is limited, this written report was initiated. It was possible to begin with few resources because of these favorable circumstances:

1. The Rochester Committee for Scientific Information had already published a number of reports in layman's language. These constitute a sketchy recent history, primarily on water pollution, water quality, lake dynamics, and land use.
2. Scientists now engaged in investigations, including Mr. Bubeck, Dr. Bannister, Dr. Harbison, at the University of Rochester, the staff of the regional office of the N.Y.S. Department of Environmental Conservation, and the writers are good acquaintances, and we exchange information freely.
3. Agency reports have been made available through the kindness of a number of officials, staff members, and consultants.

This Introductory Review will be followed by a series of others, as sources are identified and selected. The scope will be to catalogue, review, and footnote, not to attempt comprehensive original reports.

I. Water Pollution

1. J. Franklin Bonner, "A Survey of the Pollution of Surface Waters of Monroe County, New York," Monroe County Division of Regional Planning, Rochester, New York, 1939.

This is a basic historical document for establishing the record. It was one of the several achievements of Mr. Bonner's remarkable career as a land planner.

2. R.C.S.I. Bulletins

#1(W) "Report on Water Pollution," (Irondequoit Creek), October, 1964.

#3(W) "Third Report on Water Pollution," (Irondequoit Bay and Allen's and Irondequoit Creeks), May, 1965.

#4(W) "Hearing on Irondequoit Creek," (N.Y.S. Water Resources Commission), May, 1965.

#12(W) "Water Pollution in Monroe County," July, 1966.

This bulletin summarizes the findings on waters of the Ontario beaches, the Genesee River, and tributaries, small streams feeding directly into Lake Ontario, and the Irondequoit Watershed.

#22(W) "Sewage Pollution of Oatka Creek and Lower Irondequoit Creek," January, 1967.

#25(W) "Sewage Pollution of Densmore and Thompson Creeks: A Follow-up Report," May, 1967.

#26(W) "Pollution of Densmore Creek," May, 1967.

#30(W) "Improved Conditions of the Irondequoit Creek Watershed," June, 1967.

#33(W) "Continued Pollution of Thompson Creek, Densmore Creek and Slater Creek with Undisinfected Sewage," July, 1967.

#34(W) "Dissolved Oxygen in Monroe County Waters. Lower Irondequoit Creek," July, 1967.

#36(W) "Sewage Pollution of Irondequoit Creek in East Rochester," July, 1967.

#38(W) "Pollution of Irondequoit Bay with Diesel Fuel or Fuel Oil," September, 1967.

#41(W) "Fecal Pollution of Densmore Creek and Streams in the Town of Greece," January, 1968.

#45(W) "Dissolved Oxygen Levels in Irondequoit Bay, " September, 1968.

The title is not a good indication of the content of this short bulletin. It actually includes:

- 1) Discussion of New York State Water Quality Standards, and list of the categories.
- 2) Reference to Federal and County studies.
- 3) Original reports from watershed streams as well as the Bay, on phosphate as well as oxygen.

#61(W) "Phosphate in Irondequoit Creek and Tributaries, 1968-1969," November, 1969.

#101(W) "Use of Irondequoit Creek by William Stappenback, Inc.," July, 1970.

#123(W) "Nutrient Studies of Irondequoit Creek," June, 1971.

#130(W) "A Survey of the Fish of Irondequoit ^{BAY} Creek," December, 1971.

II. Physical Limnology

The most comprehensive Bay study yet undertaken was initiated with the aid of an R.C.S.I. grant in September, 1969 to R. C. Bubeck, B. L. Deck, and W. H. Diment of the University of Rochester Geology Department. The preliminary results were instrumental in securing a National Sea Grant Program award for \$68,200 for further study (GH-106, FY 1971-2), "A Limnological Investigation of Irondequoit Bay, Rochester, N. Y.," with W. H. Diment as principal investigator. T. T. Bannister assumed responsibility for the phytoplankton aspect of the program (see below). The principal field work was completed in December, 1971, and the results will be reported in Mr. Bubeck's forthcoming doctoral dissertation.

Although analysis of the data is far from complete some tentative conclusions have been drawn.

1. The density gradient caused by salt runoff prevents the bay from mixing completely in the spring, and prolongs the summer stratification; fall mixing is delayed a month.
2. The amount of salt used is astonishing. The Bay's drainage basin receives 1% of all road salt used in the United States; the Monroe County total is 2 1/2%.
3. The chloride level of bottom water of the bay and of Irondequoit Creek in winter exceed the U.S. Public Health Service recommended limit of 250 ppm.

4. Chemical data, acquired at monthly intervals or more frequently for over a year indicate a highly nutritious condition. This information forms a basis for comparing future changes, as abatement facilities are constructed and land use changes.
5. Bannister's observations based on phytoplankton indicate that phosphorus is not the critical limiting nutrient for phytoplankton in the bay itself. This is a typical situation in heavily polluted waters. The nutrient most critical varies at different times of the year, both nitrogen and silica being critical at some time during the growing season. No studies have been made of attached algae and rooted aquatic plants ("weeds"), which grow profusely in shallow waters. It is recognized that different nutrient requirements may regulate their growth.
6. From preliminary data, it appears that the frequent injections of Lake Ontario water into the Bay are not large. Enlargement of the channel will probably not improve the quality of water significantly. The water quality can be improved only by diversion of sewage and the control of other input to the Bay itself.

The flow and chloride content of Irondequoit Creek are being monitored daily at Browncroft Boulevard. This will continue through the salting season in the spring of 1972.

Two R.C.S.I. Summary-Bulletins have reported preliminary results. The full reports are available in the files of R.C.S.I.

#67(W) "Water Temperature and Dissolved Oxygen in Irondequoit Bay," February, 1970.

#125(W) "Run-off of Deicing Salt: Effect on Irondequoit Bay, Rochester, N. Y.," July, 1971. Bubeck, Diment, Deck, Baldwin, and Lipton.

The full report was published in Science, June 11, 1971. Both reports include references to previous research on Irondequoit Bay and other pertinent sources. The Environmental Protection Agency (Lake Ontario Project) and the Monroe County Health Department provided unpublished data.

Irondequoit Bay Study by Marine Resources, Inc. Submitted to Monroe County Department of Public Works, Pure Waters Agency, on Dec. 31, 1970. An Abridged Version of the report is dated Feb. 23, 1970. Both bear the project number 825-014.

"The purpose of the study is to assemble all data on Irondequoit Bay, prior to 1968, and to assess our state of knowledge of this important body of water." (opening statement)

Although a considerable assembly was accomplished, the study is extremely uneven in its quality and its emphasis. No effort was made to examine information obtained before 1938, although Bubeck et al (1971) have cited it. No attempt was made to analyze the meaning of certain types of information generally considered important in aquatic studies. A single reference is made to plant studies (algae or weeds) and no recognition of the value of biological studies appeared. So fundamental an aspect as the season dynamics of the Bay was also passed. In contrast, a great effort was devoted to a computer study which statistically analyzed a rather small amount of chemical data. The one positive conclusion reached was that one sampling station would be adequate for the bay. A few traditional chemical criteria were suggested for limnological monitoring. These were not directly related to the statistical analyses, but were chosen as being standard limnological criteria. Moreover, no conclusion was offered as to the meaning of chemical changes in the Bay. An inordinate amount of the report was devoted to speculation of ways of helping the Bay if self-cleaning did not occur rapidly enough after diversion of the sewage.

One conclusion of the report coincided with the more recent work of Bubeck et al. The proposed widening of the Bay outlet will probably not contribute to improving its water quality. While the Marine Resources report reached this conclusion by analogy with Braddock Bay, the more recent work by Bubeck cited short-term observations of current flow and direction at the Bay outlet and cited direct evidence of circulation of water and the nature of the configuration of the bottom of the Bay itself.

Although many local scientists are engaged in aquatic research, none participated in the Marine Resources study, and few are aware of the report.

III. Land Use

1. R.C.S.I. Bulletin #84(M) "Landfills Threaten Irondequoit Bay," July, 1968

This report includes discussion of: "The Bay as a Natural History Landmark," "Pollution," and, "Legal Confusion," as well as the record on landfilling, with reference to the mapping of landfilling at the mouth of the bay published in local newspapers several years earlier.

2. Irondequoit Bay Pure Waters District Environmental Reconnaissance Report by Robert D. Hennigan, P.E., Environmental Engineering Consultant. Submitted to the "Monroe County Division of Pure Waters" (accurately, the Monroe County Pure Waters Agency) in March, 1970.

This is a most interesting and informative study which is virtually unknown to the public and most officials. The consultant could have fulfilled his contract with a narrow engineering study recommending a route for the Irondequoit Valley interceptor sewer. Mr. Hennigan, who was at

that time Director of the State University of New York Water Resources Center at Syracuse, is an unusually broadly concerned man. He included an ecologist in his study group. In a joint engineering-biological effort, the "reconnaissance" not only proposed ways of reducing damaging impact, but considered land use as conservation areas and linear park system.

3. Irondequoit Bay Resolution adopted by the Monroe County Planning Council on September 28, 1971. This resolution begins from premises which include, "Inadequately controlled private and public development in the vicinity of Irondequoit Bay will lead in years ahead to the destruction of the outstanding natural beauty of the Bay;..." Eleven "principles" are recommended as guides to the public and private decision making. These are actually specific actions including: achievement of water good enough at least for swimming, formulation of an overall program for protection, public acquisition of undeveloped land, phasing out of private structures located on steep slopes over a period of time, development of hiking and bicycle trails and other park development, preservation of the wetlands adjoining the bay south of Empire Boulevard, and a plan for zoning or sharing which will minimize conflicts between incompatible uses (fishing, swimming, skiing, motor boating, airplanes).

The first test of the resolution came quickly. In October, 1971, the issue of the preservation of Tryon Park East was brought to the Rochester City Council. The following documents and papers refer to this controversy:

- a. Statement by City Planning Commission, Tryon Park, October 4, 1971.
- b. Environmental Assessment of Tryon Park East by H. S. Forest, prepared for and adopted by the Monroe County Environmental Management Council on October 6, 1971. A supplement to the report is in form of a letter to Dr. C. W. Gehris, Chairman of EMC, dated October 28, 1971.

Rochester City Planning Bureau Director, Ann B. Taylor, is preparing a detailed documentation of the Tryon Park controversy. It will be a chronology of the events leading to the final dedication of the area as park land.

4. The Genesee/Finger Lakes Regional Planning Board, in a current assessment report of environmental management problems along the Lake Ontario shoreline of Orleans, Monroe, and Wayne Counties, focuses considerable attention on Irondequoit Bay. Included are discussions of the conflicts over shore and water use, and a specific consideration of Tryon Park in its broader planning context.
5. Except for the Town of Irondequoit, the political units composing the Bay area have land use reports:

- a. Brighton master plan, Brighton Townplan, by special consultant, 1971.
 - b. Penfield Master Plan by staff of Monroe County Planning Council, 1966, and Planning Inventory, Town of Penfield, also by the Council.
 - c. Rochester City Master Plan, 1965.
 - d. Master Plan for Town of Webster by E.B.S. Management Consultants, Inc., July, 1966.
6. The Monroe County Parks Department has a master plan for development of park areas around the Bay. This has been updated from time to time, but is essentially consistent with the planning objectives of the Planning Council Resolution of 1971. A considerable increase in public land holdings over a period of years is the heart of the park plan. This plan was prepared by Carl Crandell, Consultant, for Monroe County in 1962. It is essentially a guide to land acquisition and use. The major addition to the plan has been the acquisition of 182 acres of prime shore lands in the Town of Penfield.

A treasure of valuable information on land use in the watershed is available in the records of Towns, County and the State, and in newspaper accounts. Unfortunately, we can find no attempt to gather, organize, analyze or report it.

IV. Research in Progress

1. The Game and Fisheries sections of the Environmental Management Division, New York Department of Environmental Conservation, have continued their interest in the Bay and accumulation of experience there. The Rochester Area Office (District #8, Avon, N. Y.) has a responsibility for eleven counties, however, and there is no opportunity for concentrated work. Findings of the staff are available through their file records and personal communication.
2. Studies of Irondequoit Creek and Bay under the direction of Dr. Kenneth G. Harbison, Department of Chemistry, University of Rochester, are being funded by the R.C.S.I. and the NSF-SOS program. The concentrations and effects of chemical constituents in the water system are being investigated, as well as populations of fish and other fauna.
3. The investigation of physical limnology by R. C. Bubeck and his associates has been discussed above. An estimated date of publication for the presently funded work is 1973.
4. The nutrition of planktonic (suspended) algae is being investigated by Dr. Thomas Bannister, Biology Department, University of

Rochester, and his students. They seek an understanding of the causes for extremely high production which results in soupy "blooms" of suspended material. The results may both identify the particular nutrient conditions of Irondequoit Bay, and also contribute to the basic scientific knowledge of lake nutrition. Publication is estimated for 1972.

5. Rooted vegetation and attached algae are being surveyed by Dr. Herman S. Forest, Environmental Resource Center, State University College, Geneseo, New York. Information is being gathered on the plant community. The present community will be compared with previous conditions through the New York State Biological Survey published in 1939 (R. C. Clausen), and other publications. Preserved specimens collected over the last 100 years have been reviewed to correct written reports. As a whole, the study will probably document the decline in richness of the aquatic community, which had already been noted by Clausen in 1938. Publication is estimated in 1972.

V. Environmental Impact and Management

During conferences conducted in the Spring of 1971, a number of instances of mismanagement were reported, for example:

1. Major refuse dumping (appliances, wrecking debris) had occurred recently on the shores. Apparently there is no effective management either for preventing such dumping or cleaning it up.

In a tremendously successful "Day for the Bay," September 11, 1971, 700 volunteers, cleaned a reported 70 truckloads of trash and debris from the Bay: "Although this clean-up was only a small step toward improving the quality of the Bay, it is an important indication that rhetoric is finally being translated into action..." (from EnviroNews, Vol 1 (3), October, 1971).

2. The construction of the Irondequoit Bay Bridge, under the N.Y.S. Department of Transportation, caused two major environmental disruptions which could have been avoided by predicting and monitoring environmental impact. Both have occurred at the eastern (Webster) end of the bridge.

Impact A: To the North a natural stream was destroyed. In its place a straight channel was constructed, without sedimentation basins, with the result that runoff water containing salt and other waste moves directly from the road to the Bay.

Impact B: To the South there has been the washing of tons of silt into the Bay because of the absence of erosion measures. The silt now is deposited in a layer several feet thick at the head of Held's Cove. The devastation is particularly notable because Held's Cove is the last remnant of Irondequoit Bay as it must have been in former times. It is pleasant, relatively

clean, uncluttered, and it is the remaining site for some of the interesting aquatic plants which have vanished from the rest of the Bay.

3. Although no systematic documentation is available, it is apparent that the recommendations of the Hennigan report (see above, III 2.) were not effectively implemented in the construction of the interceptor sewer through the Irondequoit Creek Valley. Local press reports noted excess stream damage and erosion, and violations of the stream protection act were reported to the State Department of Environmental Conservation. The work was done under a number of different contracts, and some were performed with much more environmental concern than others. However, insufficient information exists to determine whether poor designing, insufficient supervision by consultant engineers, disregard of instructions by construction contractors and/or other causes were responsible for unnecessary damage.

It is apparent that unilateral approaches to the problems of management of an area such as Irondequoit Bay are inadequate; water pollution, landfilling, soil removal, salting, construction permits, solid waste disposal, transportation are all interwoven. For example, the salt increase and the silting of Held's Cove are results of failure to account for the impact of a transportation problem. Agencies not only are charged with a narrow responsibility, but they are designed to accomplish tasks, not to coordinate, not to predict impact, and not to monitor changes which are occurring.

Appendix

There are several organizations which have some interest in Irondequoit Bay, and which have undertaken specific actions in its interest. None has produced a document which seems appropriate here. The following are listed as being of special interest.

1. The Irondequoit Bay Commission was established by the State of New York and the County of Monroe in 1959. Its five present members were appointed in 1970. The purpose of the commission was, "to exercise certain powers toward improvement of Irondequoit Bay." In effect, the Commission could assume Town powers with their consent. Neither funding by the County nor grant of powers by the Towns has occurred. Mr. Fred Keegan of Pittsford is Chairman. Members have shown a strong personal interest.
2. The Sierra Club has recently established a study program. Mr. Creighton Johannes, 97 Yorktown Drive, Webster, is chairman of the Bay Committee. Its work has just begun.
3. The Park View Association is concerned with land filling and land mining and excavation in the Penfield Town area, between Browncroft and Empire Boulevards. It is further interested in the approaches of zoning and planning, pollution abatement, and the establishment of wetlands and upland preserve for the Bay area. James W. Nohle, 235 Parkview Drive.
4. Irondequoit Bay Preservation League. Mrs. Elizabeth (M. E.) Clark, 202 Peart Avenue.
5. Irondequoit Historical Society. George R. Costich Jr., 309 Avondale Road.
6. Northeast Area Development, Inc. (NEAD), Tryon Park Task Force. Calvin E. Harris, 150 Tryon Street.
7. Penfield West Citizen's Association. Mrs. E. C. (Sylvia) Letter, 90 Royal View Drive.