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"Opening" of Irondequoit Bay will Not Help to Clean the Bay

By: Herman S. Forest
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Summary

One argument in favor of dredging a boat channel between Irondequoit Bay and Lake Ontario has been, that the larger "opening" will help to flush polluted waters out of the Bay. This report summarizes the scientific evidence which shows that making the connection between the Bay and the Lake deeper and wider by itself will not benefit the Bay either in terms of water purity or ecology. The arguments for and against a boat channel will have to be resolved in terms of the advantages and disadvantages of a fleet of large recreational boats to users of the Bay. It cannot be resolved by, and should not be further confused by, mistaken arguments about the effects of opening the Bay on water purity.

This report assumes that the land around the Bay will be managed, since permitting the opening of the Bay to destroy its shores is an obvious ecological degradation, whether or not it affects water quality.

Background

The water quality of Irondequoit Bay should be markedly improved by the Pure Waters sewer construction program, which will channel the sewage from neighboring towns and the City of Rochester away from the Bay. At present, however, the Bay is polluted with sewage effluents from three sewage treatment plants that discharge directly into the Bay, ten that discharge into Irondequoit Creek, and numerous private septic tanks.

The Bay is also polluted by pesticides, herbicides, fertilizers, and salt carried in from the Irondequoit Creek watershed, an area of roughly 153 square miles in eastern Monroe and small parts of Wayne and Ontario Counties. The salt pollution is so heavy that it has interfered with seasonal circulation of bottom waters (1). These pollutants must be managed at the source - by decreasing salting and controlling the amount and location of fertilizer and pesticide used. We are making some progress toward control (2); at present however salt pollution is still heavy. All pollution has of course been damaging to fishing and recreation in the Bay (3).

It has been well understood for over 40 years that the proper way to clean up the Bay is at the source of the trouble. The distinquished Cornell botanist, Robert T. Claussen, shook a 1939 Conference on the Bay by telling them that "Sludge Bay" would be cleaned only by pollution abatement and controlled land use, and that miracles should not be expected: the Bay would improve only slowly and only to a limited extent. Dr. Claussen's summation has been confirmed again and again by later scientific studies of Irondequoit Bay, and Dr. Claussen himself verified his own early judgement as recently as 1973 (personal interview).

The mistaken idea, that the Bay waters could be cleaned by dilution with Lake Ontario water was first suggested in 1939, by people who thought that the pollution had increased when the shore line was extended to build the Hojack Railroad line. It was heard as recently as 1972, at a public meeting organized by the Monroe County Environmental Management Council.

Many people would like to use the Bay in various possibly conflicting ways. An enlarged boat channel would allow the fleet of recreational boats on Lake Ontario to use Irondequoit Bay as an all-weather harbor and water skiing area. If tall boats are to enter, in addition to dredging, two traffic arteries - a railroad and a road - would have to be cut or raised over the channel on expensive bridges. Some favor removing the railroad altogether because it is little used and interferes with the beauty and recreational use of the shoreline; others feel that it is of prime importance to some area farmers and they should be given all aid possible to maintain viable farms (4). There are local residents and fishermen who may prefer that the Bay remain "closed" and quiet. The resolution of these conflicts should not be confused further by mistaken arguments about ecology.

Scientific Evidence for Negligible Ecological Impact

Irondequoit Bay is a virtually self-regulated lake. It is not a bay in the sense that its behavior is determined by a large adjoining body of water. It acts somewhat like a Finger Lake - a long, narrow lake with a stream flowing in at one end and an outlet at the other. The one environmental factor which Lake Ontario largely determines is the fish population, since this is the most mobile segment. The following facts support the view that enlargement of the opening would have negligible effects.

A) Ecological Comparison. Bays with much wider openings such as Braddock's and Sodus are also largely self-regulating, not merely arms of Lake Ontario.

B) Topography. The Bay is long and narrow. Even a complete removal of its sandspit and the artificially filled lands near its mouth would provide little exchange surface between the Bay and Lake Ontario.

C) Basin Profile. The Bay acts like an overflowing "bathtub". Much of the water is rather deep, but there is a broad, shallow lip near the mouth. Consequently, projects of the magnitude proposed would affect only surface waters and in order to dilute significant amounts of pollutants, deep waters must be exchanged. A channel 50 feet deep and 200 yards wide would have to be dredged, to provide for exchange between the deeper waters. No one would propose dredging so big a ditch.

D) Current and Head. Much of the time water will flow out of Irondequoit Bay, not in, so that the Bay water will not be diluted by Lake Ontario water. The flow will be outward as long as water is flowing into the Bay from Irondequoit Creek and other sources, or when winds blow from the south. Only when winds blow from the north long enough to pile up water near the mouth, is the direction reversed. When the level (pressure or "head") inside becomes higher than outside because of the water added from both directions, it will flow out again. Furthermore, water does not mix uniformly in the Bay itself. Some water may flow rather directly from Irondequoit Creek down the middle of the Bay to the opening, while other water remains for a much longer time in the deep basins and side coves. Biological and chemical evidence shows, for example, that the water quality may simultaneously be lower in Ides Cove and higher in Helds Cove.

E) Oscillatory or "Sloshing" Exchange. Photographs by K. G. Harbison dramatically illustrate the falacy of trying to dilute Irondequoit Bay. When water enters it builds up to level equal to the Lake, then flows out again. In effect, the same water simply sloshes in and out near the opening. The effect would not be altered by enlarging the opening.

F) Pollution of Lake Ontario Water. A study of shore currents and limited collection of chemical data by W. E. Diment's associates (communicated by R. C. Bubeck) indicates that polluted Genesee River water is well represented in Lake Ontario at Irondequoit Bay. The trade would not be pure benefit for the Bay.

G) Limited Benefits. The water and the biological community in Lake Ontario near the present opening can be used to determine the maximum benefit which might derive from enlargement of the mouth of the Bay. The rooted aquatic plants ("weeds" to the layman) can be used to reveal the story of environmental quality to the trained observer. Murky water filters out light, so rooted aquatic plants cannot grow. The clearer the water, the deeper plants will grow. The plants near the opening are of the same variety and general growth pattern as those growing near the other end of the Bay, farthest from the Lake. They are typical of murky and fertilizer-rich water. However, the plants in the Lake do grow a little deeper (about 6 inches) than those at the far end of the Bay, indicating that the clarity of the water is a bit better.

How much of an improvement is this? Very little, because the plants at Held's Cove, the best portion of the Bay, also grow 6 inches deeper than those at the south end. Plants in the Lake just outside the Bay grow to a depth of 5½ feet, whereas the range in the Finger Lakes is from 8 to 20 feet, and Sodus Bay is clear enough to allow growth at 12 feet.

The extent of improvement that one could theoretically expect from "opening" the Bay is a slight increase in the clarity of the water. Therefore the biological evidence agrees with the chemical evidence presented in Part F, above.

Sources of Information About Irondequoit Bay

The most substantial field studies on the Bay and its watershed are those of T. T. Bannister, R. C. Bubeck, K. G. Harbison, and H. S. Forest and his associates. W. H. Diment and his associates at the University of Rochester contributed significant studies of the adjacent area of Lake Ontario. An adequate record of these investigations may be found in RCSI Bulletin #137 (5) and the more recent report, Environmental Studies of Irondequoit Bay, Monroe County, New York (Forest et al., 1973)(6).

A recent bibliographic study supported by New York State Sea Grant Program reviewed the files and bibliographies of most of the original studies (Gehris, 1975) (7). This independent review also found no environmental value in enlarging the opening.

NOTE: This report is based not only on written sources but on conversations with R. C. Bubeck, T. T. Bannister, K. G. Harbison, and Graham Bonham-Carter. I am highly indebted to all of them for their generous and open contributions.

References

(1) Holmes, Lindsay; *Environmental Effects of Deicing Salts: Introductory Bulletin.* RCSI Bulletin #166, December 1973

(2) Laurie Hindson, *Salt City: One Year Later.* Rochester Democrat & Chronicle, Upstate Section, March 23, 1975, pp 12 - 21

(3) loc. cit. RCSI Bulletin #166

(4) Genesee/Finger Lakes Regional Planning Board, *Special Study Report Number 2, Transportation Feasibility Study.*

(5) Forest, H. S., and Cox, G., *Environmental Research in the Irondequoit Bay Watershed, Introduction and Review.* RCSI Bulletin #137, March 1972.

(6) Forest, H. S., T. F. Maxwell, and D. C. Doby, *Environmental Studies of Irondequoit Bay, Monroe County, New York.* Contribution of the Environmental Resource Center at Geneseo, N.Y. #28-10/73 for Monroe County Environmental Management Council, 1973.

(7) Gehris, C. E., F. Stoss, and A. Robb, *Possible Biological Impact of Dredging the Existing Channel from Irondequoit Bay to Lake Ontario.* New York State Sea Grant Institute Report #NYSSGP-RS 74-017. Biological Sciences Department, SUNY College at Brockport, N.Y., 1974. 31 pp. (Bibliography, pp 26 - 31)