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Pollution of Irondequoit Bay and Tributaries by Addition of Barge Canal Water

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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
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By Addition of Barge Canal Water
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Summary

Barge Canal water formerly was diverted to augment the flow in Allens Creek and other Irondequoit Bay tributaries. When Allens Creek was massively polluted with sewage effluent, the addition of Barge Canal water was beneficial in reducing pollutant concentrations. However, after sewage effluent was diverted from the creek into the Monroe County municipal system, recovery of the creek was retarded by the addition of relatively polluted canal water.

This Bulletin describes one of the studies done to demonstrate that the canal water added a major pollutant loading to the creek and that a change in policy was indicated.

As a result of a request from the Monroe County Health Department, Barge Canal water entering Allens Creek has been virtually eliminated, and the creek is showing improvement.

Background

The Irondequoit Bay watershed encompasses a large area of Monroe County. Five years ago the tributaries which lead into the Bay were subject to massive pollution from sewage treatment plants. Most of those plants have now been closed and the streams have improved. They need to be given every chance to cleanse themselves which may require management of the remaining sources of contamination. These include runoff of farm fertilizers, storm sewer runoff and to a lesser extent, the addition of water from the Barge Canal. Barge Canal water is dirty. It has a high nutrient loading and is turbid. When the streams were much more polluted than the Canal, adding Canal water diluted the concentration of sewage. It also kept the flow constant (rather than intermittent) which made the stream more attractive to riparian owners. A more rapidly flowing stream, if clean, is also attractive to a greater variety of desirable fish fry.

* The research for this paper was done while the author was a student intern at SUC Brockport. He thanks Dr. John Hubbard, Coordinator of the program at SUC Brockport, for his help and the Monroe County Health Department and New York State Department of Transportation for some of the data used.

Barge Canal water has been added to Bay tributaries for different purposes; generally either to reduce water content in the Canal or to increase tributary flow, which dilutes sewage concentration where necessary in order to meet federal standards.

Discharge of water from the Canal has been accomplished in two ways: 1) by allowing a controlled amount of water to flow into a tributary from the Barge Canal via special drainage pipes or siphons; or 2) by the flow of water over the top of waste weirs when the elevation reaches a specific level. The number of times water has flowed over the weirs during past years can be determined by canal elevation records. The end result of any of these additions to Bay tributaries is an increase in water which is high in nutrient concentrations flowing into Irondequoit Bay.

History of Barge Canal Discharge Into a Bay Tributary

Allens Creek is one of the tributaries that empties into Irondequoit Bay. In 1961 the Brighton Sewer Commission requested permission to add a ten-inch siphon or drain pipe to the Canal at Allens Creek near French Road for the purpose of dilution of sewage effluent downstream. Permission was granted by the State of New York Department of Public Works, with the stipulation that the siphon would be a temporary addition. The siphon was constructed and put into operation within the next few months; this temporary siphon, in addition to the already existing eight-inch siphon (installed in 1928), increased the flow into Allens Creek considerably and helped in the dilution of the sewage.

In 1965 the Brighton Sewer Commission requested permission to add a 12-inch siphon to further dilute the sewage discharged by the Allens Creek Sewage Treatment Plant. The additional water was requested because recent population increases had added a considerable amount of sewage and further dilution was necessary to meet the stricter standards of Monroe County Health Department. Permission to build the 12-inch siphon was denied. After further requests by the Sewer Commission, the New York State Department of Public Works (NYS DPW) granted permission to build a ten-inch siphon in 1966, with the stipulation that "diversion will only occur when required by stream flow conditions and effluent demands rather than continuously during the entire Canal operating season." The diversion was to be discontinued in 1968 when a new Allens Creek Sewage Treatment Plant was scheduled for completion. The plant was opened in 1968; the siphons were not disconnected. In fact, the flow from all three siphons (8", 10", 10") was continued through the 1979 canal season even though the "new" Allens Creek Sewage Treatment Plant was closed in 1978 and the sewage diverted into the even newer Cross-Irondequoit sewer which goes to the Van Lare Plant and then into Lake Ontario.

Study of Allens Creek

In this study, data was collected from Allens Creek at Brighton-Henrietta Townline Road (upstream from the canal water siphon) and near French Road and Schutt Road (downstream from canal water addition). See footnote* for methods and procedures used in the study. Graphs 1, 2, and 3 show a decided increase in nitrates, phosphates and water levels in Allens Creek downstream from addition of canal water in contrast to levels found upstream. The increase is caused by the addition of canal water.

Table 1 shows the data in chart form, and also shows the difference between the data collected before and after Barge Canal water entered Allens Creek.

Conclusions

In the spring of 1980 the Monroe County Health Department requested that the NYS Department of Transportation discontinue use of the three siphons entering Allens Creek from the Barge Canal. All three siphons were shut off, but one continued to leak throughout the season.

The recommendation for a decrease in the amount of canal water entering the Bay stems from a continuing effort by local agencies to improve the quality of Irondequoit Bay, one of our more valuable water resources. The reduction of canal water which is high in nutrients entering the system is one more step in the right direction.

One side effect has been a decrease in amount of water flow in Allens Creek during the summer. Greater water flow was considered desirable for aesthetic reasons by many area residents, but a reduction in the amount of pollution entering the stream is also very important. It is expected that the siphons will remain disconnected to help the stream to cleanse itself, unless it is demonstrated that the aesthetic benefits outweigh the water quality costs. The stream is not a health hazard when it is at its natural flow.

RCSI points out that if the Canal water was as clean as the stream water there would be no problem; cleaning up the Canal is in the domain of the NYS Department of Environmental Conservation, not the Monroe County Department of Health or the NYS Department of Transportation.

* METHODS AND PROCEDURES INVOLVED IN THIS STUDY

The stream gauging procedures were those used by the United States Geological Survey. A Pygmy Gurley meter and a Price Class A on a standard wading rod with headphones were used. The streams were gauged downstream (and upstream when possible) at one foot intervals. The area was then computed and the number of cubic feet per second of water (cfs) passing through the given area was calculated from the meter readings.

Samples were taken before the gauging procedure began to prevent any abnormal turbidity due to stirring the stream bottom. The samples were then brought back to the lab and analyzed according to the procedures of standard methods.

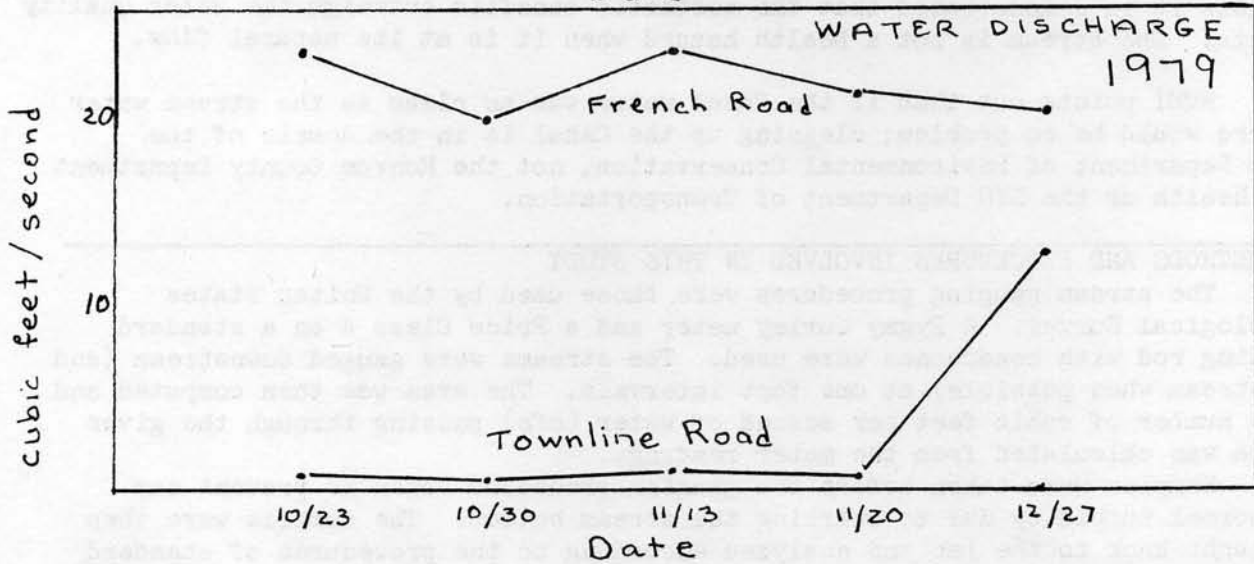
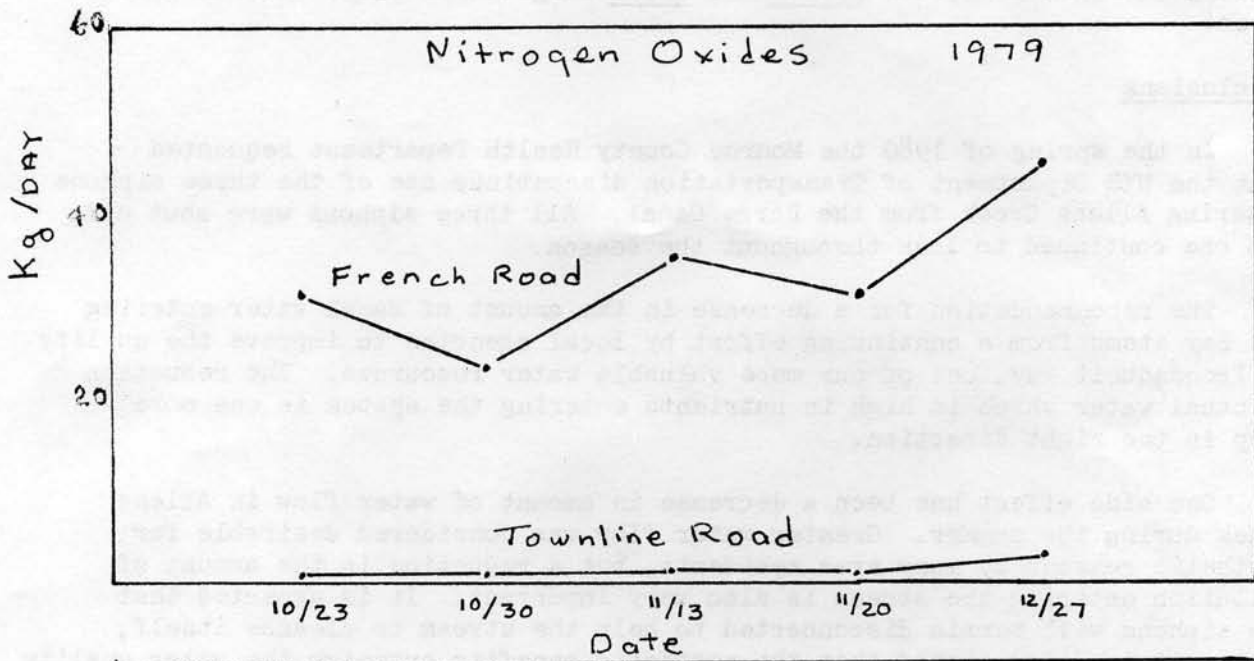
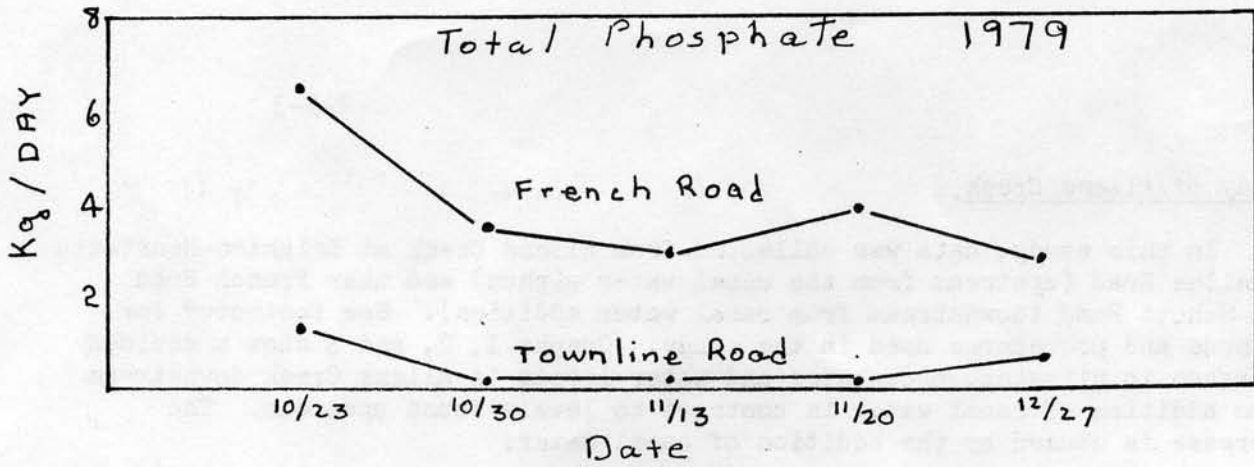


Figure 1. The effect of the addition of Barge Canal water on Allens Creek. Water from the Barge Canal increases both the loading of fertilizers (phosphorus and nitrogen) and the flow. Townline Road is above the point where the Canal discharges into the Creek; French Road is below.

Table 1
Nutrient Loadings in Tributaries
To Irondequoit Bay Fed by Barge Canal Water - 1979

| Date | Location | NO _x kg/day | Total PO ₄ kg/day | Ortho Filterable PO ₄ kg/day | Water discharge (cfs) |
|-------|---|---------------------------|---------------------------------|--|--------------------------|
| | Allens Creek - Townline Road | | | | |
| 10-23 | | 0.505 | 1.30 | 0.736 | 0.86 |
| 10-30 | | 0.440 | 0.106 | 0.044 | 0.75 |
| 11-13 | | 0.79 | 0.16 | 0.07 | 0.95 |
| 11-20 | | 0.47 | 0.165 | 0.044 | 0.75 |
| 12-27 | | 3.53 | 0.62 | 0.44 | 12.04 |
| | Allens Creek - French Road | | | | |
| 10-23 | | 31.85 | 6.08 | 1.27 | 23.67 |
| 10-30 | | 23.27 | 3.49 | 1.30 | 19.82 |
| 11-13 | | 35.34 | 2.91 | 1.08 | 23.3 |
| 11-20 | | 31.88 | 3.80 | 0.72 | 21.02 |
| 12-27 | | 45.04 | 2.84 | 4.41 | 20.01 |
| | Allens Creek at French Road minus Allens Creek at Townline Road (loading attributed to the addition of Canal water) | | | | |
| 10-23 | | 31.34 | 4.78 | 0.53 | 22.81 |
| 10-30 | | 22.83 | 3.38 | 1.25 | 19.07 |
| 11-13 | | 34.55 | 2.75 | 1.01 | 22.35 |
| 11-20 | | 31.41 | 3.63 | 0.675 | 20.27 |
| 12-27 | | 41.51 | 2.22 | 3.97 | 7.97 |