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Dissolved Oxygen in Monroe County Waters.
The Lower Genesee*

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THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION

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DISSOLVED OXYGEN IN MONROE COUNTY WATERS. THE LOWER GENESEE

1. Background Information

The first RCSI report on dissolved oxygen measurements is included. Please refer to that report for an explanation of the measurements. Note that water is suitable for trout when the dissolved oxygen concentration is 5 parts per million (ppm) or greater, that water quality deteriorates as the dissolved oxygen concentration goes down, and that water is too foul to keep any local fish alive when the measurements drop much below 3 ppm. This report deals with the lower reaches of the Genesee River.

The new York State Water Resources Commission held hearings in Rochester this last winter on upgrading the classification of the lower Genesee from its present "special" classification (permitting use of this stretch of the river as an open sewer for industrial wastes) to a "D", "C", or "B" classification. Dissolved oxygen standards for these classifications are as follows, presuming that the lower river is not to be regarded as trout water:

Classification	Dissolved oxygen standard
B	Not less than 4.0 ppm
C	" " " " "
D	" " " 3.0 "

It is the policy of the state to eliminate all classifications lower than a "D".

It was noted in earlier reports by the committee and in the detailed report presented by the Federal Water Pollution Control Administration at last summer's congressional hearing here on water pollution that the Eastman Kodak Park Works places a very heavy burden of biological oxygen demand (BOD) on the lower river; this loading corresponds to that from a population of 330,000 in terms of BOD. (This industrial waste does not constitute a source of pathogenic bacteria, however. It does, in fact, often sterilize the river for some distance, due to the presence of toxic chemicals.) The company has announced its intent to construct a large secondary waste treatment plant, which will result in the elimination of a large fractions of the present pollution load. The need for this additional processing is made only too obvious by the following data.

2. Tests of River Water Sampling Station (on Genesee River)	Date	Dissolved Oxygen
Off the docks of the Genesee Yacht Club	27 Dec., 1966	14 ppm
Genesee River at Barge Canal	8 Jan., 1967	14
Genesee Yacht Club docks at depth of 6 ft.	8 June	1.6
" " " " " " " 3 "	" "	1.2
" " " " " " " 6 ins.	" "	1.2
" " " " " " " "	" "	1.2*
Between Triangle Marine and the Marine Corps Reserve Training Station. Quite a bit of breaking swell, turbulence, and seration in sampling area	" "	4.9
Same as above	" "	4.0*

Base of Summerville jetty, depth of 5 ft.	8 June	2.5
" " " " " " 6 ins.	" "	2.6
" " " " " " " "	" "	2.2*
Genesee River at River Blvd. approx. 50 yds. south of railroad bridge	" "	9.6
Same as above	" "	9.0*

The measurements marked with an asterisk were made by a chemical method called the alkaline iodide-azide test. Other measurements were made by an electrical method, with the use of a galvanic cell dissolved oxygen meter. The two methods give nearly the same readings, showing that our measurements of dissolved oxygen are reliable. All analyses were carried out in the field. The oxygen meter was made available for use by the Scientists' Institute for Public Information.

3. The Meaning of the Results

These measurements show that the Genesee River has enough oxygen for all kinds of fish when it enters the City of Rochester. Somewhere between the Clarissa Street Bridge and the Genesee Yacht Club the river becomes polluted with organic waste, and the pollution is so extensive that the water becomes nearly airless. Fish cannot survive in such water. We noted small fish gulping air at the surface of the river off the Genesee Yacht Club dock. This is a sign that the fish are not getting enough oxygen from the water, just as would be expected from our measurements of dissolved O₂.

Our previous measurements of oxygen in the lower Genesee were made in winter. These measurements did not show how bad the pollution was, because in winter the organic wastes are swept out into the lake faster than they decompose in the river, and the effects of pollution are distributed over the whole lakefront, diluted with lake water. In summer, the river bears the brunt of the damage for three reasons: (1) the flow of water in the river is reduced, so there is less dilution; (2) oxygen does not dissolve in warm water to the extent that it does in cold; and (3) bacterial decomposition of organic wastes takes place faster when the water is warmer.

The data taken in June indicate that we may expect septic conditions to be maintained in the lower Genesee for most of the summer and early fall, with associated odors and fish kills. Such conditions make it impossible for the river to assimilate any additional waste loading, such as the secondary effluent from Irondequoit's Pattonwood sewage treatment plant. We note that the measurements made at the Genesee Yacht Club docks were made well upstream from the outfall of the Pattonwood plant, hence do not reflect pollution from this source.

Under present waste loadings it appears impossible for the lower reaches of the Genesee to achieve even a "D" classification during the summer months. We understand that Kodak has submitted the plans for its proposed new waste treatment facilities to the New York State Health Department for approval. We hope that the state health authorities act promptly on the Kodak application, since our results show that such facilities are badly needed here.

We are indebted to Mrs. Martha Wertlieb for the publication of the report.

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