

Survey of the Mianus River 1988 to 1992

This is a summary of laboratory tests performed on samples taken from the Mianus River by the Stamford Health Department.

Samples are taken from eight different locations within Stamford and one in New York. Regular sampling was initiated in 1988.

Sampling was initiated because of complaints by the Greenwich Health Department and the American Water Company (Greenwich's public water supply company) about the increased sodium levels in the Mianus river. It was believed that the primary cause for the increase in sodium was the road salting policy which was practiced in Stamford. The custom previous to 1991 was to provide "clear roads" using 100% sodium chloride with a small amount of calcium chloride and no gravel. This policy has been modified twice, once to a 3 part sodium chloride, 1 part gravel mixture and now to a 3 parts gravel, 1 part sodium chloride blend. State recommendations for road salting procedures in watershed areas is a 7 parts sand to 2 parts salt mixture. This is a recommendation for snow clearing operations occurring in watershed areas only.

The concern over sodium levels exists due to two state regulations. First, water companies must notify it's consumers when levels of sodium exceed 15 milligrams per liter. The state water quality limit for drinking water is 28 milligrams per liter. This limit is for persons who are on doctor prescribed sodium restricted diets in wells, but is mandatory in public water supplies.

Testing was routinely performed for a total chloride value and a sodium level. In addition some testing was done for total and calcium hardness, but not on a routine basis. Laboratory testing procedures for sodium have used two methods. The first method employed a sodium sensitive electrode and was used until the spring of 1991. Tests performed using the electrode were subject to interference's affecting the accuracy of the results, usually suppressing the sodium value. Values for sodium using the electrode had an accuracy of ± 0.5 mg/l, not accounting for any interference which affected the results unpredictably. It should be noted that the sodium values reported are comparable with sodium values obtained by the Greenwich Health Department despite the short comings of the electrode method. A flame photometer, which is a USEPA approved method, was obtained for all sodium determinations¹ to alleviate this problem. The precision of the flame photometer's sodium readings are ± 0.1 mg/l. The procedure to determine total chlorides is the same through out the testing and is a titration method using Mercuric Nitrate². The accuracy of the chloride test is contingent upon the amount of sample used for analysis and

¹Standard Methods for the Examination of Water and Wastewater, 17th edition, section 3500-Na D., pp. 3-146 to 3-149.

²Standard Methods for the Examination of Water and Wastewater, 17th edition section 4500-Cl-, pp.4-69 to 4-70.

ranged from ± 0.5 mg/l to ± 2.0 mg/l. Hardness testing, both for total hardness and calcium hardness is done by an EDTA titration method³. The precision of the hardness values is also dependent on dilutions used during analysis and varied from ± 2.0 mg/l to ± 4.0 mg/l.

The locations sampled originate in New York State at Miller's Mill Road, before the Mianus river goes into the Samuel J. Bargh reservoir. This site discloses most of the contribution of New York State to the Mianus River. This is charted as location #1. The bridge at Farms Road is the next site and labeled #2. The sampling point is north of the bridge and has no other contributing factors so it shows what actually comes out of the reservoir. The next sampling point is from a tributary of the Mianus (called the East branch) draining the Riverbank Road area and is designated location #4. The next point, #5, is on the Mianus River at the bridge at June Road. Again the sampling point is on the north side of the bridge showing any effect that the East branch has on the Mianus river. Sample #6 is at the end of Windward Lane. This site is the closest accessible point to the north of the Merrit Parkway before the Mianus river goes under it. The end of Thunder Hill Drive is the first accessible point south of the Merrit parkway and is sample #11. The difference between these two sample points will show any contribution of the Parkway. Merriebrook Lane is a midway point between Thunder Hill Drive and the final sample point. It shows not only more of any contribution Stamford might make, but also contributions from a tributary coming out of Greenwich. This is location #12. The final location is at West Glen Drive just before the Mianus river enters Greenwich. This point is close to where the water company takes the water for its distribution system.

All of the tests taken during the months of November, December, January, February and March are reported in the following pages. The information is grouped first by the sample point and then by fiscal year with the dates of collection, total chloride values, sodium values and the ratio of sodium to chloride presented in a tabular form. Additionally a summary of the minimum, maximum and mean value is shown for chloride and sodium results for each fiscal year. November samples are considered "blanks" showing how the normal progression of the minerals in the Mianus river occurs. Graphs done for each fiscal year exclude the Riverbank Road sample because it is only one of many contributors and not part of the main branch. The Riverbank Road sample is graphed separately for all years. The data is graphed by location and by date so a clear picture can be developed.

There are several factors which should be considered when reviewing the data and graphs. The amount of salt used per mile is unknown for any year and it is not known if the mixing of gravel with salt has changed that figure. The severity of each winter is unique. This is particularly important when considering the data from the past two years have been from mild winters. The more snow and ice, the more salt will be used to clear roads. The more rain, the more the salt will be diluted. However, rainfall immediately after snow or ice will increase the amount of salt rinsed into the Mianus river. The ground temperature will have another influence on how much salt is absorbed into the ground before a rainfall.

³Standard Methods for the Examination of Water and Wastewater, 17th Edition, sec. 2340 C, pp. 2-53 to 2-57 and sec. 3500-Ca D, pp. 3-85 to 3-87.

These factors have not been corrected for in this presentation and interpretation of the data and graphs should be done cautiously.

Even without correcting for the factors presented above, the initial change to a sand/salt mixture appears to have made a very real reduction in the amount of salt entering the Mianus river during the winter months. The change to the 3 parts sand and 1 part salt appears to have reduced the road clearing contribution to the Mianus river salt levels still further. It is hoped this study will continue so more severe winter conditions can be examined under the new policies.

The laboratory wishes to acknowledge Dr. Andrew McBride's initiation of this survey in 1988 and the Environmental Health Division's continued collection of the samples.