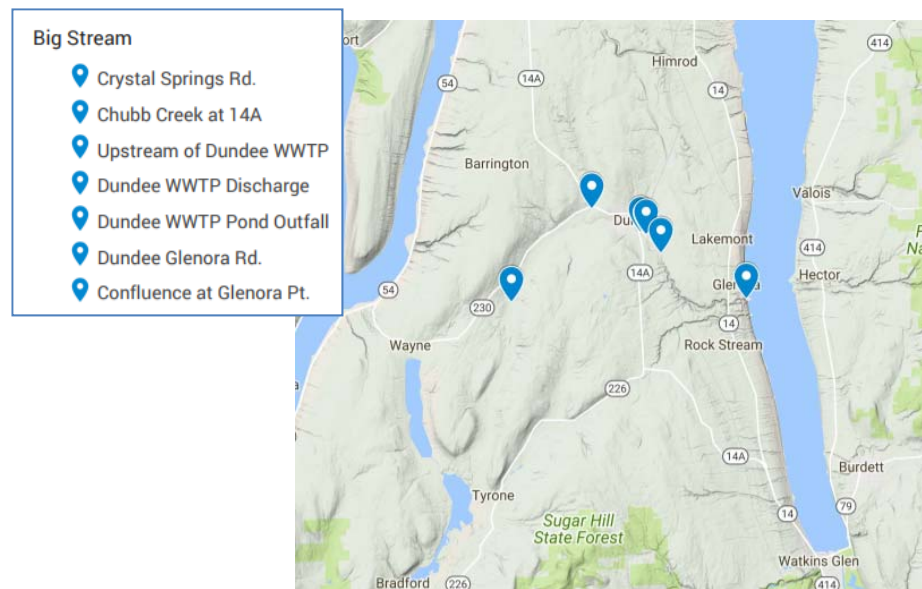


Description of Big Stream

Big Stream flows into the west shore of Seneca Lake at Glenora Point. It has a relatively large watershed that makes up approximately 7% of the total Seneca Lake watershed area. Its watershed is roughly 74% agriculture and 15% forested land, and it passes through the village of Dundee.

SPWA Water Sampling Locations

SLPWA, with assistance from its partner CSI, sampled and tested Big Stream at locations shown on the map. SLPWA has monitored Big Stream from its origin to its mouth on Seneca Lake since 2014, typically four to five times each year. A fifth location, just upstream of the Dundee Wastewater Treatment Plant (WWTP), was added in 2015 to better isolate and investigate the impact of that point source, and in 2016 direct measurements of the WWTP effluent were begun in cooperation with village officials. These were collected where the effluent discharges from the plant, and as water flows from a holding pond directly into Big Stream at a location just upstream of the Dundee Glenora Road location.

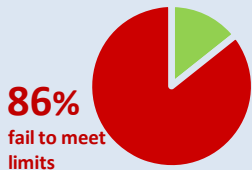
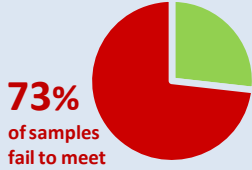
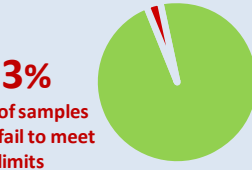


Waterbody Classification and Contamination Sources

Big Stream is designated by the DEC as a Class D Stream from the falls west to Rt. 14A, and Class C, supporting fisheries and non-contact activity, for most of its balance. The effluent from the Dundee WWTP flows into this stream, either directly or through a holding pond. The NYS Department of Conservation SPDES permit for the Dundee WWTP contains no limits for nutrients (phosphorus and nitrogen) or bacteria. Requirements for control of these pollutants would require upgrades to this facility, which is under study by the village. Agriculture can be another significant source of nutrients and bacteria, especially during periods of heavy rain from storm run-off.

Water Quality Summary

SLPWA's water quality testing includes bacteria (*E. Coli* and total coliform), nutrients (phosphorus and nitrogen), dissolved oxygen, and total suspended solids--a measure of water clarity. These tests provide information on the water quality status of the stream and how Seneca Lake might be affected. The table below provides parameters of particular concern and the compliance with established guidance or DEC limits.

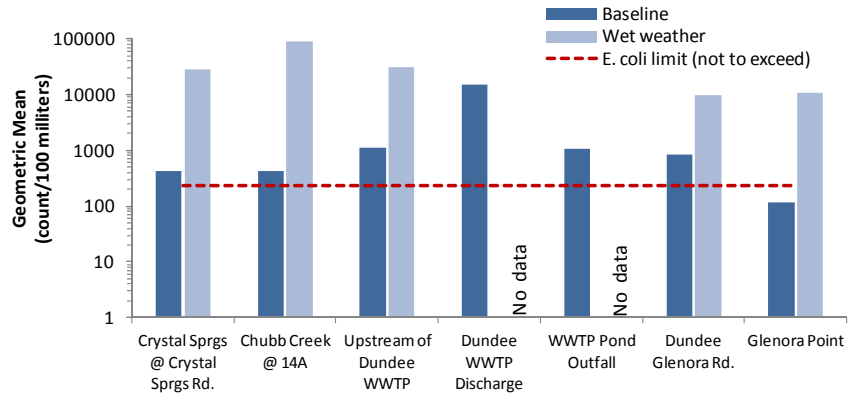
Parameter tested	Why is it measured?	% of water samples meeting guidelines in Big Stream	Is there a potential concern for Seneca Lake water quality?
Bacteria - <i>E. Coli</i>	To evaluate bacterial water quality impact of septic systems, wastewater treatment plants, and animal waste entering the creek	 <p>86% fail to meet limits</p> <p>14% of samples meet limits</p>	Yes. Fewer than 20% of bacteria samples meet DEC limits for swimming.
Total Phosphorus	To evaluate the impact of agricultural and residential phosphorus runoff that can cause excessive algae growth.	 <p>73% of samples fail to meet limits</p> <p>27% of samples meet limits</p>	Yes. Only one-third of phosphorus samples meet the phosphorus guideline.
Dissolved Oxygen (mg/L)	To evaluate the impact of erosion, agricultural or residential runoff or algal growth that can increase oxygen demand, removing oxygen needed by fish and other wildlife.	 <p>3% of samples fail to meet limits</p> <p>97% of samples meet limits</p>	No. Dissolved oxygen values meet limits except at the Dundee WWTP location in wet weather, which account for the oxygen values in the stream.

Highlights of Monitoring Results

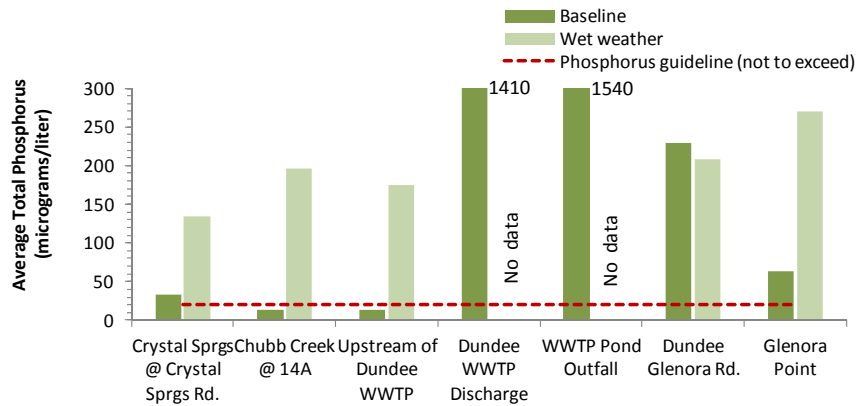
- Phosphorus levels are more elevated at downstream locations than at upstream locations, indicating the influence of the WWTP discharge. Testing directly in the WWTP effluent indicates extremely high total phosphorous levels. High phosphorous levels seen during the storm events likely capture the effects of agricultural field run-off, and potentially overflows of sanitary waste systems.
- *E.coli* bacteria results are high for Big Stream in normal flow conditions, mostly above the swimming limit, and often several multiples of that level. During one of the high flow conditions the *E.coli* levels increased to dramatically high levels (more than 100 times the swimming limit), likely due to run-off from agricultural operations. The Dundee WWTP effluent also shows very high bacteria levels.

Big Stream Water Quality by Location, 2014 - 2016

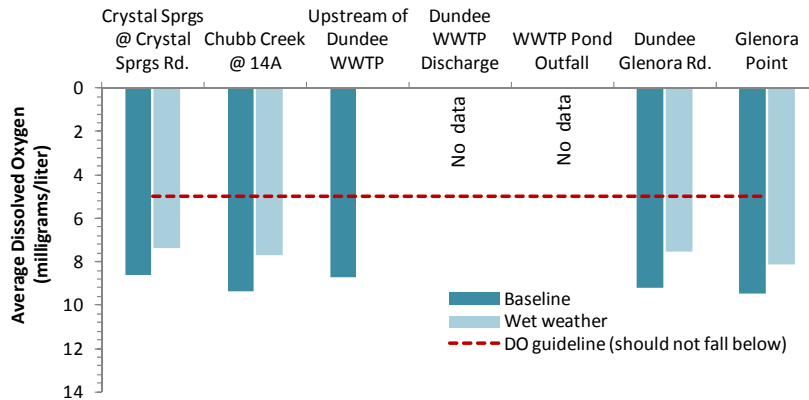
E. COLI BACTERIA (note log scale)



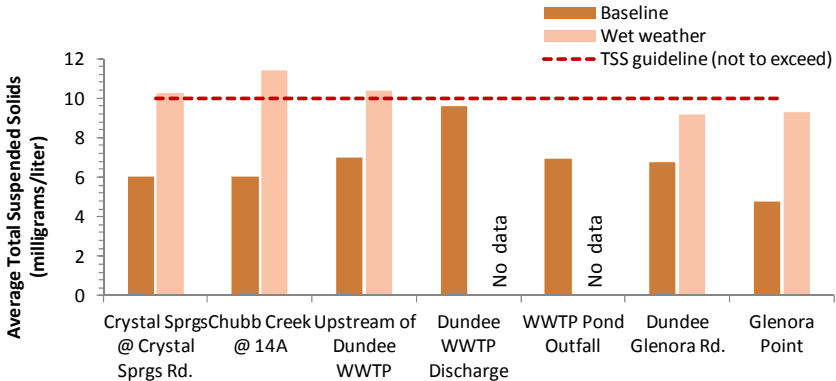
PHOSPHORUS



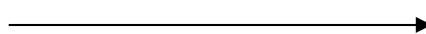
DISSOLVED OXYGEN



TOTAL SUSPENDED SOLIDS



Upstream



Downstream (near lake confluence)