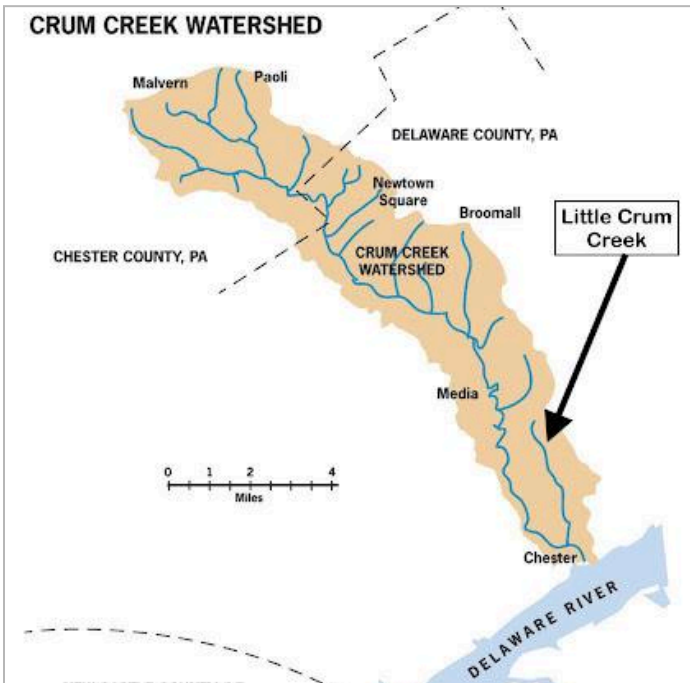
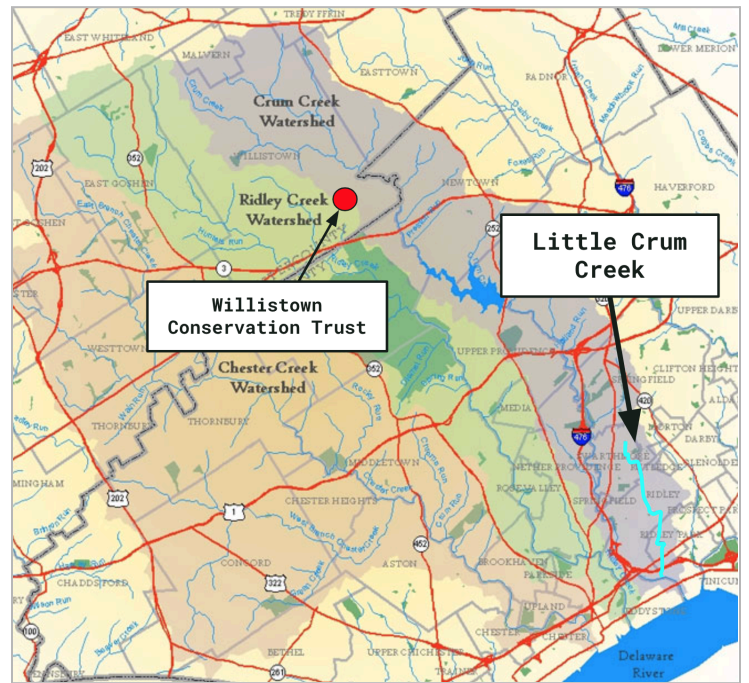


CJ Chen
Strath Haven High School
Spring 2024 Independent Study Summary

The project assesses the water quality of Little Crum Creek that passes through Little Crum Creek Park (est. 1970) in Swarthmore Borough, PA. Little Crum Creek is a small stream beginning in Swarthmore, flowing 3.68 miles¹ before joining the Crum Creek and entering the Delaware River (Map 1a and 1b).



Map 1a. Crum Creek watershed in southeastern Pennsylvania. Little Crum Creek is a major tributary that joins Crum Creek shortly before it enters the Delaware River (Aller, 2004).



Map 1b. Chester, Ridley and Crum Creek watershed in southeastern Pennsylvania. Little Crum creek is highlighted in blue, and Willistown Conservation Trust is marked with the red circle (Aller 2004).

¹ McGarity, Arthur. *Watershed Assessment of the Lower Crum Creek: Decision Support for a Community-Based Partnership*. Swarthmore College, 2001. Web.
<https://www.swarthmore.edu/NatSci/watershed/319_Project/Full_319_Report.pdf>.

Upstream waterways like Little Crum Creek carry contamination and affect the quality of downstream waters. Thus, Little Crum Creek impacts the health of the Delaware River, a crucial drinking water source for 17 million people across five states².

Land usage affects the health of the waterways; stream pollution increases as open space diminishes due to land development. The area surrounding Little Crum Creek is heavily developed for retail and residential purposes. Because water cannot soak into the impervious surfaces found in these developed areas—e.g. roadways, parking lots, sidewalks, and rooftops—large volumes of stormwater runoff are channeled through drains, which then end up in streams like Little Crum Creek.

Since 1971, Little Crum Creek has been designated as an impaired stream, meaning it does not fulfill federal water quality standards. Understanding the current health of the creek will allow for further improvements in the stream quality to be made by Friends of Little Crum Creek Park and Swarthmore Borough.

Three complete water tests were conducted from March to May using low-cost Lamotte brand kits. While many parameters were assessed, the most important findings are listed below.

Water temperature influences the ability of salts and oxygen to dissolve in the stream, and many organisms require consistent water temperatures to survive. As rain falls on impervious surfaces like pavement, the water heats up under the sun and channels through drains and sewers into the creek. High temperatures usually reflect that the surrounding landscape has a high percentage of impervious surfaces. In Swarthmore, most of the landscape is heavily developed which is reflected at Little Crum Creek with its elevated water temperatures that exceed acceptable levels established by the state across all three samplings in the park.

Chloride and specific conductivity (SPC) together assess the salt concentration. High concentrations of salts harm aquatic organisms, causing deformities in fish and amphibians and killing sensitive keystone organisms like mussels. Salt most often originates from human activity such as excessive road salting. It was found that Little Crum Creek has a salt issue originating from the unnamed tributary. Further continual study of the elevated salts is needed to determine the exact source in the unnamed tributary.

² “Delaware River — Lifeblood of the Northeast.” *American Rivers*, American Rivers, <https://www.americanrivers.org/river/delaware-river/>. Accessed 22 May 2024.

The high salt levels of Little Crum Creek follow the rising national trend of oversalting roadways. This is clearly seen when the chloride levels found in this study are compared to the water quality data from a 1971 United States Geological Survey³ (Fig. 1).

These issues may be lessened by planting native streamside vegetation, which will address elevated stream temperature and provide a buffer between the stormwater runoff and the creek. Additionally, reducing road salting in the winter and fertilizing lawns at least 48 hours before rain (if at all), are easy community led steps to reduce the contamination in Little Crum Creek.

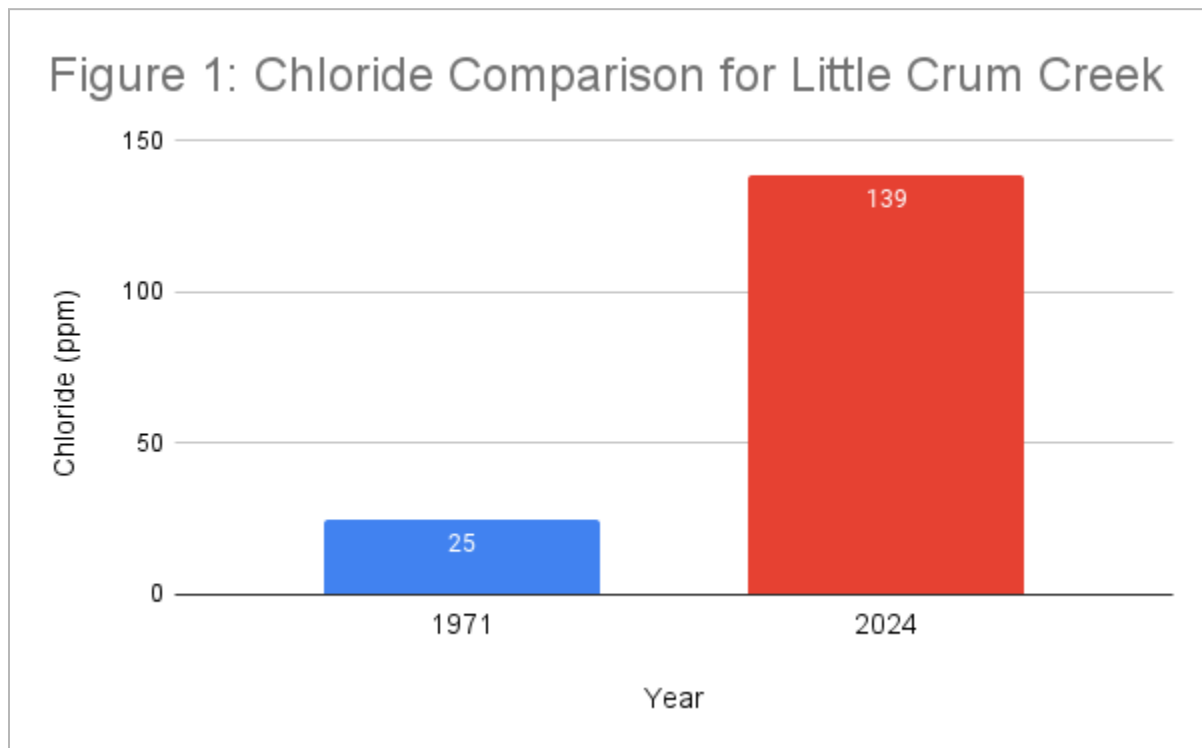


Figure 1. Comparison of chloride concentrations from 1971 USGS data versus 2024 LCC1 data. Between 1971 and 2024 there was a 6 fold increase of chloride levels.

³ USGS Water-Quality Data for the Nation. 1971, <https://nwis.waterdata.usgs.gov/usa/nwis/qwdata>.