

Sampling Salty Water in Champlain Basin Streams: Educational and Informational

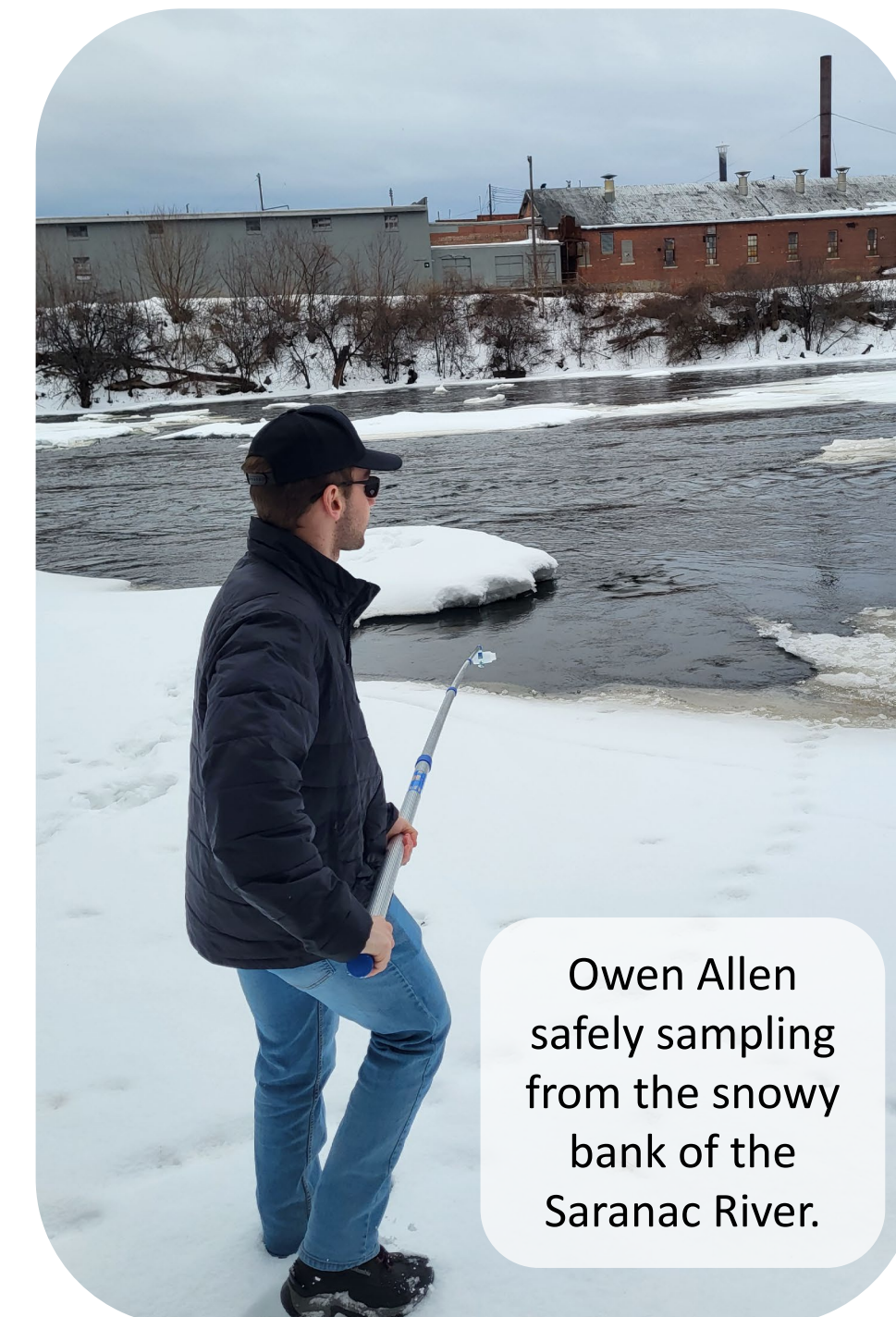
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Sampling

We made sampling kits with telescoping sampling poles for loan to schools, and we developed a sampling protocol for participating teachers. This protocol needed to be easy to follow, produce reliable chloride data, and work in all weather conditions.

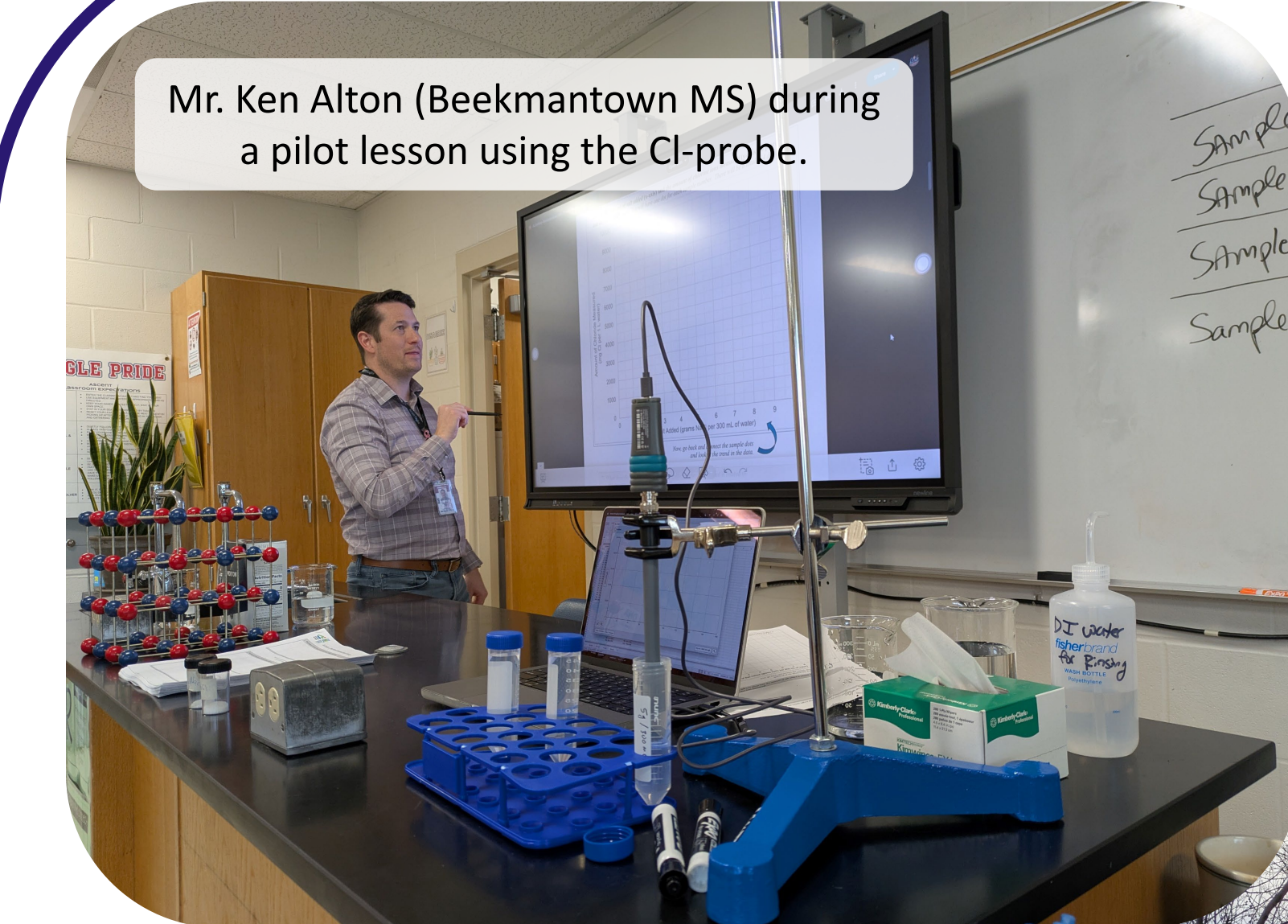
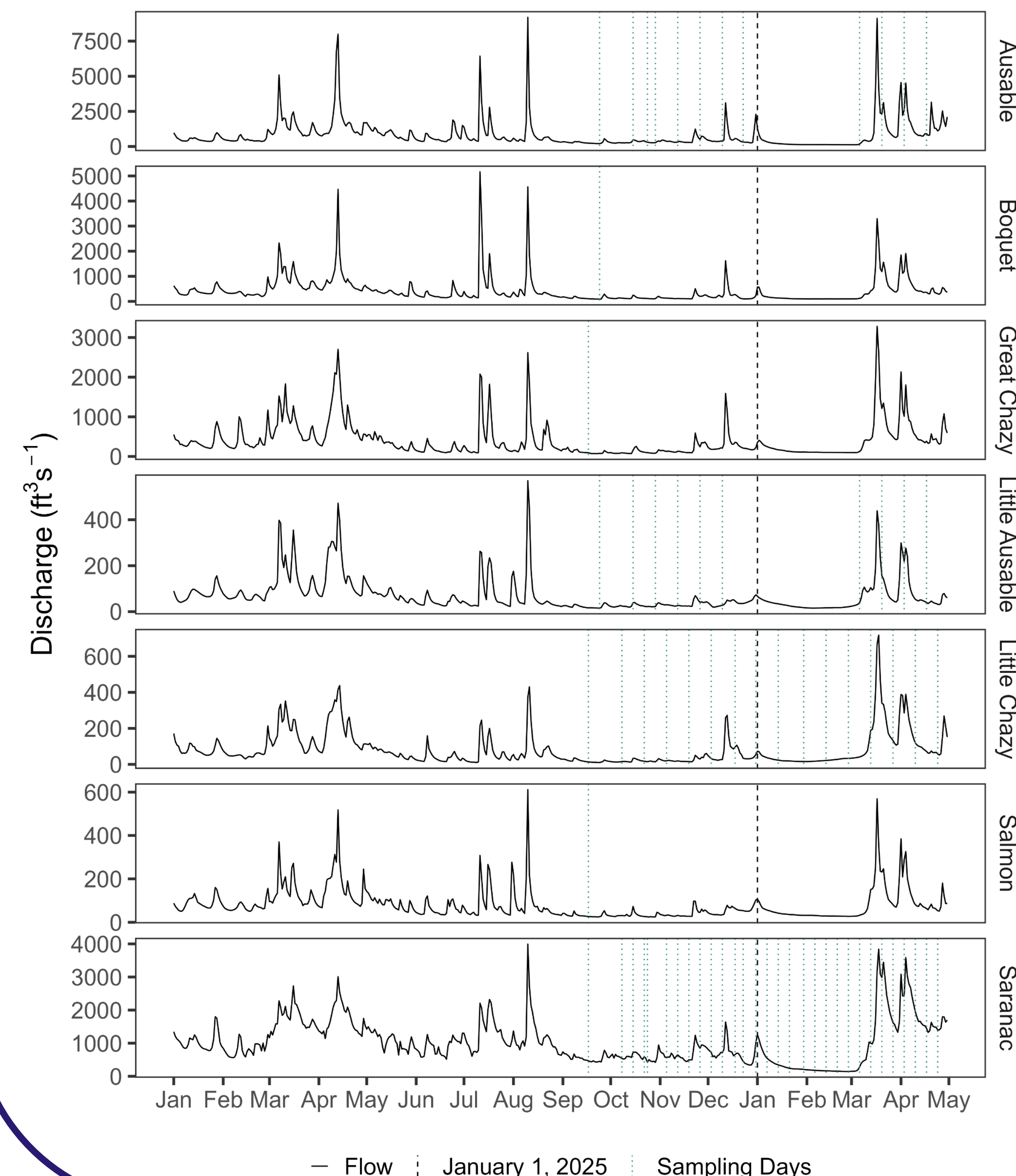


Owen Allen safely sampling from the snowy bank of the Saranac River.



Leif Goldie pouring river water into sample vials, also in the snow.

We sampled the Saranac River weekly and the Little Chazy, Little Ausable, and Ausable Rivers biweekly, as indicated by the blue lines on the discharge plot.



Mr. Ken Alton (Beekmantown MS) during a pilot lesson using the Cl-probe.

Chloride from road salt (NaCl , MgCl_2 , CaCl_2) is an environmental contaminant. Our project builds place-based lesson plans that use real methods and data to help middle- and high-school students connect human activities to the increase in chloride in watersheds.

In the 1st project year, we:

- Chose sampling sites,
- Collected samples for chloride data, &
- Developed protocols for teachers to sample and use the chloride measurement probe.



Beekmantown Middle School students walking to a local stream to collect their own water samples to test with the Cl-probe.

Purpose

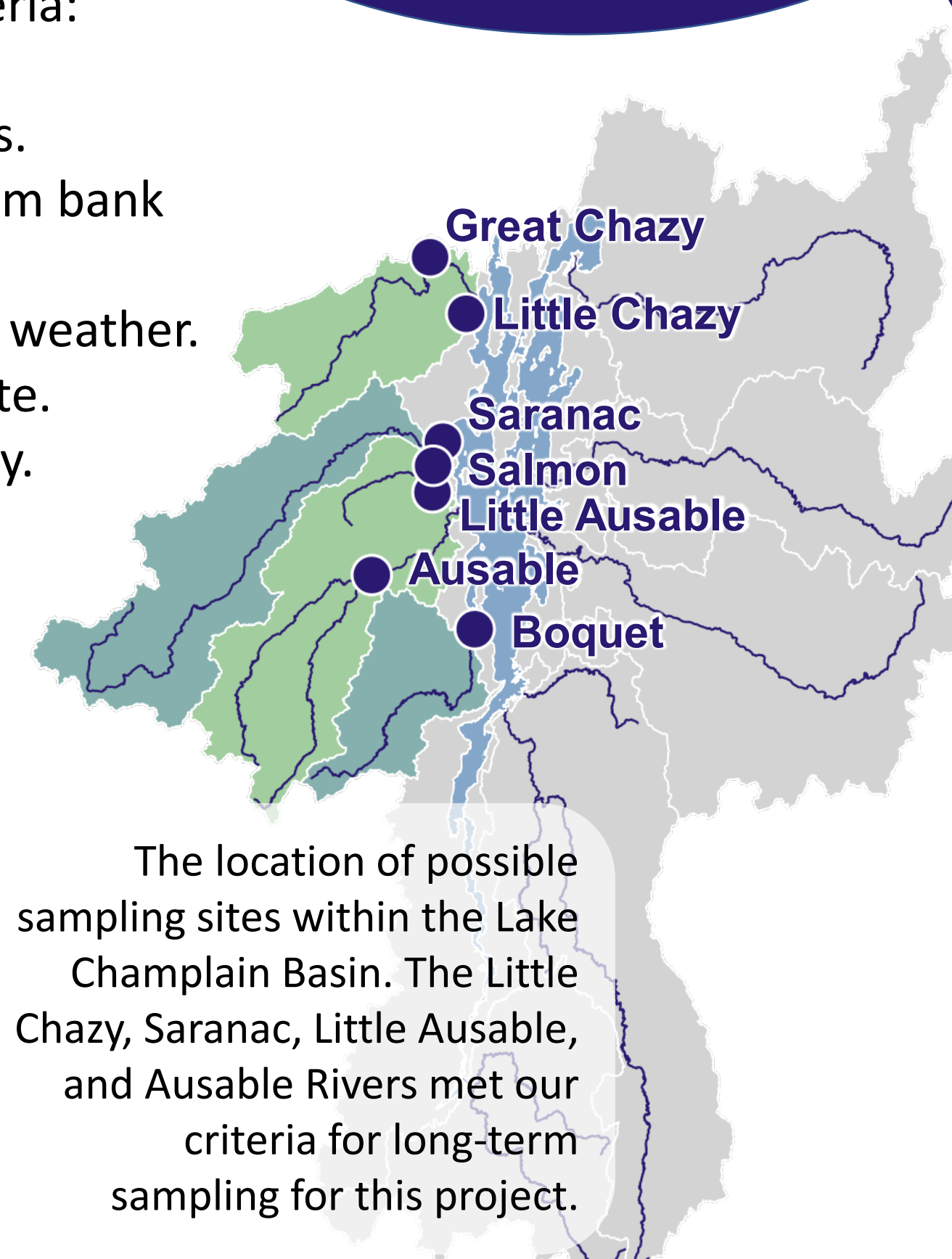
Site Selection

We chose sites based on the following criteria:

- Proximity to a USGS gauging station.
- Distance from SUNY Plattsburgh campus.
- Water within reach from bridge or stream bank with a 16 ft (~4.8 m) telescoping pole.
- Bridge or bank is safe for sampling in all weather.
- Safe parking and walking route to the site.
- Permission to access via private property.



Leif Goldie and Owen Allen sampling the Saranac River using a telescoping pole.

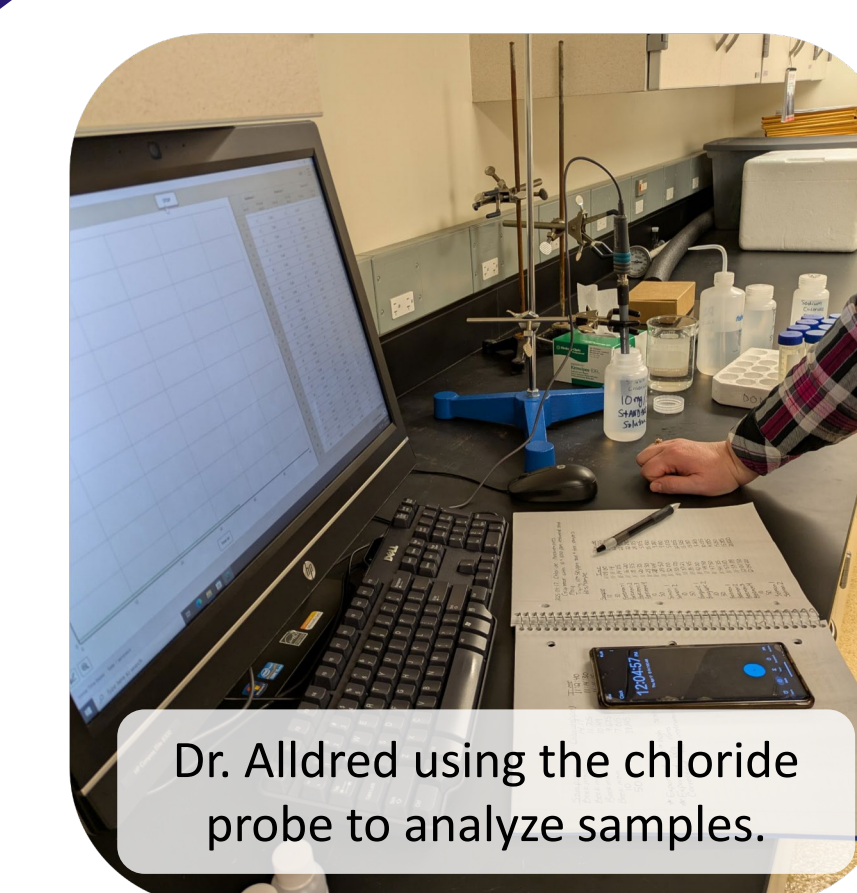


The location of possible sampling sites within the Lake Champlain Basin. The Little Chazy, Saranac, Little Ausable, and Ausable Rivers met our criteria for long-term sampling for this project.



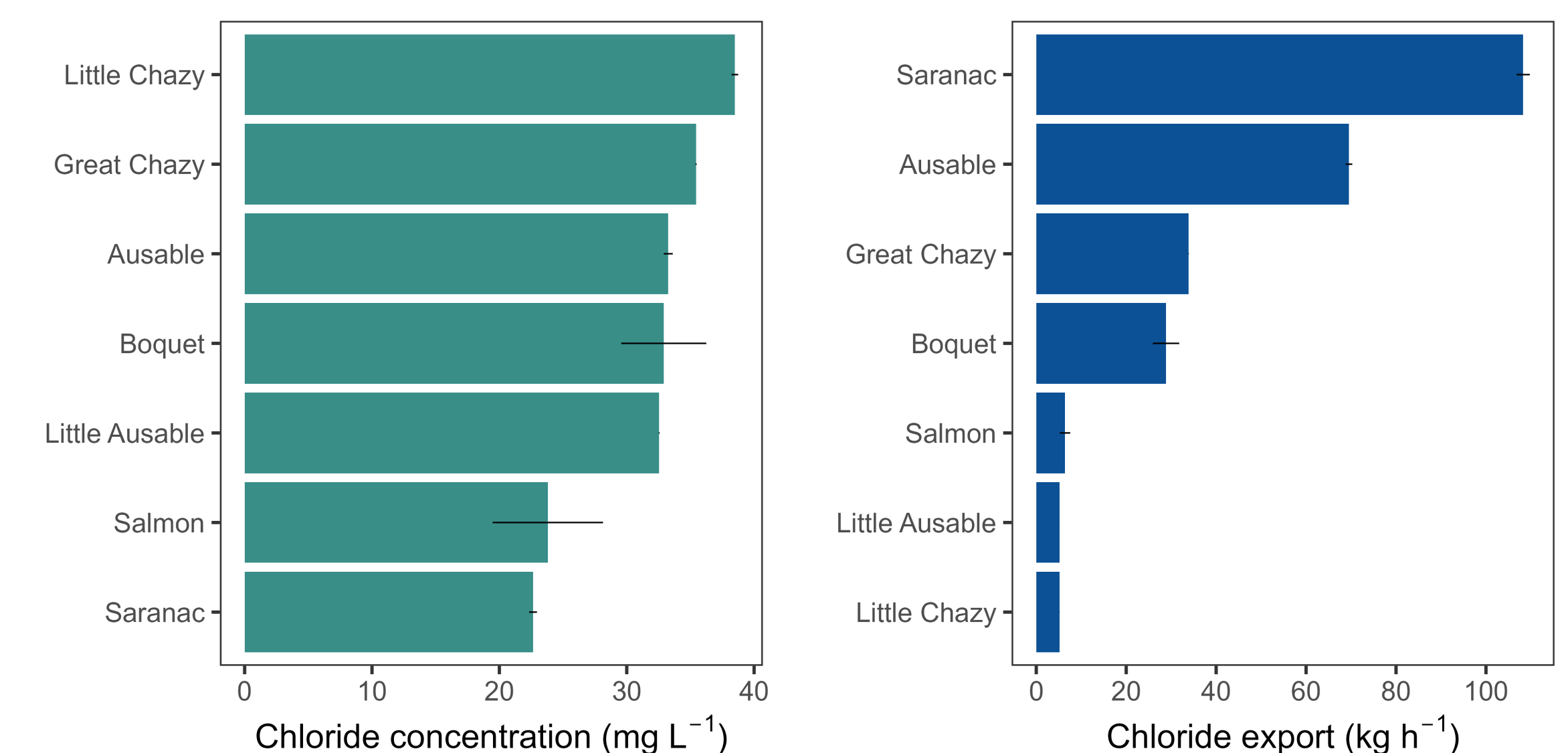
All sampling sites are near a USGS water gauging station, like the Little Chazy River shown here.

Sharing the site-selection process with middle- and high-school students teaches them about sampling methods, including challenges and limitations. This helps them understand more about *Planning & Carrying Out an Investigation*, an important part of the state science standards.

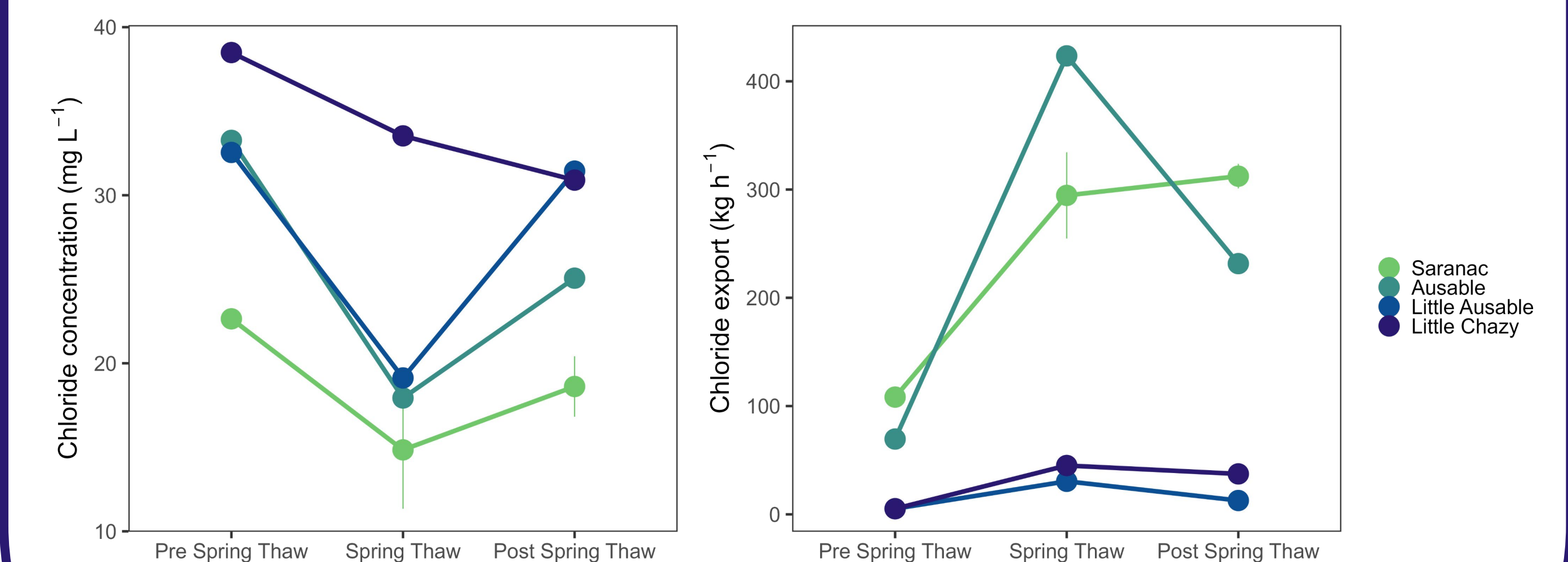


Dr. Alldred using the chloride probe to analyze samples.

We included a Vernier® chloride probe in the sampling kits for loan to schools. We developed a user-friendly protocol for analyzing the chloride concentration (mg L^{-1}) in river samples that produced repeatable and reliable measurements.



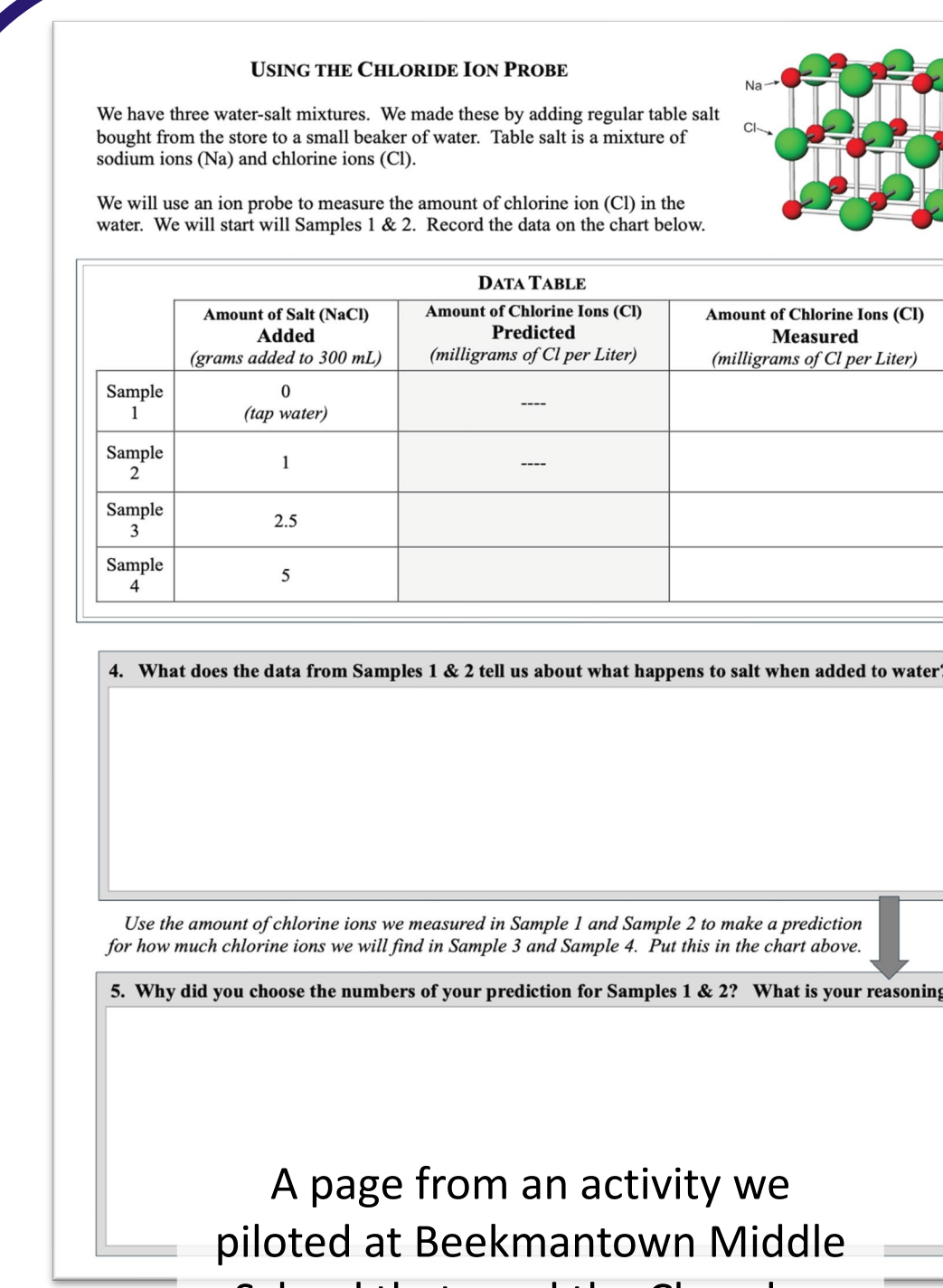
Preliminary data showed that the Little Chazy River had the highest chloride concentration (above left), but the Saranac River exported the greatest amounts of chloride (kg h^{-1}) due to higher discharge rates (above right).



We were able to show a correlation between peaks in chloride exported and the timing of road salt use.

Results

Future



The end goal of this project is to build middle- and high-school lesson plans (with feedback from area teachers) that allow students to:

1. Collect and analyze their own samples for elevated chloride using kits developed as part of the project, and
2. Query a database of chloride data that we collected to test hypotheses.

We will continue sampling for two years to provide data needed for these lesson plans.