Level 2: Fish Trawl Data From the Sloop *Clearwater*

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- **Background Information:** Fish trawling uses a net to catch fish off the side or the back of a boat as it moves through a body of water. Traditionally, fish trawling was used in commercial fishing as a quick way to catch a lot of a certain type of fish. Unfortunately, trawls are non-specific; they do not pick up just one type of fish, but anything that is in the water at the time of the trawl. As such, they can disrupt sensitive habitats and have been eliminated in the Hudson River for commercial usage.

But the very thing that makes fish trawling harmful when deployed in a commercial context makes it very useful for scientific data gathering. Scientists use trawls (the nets that are used for catching fish and other macroinvertebrates) to get a glimpse of exactly what is in the water at a specific moment in time. Then, the catch is released back into the water. The sloop *Clearwater* (a sloop is a type of sailboat) has been collecting fish data using trawls for 16 years in the Hudson River. These trawls are done towards the middle of the Hudson River, which might contain very different species than in areas found closer to shore. These nets are also able to reach the bottom of the river, so scientists can identify and count the different types of fish and macroinvertebrates living in the river, as well as ground-dwelling aquatic species.

Maija Niemisto, contributing researcher.
Credit: Hudson River Sloop Clearwater

Clearwater's educators have been collecting these data and using them to understand the long-term trends in both fish and crab distribution along the Hudson. The Clearwater team is also interested in learning how climate conditions impact this distribution and abundance. These data (collected by students!) have been instrumental in learning about the biotic health of the Hudson River.

NOTE: Sixteen years of data means there are a lot of questions to be answered and a lot of trends to be seen. Make sure you look through each tab in the dataset, as the data have been organized in ways that might be helpful to answering your questions. And feel free to manipulate the data in other ways to answer other questions!

- **Dataset Timeframe:** 1999-2015

- **Data Collection Methods:** The Hudson River Sloop *Clearwater* is an educational sailing vessel, used along the Hudson River from April through October. Students are involved in trawling, identifying, and counting for every catch. Trawl nets were used in the Hudson River along the riverbed for an average of 10 minutes per catch.

Students identifying their catch.
Credit: Hudson River Sloop Clearwater

- **Dataset Variables:**
  - **Year/Month/Day:** Indicates the day each trawl occurred.
  - **Location and Latitude:** Each trawl occurs near the channel edge in the Hudson as it is sailing. As such, the location (and its associated latitude) is for the nearest town or easily identifiable locality where the boat docks.
  - **Species:** Most columns show a species, either of fish or macroinvertebrate. In some instances, the juveniles and the adults have been broken out. In some instances, classifications larger than species have been used (e.g. clams).

- **Information about Site:**
  - Trawls occurred from Hudson River Mile 0 (Brooklyn) to River Mile 145 (Rensselaer).

- **Source of Dataset:** Maija Liisa Niemisto, Hudson River Sloop Clearwater, Inc.

- **Inquiry Idea Starters:**
  - *Do the abundant or most rare species change over time?*
  - *How do the data change based on location along the Hudson?*
  - *How do the data change over time?*

- **Extension Ideas:**
  - How do the fish trawl data compare to the shoreline data collected every October during Day in the Life of the Hudson River?
  - What might the juvenile vs. adult trends tell us about spawning in the Hudson River?
  - How does salinity play a role in fish species' trends?
  - Are there any invasive species in the data? Do they change the relative abundance of other species throughout time?
  - What is the relative diversity in one location compared to another?
  - Take into account both species richness and species evenness