



PROJECT OCEANOLOGY



Silverside Data Analysis Teaching Notes

This lesson is designed to complement Project Oceanology's "Nearshore Fish Study Study" shore program, although it can also be used as a stand-alone study. This specific lesson is focused on Atlantic Silversides, which are often the most abundant fish caught during seining. If your students did not catch silversides, or if they captured them but did not measure them, you should use the 'Nearshore Fish Diversity Data Analysis' lesson instead.

In this data analysis activity, students will use the data they have collected on the abundance and size structure of silverside populations to better understand nearshore ecosystems.

Engage:

Option 1:

Video of silversides schooling off the Avery Point dock (filmed by Dr. Hannes Baumann):

<https://vimeo.com/226322594>

Tell students that this video shows Atlantic Silversides, and ask them for some observations about what the silversides are doing and why.

Option 2:

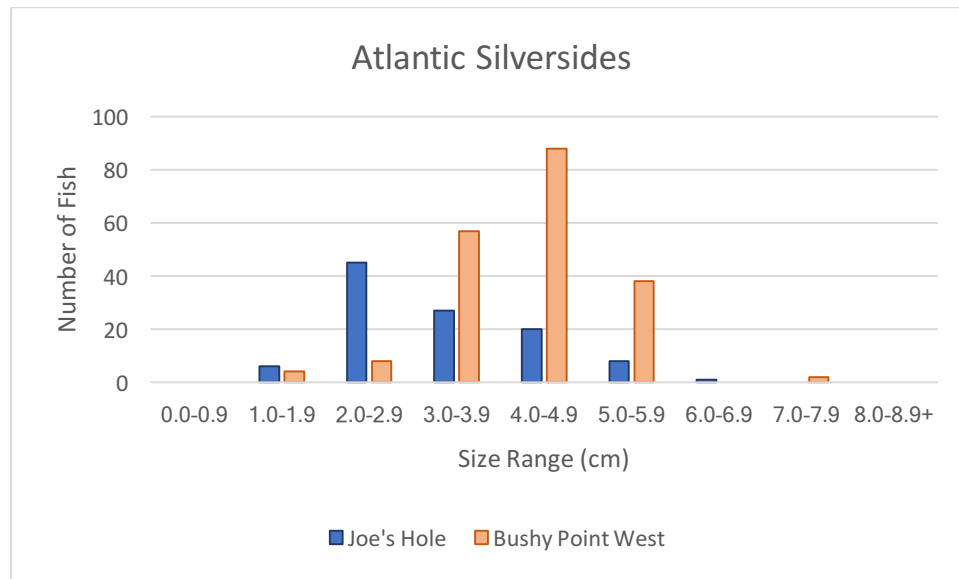
Nearshore Fish Population Game (see separate activity)

Explore:

1. Give the students a copy of the silverside dataset and the Project Oceanology common seining locations map.
2. Students examine the dataset and then make a graphic showing how the fish populations are different between the two locations (Joe's Hole and Bushy Point West). They can do this by hand on large pieces of paper, or on computers using microsoft excel or google sheets. The example graph provided below has both locations on the same graph, but many students may choose to do side-by-side histograms.



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Explain: Group discussion of graphs. Suggested questions, with commentary:

Were the fish populations at the two locations different? How?

They should see that the fish at Bushy Point West are larger than the fish at Joe's Hole. They may also observe that there were more fish at Bushy Point West.

Based on the map, how do you think the two locations are different?

Bushy Point locations are directly exposed to Long Island Sound, while Joe's Hole is in the Poquonnock River. Joe's Hole is more sheltered, closer to marshes, and probably has lower salinity (at least some of the time). The Bushy Point locations probably have higher wave energy and water movement, so are better mixed. They can't see on the map but may infer from the locations that the Bushy Point locations are sandier while Joe's Hole is muddier.

Propose an explanation for your results:

The Joe's Hole fish are smaller and therefore likely younger. There are many possible reasons for this:

- 1. It's possible they grow more slowly at Joe's Hole (less water exchange and less food?).*
- 2. It's possible that they hatch in the river, and then slowly spread out – so that by the time they reach the outer parts of Bushy Point, they are bigger.*
- 3. Sheltered areas like Joe's Hole may provide better protection from predators to small fish – then they could migrate out to more exposed areas like Bushy Point when they are larger and less vulnerable.*
- 4. Other ideas?*

Elaborate:

Have students add their own silverside data to the graph (or make a separate graph that can be placed next to the original for the purposes of comparison).



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Suggested questions:

How do your findings compare to the example dataset you studied earlier?

Did they catch more silversides? Fewer?

How does the size range compare?

If your findings were different, why do you think this was the case?

Different time of year?

Different location?

Different weather? Etc...

If you gave students leeway in how they made graphs, also discuss: What ways of graphing the data were most effective? What made it easy to see the results? What was the most important comparison you wanted to highlight, and how is your graph designed to do it? Could you improve your design? Etc...

Evaluate: Discussion questions (in class, or as homework)