

The Flounder in the Long Island Sound

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ABSTRACT

Flounder are important game fish. Their abundances indicate the productivity of the ecosystem and the effectiveness of fishery management. Consequently, long-term data on their abundances allow us to assess the health of the ecosystem as well as guide management of the fisheries industry.

My objectives for this project were (1) to evaluate population trends of three species of flounder using the Maritime Aquarium's long-term trawl dataset collected in the Long Island Sound near Norwalk, CT, (2) research possible causes for the abundance patterns, and (3) educate the public on the findings.

The three species of flounder exhibited different abundance trends from 1993 to 2014 (i.e. Summer population increased, Windowpane population decreased and Winter population was stable). These differences are likely due to the levels of each species on the food chain or the actions people are taking toward them. I presented these findings to the public at a Maritime Aquarium Event.

INTRODUCTION

The Long Island Sound (LIS) is an estuary, meaning that it is a place where ocean's salt water meets fresh water. This is important because it can include many species of marine life. The LIS is home to many game fish such as Striped Bass, Bluefish and Flounder. Flounder, one important type of game fish, is a flatfish species that reside at the bottoms of bodies of water. In the Long Island Sound, there are three species of flounder: Summer (*Paralichthys dentatus*), Winter (*Pseudopleuronectes americanus*) and Windowpane (*Scophthalmus aquosus*) Flounders. The study and regulation of the abundance over extended periods of time is important because the loss of not one but three species in the sound could upset the balance of the marine life in the sound. Plus those who come to the sound regularly to catch fluke would now have to go somewhere else to catch these fish. (LIS Study).

To assess the health of the LIS as well as guide management of flounder, long-term data on flounder abundance is vital. Fortunately, the Maritime Aquarium in Norwalk has conducted monthly trawl surveys in the LIS for over 20 years to monitor the populations of over 40 marine species. Nevertheless, no one has utilized the data to assess abundance patterns of flounder.

Objectives:

1. To evaluate population trends of three species of flounder in the LIS using the Maritime Aquarium's long-term trawl dataset;
2. Research possible causes for the abundance pattern;
3. Educate the public on the findings.

PUBLIC EDUCATION

- I created a poster with my findings to be presented at the Maritime Aquarium's Fish School on February 24, 2016 (Fig. 3).
- Roughly 100 teachers showed up to the event and many came up to ask me to convey my discoveries to them.



Fig 3. At the Fish School event with my poster that conveys a synopsis of my findings.

Fig 1. (Left & Right) Collecting population data on species in the Long Island Sound during one of the Maritime Aquarium excursions with fellow NRCA students. (Middle) The boat in which trawl surveys were conducted.

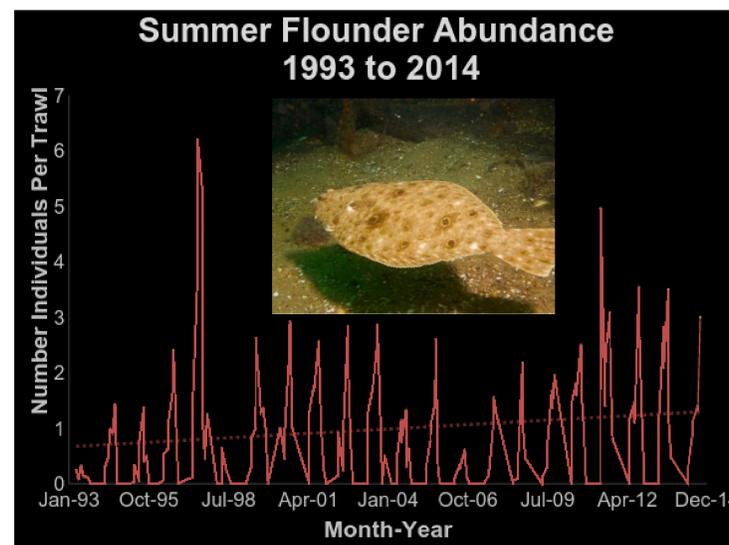
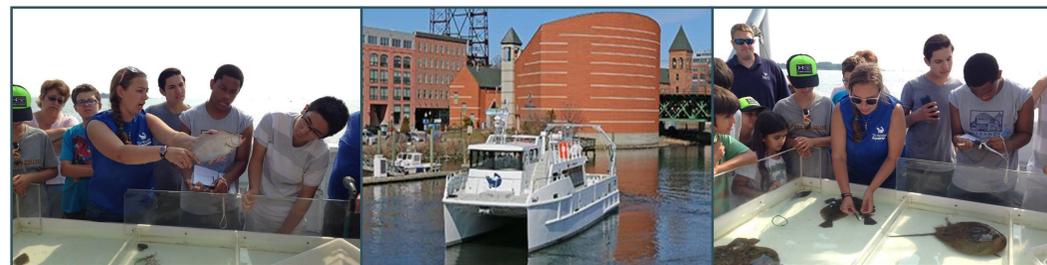
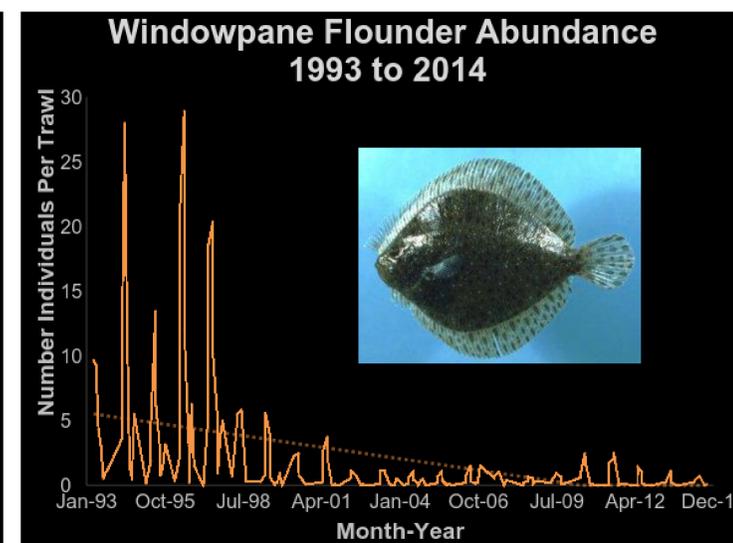
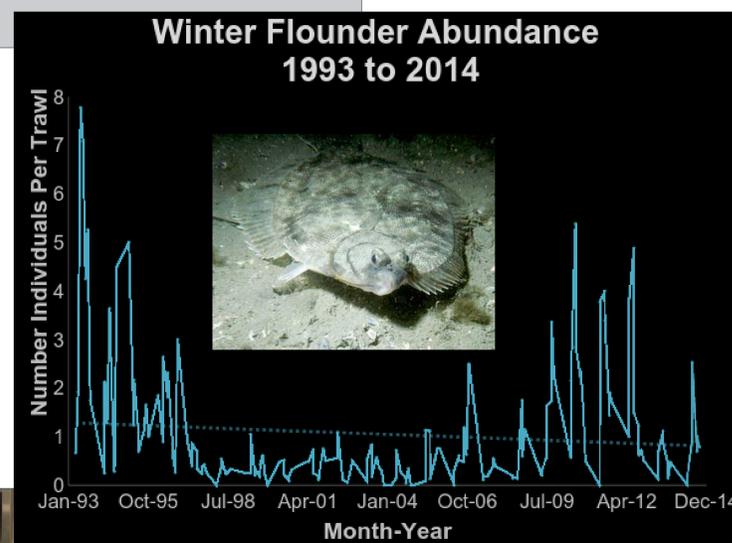


Fig 2. Graphs display average number of flounders per survey per month from 1993-2014 for Summer Flounder, Winter Flounder, & Windowpane Flounder



METHODS

Study Area and Organism

- The Maritime Aquarium conducts trawl surveys to study the organisms living in the Long Island Sound (Fig. 1).
- Abundance data used for my project were collected from 1993 to 2014.
- Trawl surveys were conducted typically from March to December (survey months vary yearly).
- Number of surveys vary per month; some months had 1 while others had 44.
- I examined abundance data on Summer Flounder (*Paralichthys dentatus*), Winter Flounder (*Pseudopleuronectes americanus*), and Windowpane Flounder (*Scophthalmus aquosus*).

Data Analysis

- First, I organized the abundance per month data into a usable format in Excel.
- Because of inconsistency of trawls per month, I calculated the average number of individuals per survey per month.
- Next, I graphed the average number of individuals per trawl per month over the 21 year-period for each species.
- I then analyzed the trends in the populations of each flounder species and researched possible causes of these patterns.

RESULTS

Trends in the abundances of each flounder species were different (Fig. 2).

Summer Flounder—Increased

- Summer Flounder have been doing well, aside from various fluctuations in population.

Winter Flounder—Stable

- Although the Winter Flounder had a severe drop in abundance in the 1990s, abundances increased in the 2000s, producing a trend line with no slope.

Windowpane Flounder—Decreased

- Windowpane initially had much higher abundances than the Summer and Winter; however there was a huge decrease in their population.

CONCLUSIONS

My research on flounder revealed potential reasons for the trends in variation in abundances of the three species over the 21 year-period.

The Summer Flounder may be doing well because it can have up to 4 million eggs during a spawning season (CPT Dave). Summer Flounder predate on many species, including juvenile Winter Flounder and Windowpane Flounder (NJ Scuba).

Winter Flounder did experience a drop in their springtime abundance due to the fact that they thrive in the colder climates, along with the competition they have with other species like seals. (Long Island Sound Study)

Windowpane are the smallest of the three flounder species, which makes it the most susceptible to predators in LIS (EDC URI). In 2012, the overall catch limit was exceeded by approximately 28% (NEFSC). This shows that people have been overfishing this species.

FUN FACTS

Summer Flounder

- Like all flounder species, its eyes start on both sides of its body, then one moves to the other side.

Winter Flounder

- Out of the three I studied, this is the only flounder species with eggs that float.

Windowpane Flounder

- When held up to the light, Windowpane Flounder are transparent.

ACKNOWLEDGEMENTS

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REFERENCES

- <http://longislandsoundstudy.net/about-the-sound/what-makes-it-special/>
- <http://longislandsoundstudy.net/2012/01/game-fish/>