

Collection and measurement of Fairfield microplastics in accordance to the Big Microplastic Survey

NRCA Student: Daniel Pollack¹

Community Partners: Bridget Cervero² Carrie Rullo³

¹Fairfield Ludlowe High School & Bridgeport Regional Aquaculture, ²Maritime Aquarium, ³Mill River Wetland Committee

Introduction

A microplastic is any piece of plastic less than 5mm long that can do harm to the ocean and aquatic life (USDC & NOAA, 2016), and it has been known to carry pollutants like PCBs along with harmful bacteria like E. coli (Thorbecke, 2019).

The objective of this research was to survey two sites in Fairfield, CT to determine the most prevalent type of plastic. If microplastics are prevalent in oceans around the world, then they are present within Long Island Sound.

Materials and Procedure

A strandline is set during an outgoing tide and a four meter long rope was bound and stretched to a square to form one quadrat. Using Google Maps, we recorded GPS coordinates of the quadrat.

In each set of quadrats, five quadrats would represent one sample; each quadrat being set up 5 meters away to the right of the first quadrat. With a square 10 cm template, we dug down an inch in the sand with a spoon. Within one quadrat, five spoonsful of sand were placed in a bucket of sea water.

When finished, the plastics were measured to a millimeter length and sorted by color. Photos were taken and the data was submitted to the Big Microplastics Survey, a collaborative project run by the University of Portsmouth and Just One Ocean in the UK. Lastly, the plastics were stored by date and location of survey in plastic bags.



Fig. 2. A sample being conducted at Penfield Beach (Left), and one at Mill River (right).

Analysis

The average length of all the plastics is about 9.5mm, greater than the maximum of a true microplastic. Of the fourteen pieces recorded over four surveys, three days, and two sites, eight were true microplastics.

Three of these microplastics were polystyrene, among five total pieces of the hydrocarbon compound. Only three pieces of microplastic were made intentionally small judging by the shapes: two peg-like plastics, and a spherical nurdle.

Conclusion

If plastics are found in the ocean, then they are also found in a brackish environment like the Long Island Sound. The hypothesis is correct since plastics were found while surveying two coastal sites in Fairfield. Unfortunately, a local impact cannot be realized because this data has not been compared with a similar previous experiment focusing on Long Island Sound. If the project were to be redone, the water would also be sampled and analyzed under a microscope. In an improved version, the Sound's history of plastic pollution would be researched to gain more specific background knowledge of the subject.

References

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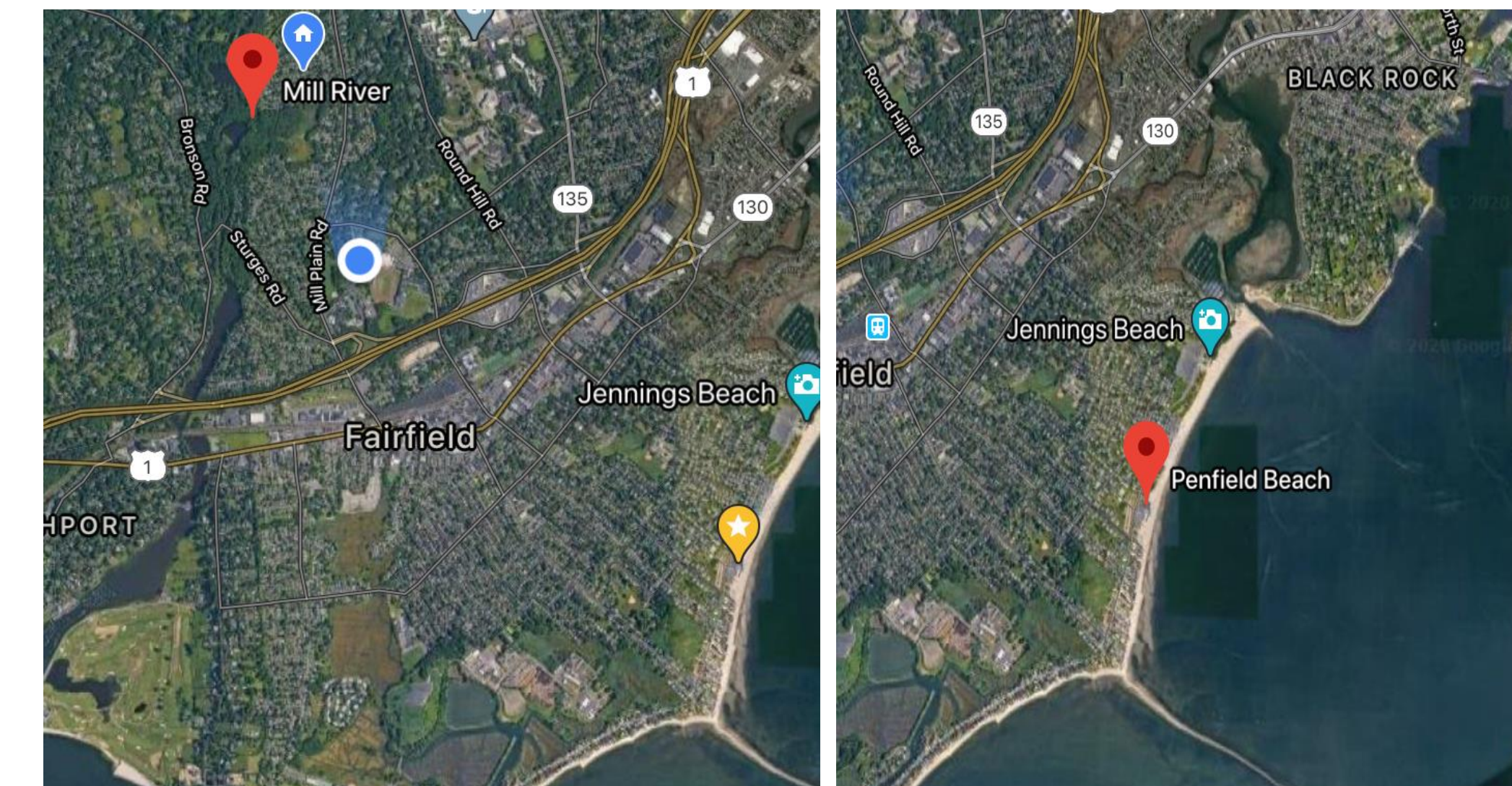


Fig. 4. Satellite map of each site. Mill River is displayed on the left, Penfield Beach is displayed on the right.

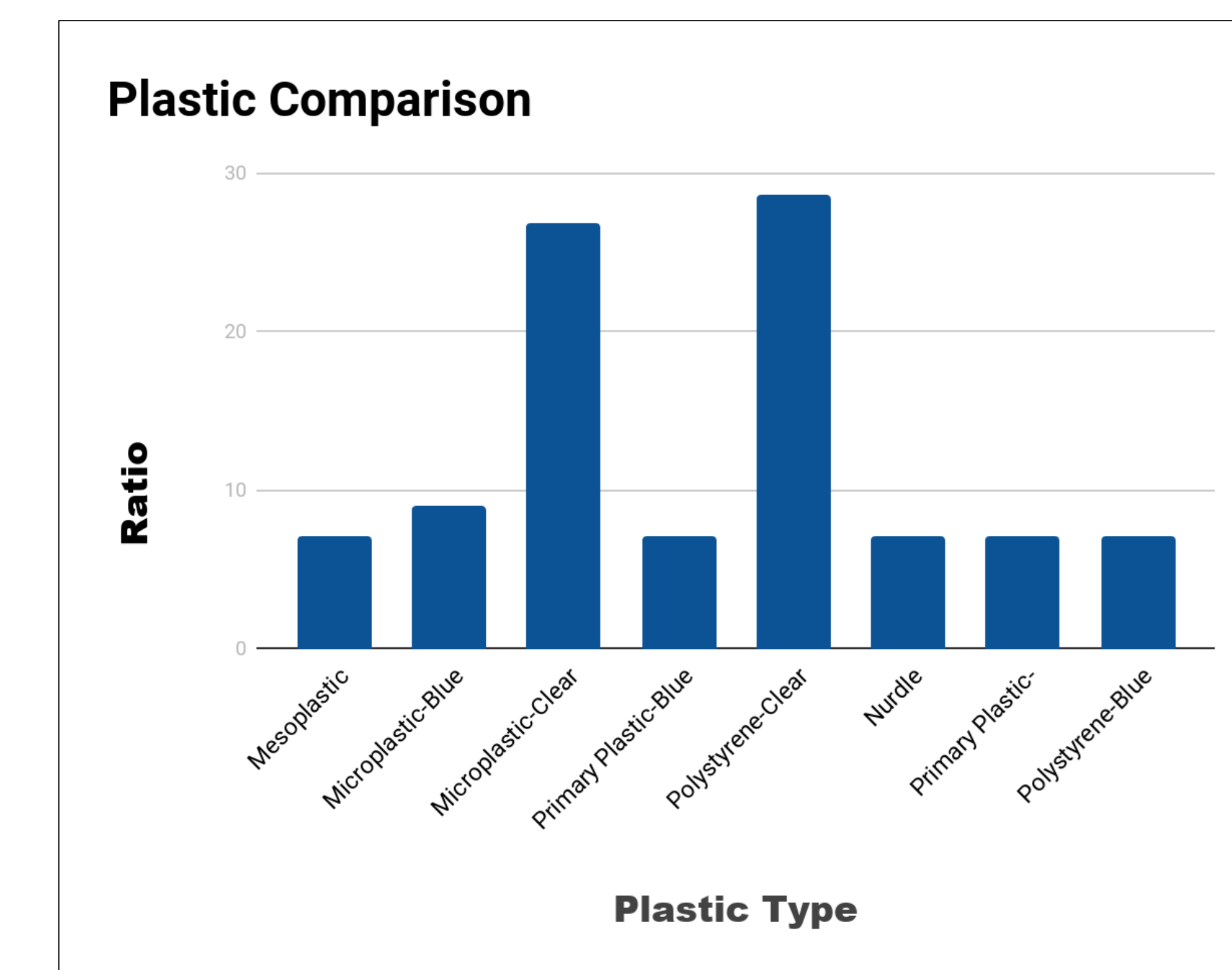


Fig. 5. The ratio between each of the types of microplastics, showing those that were found most frequently.

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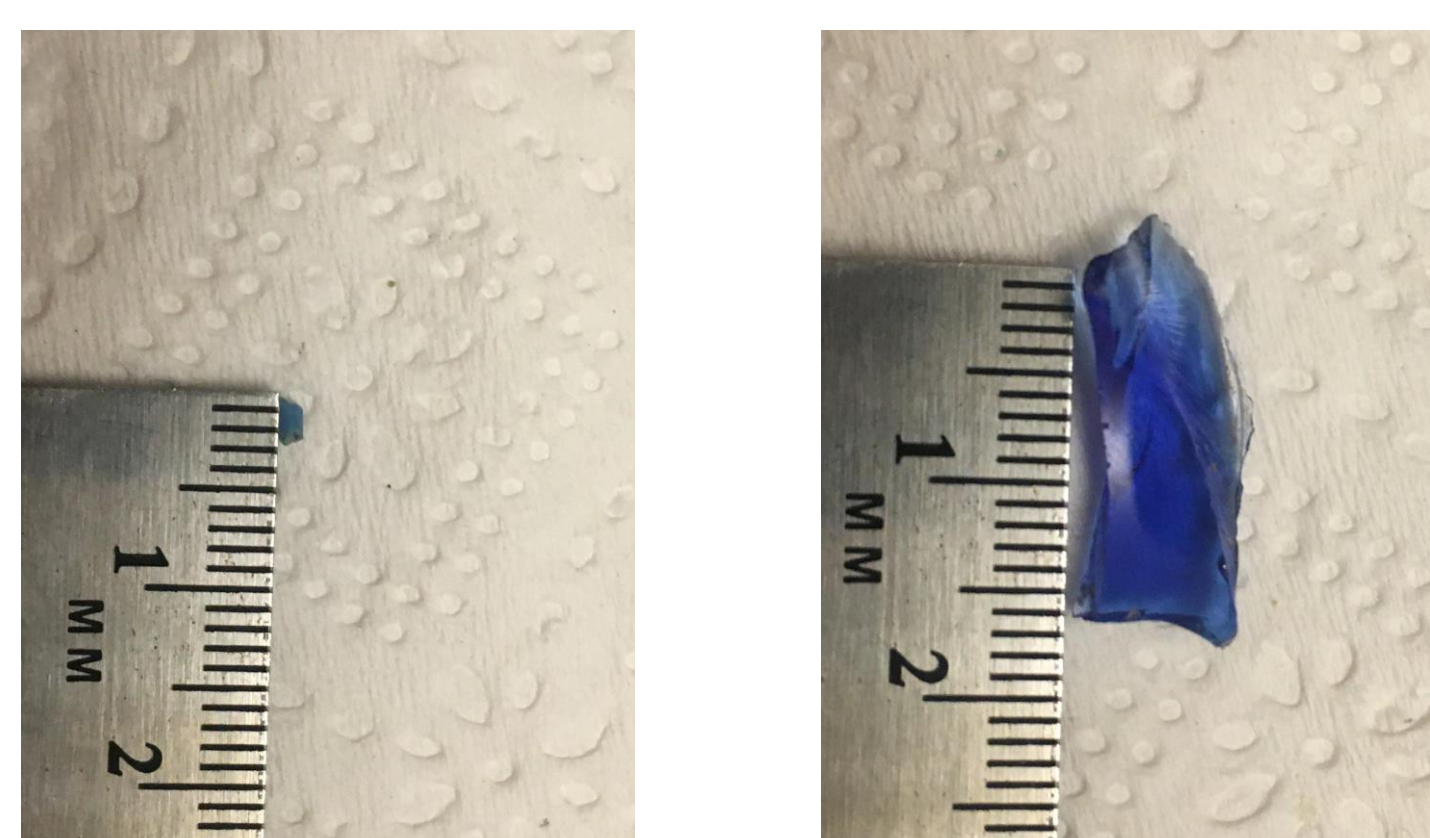


Fig. 1. Two of the plastics found in the survey. One is 3mm, the other measures at 26mm.

