CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

J1103

Project Title

Monterey Bay: Sanctuary for Microplastics?

Abstract

Objectives/Goals

The objective of this study is to determine if there are microplastics in Santa Cruz ocean waters on Monterey Bay Marine Sanctuary. I decided to do this after reading about seabirds unknowingly consuming plastic. My hypothesis was that there would be microplastics in Monterey Bay and that water from most-used beaches would have the most microplastics.

Methods/Materials

Sampled water at three local beaches (one heavily used/populated, one hardly ever used/populated, one a popular CA State Beach, medium use/populated) using plastic milk jugs, glass measuring cup, filtered using clear plastic tube, plastic kitchen funnel and coffee filters (6 micron filter), analyzed using method of identifying microplastics similar to that of Dr. Abby Barrows - visually identified plastics using father's microscope(Leica # MZ6 Dissecting Microscope)and microscope camera (AmScope# Microscope Eyepiece Camera 250 mA USB 2.0 DC 5v).

Results

Microplastics found at every beach in every sample regardless of use/populatedness. Microplastics count ranged from 13 microplastics/2 cup sample to 73/2 cup sample. Repeated samples over several months confirmed. Most microplastics found at most heavily used beach. Least used beach did not have least amounts of microplastics. Most common microplastics found: thin, brightly & evenly colored filament fragments,0.3 mm-2.0 mm(Pictures A&B).

Conclusions/Discussion

Evidence supported hypothesis:
- found microplastics at all beaches sampled; Cowell#s water had most. Unexpected: Fair Street beach had more than Natural Bridges even though less populated and less accessible --- possible explanation: runoff from Fair and West Cliff dumps into Fair St beach. Results are very disturbing because so many microplastics found- Monterey Bay is marine sanctuary, so would expect to find much fewer- Santa Cruz is small city, so would expect less microplastics than near a larger city. Impact- can help us focus cleanup and conservation resources- teaches us that there is microplastic pollution in Monterey Bay - urgently need to figure out how to remove them: October 2015 bills passed in California and at national level prohibit microbeads in products --- but not until 2020!

Summary Statement

I studied ocean water in Monterey Bay to determine if there were microplastics in a marine sanctuary, and my results confirmed striking amounts of microplastics in every water sample.

Help Received

I designed, sampled, and filtered mostly by myself. My father taught me how to use his microscope and camera, my mother drove me to sample sites, my grandmother helped hold the plastic tube while filtering.