Plastic Pollution in the Ocean

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Subtropical Ocean
aka “Garbage Patches”

Images from Sea Education Association
Subtropical Ocean
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Images from Sea Education Association
North Pacific Ocean, Oct. 2012
aka “Great Pacific Garbage Patch”

Images from Sea Education Association
“Microplastics”
Impacts of large debris

Entanglement

New substrate
Impacts of microplastics

New substrate

Ingestion

Cocktail of Contaminants

Plastic Marine Debris

Chemical Ingredients

Chemical Byproducts

Sorbed Contaminants
Surface plankton net tow
Measuring microplastics

- Net mouth: 1 m x 0.5 m
- Net mesh: 335 µm
- Tow length: 1.8 km
- Ship speed: 2 knots
Typical plastic debris collected in plankton nets

240 pieces
~ 130,000 pieces per km$^2$
Laboratory Analysis

- 3,700 individual plastic pieces analyzed
- Size analysis using scanner
- Raman spectrometer used for polymer type
- Visual surface feature analysis using microscope camera
Open ocean measurements
> 6600 surface net tows from 1986-2010
Plastics input to the marine environment

Global plastics production

8 million metric tons per year input to the ocean

Lima, Peru

Los Angeles, CA
Where is all the plastic?

~1% is floating as microplastics

Where is the other 99%??