

A close-up photograph of numerous small, translucent plastic particles (microplastics) suspended in dark, slightly cloudy water. The particles vary in size and some are tinted blue or green.

Microplastics—the sources might surprise you

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Extension Agent



What are microplastics?

- Oxford Dictionary definition of plastic: *A synthetic material made from a wide range of organic polymers such as polyethylene, PVC, nylon, etc., that can be molded into shape while soft and then set into a rigid or slightly elastic form.*
- Microplastics are generally defined as plastics that are less than 5 mm in size

Types of microplastics

- Pieces from degradation of larger plastic items



Types of microplastics

- “Nurdles”



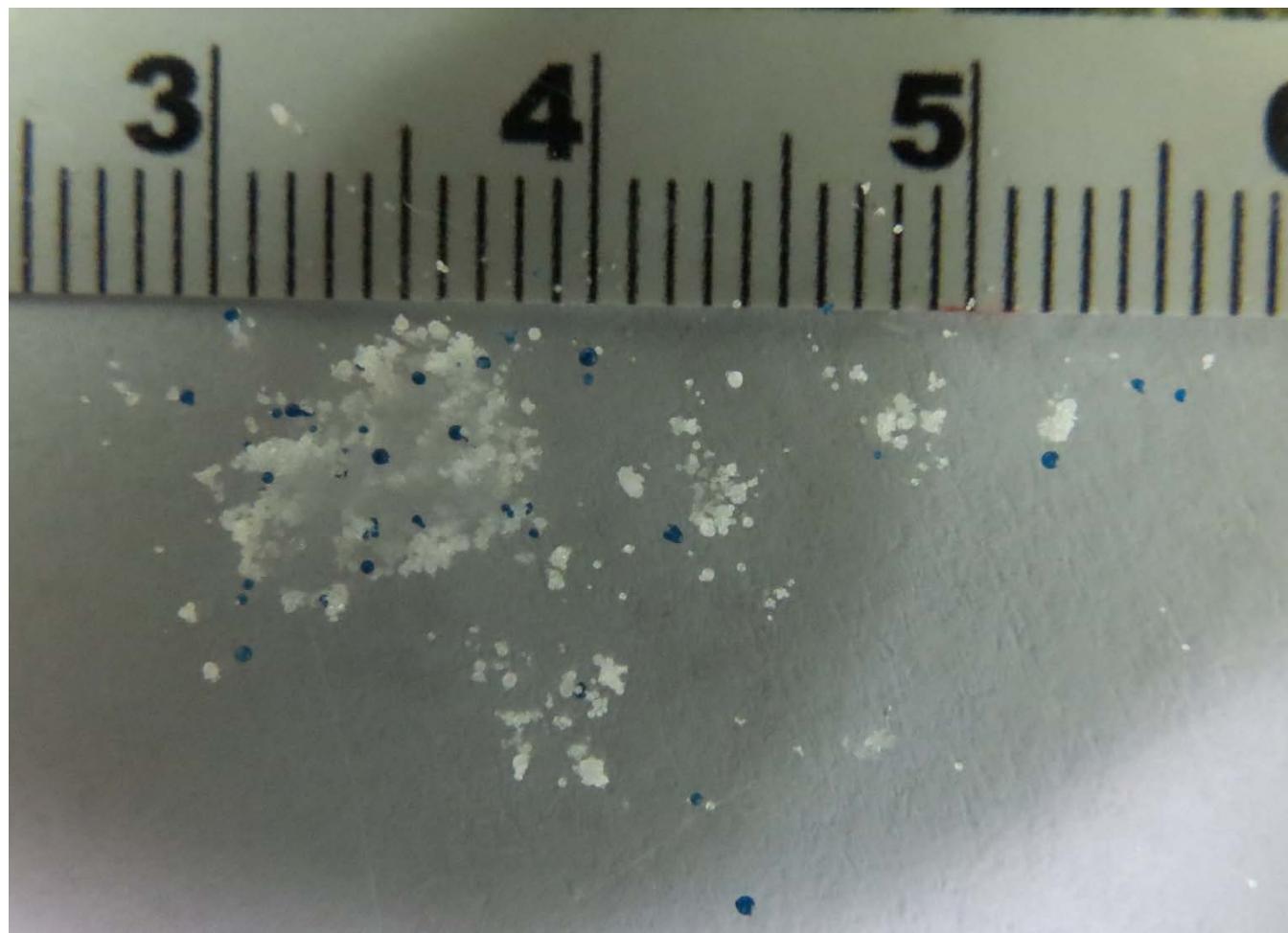
Where do nurdles come from?

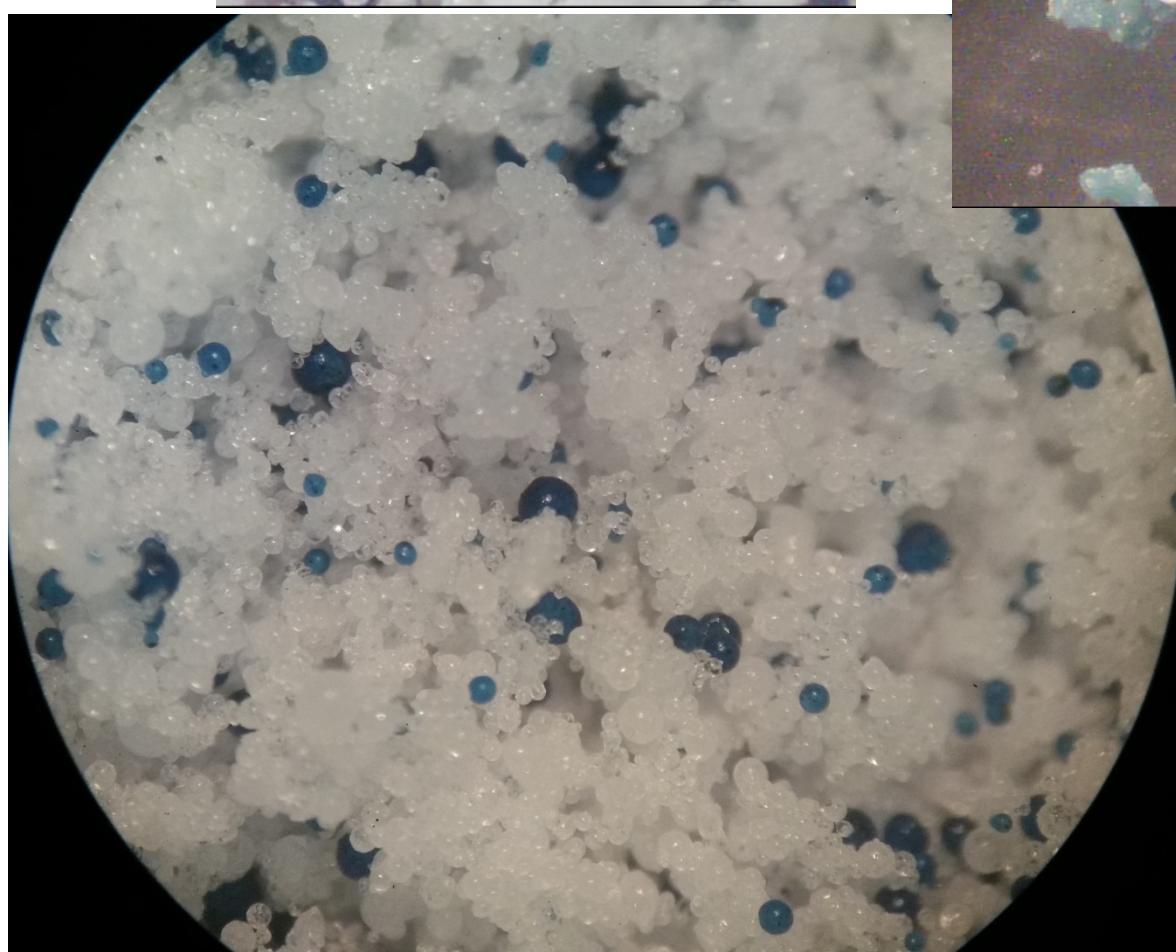
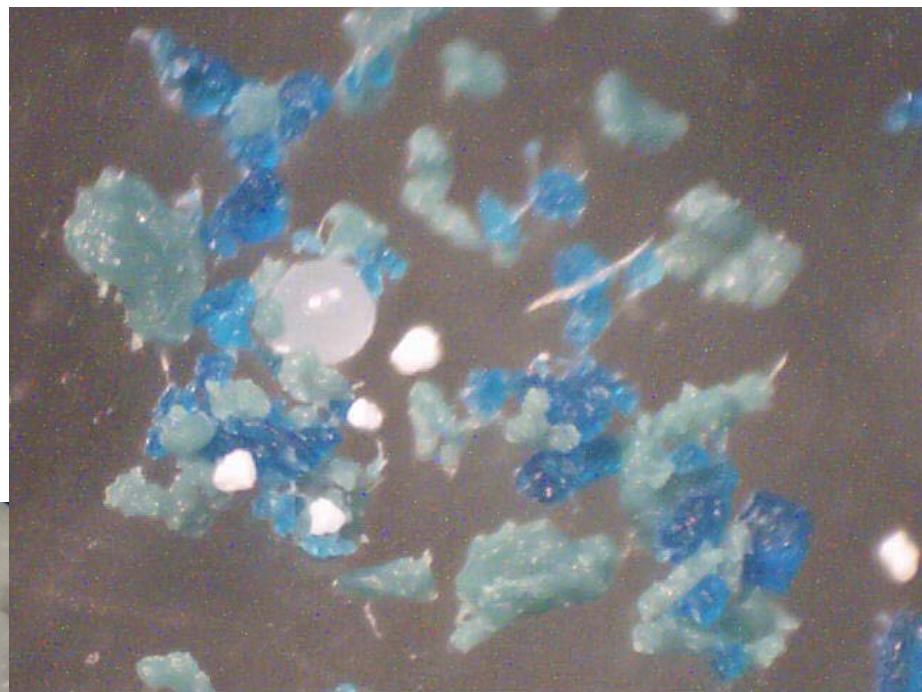
- Nurdles are pre-production resin pellets used for the manufacture of plastic items, and as fillers (e.g. in Beanie Babies, squishy pillows).



Types of plastics

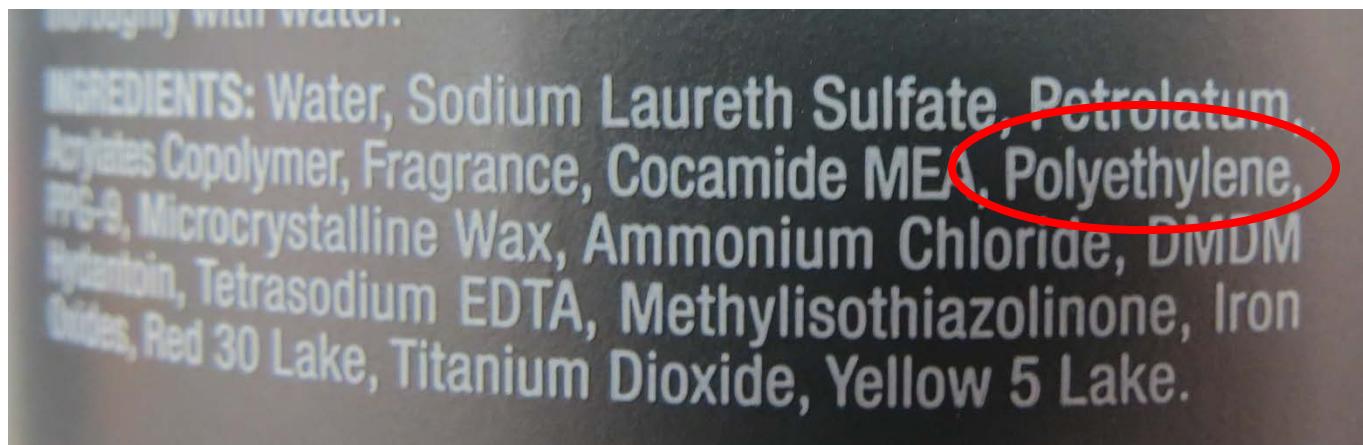
- “Microbeads”





Where do microbeads come from?

- Added to many personal care products for color/shine, fillers....
- Are not removed by wastewater treatment plants



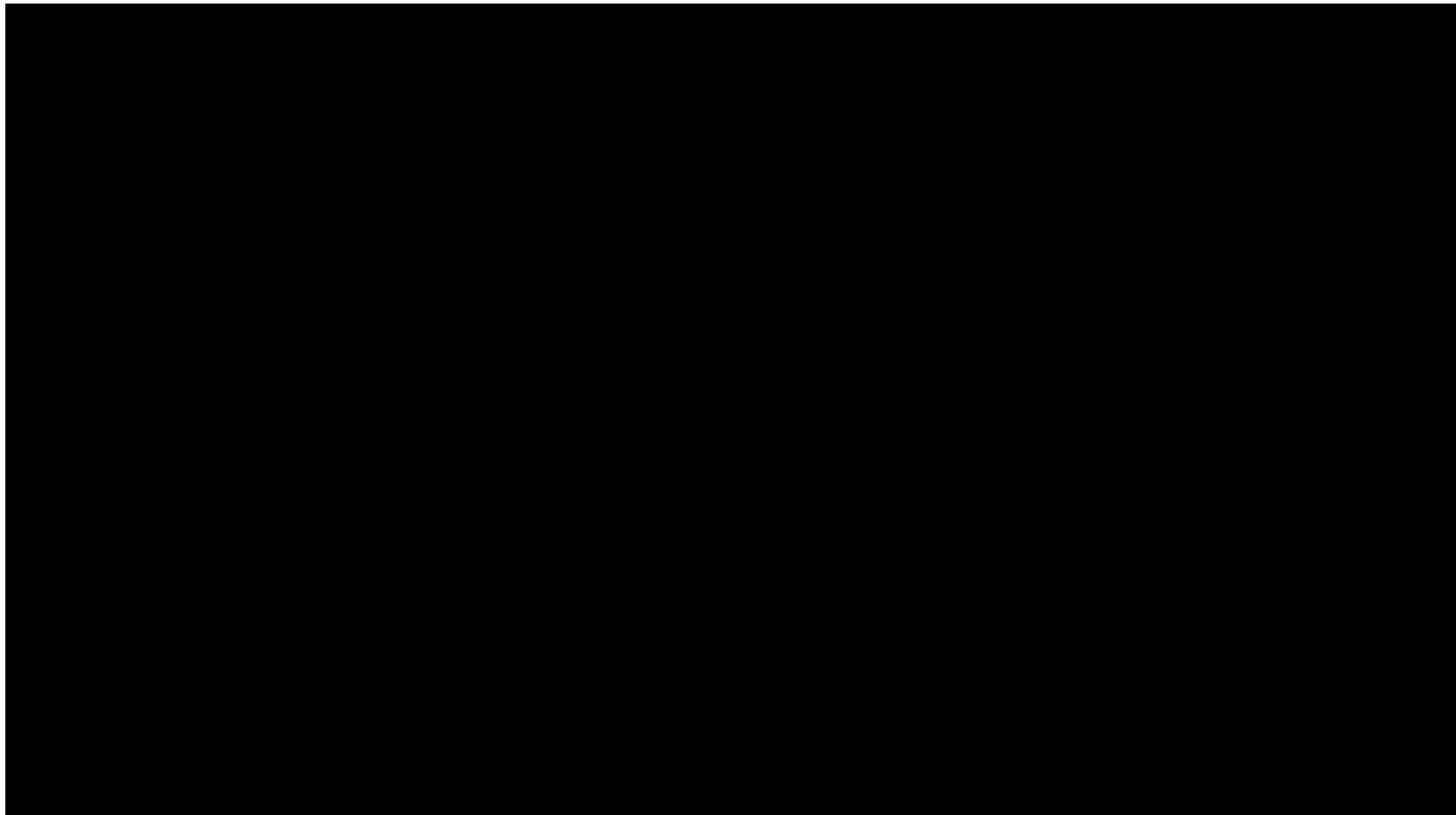
What personal care products contain polyethylene?

- <http://householdproducts.nlm.nih.gov/>
- Search for keyword polyethylene

The screenshot shows the homepage of the Household Products Database. At the top, there's a navigation bar with the U.S. Department of Health & Human Services logo, the URL www.hhs.gov, and the National Institutes of Health/National Library of Medicine/National Library of Medicine Specialized Information Services logo. Below the navigation bar, the main title "Household Products Database" is displayed, along with the subtitle "Health & Safety Information on Household Products". On the left side, there's a "Quick Search" box containing the term "polyethylene" and a "Go" button. Below the search box are links for "Advanced Search" and "Browse by Category". In the center, there's a "Search Results" section with the message "Search results: Primary record found searching **polyethylene** as Ingredient." followed by a bullet point and the link "[Polyethylene](#)". A large graphic of various household products is visible on the right side of the page.



The nurdles' quest for ocean domination (TED-Ed)



<https://www.youtube.com/watch?v=KpVpJsDjWj8>

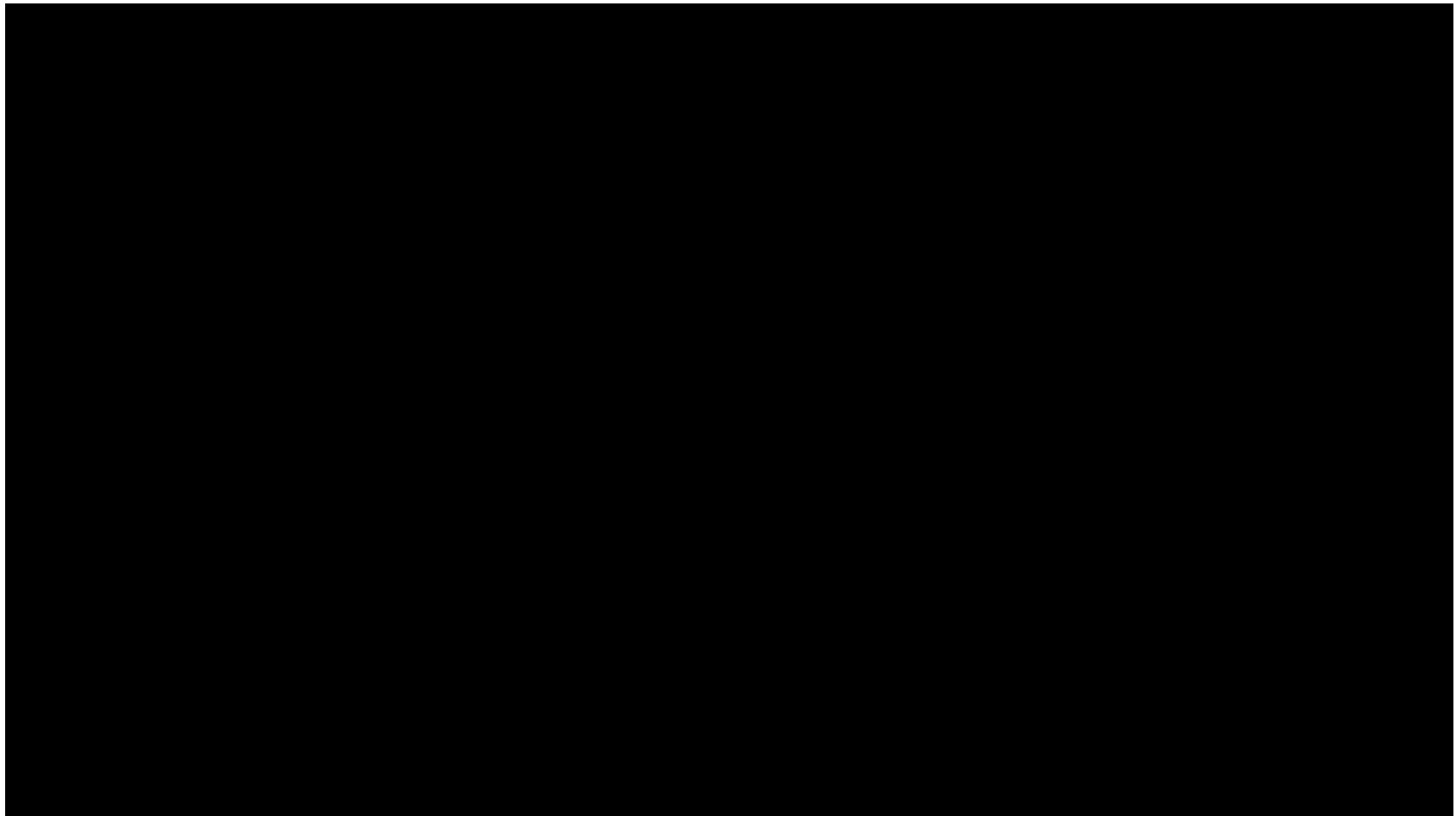


So why do we care about microplastics?

- They are in the environment
- They never biodegrade
- Toxins (e.g. PCBs) adsorb to their surfaces
- They are eaten by marine life
- Additives used in the manufacture of plastics (e.g. bisphenol A) and toxins can leach into animal tissue



Synthetic Sea



<https://www.youtube.com/watch?v=pEKohTXF4Xw>



Some numbers*

- 268,000 metric tons
 - Estimated total mass of plastic debris in the 5 gyres
- 466,000 particles/km²
 - Highest abundance of plastics found in Great Lakes samples
- 5 trillion
 - Estimated # of pieces of plastic in the oceans



*From 5 Gyres Institute

5gyres.org

Mapping the Plastic Seas



Plastic distribution

- 20 kg of plastic

Ocean estimates

268,000 tonnes global

Expeditions

Expedition stages

S.E.A. Change



Mapping the Plastic Seas

SAILING SEAS OF PLASTIC

+ -



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Mapping the Plastic Seas

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Unknowns....

- Do filter feeders excrete microplastics after they filter them out?
- Can/will microplastics bioaccumulate up the food chain?
- Are there potential human health risks from microplastics?





What can we do?

- Reduce, reuse, recycle, refuse
- Check labels on personal care products
- Participate in beach cleanups, and look for the very small plastics





In the news: microplastics

- 2012—consumer goods company Unilever committed to making all of its products plastic-free by 2015. *Its website says all plastics were phased out by Jan 1, 2015.*
- L'Oréal, Colgate/Palmolive, Beiersdorf, Procter & Gamble and Johnson & Johnson have followed the example set by Unilever and over the course of 2013 pledged to stop the use of microbeads. Unfortunately, not all of these companies have set a deadline for when they plan to have completely phased out microbeads.

- April 2014—Target pledged to remove microbeads from its branded facial skin care products by late 2014; from all of its branded products by the end of 2015
- June 2014—Illinois became the first state to ban the sale of cosmetics containing plastic microbeads. Manufacturers have a phase out period between 2017-2019. [ME, NJ, CO, IN, MD and WI have since passed similar legislation]
- Sept 2014—Crest pledged to remove microbeads by March 2016



WHAT IS
THE ISSUE

SEE GLOBAL
RESEARCH

WHO
WE ARE

HOW TO GET
INVOLVED

WHATS HAPPENING
NOW

GIVE

WHAT IS THE SOLUTION

"There is no single solution to the plastic waste problem"



REDUCTION

RECOVERY

ACTION

INNOVATION

LEGISLATION



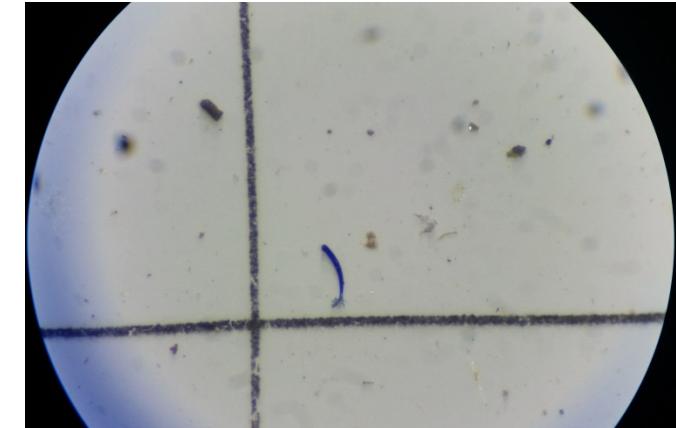
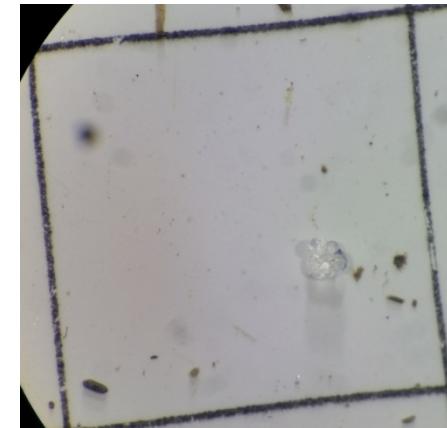
REDUCTION

The vast majority of plastics consumed by society are not recovered or recycled



The challenges for recovery

- Small sizes
- Distributed throughout the water column
- How to remove plastics without removing marine life?



Questions?

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<http://stjohns.ifas.ufl.edu/sea/seagrant.htm>