MANTA TRAWLING FOR MICROPLASTIC IN LAKE MICHIGAN

Illinois Water 2014
October 15
Laura Kammin
Illinois-Indiana Sea Grant, Pollution Prevention Specialist
“the sustainability of plastics from cradle to grave”
Dr. Sherri “Sam” Mason, SUNY at Fredonia

Summer 2012: First sampling of the Great Lakes

[Map showing sampling locations and particle counts]
### Abundance of plastic pieces (count/km²) by type and size

<table>
<thead>
<tr>
<th></th>
<th>Great Lakes</th>
<th>NASG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.355—0.999mm</td>
<td>1.000—4.749mm</td>
</tr>
<tr>
<td>Fragment</td>
<td>247,106.5</td>
<td>123,906.2</td>
</tr>
<tr>
<td>Film</td>
<td>3,943.5</td>
<td>1,332.2</td>
</tr>
<tr>
<td>Foam</td>
<td>54,340.9</td>
<td>18,208.4</td>
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<tr>
<td>Pellet</td>
<td>430,029.8</td>
<td>5,614.1</td>
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<tr>
<td>Line</td>
<td>1,328.9</td>
<td>2,571.9</td>
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<tr>
<td>count/km²</td>
<td>736,749.6</td>
<td>151,632.9</td>
</tr>
<tr>
<td>% of total</td>
<td>81%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Results from 2012

Photo courtesy of Brendan Bannon

August 2013

IISG sampled 16 locations in the southern tip of Lake Michigan
In search of microbeads
Preliminary results from southern Lake Michigan 2013

<table>
<thead>
<tr>
<th></th>
<th>0.3555-0.999mm</th>
<th>1.000-4.749mm</th>
<th>&gt;4.75mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragment</td>
<td>15,552.38</td>
<td>44,537.29</td>
<td>8,510.85</td>
</tr>
<tr>
<td>Film</td>
<td>2,685.94</td>
<td>0</td>
<td>907.85</td>
</tr>
<tr>
<td>Foam</td>
<td>5,611.51</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pellet</td>
<td>10,146.64</td>
<td>918.18</td>
<td>0</td>
</tr>
<tr>
<td>Line</td>
<td>19,160.07</td>
<td>5,393.13</td>
<td>7,767.72</td>
</tr>
<tr>
<td>count/km²</td>
<td>53,156.54</td>
<td>50,848.6</td>
<td>17,186.42</td>
</tr>
<tr>
<td>% of total</td>
<td>44%</td>
<td>42%</td>
<td>14%</td>
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</tbody>
</table>
Plastic Microbeads in the Great Lakes

By Helen M. Domanski

For years people have worried about the environmental impacts from plastics left behind in the oceans and Great Lakes. Pictures of birds tangled in six-pack rings or turtles choking on plastic bags have documented the danger of discarded plastics that linger in the environment. Recently, attention has turned to the Great Lakes and small plastic particles and microbeads that have been found there. Some plastic particles result from the breakdown of larger plastic items, but others are small plastic spheres known as microbeads.

These minute plastic beads are typically used as scrubbing agents or exfoliants in personal care products. They are often brightly colored and can be seen suspended in the body washes, facial scrubs and toothpastes that contain them. As these products are used by consumers, microbeads are rinsed off and go directly down the drain with water that eventually makes its way to waste water treatment plants. Although some of the particles are captured through treatment, many are not and sewage treatment overflows can also dump these microbeads directly into the ecosystem.

Although harmless in appearance, microbeads have the potential to cause environmental damage. Some of the microbeads are about the size of certain fish eggs, so these small plastic particles can be ingested by Great Lakes fish and other aquatic organisms. Once eaten the plastic material could deprive these organisms of nutrients supplied by food or possibly get lodged in their stomachs or digestive systems. Additionally, plastics can absorb toxins, such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs), making these harmful substances more readily available within the food web. These toxins remain in fish where they can move up the food chain, as smaller fish are eaten by larger predators.
Are microbeads in beauty products hurting the environment?

May 6, 2014, 3:43 PM
Scientists are finding high concentrations of microbeads in the nation’s water supply. Bigad Shaban reports on the beauty product ingredient’s possible threat to the environment.
MICROPLASTICS IN THE GREAT LAKES

A Cities Initiative Fact Sheet

WHAT ARE MICROPLASTICS?

Microplastics are plastics that are less than 5mm in diameter. They enter our Great Lakes in two ways:
1. When larger plastic pieces enter the marine environment through rivers, beaches or other dumping at sea and are subsequently broken into smaller pieces by wind, waves and UV radiation; or
2. When plastic pieces already less than 5mm in diameter are manufactured and then added to common consumer care products, such as exfoliating body wash. These are then flushed down the drain and cannot be captured by wastewater treatment plants, so find their way into the Great Lakes.

WHAT PRODUCTS TYPICALLY CONTAIN MICROPLASTICS?

Microplastics are found in many common consumer products, including toothpastes, deodorants, body washes, hand cleansers and facial exfoliate. You can tell if a product uses plastic microbeads if it contains polyethylene or polypropylene.

WHY ARE MICROPLASTICS A PROBLEM IN THE GREAT LAKES?

1. They are present in huge numbers
   In 2012 and 2013, a pair of scientific studies by Dr. Sherri Mason, professor at SUNY Fredonia, and the 5 Gyres Institute recorded the plastic content of Lake Huron, Lake Erie and Lake Superior and discovered microplastics in greater concentrations in Lake Erie than in any other body of water on earth, with concentrations exceeding data collected in the Great Pacific Garbage Patch.

2. They have tremendous impacts on wildlife and humans
   - Fish and birds ingest them; microplastics can cause internal blockage, dehydration and death in wildlife.
   - Ecosystem and habitat destruction: microplastics on beaches change the physical properties of beaches, such as heat retention and light reflection, which impacts organisms dependent on land temperature.
   - Super-concentrations and bioaccumulation of pollutants: microplastics absorb pollutants already in the water such as DDT, PAHs and PCBs. When ingested by wildlife, the plastics contain super-concentrations of these dangerous toxins. They become more concentrated as they bioaccumulate in the food chain.

WHAT ARE COMPANIES DOING ABOUT MICROPLASTICS NOW?

Some companies have promised a voluntary phase-out of plastic beads. Others have made no commitments.

Promises to phase-out:
- Beiersdorf (no set date)
- Colgate-Palmolive (by end of 2014)
- Johnson & Johnson (by end of 2015)
- L’Oreal (no set date)
- Proctor & Gamble (by end of 2017)
- Unilever (by end of 2015)

WHY IS THE GREAT LAKES AND ST. LAWRENCE CITIES INITIATIVE DOING ABOUT MICROPLASTICS?

The Cities Initiative has written to USEPA and Environment Canada asking what the US and Canadian governments are doing and plan to do to prevent microplastics from entering the Great Lakes and to remove microplastics already in the Great Lakes.

The Cities Initiative has written all the major companies using microplastics in their products, asking for:
- Full disclosure of all products that contain microplastics.
- A commitment to completely phase-out all microplastic production by 2015 at the latest.

SOURCES AND LINKS

B. Photos: Plastic Shore Movie
C. Photo: City of Racine
F. Stiv Wilson, Victory #2, 5 Gyres Foundation (June 24, 2013)
G. Plastic Free Seas, Microbeads accessed on Sep 24, 2013
H. Plastic Soup Foundation. Colgate-Palmolive, L’Oreal and Beiersdorf Halt Use of Micro Beads (May 7, 2013)
I. Photo: Treehugger.com
J. Photo: Durham Region

ABOUT US

The Great Lakes and St. Lawrence Cities Initiative (www.glstcities.org) is a binational, coalition of over 100 Mayors that works actively to advance the protection, restoration and promotion of the Great Lakes and St. Lawrence River basin. To learn more about the Cities Initiative’s work on microplastics, visit glstcities.org/initiatives/microplastics.
Illinois Becomes the 1st State to Ban Microbeads

SB2727: EPA-Cosmetic Product-Microbead
Signed into law on June 2014

Effective December 31, 2017:
No person shall manufacture for sale or offer for sale any personal care product that contains synthetic plastic microbeads.

Effective December 31, 2019:
No person shall accept for sale an over the counter drug that contains synthetic plastic microbeads.
Next Steps

• Publish results from 2013
• What toxins bind to the particles?
• What species are ingesting the particles?
• What are the impacts to the food web?
• Are plastic fibers of concern?
The Great Lakes Land-based Marine Debris Action Plan

NOAA Marine Debris Program
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Technical Memorandum NOS-OR&R-49
May 2014

ACKNOWLEDGMENTS

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QUESTIONS?

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Join the conversation at:

www.unwantedmeds.org