UW Oshkosh Marine Debris and Microplastics Outreach/Research

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What is marine debris?

"Marine debris is defined as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes." (NOAA Marine Debris Program)

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Sources of Marine Debris

Land-based (49%)
- Municipal landfills
- Transport of litter and waste
- Storm water discharge
- Industrial or manufacturing
- Litter and waste generated in inland or coastal areas
- Natural events

Water-based (18%)
- Merchant shipping, ferries, and cruise liners
- Fishing, public, and private vessels
- Offshore oil and gas platforms, and drilling rigs
- Aquaculture installations
- Natural events

General (33%)
- Items that can come for either a land or water source

Percentages and Source Information from EPA, 2012 via Ohio Sea Grant

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Common Types of Trash on Beaches

Cans, plastic bottles

Styrofoam food containers

Plastic straws

Cigarette butts

Toys, shoes….

balloons

Source: Ohio Sea Grant

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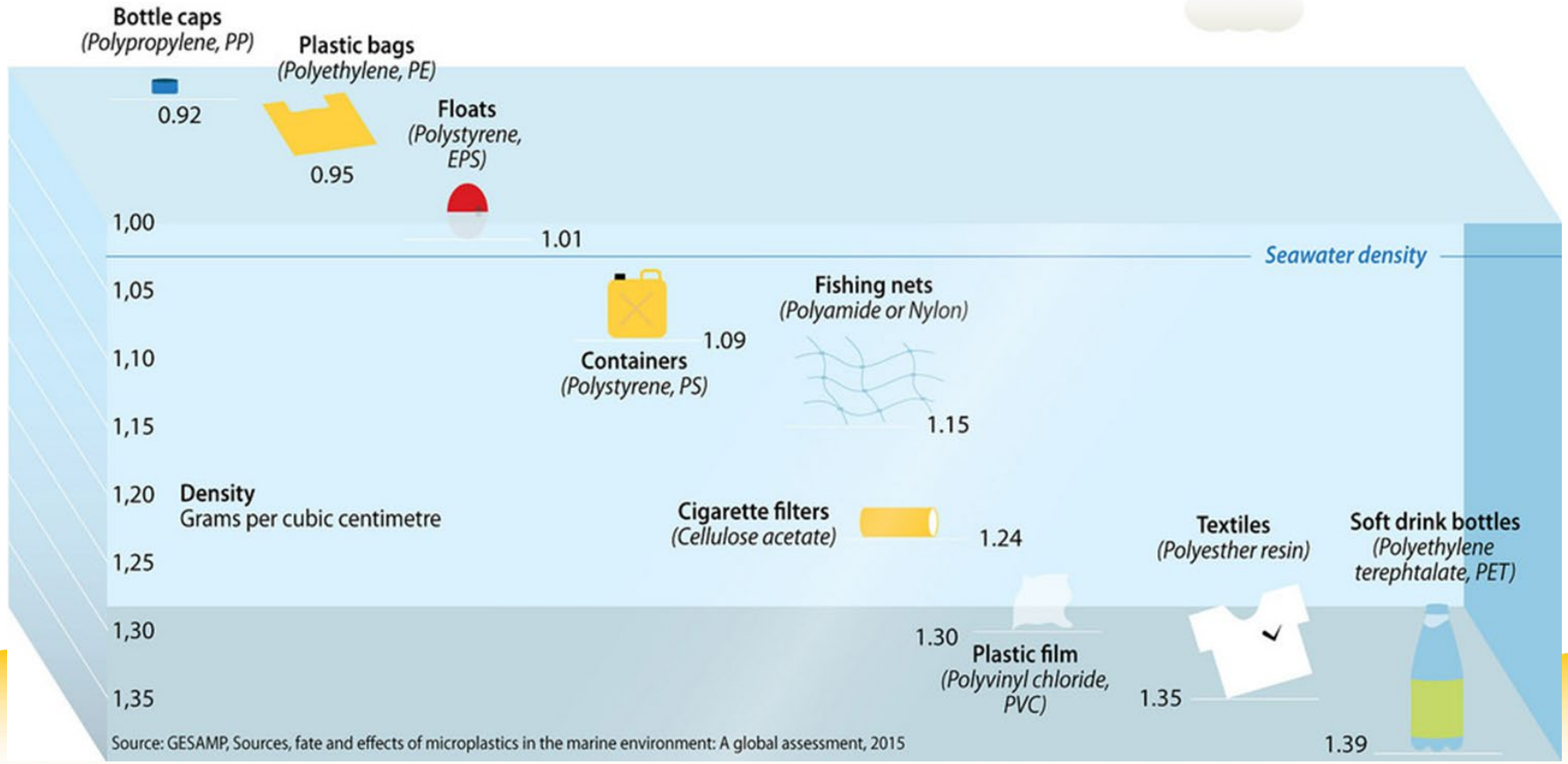
Which plastics float and which sink in seawater?



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What makes the microplastics?

PRIMARY MICROPLASTICS

MICROBEAD

Photo Credit: Minnesota Pollution Control Agency

Plastic beads in face washes, toothpaste, etc.

NURDLES

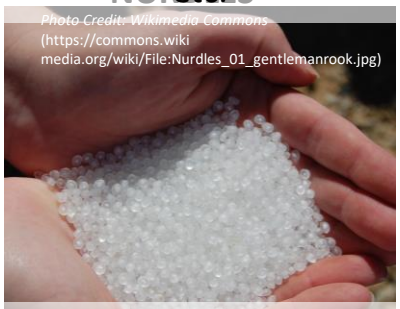

Photo Credit: Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Nurdles_01_gentlemanrook.jpg)

Plastic beads made by plastic manufacturers

SECONDARY MICROPLASTICS

PLASTIC FILM

Photo Credit: Wikimedia Commons (https://tr.m.wikipedia.org/wiki/Dosya:Saran_Wrap_02.JPG)

Plastic wrap, zip locks & food packaging

RUBBER

Photo Credit: Wikimedia Commons (https://www.flickr.com/photos/71776010@N04/6748402375)

Tires, shoes, gloves.

NYLON THREAD

Photo Credit: Wikimedia Commons (https://commons.wikimedia.org/wiki/File:1-DSC_0001_(18).jpg)

Fishing Nets & Clothes

POLYSTYRENE

Photo Credit: Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Styrofoam_peanuts.JPG)

Foam food containers, cups and packaging

POLYPROPYLE

Photo Credit: Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Recyclables.JPG)

Lots of stuff! Plastic bottles, food wrappers, phone cases...

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KNOW YOUR MICROPLASTICS

MICROPLASTICS ARE PIECES OF PLASTIC 5 MILLIMETRES OR SMALLER.

5 mm scale

Common microplastics:

FRAGMENTS

Small pieces of a larger plastic object.

FIBRES

The most common type of microplastic. Plastic strands from clothing.

FOAM

Pieces of food containers and coffee cups.

NURDLES

Plastic pellets usually used in manufacturing.

MICROBEADS

Beads used in soaps and cosmetics. Now labelled "toxic" in Canada, soon to be banned in personal care products. Look for "poly" on the label.

Credit: Lake Ontario Waterkeeper

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- ✓ Tap water
- ✓ Bottled water
- ✓ Beer
- ✓ Sea salt
- ✓ Oysters
- ✓ Mussels
- ✓ etc….

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Microplastics Found in Human Poop for the First Time

The pesky particles were present in all eight stool samples gathered for pilot study

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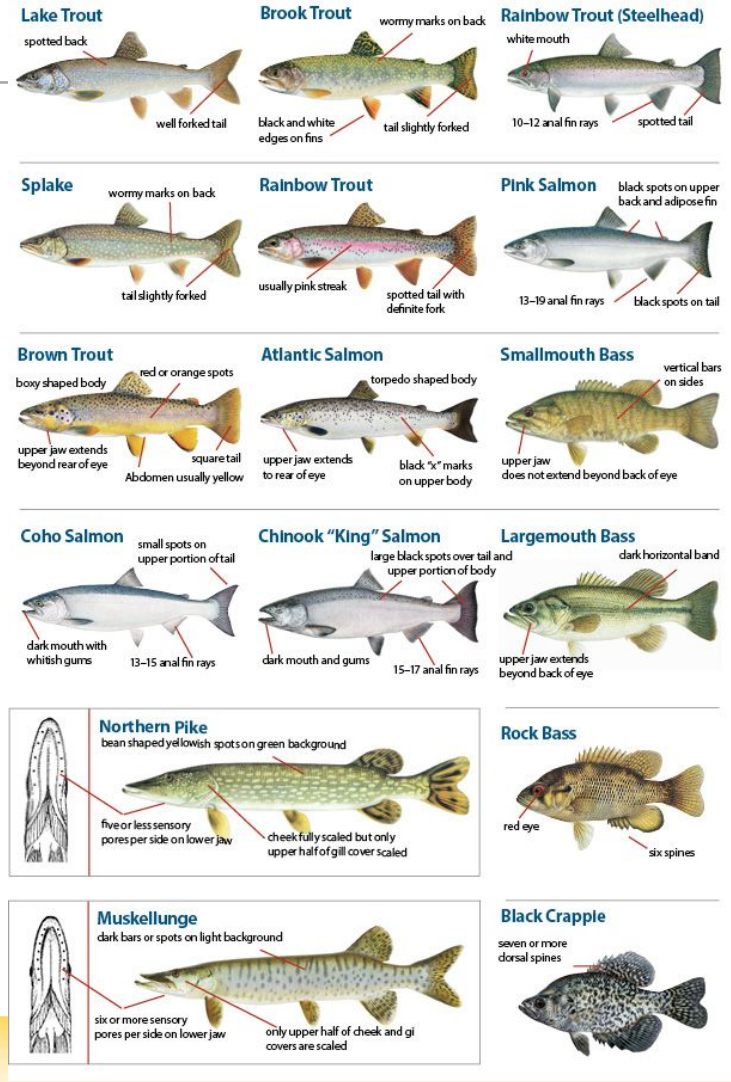
Why do we care about MP's?

- They are in the environment, and seem to be increasing in abundance
- They never biodegrade
- They are eaten by marine life
  - From zooplankton and corals to mussels and fish
  - Bioaccumulation to larger marine life?
    - Studies are still being done on this



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Microplastics in Door County and Lake Michigan

- In 2019, over 90% of the litter picked up by Adopt-a-Beach volunteers through the Alliance for the Great Lakes was composed partially or fully of plastic.
- Some of these items included plastic pieces, cigarettes/filters, foam pieces, plastic bottles and caps, food wrappers, and straws.
- According to the Rochester Institute, more than 22 million pounds (11,000 tons) of plastic is deposited in the Great Lakes annually.

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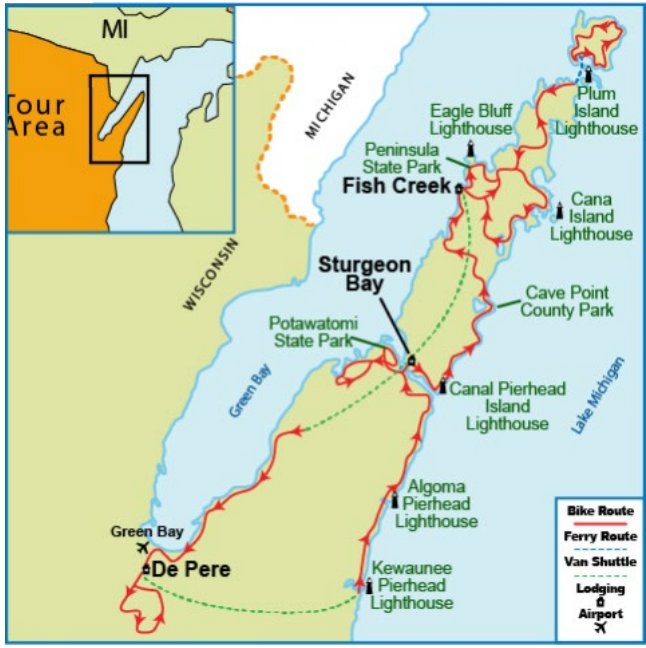
Microplastics in Door County and Lake Michigan

- In addition to the trash produced by its citizens and tourists, Door County also serves as a physical barrier to trash that has been produced in Green Bay and in areas of Michigan's Upper Peninsula.
- This barrier collects trash on the shoreline due to wind, waves, and water current movement.
- Thus, trash discovered in Door County is a combination of locally produced trash and that has washed ashore from wind, water, and wave action from other locations along Green Bay and northern Lake Michigan.



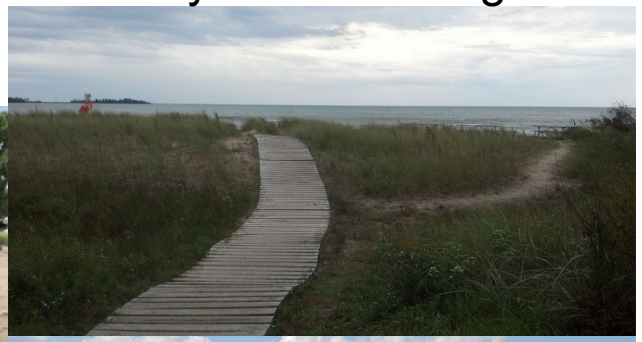
Preliminary Evaluation

- In 2021 we are collected at 10 sites in Door County
  - 1 surface water sample each week
  - 1 sand sample each week

Otumba Park

Murphy Park

Baileys Harbor Ridges



Fish Creek

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Major Projects in 2021 and Beyond

US EPA – Trash Free Waters
- Trash Boat
- Seabins
- Characterization of debris
- Public meeting

NOAA Marine Debris (collaboration)
- Seabin installation
- Characterization of debris from marinas

WICMP
- Identification of public access
- Assessment of trash receptacles
- Map locations

ERIC Research
- Microplastics
- Fate and transport of
- Outreach and education

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Great Lakes RESTORATION

Marine Debris Program NOAA www.MarineDebris.noaa.gov Keep the sea free of debris

WISCONSIN COASTAL MANAGEMENT PROGRAM

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Partners and Funding

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Project Locations

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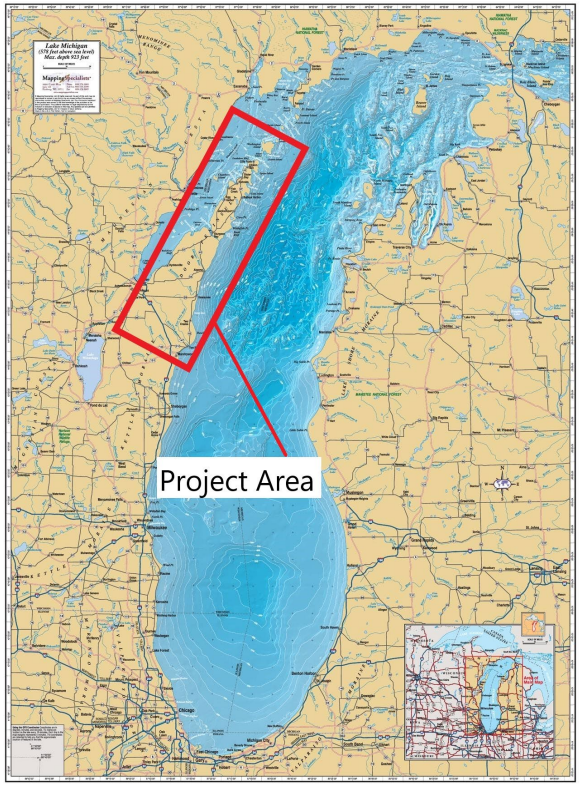

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Trash Boat

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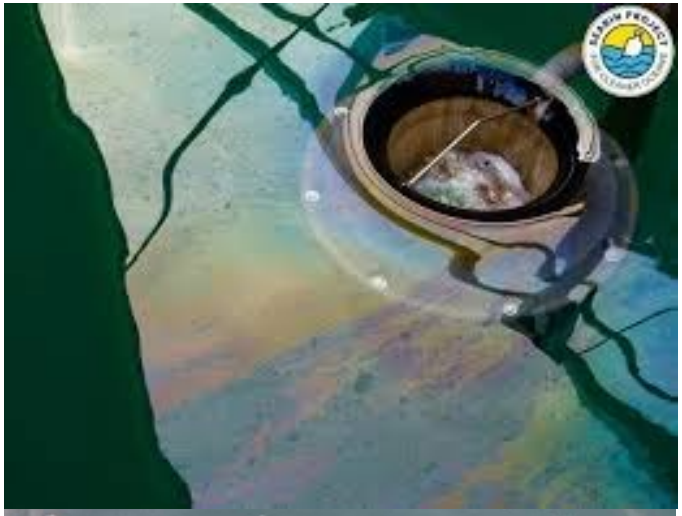
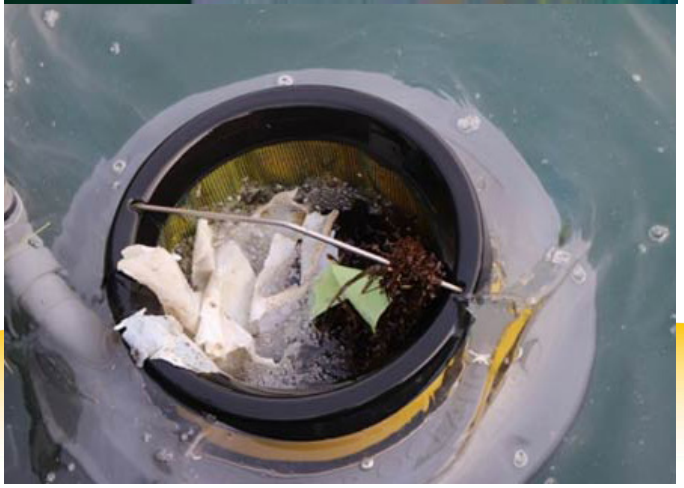
Sea Bins





FLOATING DOCKS	FIXED DOCKS	
FLOATING SEABIN	MOBILE SEABIN	FIXED SEABIN

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Fishing Line Recycling

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Characterization of Recovered Debris

Research and Outreach:

- What is found?
  - Micro
  - Micro
- Where is it found?
- What can be done for prevention?
- Outreach and Education

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Prevention and Mitigation Efforts

Education

Stewardship

Research

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Prevent the Great Lakes from looking like this!

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Partners wanted!

- We are interested in adding partners to our work.
- What can we do to help you?
- How can you help further debris and plastic research on the Great Lakes?

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Thank you!

Any questions?