

OHIO SEA GRANT AND STONE LABORATORY

The Problem with Plastic Pollution

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Extension Educator

Ohio Sea Grant College Program

January 29, 2020



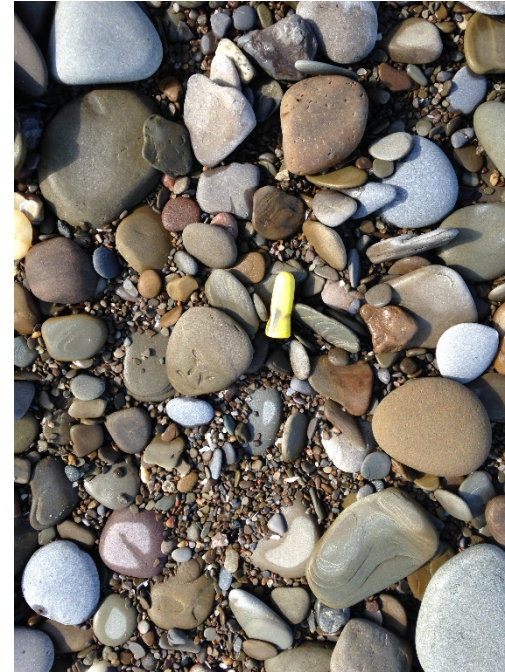
Ohio Sea Grant



Outreach, Education, and Research

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)**



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 from either a land or water source

Types of Marine Debris



96% of what is found on beach cleanups in the Great Lakes is plastic.

“Throwaway Living”



Life Magazine
1955

Celebrated
Throwaway
Living

("The objects flying through the air [in the first picture above] would take 40 hours to clean," LIFE noted, "except that no housewife need bother. They are all meant to be thrown away after use.")

Uses of Disposable Plastic

3x longer



KNOW YOUR MICROPLASTICS

**MICROPLASTICS ARE PIECES OF PLASTIC
5 MILLIMETRES OR SMALLER.**



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.

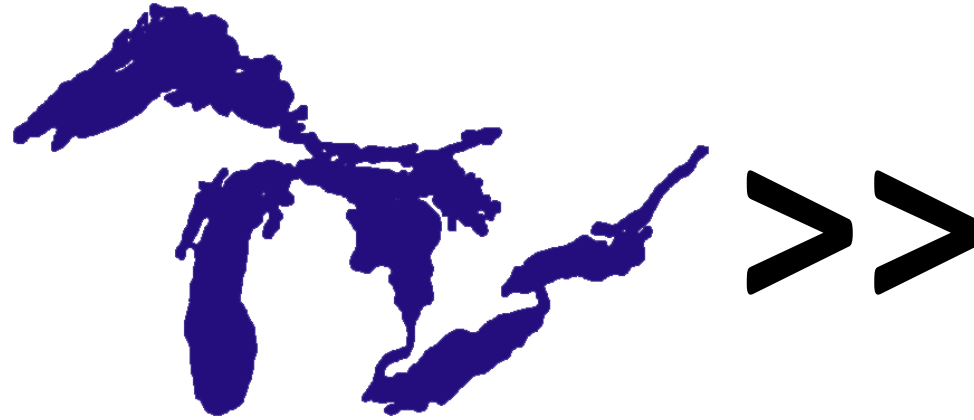
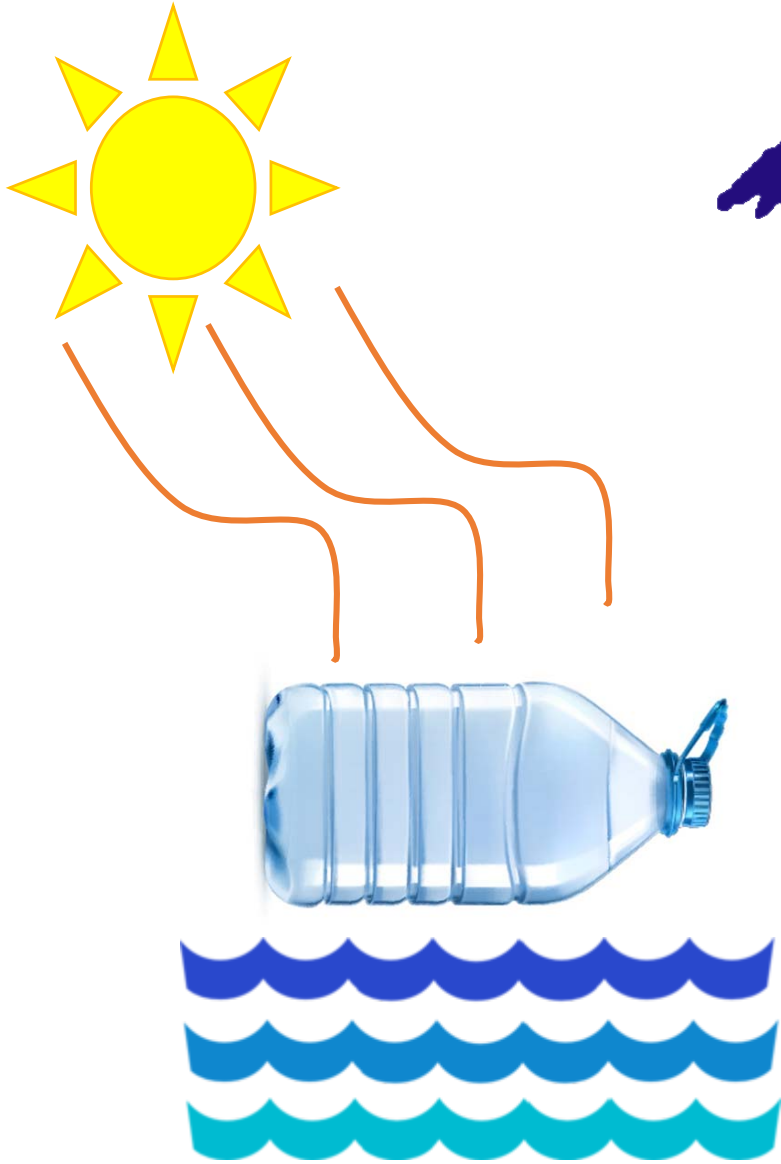


MICROBEADS

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.



Photo Degradation of Plastic

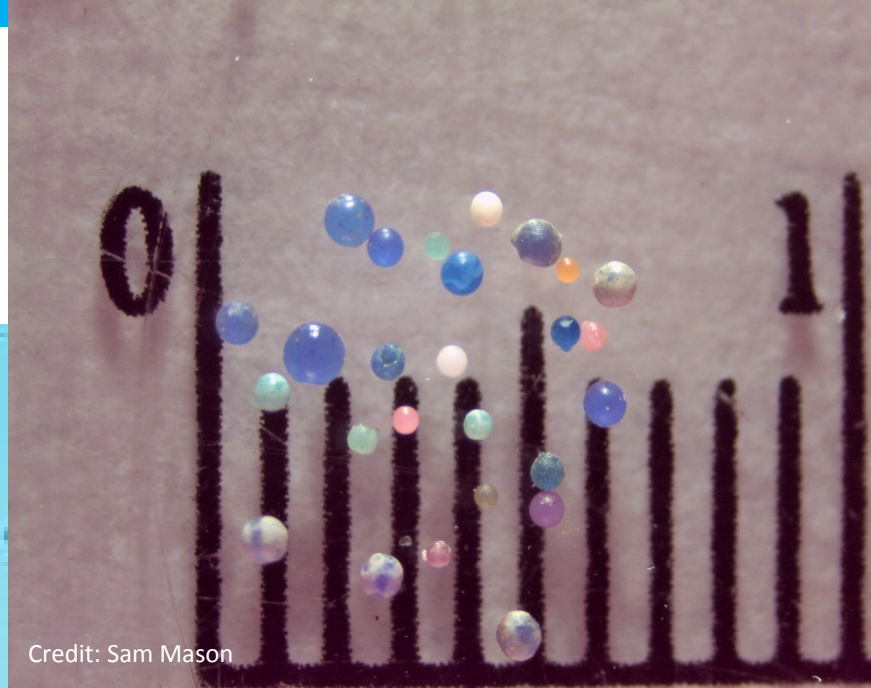


Shedding of Synthetic Materials

10,000-over 100,000
fibers per wash



Microbeads



**A TUBE OF FACEWASH
CAN CONTAIN OVER
330,000 MICROBEADS**

This means billions of plastic microbeads are flowing into our global waterways.



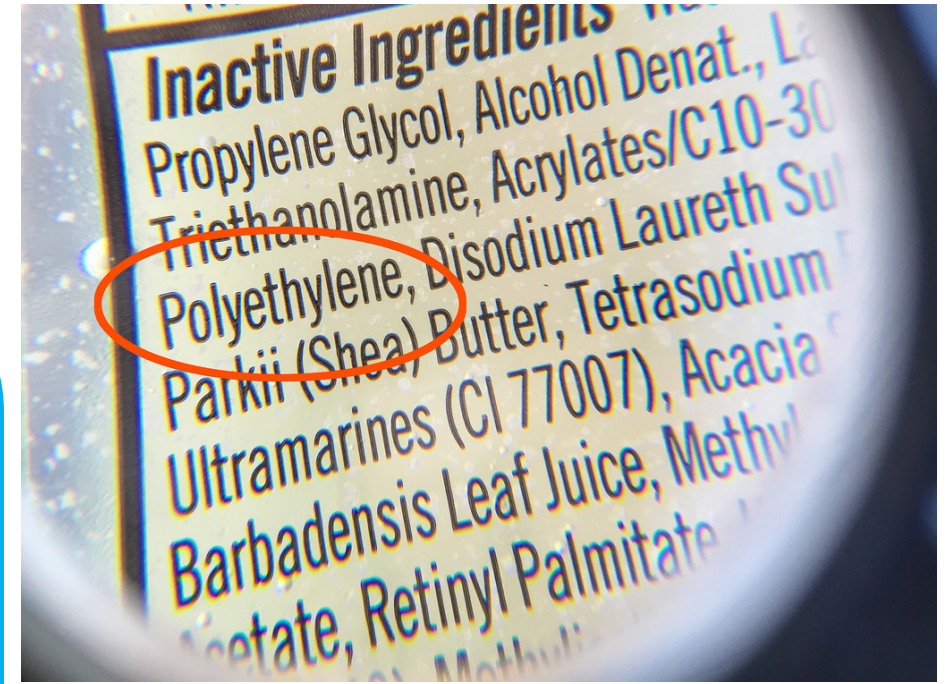
Credit: 5 Gyres

Microbead Legislation

Microbead-Free Waters Act of 2015

Dec. 28, 2015

- Facewash, toothpaste and shampoo containing plastic microbeads
- Must stop manufacturing by July 1, 2017
- Must stop selling by July 1, 2018



Plastic Still in Beauty Products

COSMETICS INFO THE SCIENCE & SAFETY BEHIND YOUR FAVORITE PRODUCTS

Safety Basics What's in My Products? Get the

| PRODUCT CATEGORIES | FIND AN INGREDIENT |
|--------------------------------|--|
| INTRODUCTION | Ingredients A to Z 1 2 3 4 5 6 A B C D E F G H I J K W X Y Z Poloxamer 403 Poloxamer 407 Polyacrylamide Polyacrylamidomethyl Benzylidene Camphor Polyacrylic Acid Polyamino Sugar Condensate Polybutene Polyethylene |
| SHELF LIFE | |
| BABY | |
| BATH | |
| EYE MAKEUP | |
| FACIAL MAKEUP | |
| FRAGRANCE | |
| HAIR CARE | |
| HAIR DYE AND HAIR COLORING | |
| NAIL | |
| ORAL CARE | |
| PERSONAL CLEANLINESS | |
| SHAVING | |
| SKIN CARE | |
| SUNSCREENS AND SUNLESS TANNERS | |

Uses reduces underarm wetness

Warnings

- For external use only.
- Do not use on broken skin.
- Ask a doctor before use if you have kidney disease.
- Stop use if rash or irritation occurs.
- Keep out of reach of children. If swallowed, get medical help or contact a Poison Control Center right away.

Directions apply to underarms only

Inactive ingredients
Cyclopentasiloxane, Stearyl Alcohol, C12-15 Alkyl Benzoate, PPG-14 Butyl Ether, Hydrogenated Castor Oil, PEG-8, Fragrance (Parfum), Dimethicone, Silica, Polyethylene, Helianthus Annuus (Sunflower) Seed Oil, Steareth-100, BHT.

Questions? call 1-800-761-3683

Direct



Ingestion

Credit: Algalita Marine Research Foundation



Entanglement



Ecosystem
Alteration

Credit: Lindsey Hoshaw

Environmental Impacts

Indirect

Ecosystem
Alteration



Credit: Beachhunter.net



Credit: U.S. Dept. of the Interior

Invasive
Species

Navigation



Economic Impacts

Tourism



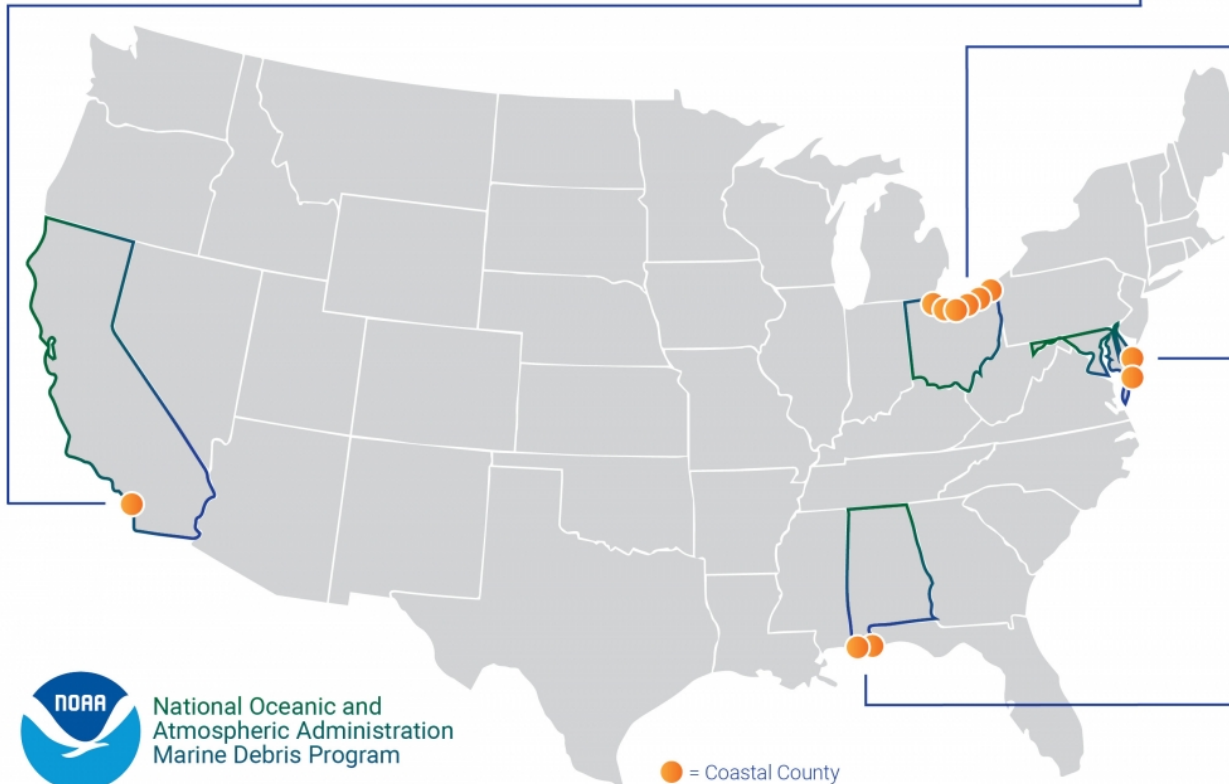
Fishing



The Cost of Marine Debris

The Economic Impacts of Marine Debris on Beaches

The NOAA Marine Debris Program funded a study with Abt Associates to better understand the economic impacts of marine debris on beaches. The results of the study showed that the varying amounts of marine debris on beaches can have an impact on the number of days visitors spend on those beaches, resulting in changes to the amount of tourism dollars spent, the number of local jobs, and the value of beach recreation.



| Beach | Cost | Timeframe |
|------------------------|----------------|------------------------------|
| Mentor Headlands Beach | \$20,000 | Per spring cleanup (1 month) |
| Lorain Lakeview Park | \$500 (\$6000) | Per week for 12 weeks |
| Cleveland Metroparks | \$61,000 | Per year |

recreational value
 ↑ \$35 million in tourism spending
 ↑ 670 jobs

recreation value
 ↓ \$113 million in tourism spending
 ↓ 2,200 jobs

Sharp Items



Human Health and Safety Impacts

Leach
Chemicals



Bacteria

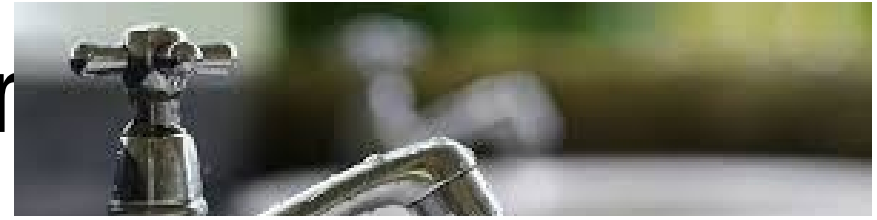


Food
Contamination

Toxic Plastic Found in the World's Favorite Fish
Researchers discover that tuna and swordfish are eating microplastics contaminated with harmful chemicals.



thin



ENVIRONMENT | PLANET OR PLASTIC?

In a first, microplastics found in human poop

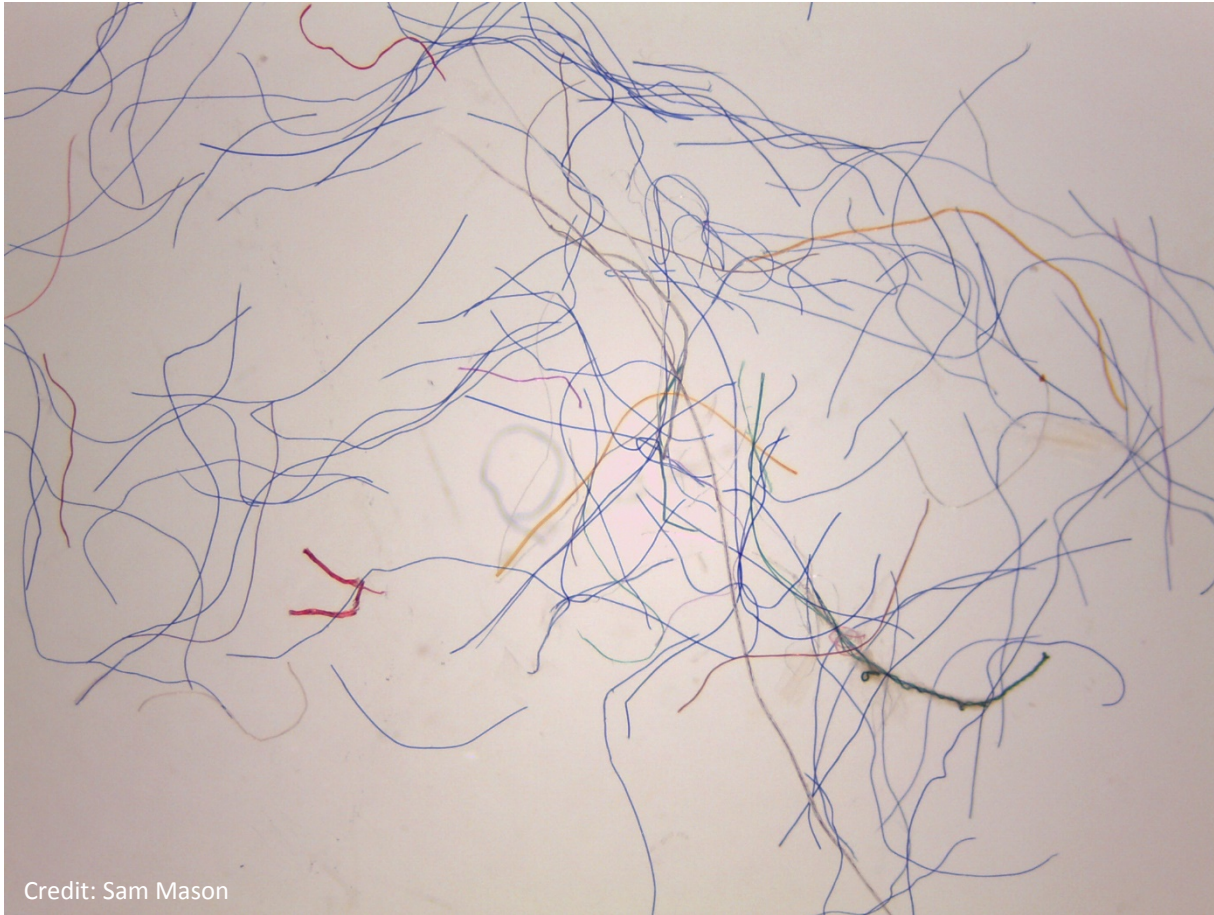
As microplastics permeate remote places and species around the globe, people are no exception.



THE OHIO STATE UNIVERSITY



Human Ingestion of Plastic



Credit: Sam Mason

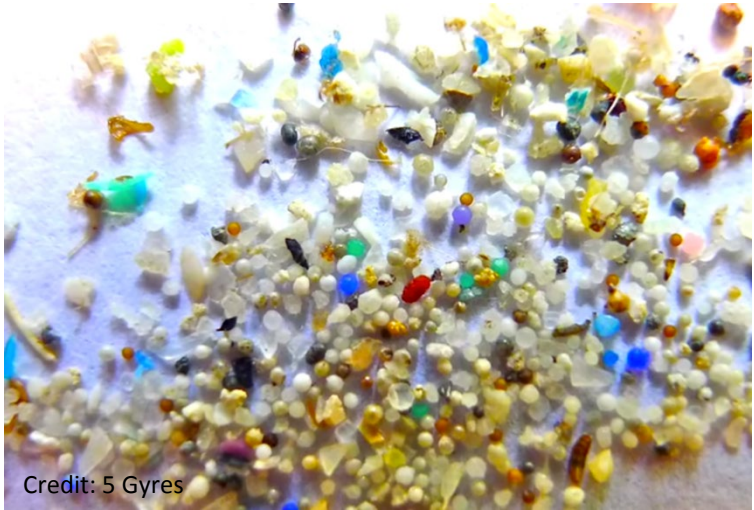
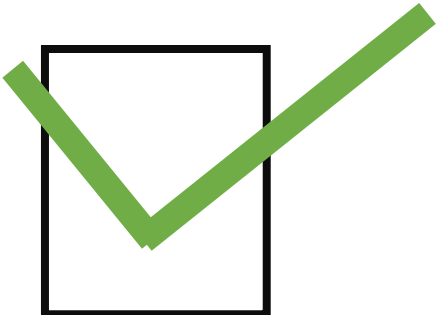
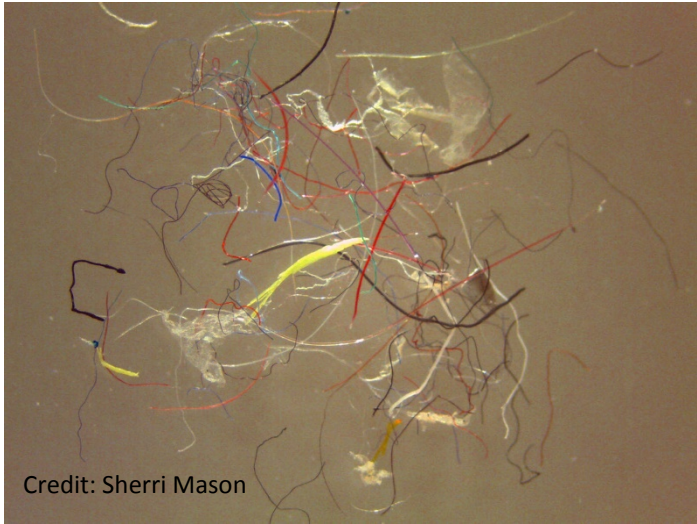
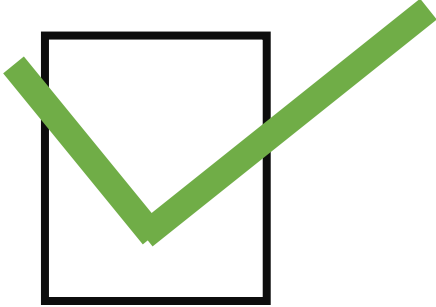


- ❖ Hundred of thousands of fibers
- ❖ 5 grams of plastic per year

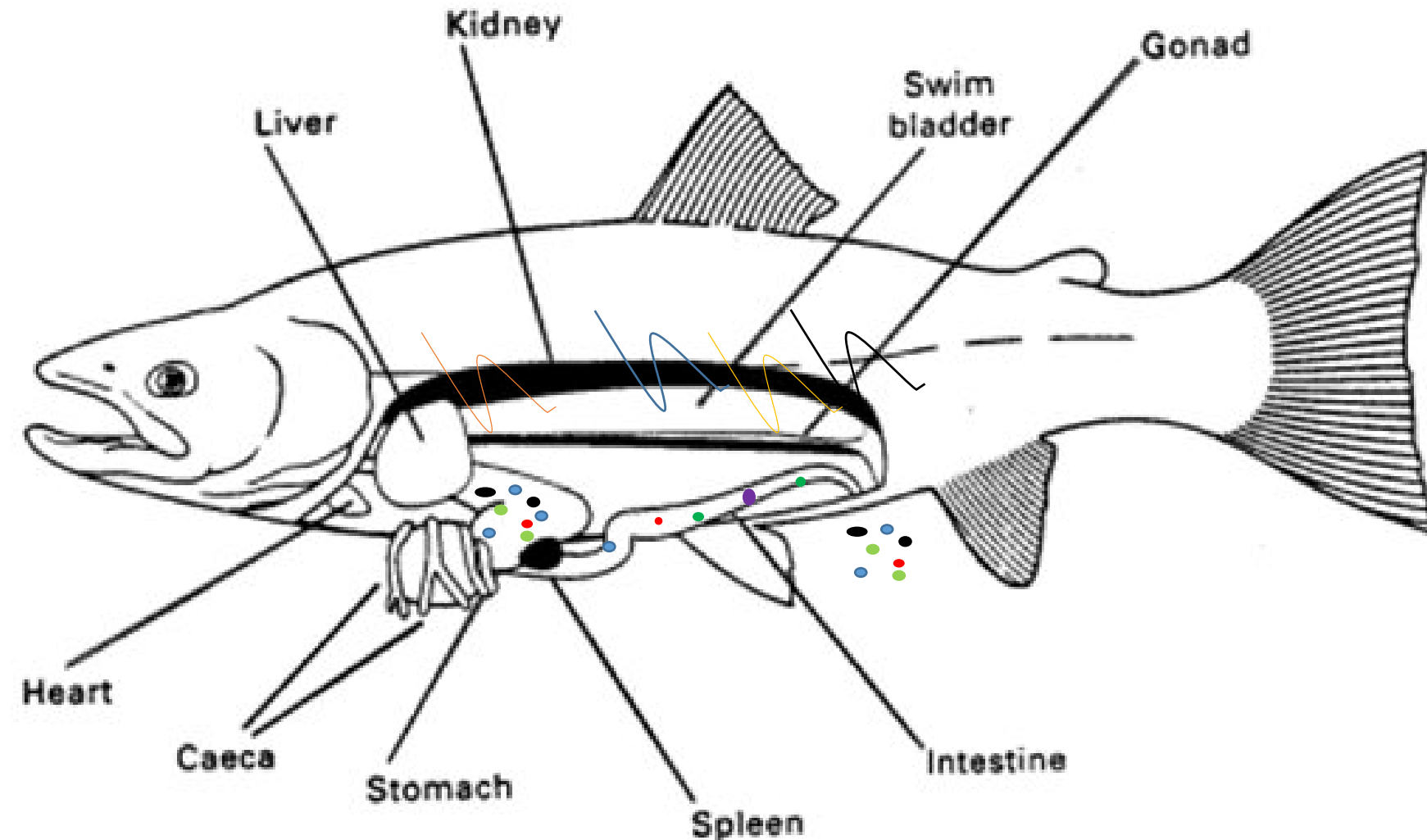
How are we affected?



Are microplastics found in fish and plankton?



Microplastics in Fish



❖ Small fish: 0-3 fibers

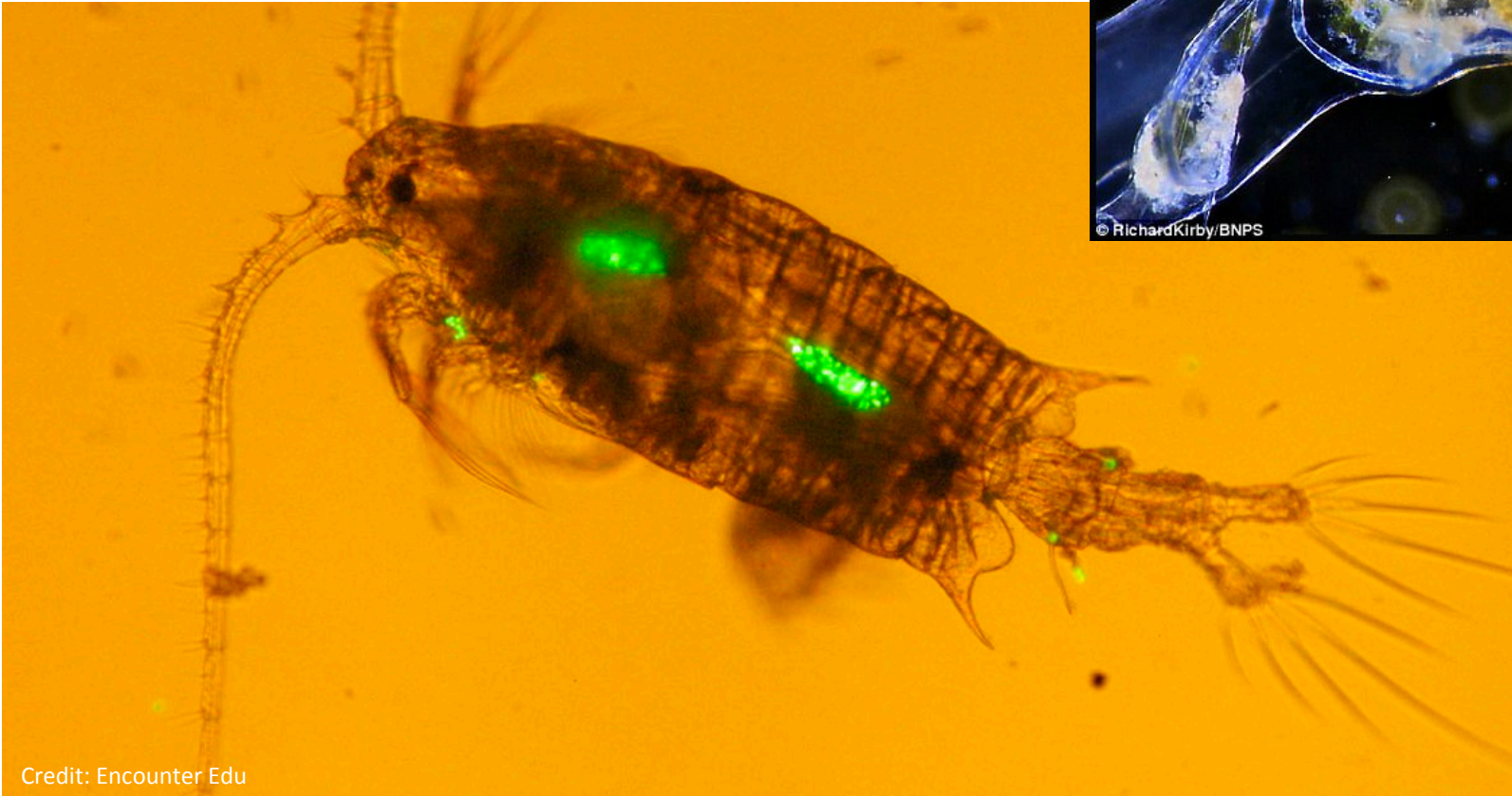
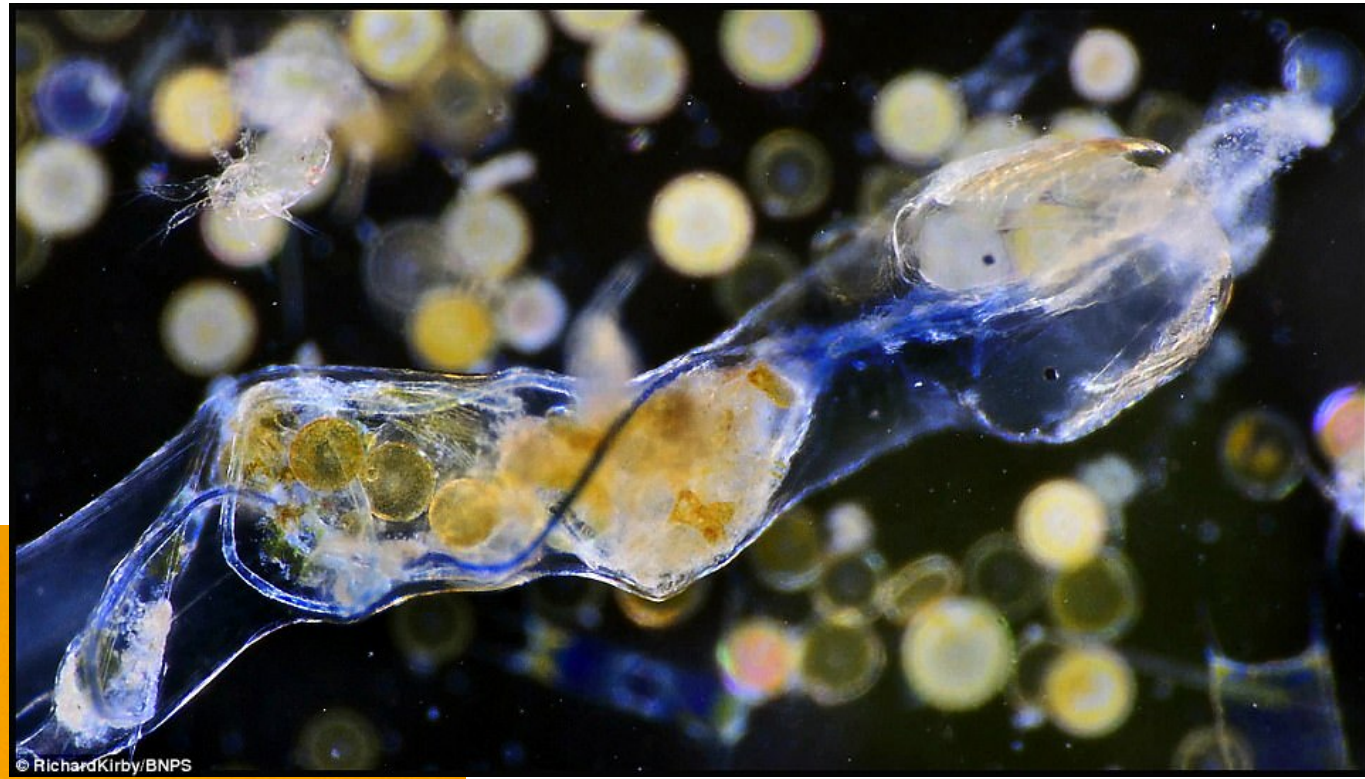
❖ Medium fish: 3-7 fibers

❖ Large fish: 7-12 fibers

❖ Cormorant: 32 fibers

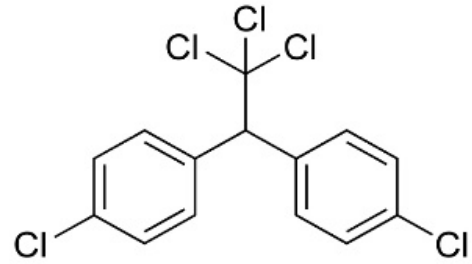
(Research from Mason, 2017)

Microplastics in Plankton



Are the animals affected?

DDT

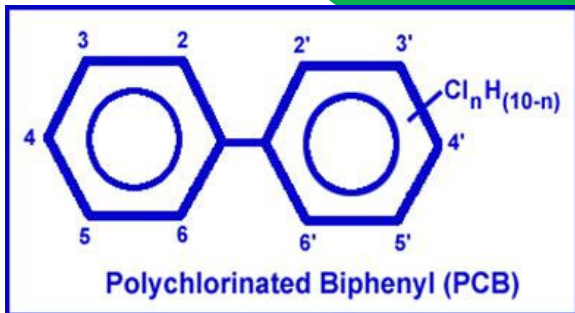
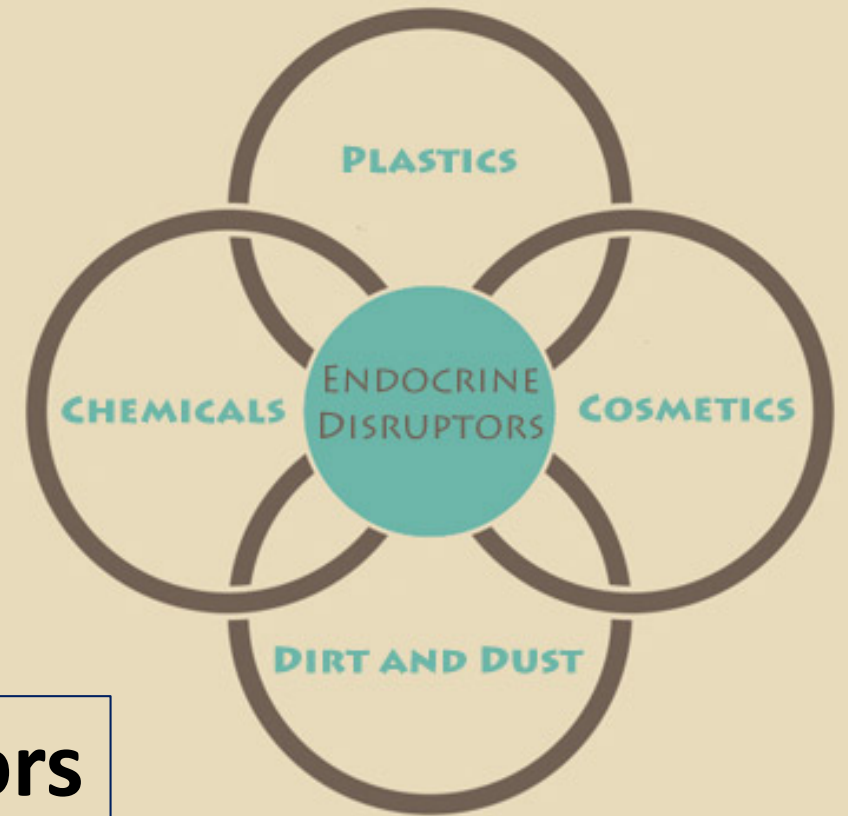


Plastic



Altered Behaviors

- Feeding
- Reproduction
- Growth
- Movement



Hot Topics



Biodegradable Symbol



Plastic Bags



Bag Ban or Fee Challenges

Cuyahoga County Council passes plastic bag ban

Updated May 29, 2019; Posted May 28, 2019



House Bill 242



Ohio House passes ban on plastic bag bans

Bag Ban Cuyahoga County

Cuyahoga County PLASTIC BAG BAN



THE BAN

Disposable plastic bags are a major source of pollution in our environment and our waterways. They also harm wildlife and people and impose cleanup costs on our communities. As a result, Cuyahoga County passed a county-wide ban on plastic bags that will go into effect on January 1, 2020.

By passing legislation, Cuyahoga County joins the many other communities and nations who are taking steps to curb plastic pollution. This ban prohibits retailers from providing disposable bags at checkout, but they may still provide recyclable paper bags and sell reusable bags. We can each be part of the solution to plastic pollution. Remember to Bring Your Own Bags when you shop.

THE BAN APPLIES TO

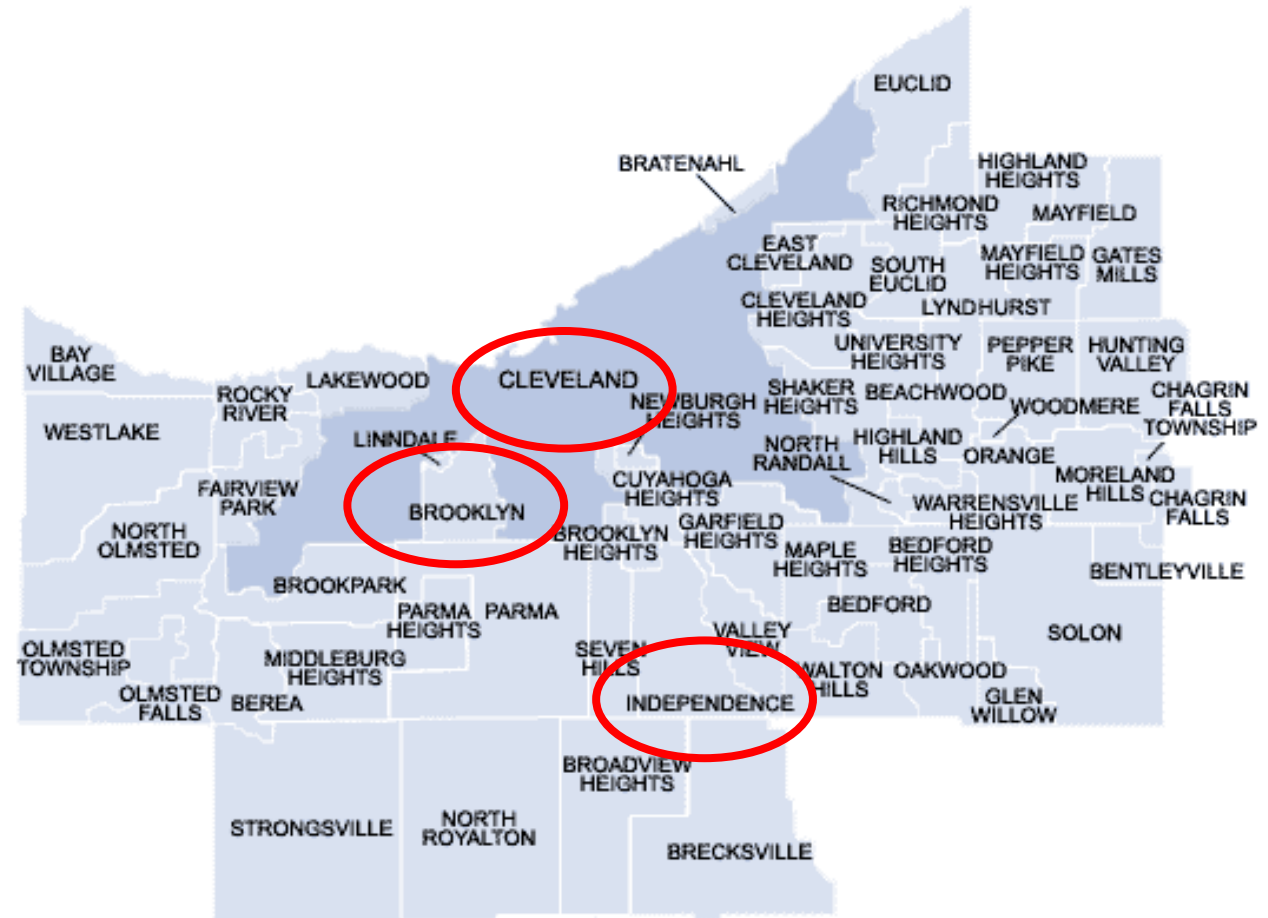
- Retail stores of all types
- Convenience stores
- Grocery stores and supermarkets
- Service stations
- Drug stores

Except when used for:

- Curbside pick-up or delivery
- Leftovers
- Prepared foods
- Packaging bulk items or perishables (such as meat, fish, produce, baked goods, flowers)
- Prescription medicines
- A newspaper
- Prepackaged bags used for pet waste

THE BAN DOES NOT APPLY TO

- Dry cleaners who only use plastic bags for dry cleaning items
- Restaurants
- Bakeries



Website: <http://sustainability.cuyahogacounty.us/en-US/BYOBag.aspx>



Plastics Recycling

Website: https://cuyahogarecycles.org/how_to_recycle

Recycling in Cuyahoga County is easier than ever.

Good news: Most product packaging and paper can be recycled in your home. Cut your trash in half when you combine paper, cans, cartons and glass along with plastic bottles and jugs in your curbside recycling. Recycle more, recycle better.

Learn more at CuyahogaRecycles.org



Cuyahoga County
SOLID WASTE DISTRICT



Place these items loose – not bagged – in your recycling container.



Collapse of Recycling

1% contamination and it goes to landfill



BV TRASH VALET & RECYCLING

WHAT IS RECYCLING CONTAMINATION AND WHY DOES IT MATTER?

RECYCLING CONTAMINATION IS WHEN THE WRONG ITEMS ARE PLACED IN RECYCLING BINS OR RECYCLABLE ITEMS BEING PREPARED INCORRECTLY OR CONTAMINATED BEFORE BEING RECYCLED.



CHECK ACCEPTABLE MATERIALS

BEWARE OF HAZARDOUS MATERIALS



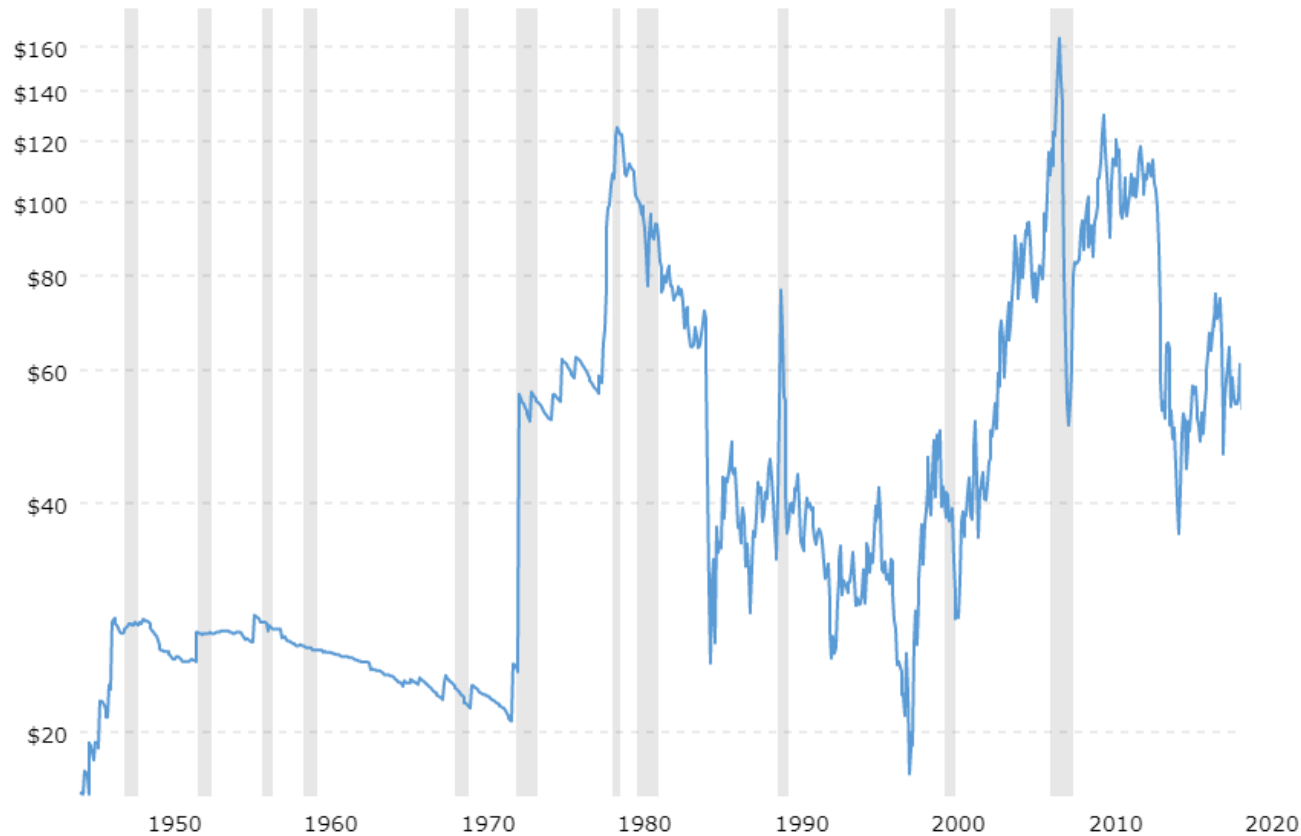
FOOD RESIDUE

COLLECTING IS NOT RECYCLING



Market Changes for Recycling

The current price of WTI crude oil as of January 27, 2020 is **\$53.14** per barrel.



Credit: MacroTrends



© Can Stock Photo - csp19697944



Credit: CNN

What plastics can be recycled in Cuyahoga County?



Biodegradable or Compostable Plastics



Backyard vs. Industrial Composting



Credit: Black Earth Compost

RUST BELT  RIDERS



Credit: Rustbelt Riders

Reduced or Zero Waste Events

Zero and Reduced Waste Event Planning Guide

compiled by



Backyard vs. Commercial Composting

For small events, backyard composting may be the most convenient and cost-effective way to dispose food waste. **It is not recommended to compost meat, fish, fats, oils, grease, or compostable serviceware at home.** Backyard composting does not reach temperatures high enough to properly break down the waste. Commercial composting facilities use grinders during a pre-processing phase, which allows the microbes to fully break down all organic waste, including compostable serviceware. **Check if your product vendor is BPI-certified at www.bpiworld.org.**

Website:

<https://www.sustainablecleveland.org/zwneo>

Appendix 4:

Compostable Material Vendors

Compostable serviceware that is certified through the Biodegradable Products Institute (BPI) and meet standards for compostability, which means the products are guaranteed to break down in a commercial compost facility. While some vendors exclusively offer products that are BPI-certified, there are others that only choose to certify certain products. For current BPI-certified companies and products, visit: www.bpiworld.org.

BPI-Certified Product Vendors

(All products are certified compostable)

Vegware

1554 Thomas Road, S.E.
Warren, OH 44484
330-369-1192
vegwareus.com

World Centric

101 H Street, Suite M
Petaluma, CA 94952
886-850-9732
worldcentric.org

TrueChoicePack

1285 Lyons Road, Bldg. H
Dayton, OH 45458
biogreenchoice.com

BPI-Certified Product Vendors - Limited products

(Some products are certified compostable)

Eco-Products, Inc.

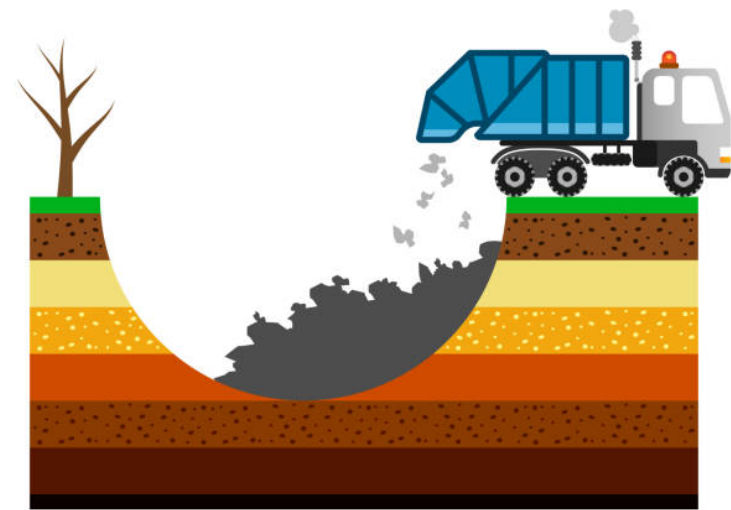
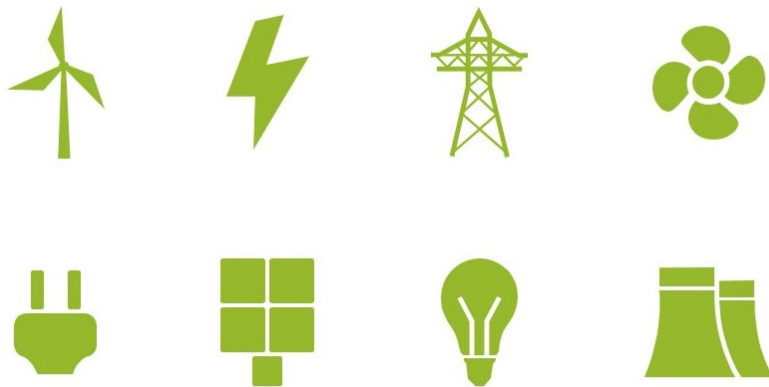
4755 Walnut Street
Boulder, CO 80301
303-449-1877
www.ecoproducts.com

Green Paper Products

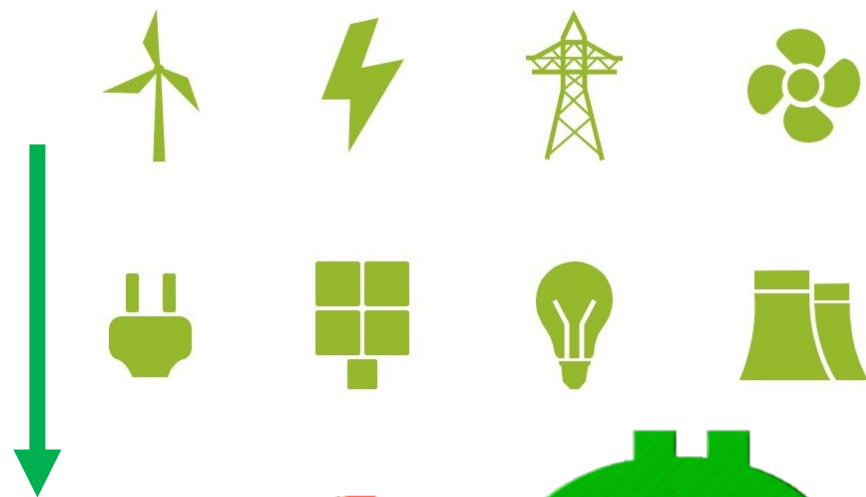
93 Alpha Park
Highland Heights, OH 44143
877-341-5464
www.greenpaperproducts.com



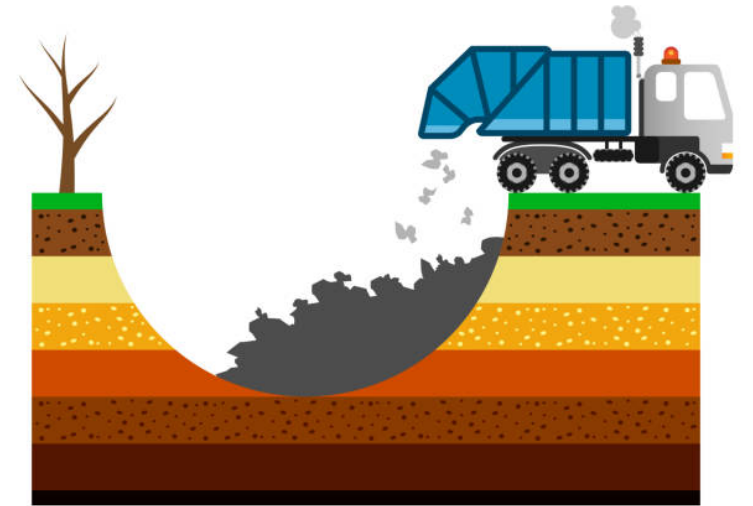
Paper or Plastic?



Paper or Plastic?



Paper, Plastic, or Reusable?



GL MD Land-based Action Plan

Contact

Sarah Lowe

Great Lakes Regional
Coordinator

Sarah.lowe@noaa.gov



through the 2014-2019 Great Lakes Land-based Marine Debris Action Plan. This work included completing research and publishing scientific articles, engaging with the policy and management community, educating the public and students, and removing debris from the environment. In total, 180,062 people were educated on the topic during 711 events and approximately 306,665 pounds of debris was removed by volunteers. A

Goals

Goal 1: The research and monitoring of marine debris addresses knowledge gaps and informs action.

Goal 2: A science-based, strategic approach guides marine debris policy and management decisions in the Great Lakes.

Goal 3: Marine debris is prevented and reduced through an educated and involved community.

Goal 4: The marine debris that reaches the Great Lakes environment is removed to minimize adverse impacts.

**2020 Great Lakes
Marine Debris Action Plan**

January 2020

Photo credit: NOAA

Plastic Reduction Working Group

The Sustainable Cleveland Plastic Reduction Working Group invites you to join in our Skip the Straw campaign. Through this targeted effort, we hope to prevent millions of plastic straws from entering the Lake. Restaurants, bars and similar establishments can play an important role by reducing the amount of plastic straws that are used by their customers daily.



Contact

Cathi Lehn

Sustainable Cleveland Manager

clehn.@city.cleveland.oh.us

Great Lakes Friendly Restaurants

Restaurants participating must follow the first five criteria:

- No expanded polystyrene use (aka Styrofoam).
- Proper recycling practices are followed.
- Only reusable foodware is used for onsite dining.*
- No plastic bags offered with take out or to-go orders and utensils are provided only upon request.
- Paper straws are provided only upon request.**

Website: <https://northernohio.surfrider.org/>



**GREAT LAKES FRIENDLY
RESTAURANTS**



Marine Debris PSA Competition

- Contest for high school age students in coastal Ohio, USA (Lake Erie)
- Complete one marine debris lesson (provided)
- Write 750 word essay
- Develop Public Service Announcements: ~1 min.
- Launched in fall; Due mid-March

Website:

<https://marinedebris.noaa.gov/outreach/communicating-clean-future-ohio-marine-debris-challenge>



Talking with Our Tourists



- ❖ **2016** (no campaign): **223,500**
- ❖ **2017** (stopped freely putting straws in each drink): **177,500**
- ❖ **2018** (officially started Skip the Straw Campaign): **115,100**
- ❖ Reduction of **108,400 straws** in two years! That's enough straws to line the length of PIB 4 times!



Skip the Straw Customer Response

Staff Response

- 3 people stopped using straws
- All staff trying to use reusable cups or water bottles
- They have also changed their plastic use habits

Customer Response

- Overwhelming positive response
- People who requested straws often changed their mind when staff explained to them why they were skipping the straw

Financials

- Restaurant has not lost business
- Staff have not lost tips



It All Adds Up

| Item | Use per tourist per visit <i>(visit length 1.5 days)</i> | Use by all tourists for entire year <i>(750,000 tourists per year)</i> |
|--------------------------|--|--|
| Water Bottle | 5 | 3.75 million |
| Straw | 4 | 2.81 million |
| Cup | 3 | 1.87 million |
| Coffee Cup | 2 | 937,500 |
| Bag | 4 | 2.81 million |
| Spoon | 4 | 2.81 million |
| Fork | 4 | 2.81 million |
| Knife | 4 | 2.81 million |
| Takeout Container | 2 | 937,500 |

Single-use plastic consumption by tourists visiting Put-in-Bay, OH.



It All Adds Up

| Item | Use per tourist per visit <i>(visit length 1.5 days)</i> | Use by all tourists for entire year <i>(18.5 million tourists per year)</i> |
|--------------------------|--|---|
| Water Bottle | 5 | 92.5 million |
| Straw | 4 | 74 million |
| Cup | 3 | 55.5 million |
| Coffee Cup | 2 | 37 million |
| Bag | 4 | 74 million |
| Spoon | 4 | 74 million |
| Fork | 4 | 74 million |
| Knife | 4 | 74 million |
| Takeout Container | 2 | 37 million |

Single-use plastic consumption by tourists visiting Cleveland, OH.

Grocery Store Outreach



Survey Link:

https://osu.az1.qualtrics.com/jfe/form/SV_1ZK7NMr7pO5In8F



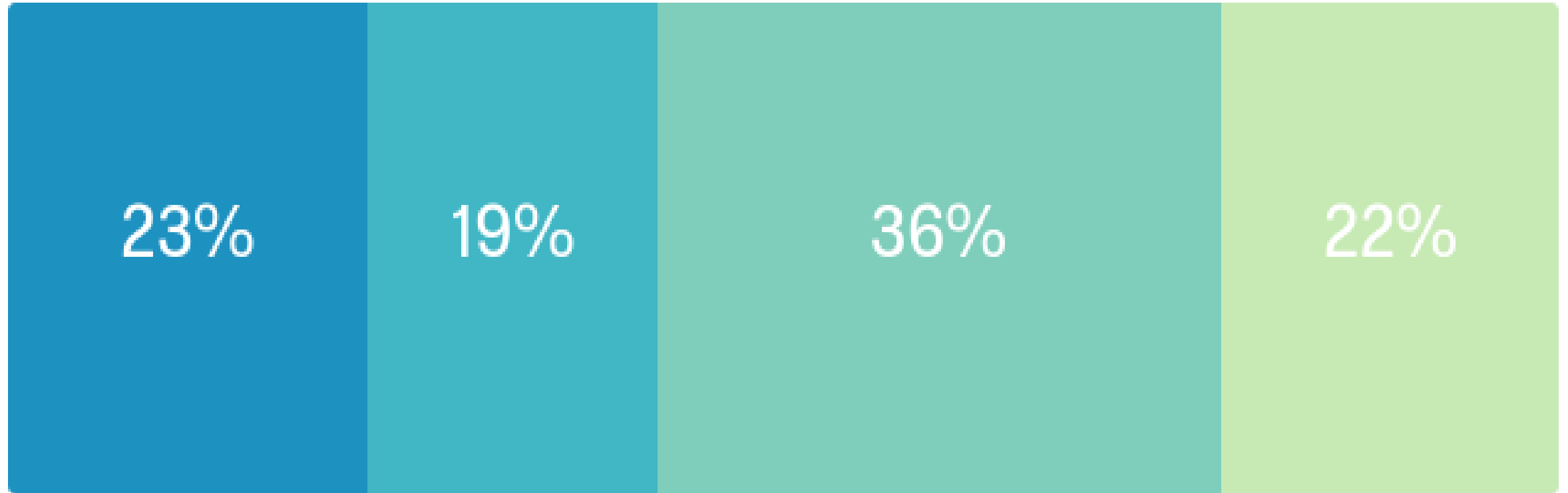
Why aren't reusable bags always used?

Reasons Why Reusable Bags are Not Always Used



Reducing Use of Plastic Bags

Options Supported to Limit Use of Plastic Bags



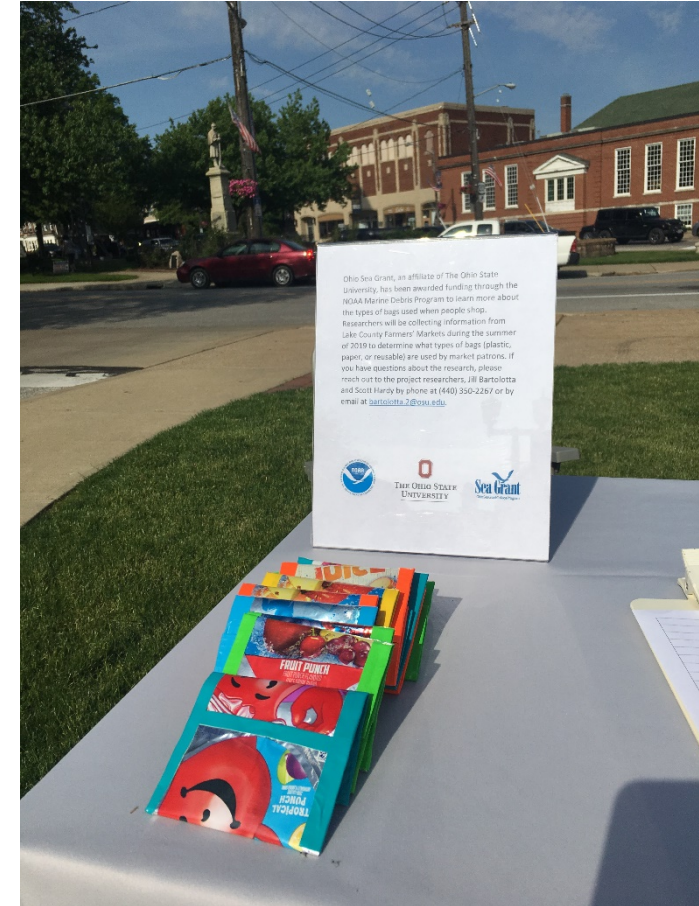
■ Fee for use of plastic bags.

■ Ban on use of plastic.

■ Both

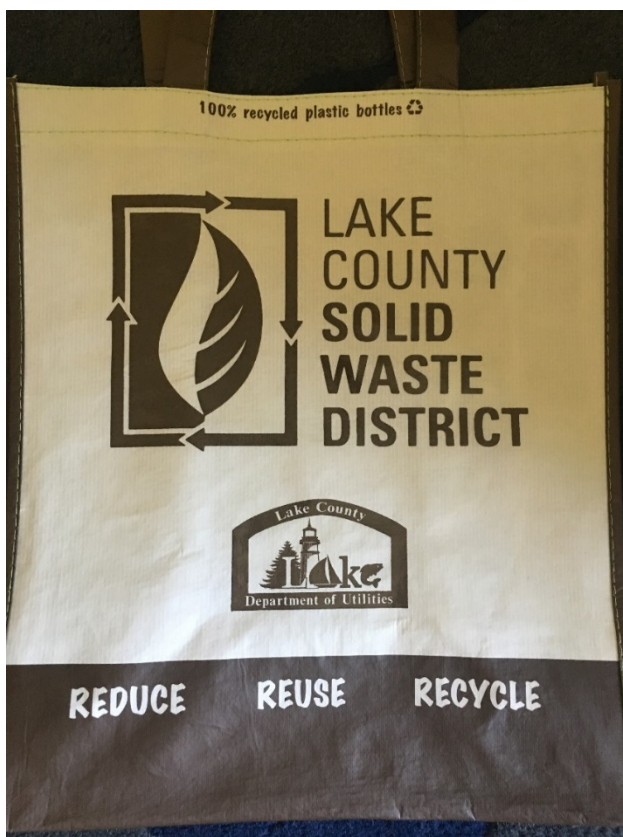
■ Neither

Farmers' Markets



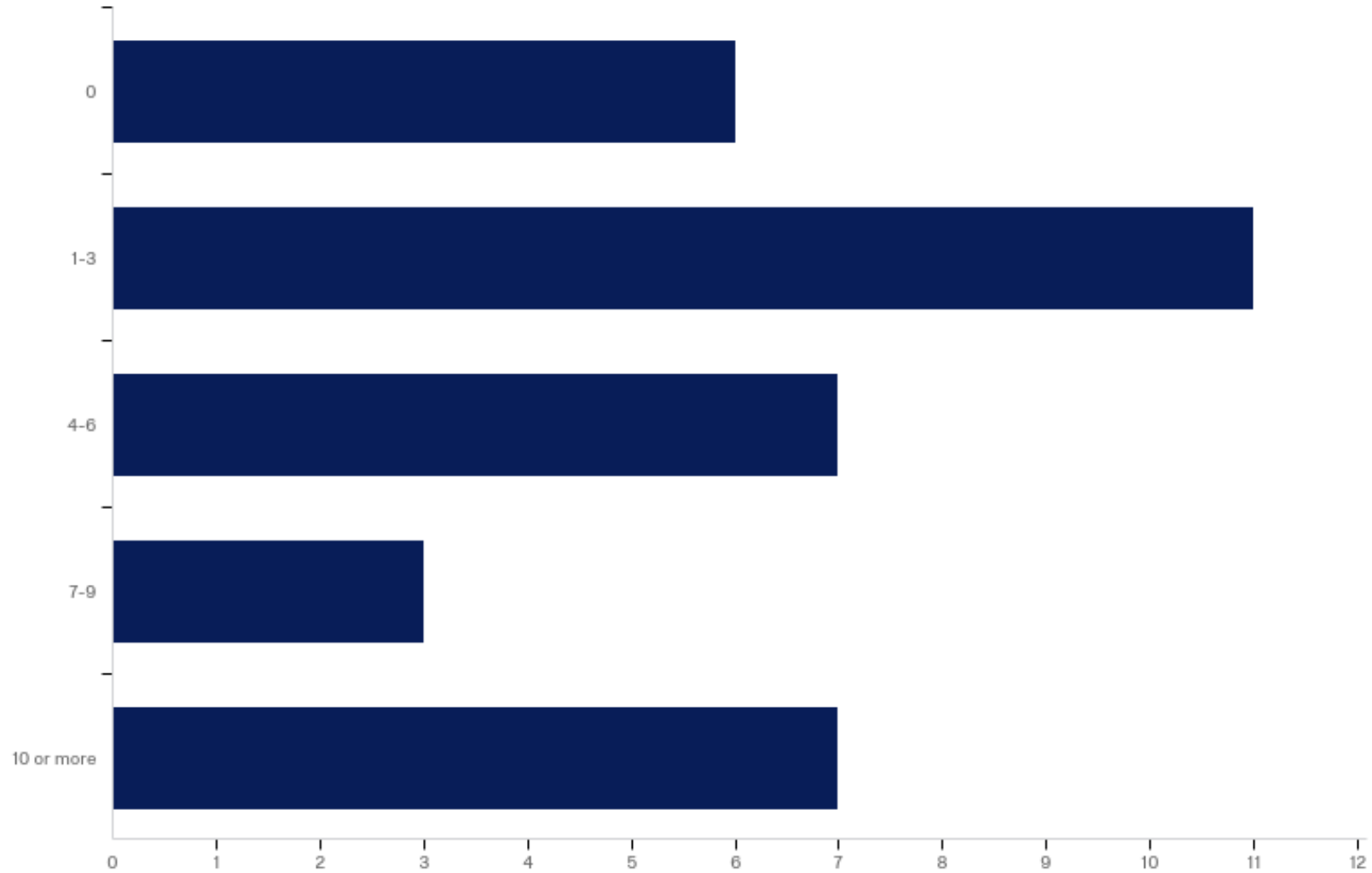
Bag Reuse

1600 bags given out

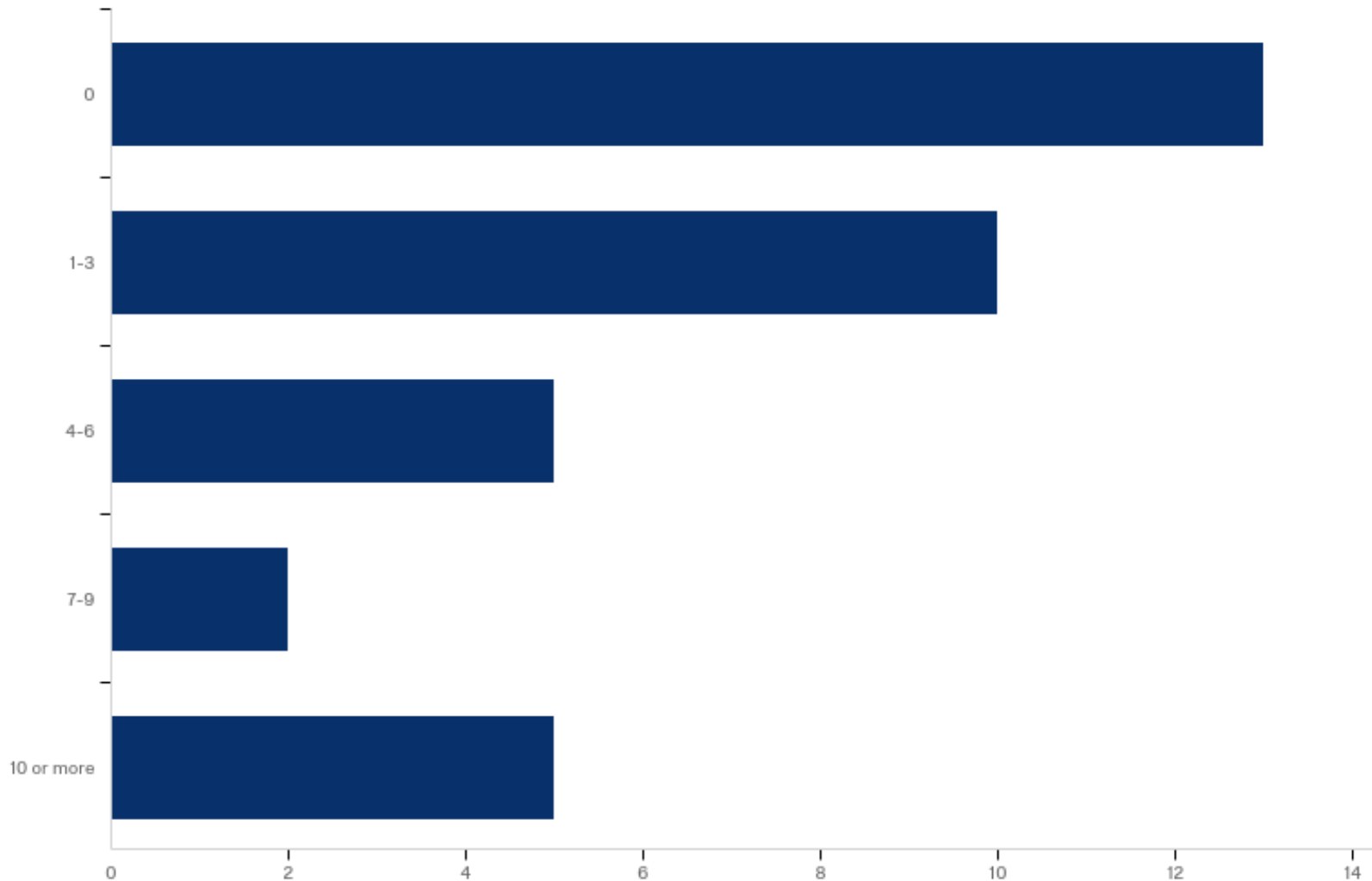


| Solid Waste Bags Observed | |
|---------------------------|--------------------------|
| <i>Bags Given Out</i> | <i>No Bags Given Out</i> |
| 53 | 6 |
| 35 | 2 |
| 0 | 9 |
| 57 | 5 |
| 7 | 4 |
| 20 | 5 |
| 16 | 4 |
| | 5 |
| | 10 |
| 188 (12%) | 50 (3%) |

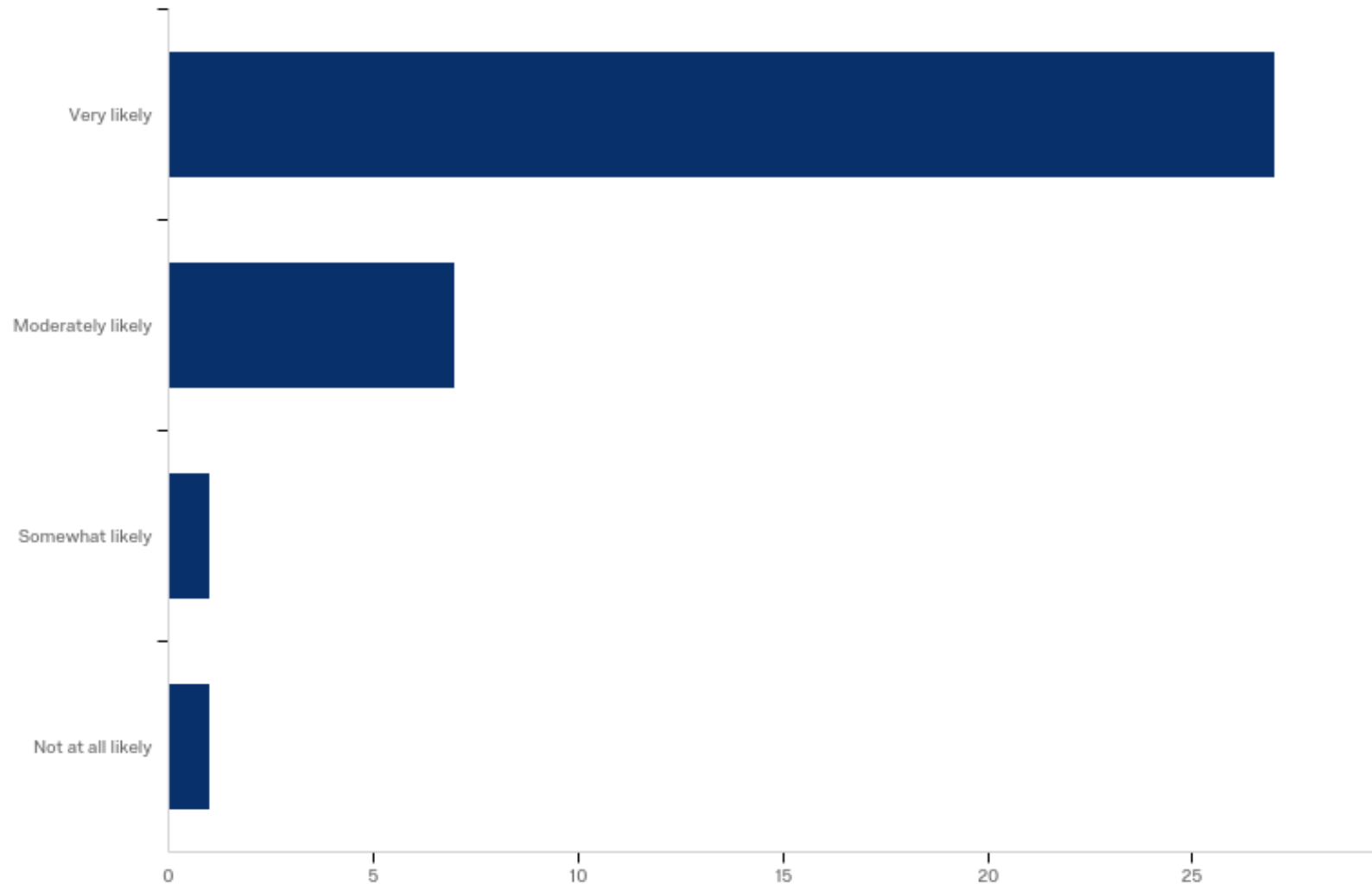
Early Results: Reuse of Bag at Other Stores (37 responses)



Early Results: Reuse of Bag at Other Farmers' Markets



Early Results: Support for Stores without Bags Provided



Bagless Initiative: Revolve Kids

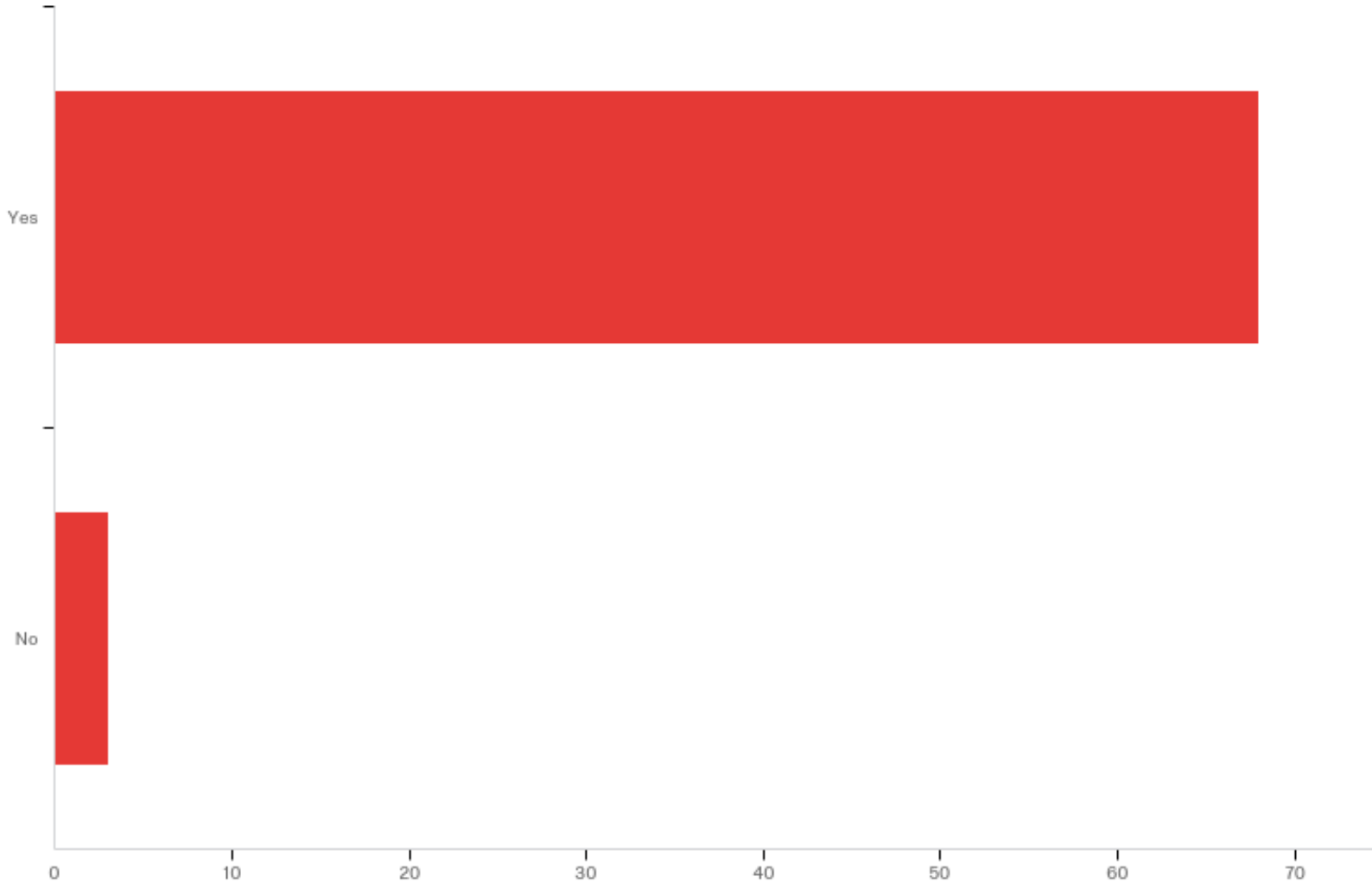


Revolve Kids is part of a grant from *Ohio State University, NOAA and Sea Grant* that addresses the dire consequences of single-use plastic bags on the environment, particularly the marine (water) environment.

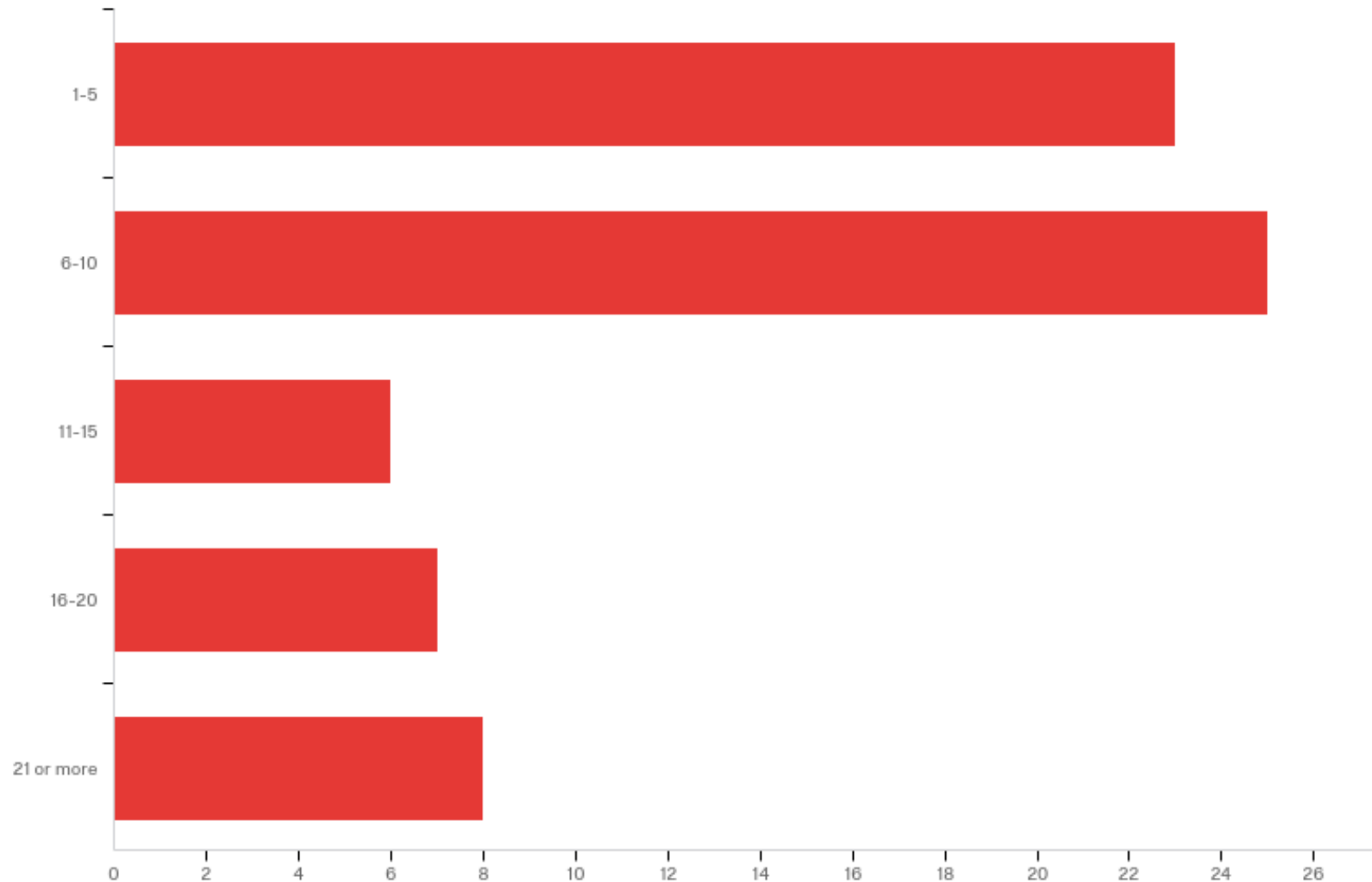
Cuyahoga County has passed a bill that takes effect in January 2020 forbidding retailers to use single-use plastic bags in their stores. We are

1. Trying to change our customers' behavior, both the *expectation* of getting a single-use plastic bag after a purchase, and to *bring their own reusable bag*, and
2. To be a model for other retailers to learn how best to adjust to the new law. Thank you for your help in this very important endeavor, and we are sorry for any inconvenience, we hope you train yourself to always **BYOB!** We can be the change!

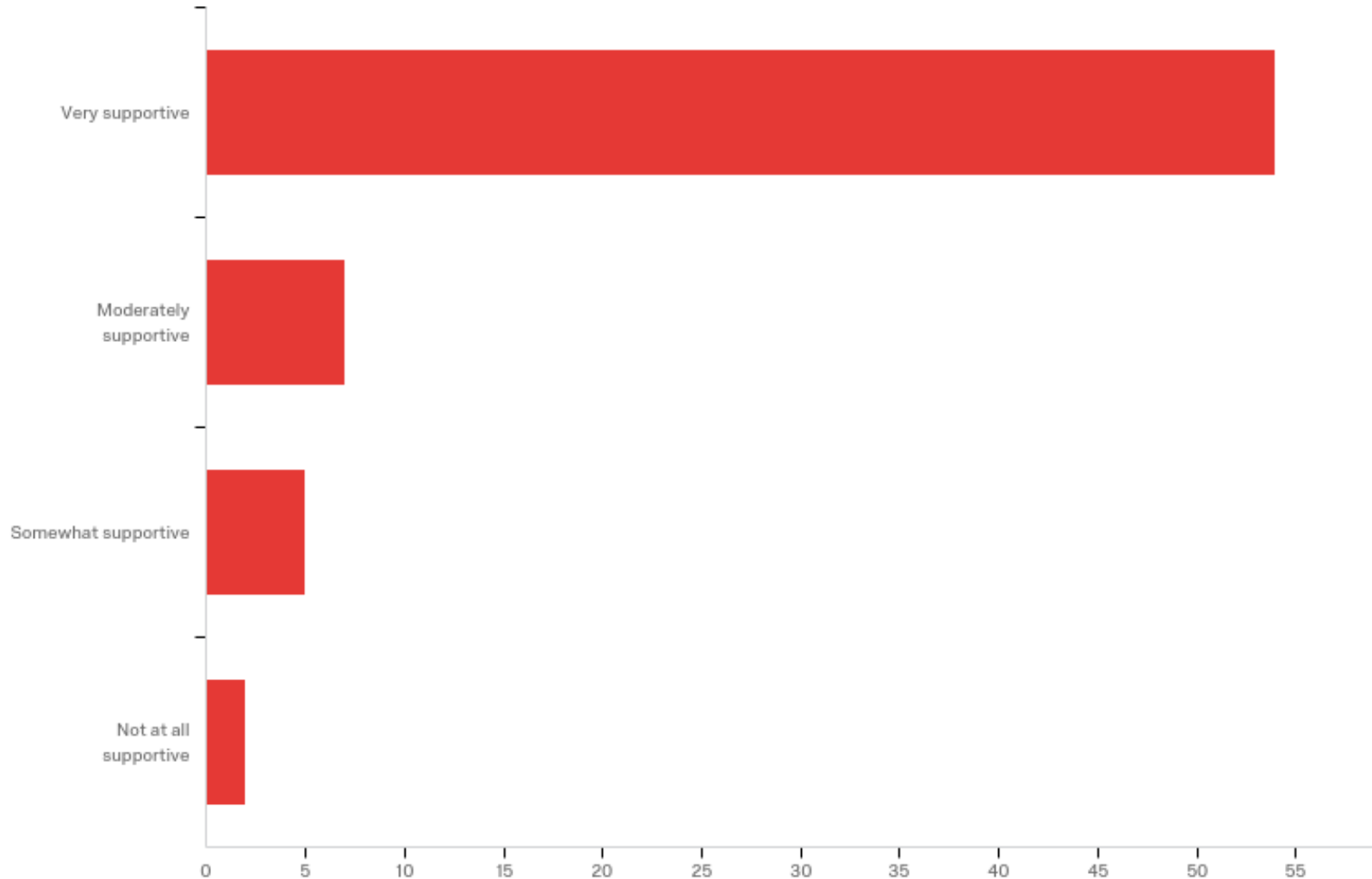
Early Results: Access to Reusable Bags (74 responses)



Early Results: Number of Reusable Bags at Home



Early Results: Support for Stores without Bags Provided

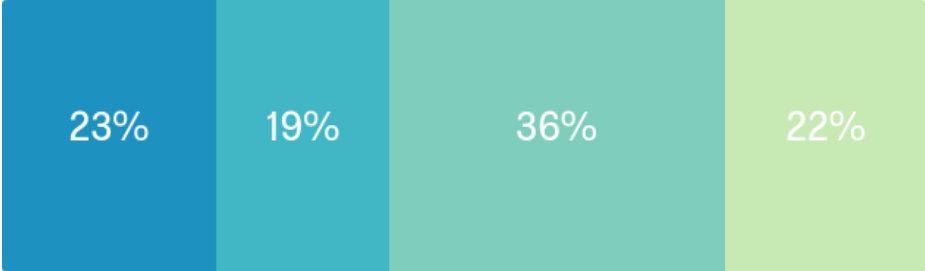


Takeaway 1: Reusable Bags

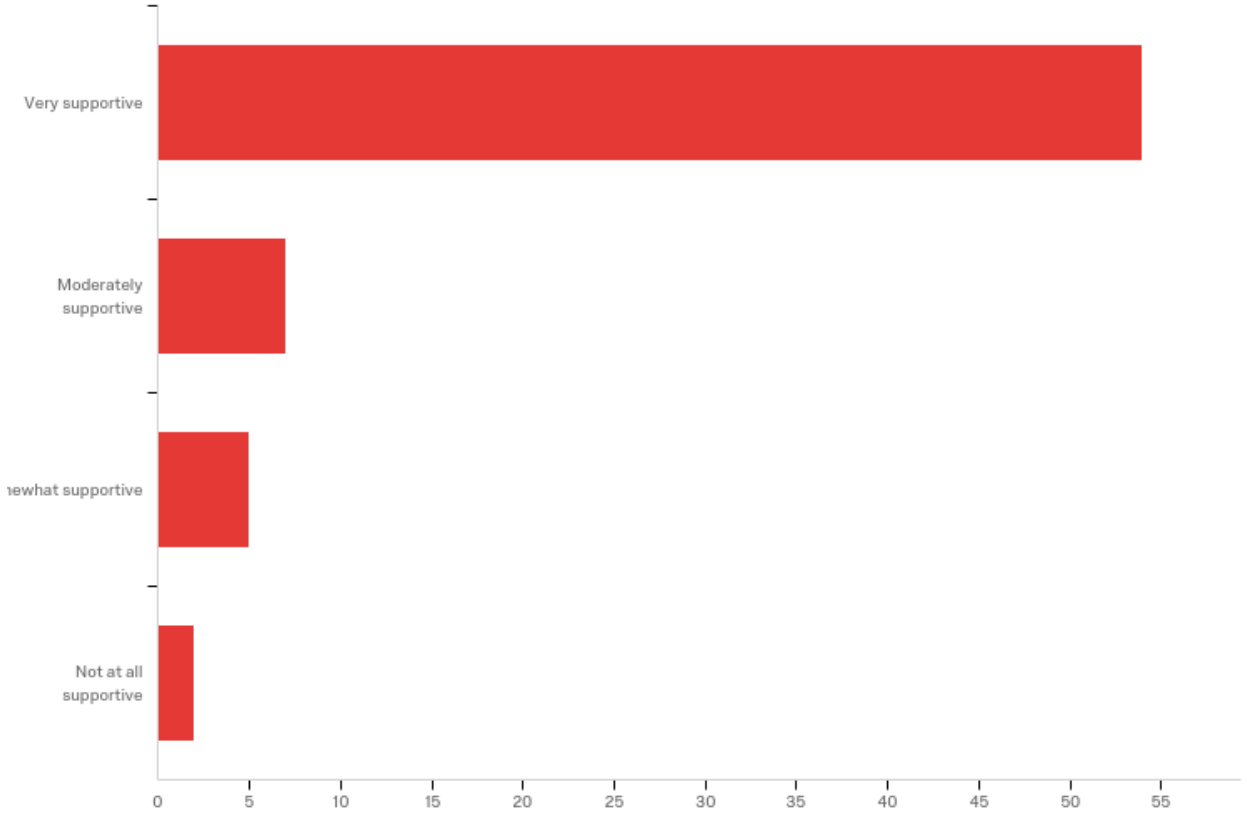
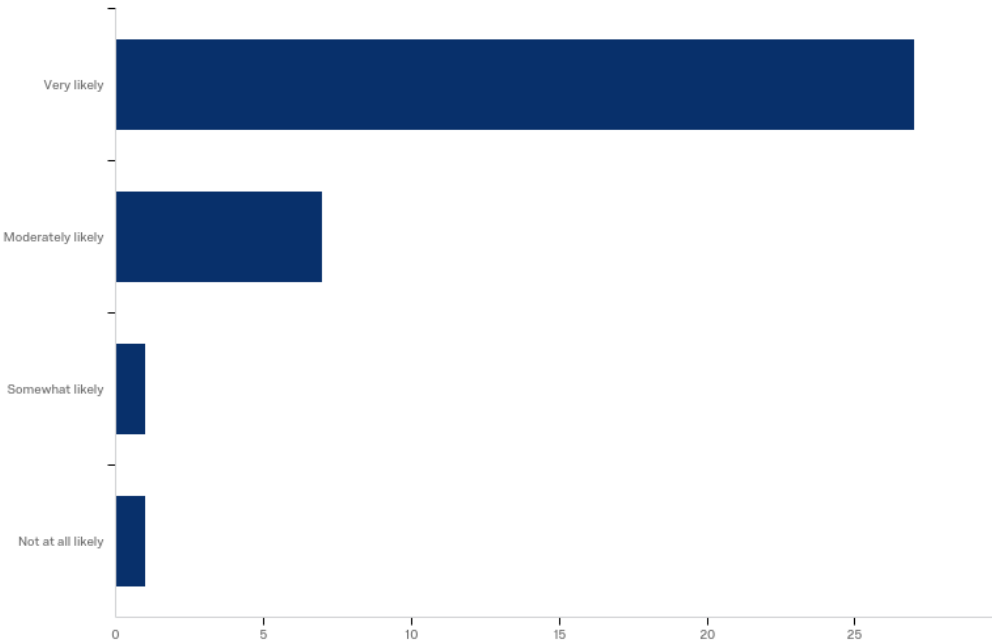


Takeaway 2: Less or No Disposable Bags

Options Supported to Limit Use of Plastic Bags



■ Fee for use of plastic bags. ■ Ban on use of plastic. ■ Both ■ Neither

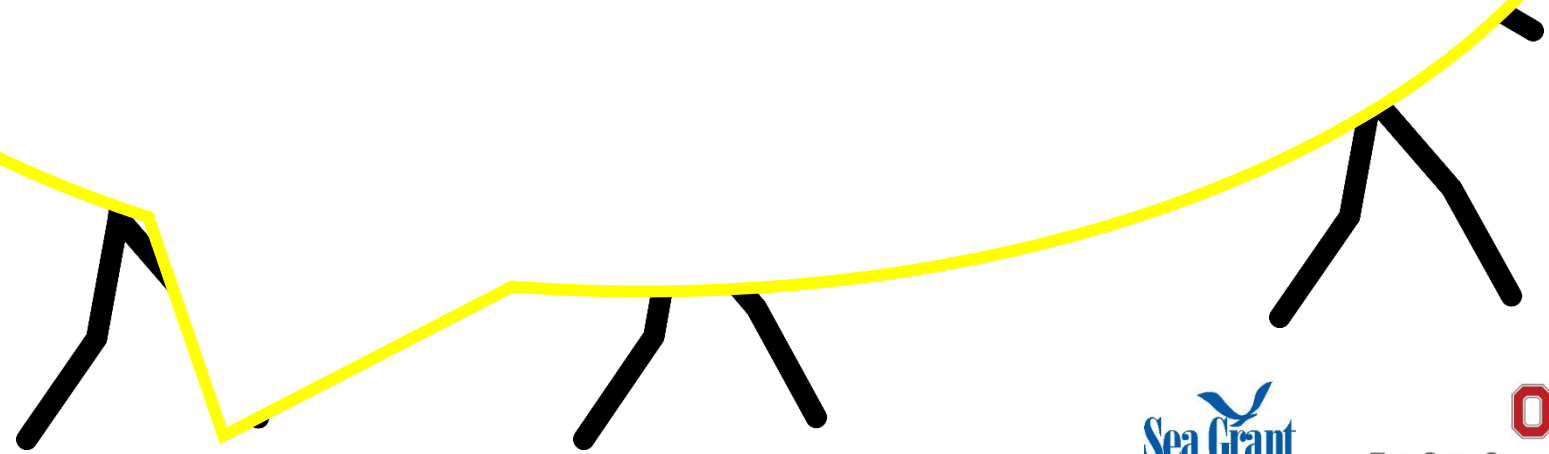
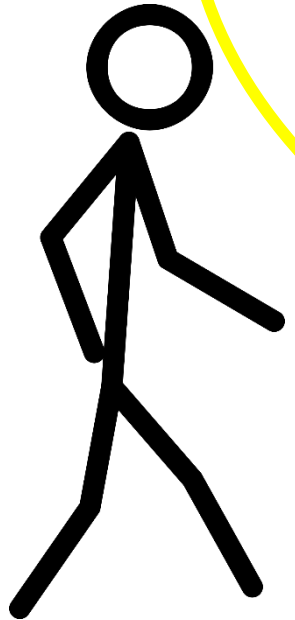


Why Should I...

I want
with
a

I want animals to
not dying from
or being
in trash.

It is
preventable...



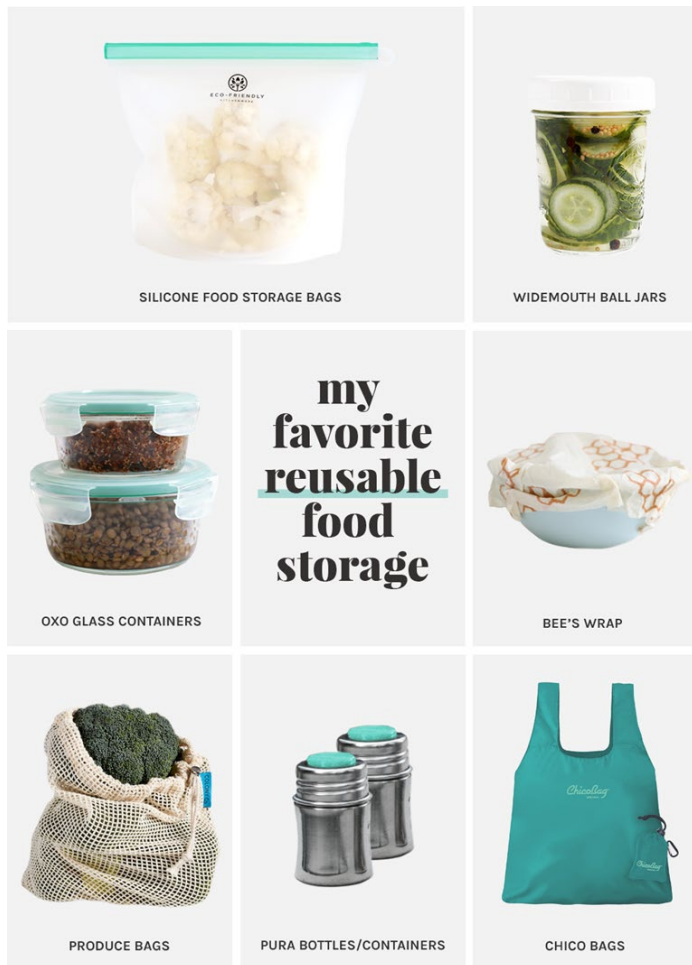
It is Simple. **Refuse** and **Reuse!**



Refuse!



Reuse!



Resources

- EPA Trash Free Waters: <https://www.epa.gov/trash-free-waters>
- NOAA Marine Debris Program: <https://marinedebris.noaa.gov/great-lakes>
- Alliance for the Great Lakes: <https://greatlakes.org/>
- Ocean Conservancy: <https://oceanconservancy.org/>
- Plastic Bag Memo: <http://nsglc.olemiss.edu/Advisory/pdfs/plasticbag.pdf>

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Questions?

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Can you spot the marine debris?

