

PLASTICWATCH



Helen Bailey

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Outline

- Motivation
- Approach
- Preliminary Results
 - Piloting Alternatives
 - Cost Analysis
 - Community Engagement
- Next steps



Sea turtles



The Leatherback Trust

"A gentle book of subtle magic, this poetic little story is a fine way to introduce young minds to the ocean world and our role in it."
—Dr. Carl Safina, author of *Voyage of the Turtle* and *Beyond Words: What Animals Think and Feel*

"Gentle, mysterious leatherback turtles are among the most beloved ocean creatures. In *The Grande Turtle Adventure*, readers will find themselves charmed and entertained, but also deeply educated. Now, more than ever, these magnificent turtles need our help."
—Susan Casey, author of *Voices in the Ocean: A Journey into the Wild* and *Haunting World of Dolphins*

"Stories of epic explorations light up a child's brain with empathy, imagination, and wonder and stay with us as guides all our life. The great adventures of two sea turtles named Laurie and Tica take readers on a deep dive and do serious good for the oceans too."
—Dr. Wallace J. Nichols, author of *Blue Mind*

"The *Grande Turtle Adventure* highlights in telling details the life cycle of the critically endangered leatherback sea

"Un agradable libro de sutil encanto, esta pequeña historia poética es una hermosa manera de introducir a los más pequeños en el mundo del océano y nuestro rol en relación a él."
—Dr. Carl Safina, autor del *Voyage of the Turtle* y de *Beyond Words: What Animals Think and Feel*

"Entre las criaturas preferidas del océano se encuentran las nobles y misteriosas tortugas baulas. La lectura de *Las aventuras de las tortugas baulas* va a cautivar y entretener a los lectores, pero también les va a enseñar mucho. Ahora, más que nunca, estas magníficas tortugas necesitan de nuestra ayuda."
—Susan Casey, autora de *Voices in the Ocean: A Journey into the Wild* y de *Haunting World of Dolphins*

"Los relatos de exploraciones épicas fomentan en el cerebro infantil la empatía, la imaginación y el asombro, que perduran y nos guían durante toda la vida. Las fabulosas aventuras de dos tortugas marinas llamadas Tica y Laurita, invitan a los lectores a una inmersión profunda, también en favor de los océanos."
—Dr. Wallace J. Nichols, autor de *Blue Mind*

"Las aventuras de las tortugas baulas recalcan los detalles del ciclo de vida de las tortugas baulas en peligro crítico de extinción

It's a big ocean for two baby leatherback turtles! Join Laurie and Tica on their adventure as they search for food together and try to find their way home. Will they make it?

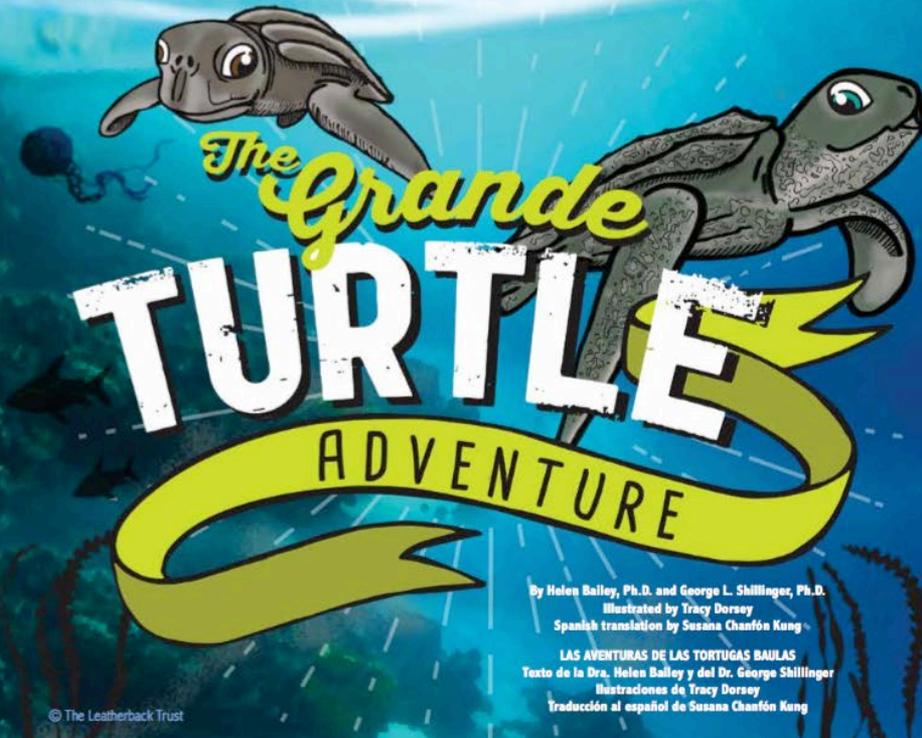
100% of the proceeds from the sale of this book will support sea turtle research and conservation through The Leatherback Trust
www.leatherback.org

Acompaña a las tortuguitas Tica y Laurita en sus aventuras para alimentarse y para encontrar el camino de regreso a casa en medio del vasto océano. ¿Lo lograrán?

La totalidad de las ganancias obtenidas con la venta de este libro serán destinadas al patrocinio de investigaciones sobre tortugas marinas y su rescate, a través de The Leatherback Trust
www.leatherback.org/es

THE GRANDE TURTLE ADVENTURE

BAILEY/SHILLINGER/DORSEY/CHANFÓN-KUING



By Helen Bailey, Ph.D. and George L. Shillinger, Ph.D.
Illustrated by Tracy Dorsey
Spanish translation by Susana Chanfón Kueng

LAS AVENTURAS DE LAS TORTUGAS BAULAS
Texto de la Dra. Helen Bailey y del Dr. George Shillinger
Ilustraciones de Tracy Dorsey
Traducción al español de Susana Chanfón Kueng

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How you can help:

- 1) Reduce, re-use, recycle. Plastic and other trash can hurt turtles because they think it is food. Try to reduce the amount of plastic you use, re-use shopping bags, and recycle any waste.
- 2) Skip the straw! Try not to use plastic straws or utensils because sea animals can get injured by choking on them.
- 3) Clean up your beach. Pick up any trash on the beach.
- 4) Avoid releasing balloons into the air. Once deflated, they can end up in the ocean. Turtles can get hurt eating balloons or become tangled in the strings.
- 5) Turn out lights and close curtains near the beach. Lights can confuse nesting turtles and hatchlings.
- 6) Tell your friends what you have learned about turtles and how to protect them.

Impact on marine life



A pregnant sperm whale washed up dead on a beach in Sardinia, Italy. Its stomach was full of plastic.

COURTESY OF SEAME SARDINIA

2019: Several whales around the world already found dead with stomachs full of plastic

2014: Sei whale died from a broken piece of a DVD case and stranded in St. Julien's Creek, off the Elizabeth River, a tributary of the Chesapeake Bay



2015: Straw removed from nose of Kemp's Ridley turtle



From Land to Ocean

Plastics are the most common form of marine debris. They can come from a variety of land- and ocean-based

SOURCES

ENTER THE WATER in many ways, and **IMPACT** the ocean and Great Lakes. Once in the water, plastic debris never fully biodegrades.

COMMONLY FOUND PLASTICS



Cigarettes Butts



Food Wrappers



Beverage Bottles



Straws



Cups & Plates



Bottle Caps



Single Use Bags

HOW TO HELP?



Reduce



Reuse



Recycle



DISPOSE OF WASTE PROPERLY no matter where you are.



GET INVOLVED and participate in local cleanups in your area.



REMEMBER that our land and sea are connected.

PLASTICS IN THE OCEAN

MICROPLASTICS

Microplastics are small plastics less than 5mm. They can come from large plastics breaking down, or can be produced as small plastics such as microbeads, which can be found in products such as toothpaste and face wash.

ENTANGLEMENT

Marine life can get caught and killed in derelict fishing nets and other plastic debris.

BOATS/NETS

Fishing gear can become marine debris when it is lost or abandoned.

INGESTION

Animals can easily mistake plastic debris for food.

RAIN & WINDS

Rain and wind can sweep debris into nearby waterbodies.

LITTERING

Intentional littering or improper disposal of trash can cause marine debris.

STREAMS & STORM DRAINS

Streams and storm drains can carry debris directly into the ocean or Great Lakes.



<https://marinedebris.noaa.gov/>

Plastics in the Ocean

- Estimated than 4.8-12.7 million metric tons of plastic waste entered the ocean from the land and coastal regions in 2010 (Jambeck et al. 2015).
- Plastic debris and microplastics prevalent in the Chesapeake Bay (Yonkos et al. 2014).
- U.S.A. has the highest per capita use of plastics with >100 kg per person per year.

9 REASONS TO REFUSE SINGLE-USE PLASTIC



Made from fossil fuels



Huge carbon footprint



Will still be here in hundreds of years



Only a tiny percentage is recycled



Leaches toxins into food & drink



Causes hormone disruption & cancers



Pollutes our oceans



Kills marine animals and birds



Enters our food chain

LESS
PLASTIC.

WWW.LESSPLASTIC.CO.UK

“I forgot to ask the waitress for no straw”

“I have sensitive teeth and need a straw”

“I feel uncomfortable bringing my own straw to a restaurant”

“I asked for no straw, but the waiter still brought me one”

Behavior Change is Difficult!

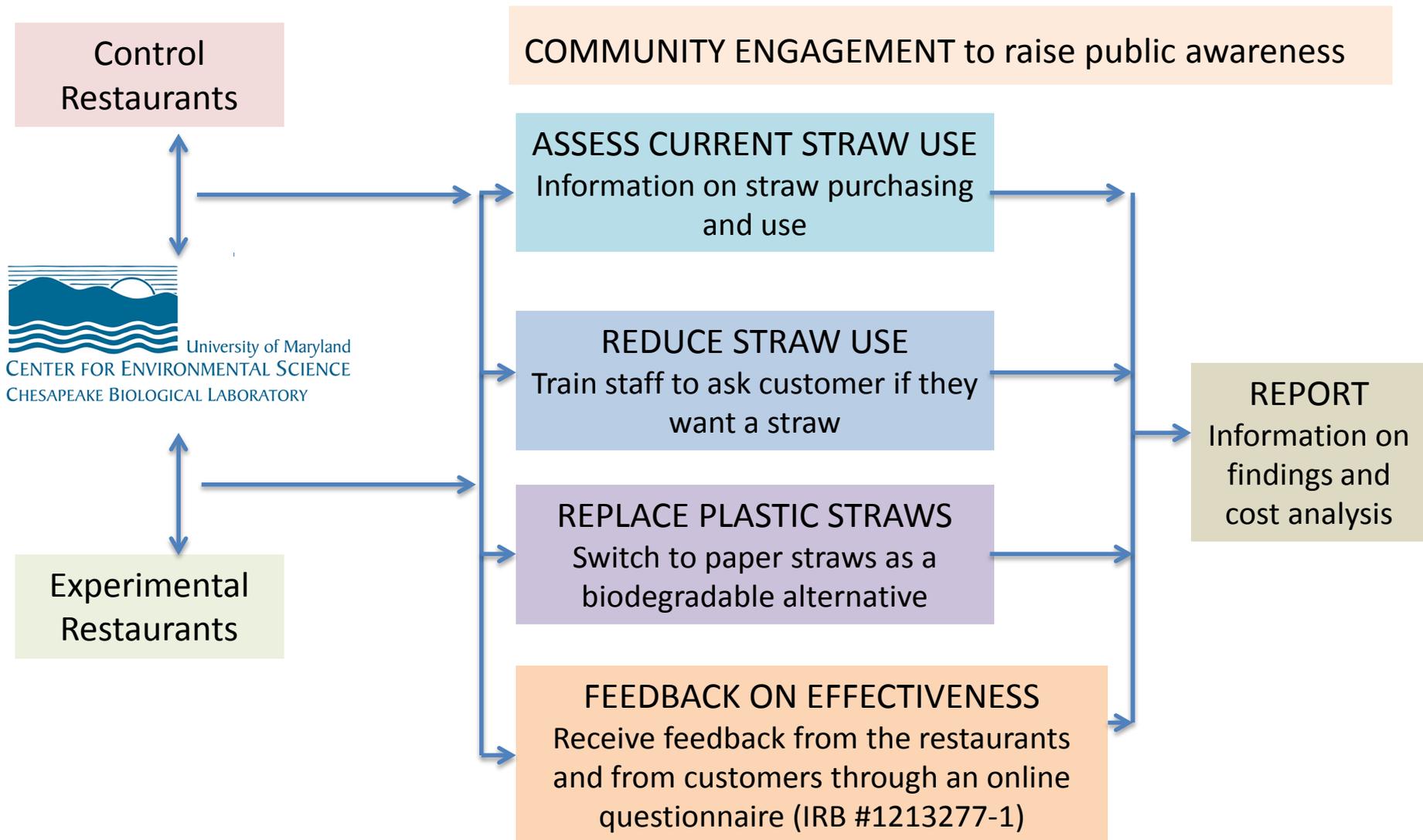
“I am afraid I will spill my drink if I don't have a straw”

“I forgot to bring my reusable straw”

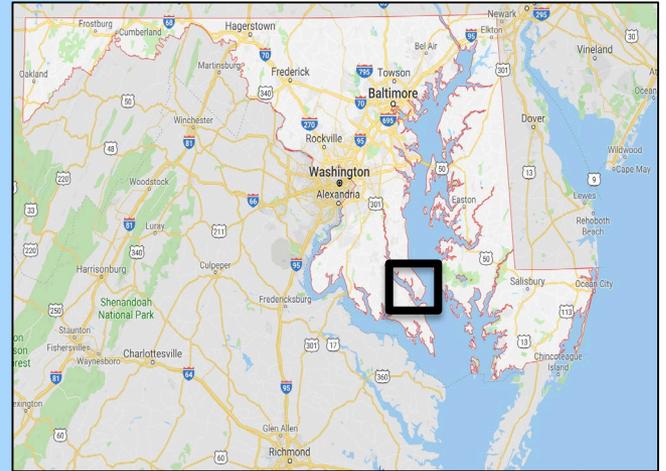
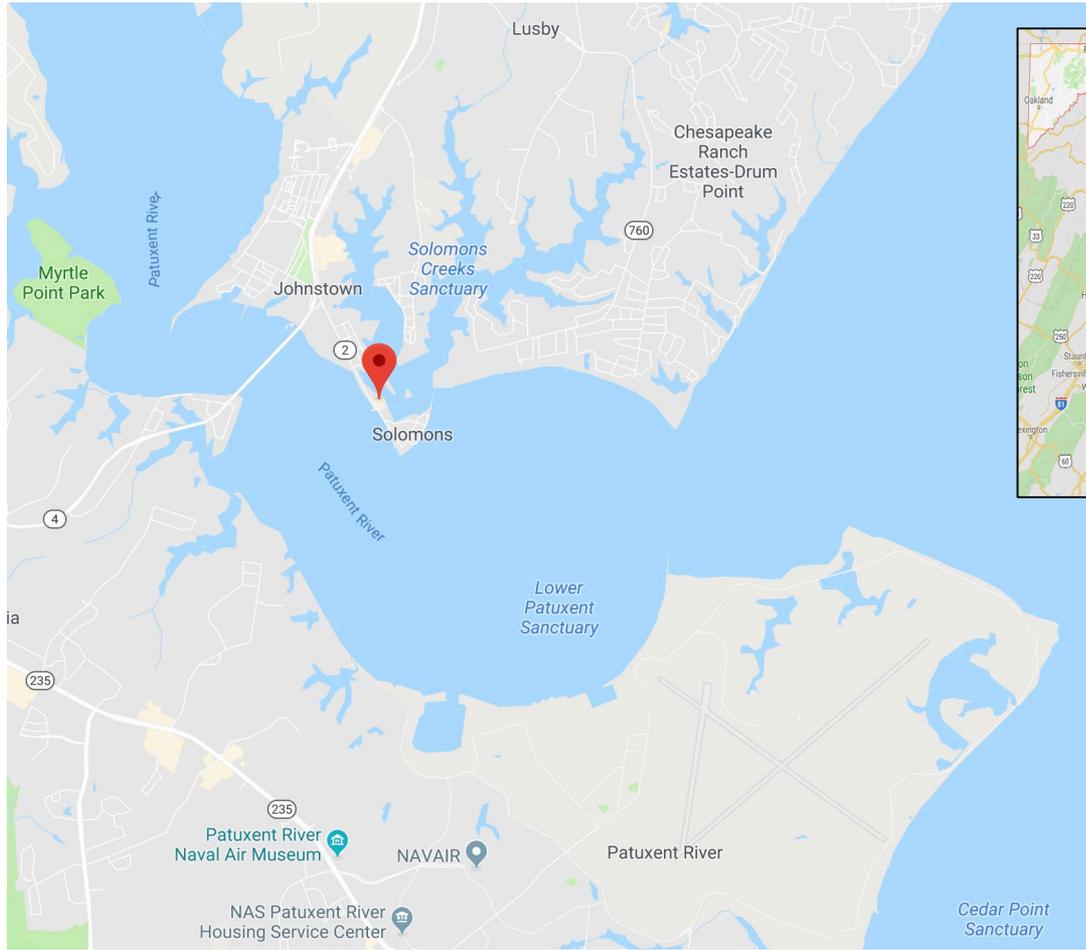
“When they put ice in the cup then I need a straw”

“I don't think you can clean a reusable straw properly”

Study Approach



Solomons Island



Participating restaurants

Experimental

1. CD Cafe



2. Lotus Kitchen



3. The Pier



Control

Kingfishers



Island Hideaway



Ruddy Duck



Meetings

- In-person meetings with the restaurant owners/managers was found to be the most effective means of communication
- Obtained current information on their straw and take-out container use, requirements and any preferred vendors.
- Identified biodegradable (or reusable) alternatives
- Distributed alternative products in September 2019
- Created and distributed posters to the restaurants that described why they were switching from plastic.
- Worked with restaurants on encouraging staff to only provide a straw upon request.



Poster



Billions of pounds of plastic pollution enter the ocean every year.

Where does it come from? Much of it comes from single-use disposable items, such as plastic straws, cups, bags and bottles. These plastics may be eaten by animals or they can become entangled causing them harm and even death.

Scientists at the University of Maryland Center for Environmental Science (UMCES), Chesapeake Biological Laboratory, are working with restaurants in Solomons, Maryland, on a project called "PlasticWatch" to replace single-use plastic straws and take-out containers with biodegradable alternatives.

Visit our website to learn more and take our online survey: www.umces.edu/plasticwatch



WHAT CAN YOU DO?

-  Skip the straws, plastic bags, and plastic take-out items!
-  Reduce, Reuse, and Recycle...or just Refuse to Use!
-  Participate in beach and community greenspace cleanups!



The PlasticWatch project is funded by the Maryland Department of Natural Resources Coastal Zone Management Program through the Coastal Zone Management Act of 1972, as amended, administered by the Office for Coastal Management, National Oceanic and Atmospheric Administration.



PlasticWatch Website

www.umces.edu/plasticwatch



HOME / PLASTICWATCH

PLASTIC IN THE OCEAN

SOLOMONS PROJECT

WHAT CAN I DO

OUR TEAM

PLASTICWATCH SURVEY

The Plastics Issue



Do you go to restaurants and automatically get a plastic straw in your drinks? Do you use plastic/styrofoam take-out containers? When you order takeout, do you bring it home in a plastic bag with extra plastic utensils that immediately get thrown in the trash? We are all used to this disposal plastic, but some of it ends up in our streams

PlasticWatch Online Survey

- Questions on:
 - Current plastic use
 - Satisfaction with alternatives
 - Current knowledge about plastics and their environmental impacts
- Respondents can optionally give email address to receive a summary of the findings

Online questionnaire

[PLASTIC IN THE OCEAN](#) [SOLOMONS PROJECT](#) [WHAT CAN I DO](#) [OUR TEAM](#)

[PLASTICWATCH HOME](#)

This research is being conducted by a team of scientists from the University of Maryland Center for Environmental Science. We are inviting you to participate in this research project to find out about how much plastic people use, their satisfaction with alternative, biodegradable products, and their opinions on plastic in the environment. The purpose of this research project is to identify how to most effectively switch from plastic products, including straws, cups and take-out containers, to biodegradable alternatives.

If you choose to provide your e-mail address at the end of the questionnaire (optional), then you will be entered into a draw to win a place on our 80-foot research vessel for a cruise on the Patuxent River.

Your participation in this research is completely voluntary and you may stop at any time. If you have questions, please contact us, plasticwatch@umces.edu.

If you agree to participate, please click Yes *

Yes

1) How many plastic disposable straws do you use per week?

2) Are you willing to go without a straw in your drink?

3) Do you bring a reusable straw when you eat/drink out?

4) If you sometimes bring, or don't bring a reusable straw, what is the reason?

5) How often do you recycle your plastic products and containers?

Your Level of Satisfaction with Alternative, Biodegradable Products We are working with restaurants in Solomons, Maryland, to replace plastic straws and take-out containers with paper and other biodegradable alternatives. We would love to hear your feedback on this effort!

6) Have you used a biodegradable paper straw or take-out container at a restaurant recently? If your answer is no, jump ahead to question 9.

7) How satisfied were you with the biodegradable product?

Please email us at plasticwatch@umces.edu

Raising Awareness

1. Cruise on the R/V Rachel Carson to sample for plastic debris in the Patuxent River
2. Creating and printing outdoor signage for Solomons Boardwalk
3. Creating animated video for website and social media
4. Outreach events at the participating restaurants and within the local community

Preliminary Cost Analysis Results

- Plastic straws approx. \$0.004 each (Webstaurant). If using 8,333 per month this costs \$33.33.
- Paper straws \$0.038 each (Pack'N'Wood). If reduce straw usage by about half to 3,352 this costs \$128.48.
- -> Half the quantity, but about 4 times the cost.



Preliminary Cost Analysis Results

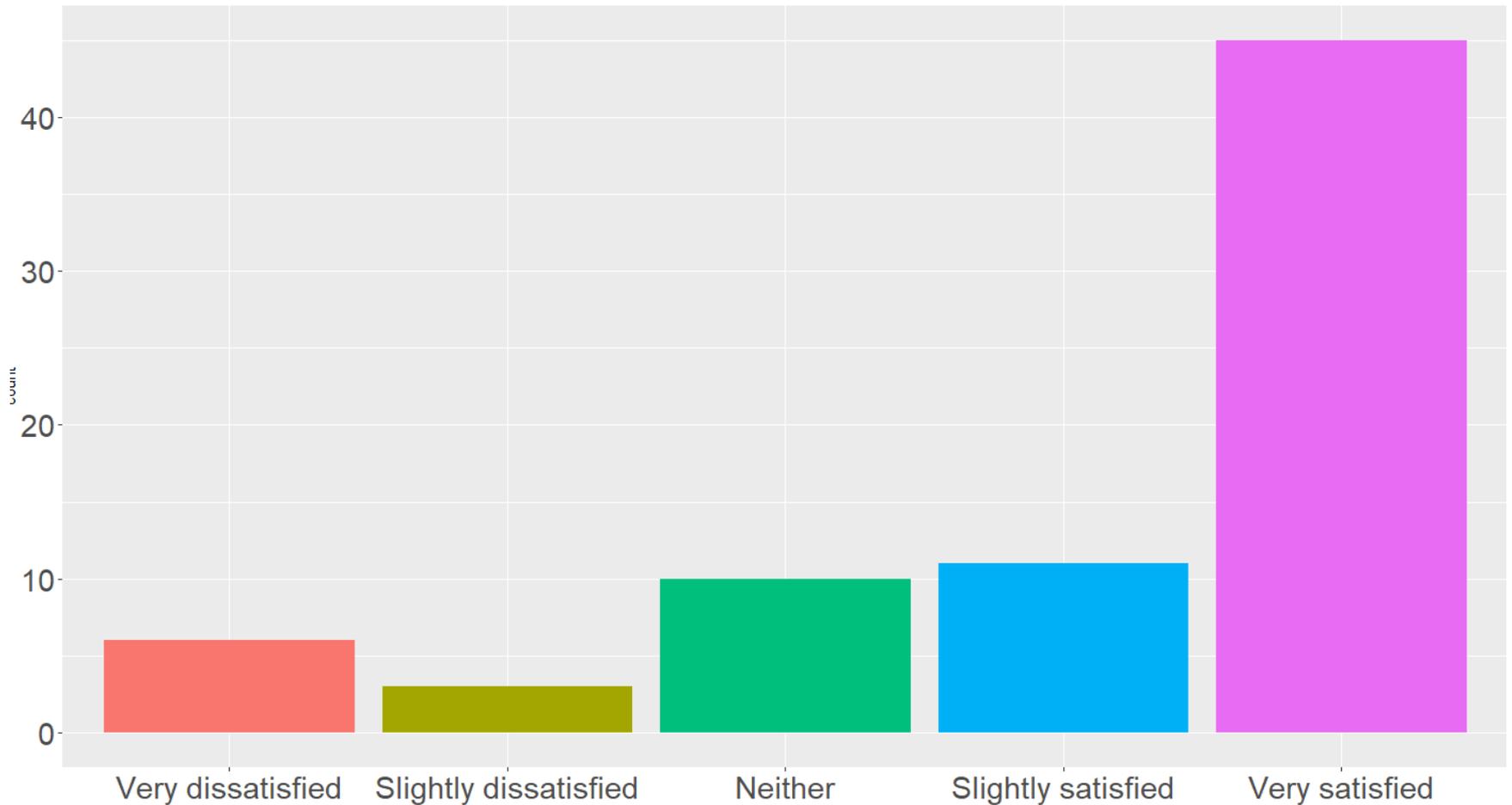
- Relatively small cost difference between paper and styrofoam take-out containers at approx. \$0.16 and \$0.12 each respectively.
- Also small cost difference between sugarcane and plastic take-out sauce containers at \$0.03 and \$0.02 each respectively.



Mid-Project Meeting with Restaurants

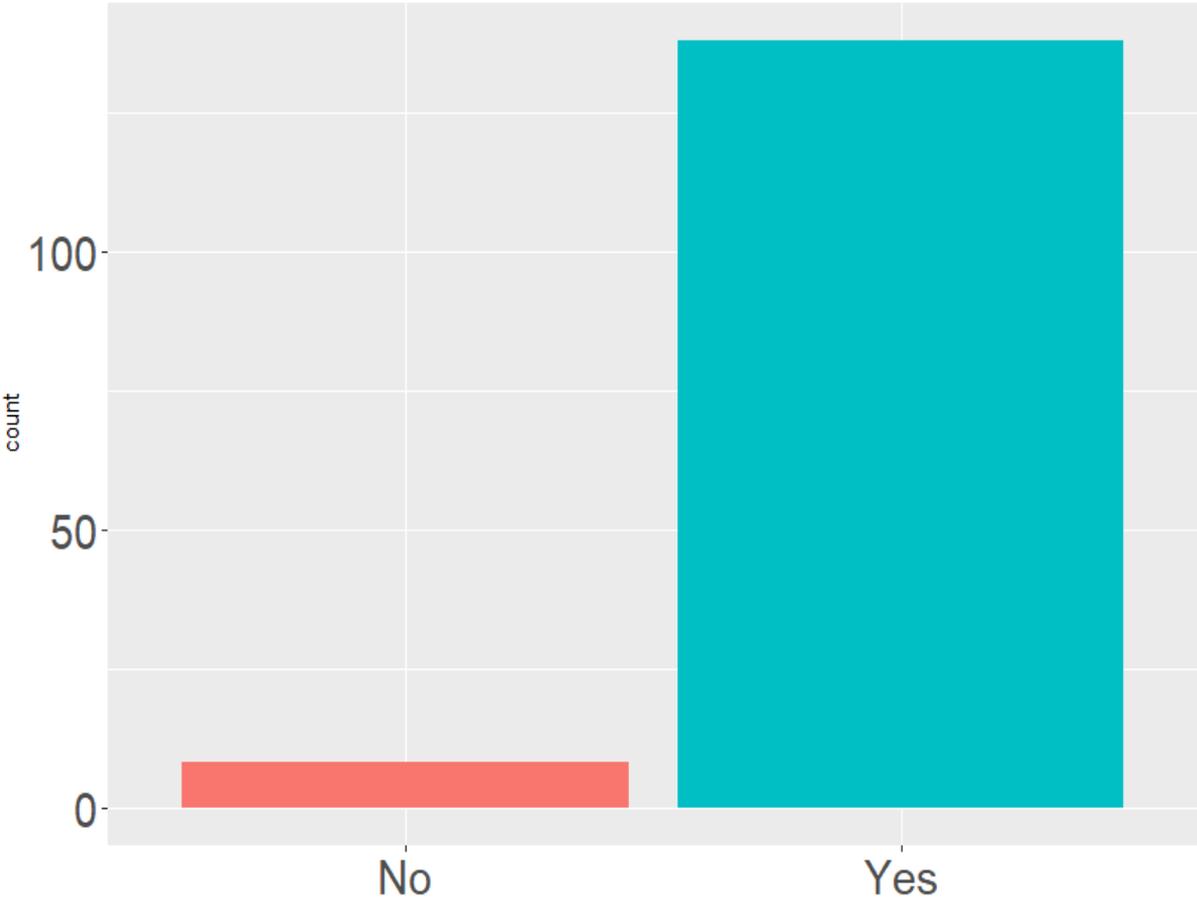
	Lotus Kitchen	The Pier	CD Cafe
Will you continue to use the biodegradable products distributed?	<u>yes</u>	<u>yes</u>	<u>yes</u>
Favorite vendors/products?	Pack N' Wood straws	Pack N' Wood straws, <u>Webstaurant</u> take-out boxes	Pack N' Wood straws
Staff satisfaction with products (1-10)	10	9	8
Customer satisfaction with products (1-10)	9	9	7
Would you like to continue working with <u>PlasticWatch</u> on future projects?	<u>yes</u>	<u>yes</u>	<u>yes</u>

Did customers like the alternatives?



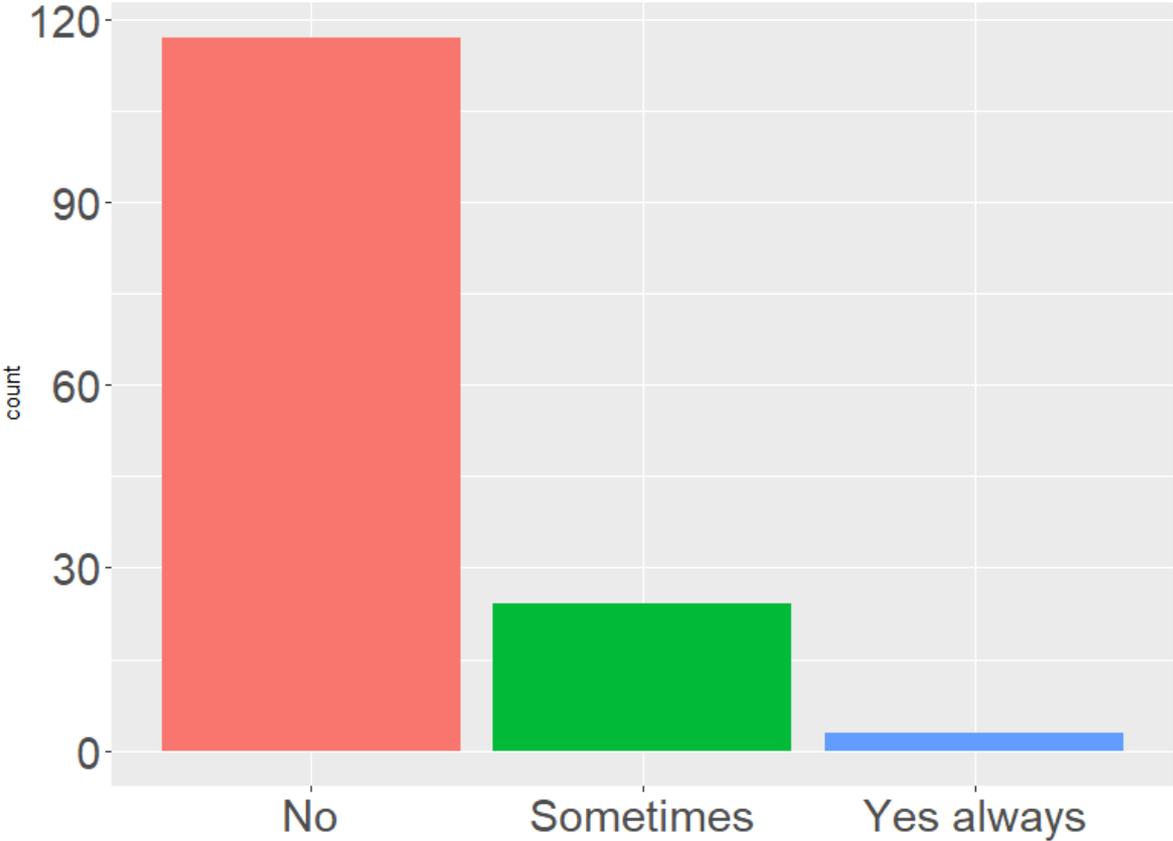
146 respondents to online survey

Willing to go without a straw?



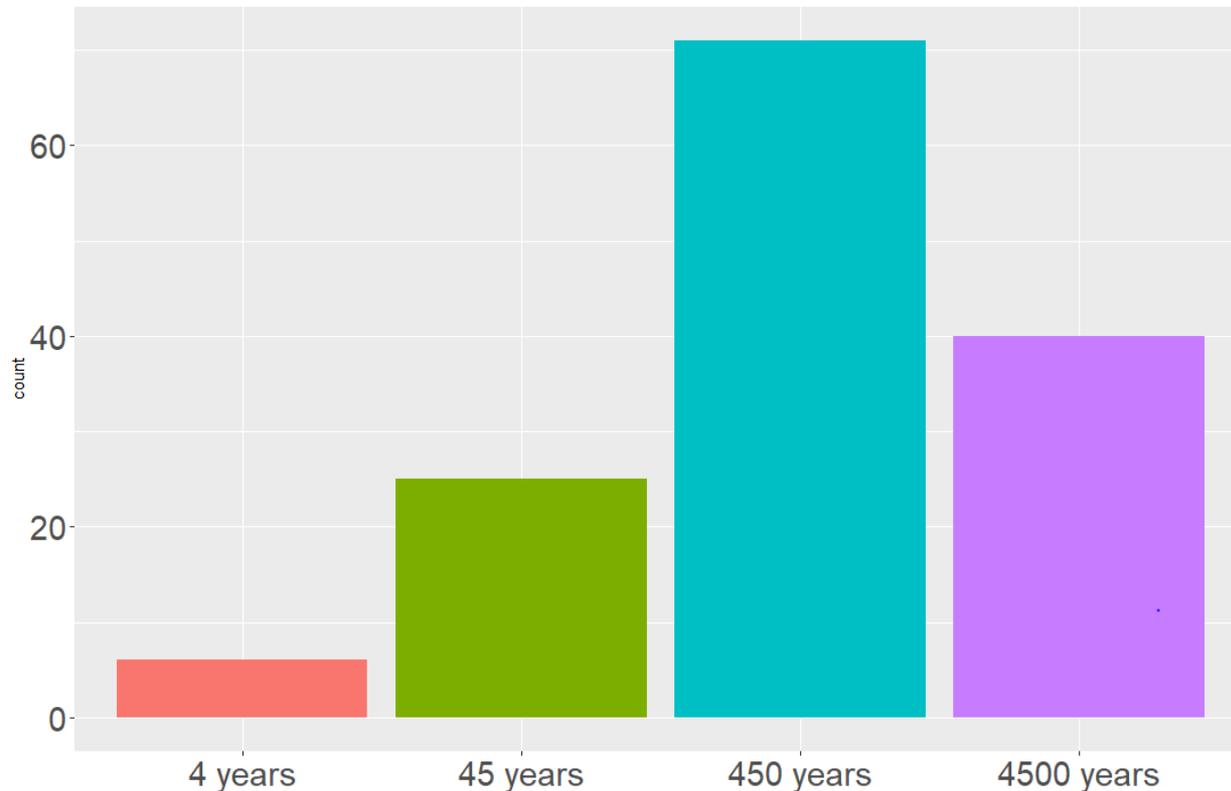
146 respondents to online survey

Do you bring a reusable straw?



146 respondents to online survey

How long does it take for a plastic water bottle to break down?



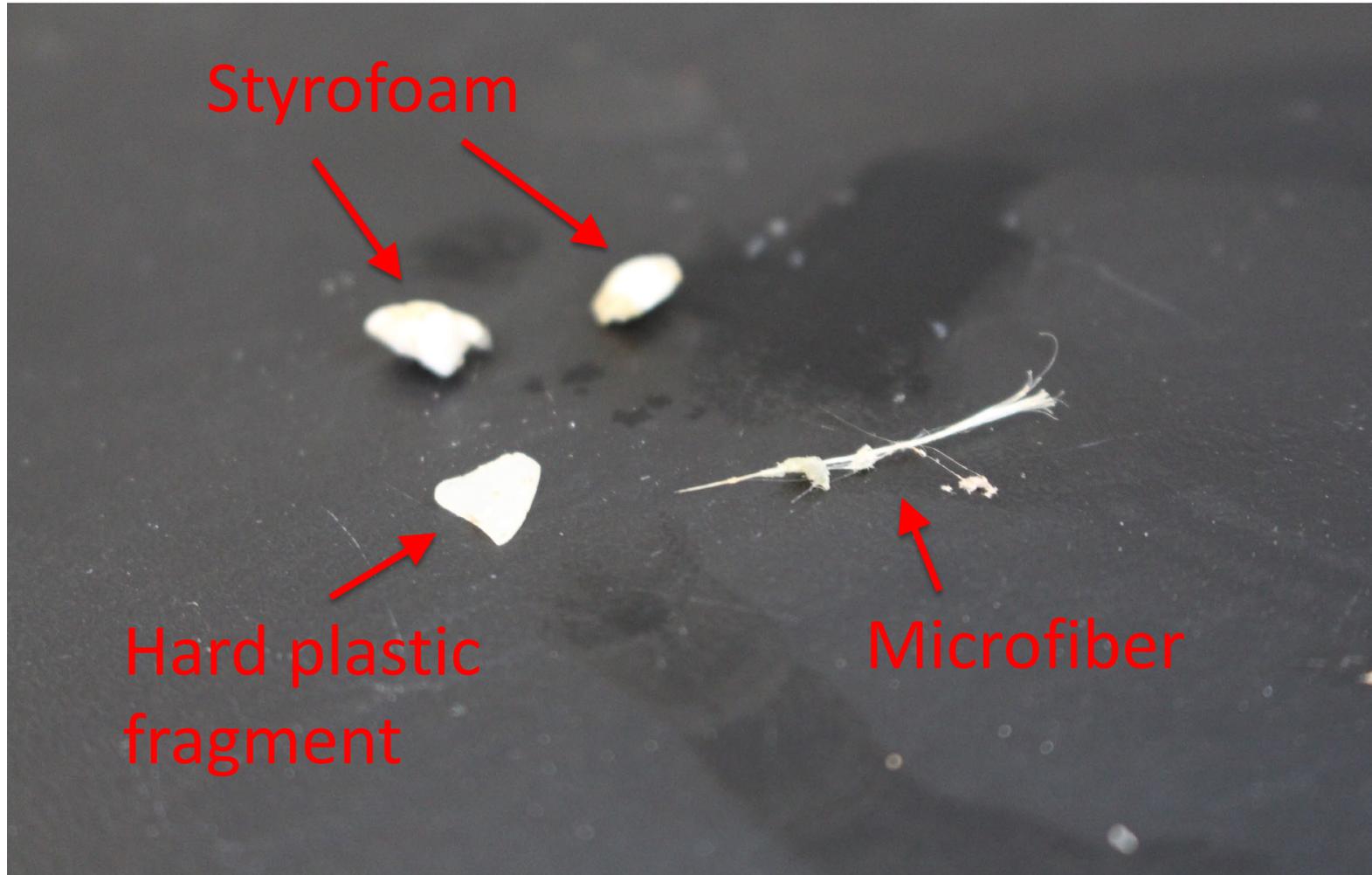
The most common response was correct (approx. 450 years), but about **20% of respondents underestimated** the time it takes for a plastic water bottle to break down.

Plastic Sampling Cruise



28th
March
2019

Plastic Debris in the Patuxent River



Followed NOAA Marine Debris Program Surface Water Trawl Methodology

Outdoor Signage - Placement



Sign placement and text approved by Calvert Board of County Commissioners. The printed signs will be installed by Calvert County.

Sign 1

HOW DO PLASTICS GET INTO THE CHESAPEAKE BAY?

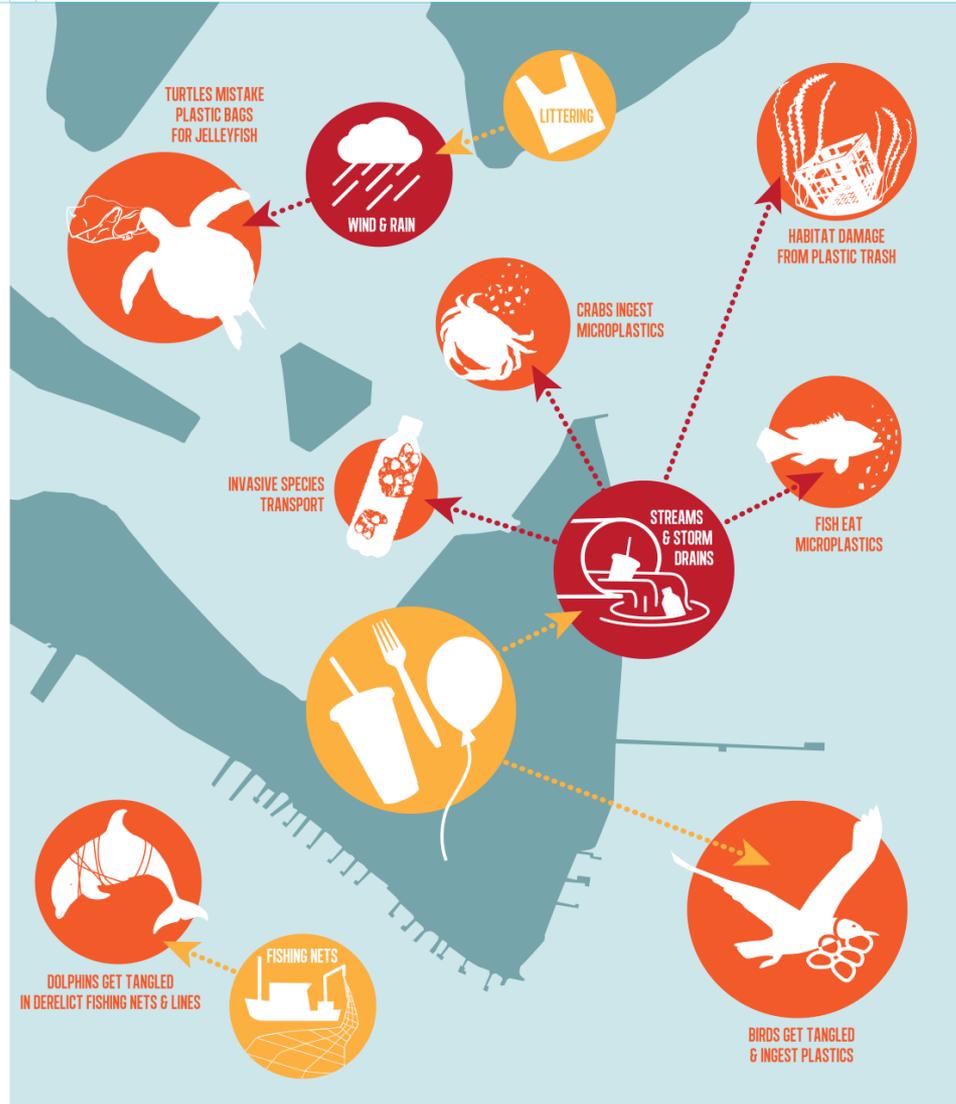
An estimated 8 million tons of plastic enters the water from land every year! This includes many single-use items, like plastic straws, bags, bottles and take-out containers.

Plastic doesn't just enter waterways through boat-based activities. Most plastic marine pollution comes from activities on land. Strong rain or winds can blow over trash cans and wash litter from roads directly into local waterways or into storm drains that flow into rivers.

Here, small streams and rivers flow into the Patuxent River, which leads to the Chesapeake Bay, and the Atlantic Ocean.

WHY SHOULD WE CARE?

Plastics release toxic chemicals into the air and water, harm and kill wildlife, pollute your beaches and waterways, and cost millions of taxpayer dollars to cleanup every year.



WHAT CAN YOU DO?

 Skip the straws, plastic bags, and plastic take-out items!

 Reduce, Reuse, and Recycle...or just Refuse to Use!

 Participate in beach and community greenspace cleanups!



PLASTICWATCH

Visit our website to learn more
www.umces.edu/plasticwatch



The PlasticWatch project is funded using federal funds under award number NA16N054190170 from NOAA, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce.

PROOF ONLY

Sign 2

PLASTICS BREAK UP INTO MICROPLASTICS. HOW LONG DOES IT TAKE?



PLASTIC BEVERAGE HOLDER
400 YEARS



PLASTIC WATER BOTTLE
450 YEARS



PLASTIC UTENSILS
200 YEARS



PLASTIC BAG
20 YEARS



PLASTIC STRAW
200 YEARS



FOAM PLASTIC CUP
50 YEARS

MICROPLASTICS

Microplastics are small plastic pieces less than five millimeters long which can be harmful to our aquatic life.

PROOF
ONLY

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Decomposition rates will vary depending on product material and environmental conditions

Sign 3

REDUCING PLASTIC POLLUTION IN THE CHESAPEAKE BAY 7 THINGS YOU CAN DO



**BRING YOUR OWN
SHOPPING BAG**



**USE A REUSABLE
WATER BOTTLE OR MUG**



**SAY NO TO STRAWS &
PLASTIC UTENSILS**



**PACK YOUR LUNCH IN
REUSABLE CONTAINERS**



**PARTICIPATE IN BEACH &
COMMUNITY CLEANUPS!**



**REDUCE, REUSE, AND RECYCLE...
OR JUST REFUSE TO USE!**



**SHARE THESE TIPS WITH YOUR FRIENDS.
TOGETHER WE ALL MAKE A DIFFERENCE!**



PLASTICWATCH

**Billions of pounds of
plastic pollution enter
the ocean every year.**

Where does it come from? Much of it comes from single-use disposable items, such as plastic straws, cups, bags and bottles. These plastics may be eaten by animals or they can become entangled causing them harm and even death.

Scientists at the University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, are working with businesses on a project called "PlasticWatch" to reduce the use of single-use plastics in our community.

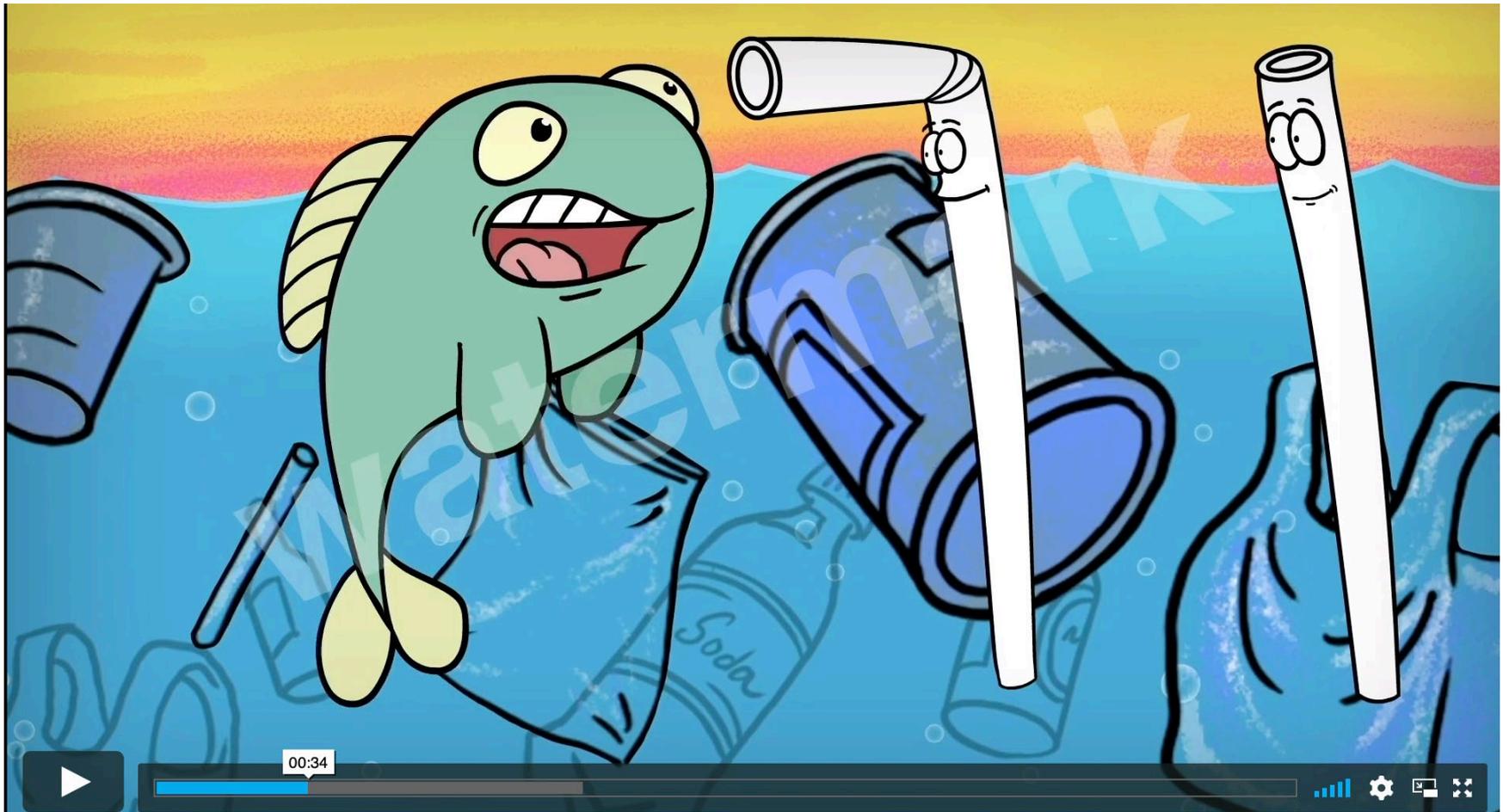
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**PROOF
ONLY**

Animated video



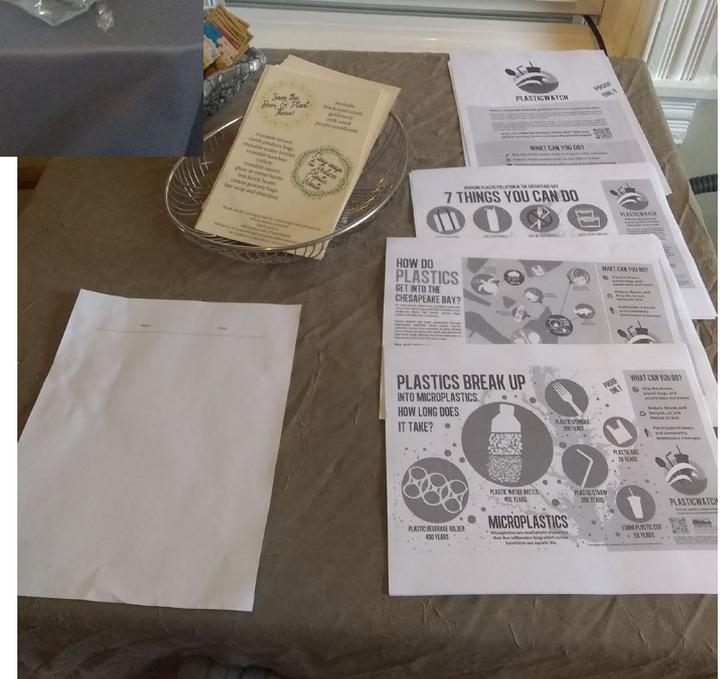
Animated story about a plastic and paper straw – first video draft complete

Outreach Event



5th April 2019

Happy Hour at
Lotus Kitchen



Challenges

- Publicity about plastic straws has led to rapid increase in demand. Production has struggled to keep up and the American supplier Aardvark straws currently has a 5-month delivery time.
- Take-out containers tend to have a lining so not solely paper/cardboard.
- Calvert County does not have an industrial composting facility, which is necessary for the plant-based plastic products to degrade.



Next steps

- Provide remaining alternative product supplies to restaurants for the summer season
- Complete and obtain final approval for outdoor signs for Solomons boardwalk
- Complete animated video
- Analyze full year of data for final report due September 2019

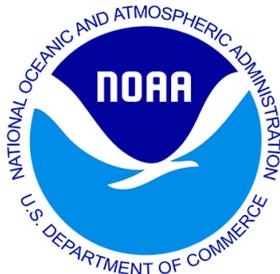


Other Activities

- Sharing PlasticWatch documents with St. Mary's and Calvert County Public Middle Schools as we work with them to develop a curriculum unit on plastic pollution funded by NOAA B-WET program.
- Collaborating across the University System of Maryland to encourage the reduction of single-use plastics.

Acknowledgements

- Thank you to Kimberly Grubert and Donna Morrow for providing help and support for this project.
- Thank you to Jason Rolfe and the NOAA Marine Debris Program for loaning a manta net.
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THE PIER

Restaurant • River Bar

Open 11am daily

Sunday Brunch 9am

410-449-8406



Thank you!

Questions: plasticwatch@umces.edu