

Plastic Pollution in the Gulf of Maine

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www.sea.edu/plastics



With support from March Marine Initiative

THE GREAT BARRIER
SPACE ANYMORE,
GARBAGE PATCH



www.greenhundredr.com



August 5, 2021
Image credit: NASA



Traditional measurements of ocean plastics

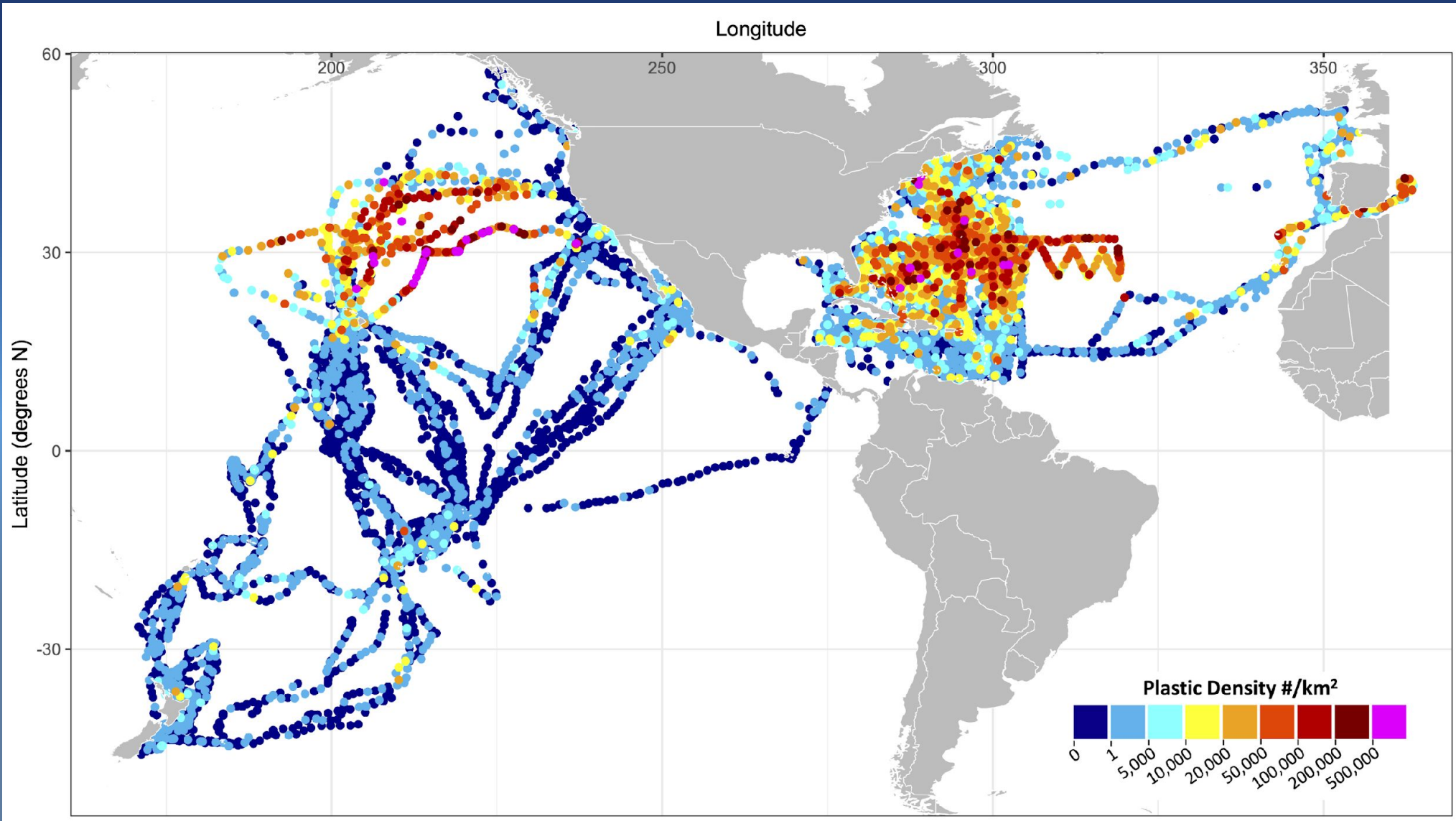
Surface-towing plankton net:
1.0 m x 0.5 m mouth, 0.335 mm mesh





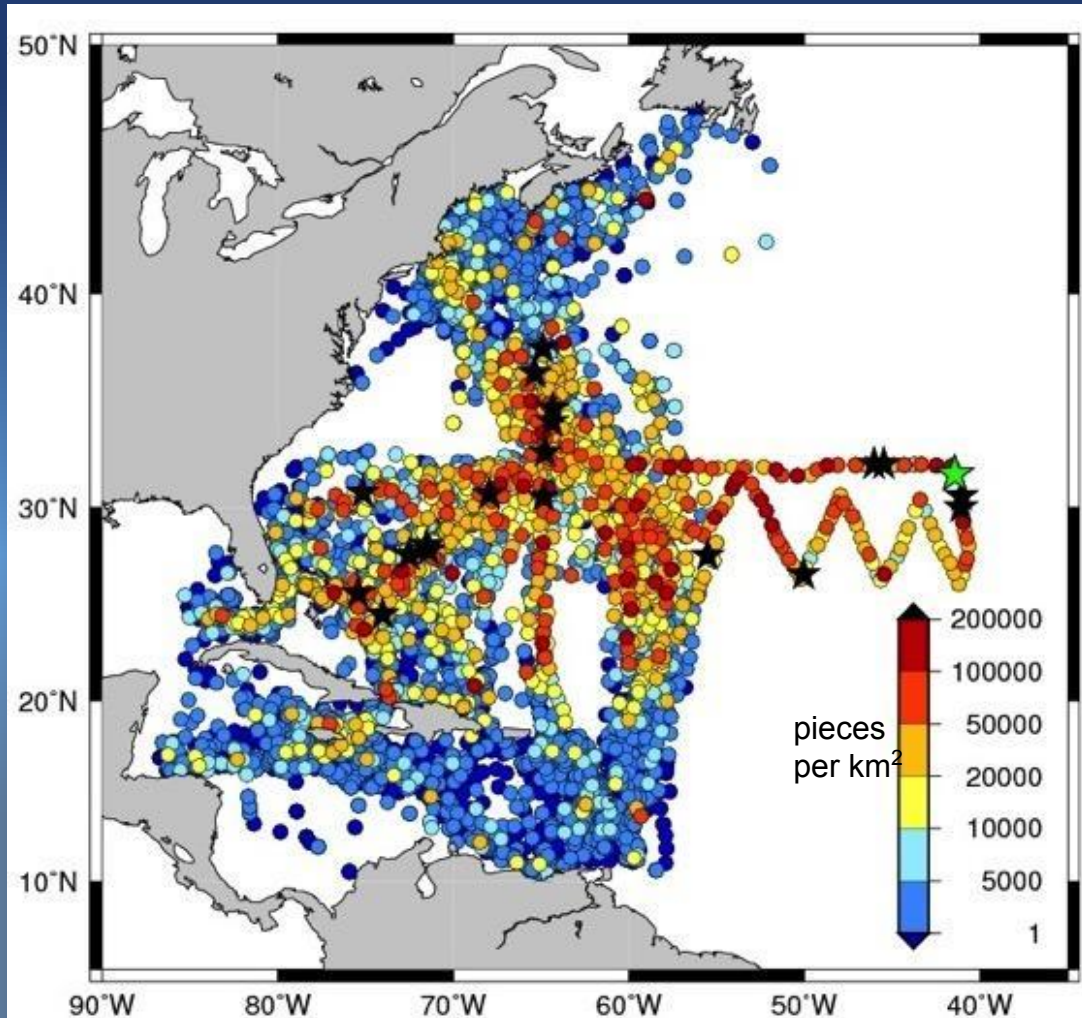
Global measurements of floating microplastics

> 10,000 plankton net tows since 1986





Microplastics floating in western North Atlantic



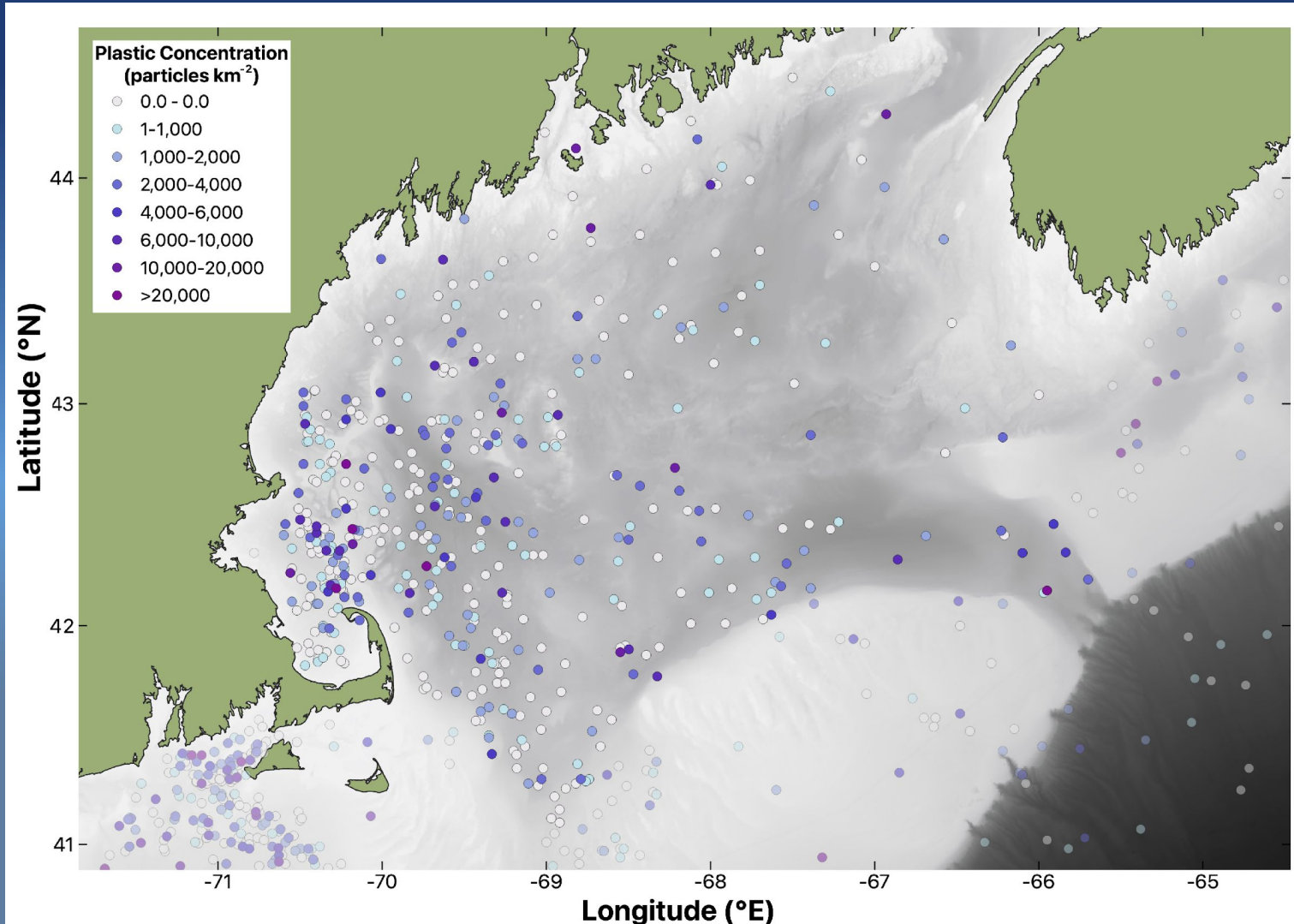
Law, K.L., S. Morét-Ferguson, N.A. Maximenko, G. Proskurowski, E.E. Peacock, J. Hafner, and C.M. Reddy, 2010. Plastic accumulation in the North Atlantic subtropical gyre. *Science* 329, 1185–1188.



240 pieces
~ 130,000 pieces per km²



Floating plastics in Gulf of Maine



Data set:

517 plankton net tows

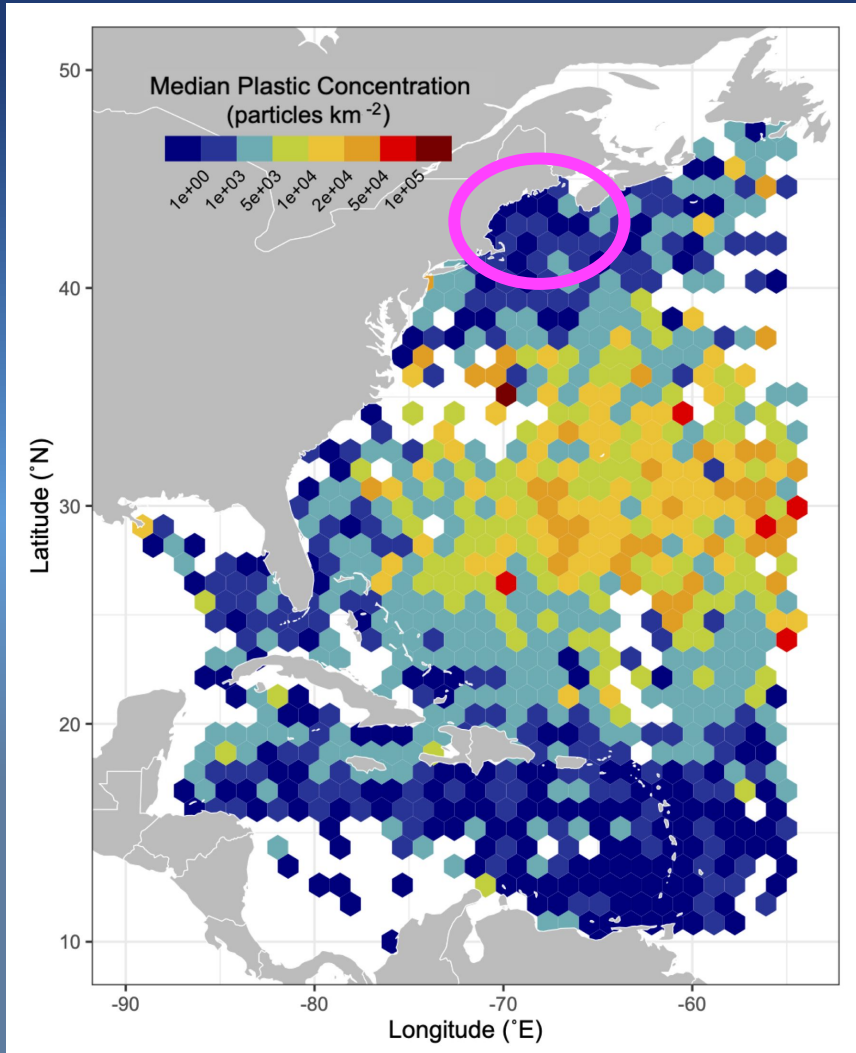
June 1987 – July 2022

- > 50% tows contained no plastic
- 1,341 plastic particles
- Mean concentration: 1,510 particles km⁻²



Gulf of Maine vs. “Garbage Patch”

Concentration of floating plastics

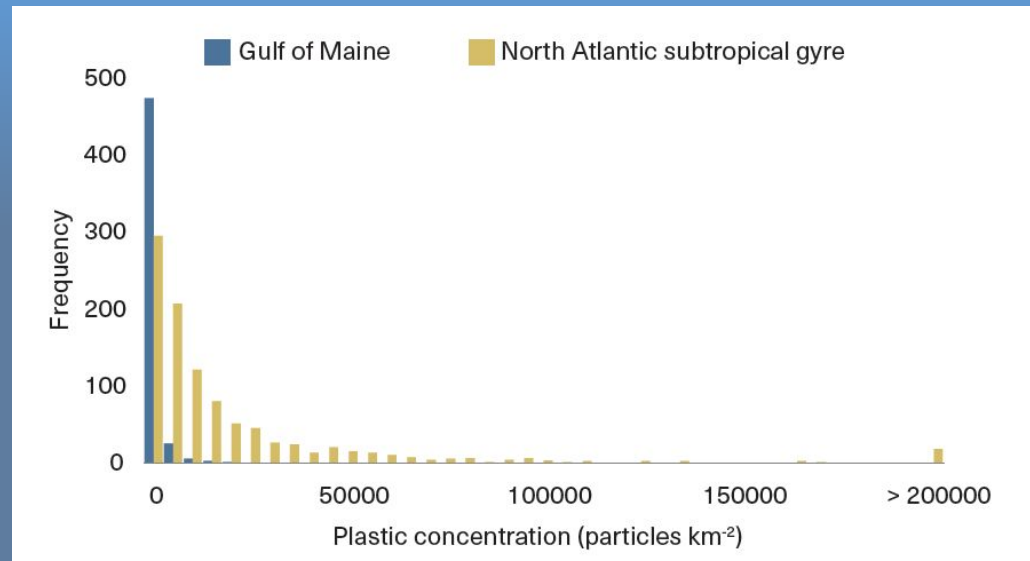


GULF OF MAINE

- 571 net tows
- > 50% of tows contained no visible plastic
- Mean concentration: 1,510 particles km⁻²

GARBAGE PATCH

- 1,022 tows
- 7% of tows contained no visible plastic
- Mean concentration: 28,400 particles km⁻²

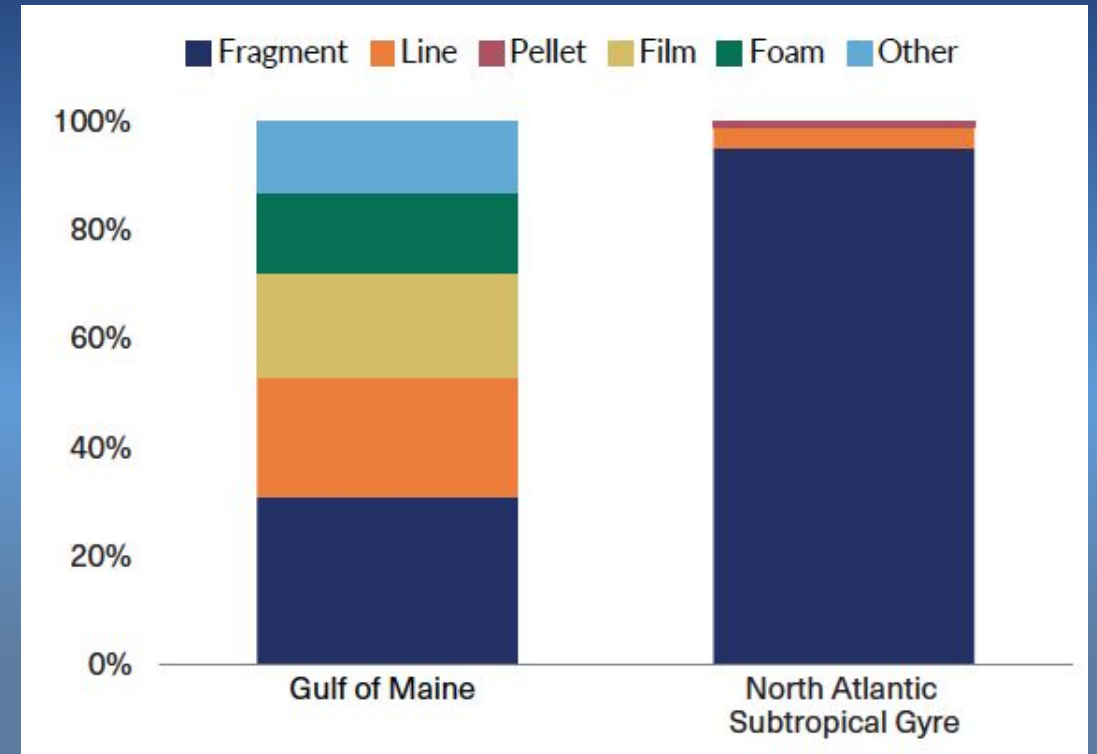
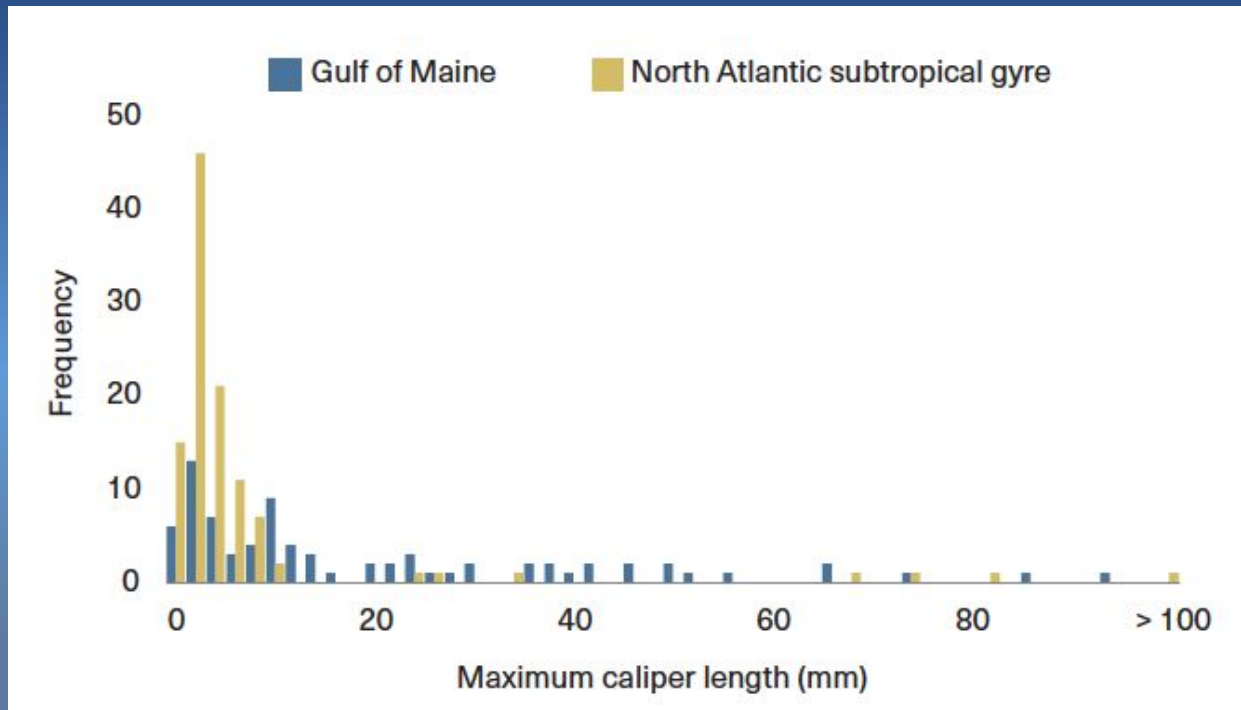




Gulf of Maine vs. “Garbage Patch”

Particle characteristics

Plastics collected in the Gulf of Maine are **larger** and more **diverse in morphology**



Plastics floating in the Gulf of Maine are **“younger”** than those in the subtropical gyre.

Shoreline debris in the Gulf of Maine

Table 1: Plastic Waste Collected in Coastal and Remote-Island Shoreline Cleanups in Maine between 2011 and 2020.

Plastic waste category	Item count	% of total
Foam fragments	11,578	23.1
Plastic fragments	8,351	16.6
Plastic food ware: cups/plates/utensils/containers/lids/caps	7,793	15.5
Plastic drink bottles	6,140	12.2
Foam food ware: cups/plates/containers	3,685	7.3
Food wrappers	2,989	6.0
Strapping bands/zip-ties	2,427	4.8
Plastic sheeting/tape	2,302	4.6
Cigarettes/cigar tips	1,236	2.5
Balloons	1,075	2.1
Bleach/cleaner bottles	834	1.7
Plastic bags	747	1.5
Straws/stirrers	577	1.2
Shotgun shells/wadding	399	0.8
Oil/lube bottles	390	0.8



Table 2: Fishing-Related Debris Collected in Coastal and Remote-Island Shoreline Cleanups in Maine between 2011 and 2020.

Debris category	Item count	% of total
Rope	13,248	45.6
Buoys/floats	5,716	19.7
Filament from nets and fishing line	4,860	16.7
Traps/trap pieces	2,598	8.9
Lobster claw bands	1,542	5.3
Bait containers/crates	984	3.4
Fishing nets	60	0.2
Lures and light sticks	23	0.1





Summary and Policy Implications



In the offshore waters of the Gulf of Maine:

- Concentrations of floating microplastics are very low
- Physical characteristics of floating plastics suggest they have spent less time in the environment than those in the “garbage patch”

On Gulf of Maine shorelines:

- Large plastic debris is abundant, and has been for decades
- Most common items are associated with food/food packaging, and fishing activities

Policy measures could aim to minimize intentional losses, and provide support for environmental cleanup activities.