

SAVING

OUR

SYNTHETIC

SEAS



5GYRES

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JUNK RAFT




“THROW AWAY LIVING” 1955





"The best
come in C



You see so many good things in Du Pont Cellophane

You see  the good things you buy... no guesswork.

They come fresh  stay fresh longer—less waste.

And Cellophane keeps them extra-clean  and sanitary.



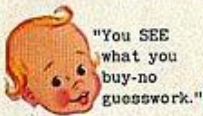
BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

Look at "Cavalcade of America" on Television



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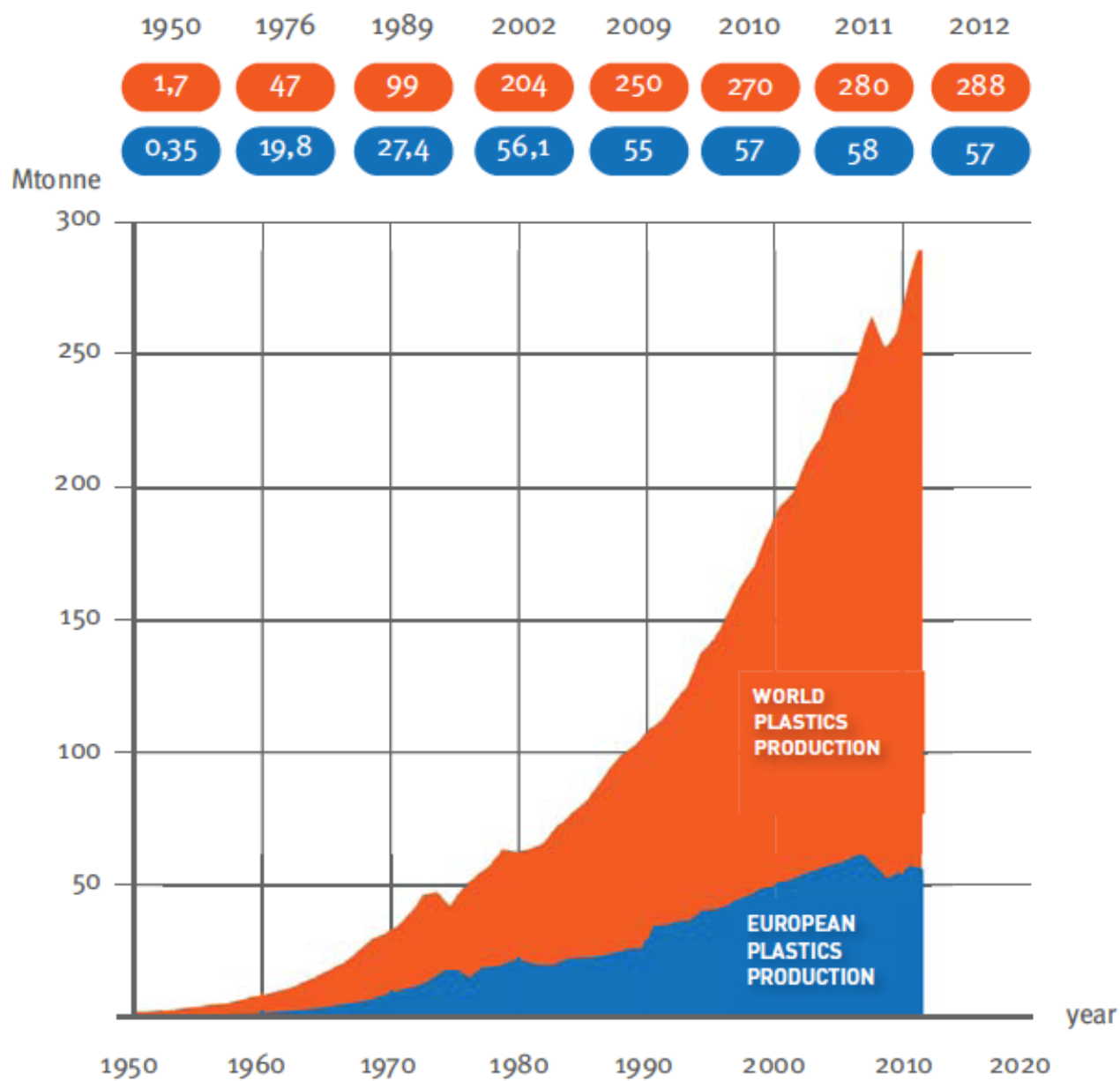


"You SEE
what you
buy—no
guesswork."



"Foods co
fresh-st
fresh lo
less was





The plastics industry has benefited from 50 years of growth with a year on year expansion of 8.7% from 1950 to 2012, with a global production of 288 million tons produced in 2012.

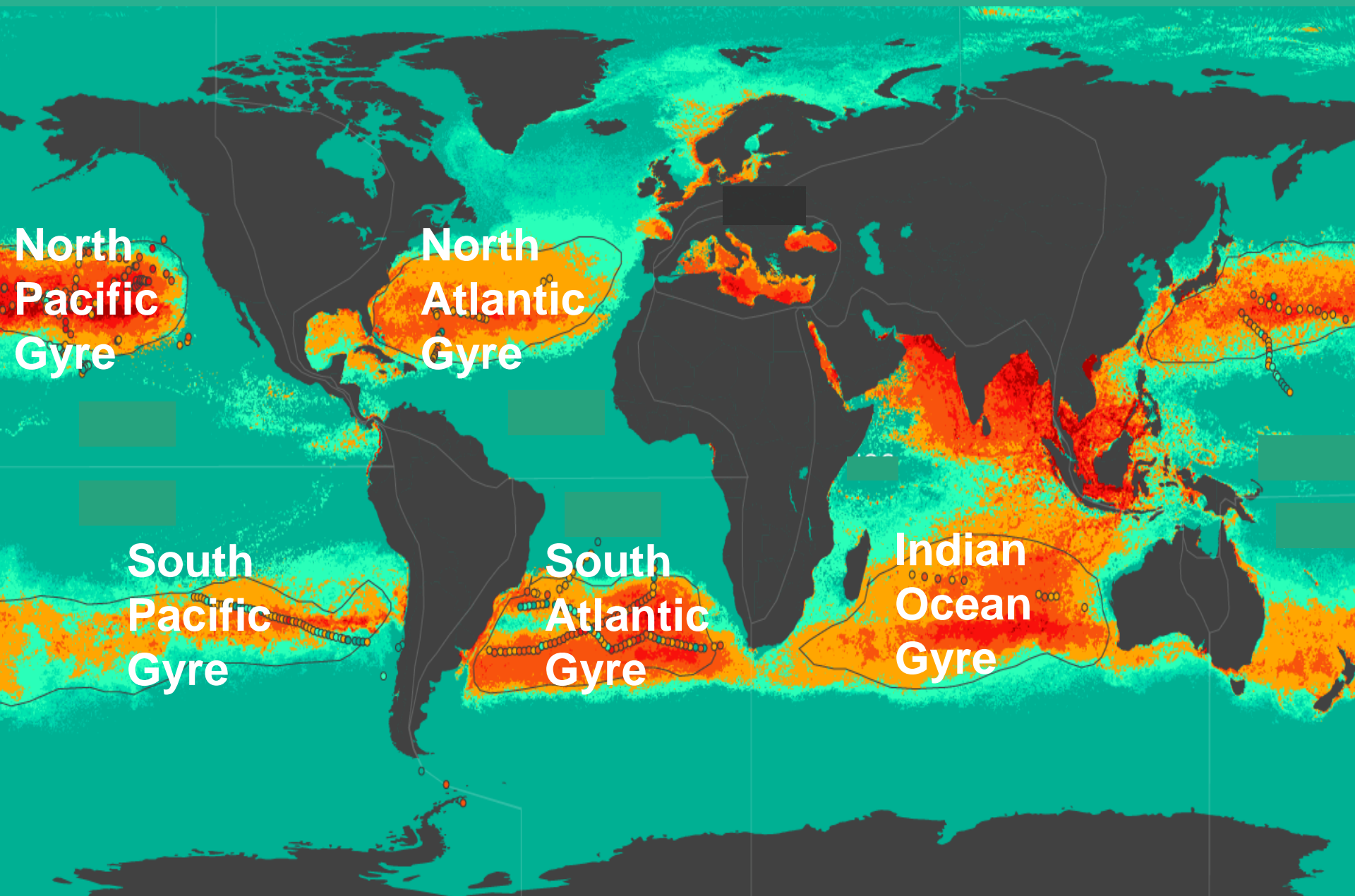
Figure 2: World plastics production 1950-2012

Includes thermoplastics, polyurethanes, thermosets, elastomers, adhesives, coatings and sealants and PP-fibers. Not included PET-, PA- and polyacryl-fibers

Source: PlasticsEurope (PEMRG) / Consultic

“THROW AWAY LIVING” 2005





Plastic Pollution Accumulation Zones

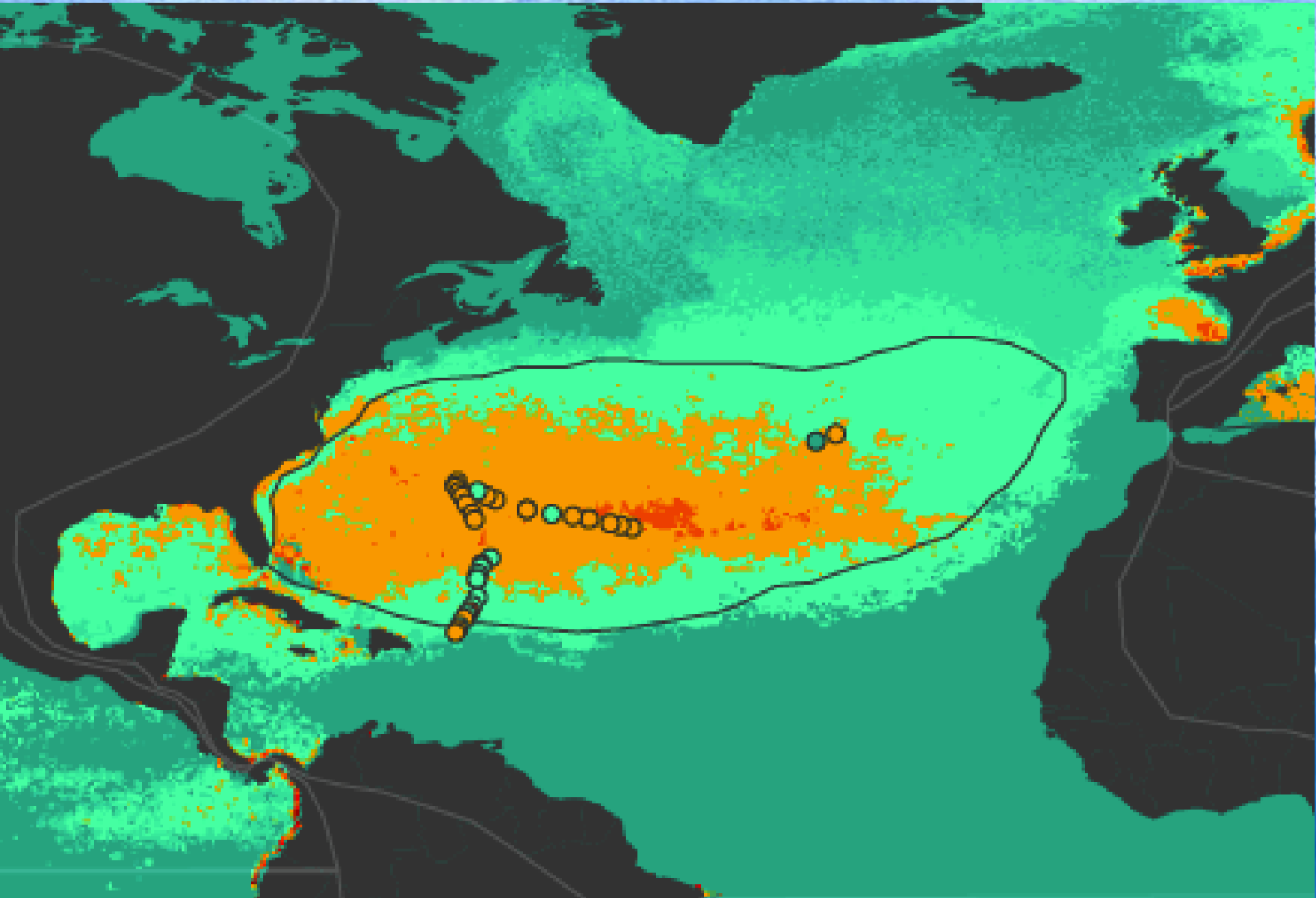
(Lebreton et al., Mar. Pol. Bul., 2012)



NORTH ATLANTIC GYRE



Manta Trawl

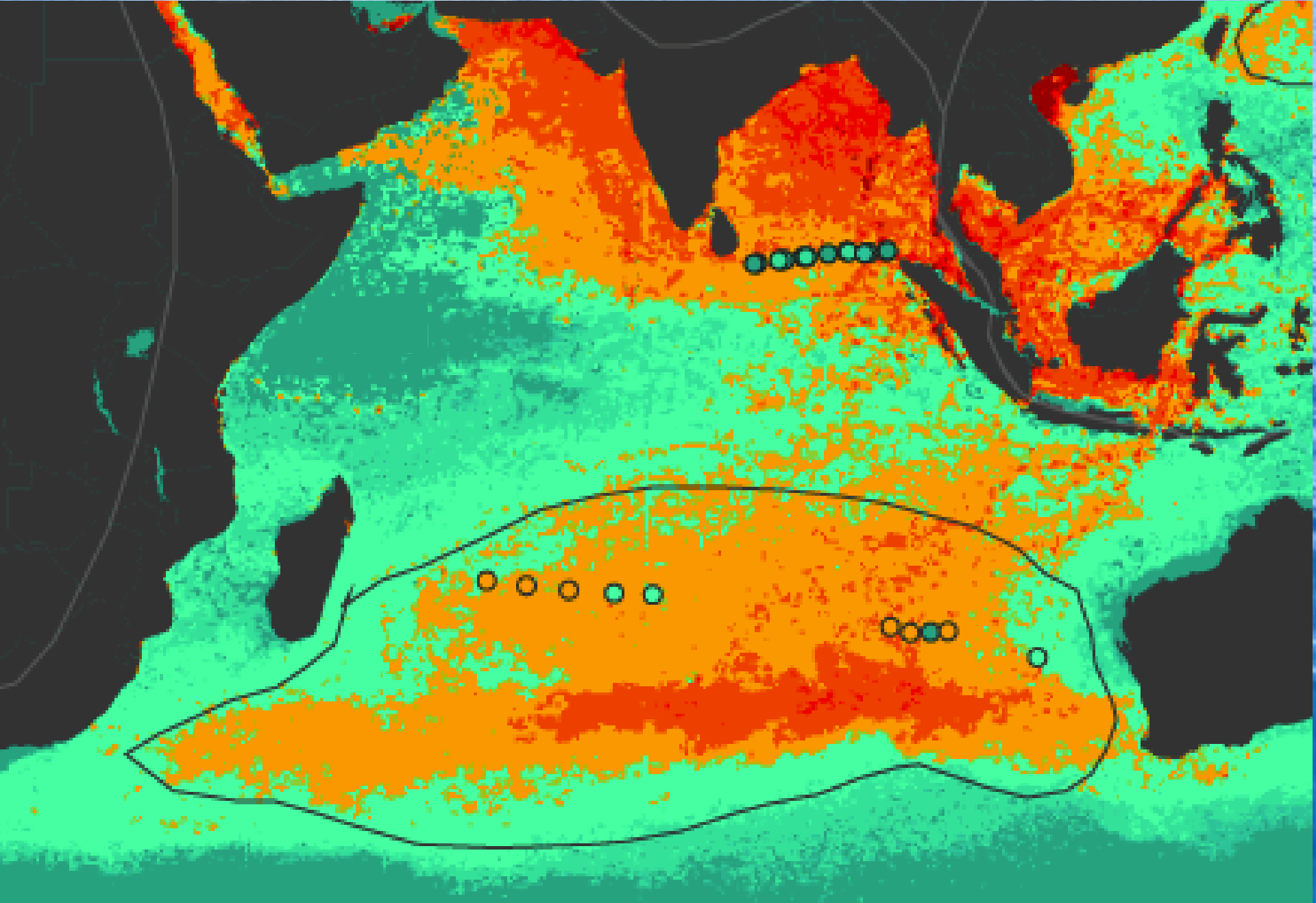


North Atlantic Gyre 2010, 2013

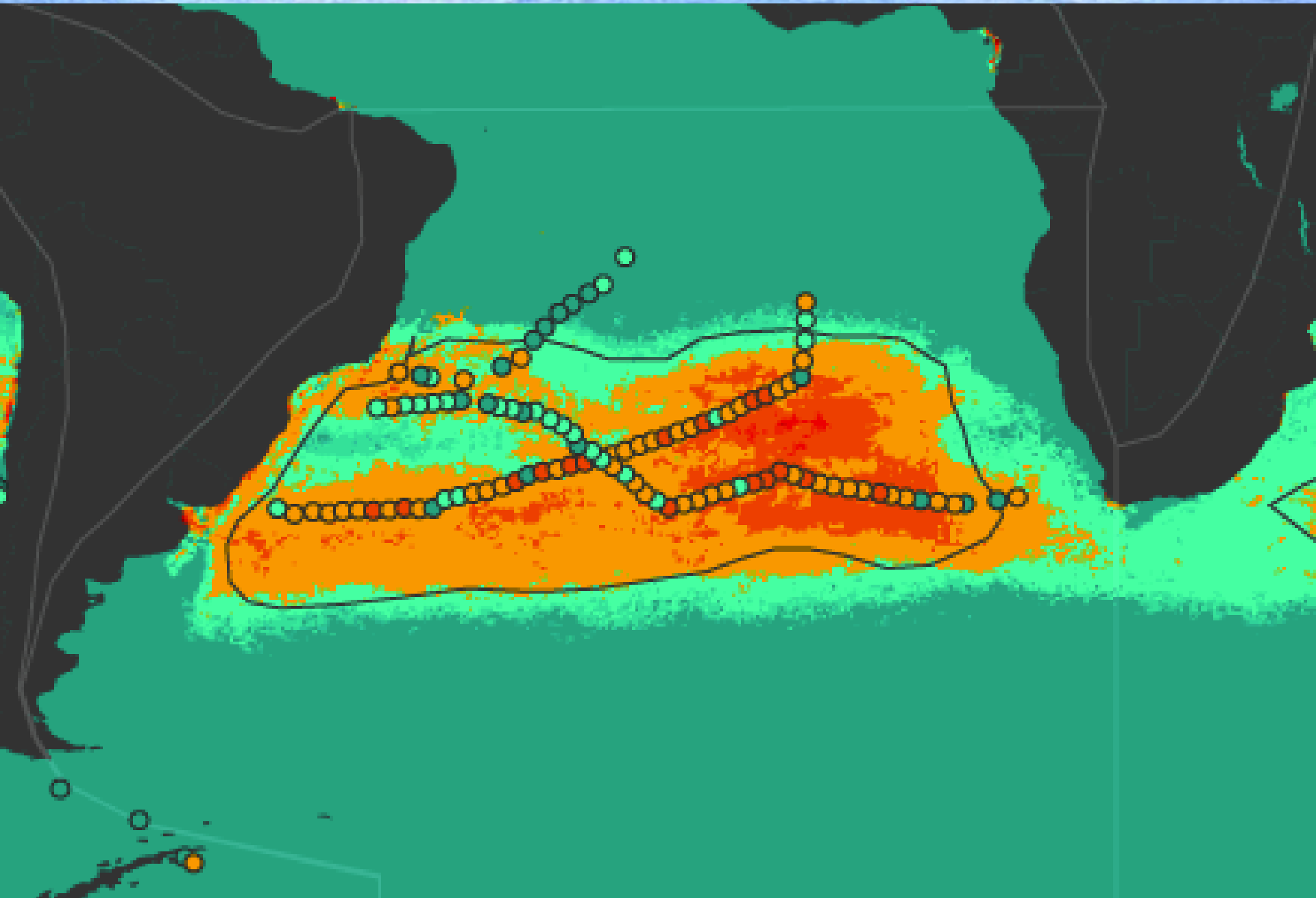


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North Atlantic Gyre – Myctophid fish and microplastics

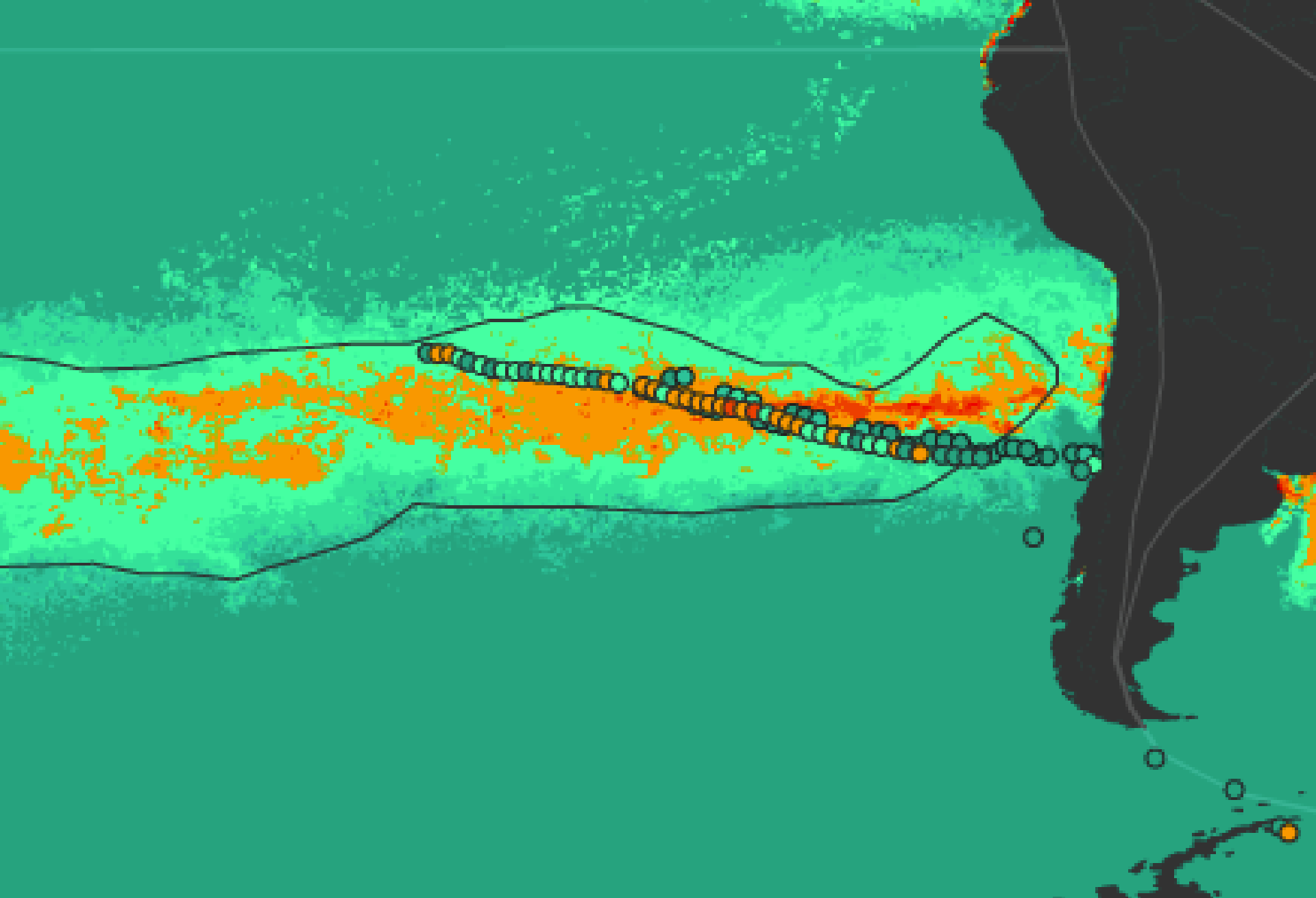




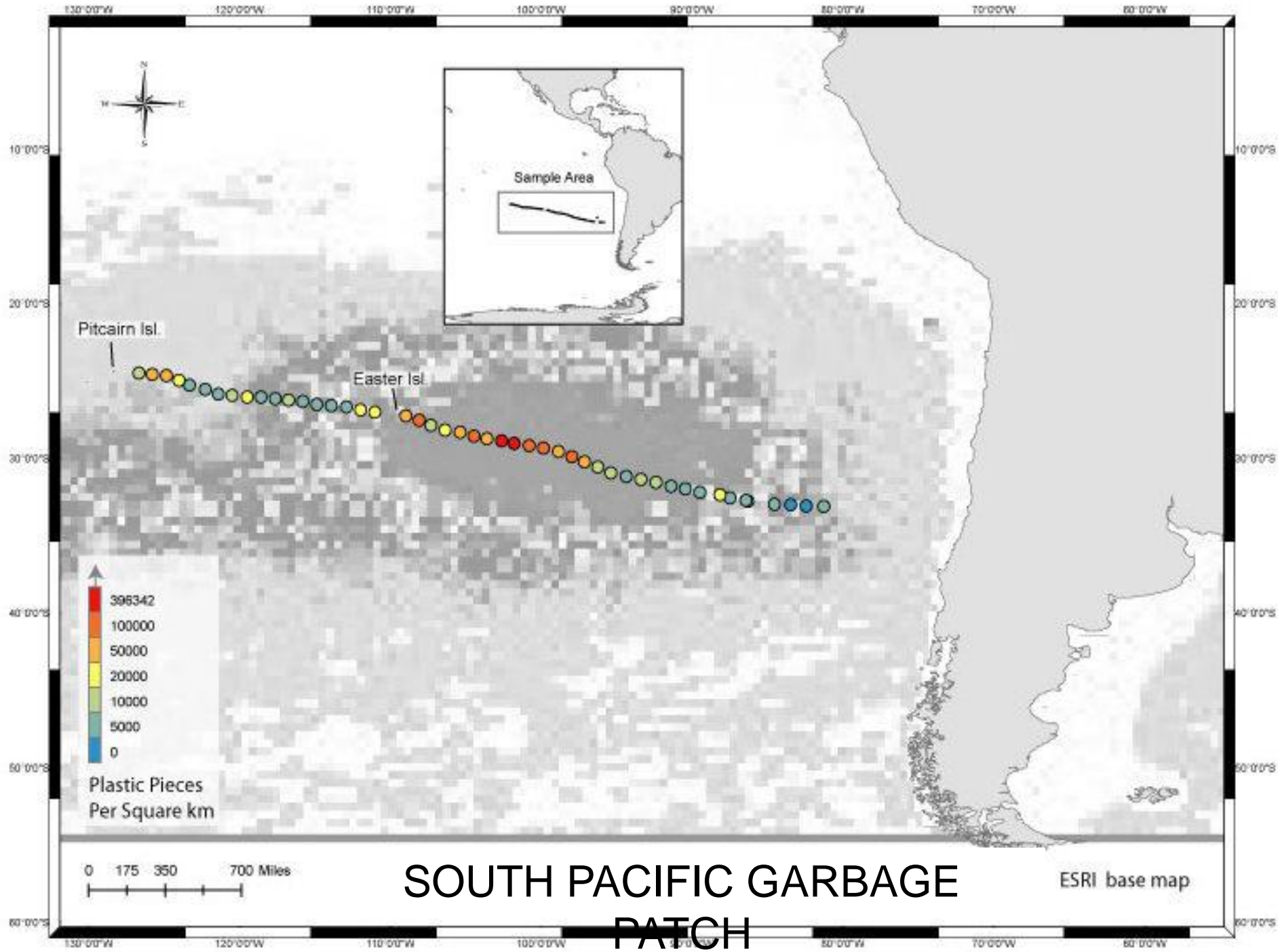


South Atlantic Gyre



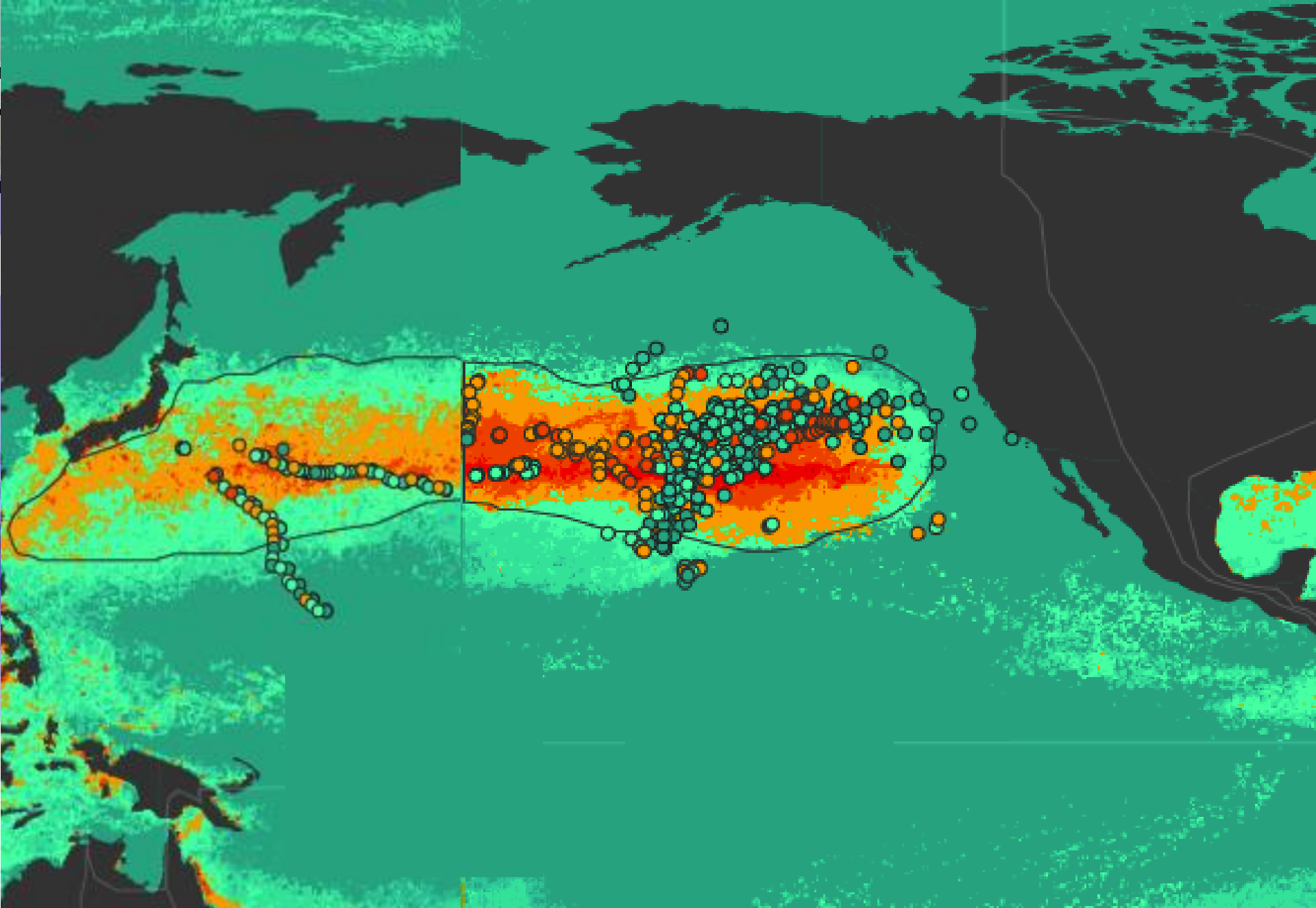


South Pacific Gyre 2011



SOUTH PACIFIC GARBAGE PATCH



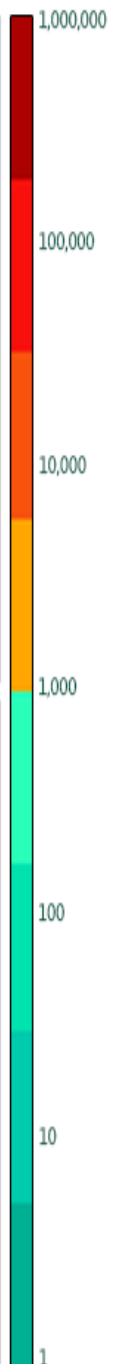
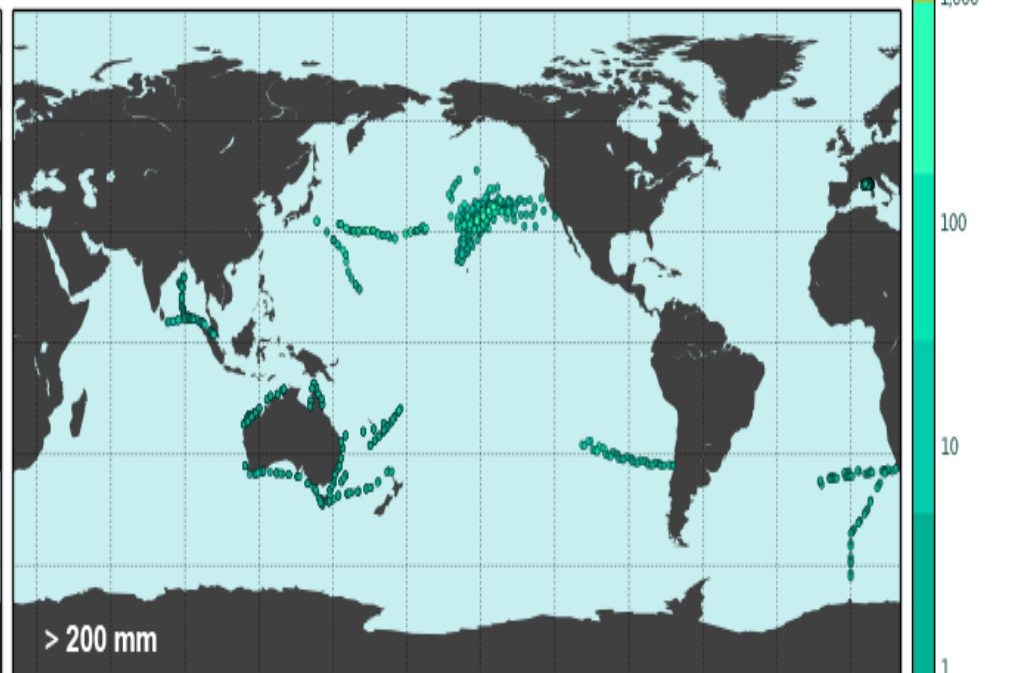
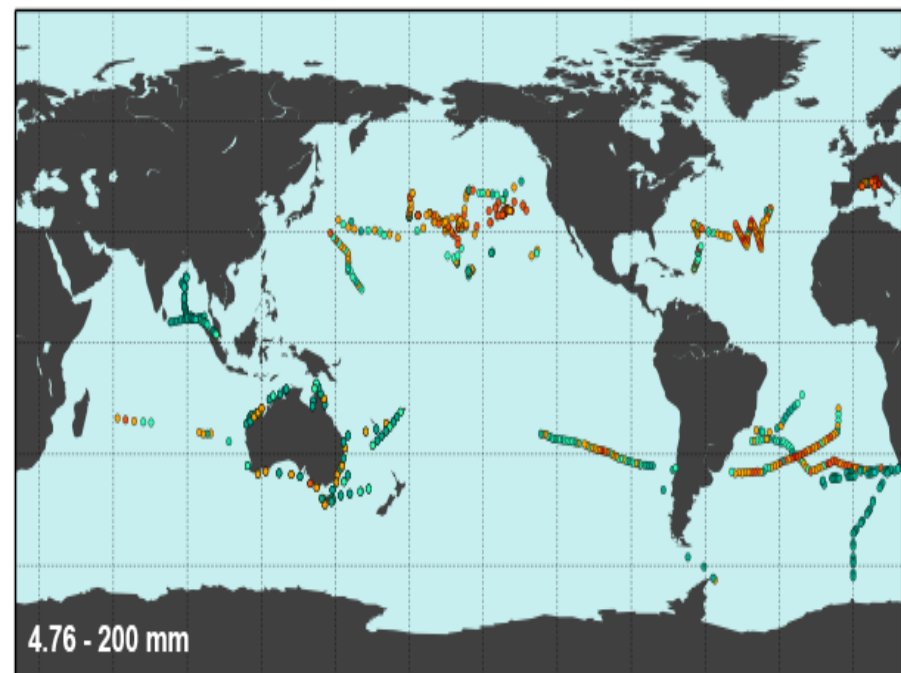
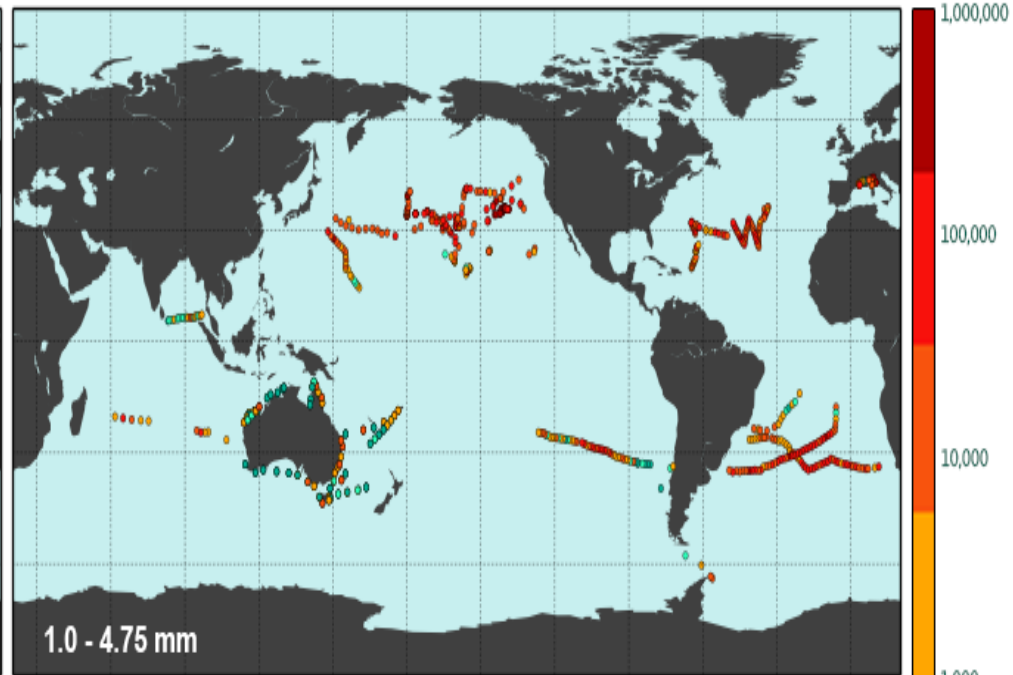
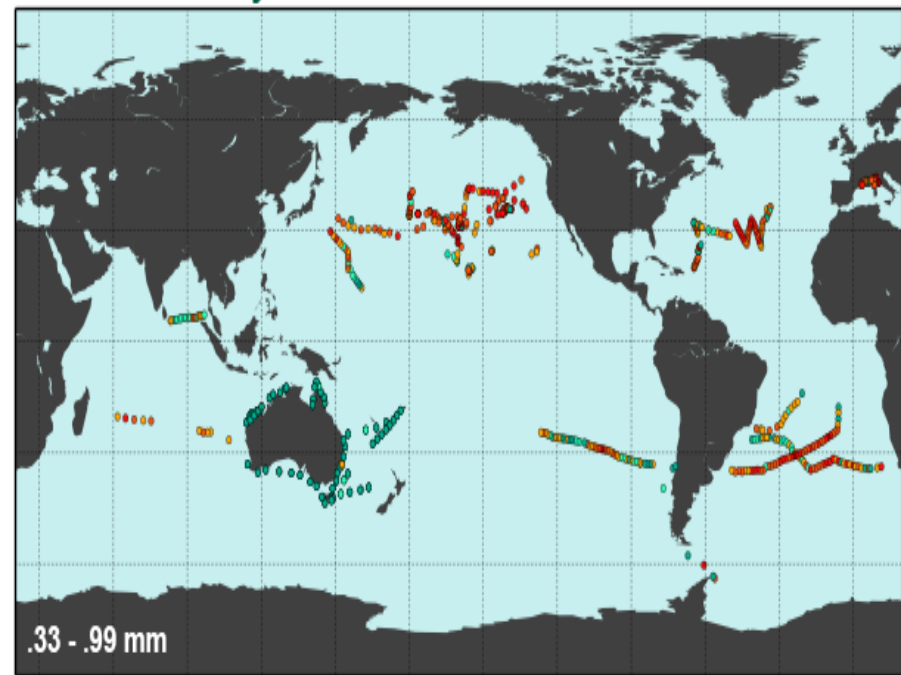


North Pacific Gyre – 2008, 2011, 2012

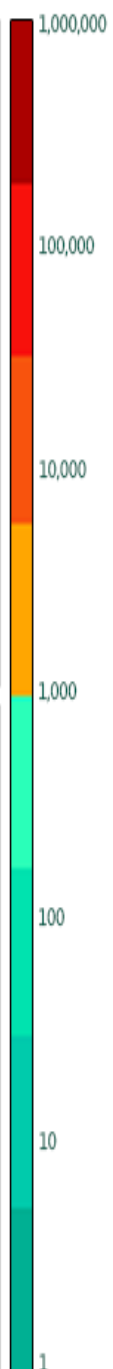
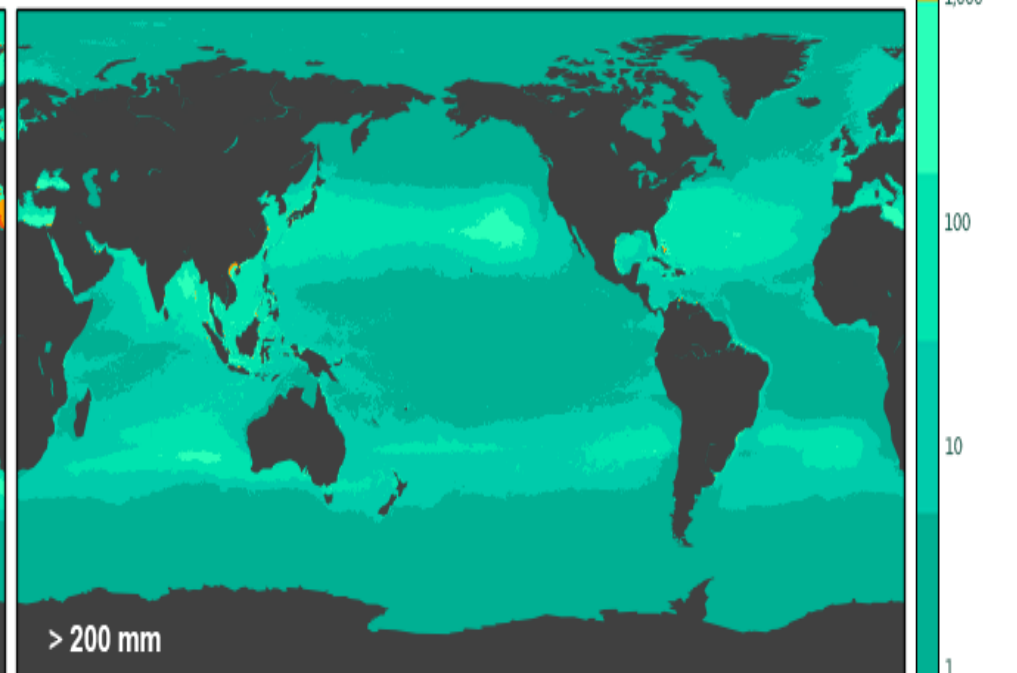
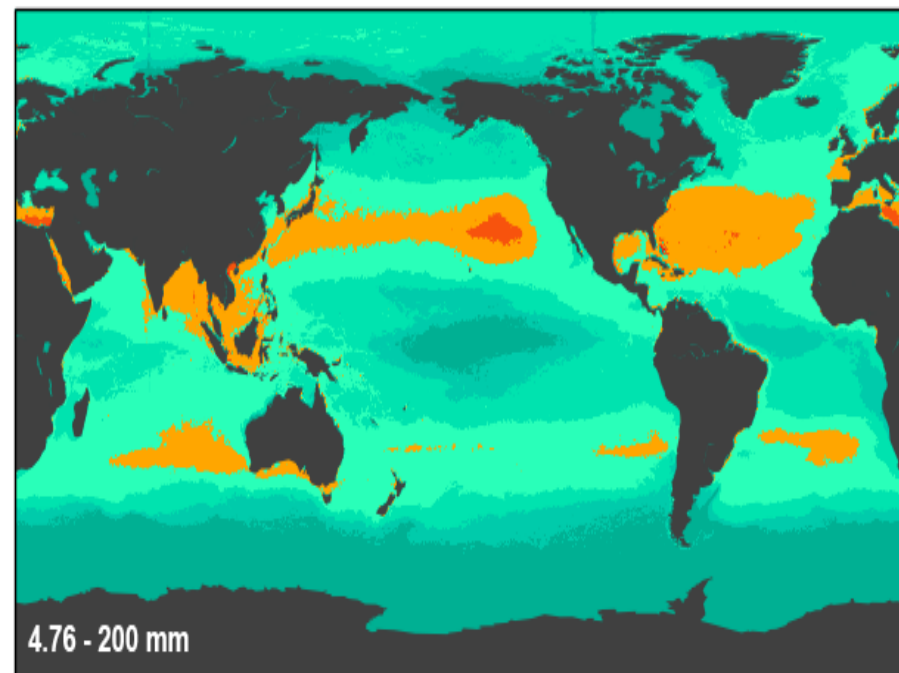
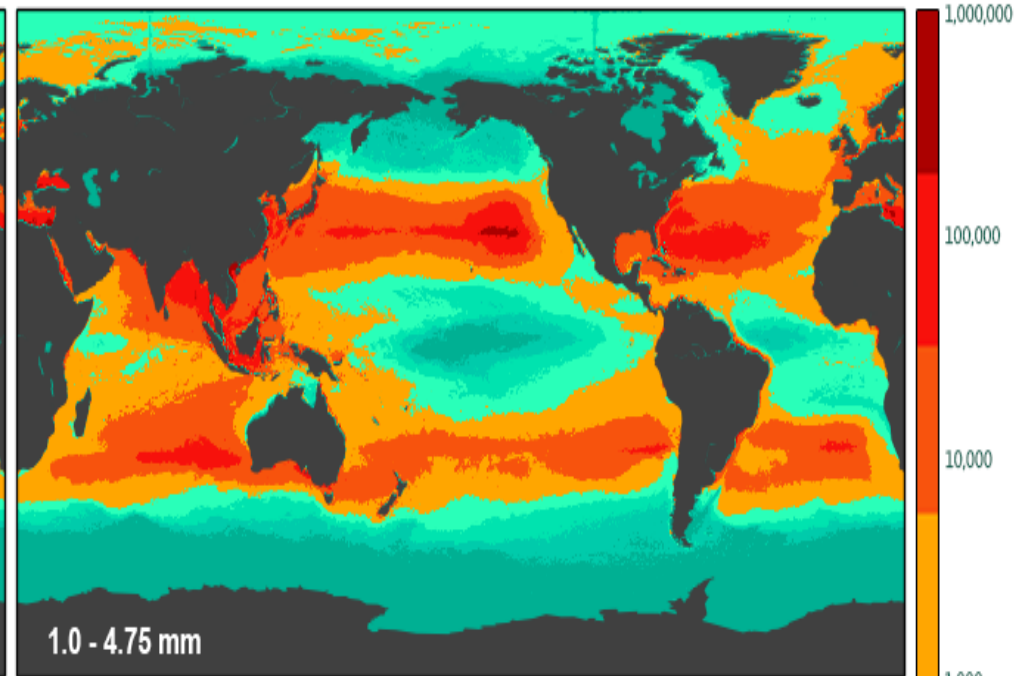
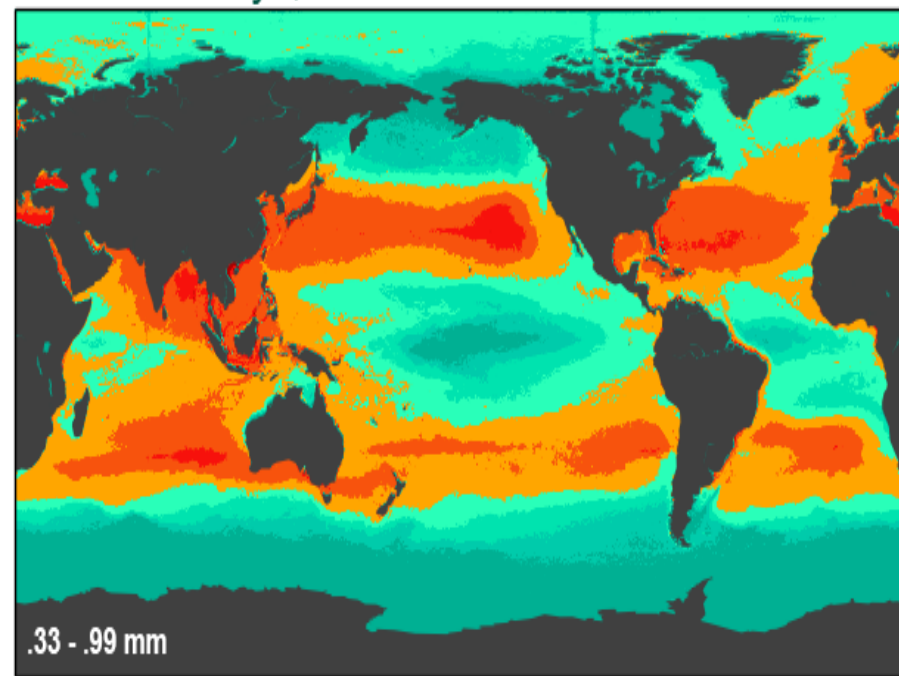


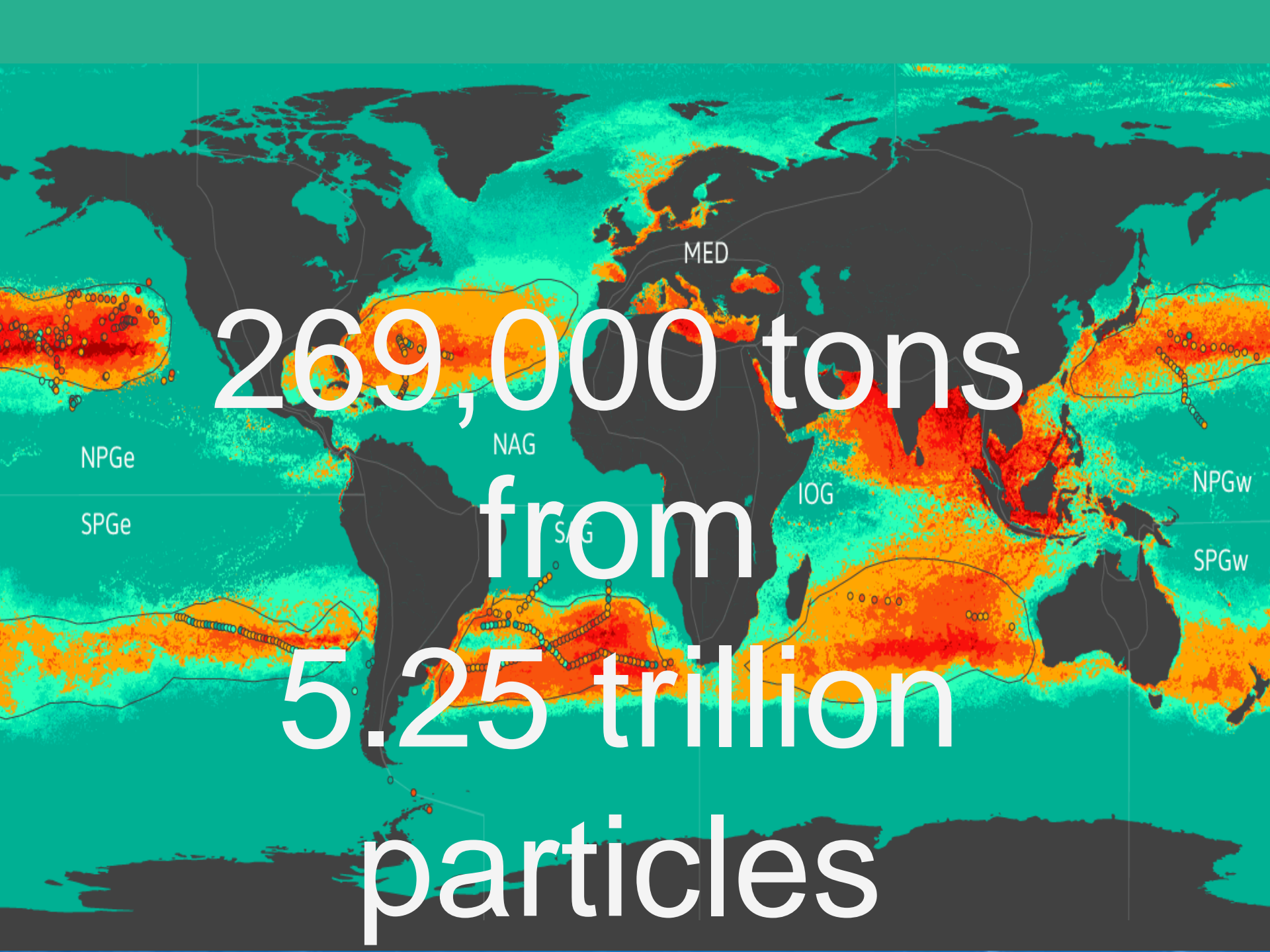
North Pacific Gyre – 2008, 2011, 2012

Count Density - pieces.km⁻²



Count Density - pieces.km⁻²





269,000 tons

from

5.25 trillion

particles

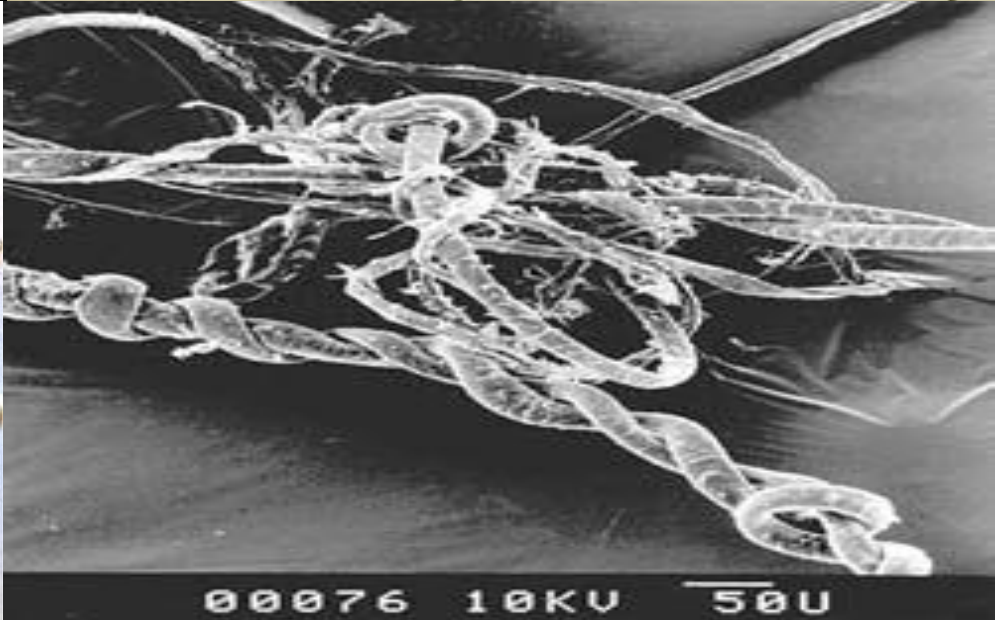
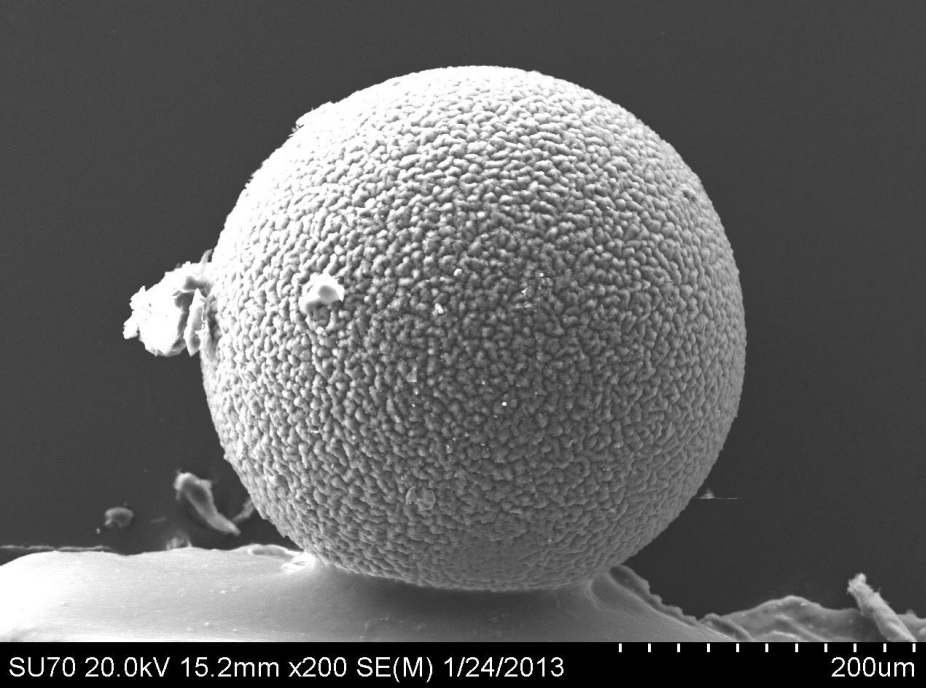
SOURCES OF PLASTIC POLLUTION





SGYRES

Poor waste management in developing nations



2011 JAPAN TSUNAMI



5.00 million tons



DEGRADED FISHING GEAR

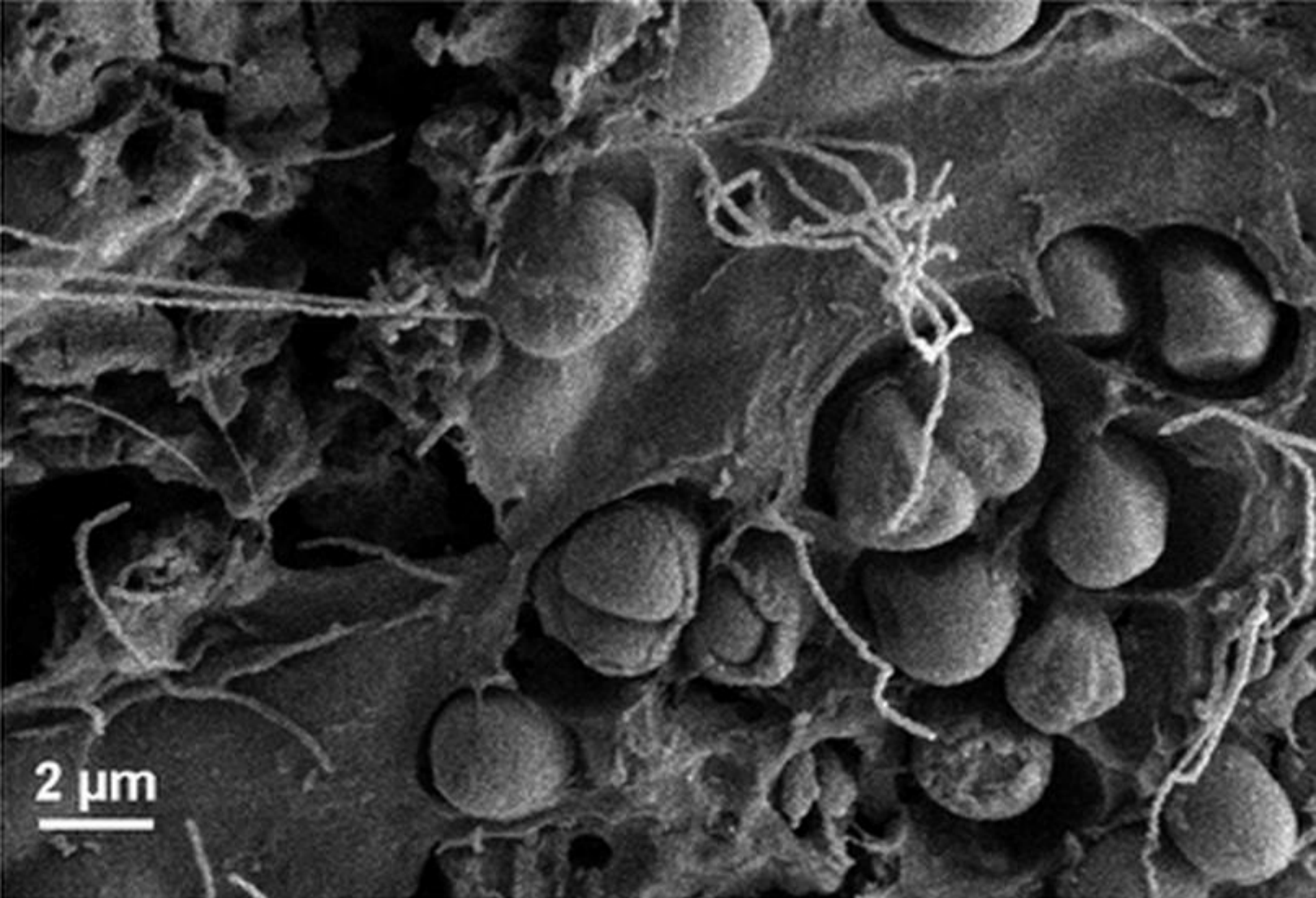
LIFE CYCLE FOR PLASTIC POLLUTION





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Photodegradation, Mechanical & Chemical degradation



2 μm



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Biodegradation

(Zettler et al., 2013)

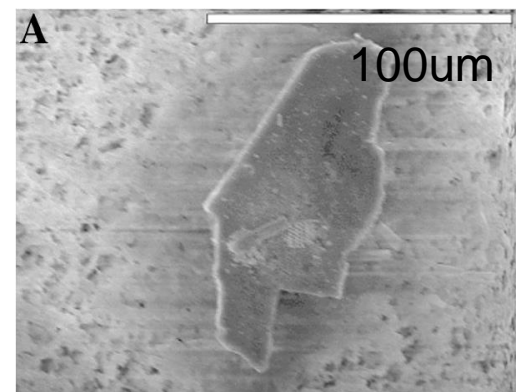
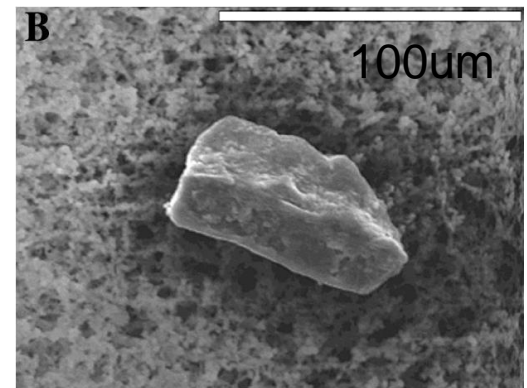
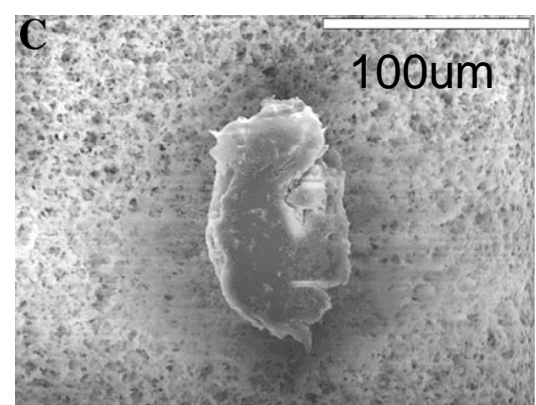
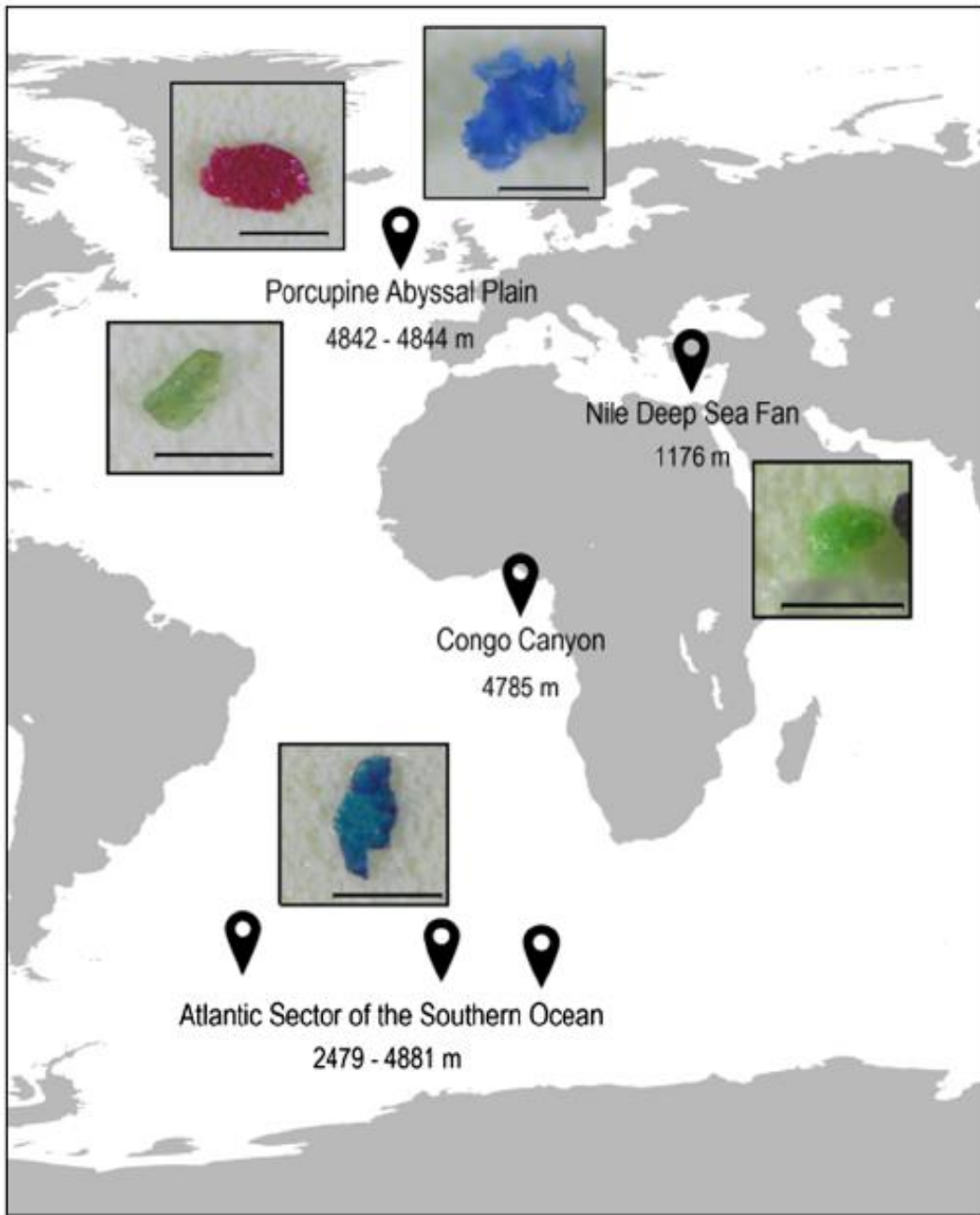


Fragmentation by grazing



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Shoreline deposition



WHAT ARE THE ECOLOGICAL IMPLICATIONS OF PLASTIC POLLUTION?





ENTANGLEMENT



Photo: Chris Jordan



5GYRES

INGESTION





(Thompson, 2004)



(Cole et al., 2013)



(Goldstein et al., 2013)

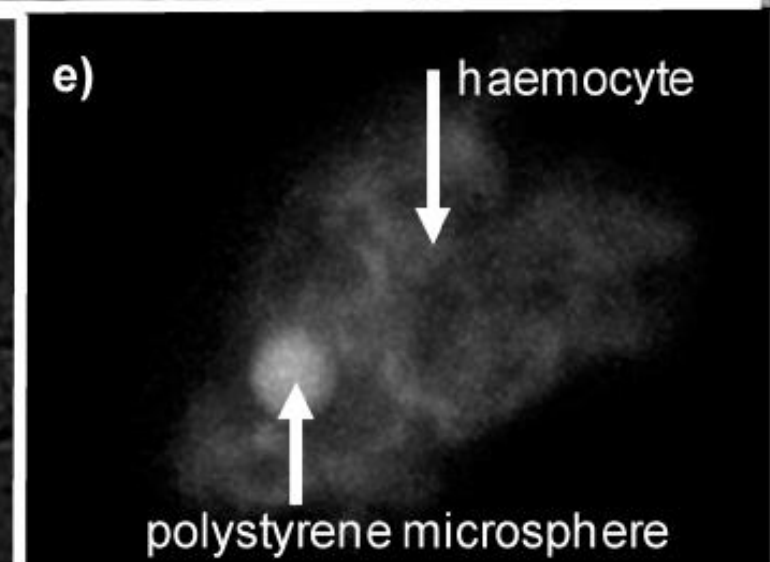
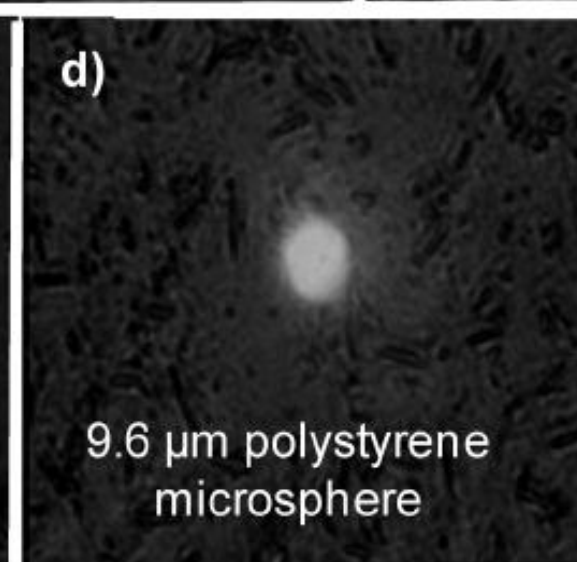
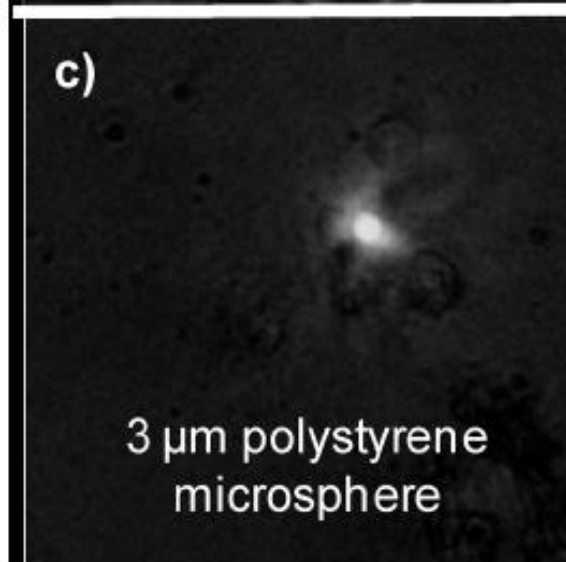
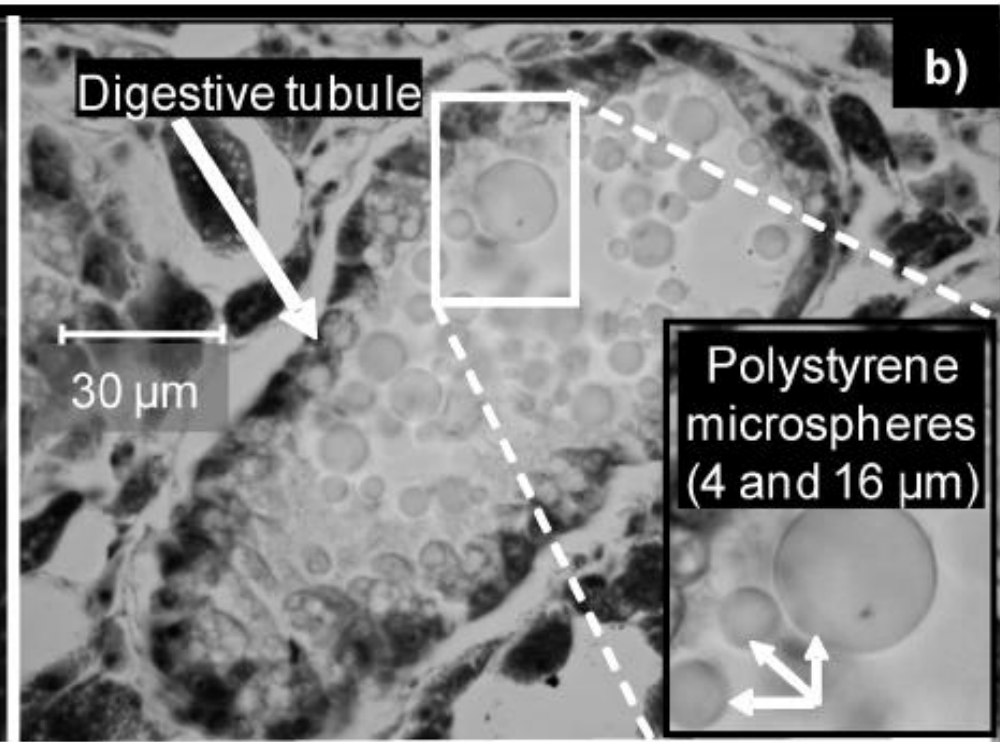
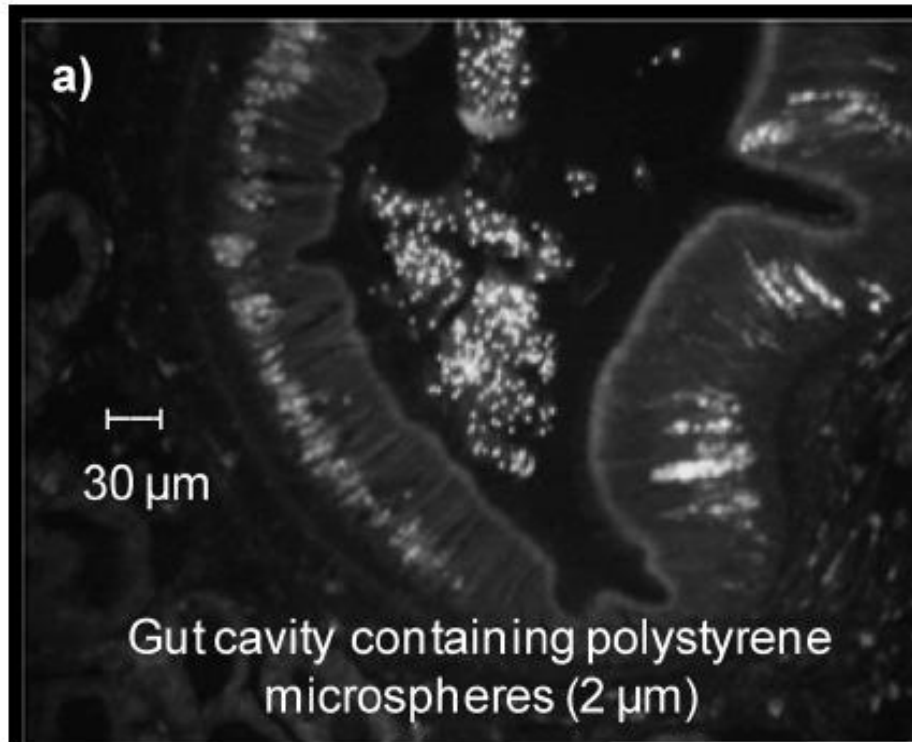


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COLONIZATION AND INVASIVE SPECIES



THE NEW REEF
 North Pacific Expedition 2012
 325 pound tangled net
 89 different types of line
 130 different plastic pieces
 36 species macrofauna
 3 entangled fish







THERE ARE NO OCEAN-CAUGHT ORGANIC FISH

59%



AP

24%



17%



663 species impacted by marine debris

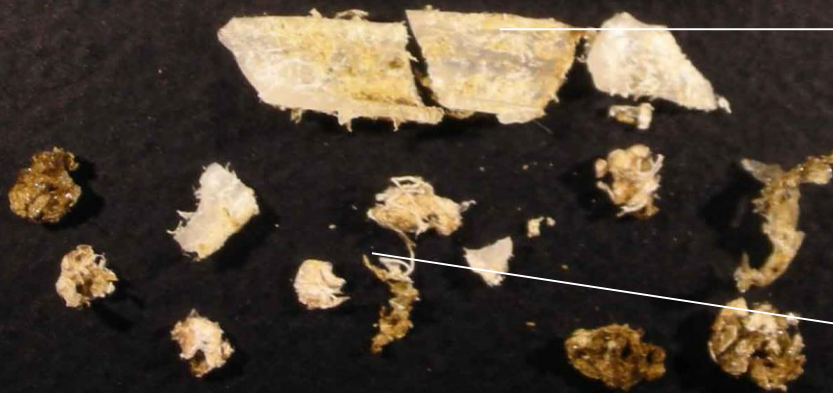
(CBD Technical Series No. 67)

THE HUMAN HEALTH CONNECTION





PLASTIC



PLANKTON

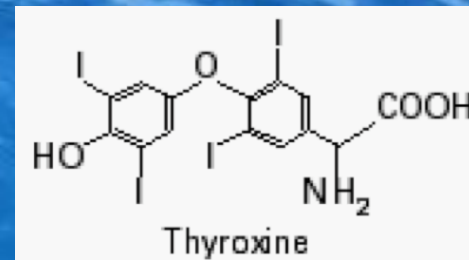
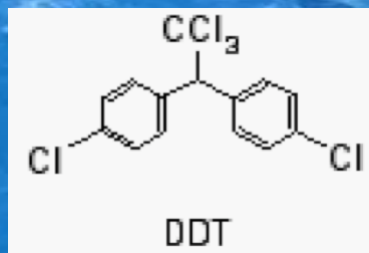
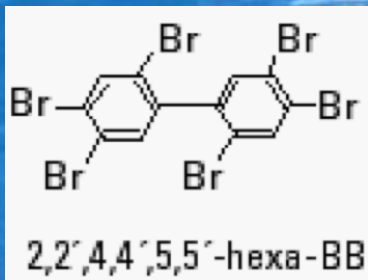


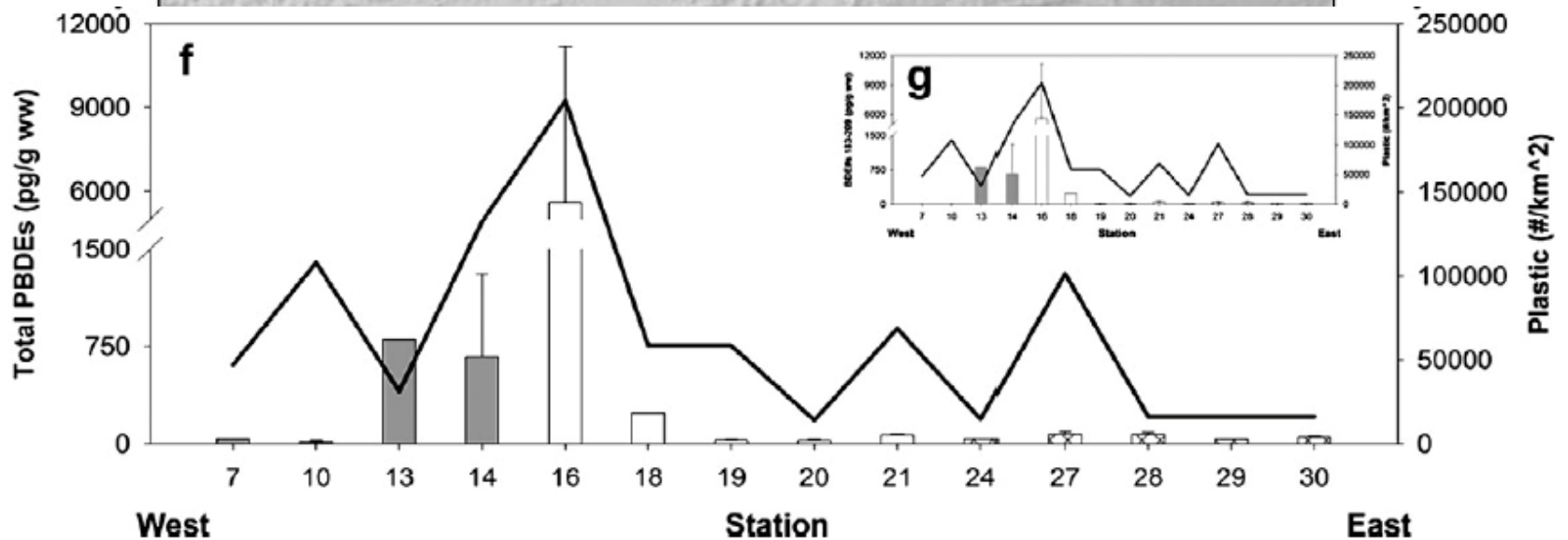
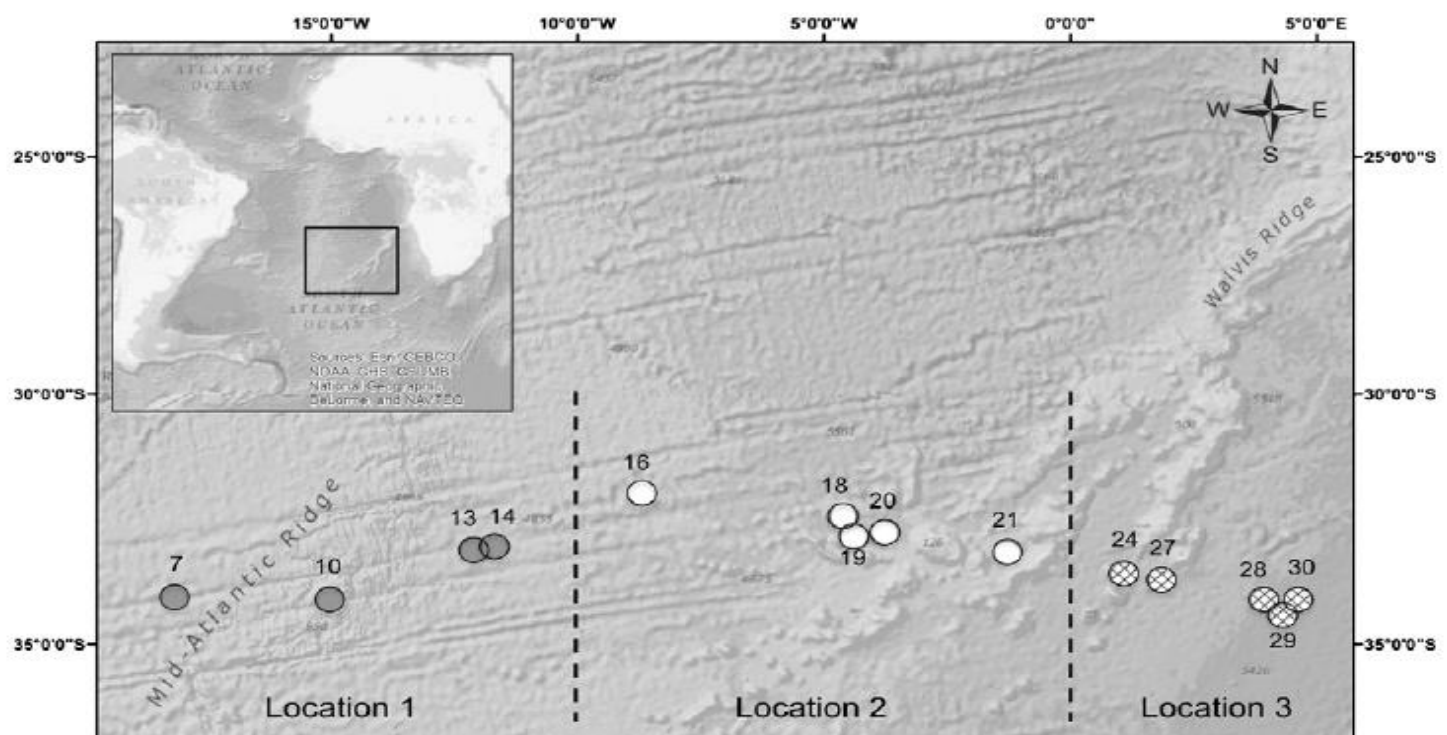
SGYRES





Time at Sea







How synthetic are we?

The image features a background of deep blue ocean water with visible ripples and small waves. Centered over this background is the text "SCIENCE TO SOLUTIONS" in a clean, white, sans-serif font. The text is arranged in three lines: "SCIENCE" on the top line, "TO" on the middle line, and "SOLUTIONS" on the bottom line.

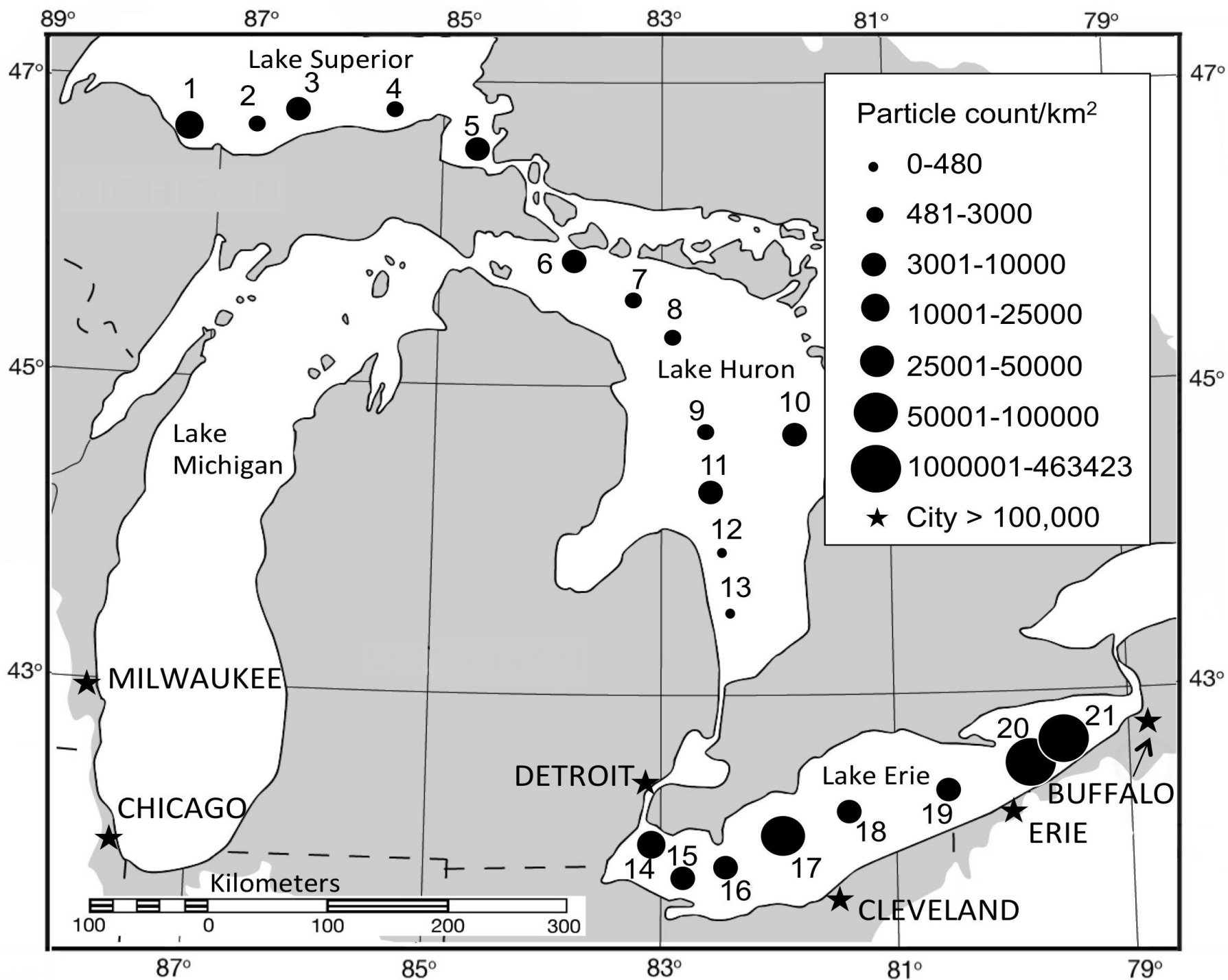
SCIENCE
TO
SOLUTIONS

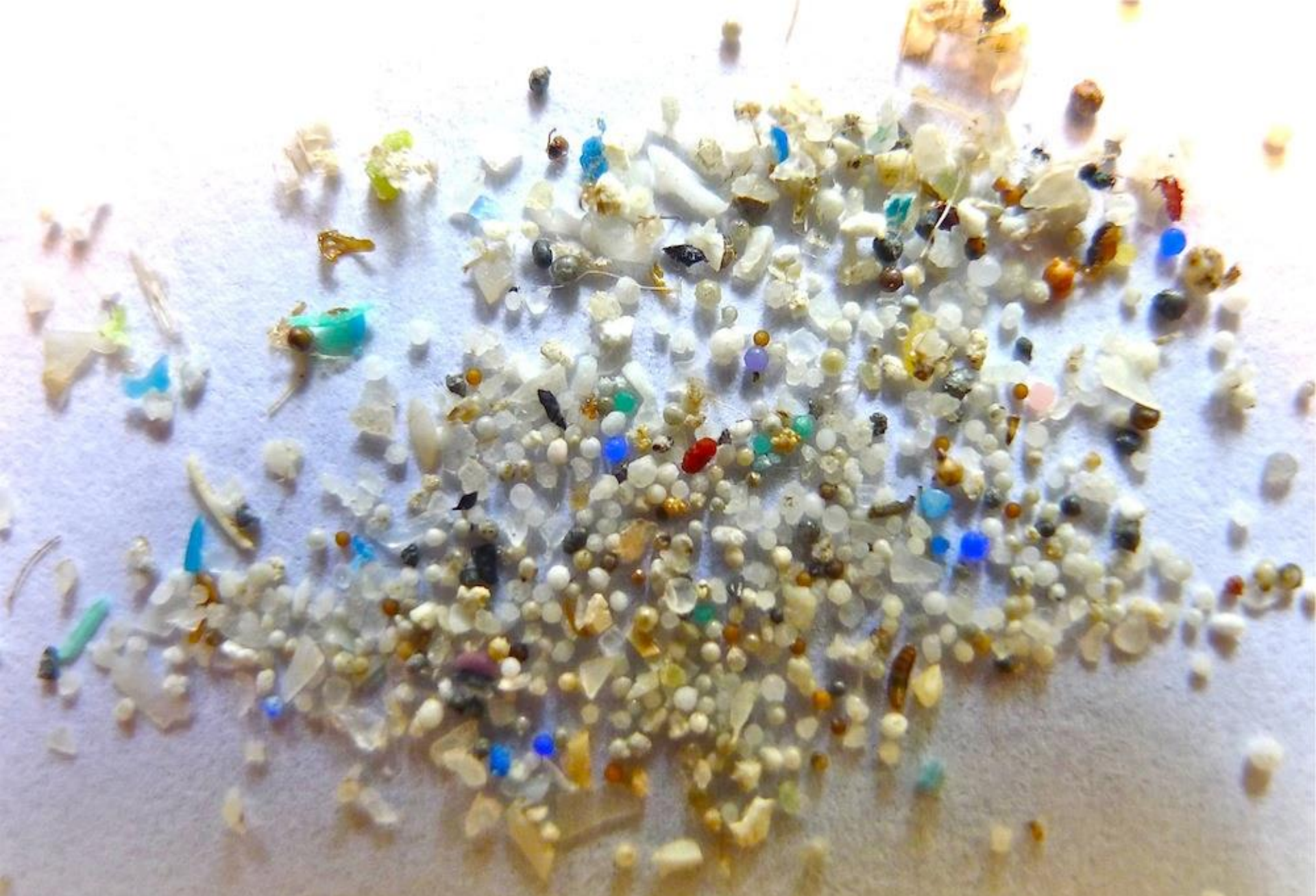
A three-masted sailing ship with white sails and a yellow hull is shown on the water. The ship is viewed from a side profile, sailing towards the right. The sails are partially unfurled. An American flag is visible on the left side of the ship. The background is a clear blue sky and a calm sea.

GREAT LAKES EXPEDITIONS 2012-13



21 samples collected in lakes Superior, Huron and Erie





Station #20 Lake Erie

GENTLE

SCRUB

g me guy.
faurate, Polyethylene, Glycerin
sauric Acid, Acrylates/C10

oil free

microbeads gently exfoliate,
Beta Hydroxy cleans deep into
pores for soft, smooth skin

Neutrogena®



Phase out problematic design

Polyethylene
Microbeads



Apricot
Shells



Cocoa
Beans



5GYRES

Alternative products are benign by design



ARE YOU SCRUBBING YOUR FACE WITH PLASTIC?

VICTORY

Johnson & Johnson - 2015

Loreal – 2015

Body Shop – 2015

Proctor & Gamble – phase out in 2017?



2014 EXPEDITION TO ICELAND





2,400 miles

31 surface tows



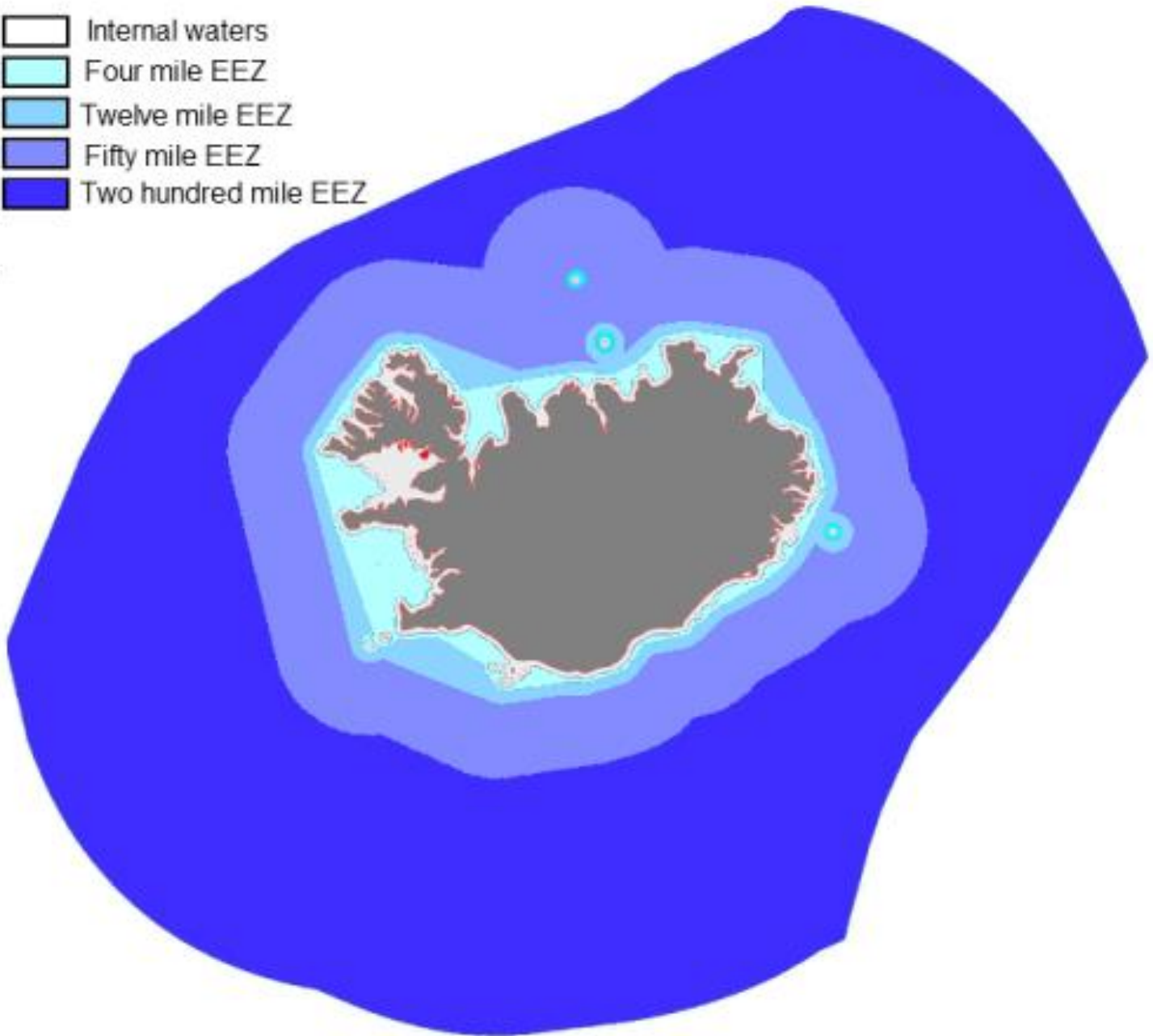
Vertical
distribution



3-mile dive



- Internal waters
- Four mile EEZ
- Twelve mile EEZ
- Fifty mile EEZ
- Two hundred mile EEZ



5GYRES

Exclusive Economic Zones of Iceland

SAVING

OUR

SYNTHETIC

SEAS



5GYRES

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