



Image credit: NOAA

Plastic in the Ocean: Facts, Fiction, and Unknowns

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Ocean
Plastics
Primer

Ocean
Plastics
Primer

Plastics
and
Seabirds

```
graph LR; A((Ocean Plastics Primer)) --- B((Resources)); A --- C((Plastics and Seabirds)); B --- C;
```

**Ocean
Plastics
Primer**

Resources

**Plastics
and
Seabirds**

Do you recycle?

- Yes
- No
- Sometimes!

What questions do you have about plastic in the ocean?

- Type your questions into GoToMeeting now! I will take a few seconds to look over and try to make sure I address in the body of my presentation.

A graphic consisting of a large blue circle with a yellow border, centered on a black background. The text "Ocean Plastics Primer" is written in white, bold, sans-serif font inside the blue circle.

Ocean
Plastics
Primer

Marine Debris

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graph TD; MD((Marine Debris)) --- MP((Microplastics)); MP --- MF((Microfibers)); MP --- NP((Nanoplastics));
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Microplastics

Microfibers

Nanoplastics

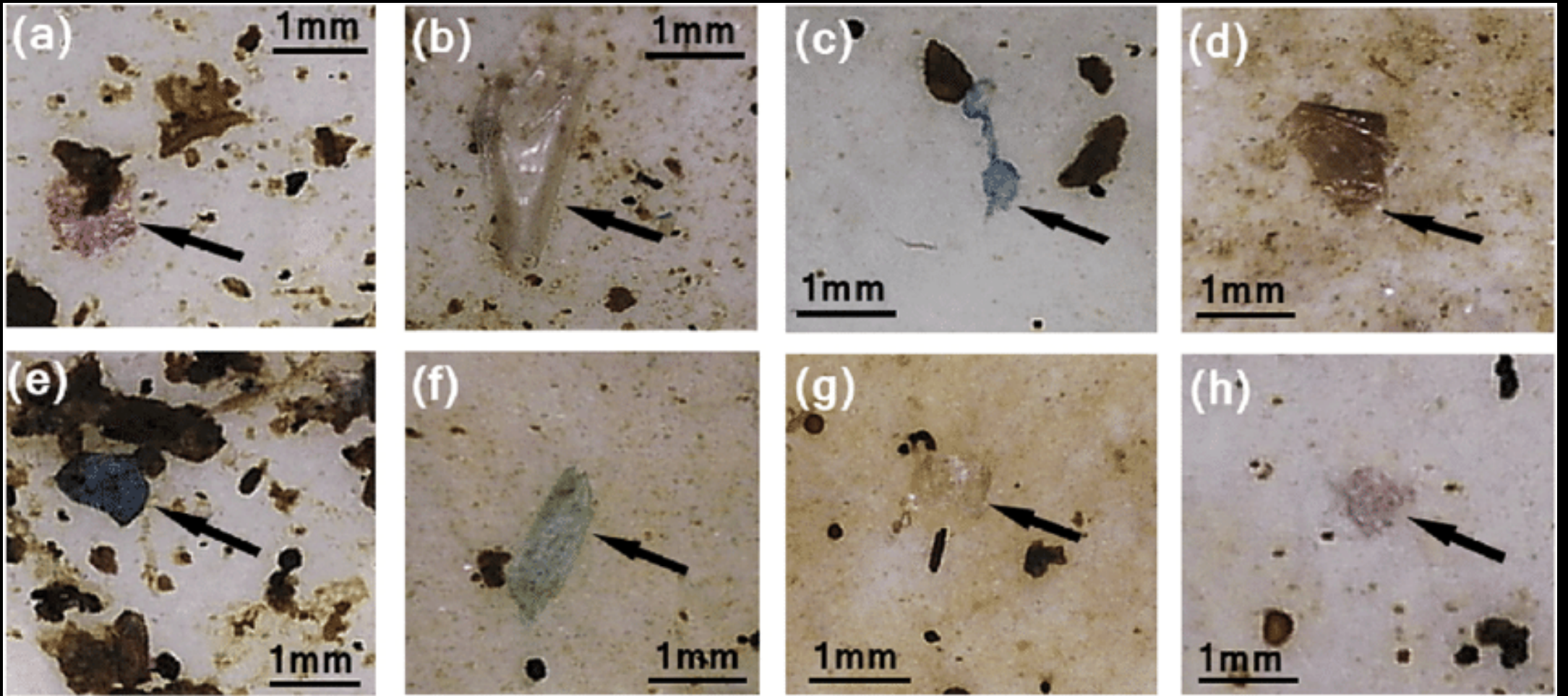
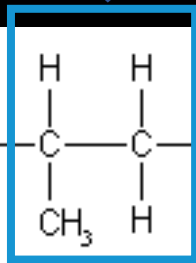


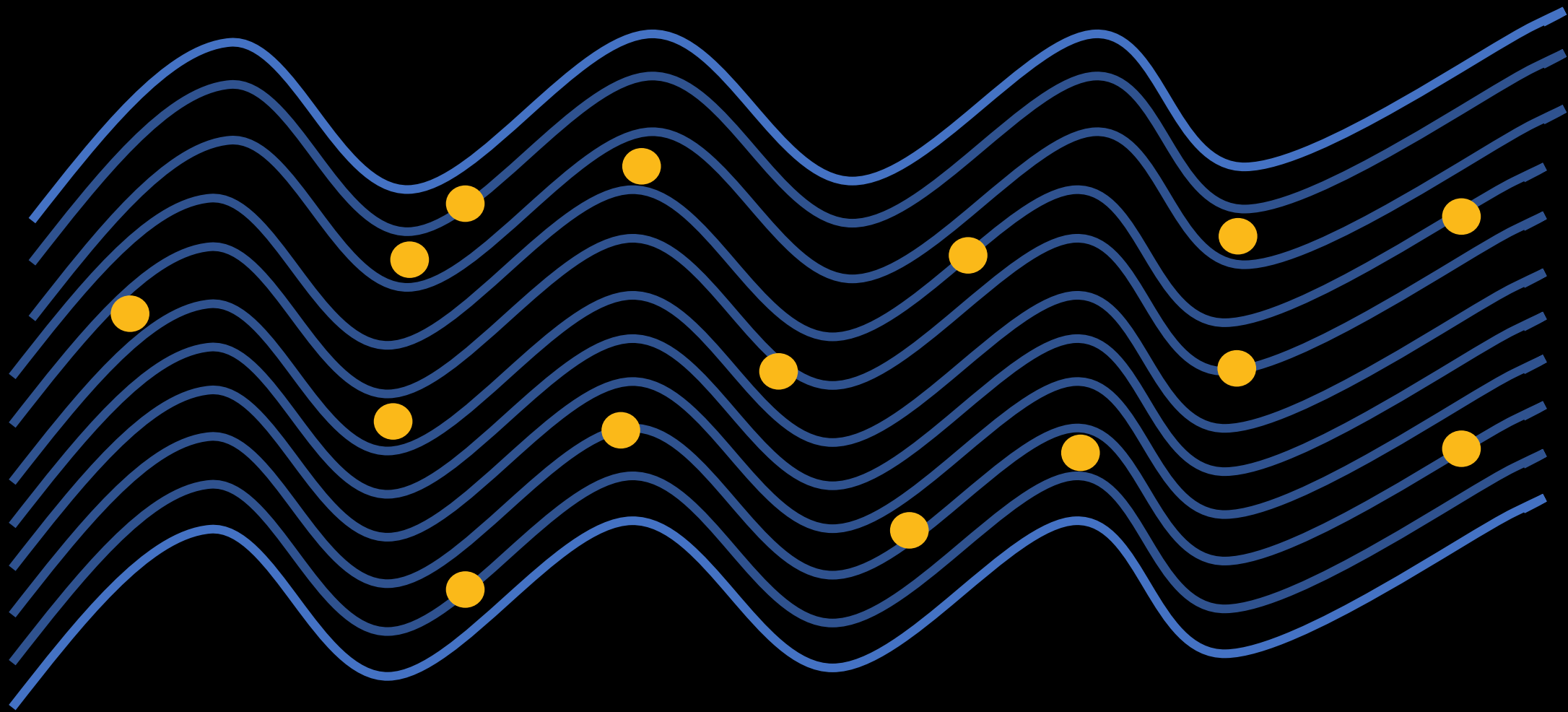
Image credit: Wang et al. 2016

Plastic = polymer, many “mers”

monomer



Polyethylene (PE)	
Polyethylene terephthalate (PET)	
Polypropylene (PP)	
Polystyrene (PS)	
Polyvinyl chloride (PVC)	





PETE



HDPE



PVC



LDPE



PP



PS



OTHER

**polyethylene
terephthalate**

**high density
polyethylene**

**polyvinyl
chloride**

**low density
polyethylene**

polypropylene

polystyrene

other



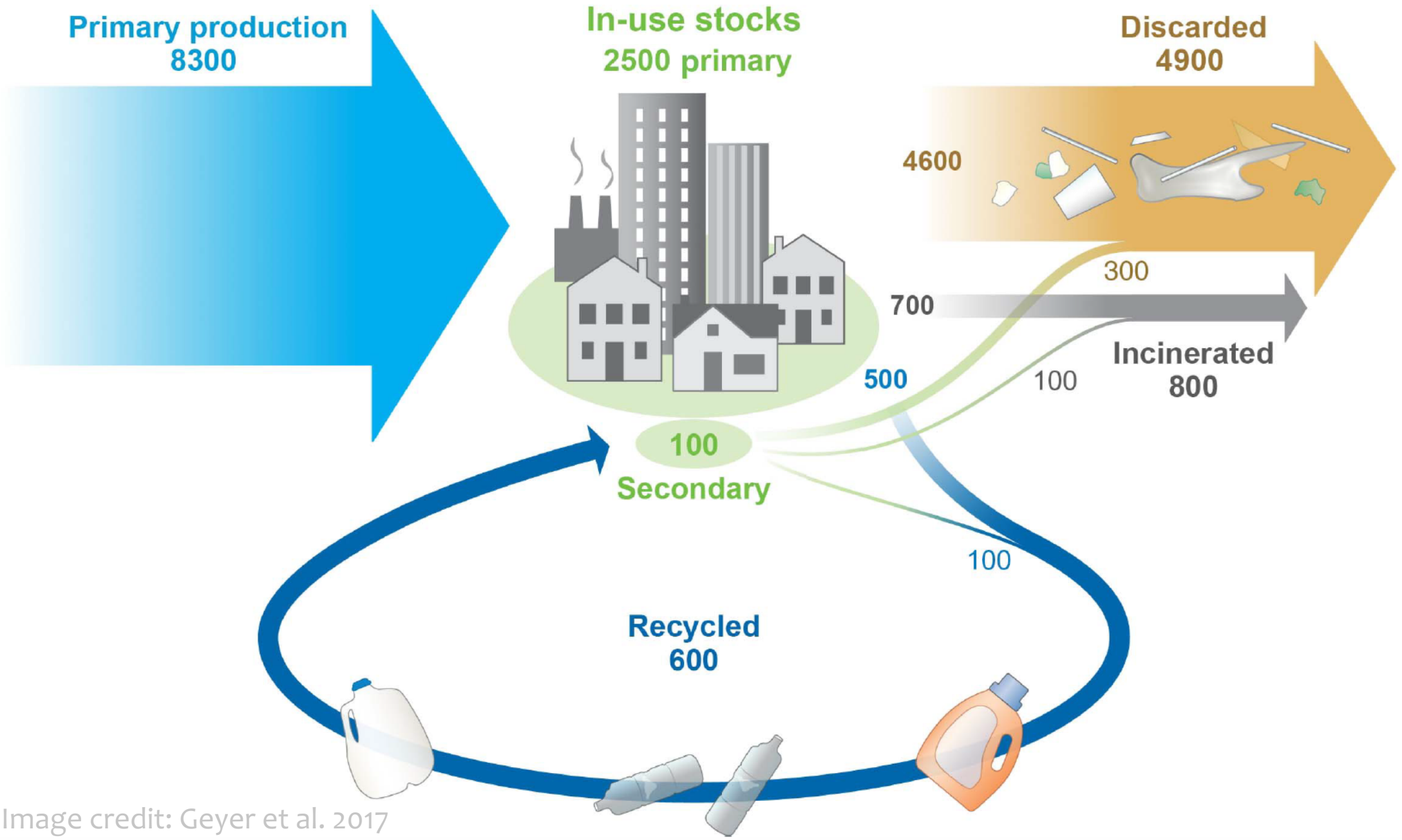



Image credit: Geyer et al. 2017



95% of plastic packaging material value or **\$80–120 billion** annually is lost to the economy after a short first use.


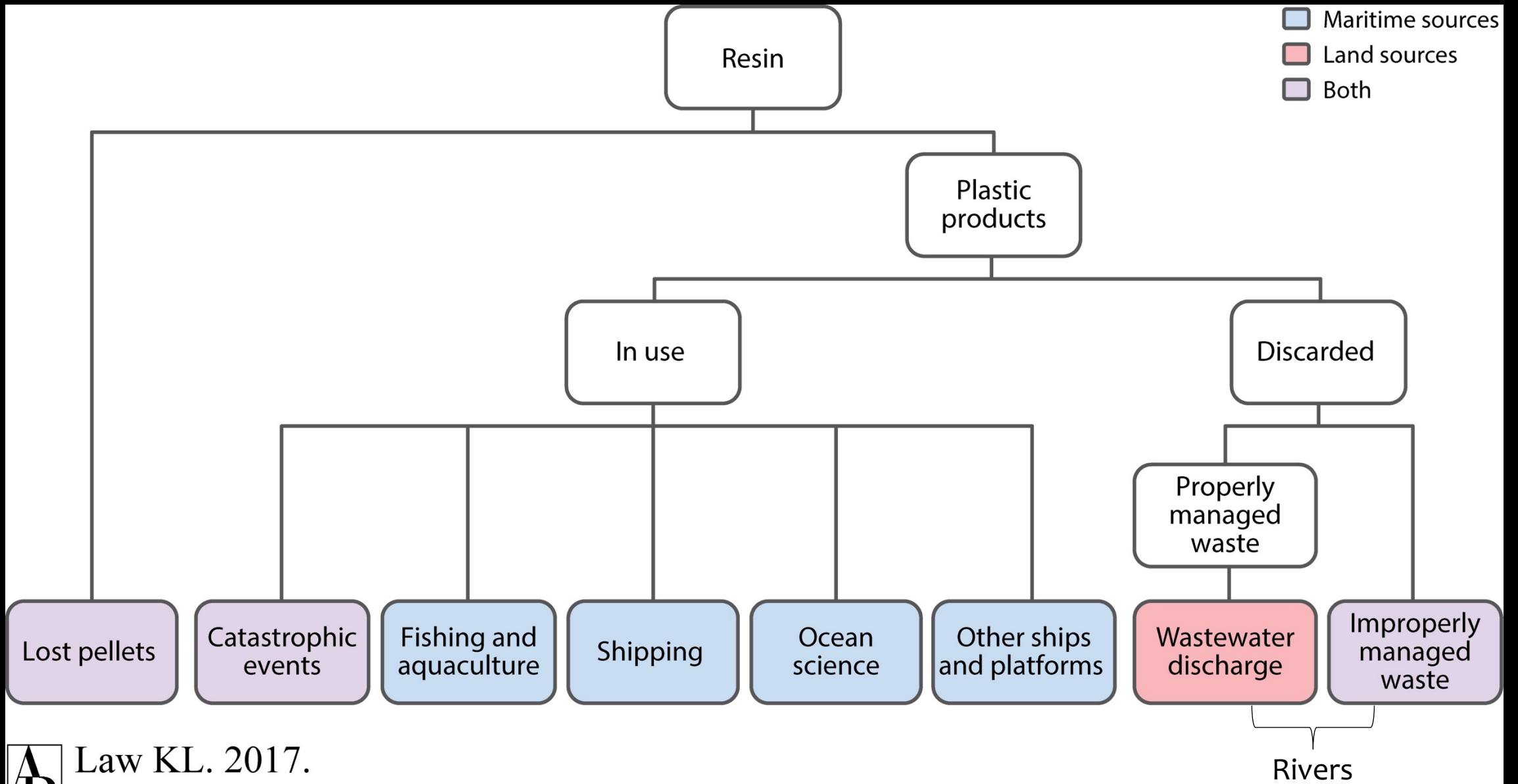
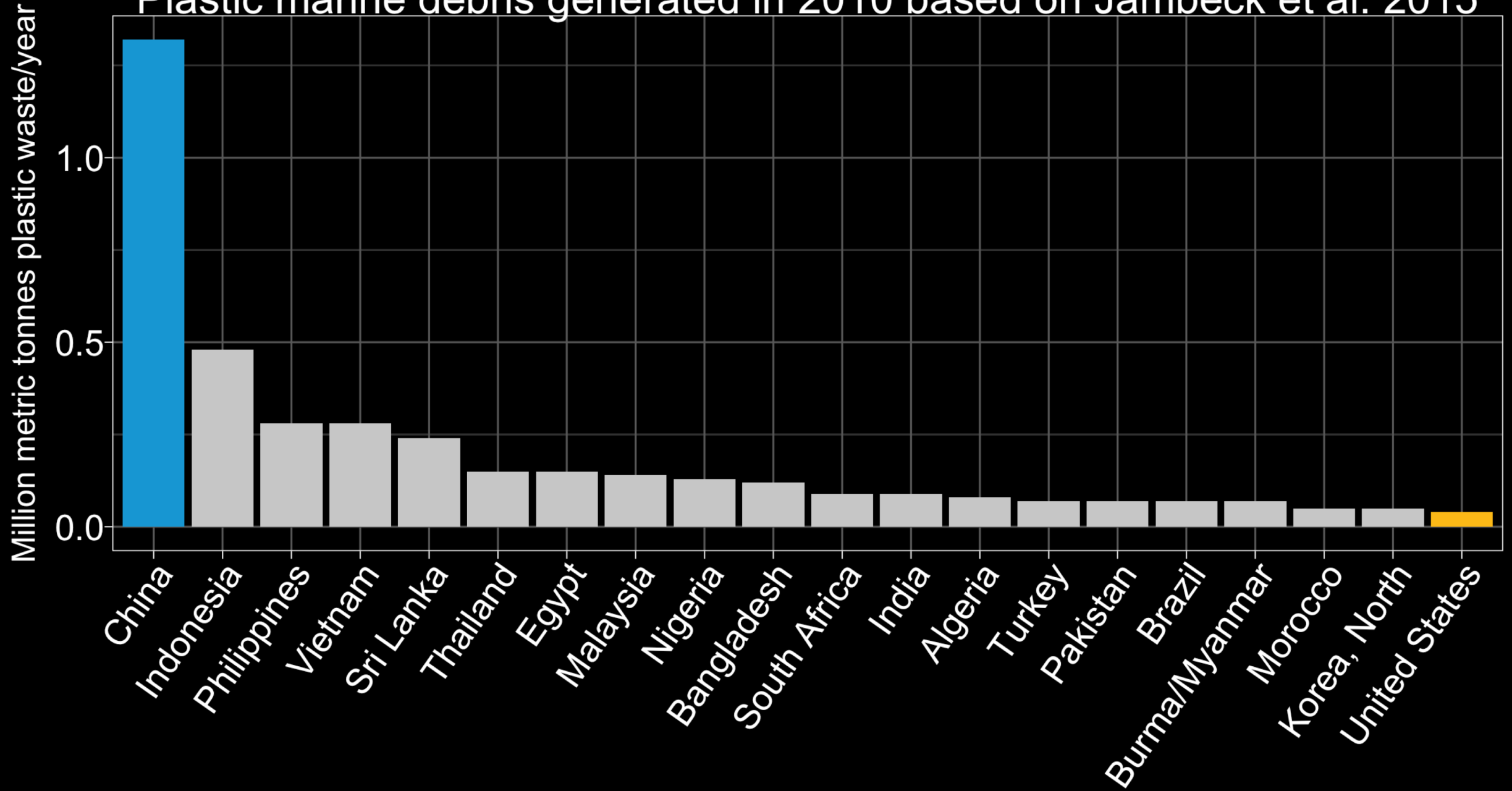


Image credit: Caroline Power/BBC News
Data source: World Economic Forum



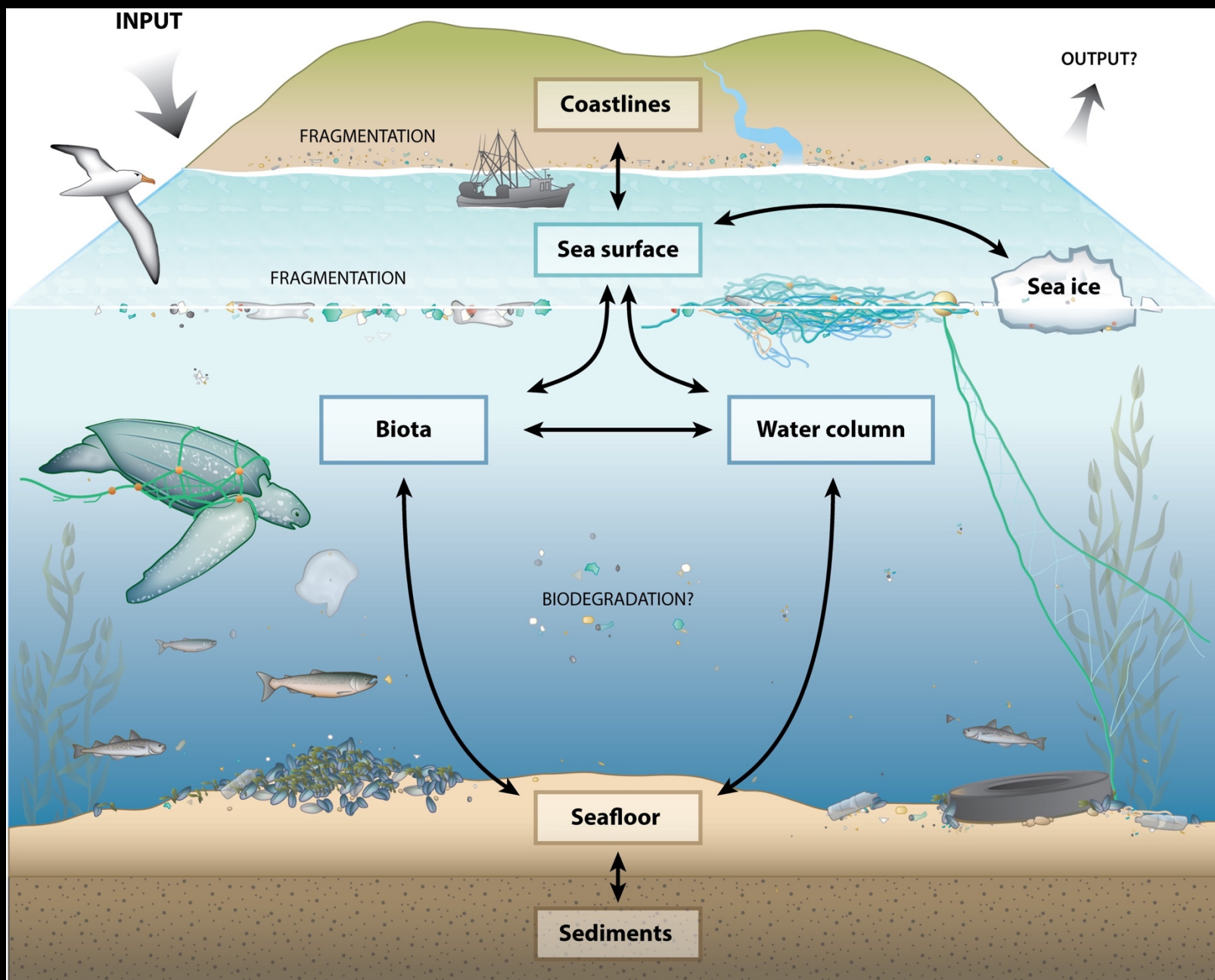
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 Annu. Rev. Mar. Sci. 9:205–29

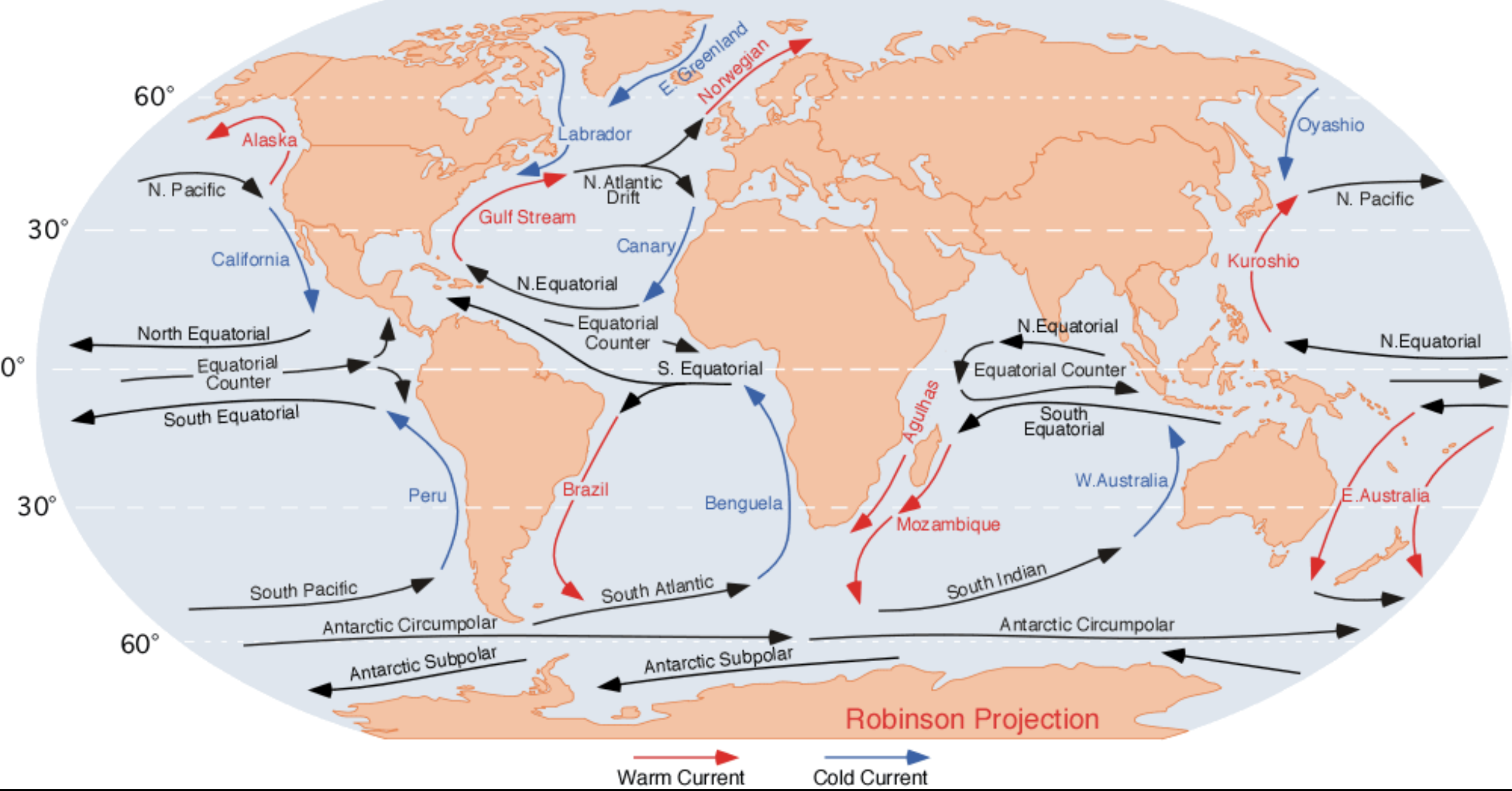
Plastic marine debris generated in 2010 based on Jambeck et al. 2015

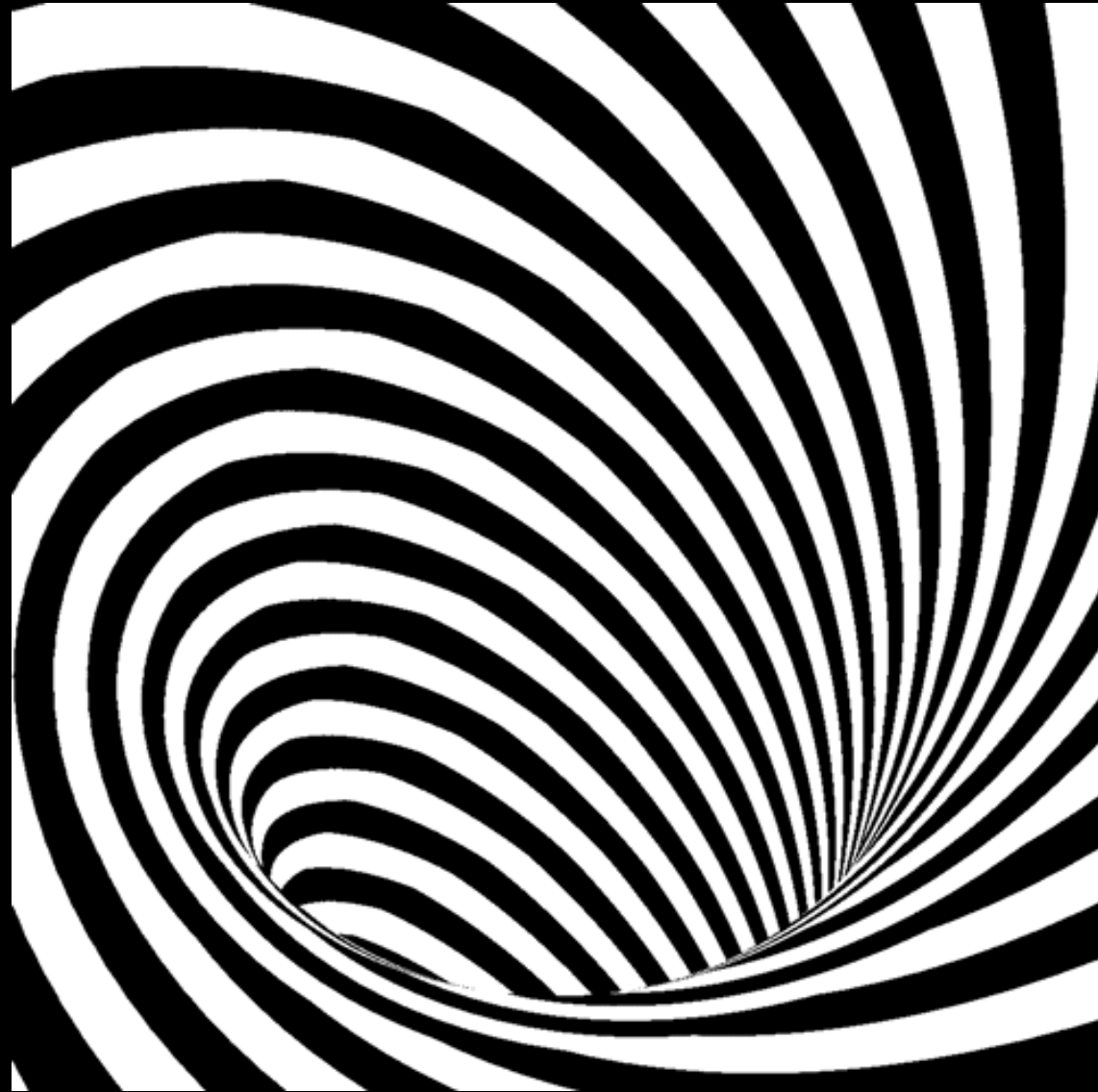


Where does ocean plastic accumulate?

- Ocean gyres
- Coastlines
- Ocean sediments
- All of the above

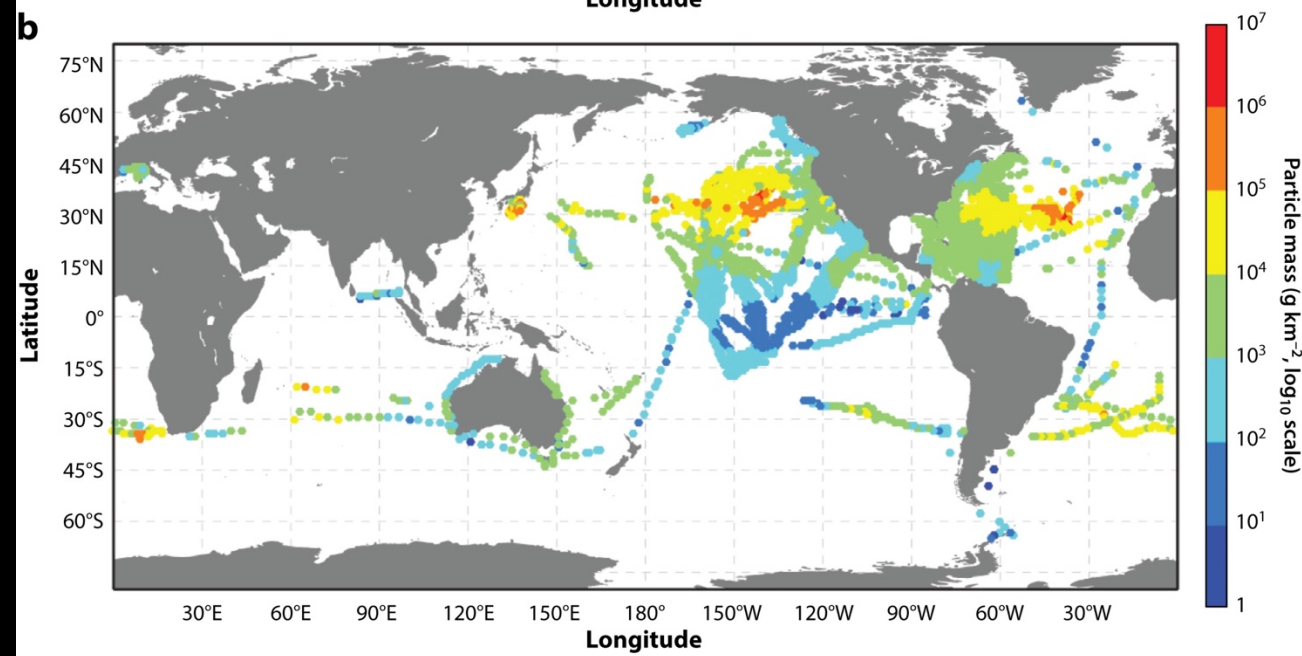
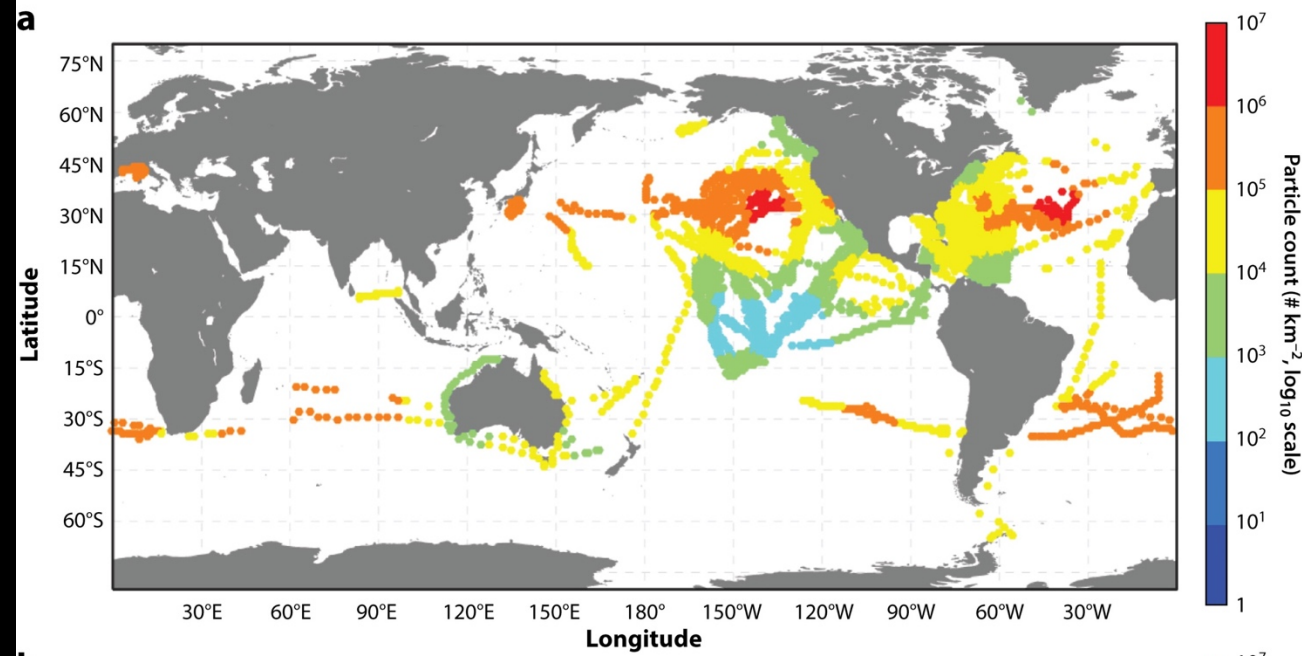








PHOTOGRAPH BY JONATHAN ALCORN, BLOOMBERG/GETTY





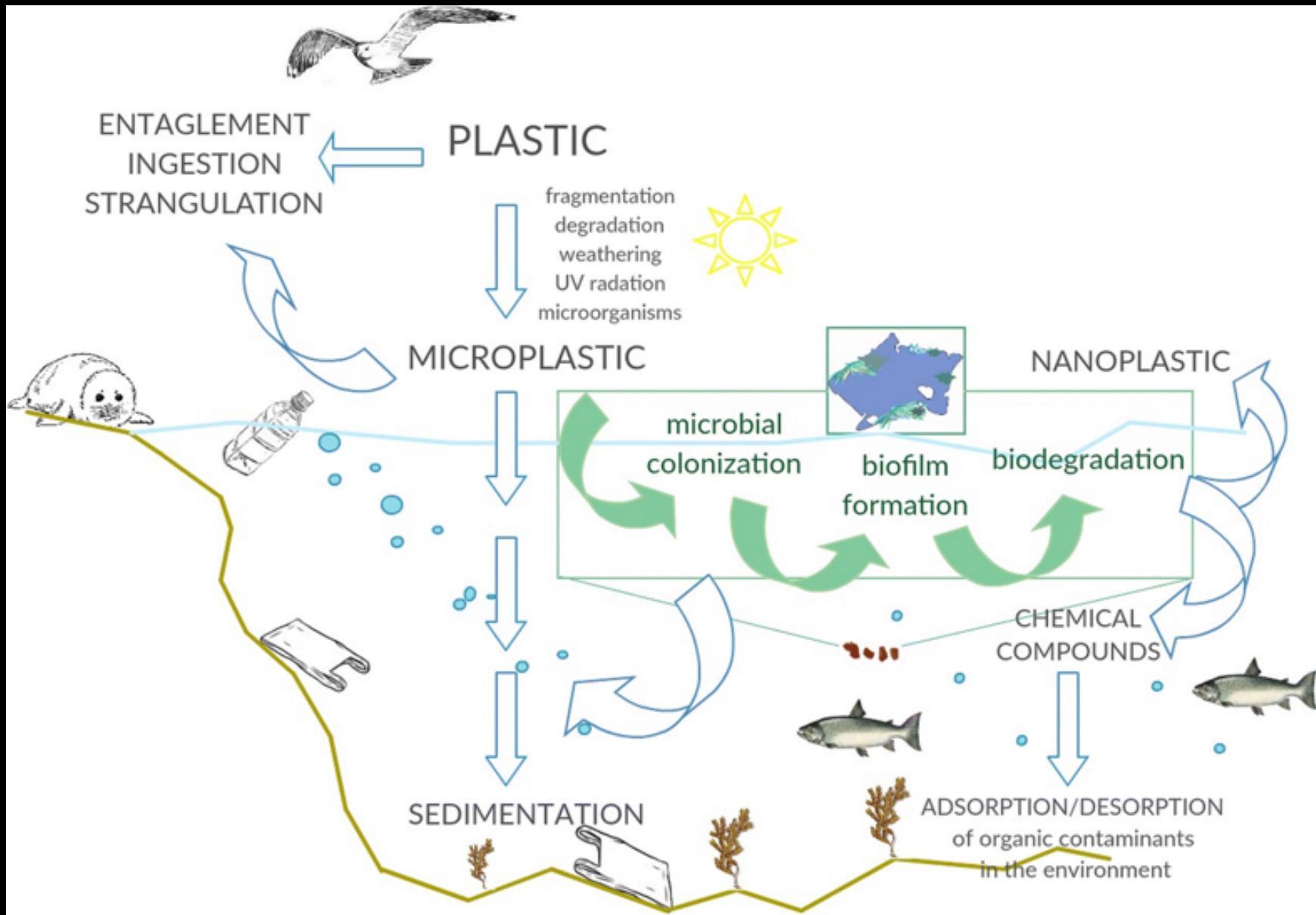
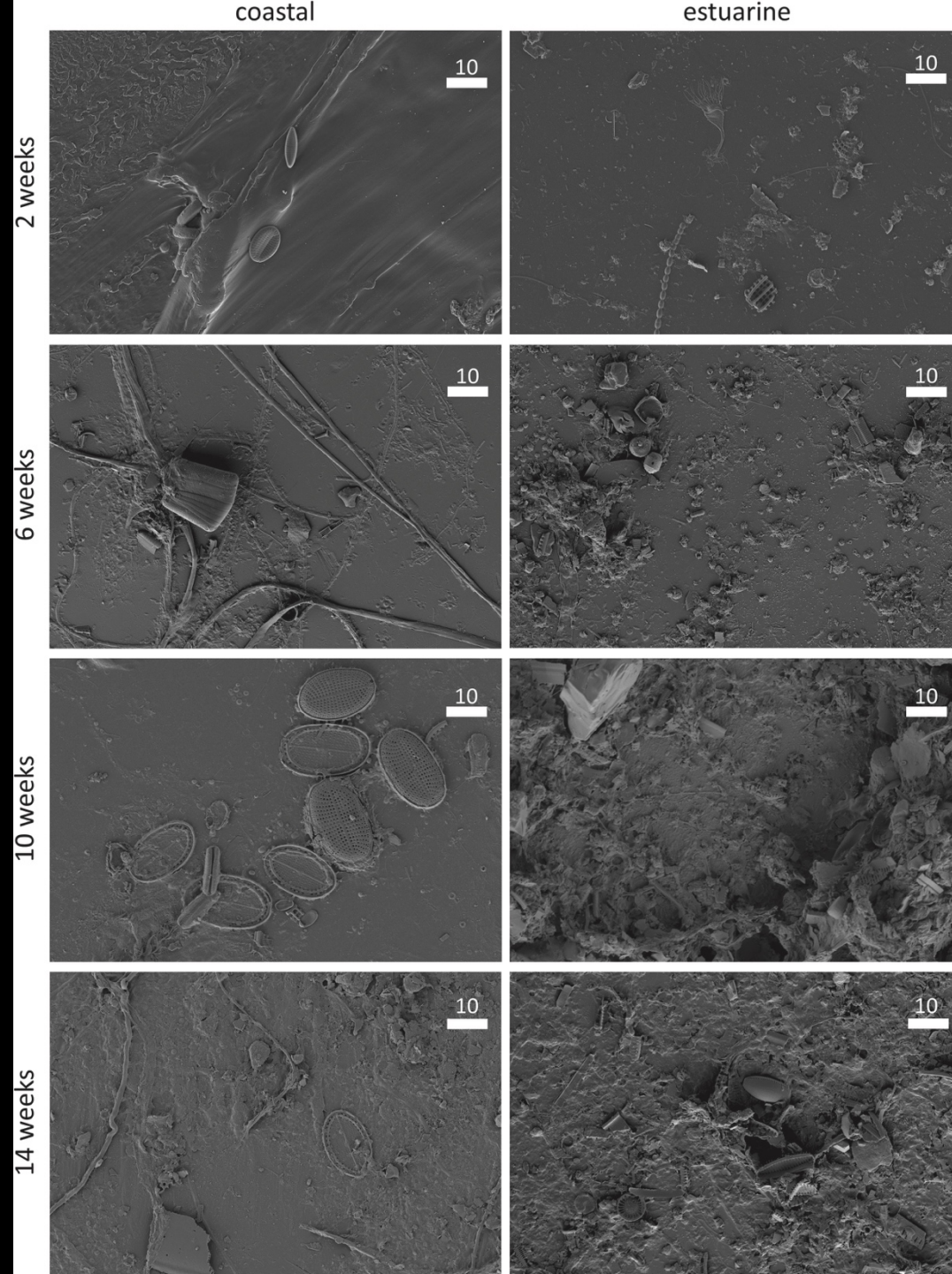


Figure credit: Urbanek et al. 2018



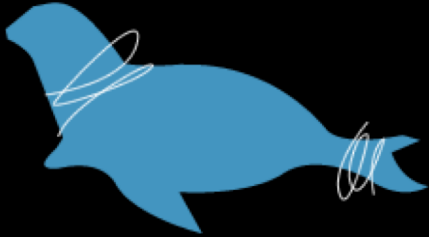
IMPACTS OF MARINE DEBRIS

Image credit: NOAA Marine Debris Program



INGESTION

Animals mistakenly eat plastic and other debris.



ENTANGLEMENT & GHOSTFISHING

Marine life gets caught and killed in ghost nets, trapped in derelict gear, and entangled in plastic bands and other marine debris.



HABITAT DAMAGE

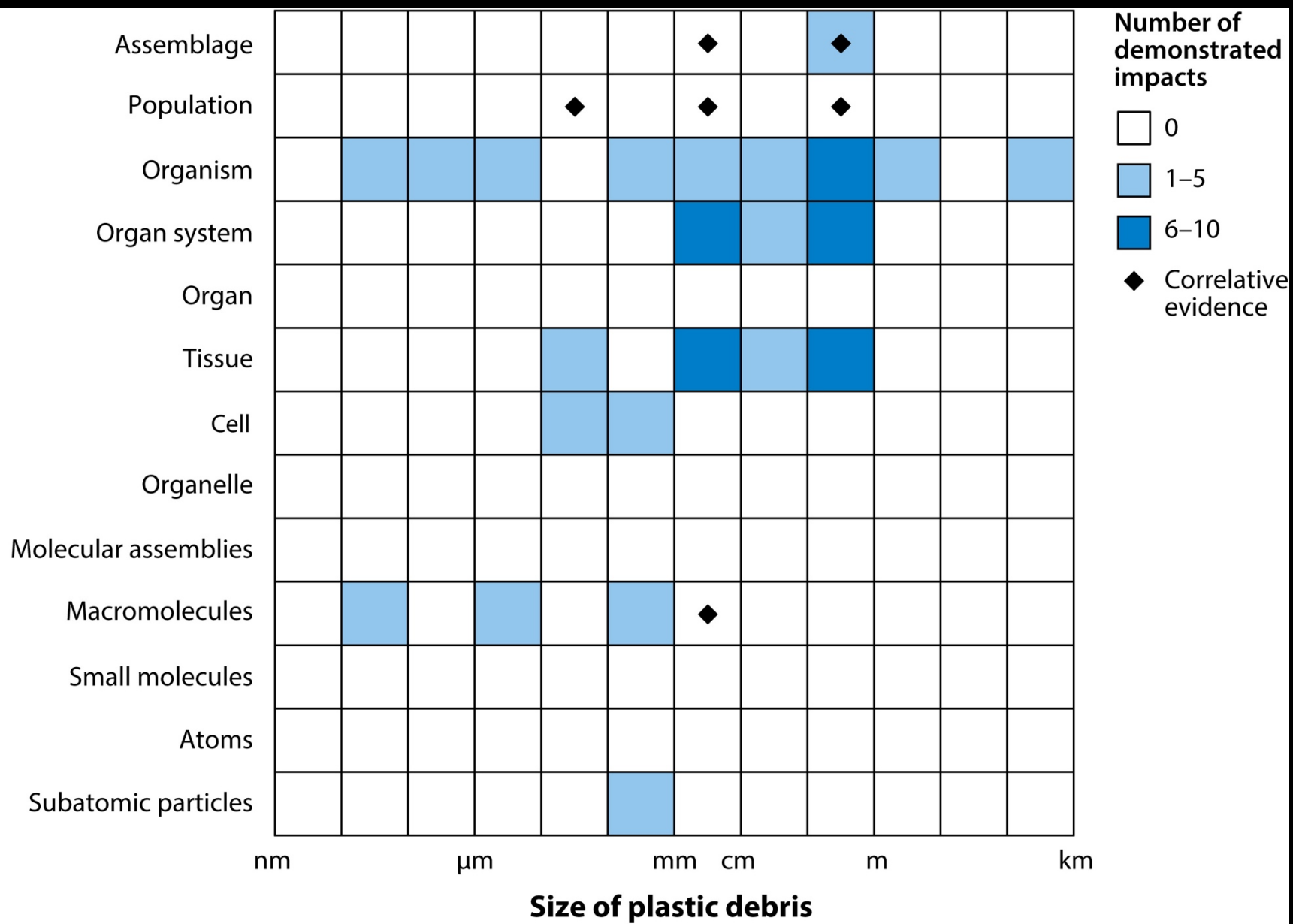
Heavy marine debris crushes sensitive habitat, such as coral reefs and sea grass.



NON-NATIVE SPECIES

Marine debris transports alien and invasive species from one region to another.

Level of biological organization



Law KL. 2017.
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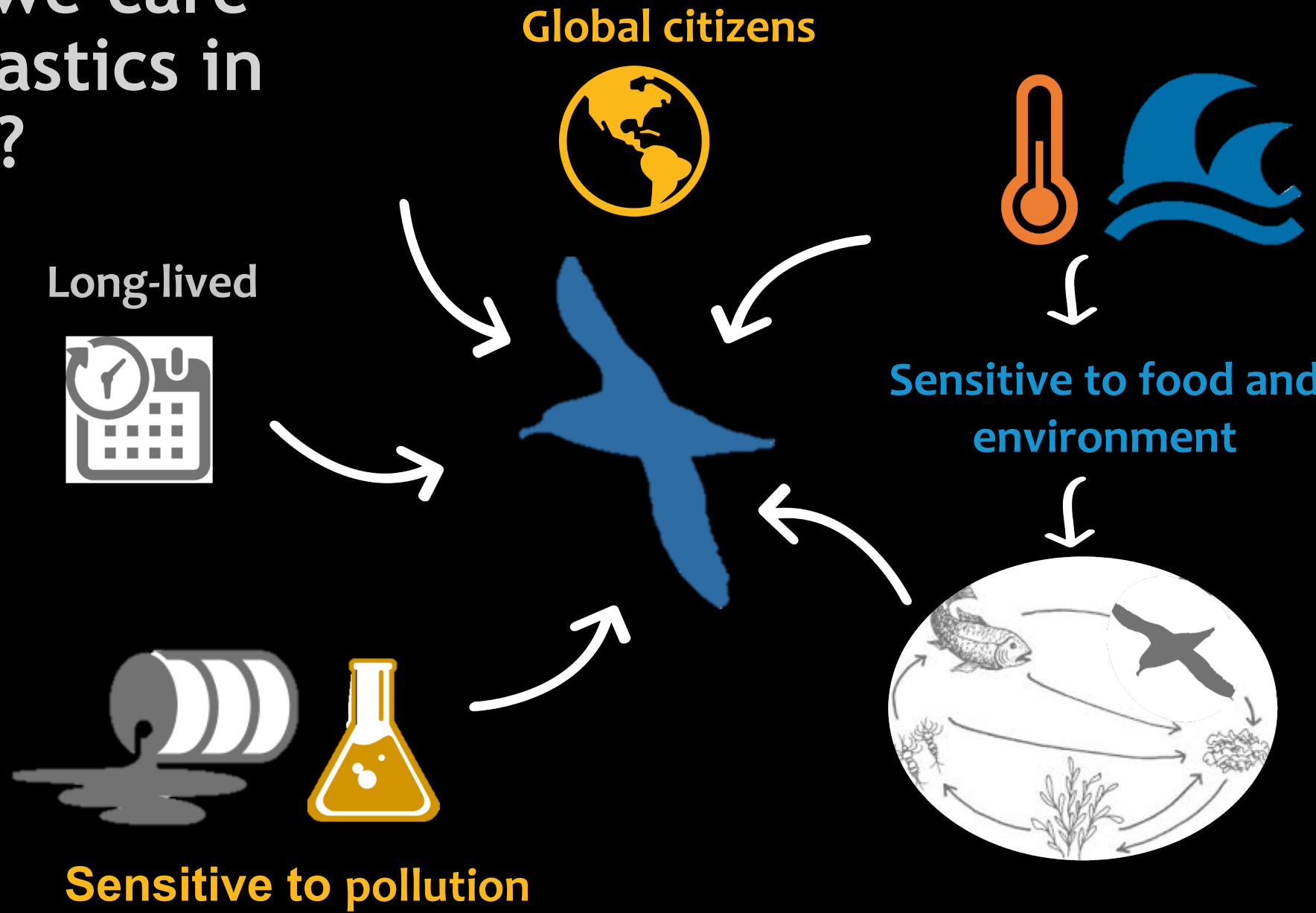


**Plastics
and
Seabirds**

Where have seabirds been found to eat plastic?

- Midway Atoll
- Hawaii
- California
- New Zealand
- Australia
- Massachusetts
- All of the above

Why do we care about plastics in seabirds?





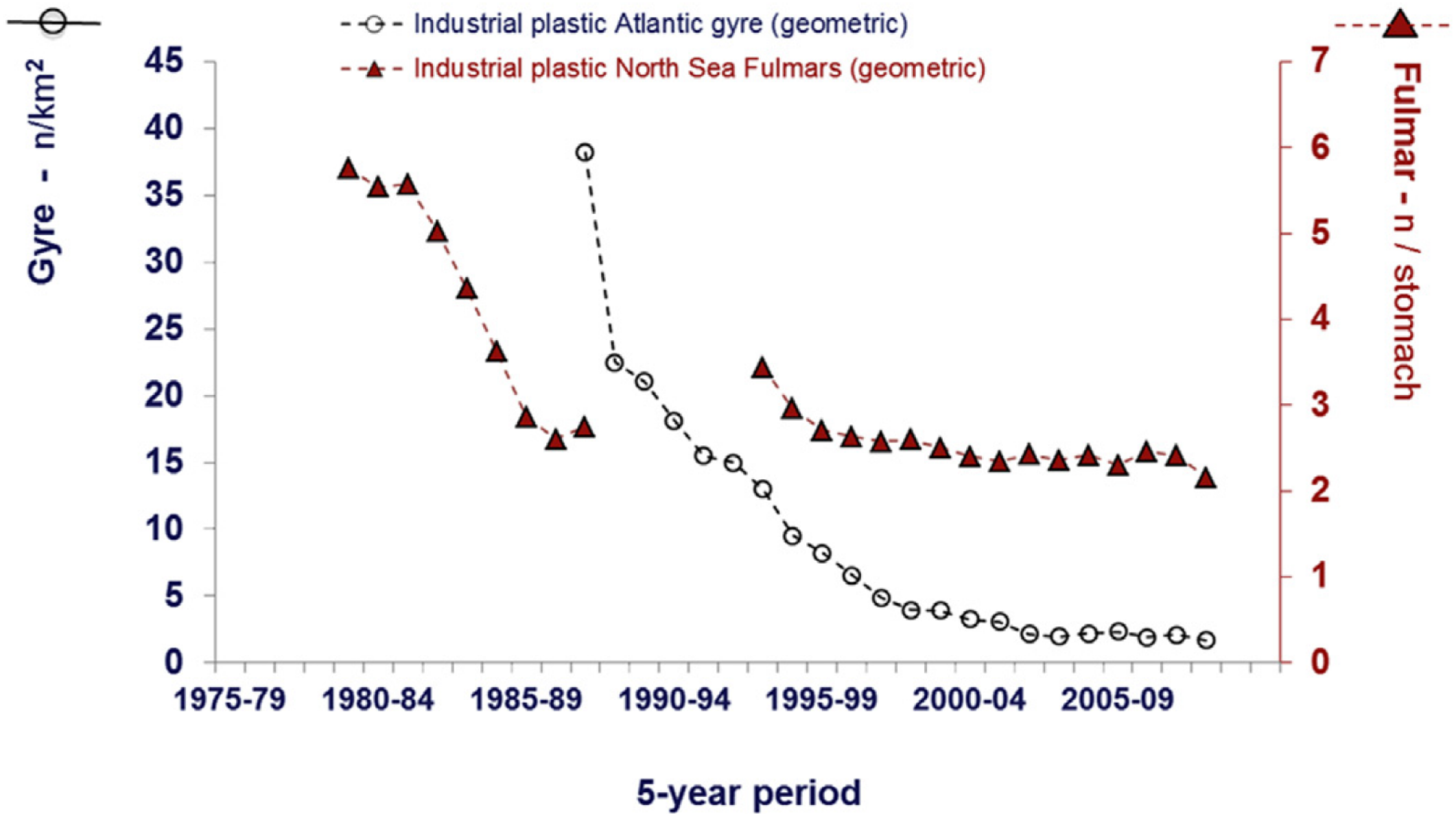
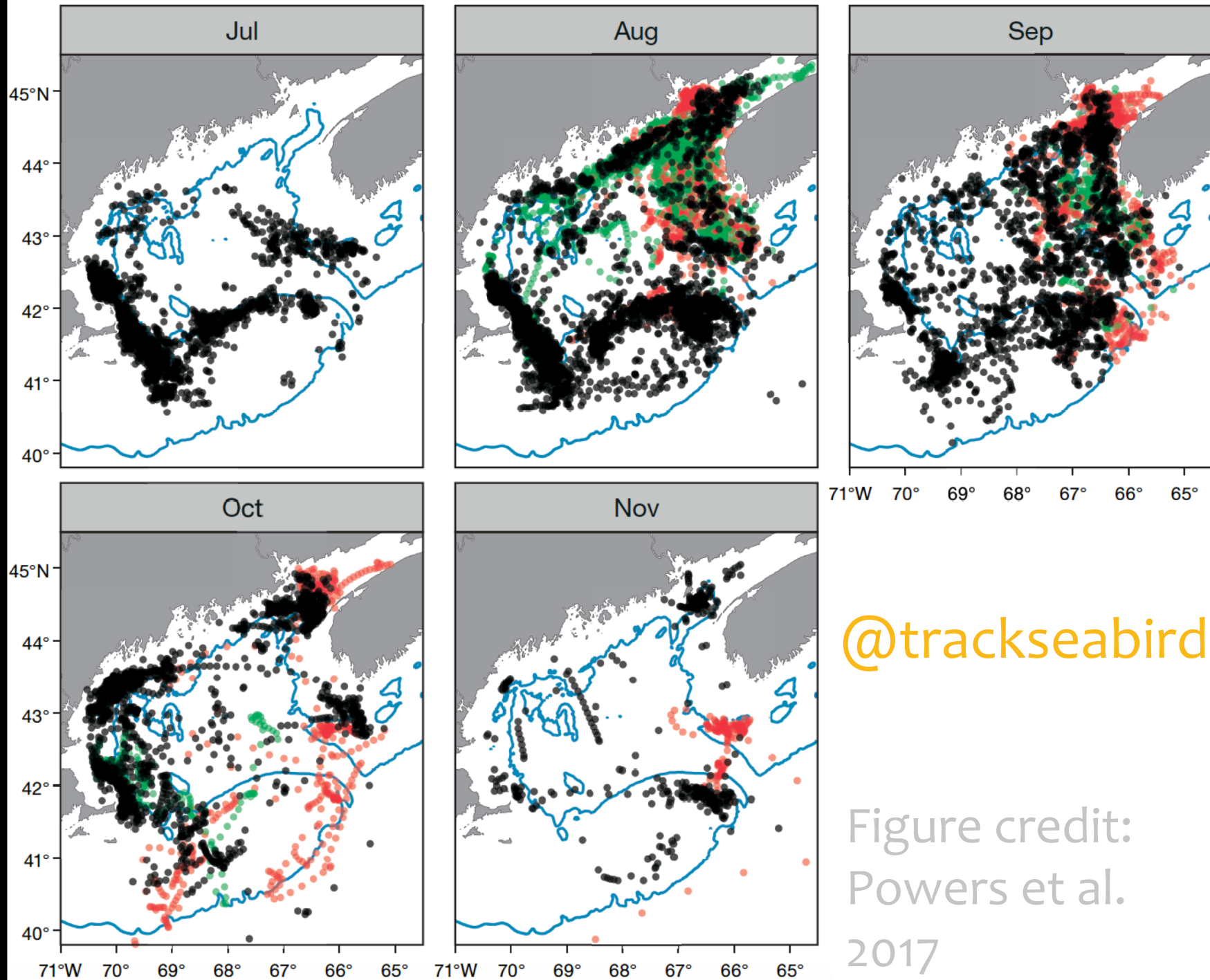


Figure credit: van Franeker and Law 2015



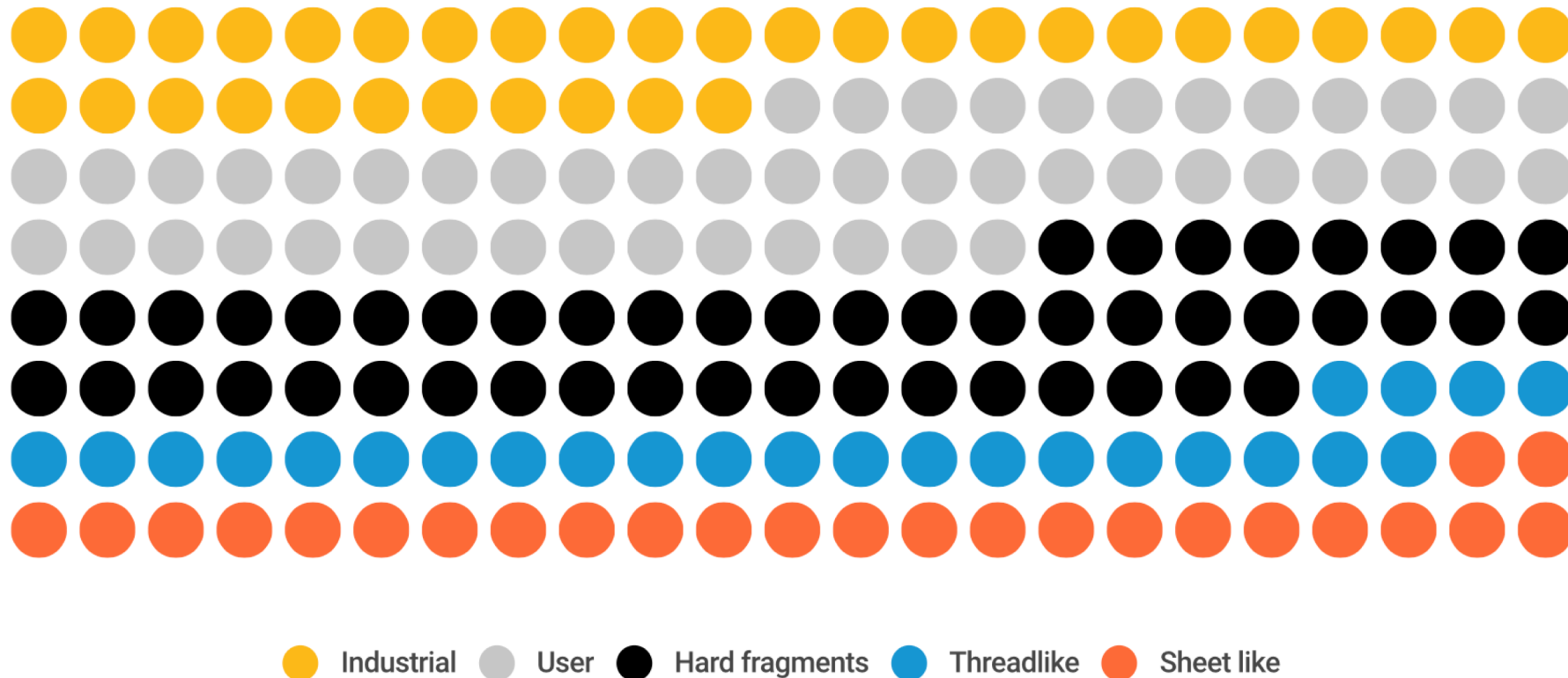
Map: NOAA SBNMS



@trackseabirds

Figure credit:
Powers et al.
2017

71% of Great Shearwaters contained plastic fragments





The following live segment will show a dead seabird and a bird GI tract.



10 THINGS YOU CAN DO FOR TRASH FREE SEAS



Image credit: Ocean Legacy

The 6 R's of Green Living



Refuse
Reduce
Reuse
Repair
Recycle
Re-Think

GreenSalem.com

Additional resources

- NOAA Marine Debris Program
- [Jambeck Research Group](#)
- [Rochman Research Group](#)
- [History of Plastics](#)
- 5 Gyres
- Ocean Conservancy
- Clean Ocean Access (New England)
- Plastic Pollution Coalition
- [NIEHS BPA info](#)
- Twitter!



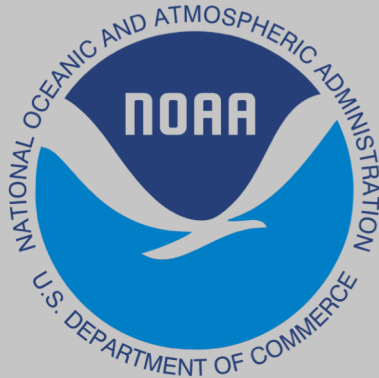
Select Literature Cited

See slide notes for explicit references

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More information about STEER is available at: <https://web.uri.edu/steer/>

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