

# HOW MUCH OF A PROBLEM IS WASTE IN OCEANS?

FOCUS ON MICROPLASTICS



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4. Impacts
  1. Environmental
  2. Health
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PRESENT

8 MILLION  
TONS





P R E S E N T

8 2 2 0 0 0  
T I M E S



PRESENT

1 TRUCK  
EVERY  
MIN



# FUTURE

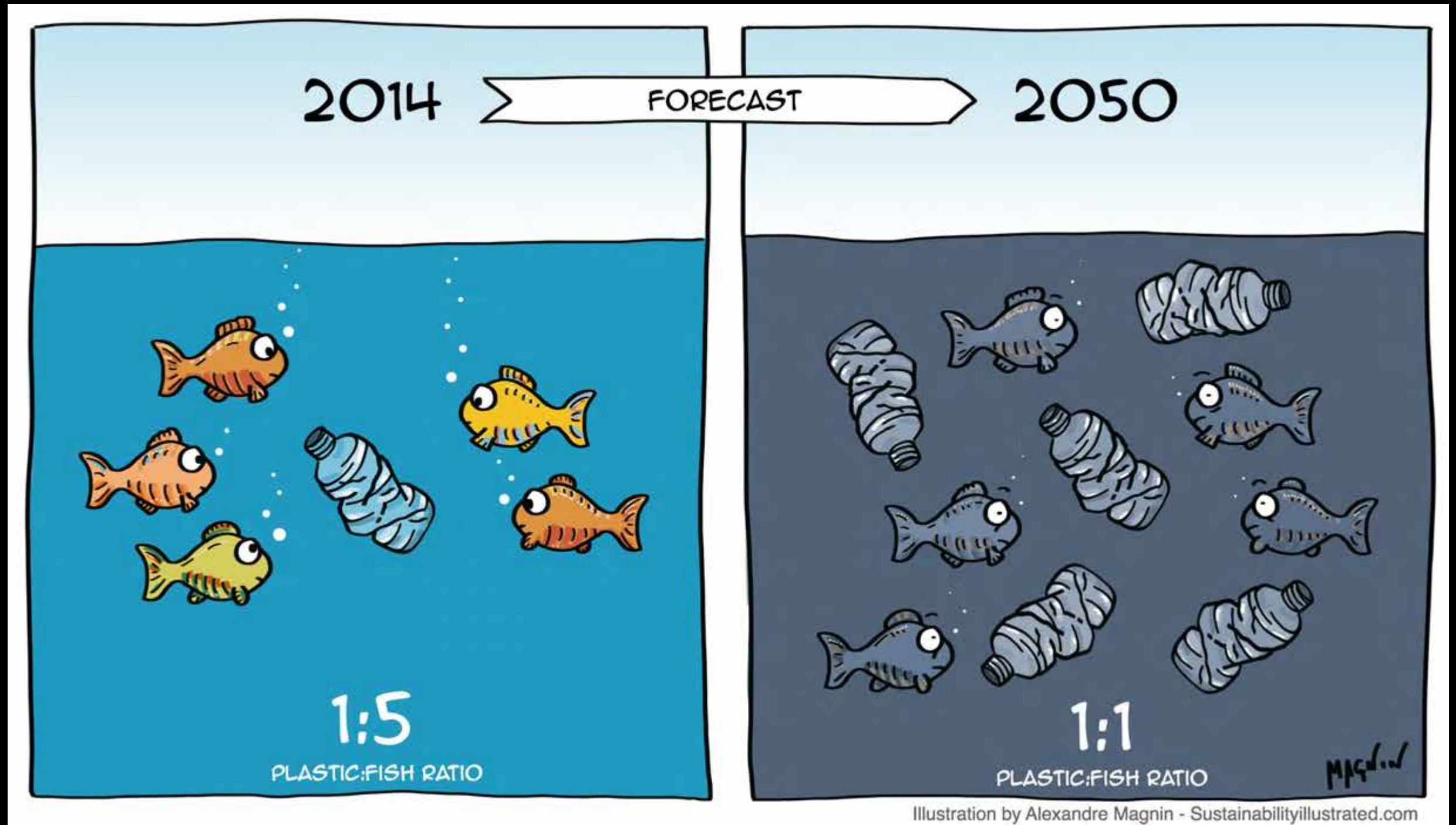
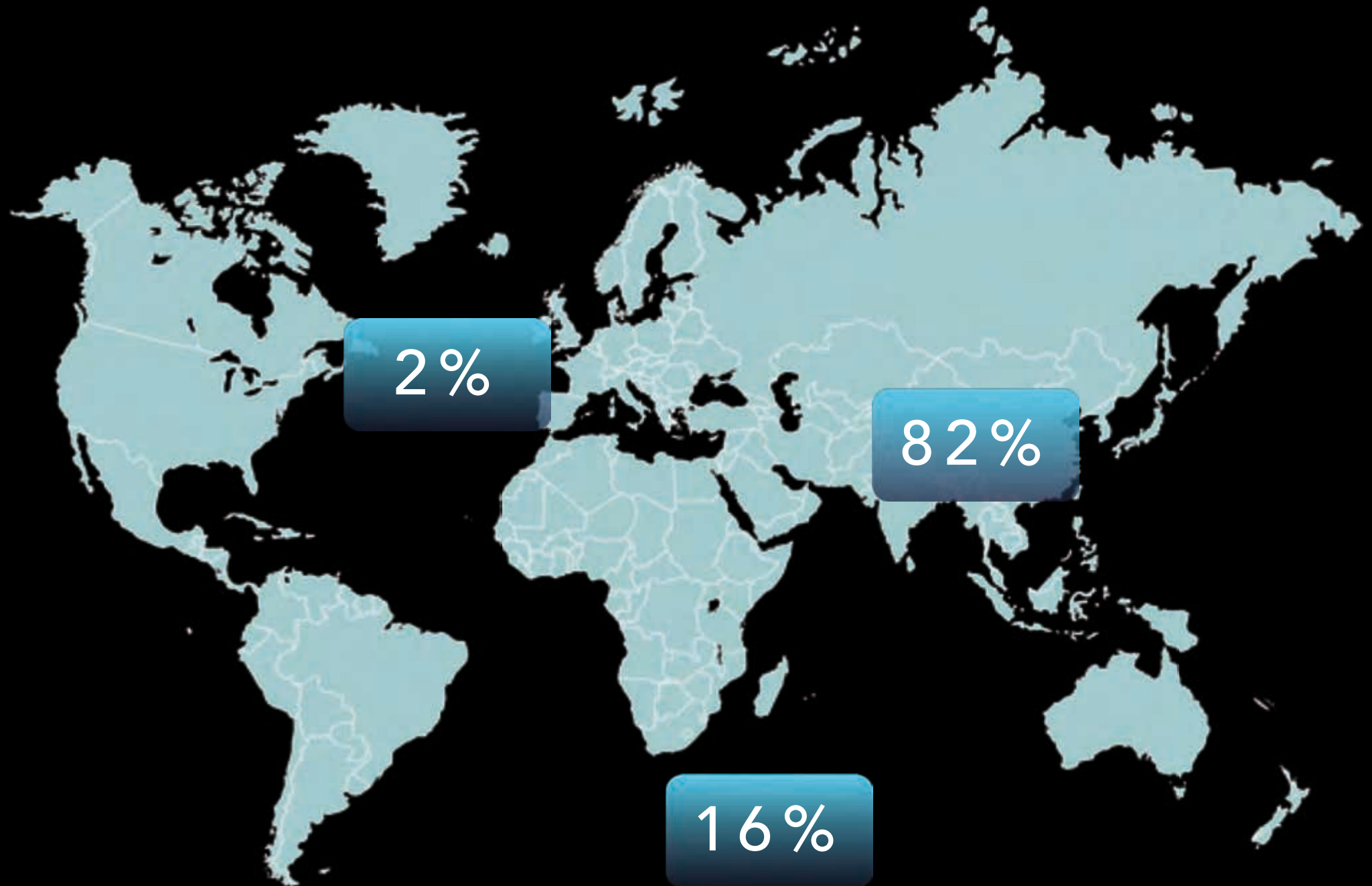


Illustration by Alexandre Magnin - Sustainabilityillustrated.com

<https://sustainabilityillustrated.com/en/2018/06/12/more-plastic-than-fish-in-2050/>

# PLASTIC

## ORIGIN



<http://www.ultimate-packaging.co.uk/statement-from-ultimate-packaging-regarding-recent-communications-and-legislative-interventions-relating-to-plastic-packaging/>



# PLASTIC

## GYRES



<http://teded.tumblr.com/post/134857415063/how-nurdles-are-invading-our-oceans>



# MICROPLASTIC

## DEFINITION



<http://blogs.ifas.ufl.edu/lakeco/2017/09/17/microplastics-whats-big-deal/>

"small plastic pieces less than five millimeters long which can be harmful to our ocean and aquatic life."

National Oceanic and Atmospheric Administration U.S. Department of Commerce, 2018



<http://jpi-oceans.eu/news-events/news/results-%E2%82%AC75-million-call-microplastics-published>

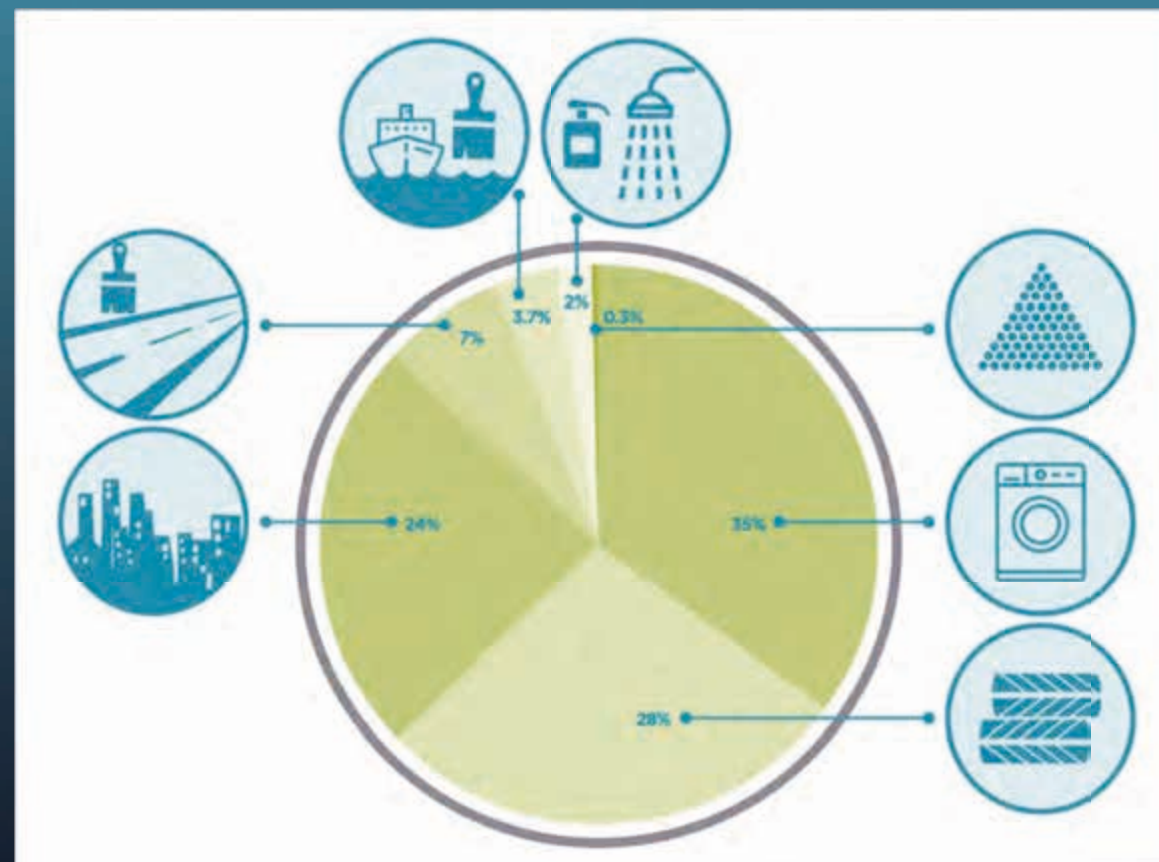


# MICROPLASTIC

## CATEGORIES

### PRIMARY

« are plastics directly released into the environment in the form of small particulates »





# MICROPLASTIC

## CATEGORIES

### SECONDARY

« are plastics originating mostly from the degradation of large plastic waste into smaller plastic fragments once exposed to the marine environment »

Julien Boucher, 2017

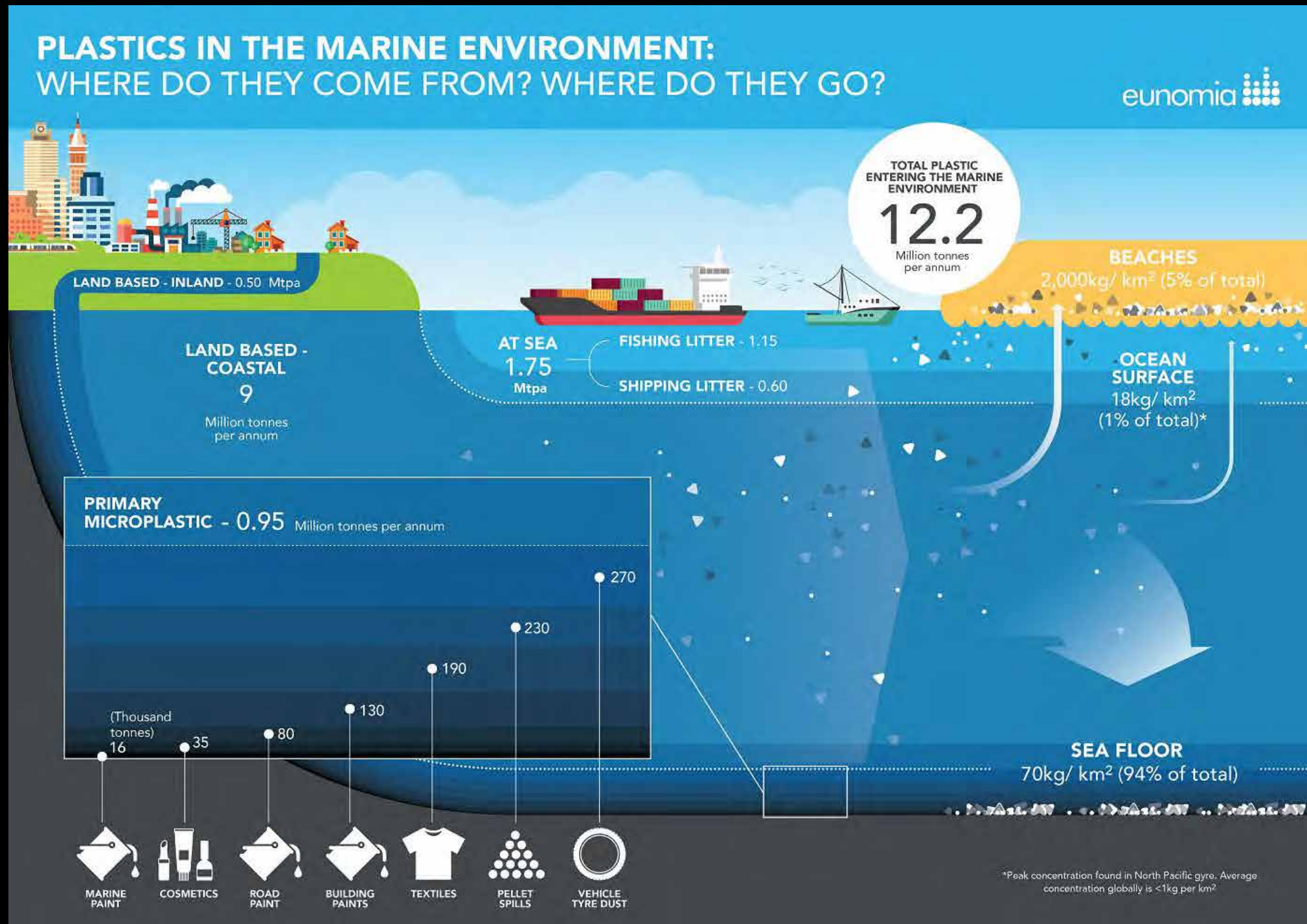


<http://blog.nationalgeographic.org/wp-content/uploads/2016/04/Archi-official-09.jpg?fbclid=IwAR0HHoz3MSBQajLsEuCY10pthwiGX2Q2-ufmm0H3YVGZJFhThybkLMTKZ7w>



# MICROPLASTIC

## PATHWAYS



<http://www.eunomia.co.uk/marine-plastics-we-should-fight-them-on-the-beaches/>



# MICROPLASTIC

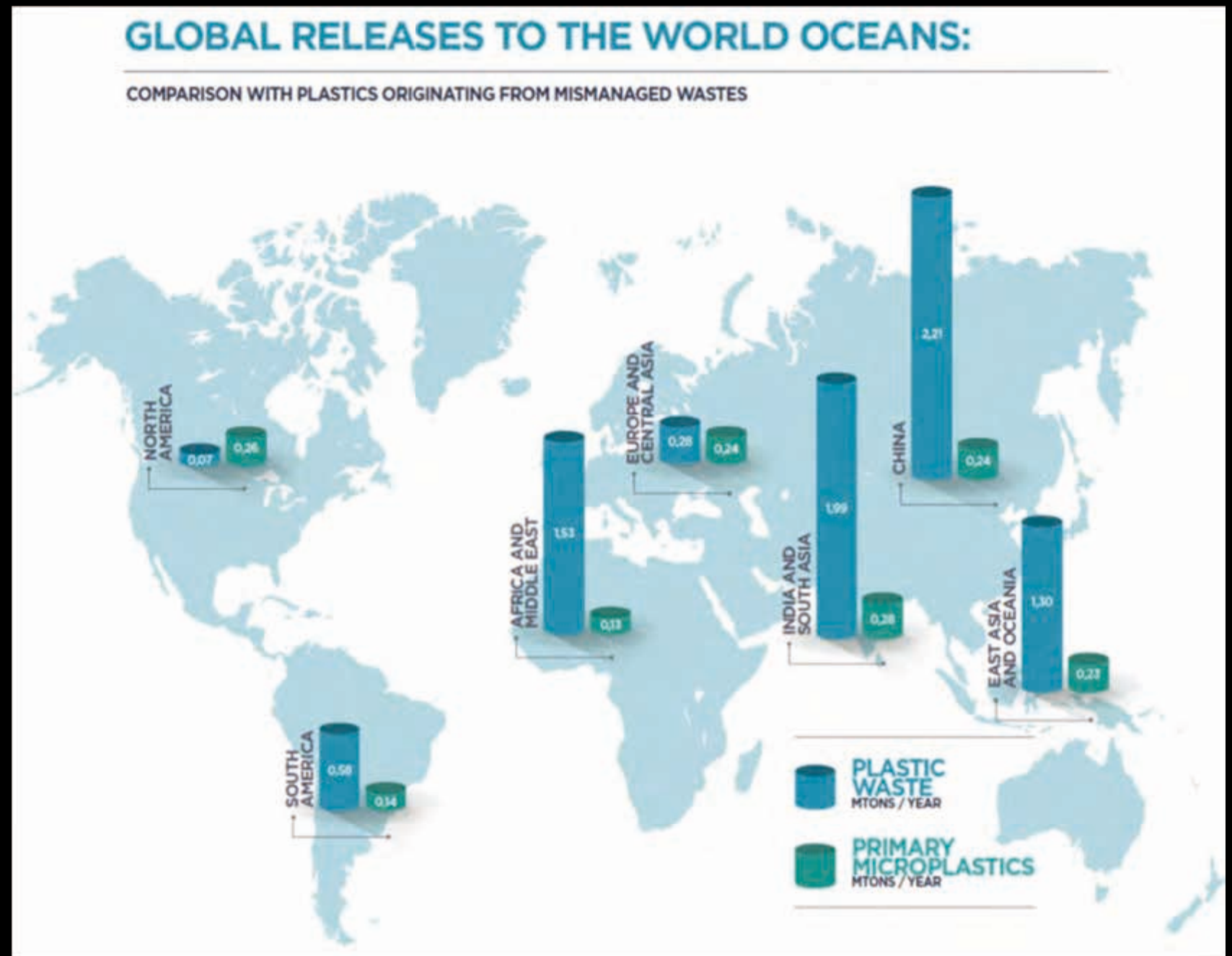
## ORIGIN

PRIMARY

WESTERN  
COUNTRIES

SECONDARY

EMERGING  
ECONOMIES



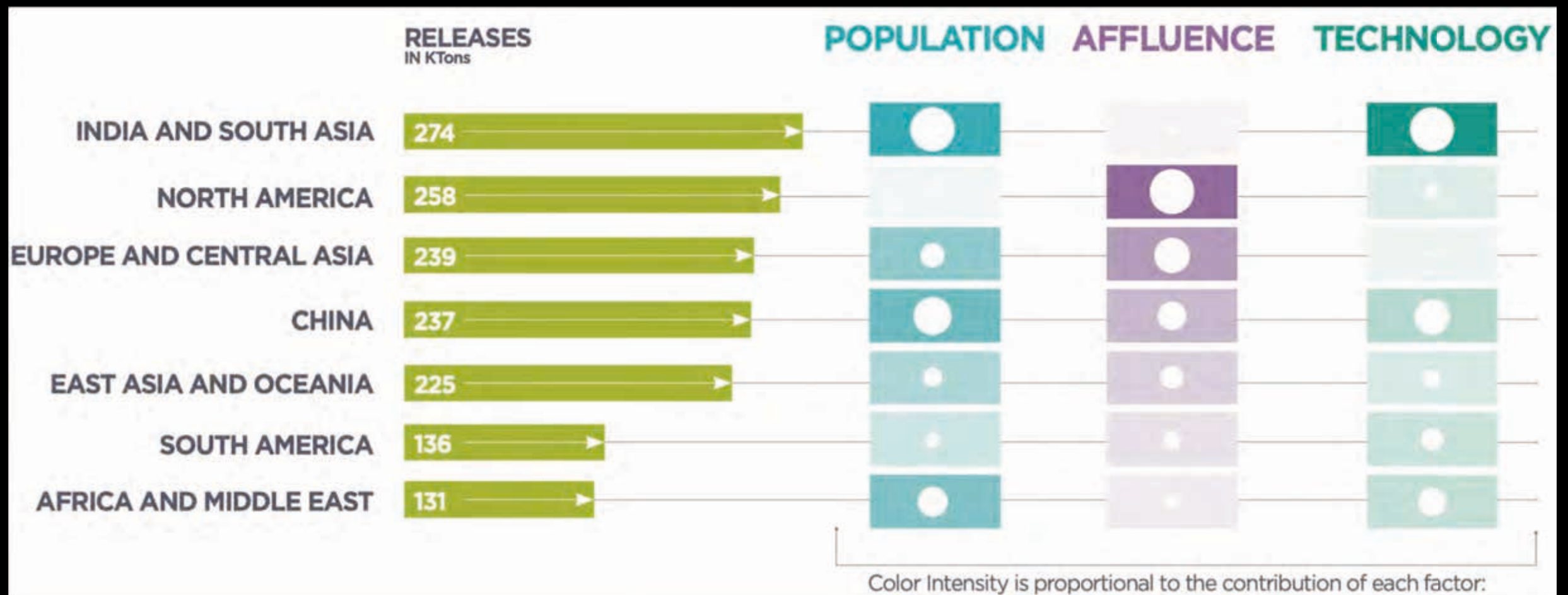
<https://storyofstuff.org/wp-content/uploads/2017/02/IUCN-report-Primary-microplastics-in-the-oceans.pdf>



# MICROPLASTIC

## IMPACT OF COUNTRIES

$$\text{IMPACT} = \text{Population (habitants)} * \text{Affluence (US\$ GDP/habitant)} * \text{Technology efficiency (Release / US\$ GDP)}$$



<https://storyofstuff.org/wp-content/uploads/2017/02/IUCN-report-Primary-microplastics-in-the-oceans.pdf>



# ENVIRONMENTAL IMPACTS

## IMPACT ON ECOSYSTEMS

- ▶ Microplastics can transport invasive species, including:

- ▶ Algal blooms



- ▶ Pathogens



- ▶ Threat to biodiversity: Increasing likelihood of diseases of coral reefs



- ▶ Found in remotest places of earth: deep sea sediments



<https://www.fromthegrapevine.com/nature/these-colorful-coral-reefs-shocked-scientists>

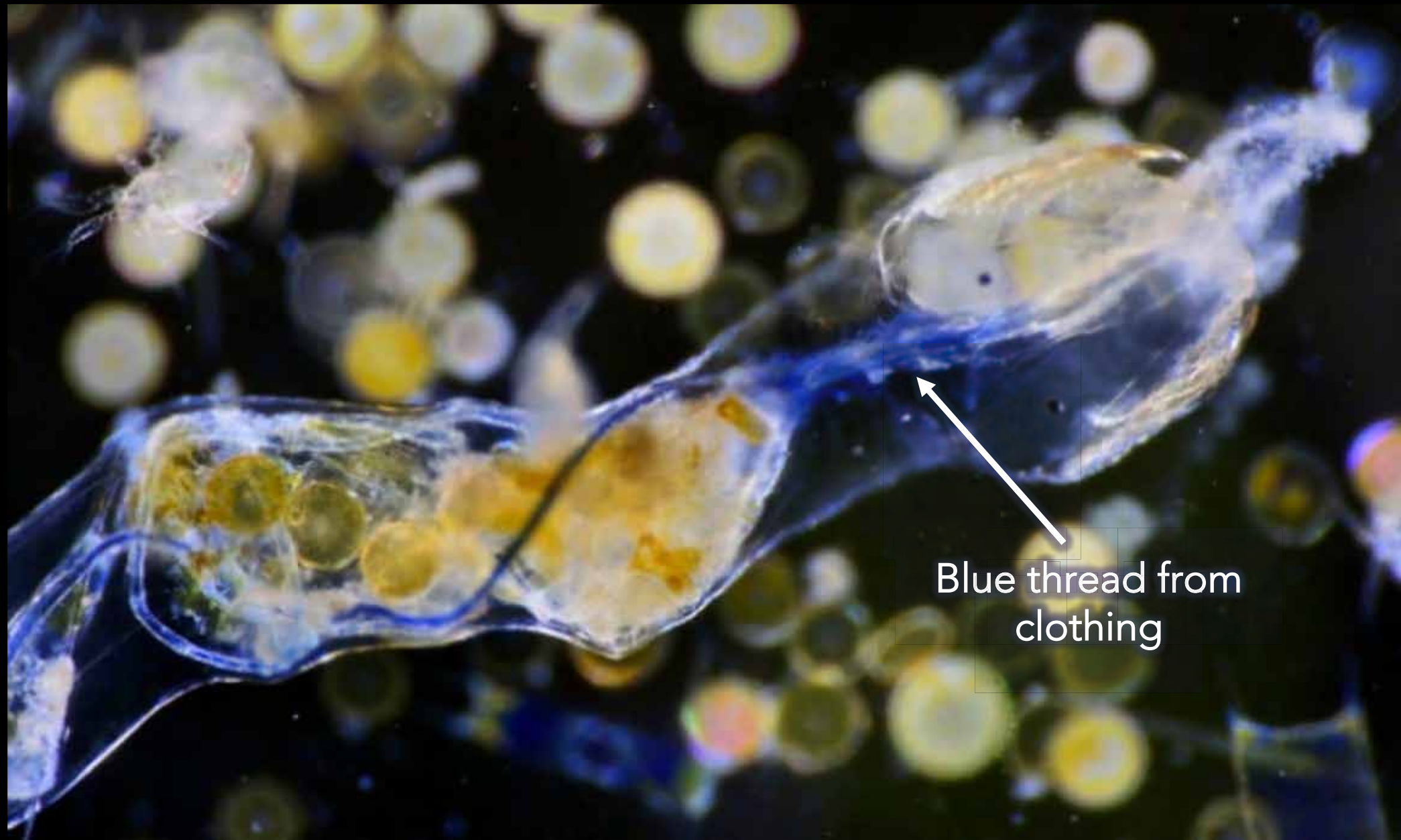


<https://phys.org/news/2018-09-polluted-groundwater-contaminated-south-pacific.html>



# ENVIRONMENTAL IMPACTS

## IMPACT ON ECOSYSTEMS



Blue thread from  
clothing

<https://www.theguardian.com/environment/2017/nov/15/plastics-found-in-stomachs-of-deepest-sea-creatures>



# ENVIRONMENTAL IMPACTS

## IMPACT ON INDIVIDUAL ANIMALS

### PHYSICAL EFFECTS

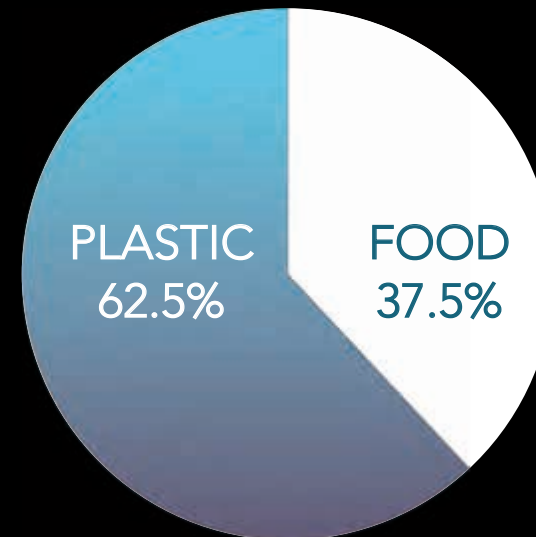
- ▶ Obstruction preventing uptake of food



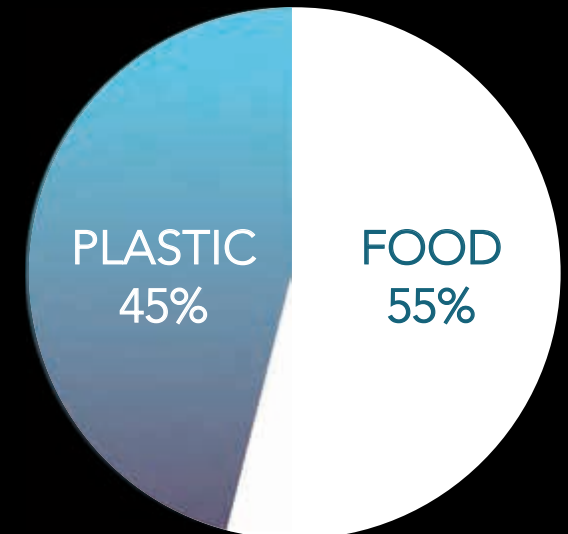
- ▶ Damage to digestion track



### SEATURTLE



### ALBATROSS



<http://www.earthday.org/wp-content/uploads/Earth-Day-Network-Plastic-Pollution-Primer-and-Action-Toolkit-updated-2.20.2018.pdf>

# ENVIRONMENTAL IMPACTS

## IMPACT ON INDIVIDUAL ANIMALS

### CHEMICAL EFFECTS

- Chemical toxicity



- Heavy metals



- Impaired Health



<https://www.nrdc.org/onearth/palate-plastic>



# ENVIRONMENTAL IMPACTS

## IMPACT ON INDIVIDUAL ANIMALS

TAKEN UP ACROSS THE  
GILLS THROUGH  
VENTILATION

ADHERE TO THE BODY  
OF ORGANISMS

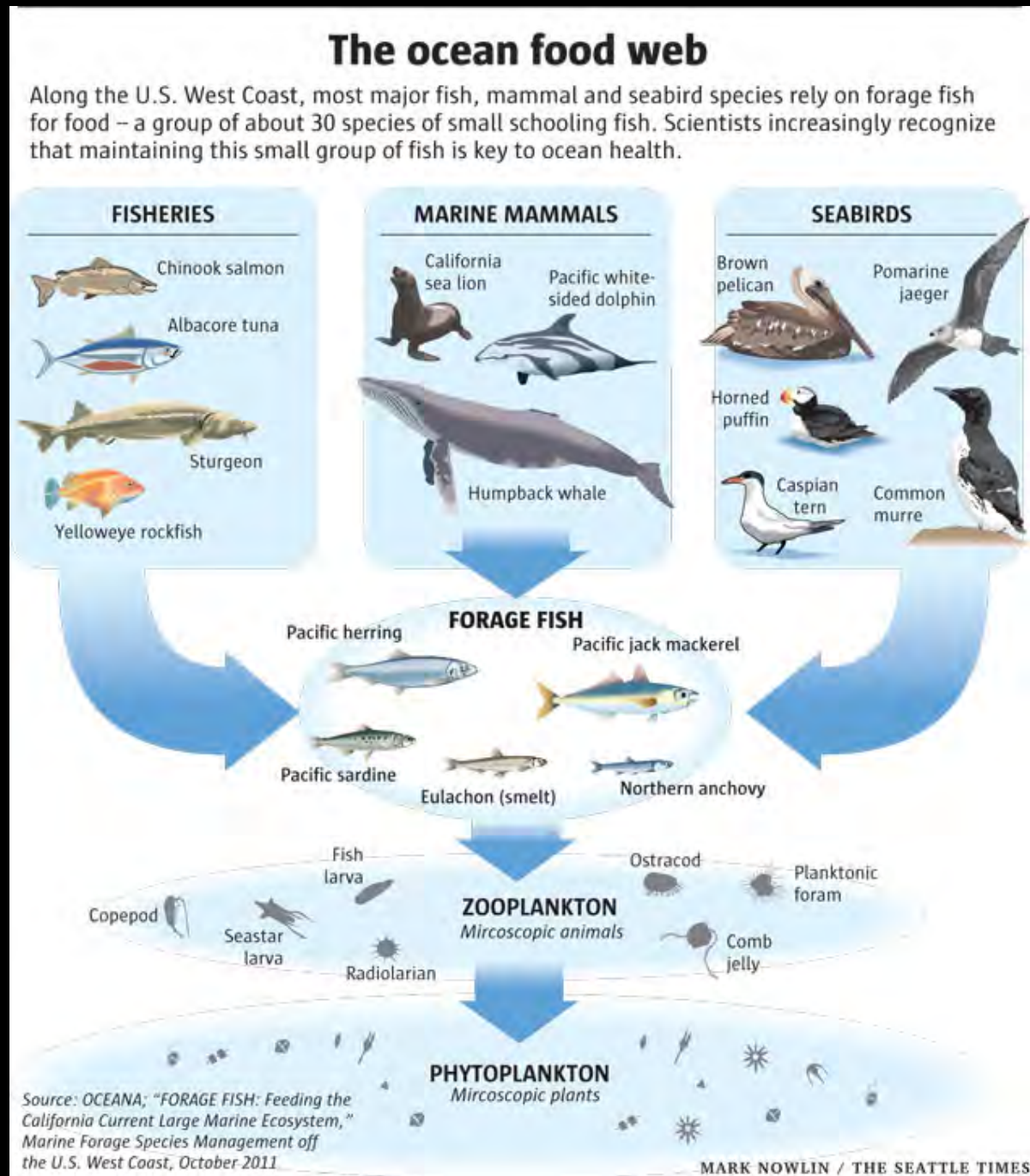
HOW?

INGESTED  
(DIRECTLY OR  
INDIRECTLY)

ABSORBED INTO THE  
ORGANISM

# ENVIRONMENTAL IMPACTS

## OCEAN FOOD WEB



[http://o.seattletimes.nwsources.com/html/localnews/2017762147\\_littlefish16m.html](http://o.seattletimes.nwsources.com/html/localnews/2017762147_littlefish16m.html)



[https://cdn4.dogonews.com/images/4bcc2151-cfb8-45c6-8a2f-ca3b53ba5688/fc5badc4-2942-11e6-b3b6-bdf44ca17c9d\\_1280x720.jpg](https://cdn4.dogonews.com/images/4bcc2151-cfb8-45c6-8a2f-ca3b53ba5688/fc5badc4-2942-11e6-b3b6-bdf44ca17c9d_1280x720.jpg)



<https://www.seaturtlecamp.com/plastic-paradise/>



# HEALTH IMPACTS

DO WE EAT PLASTIC?



# HEALTH IMPACTS

## HUMAN HEALTH

### FACTS

- Ingested & Digested
- "more than 50% of the world population might have microplastics in their stools"  
UEG, 2018
- Made out of chemicals

### EXAMPLES

- Polyethylene Terephthalate (PET): nausea, vomiting, diarrhea
- Polyvinyl Chloride (PVC):  
'endocrine disruptors' interfere with the production of hormones



# ECONOMIC IMPACTS

## FISHERY AND AQUACULTURE

"10% to 12% of the global population relies on fisheries and aquaculture for their livelihood."

FAO, 2014

### IMPACT

- ▶ Damaged fishing vessels
- ▶ Reduced catches due to abundance of debris
- ▶ Microplastic contamination in marine species can affect the local consumption of seafood



<https://www.pinterest.com/pin/500884789785115864/>

# ECONOMIC IMPACTS

## TOURISM

### IMPACT

- Reduces aesthetic value
- Affects recreational opportunities
- Example: Kamilo Beach, Hawaii



[https://www.huffingtonpost.com/entry/kamilo-beach-hawaii-dirtiest-beach-america\\_us\\_58e99a38e4b05413bfe3792d](https://www.huffingtonpost.com/entry/kamilo-beach-hawaii-dirtiest-beach-america_us_58e99a38e4b05413bfe3792d)



# SOLUTIONS

STOP PUTTING PLASTIC IN THE OCEAN

## PRODUCERS



**LUSH**  
FRESH HANDMADE COSMETICS



## CONSUMERS



## GOVERNMENTS



<https://www.worldatlas.com/r/w728/upload/8d/00/66/plastic-bag-infographic.jpg>

## ORGANIZATIONS



The Honolulu Strategy

# SOLUTIONS

## TAKING THE PLASTIC OUT OF THE OCEAN

### INITIATIVES

#### International Coastal Clean Up



<https://oceanconservancy.org/wp-content/uploads/2018/07/Building-A-Clean-Swell.pdf>

#### The Pacific Ocean Clean Up



<https://www.digitaltrends.com/cool-tech/ocean-clean-up-garbage-patch/>



# SOLUTIONS

## THE NEW PLASTICS ECONOMY

- ▶ Circular Economy Principles
- ▶ Lost opportunity
- ▶ Improve waste management and recycling systems



<https://footwearnews.com/2016/focus/athletic-outdoor/adidas-parley-for-the-ocean-prototype-sneakers-instagram-contest-227860/>



<https://www.remarkablecoating.com/california/san-francisco-whiteboard-paint/>

# KEY TAKEAWAYS

150 Million Tons  
1:1 by 2050

Huge importance  
of primary  
micro plastics

Contamination  
of the food chain



# DISCUSSION

- What do you think about the way media communicates this issue?
- Do you know any other solution to fight against ocean waste (microplastics)?
- Do you think governments are doing enough to limit or ban the use of plastics?

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<http://agro.icm.edu.pl/agro/element/bwmeta1.element.agro-953d4b4d-549a-4bc6-9d95-2b10030b7552>

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