

# Plastic Whales..... and others



# Environmental Impacts

**There are three major impacts on marine ecosystems**

- **Entanglement**



- **Ingestion**



- **Transport of Invasive Species**



So what is the  
true ecological  
impact of our  
plastic oceans?

# Plastic & Turtles

- Plastic kills approximately 100,000 sea turtles and other marine animals each year.
- Sea turtles mistake floating plastic bags for jellyfish.
- Consequences of ingesting plastic can be fatal.
- Plastic bags are petroleum-based and do not biodegrade.

*Gregory, 2009*



# Midway Island Albatross

**Ninety eight percent of  
Albatross on Midway  
have plastic in them**



**Forty percent of all  
Albatross chicks  
birthed on Midway  
Atoll die each year  
due to ingestion of  
plastics**

# Filter Feeders

**Possible effects of micro plastics on marine organisms after ingestion**

- physical blockage or damage of feeding appendages or digestive tract
- leaching of plastic component chemicals into organisms after digestion
- Ingestion and accumulation of absorbed chemicals by the organism.

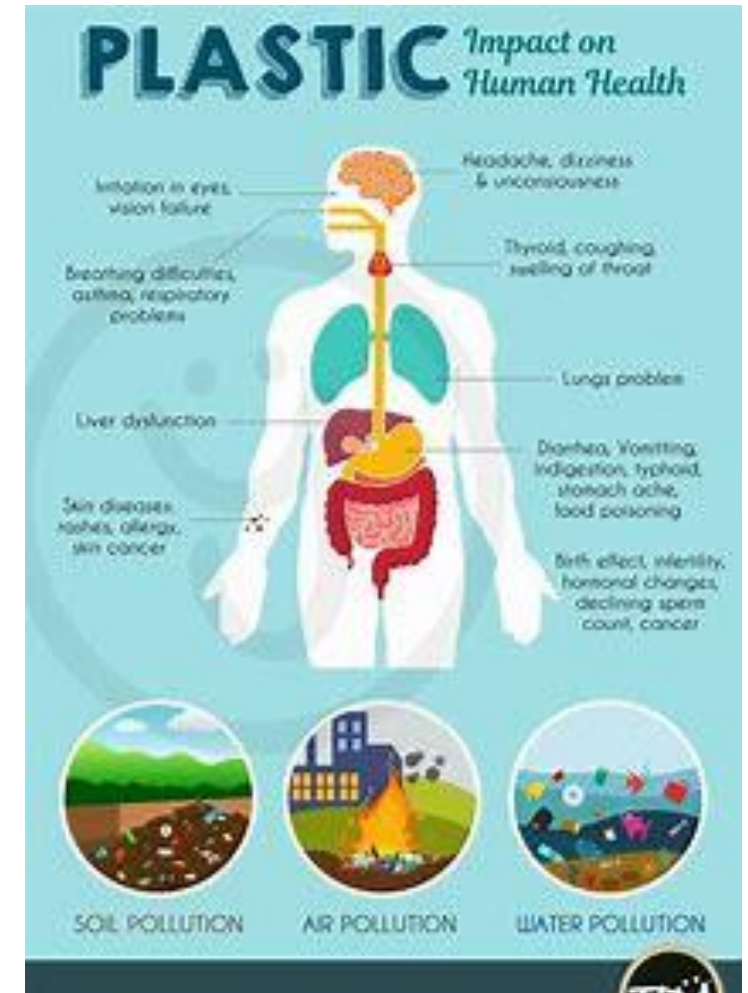
•Plastic toxins end up in fish, which end up on our plates, which end up inside our bodies.



# Human Health Impacts

Recent research into chemical additives in plastic have been linked to problems associated with human health

- Break down of plastic
- Fish food
- Persistent Organic Pollutants (POPs) (*Thompson, 2010*).
- POP's and Health related issues
  - Cancer
  - Diabetes
  - Low sperm count
  - Altered immune systems
  - Genital defects (WWF 1999)
  - Endocrine disruptors
  - Rheumatoid arthritis
  - Low birth weights
  - Developmental problems in children:







Experts estimate there are five trillion pieces of plastic litter floating on the world's oceans, discarded by a throw-away society and killing countless animals a year.



A dead sperm whale that washed ashore in a national park in Indonesia had nearly 6kg (13 lbs) of plastic waste in its stomach. 115 drinking cups, four plastic bottles, 25 plastic bags and two flip-flops.  
(BBC, 2018)

It has been estimated that by 2050 there will be more plastic in the sea than fish.



- Study on strandings in UK on cetaceans and pinnipeds – 100% (n=50)
- All had microplastics in the stomachs/intestines
- Synthetic fibres from clothes or fishing lines
- Plastic food and drink packaging
- Unknown impact on health
- Those animals confirmed as having died from infectious disease had higher % contamination.

"The number of particles in each animal was relatively low, an average of 5.5 particles per animal, suggesting they eventually pass through the digestive system, or are regurgitated". (Nelms, 2019:1)



Bacteria, viruses and contaminants carried on the plastic are a cause for concern.

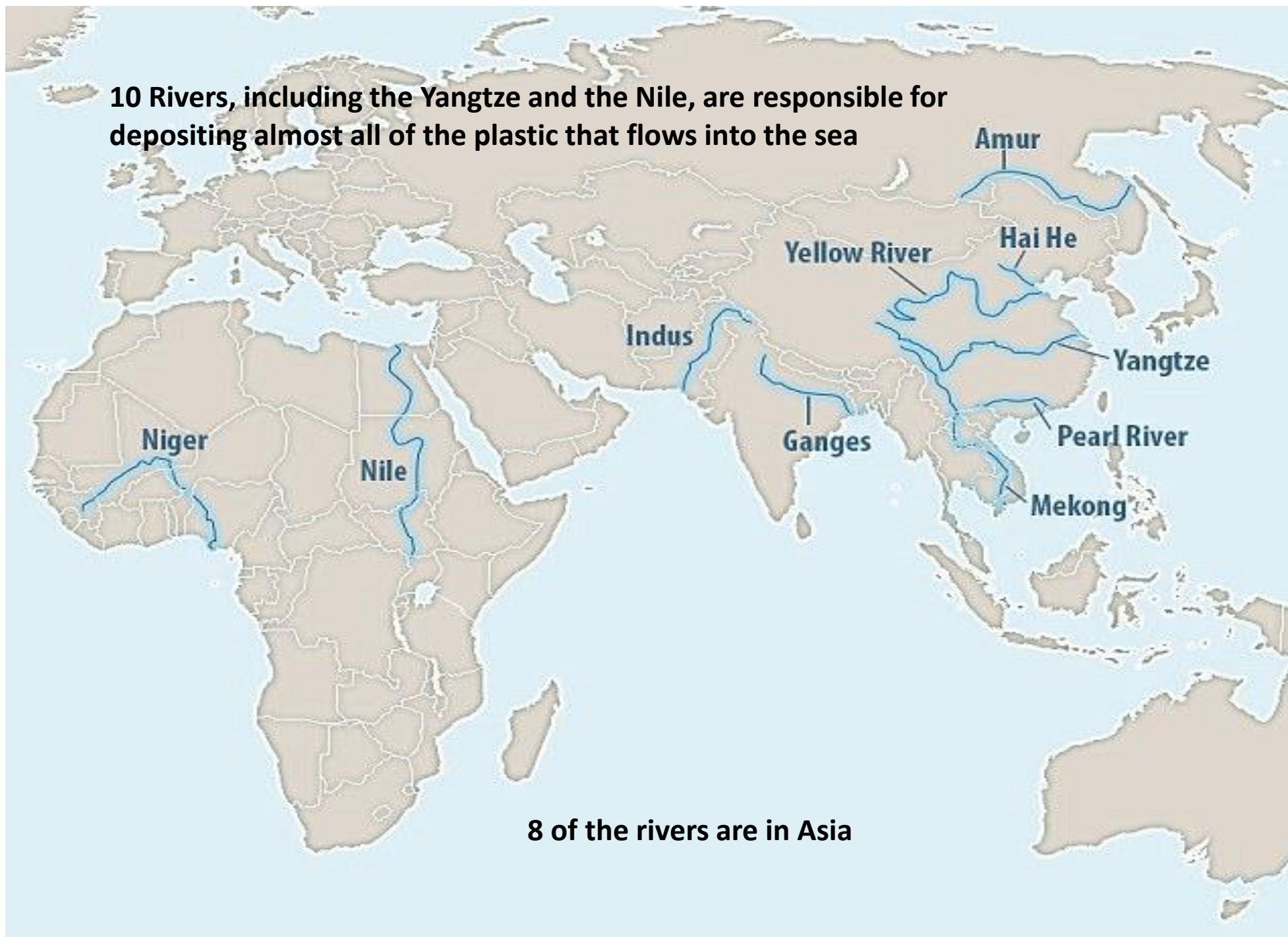


Manila, Phillipines

A different study by the University of Manchester found high levels of microplastics in UK rivers and evidence that much of it is washed towards the sea during flooding.



**10 Rivers, including the Yangtze and the Nile, are responsible for depositing almost all of the plastic that flows into the sea**



**8 of the rivers are in Asia**



When did this become the acceptable norm for people?

Pacific Ocean garbage patch







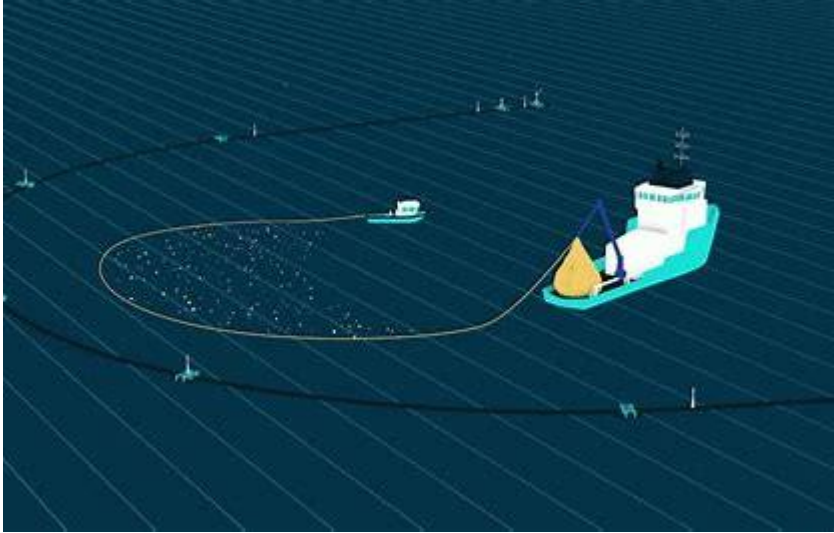
- **So what are the solutions?**
- **What type of campaigns have been recently launched to combat plastic pollution? How successful are they?**
- **Is legislation sufficient?**

# Some light at the end of the tunnel: Technological Solutions



- Chitin – waste product from shrimp/crab/lobster shells – combine with silk proteins
- Mango skin and stones – possible bioplastic
- Wood – lignin, by-product of paper making industry
- Seaweed – a bioplastics made from algae for use in 3D printers
- Mushrooms – using mycelium for a foam packaging as a replacement for polystyrene
- Hair – an art student has glued together waste hair from hairdressers with a bioplastics to make furniture – a chair for eg (Scales, 2020: Science Focus Magazine)

## Some light at the end of the tunnel: Technological Solutions



- Ocean Cleanup System launched in 2019
- Seabins in marinas
- 'Smart' and biodegradable nets

# The Interceptor



Just 1% of plastics remain at the surface – 94% end up on the seabed

The Interceptor is an autonomous system that collects plastic waste from rivers before they enter the ocean

- Solar powered
- Floating barriers divert debris into its mouth
- Conveyor belt extracts rubbish
- Transferred into bins on a barge
- When full, an automated message is sent to the local waste operator

# Conclusion

The impacts of plastics on wildlife, humans and the environment is colossal and a growing problem without a quick solution.

## What can you do?

- Avoid using single-use and disposable plastics
- Reduce waste by becoming a responsible consumer
- Reuse preferably nontoxic (glass, stainless steel) containers and goods to make less waste.
- Recycle but be aware that many plastics are not recyclable and are accidentally lost into waterways and oceans..
- Educate the general public of the dangers concerning plastic and the disposing of it.

Self Study:

Investigate the technological solutions that are being researched but be critical. What are the pros and cons to each? Is this the way forward? Is this the only way forward?