

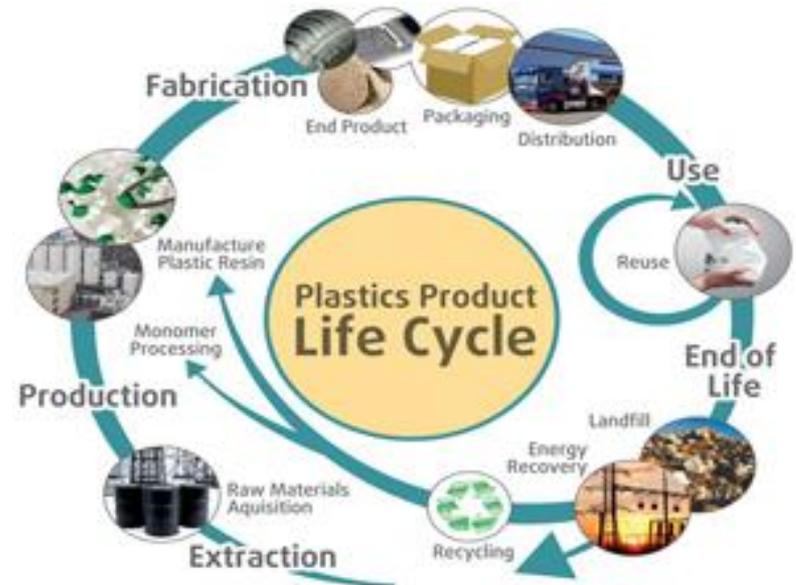
# Plastic: from miracle material to environmental threat



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VP Research - Ocean Wise

# Plastic



(Kate Le Souef, Great Canadian Shoreline Cleanup)

# Plastic



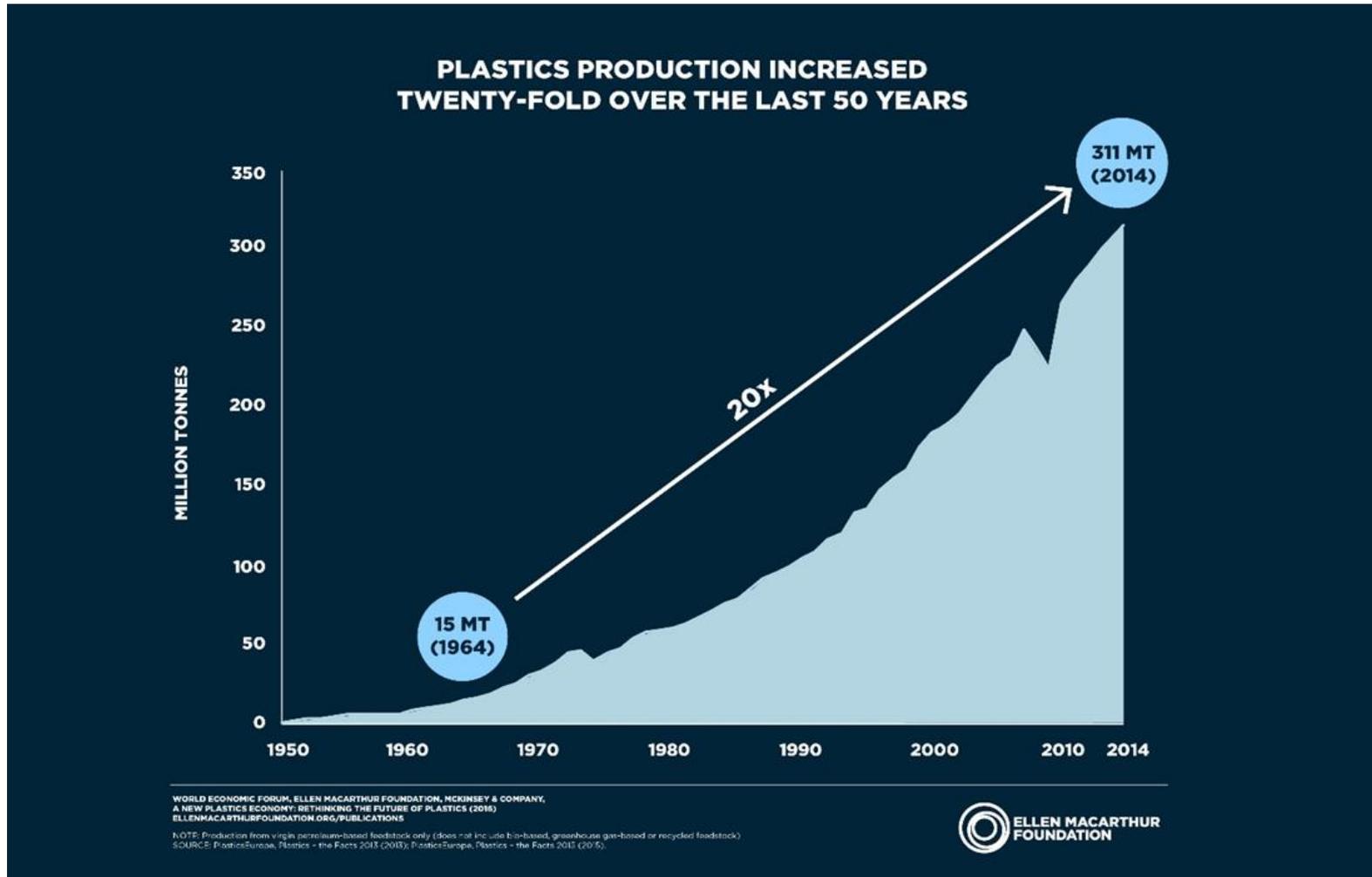
- Used in just about any product we buy today, including clothing, packaging and toys;
- Early forms include natural rubber (1839), celluloid (1863), Viscose Rayon (1894), Bakelite (1909), Unsaturated polyester or PET (1942);
- From Ancient Greek (*plastikos*), meaning to shape or mould, such that it represents a physical rather than chemical class of products.

# Plastic represents a visible threat to sea life



- Charismatic species have been visible victims of nets and other debris for decades;
- Packing bands, fishing gear and plastic bags entangle turtles, seabirds and marine mammals;
- Plastic represents a conservation threat to many seabird species.

# Increasing plastic production poses risks of a global nature



# 25 years of the *Great Canadian Shoreline Cleanup*: A national conversation on visible litter

- Annually:
  - 2,016 cleanup sites
  - 3,211 km shoreline cleaned
  - 11,910 garbage bags filled
  - 59,136 volunteers participated

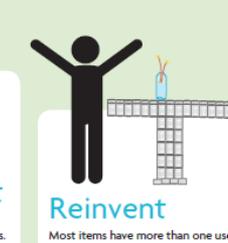
|  |                             |                |   |                              |               |
|--|-----------------------------|----------------|---|------------------------------|---------------|
|    | 1. Tiny Plastic or Foam     | <b>333,289</b> |    | 7. Plastic Bags              | <b>22,724</b> |
|    | 2. Cigarette Butts          | <b>244,734</b> |    | 8. Miscellaneous Packaging   | <b>18,465</b> |
|    | 3. Plastic Beverage Bottles | <b>50,285</b>  |    | 9. Straws & Stirrers         | <b>17,654</b> |
|  | 4. Food Wrappers            | <b>47,466</b>  |  | 10. Foam materials           | <b>17,527</b> |
|  | 5. Plastic Bottle Caps      | <b>38,624</b>  |  | 11. Beverage Cans            | <b>17,337</b> |
|  | 6. Paper Materials          | <b>22,877</b>  |  | 12. Rope (1 piece = 1 meter) | <b>11,365</b> |

GREAT CANADIAN  
Shoreline  
Cleanup  
VANCOUVER AQUARIUM & WWF

A CONSERVATION INITIATIVE OF  
vancouver  
aquarium. WWF

## Change Starts with Action

Our actions promote the changes in behaviour that lead to litter prevention. Here are some quick and simple challenges for you to reduce waste in your everyday life.



**Thank you**

for helping make aquatic ecosystems cleaner, healthier and safer for all living things.

  
ocean wise®

# Microplastics emerge as a new conservation concern



Microplastic particles are < 5 mm.

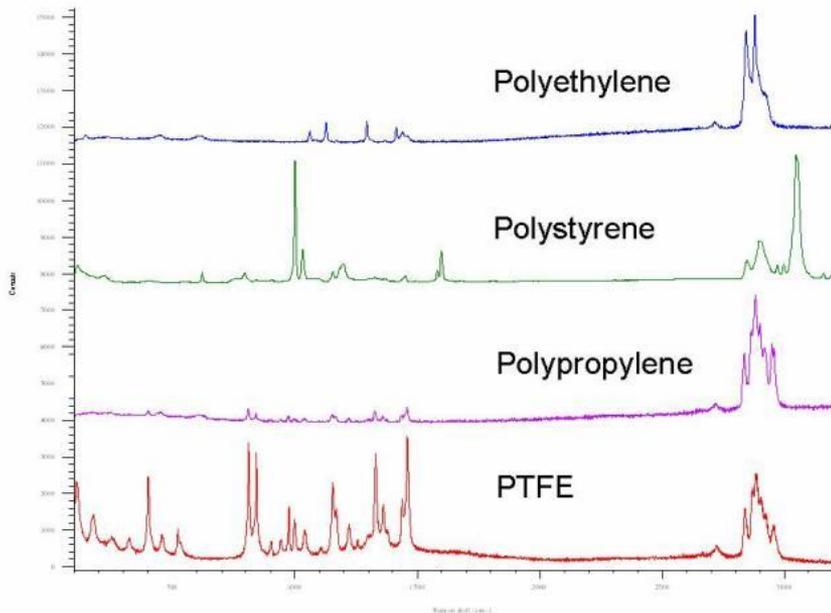
Two categories:

*Primary microplastics* are deliberately manufactured (microbeads and nurdles);

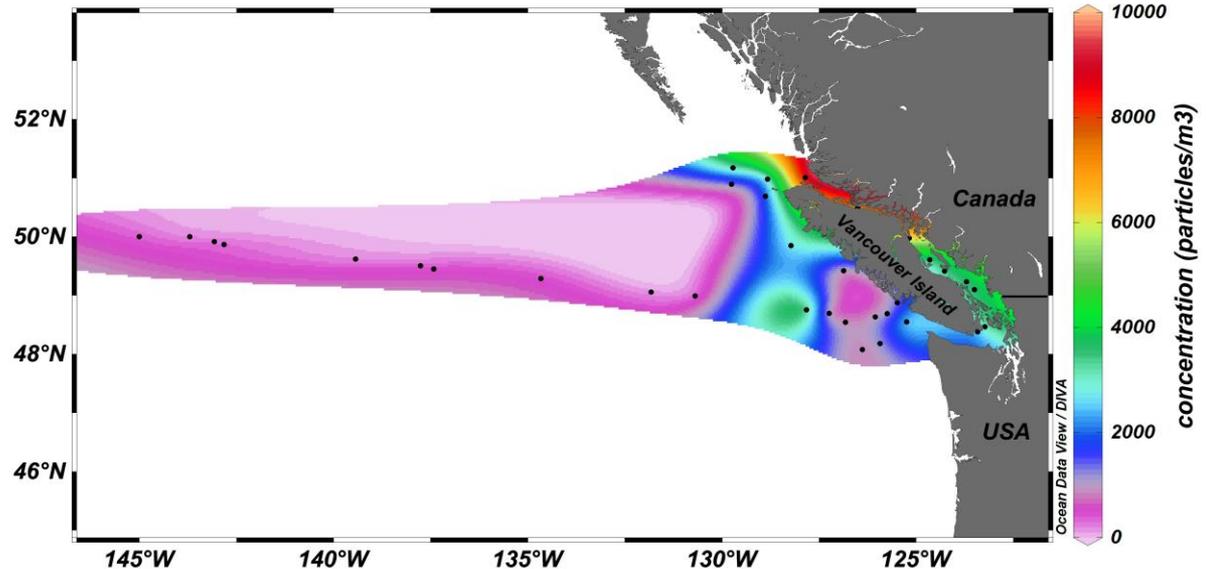
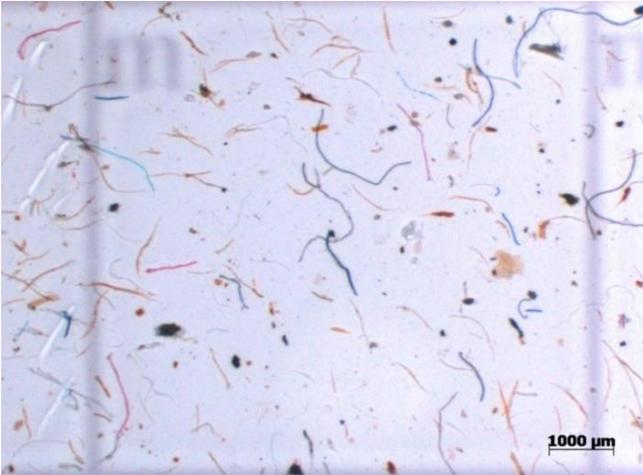
*Secondary microplastics* are the breakdown products of larger items such as plastic bottles, bags, packaging, nets and textiles.

# The Ocean Wise *Environmental Microplastics Facility* (‘The Plastics Lab’)

1. Sampling in environment
2. Extraction & cleanup in the lab
3. Visual characterization and counting using microscopy
4. Forensic identification using FTIR spectrometry



# Seawater: up to 9,200 particles per cubic meter in the NE Pacific Ocean



(Desforges, Galbraith, Dangerfield & Ross 2014)

*Up to 80% are fibres*



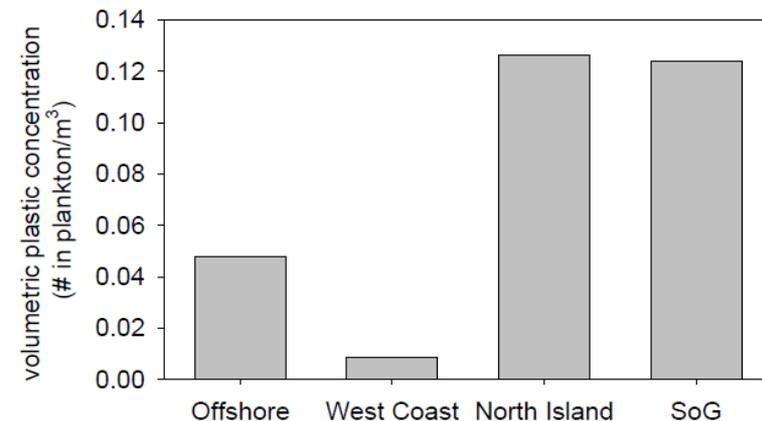
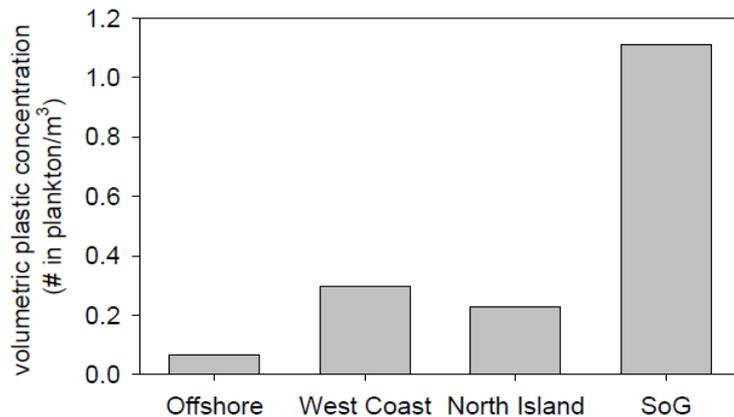
# Threat to ocean productivity?

## Zooplankton are mistaking microplastics for food

*Neocalanus cristata*



*Euphausia pacifica*

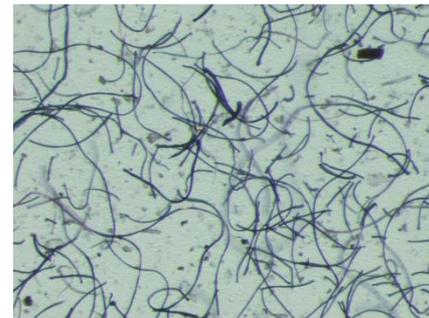
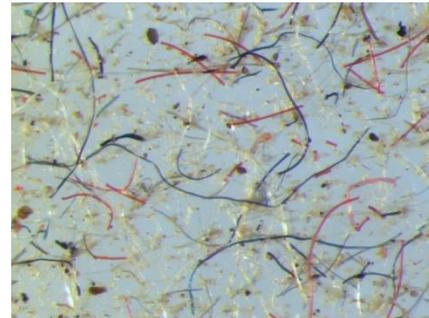
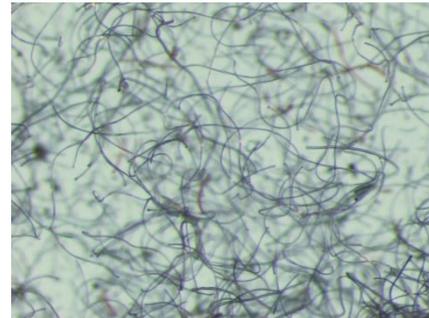


(Desforges, Galbraith, Dangerfield & Ross 2015)

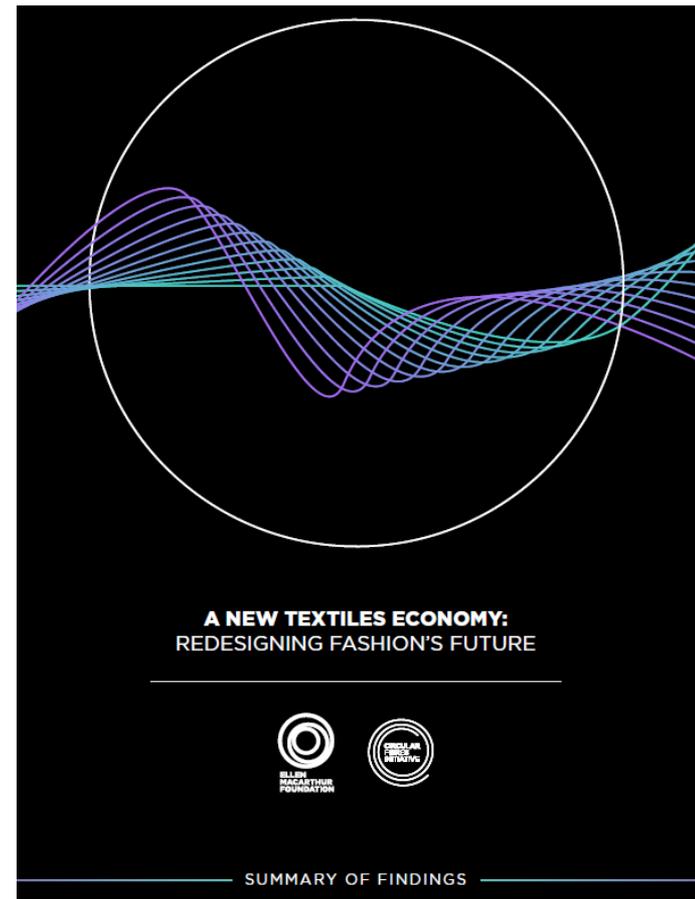
# Where are these microplastics particles coming from?



# A synthetic sweater can lose up to 10 million fibers in a single load of laundry



# Key information sources for the global plastics and textiles topics



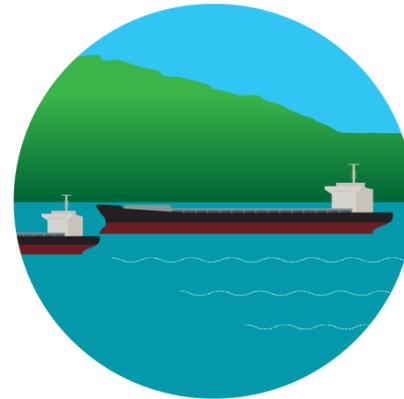
# Innovation and opportunity: Rewards and a competitive edge await those able to close the loop on the plastic economy



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