SINTEF CENTER FOR CLEAN OCEAN RESEARCH

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STCM BSPC Seminar, 12th of November, 2018

NASA/Apollo 17 crew

Reuters

"Clean Ocean for Clean Blue Growth"

Challenges related to marine littering and pollution must be solved to realise growth in a sustainabe blue economy

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Photo: shutterstock

Source : Athelstan Spilhaus, *Atlas of the World with Geophysical Boundaries, 1991*
Cartographie : Clara Dealberto

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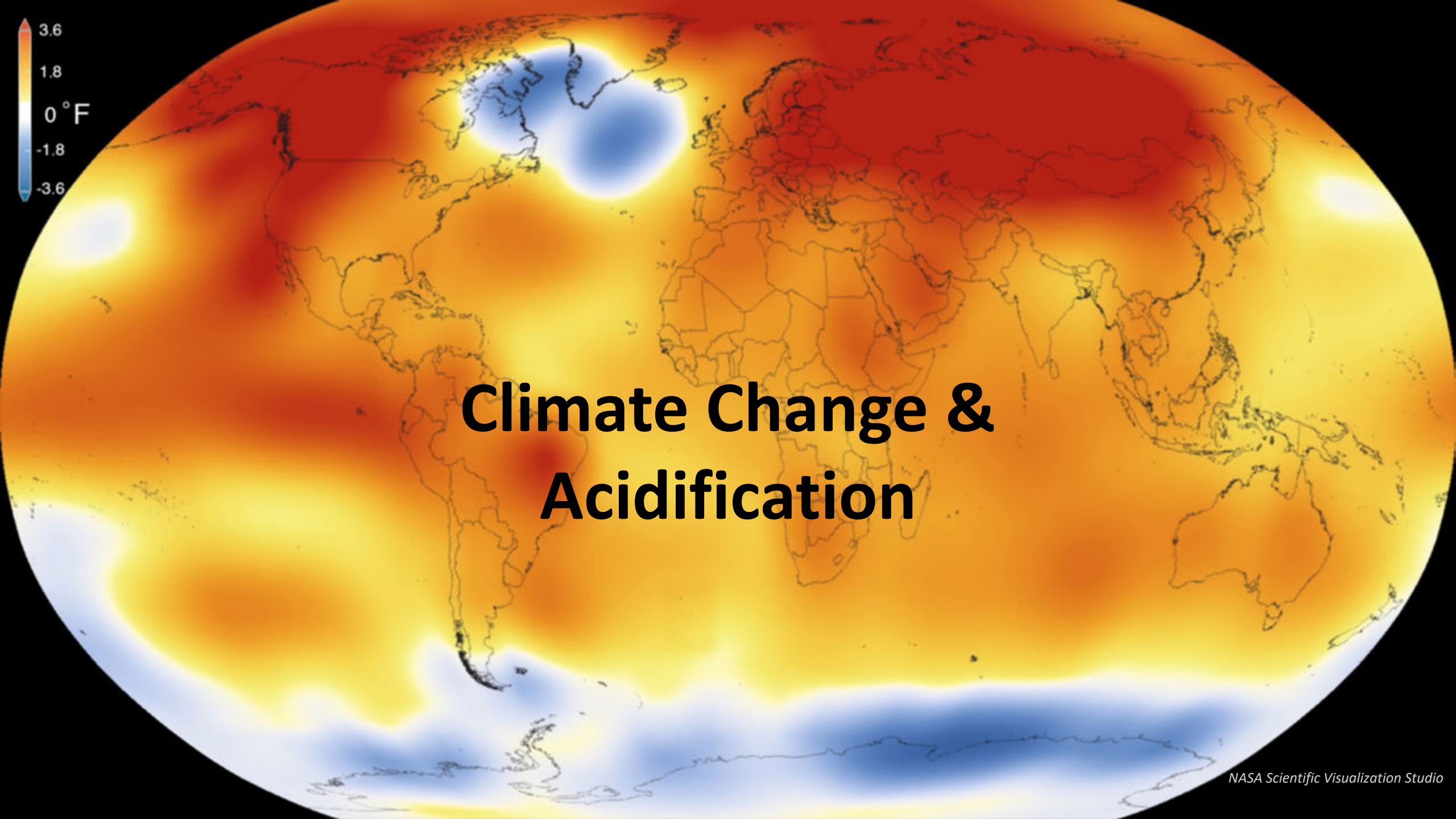
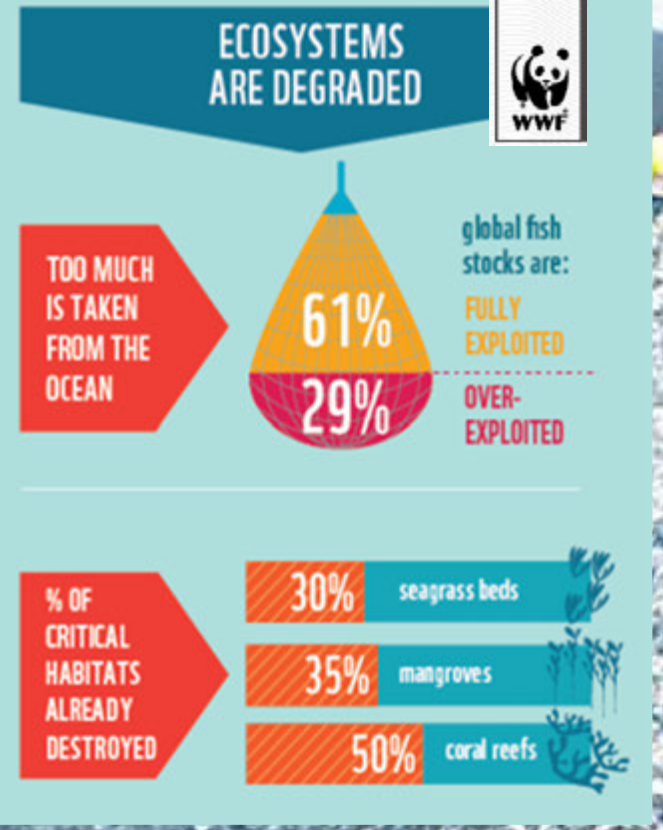


Climate Change & Acidification

NASA Scientific Visualization Studio

Over Fishing & Destruction of Habitates



Marine Littering & Pollution

BENEFITS OF A HEALTHY OCEAN GLOBALLY

LIVELIHOODS

90% Most people who derive livelihoods from fishing live in developing countries

About **350 million** jobs are linked to the ocean globally

MARINE TOURISM

Tourism is the world's largest industry

The marine tourism industry provides **200 million** jobs worldwide

COASTAL PROTECTION

Wetlands, seagrass beds, mangroves and coral reefs are natural defences to protect coastlines

FOOD

Fisheries are an important source of protein for billions of people

CLIMATE

50% The ocean produces half the oxygen we breathe and absorbs 30 per cent of CO_2

RESILIENCE

A healthy ocean will cope with negative impacts better

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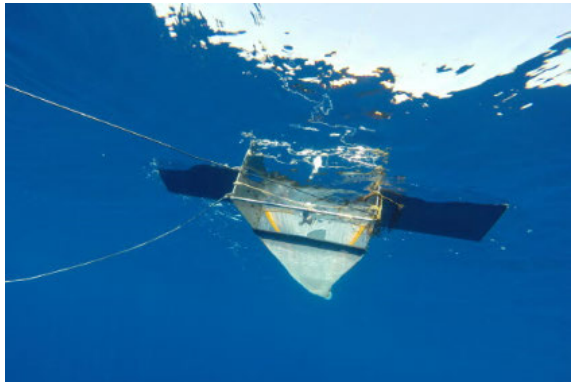
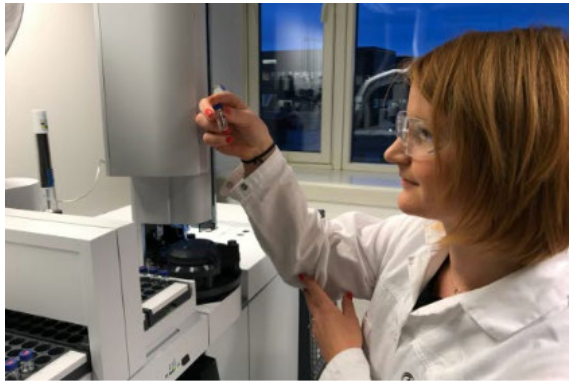
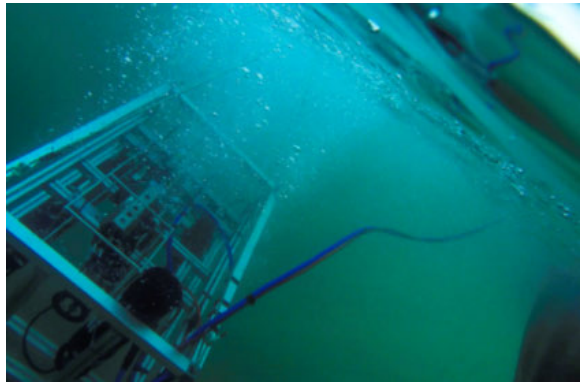
Marine Oil Spill R&D



Plastic in the Ocean



Emerging Pollutants



Deposition in the Ocean

Nanomaterials in the Ocean

Ocean Politics

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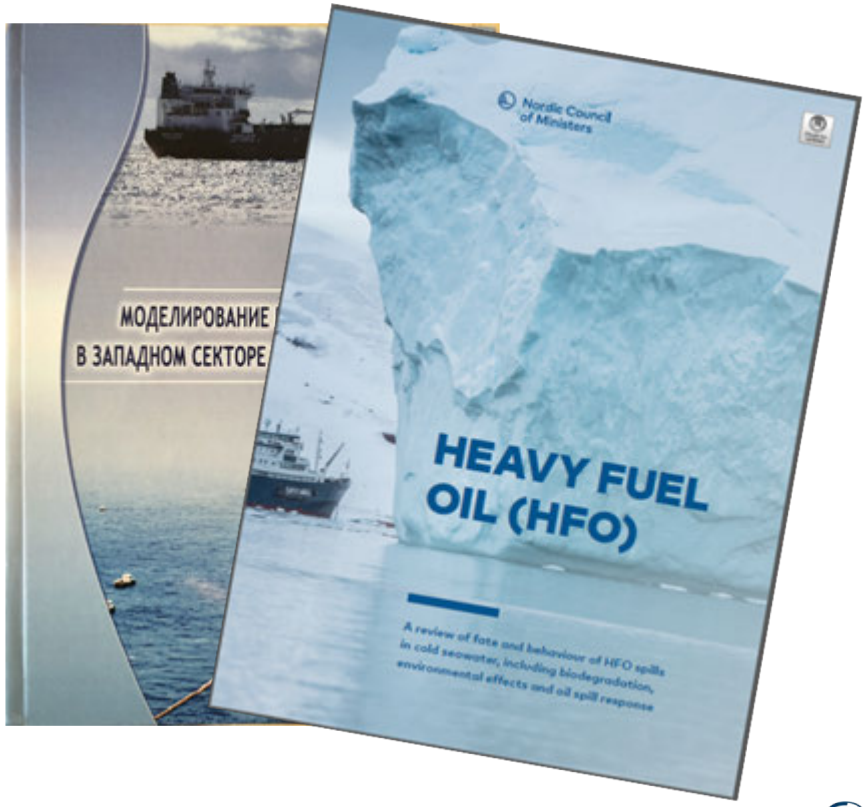
NASA/GSFC

Oil Spill Contingency and Response

- Oil chemistry and weathering studies
- Use of dispersants
- In-situ burning
- Mechanical recovery
- Oil on shore
- Field work



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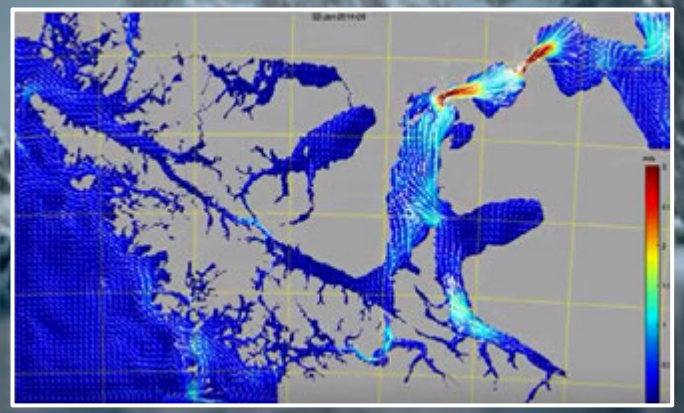
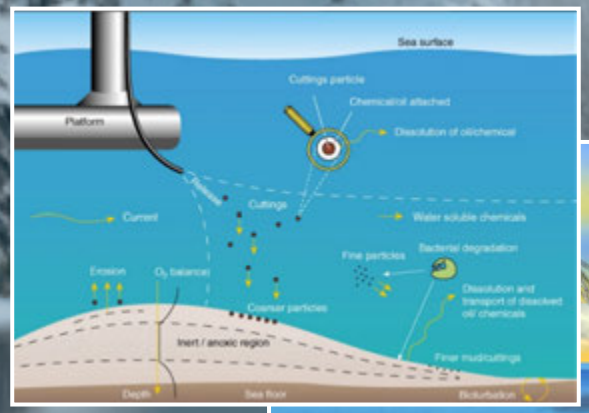
Marine ecosystem and physics

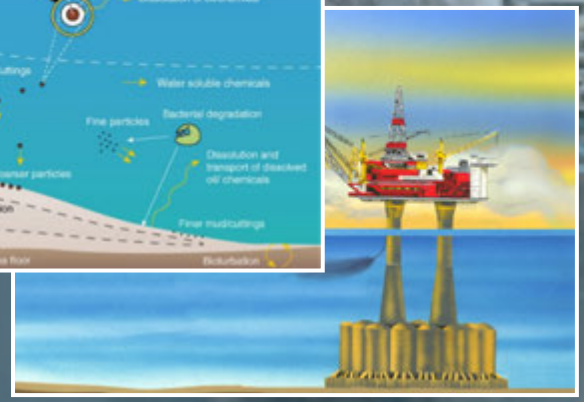


www.sintef.no/SINMOD

DREAM

Regular discharges and ecotoxicology





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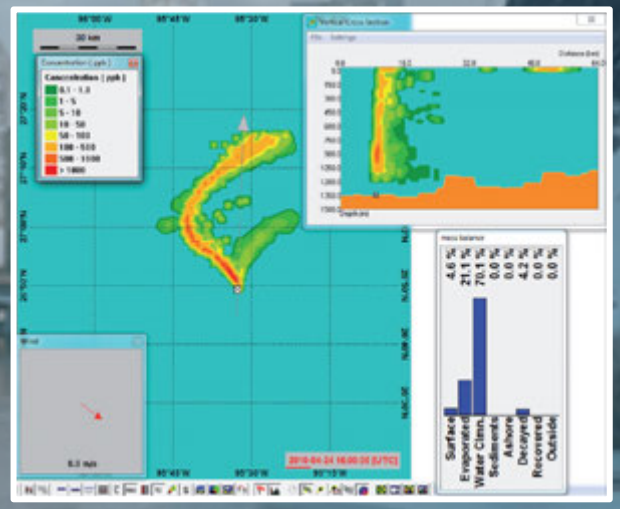
OSCAR

Accidental releases of oil



www.sintef.no/OSCAR

Decision support, environmental impact & risk assessment.

Where does it end up? What will be affected? How can we reduce the impact?
How can we mitigate/respond?

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Poor management of waste is the cause of 80-90% of all marine pollution

Photo by Miriam Goldstein

What is plastic in the ocean?

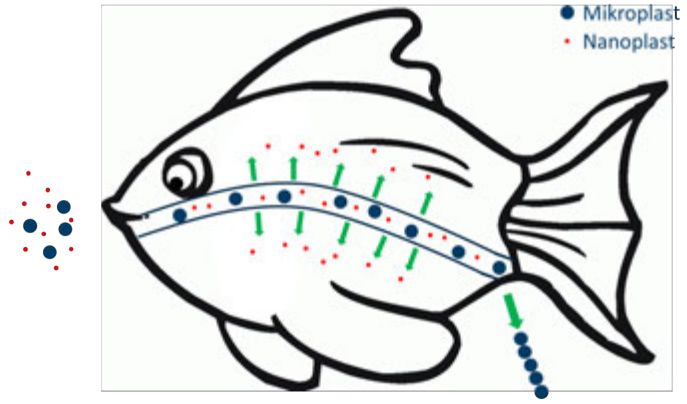
- The most common types of plastic: PE, PP, PVC and polyester

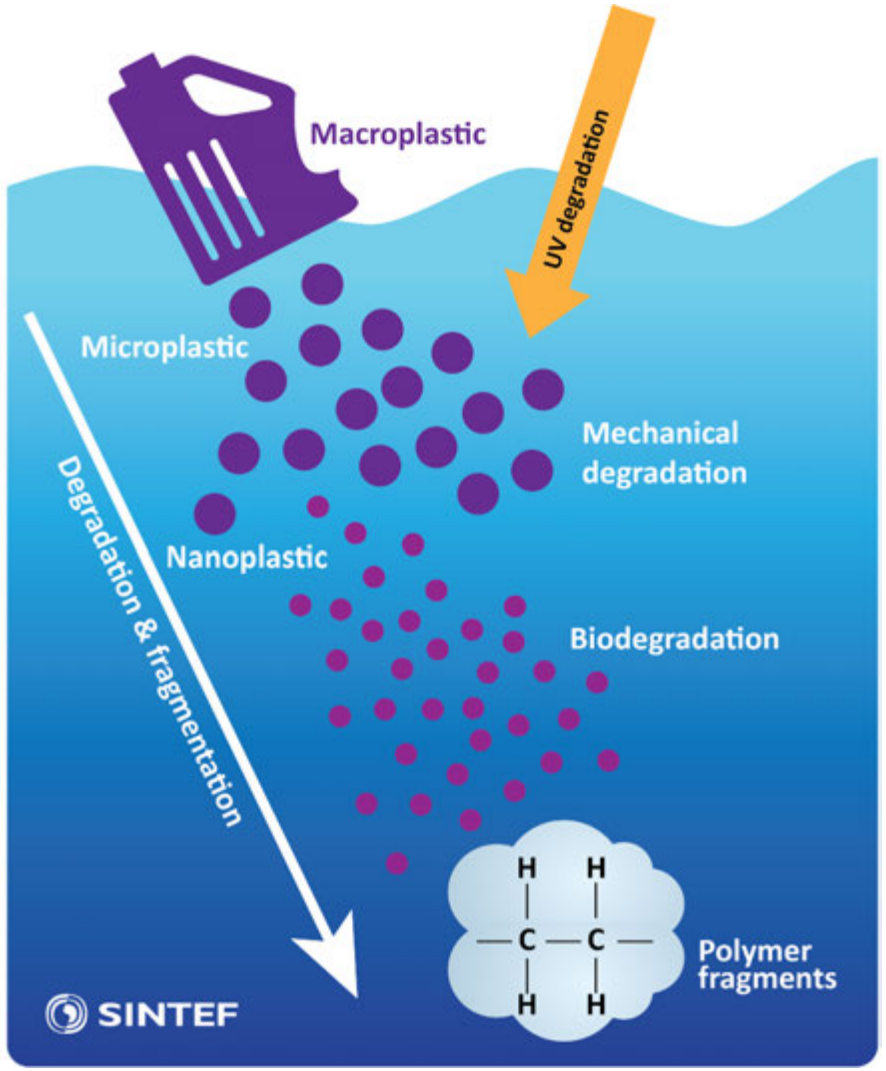
  + additives

  + other pollutants

  + biota, e.g. bacteria

- The size matters
  - Macroplastic -> microplastic -> nanoplastic





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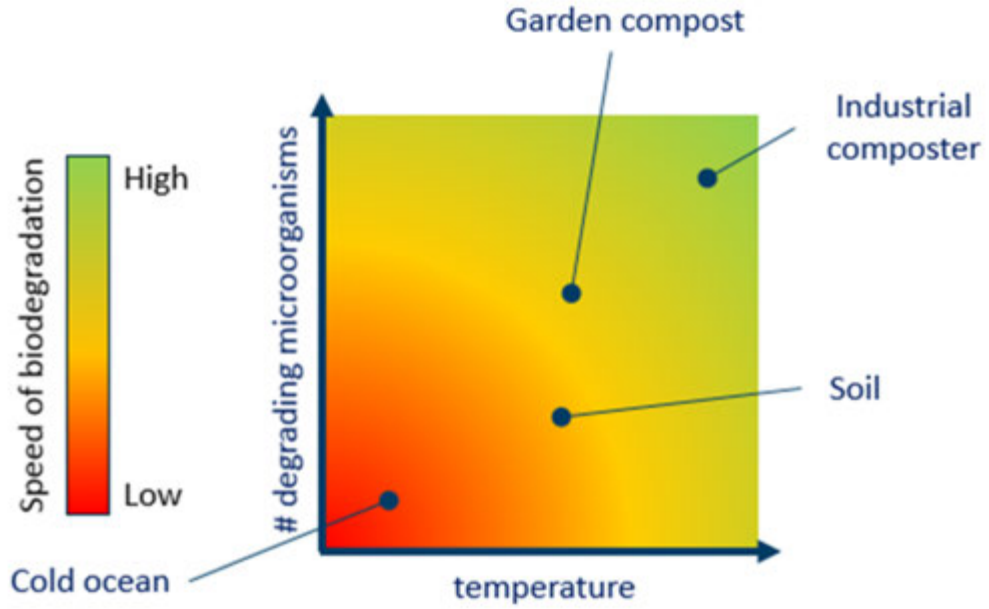
Ok, but how about biodegradable plastic?

- May be a solution to some applications, but we need to consider that biodegradable plastic:
  - May not have the same functional properties as "regular" plastic
  - May not biodegrade under all conditions, e.g. not in nature
  - May still contain additives
  - May not be recyclable using current technology
  - Is designed to become waste, i.e. does not readily fit into a circular economy



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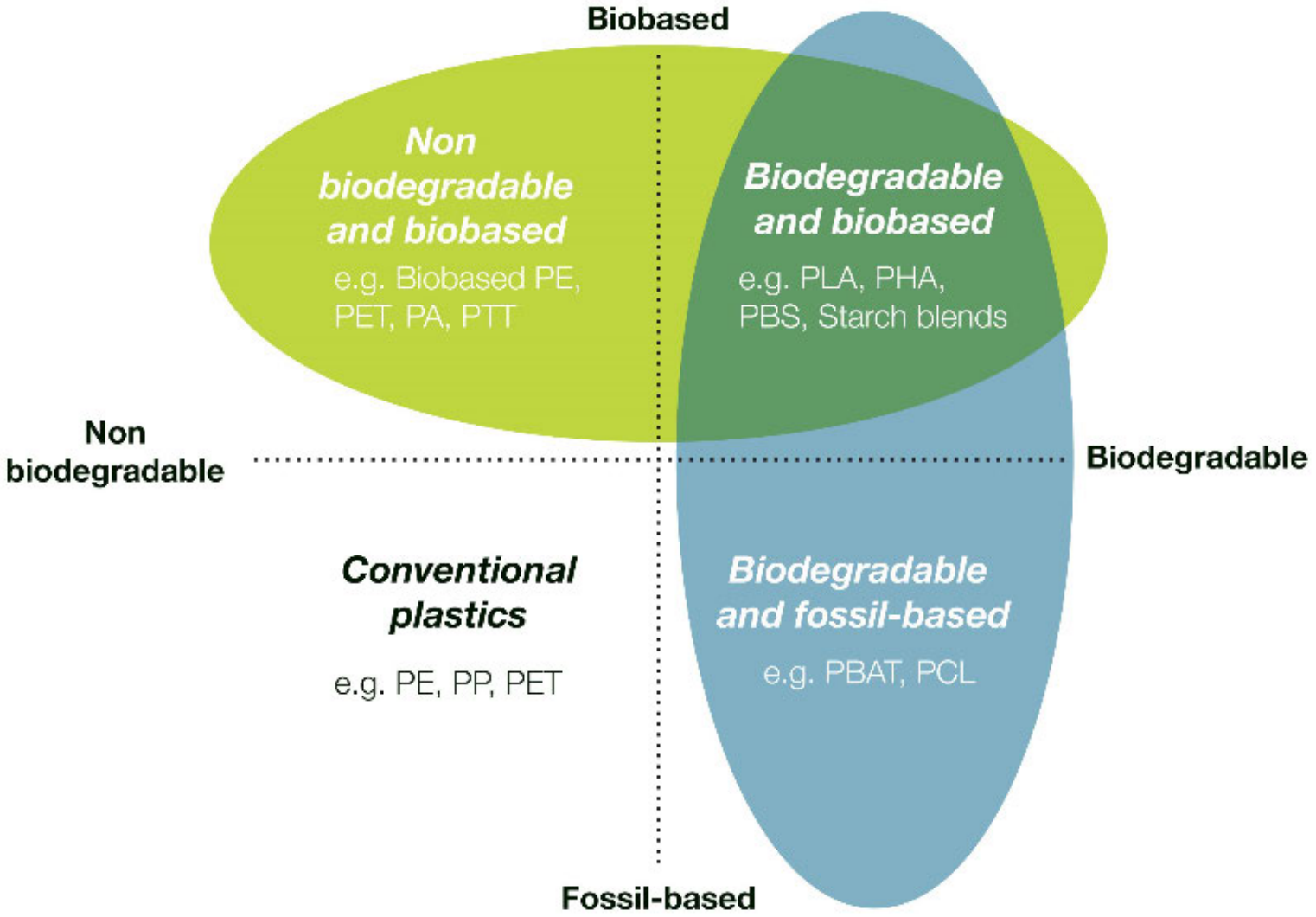
Conventional Plastic vs. Bioplastic vs. Biodegradable Plastic



http://www.plastics.org.nz/environment/bioplastics-degradables

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How do we mitigate plastic pollution?

- Development/improvement of infrastructure and waste management
- Phase out unnessesary single use plastic
- Extend liability for producers
- International coordiation
- New knowledge and technology

Foto: shutterstock

microfibre

- Discharge of microfibres from textiles
- Resultater:
  - Great difference between different materials
  - Most fibres are released in the first washing

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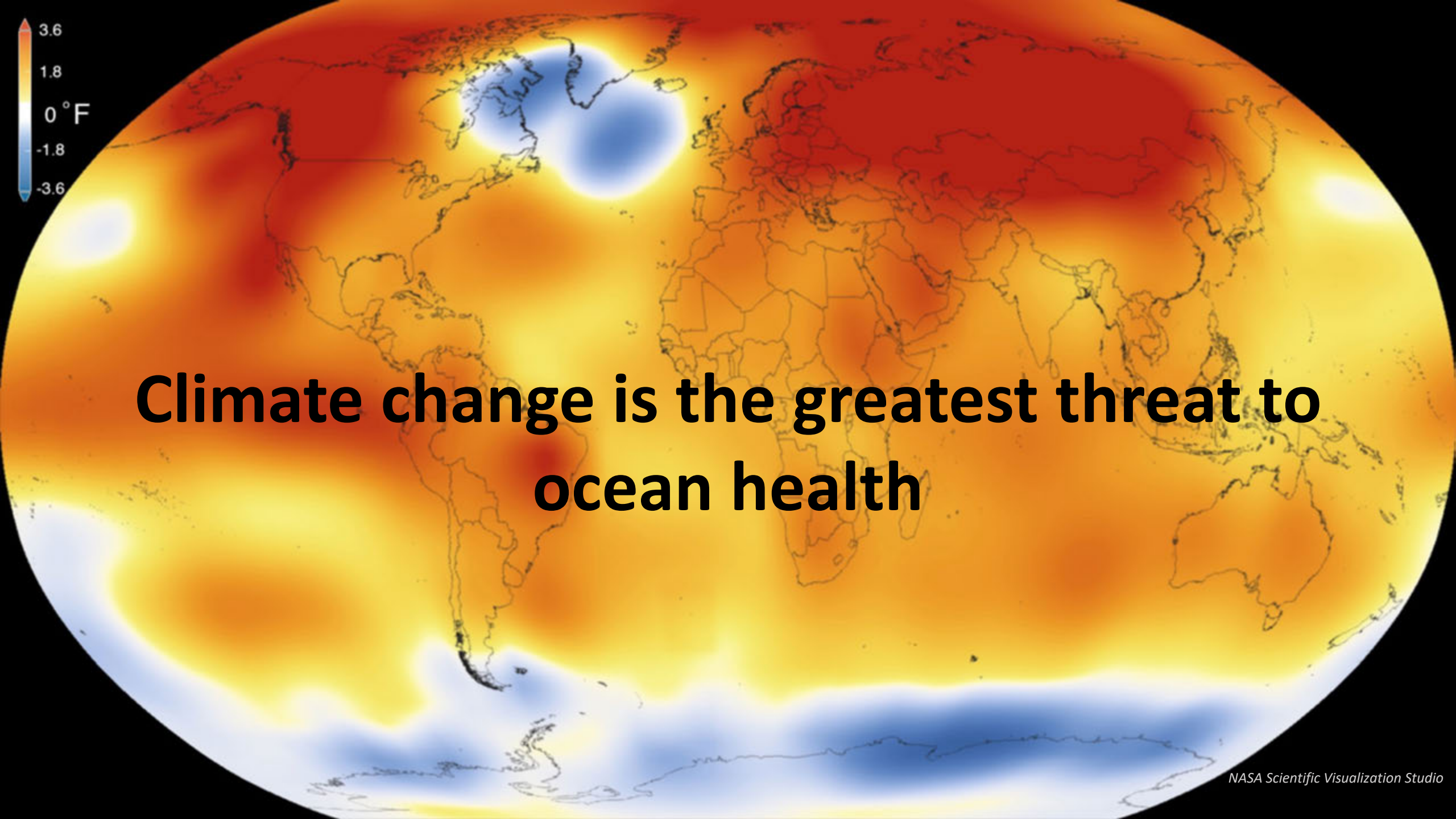

Climate change is the greatest threat to ocean health

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Thank you!

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