

More food from the ocean - the scientific perspective on feasibility and uncertainty

Europe, The Ocean and Feeding the World

Brussels

20th March 2018

Sheila JJ Heymans

Executive Director

European

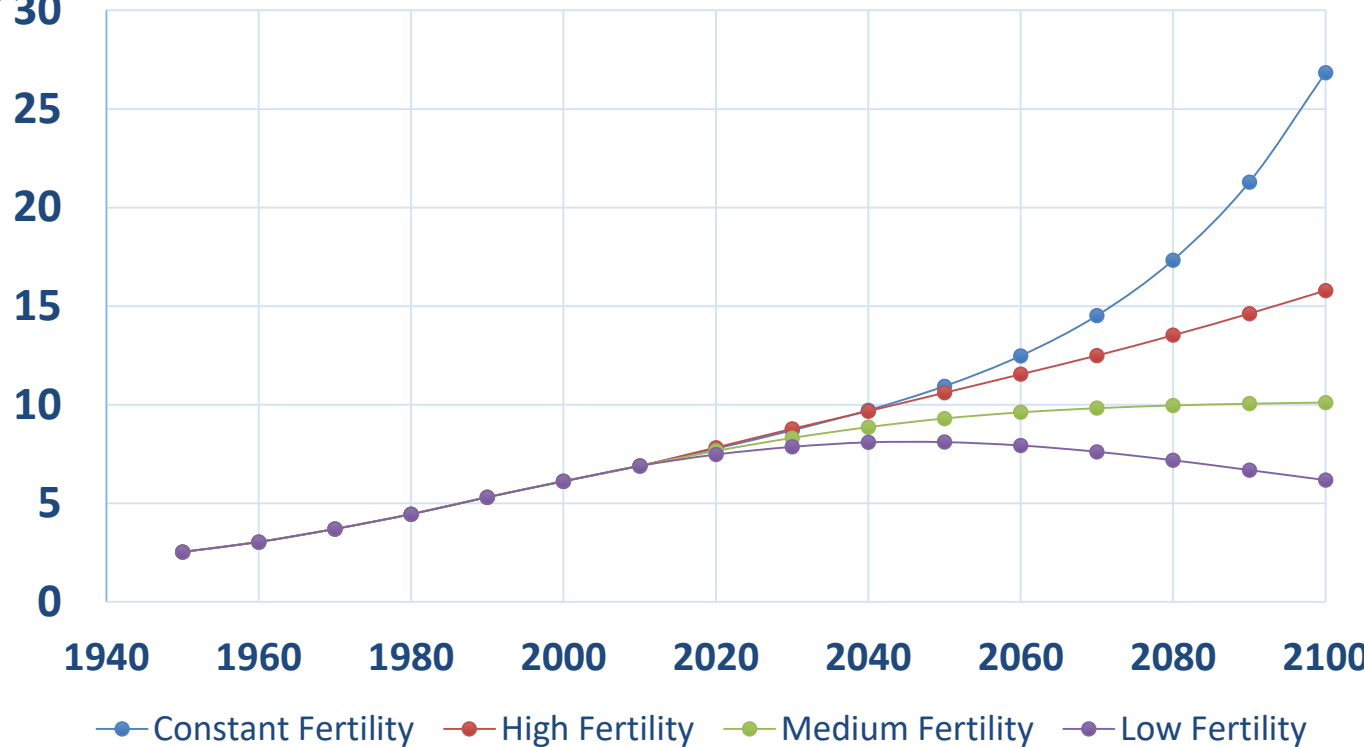
MARINE BOARD

Advancing Seas & Ocean Science

The problem

Ocean accounts for 50% of biomass production on earth, but only 2% calories/ 15% protein consumed as food.

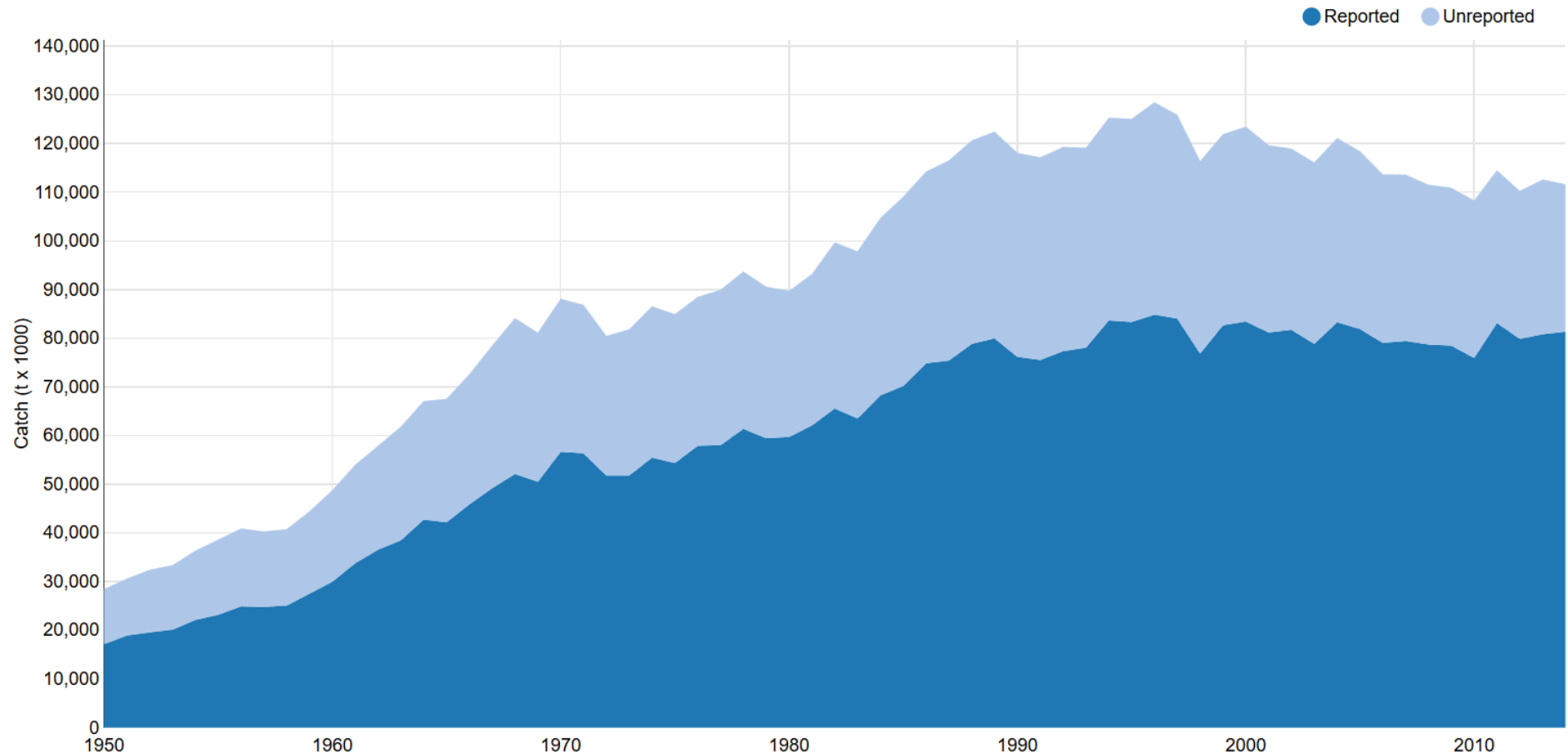
UN population estimates (billions)



The ecological efficiency of biomass production in water is higher than on land.

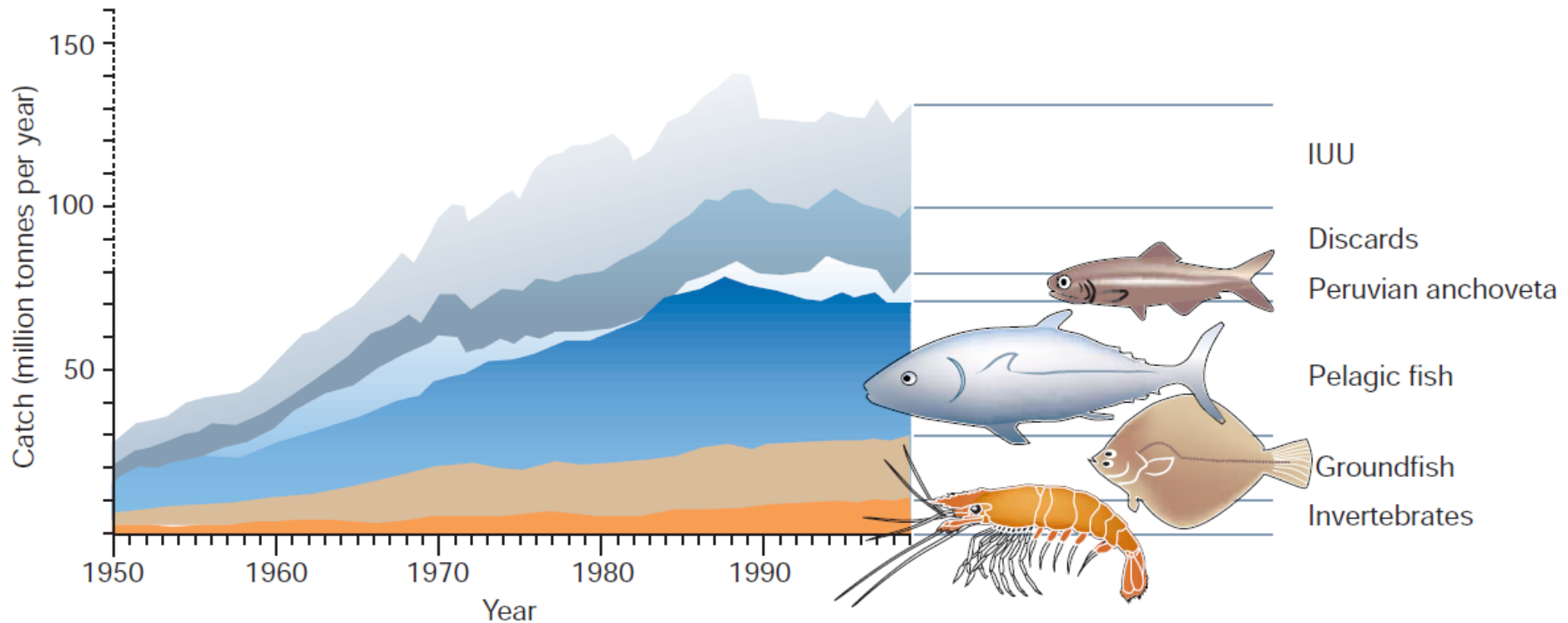
History

Global catches have plateaued (even taking into account unreported catches)



History

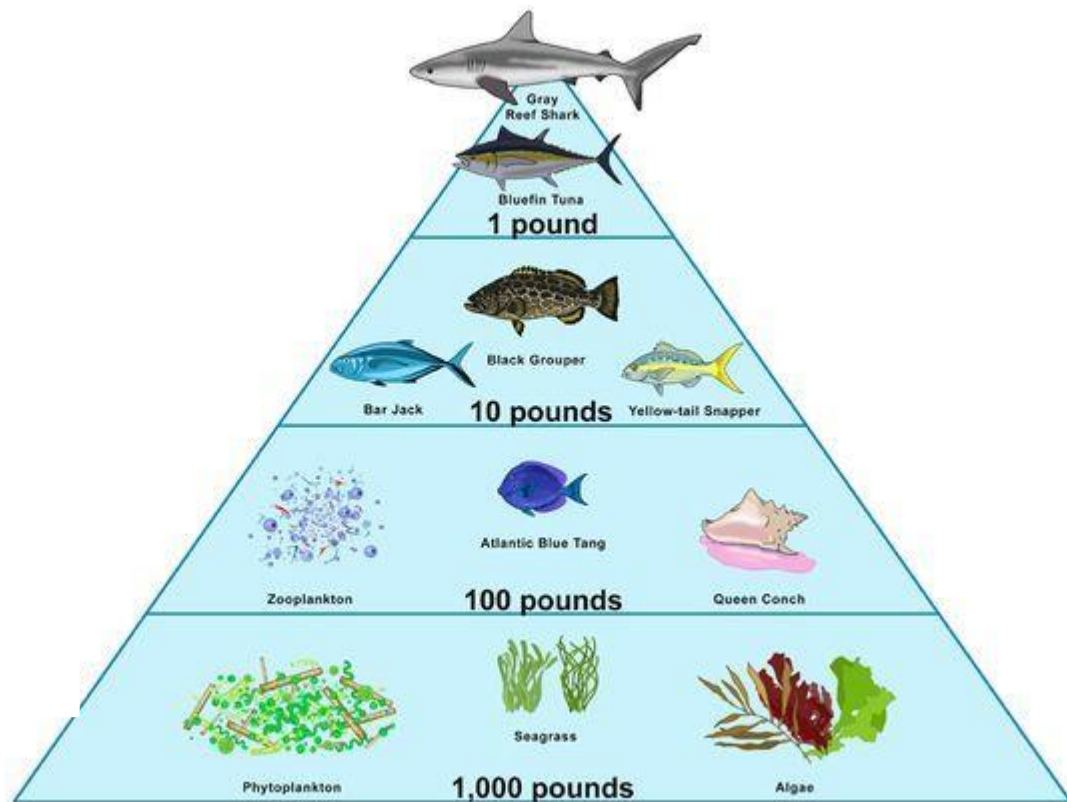
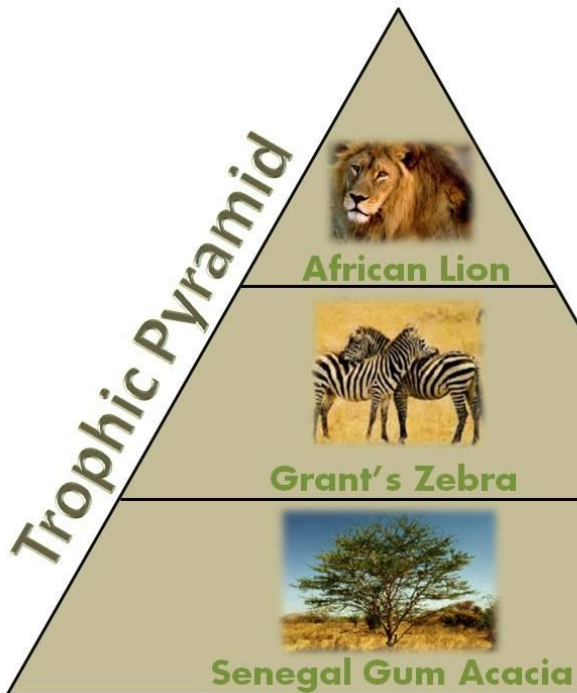
Discards have increased
and our catch of pelagic fish have plateaued.



The problem with fisheries

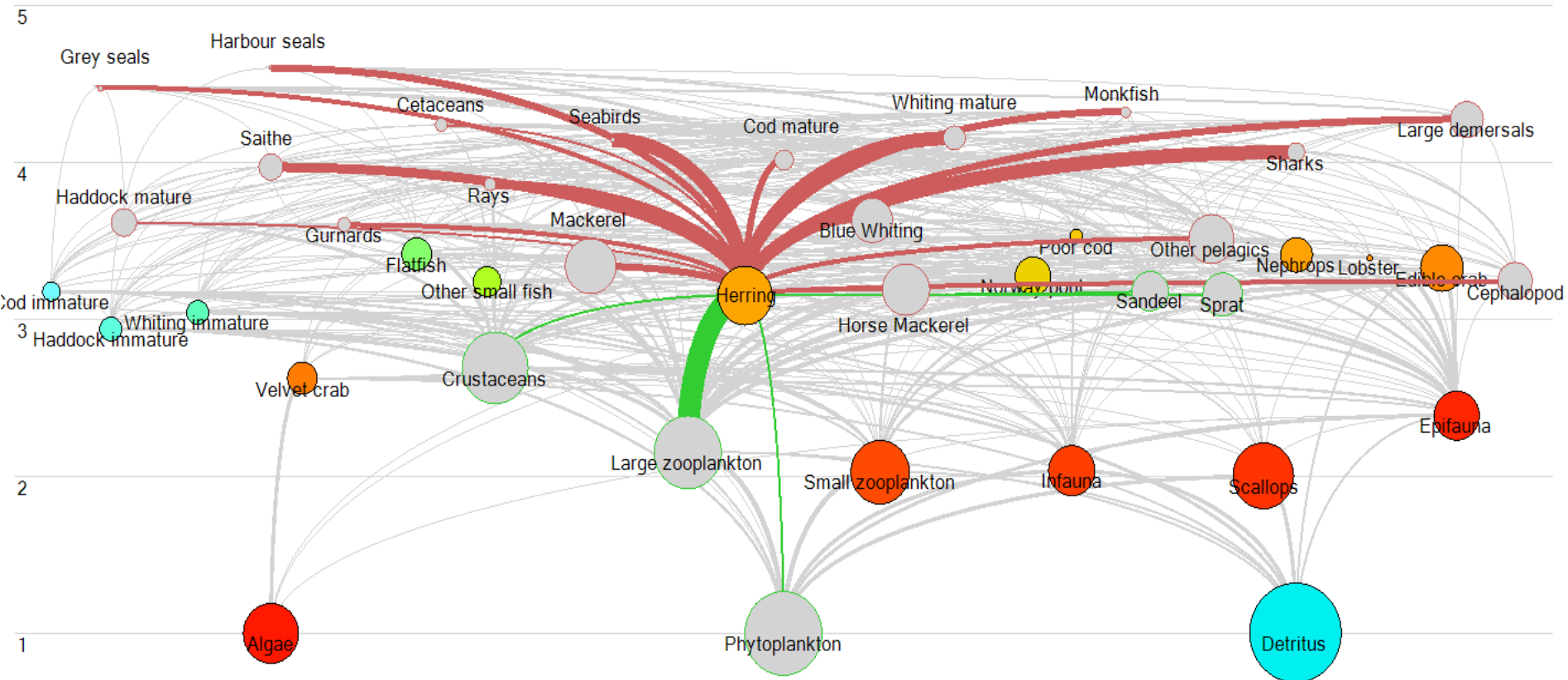
... and we are eating the lions of the sea (tuna, sharks, etc.)

Creating 1 kg of tuna takes ~ 100 times more energy than 1 kg of herring



Unintended consequences

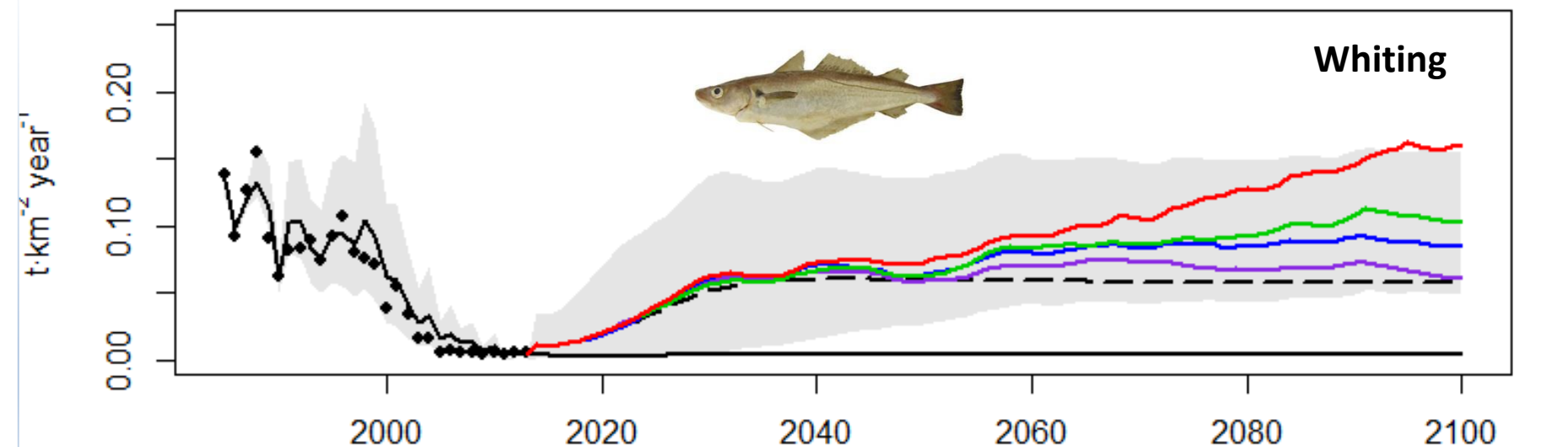
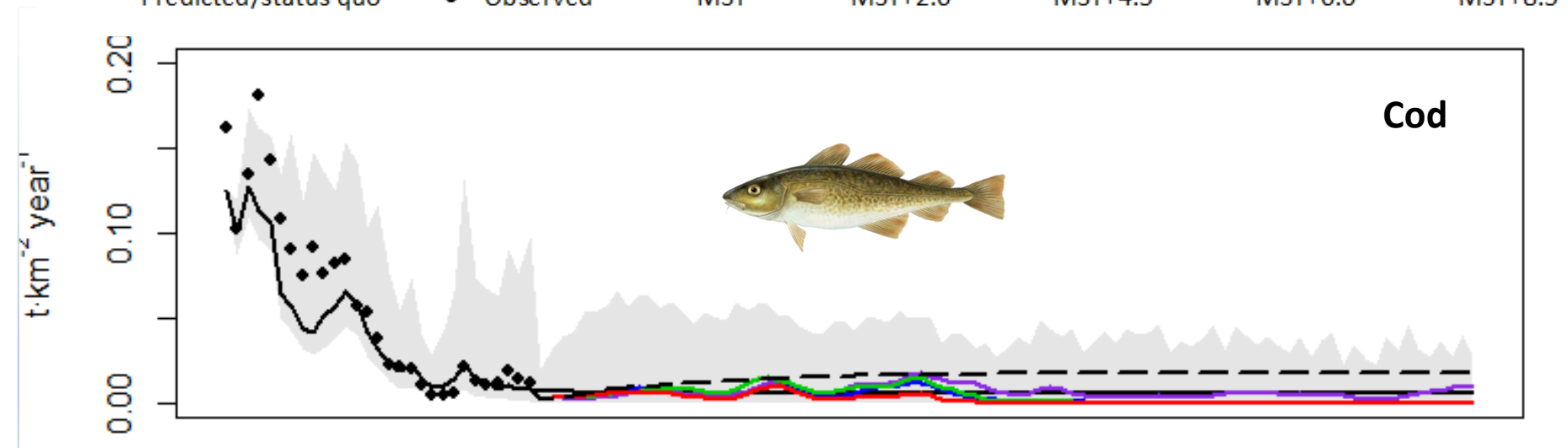
If we catch all the herring we will have an impact on the species that depend on them. (MSFD)



Energy flow through the West Coast of Scotland ecosystem (Serpetti et al 2017)

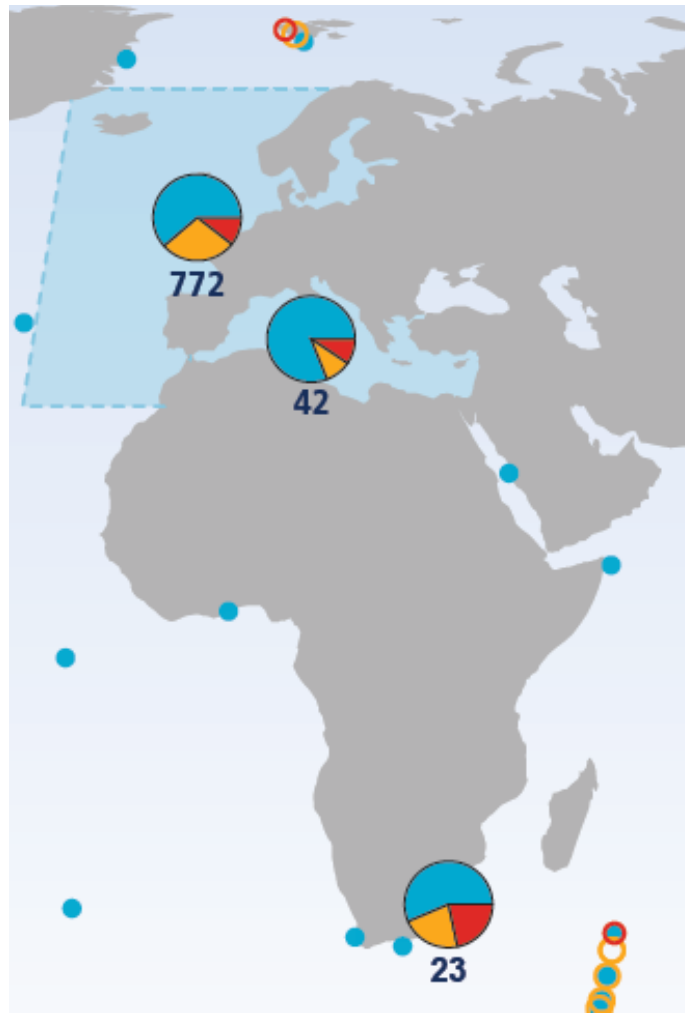
Uncertainty: impact of climate change

— Predicted/status quo • Observed - - MSY — MSY+2.6 — MSY+4.5 — MSY+6.0 — MSY+8.5



Serpetti et al. 2017. Impact of ocean warming on sustainable fisheries management informs the Ecosystem Approach to Fisheries." *Nature Scientific Reports* **7(13438)**.

Range shift due to climate change



Observed responses to climate change from single- and multi-species studies.

Type of observed change

- Change **consistent** with climate change
- No change
- Change **not consistent** with climate change



Regions with large numbers of observations



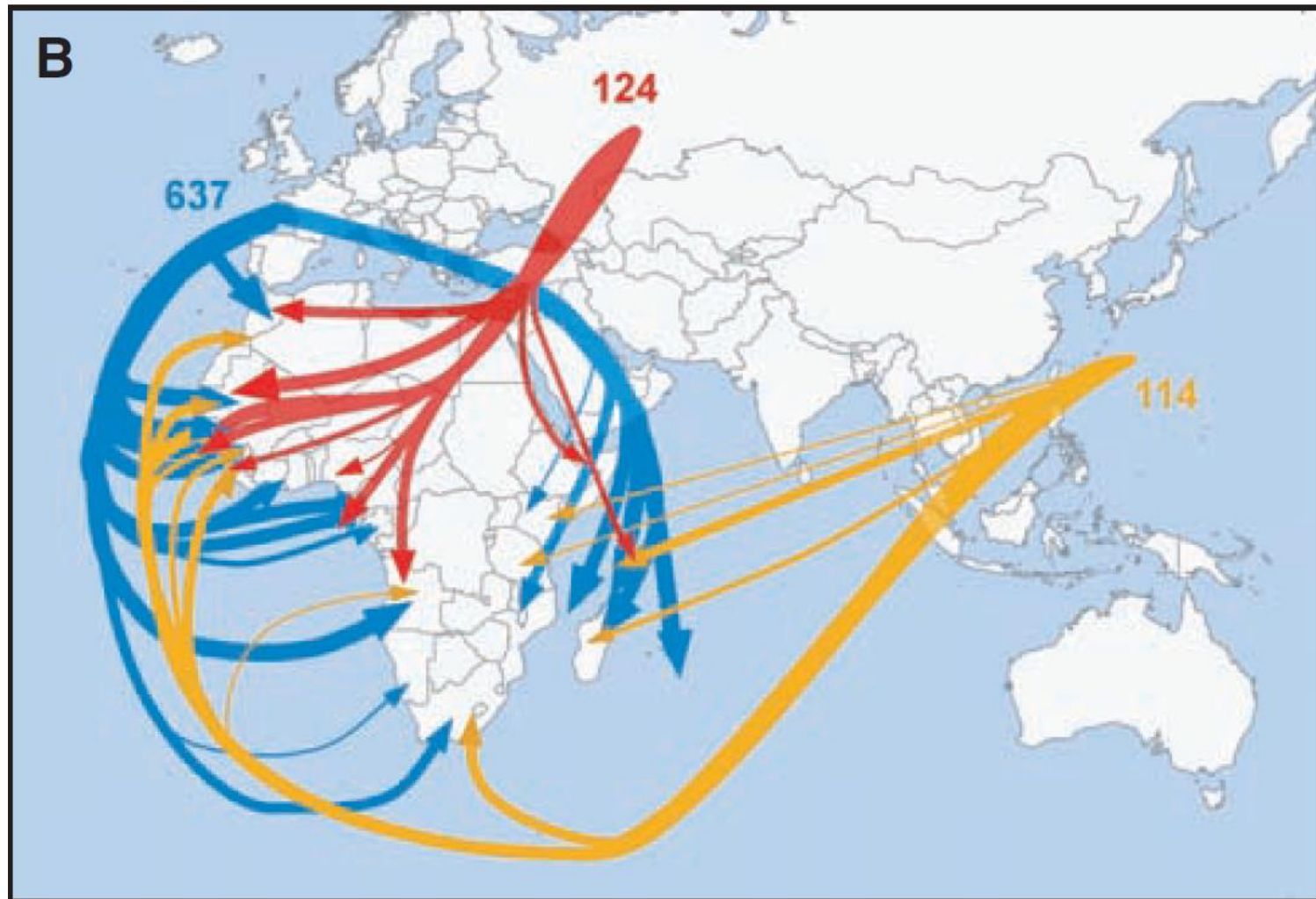
Proportion of observed changes

41

— Total number of observations within each region / locality

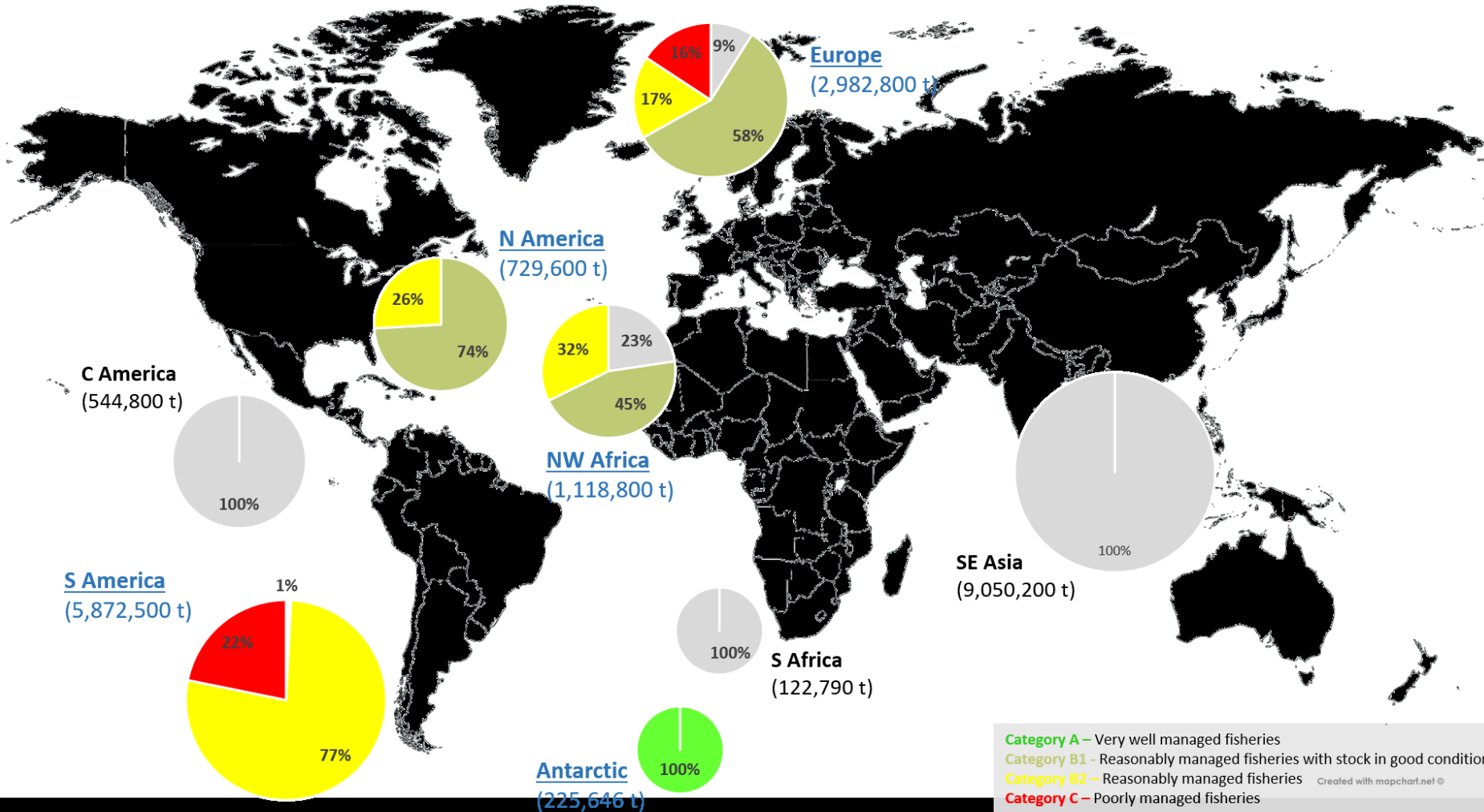
Poloczanska et al. 2014: Cross-chapter box on observed global responses of marine biogeography, abundance, and phenology to climate change. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., et al. (eds.)]. Cambridge University Press, Cambridge, 123-127.

Exporting the problem



Movement of fishing effort from developed nations to Africa in the 1990s. Data indicate total access years in distant-water fishing agreements.

Reduction fisheries



Category A – Very well managed fisheries
 Category B1 - Reasonably managed fisheries with stock in good condition
 Category B2 – Reasonably managed fisheries
 Category C – Poorly managed fisheries
Created with mapchart.net

Solutions

- Eat at lower trophic levels;
- Understand the implications of taking energy out of the ecosystem at different trophic levels;
- Understand the implications of climate change on range shift and sustainability of our fisheries (EOOS);
- Eat everything we catch;
- Be aware of where the fish come from;
- Reduce mariculture dependency on wild fish;
- We will not do it with the current fishing methods – we need to diversify our mariculture too.



Thank you

A unique European partnership of major marine and oceanographic institutes, research funding agencies and national networks of universities.



sheymans@marineboard.eu
info@marineboard.eu
www.marineboard.eu



Research Performing
Institutes



Research Funding
Organizations



National University
Networks

32 members from

18 countries