

Rebuilding the abundance of Canada's seas

Daniel Pauly

Sea Around Us

Institute for the Oceans and Fisheries

University of British Columbia

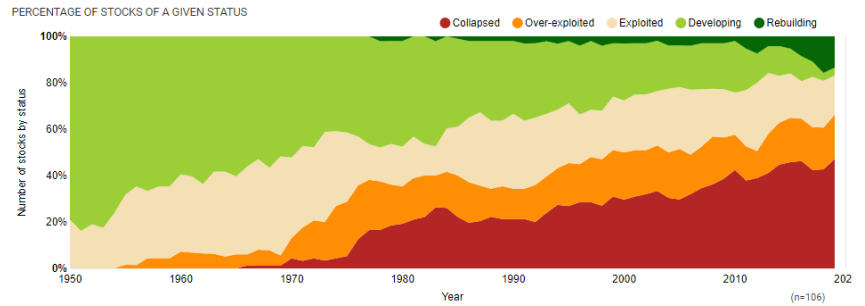
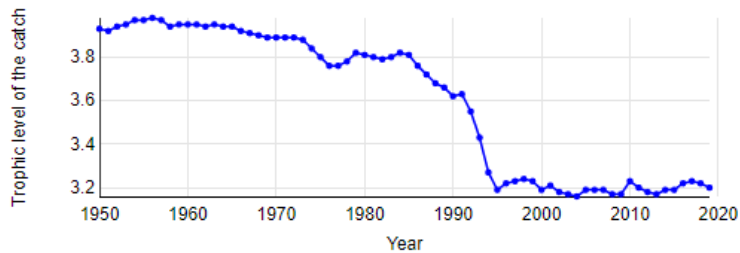
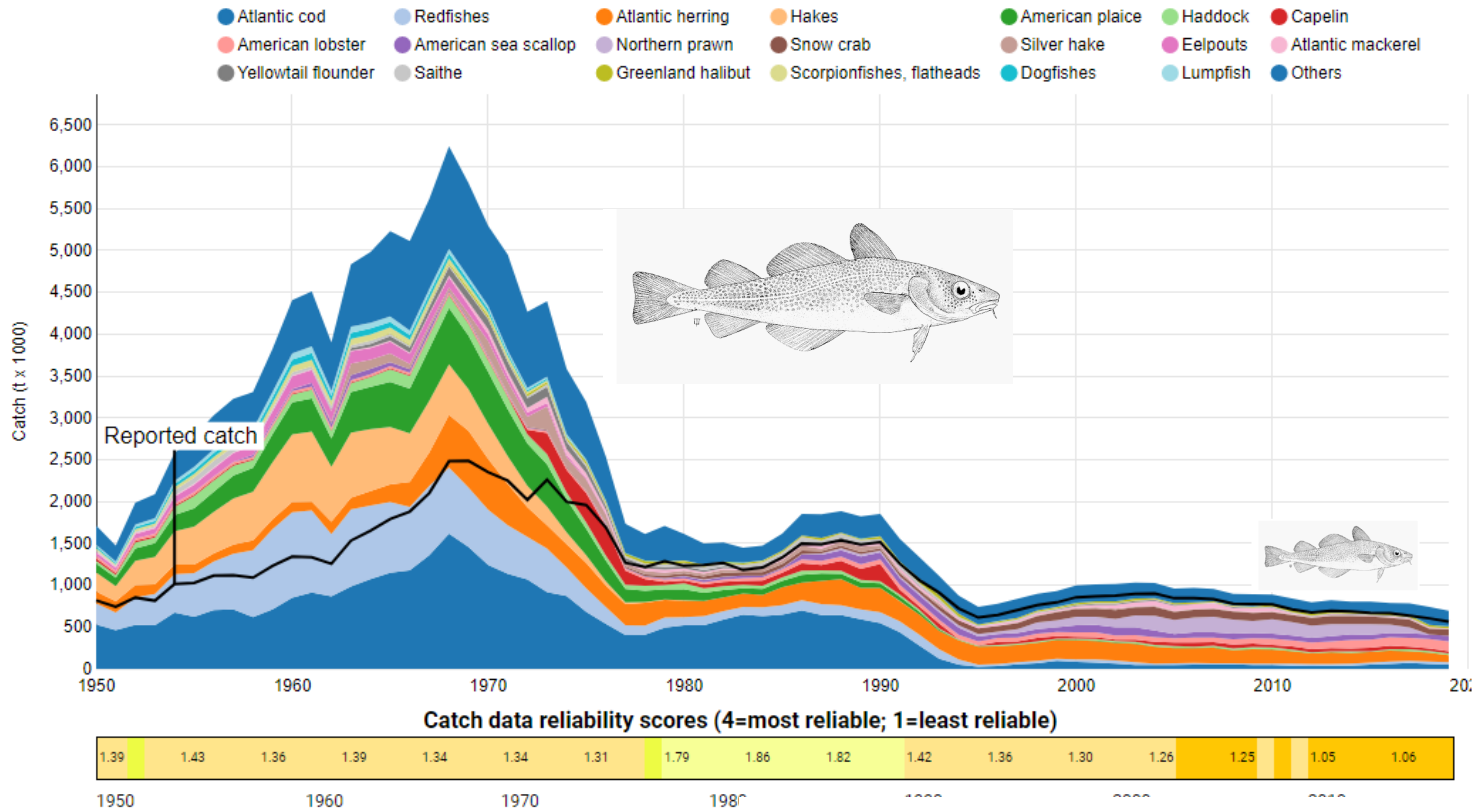


For Oceana Canada's symposium
Wednesday, October 26, 2022

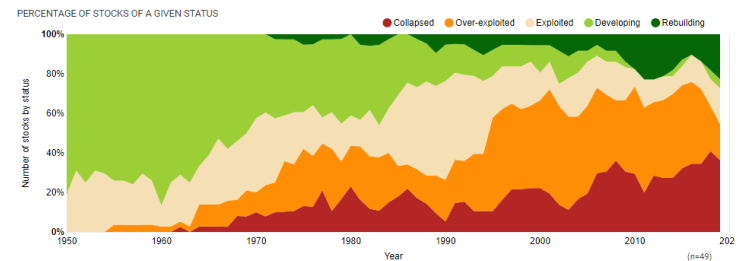
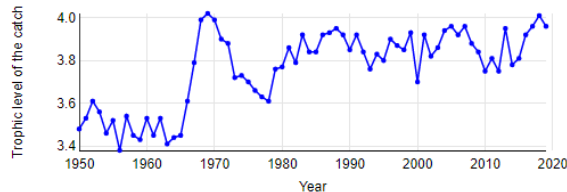
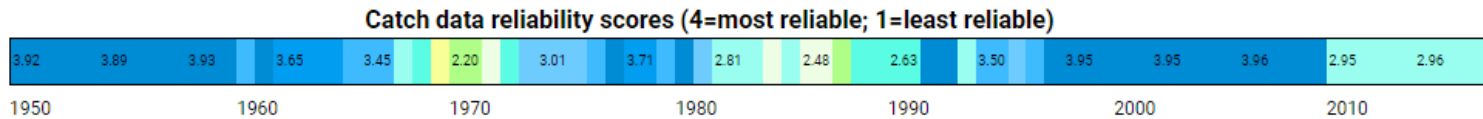
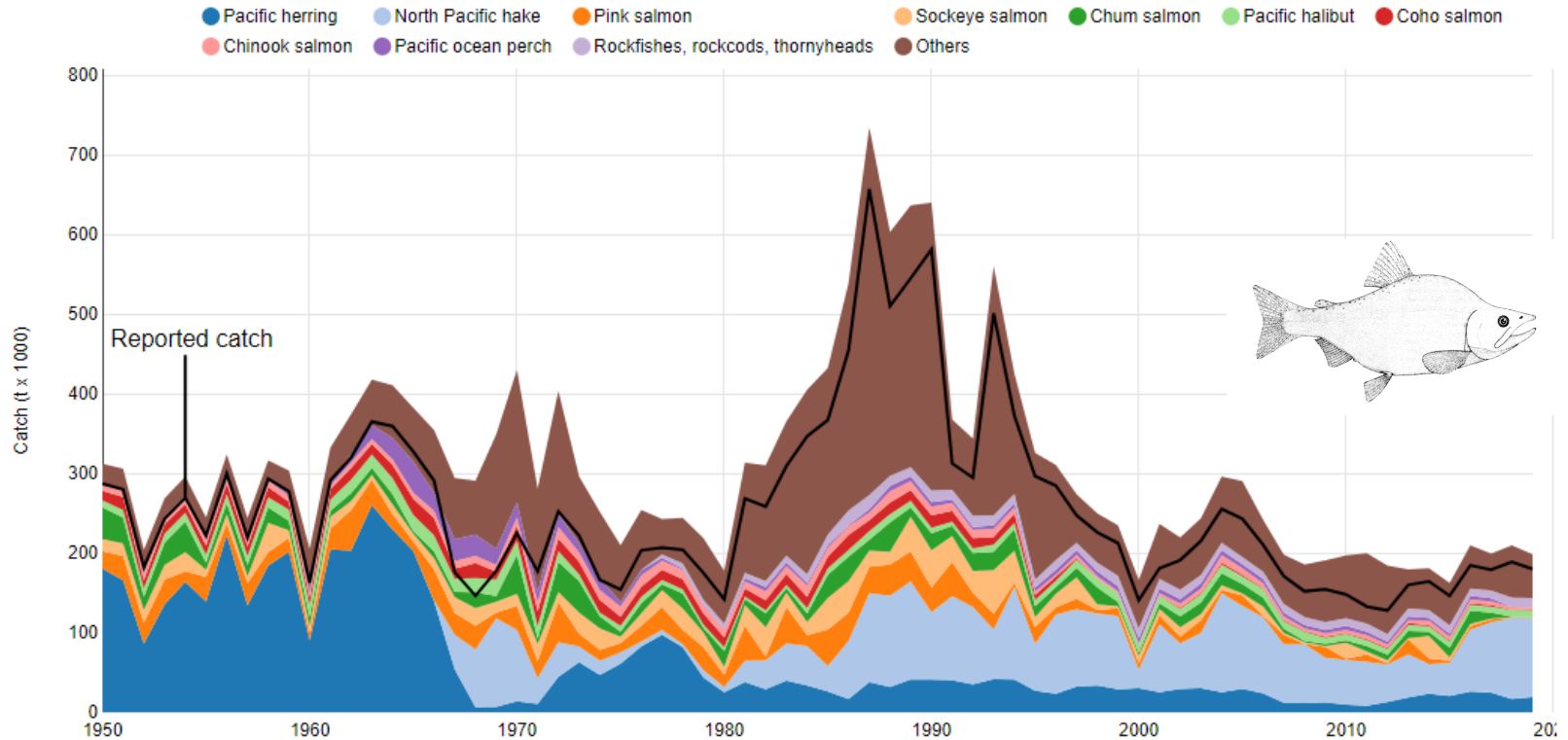
Westin Hotel
11 Colonel By Drive
Ottawa, Ontario



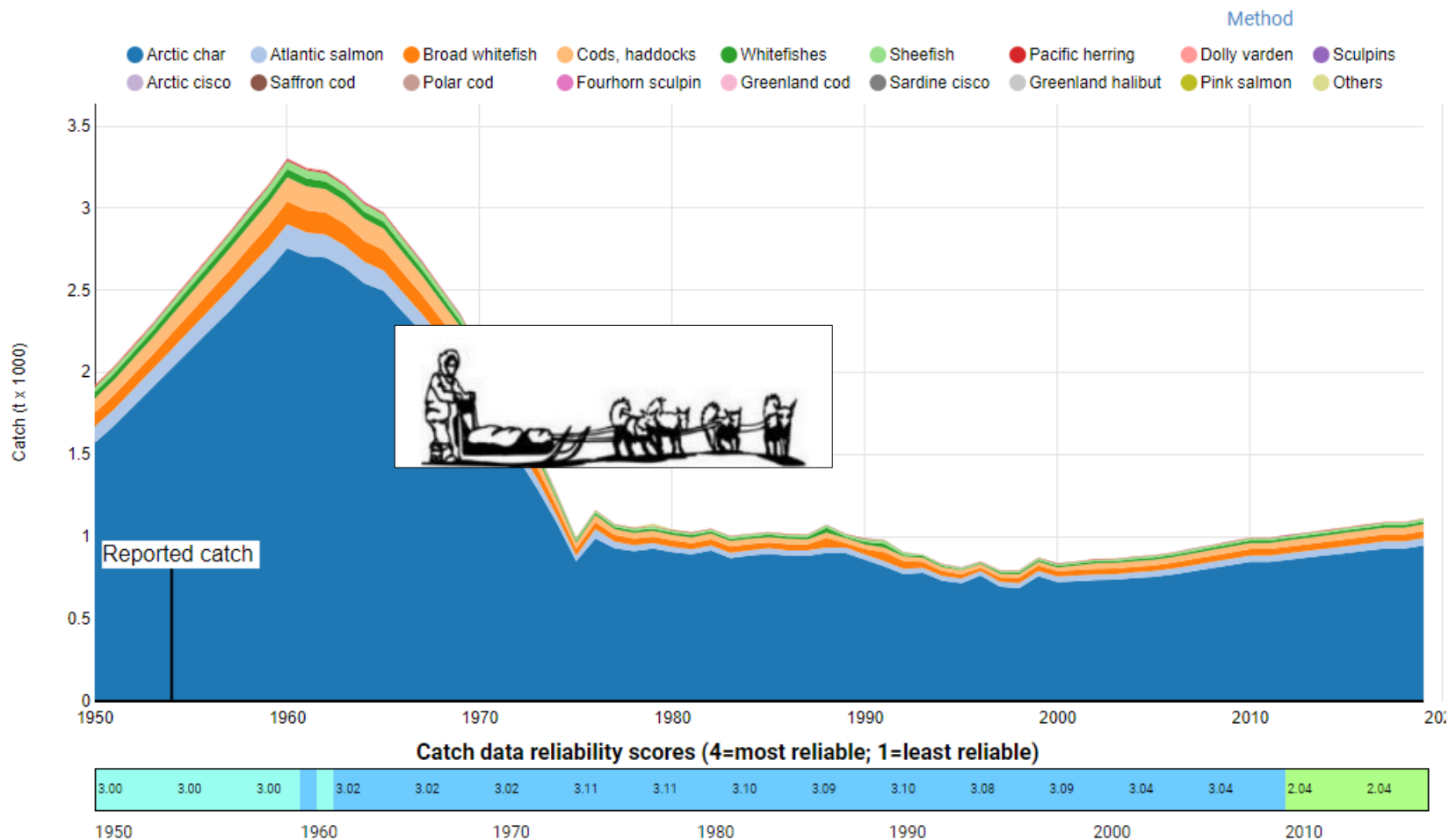
First, we assess where we are on the East Coast...



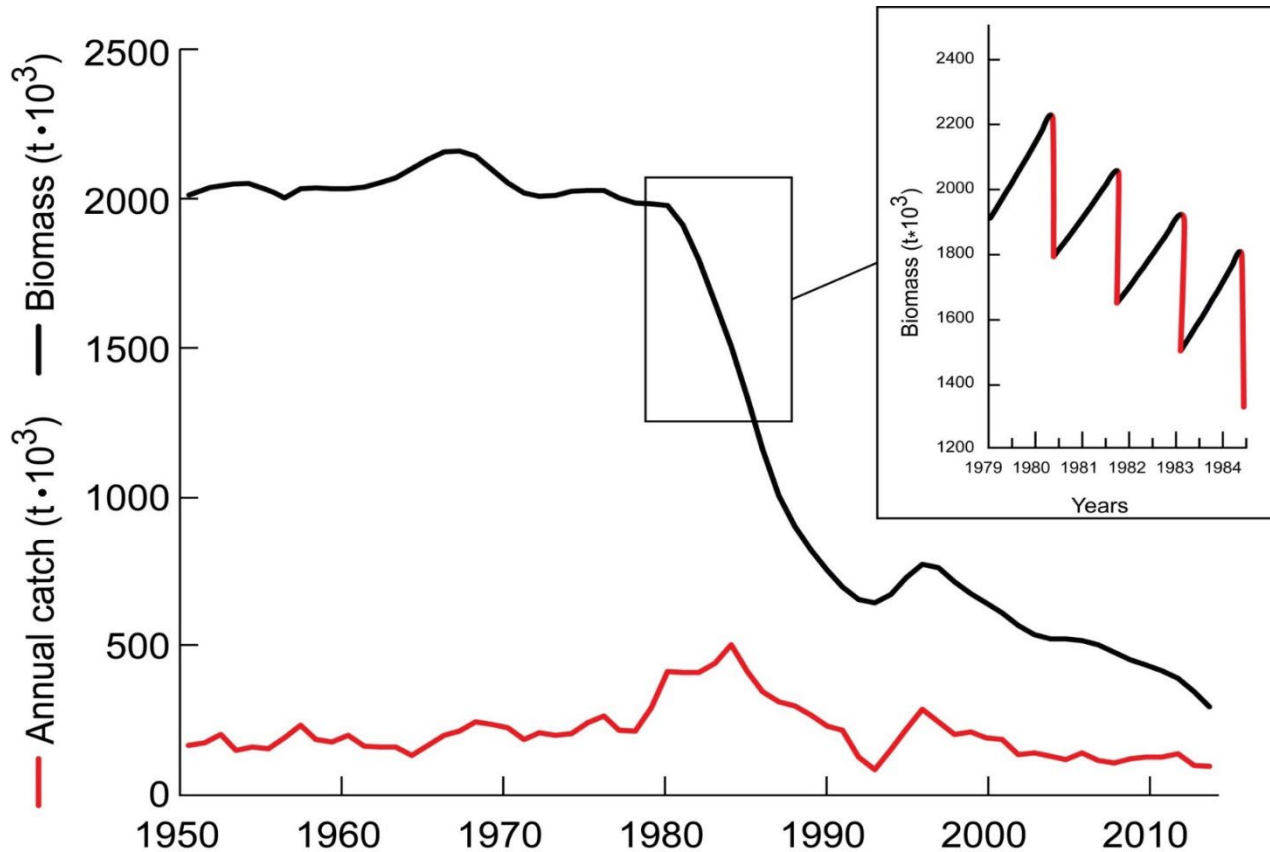
...then, on the West Coast...



And, finally in the Arctic.



Now, simple methods exist which allows assessing fished stocks throughout the world, even when detailed data are scarce. One of them is CMSY...



Food for Thought

Five centuries of cod catches in Eastern Canada

Rebecca Schijns^{1*}, Rainer Froese², Jeffrey A. Hutchings^{3,4,5}, and Daniel Pauly¹

¹Sea Around Us, Institute for the Oceans and Fisheries, The University of British Columbia, Vancouver BC V6T 1Z4, Canada

²GEOMAR Helmholtz Centre for Ocean Research, Düsterbrookweg 20, 24105 Kiel, Germany

³Dalhousie University, Halifax NS B3H 4R2, Canada

⁴Institute of Marine Research, Flødevigen Marine Research Station, N-4817 Hic, Norway

⁵Centre for Coastal Research, University of Agder, N-4604 Kristiansand, Norway

*Corresponding author: tel: 647-457-7712; e-mail: rschijns@oceans.ubc.ca

Schijns, R., Froese, R., Hutchings, J. A., and Pauly, D. Five centuries of cod catches in Eastern Canada. – ICES Journal of Marine Science, 0: 1–9.

Received 19 May 2021; revised 25 June 2021; accepted 16 July 2021.

CMSY was used to assess the historic stock of Northern cod

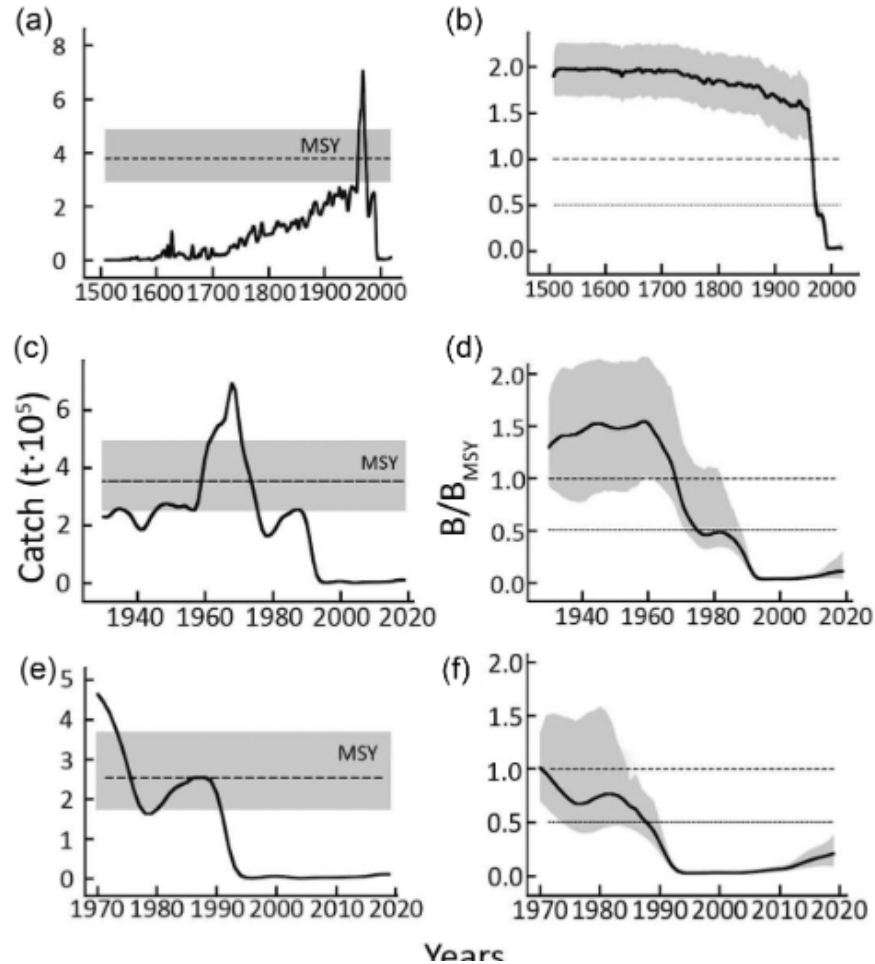
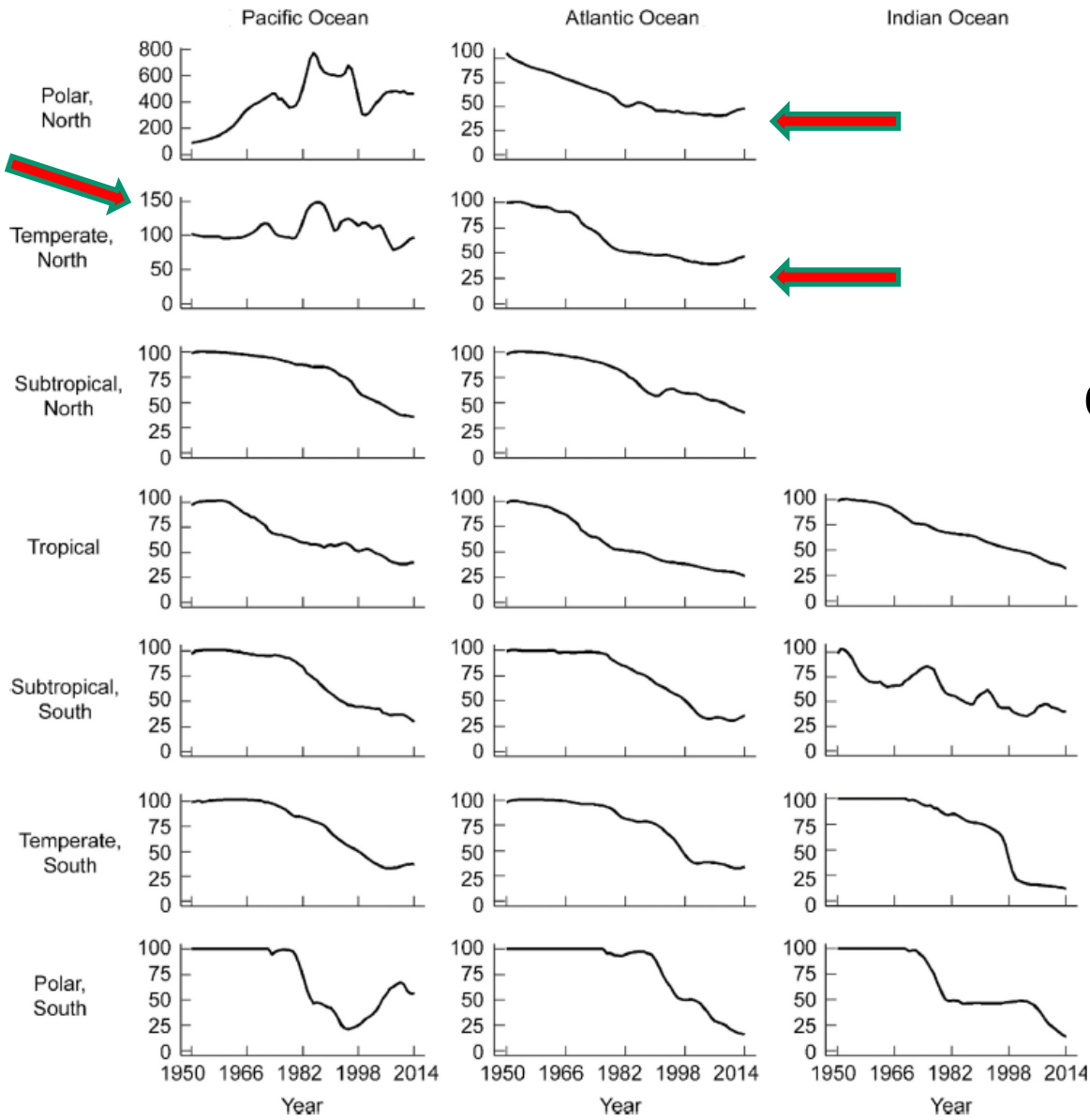


Figure 1. Catch and estimated biomass of Northern cod (*Gadus morhua*) off Eastern Canada from 1508 to 2019 (A, B), with emphasis on 1930 to 2019 (C, D) and 1970 to 2019 (E, F). The catch and relative biomass level compatible with Maximum Sustainable Yield are shown (dotted lines), along with the 95% confidence intervals.

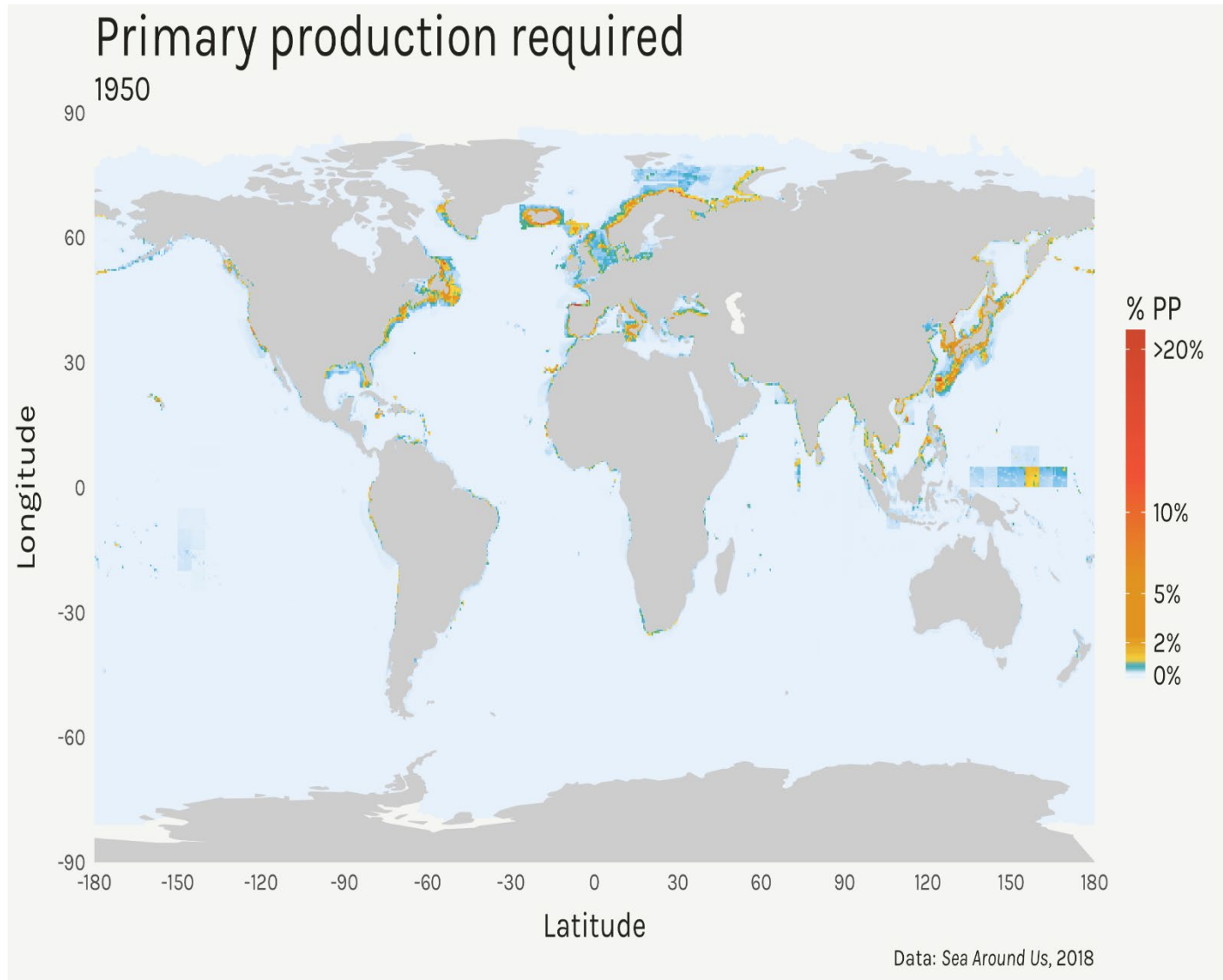


And here are the biomass trends we got for the world's oceans and climate zones

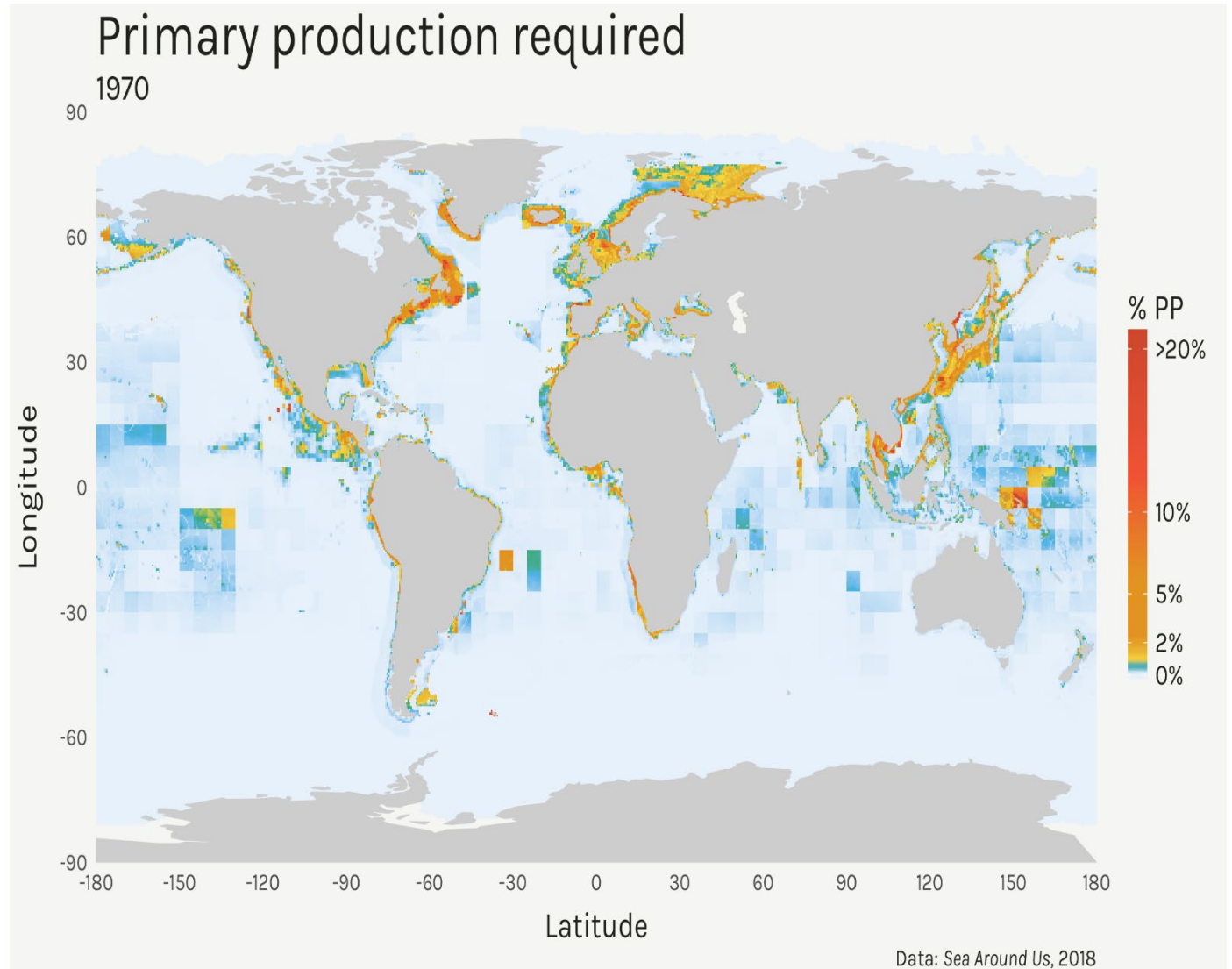
Palomares et al. 2020. *Estuarine, Coastal and Shelf Science*, doi.org/10.1016/j.css.2020.106896

Fig. 4. Relative changes in population biomass of analyzed populations over time expressed as a percentage of the average biomass at the start of the time series (1950-1954), grouped by climatic zone and ocean basin. Note that the Indian Ocean is limited to the north by the Asian continent and thus does not have any northern subtropical, temperate or polar zones.

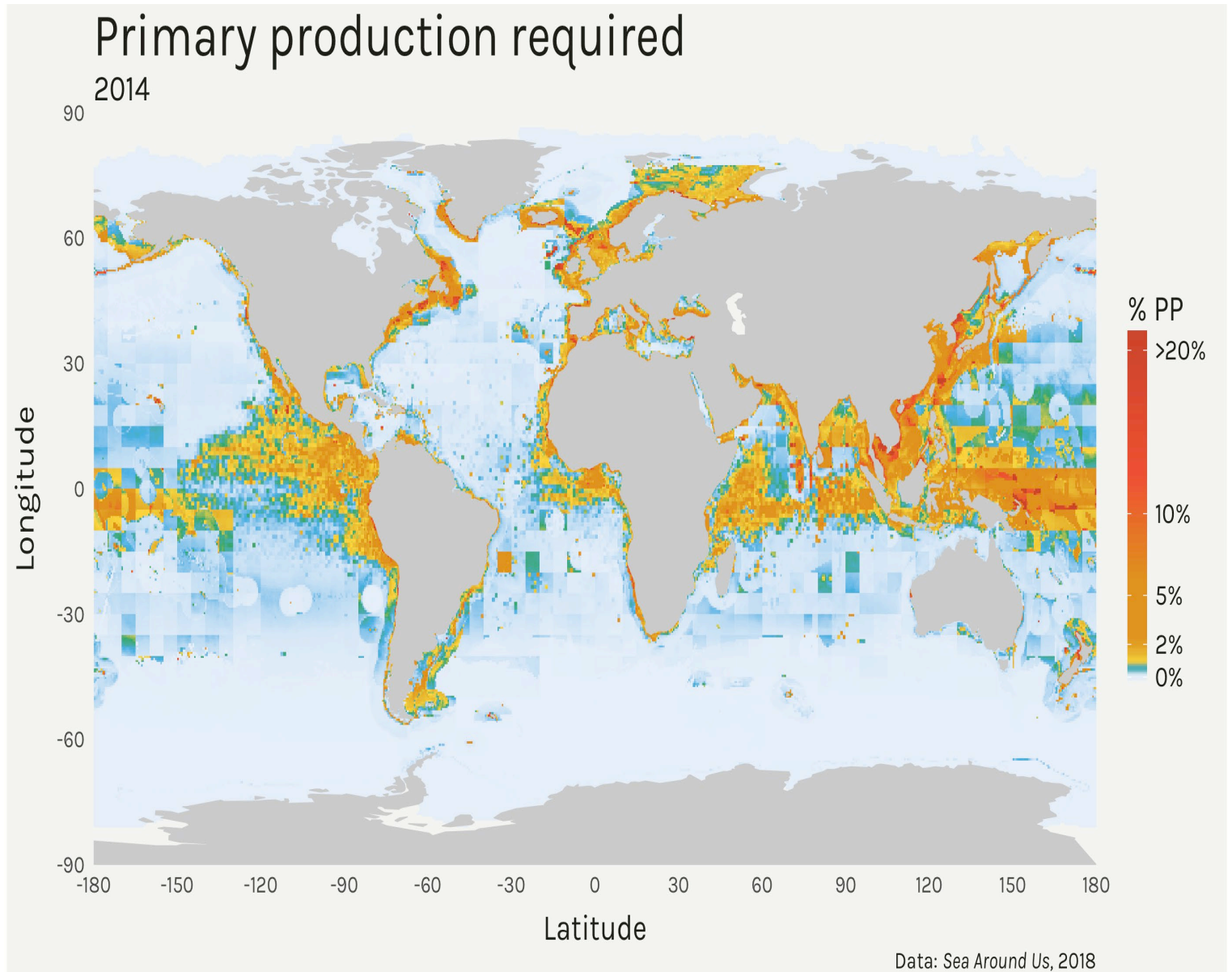
Fisheries on their own tend to expand geographically, as assessed by...



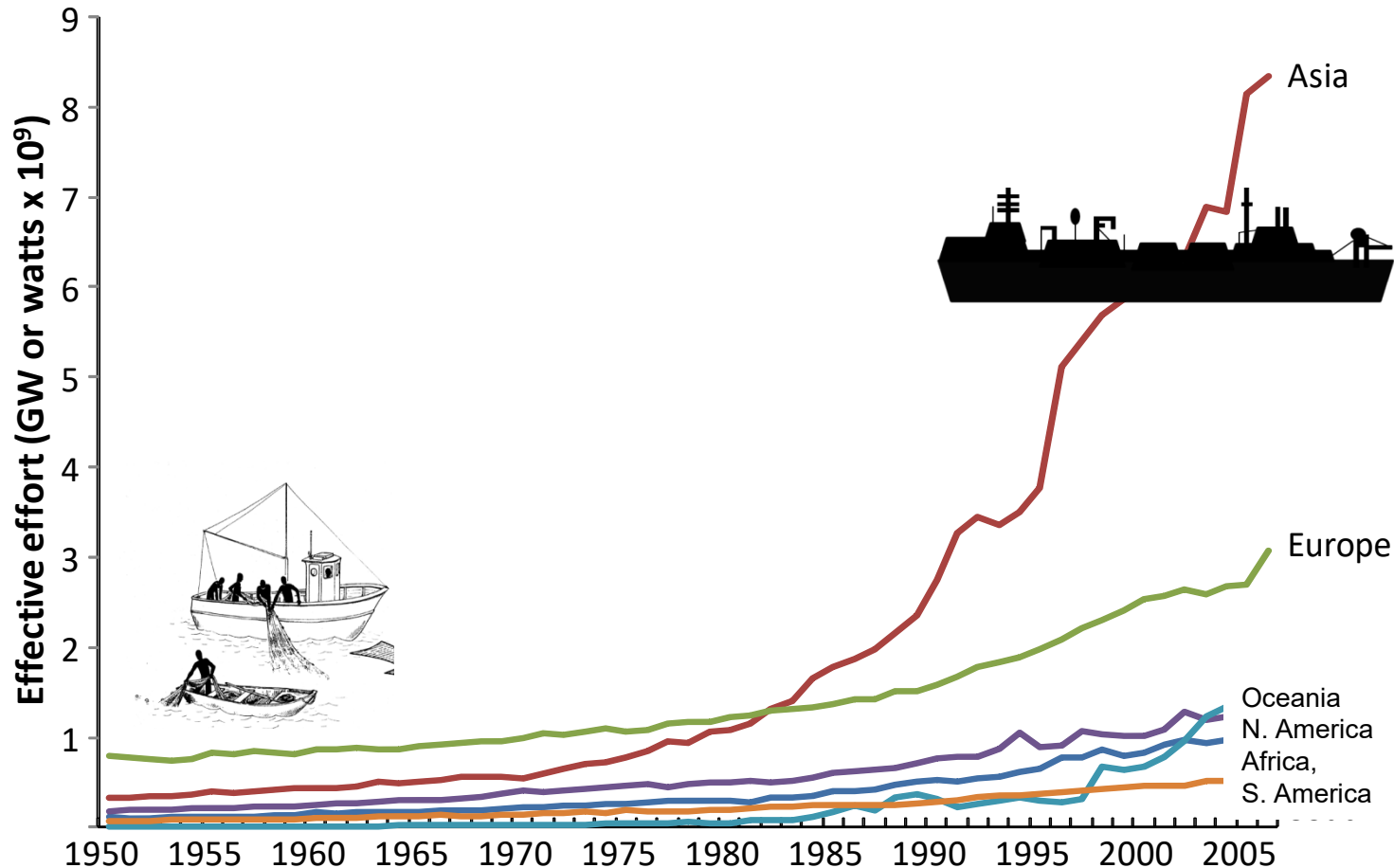
...in the 1970s...



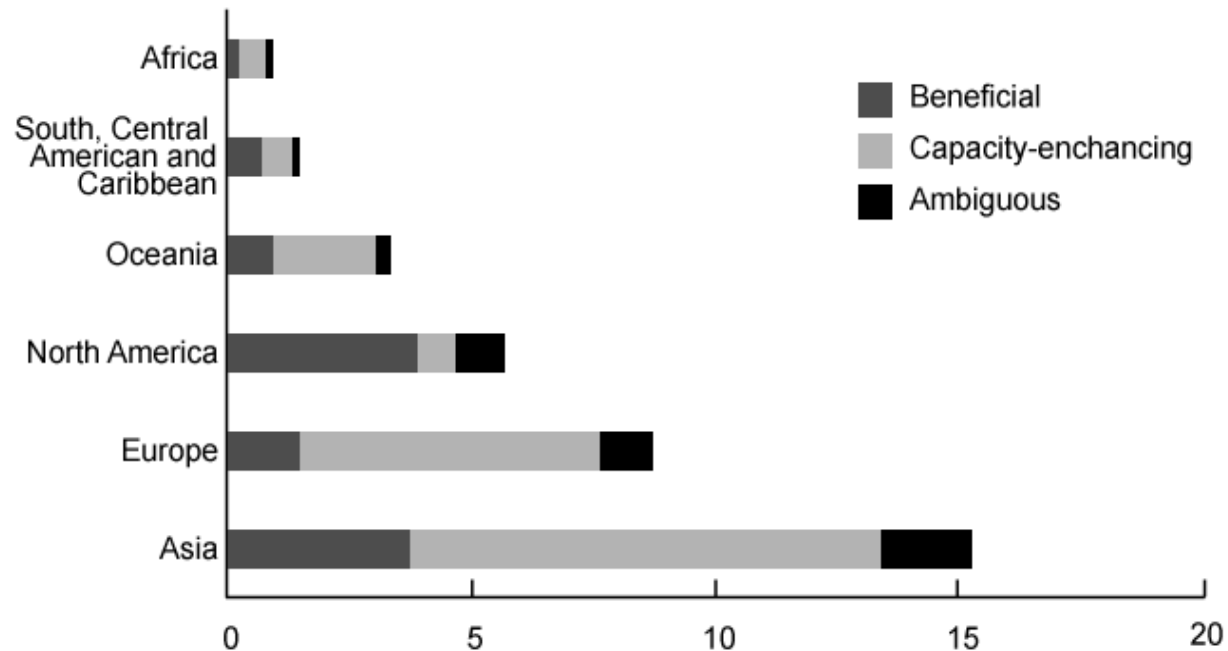
...all the way to the present.



This expansion is a result of the world's fishing fleet increasing relentlessly, notably by the distant-water fleets of a few countries...



This why fisheries must be reined in (i.e., managed).
And they should not be subsidized...

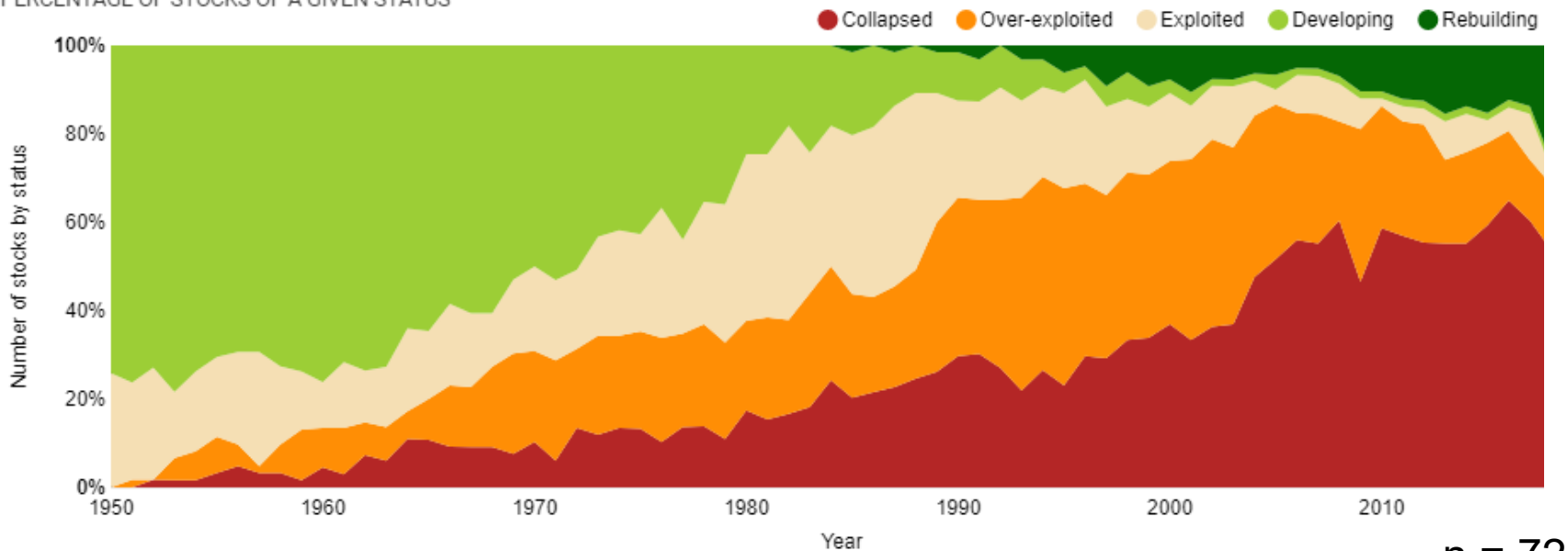


Asia is by far the greatest subsidizing region (43 % of total), followed by Europe (25 % of total) and North America (16 % of total). For all regions, the amount of capacity-enhancing subsidies is higher than other categories, except the Americas, which have higher beneficial subsidies.



One good example of rebuilding is the recovery of numerous rockfish stocks off California, resulting from the application of the Magnuson-Stevens Act.

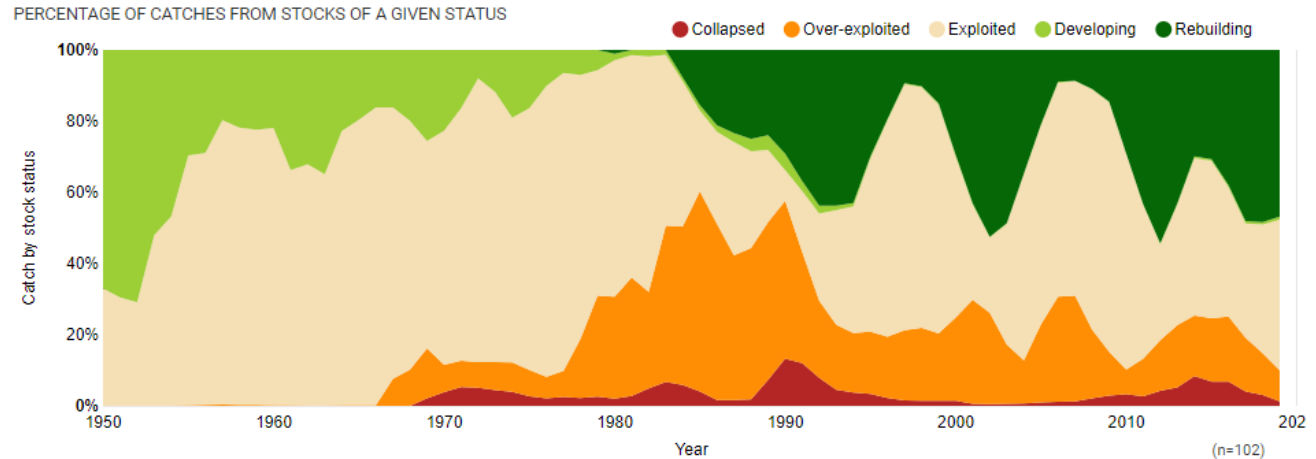
PERCENTAGE OF STOCKS OF A GIVEN STATUS



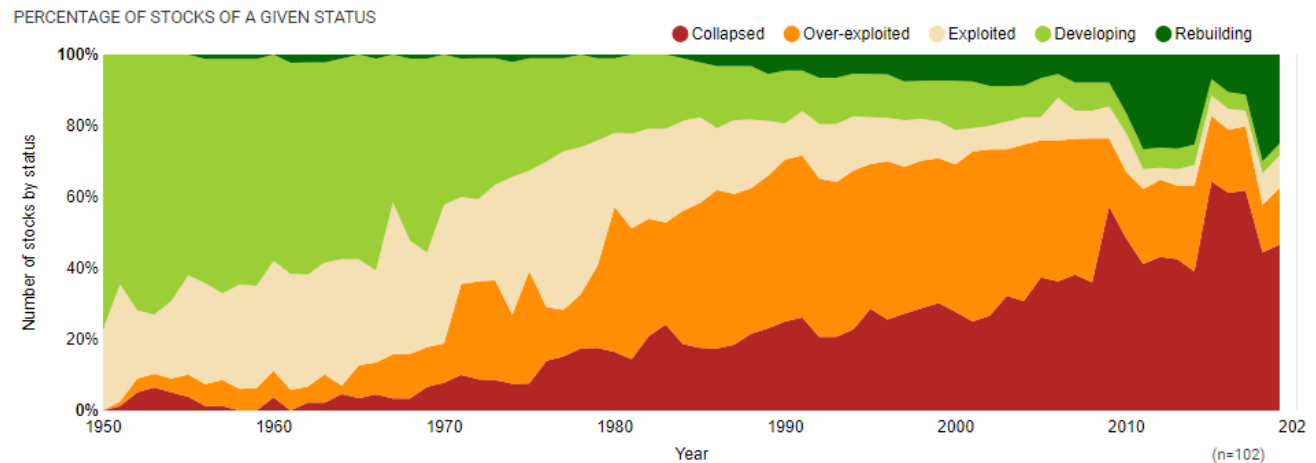
n = 72

...and in Norway, where about half of the current catch originates from rebuilt stocks

Above:
catch in weight from stocks of different status



Below:
number of stocks of different status



In principle, rebuilding is easy:

- 1) Fishing reduces the abundance of exploited stocks;
- 2) Thus, reduced or no fishing should (and does) enable stocks to recover;
- 3) But you must accept (1) and not blame the seals, or changing temperatures for what is clearly the effect of fishing;
- 4) also, stock rebuilding benefits fisheries (and biodiversity, and marine ecosystems), but you can't expect that the fishing lobby will agree (they don't even agree with 1).



Thank you!