

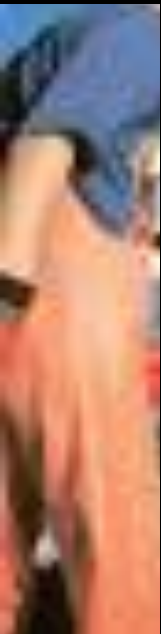


Risk to food security as a result of climate change impacts on marine ecosystems

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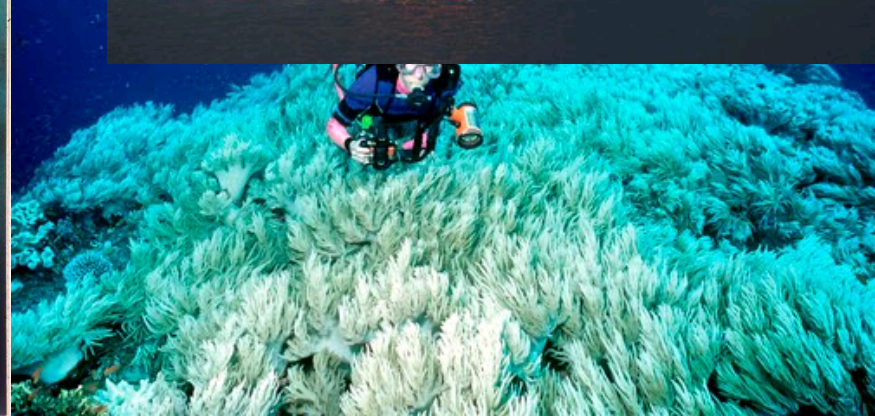
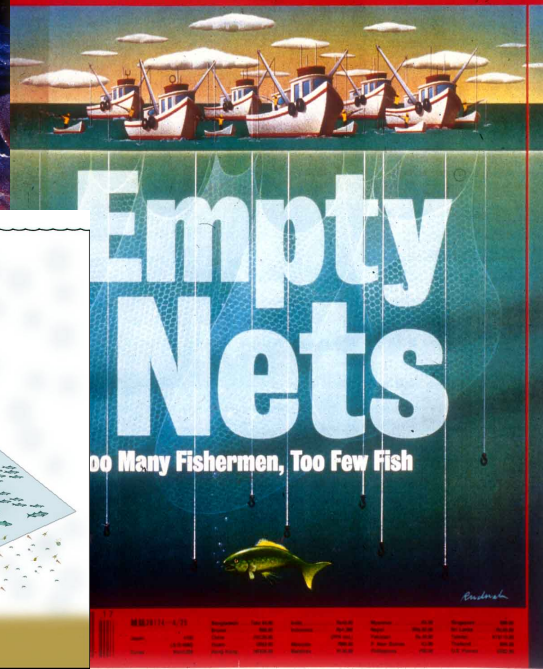
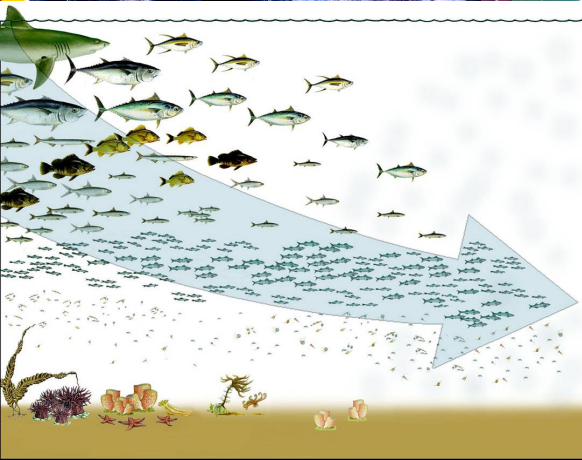
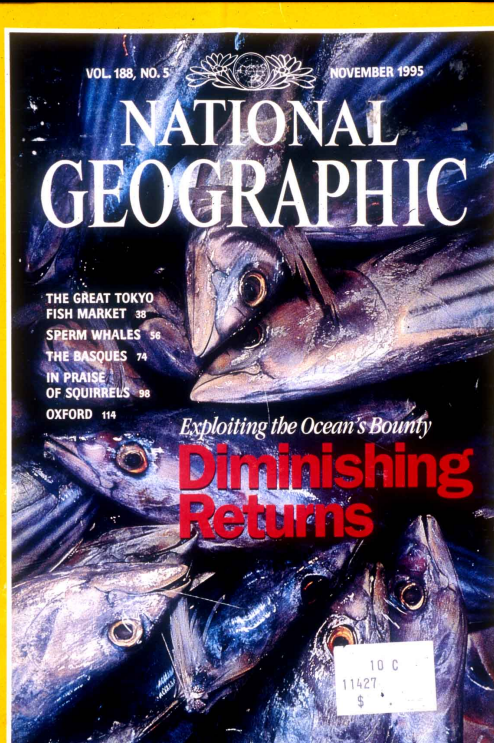
United Nations, New York, 27 May 2014



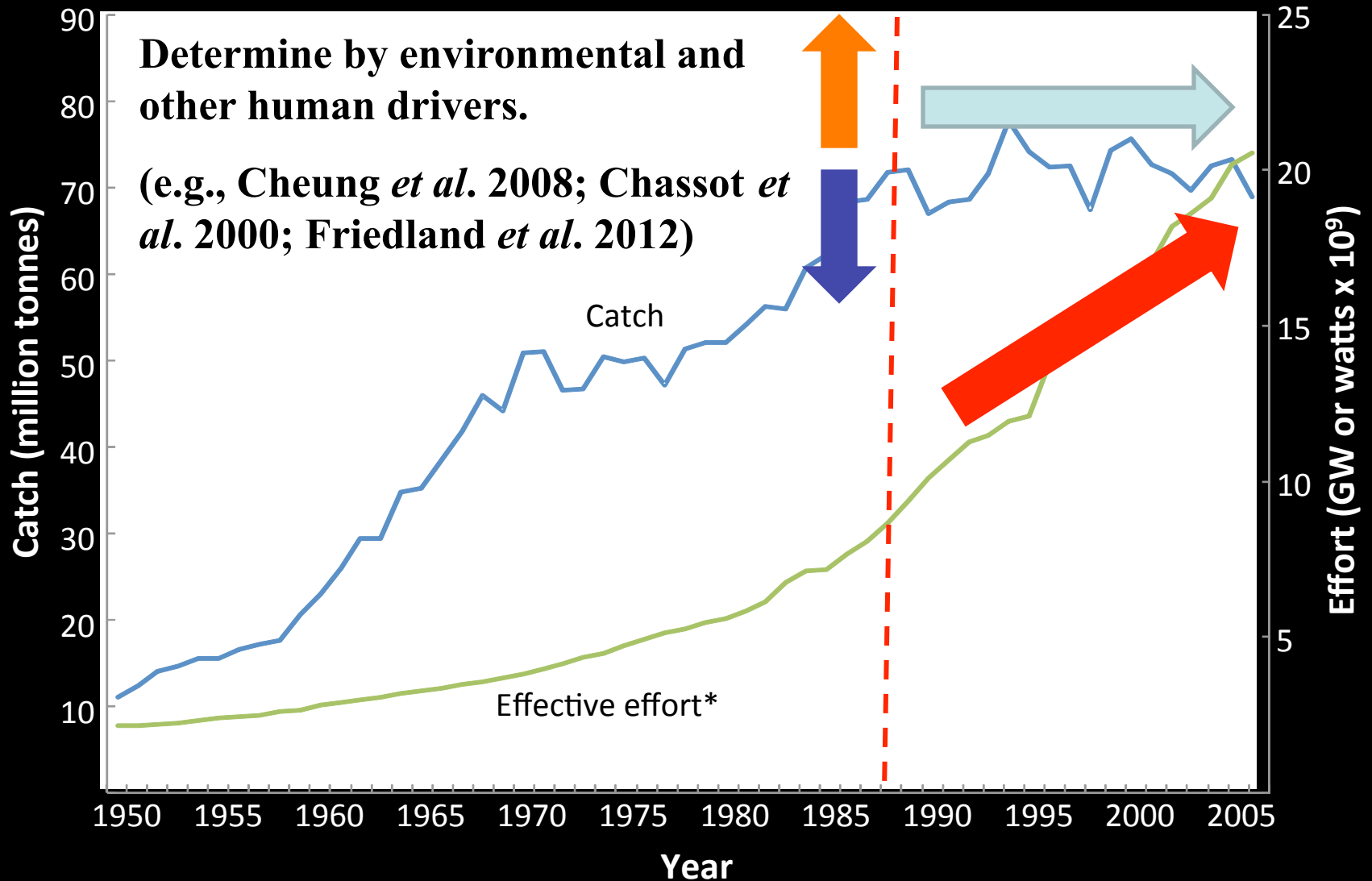
Key focus of this talk

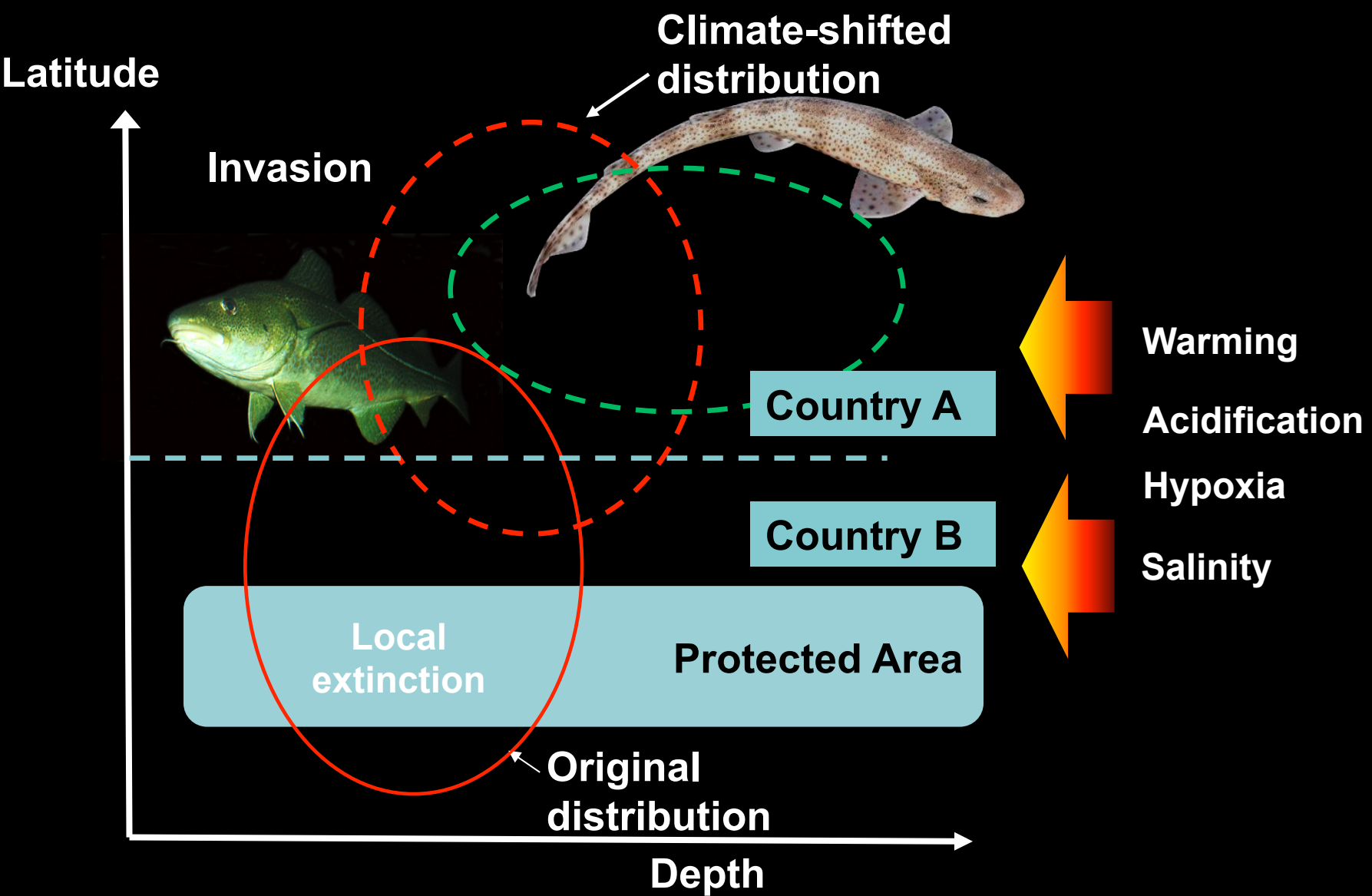
- Ocean changes are altering the distribution, body size and abundance of marine species;
- This affects food security through redistributing fish catches; this affects commercial, subsistence and culturally important fisheries;
- Tropical regions are projected to reduce in catch and species diversity;
- Vulnerable ecosystems such as coral reefs are already being threatened;
- These impacts are not likely to fully avoided through adaptation.

Human impacts on marine ecosystems



Limit to global fisheries production



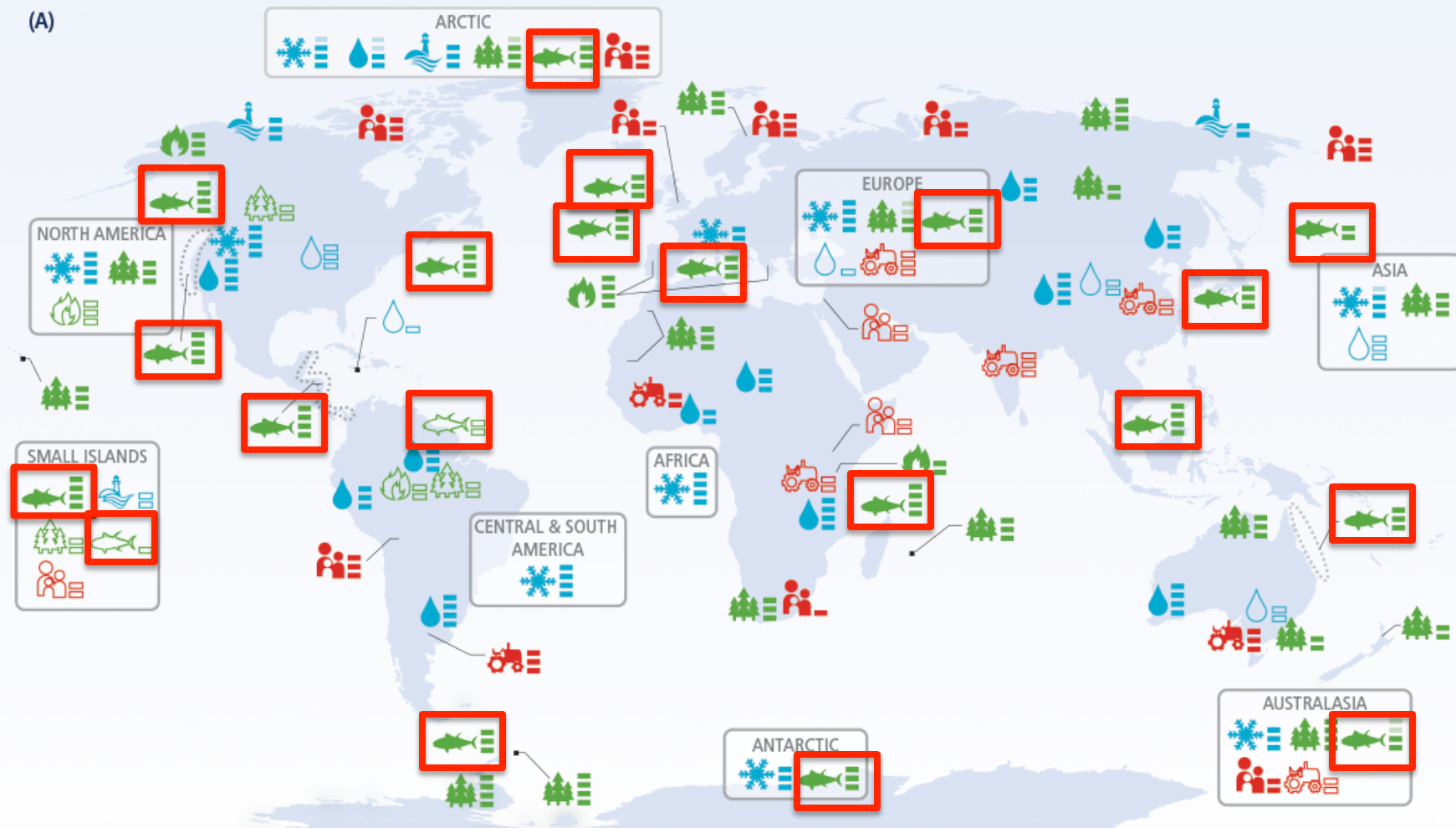


Key findings from Intergovernmental Panel on Climate Change (IPCC)

- Marine species have shifted their distributions, seasonal activities, migration patterns, and abundance, and have demonstrated altered species interactions;



(A)



Confidence in attribution to climate change

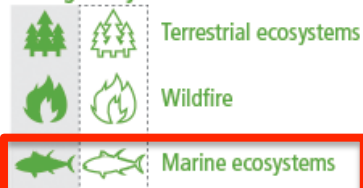


Observed impacts attributed to climate change for

Physical systems



Biological systems



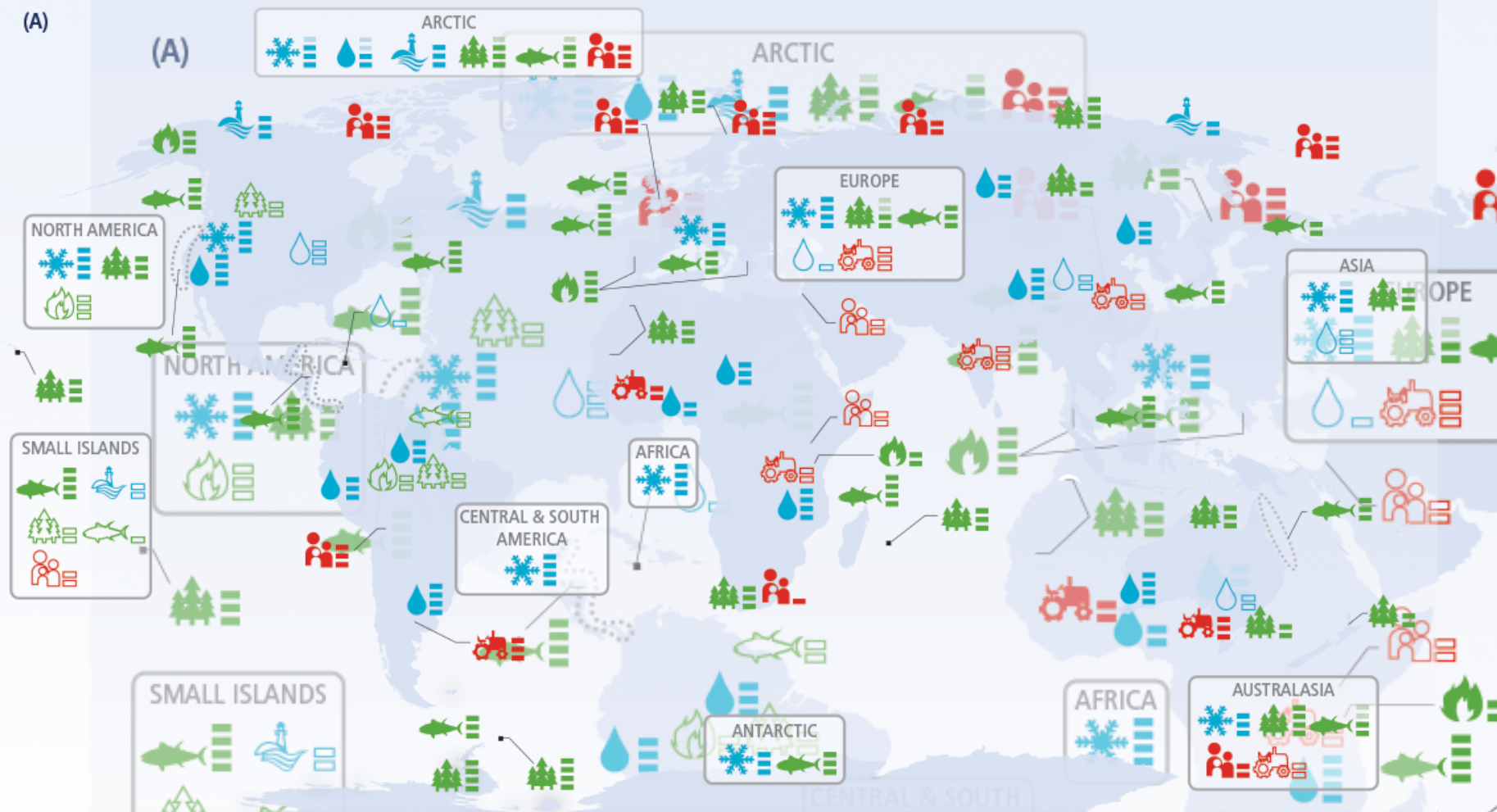
Human and managed systems



Regional-scale impacts

Outlined symbols = Minor contribution of climate change
Filled symbols = Major contribution of climate change

(A)



Confidence in attribution to climate change

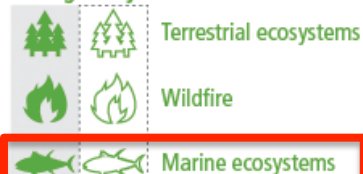


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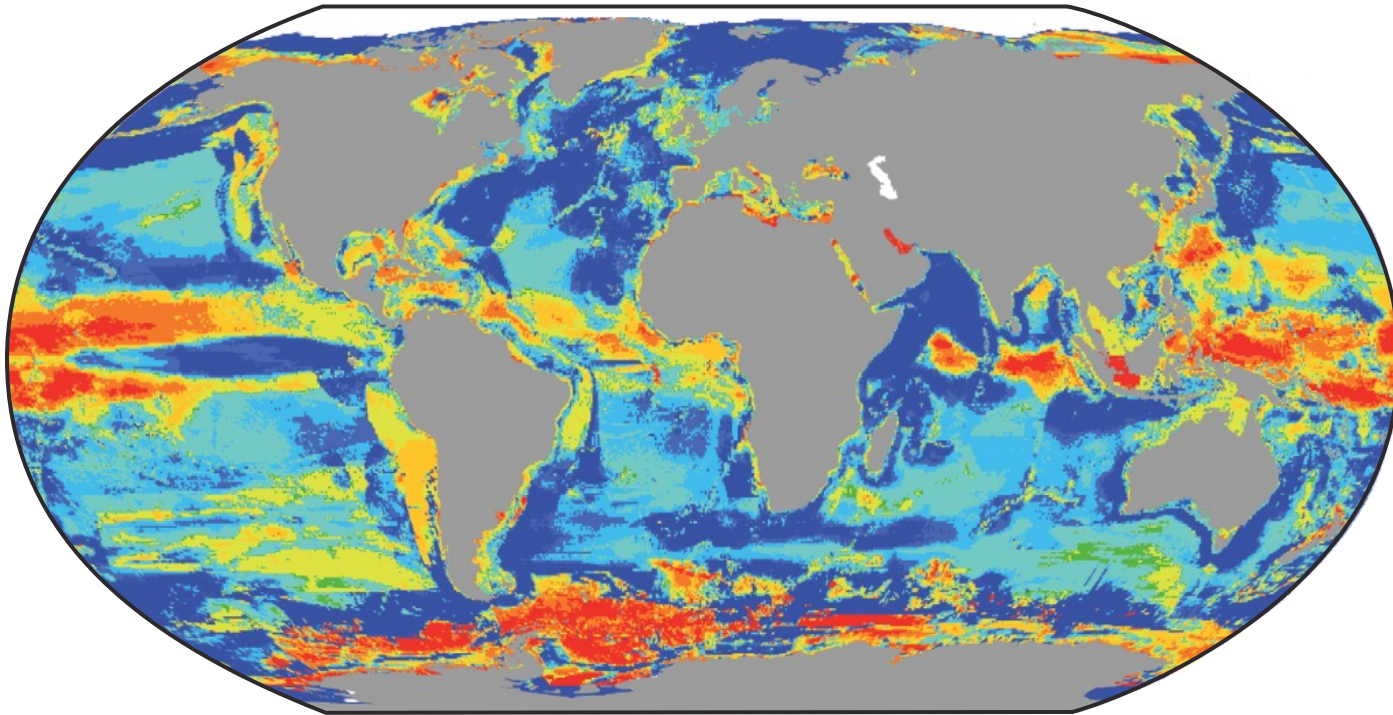
Regional-scale impacts

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Redistribution of fisheries catches

- By mid-21st century, climate change is expected to result in global redistribution of catch for fishes and invertebrates, with implications for food security.

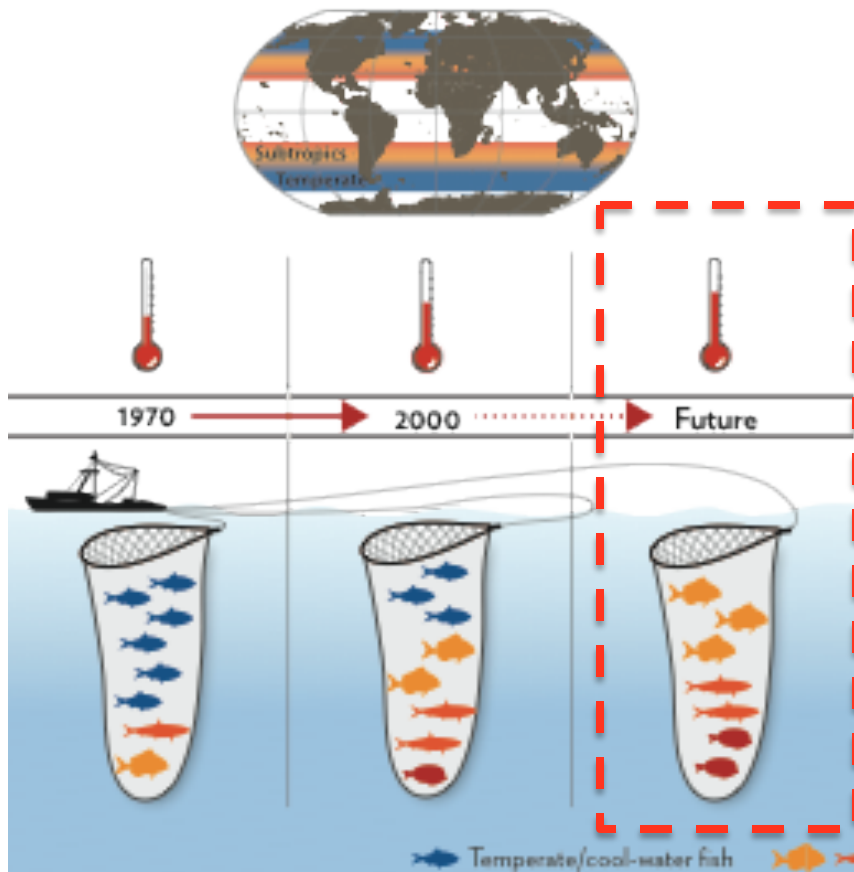
CHANGE IN MAXIMUM CATCH POTENTIAL (2051-2060 COMPARED TO 2001-2010, SRES A1B)



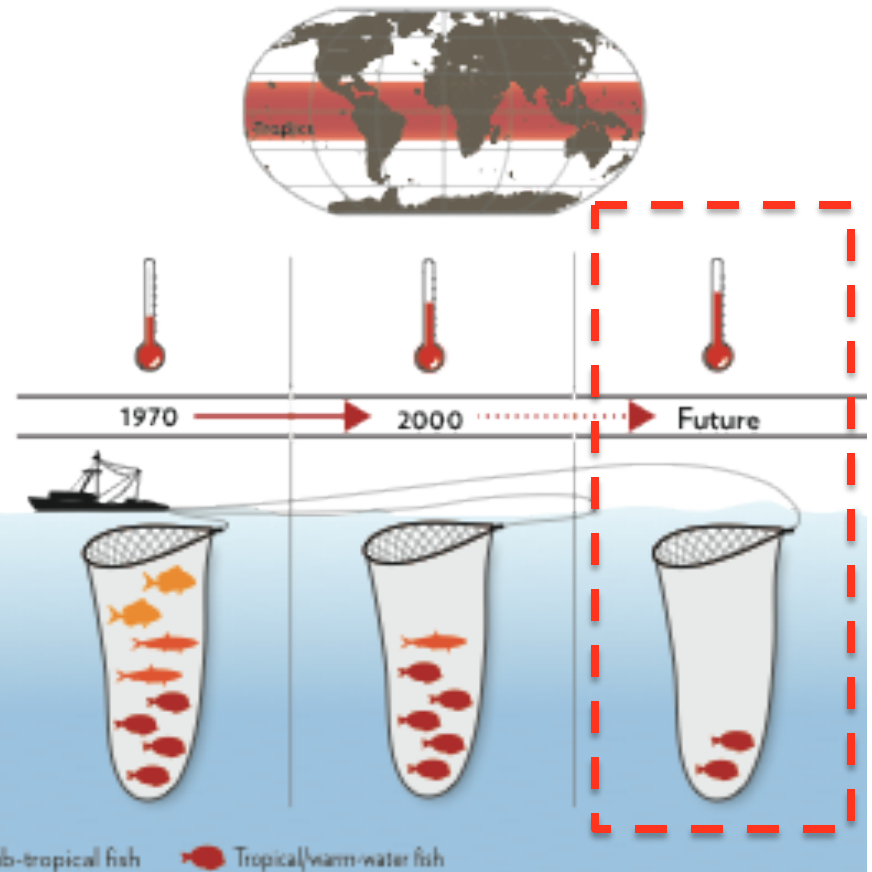
Changes in catch composition

Species from warmer waters are replacing those that are traditionally caught in fisheries worldwide.

Sub-tropics and temperate ocean

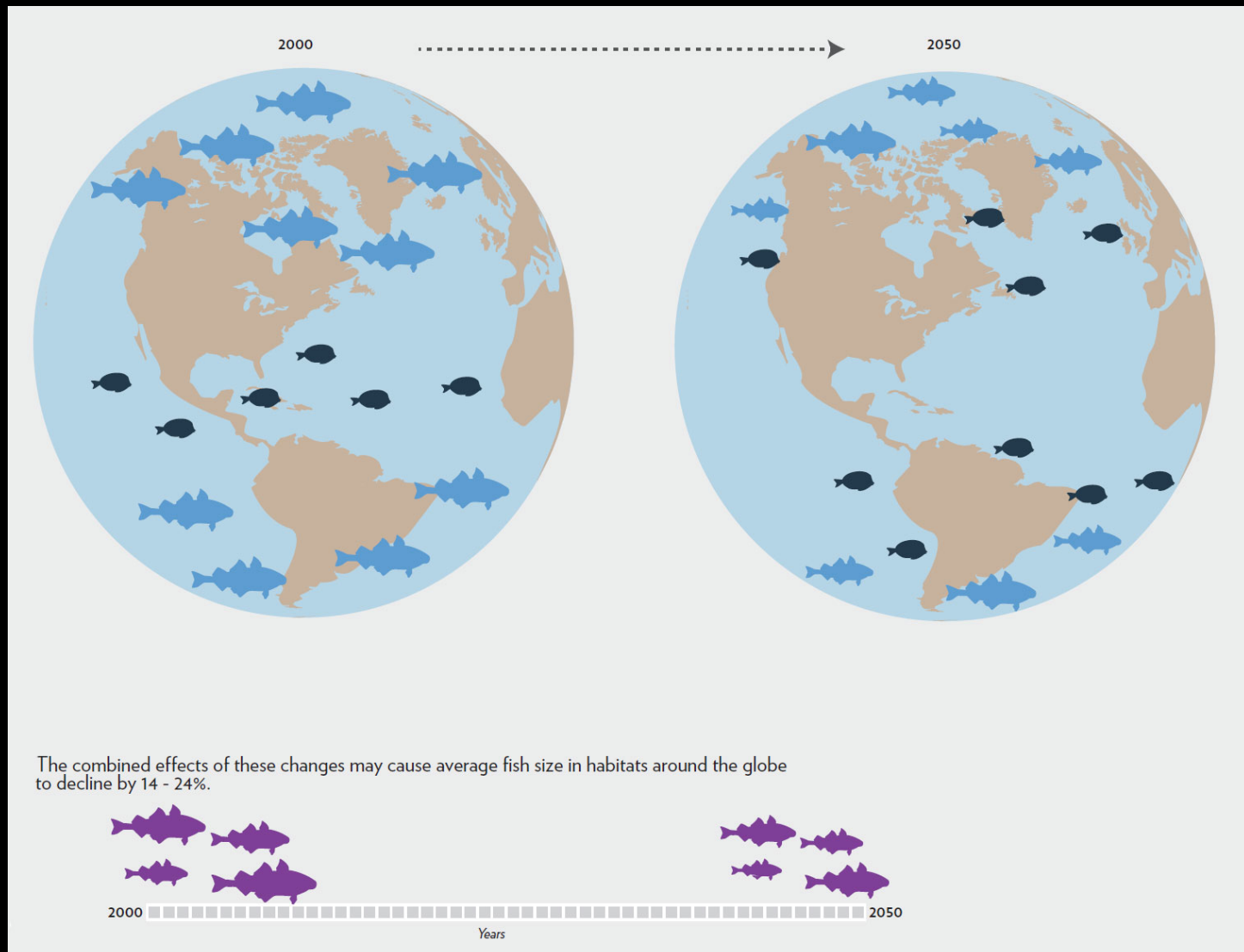


Tropics



Based on Cheung *et al.* (2013) *Nature*; Graphic: Pew Charitable Trust.

Projected decreases in maximum body size of fishes



Vulnerable ecosystems – coral reef

- Coral reefs are already being impacted by extreme events (extreme warm waters, storms) and other human impacts;
- Projected warming and ocean acidification will eliminate some coral reef ecosystems (e.g., mass coral bleaching and mortality) and increase risks and vulnerabilities to coastal livelihoods and food security.

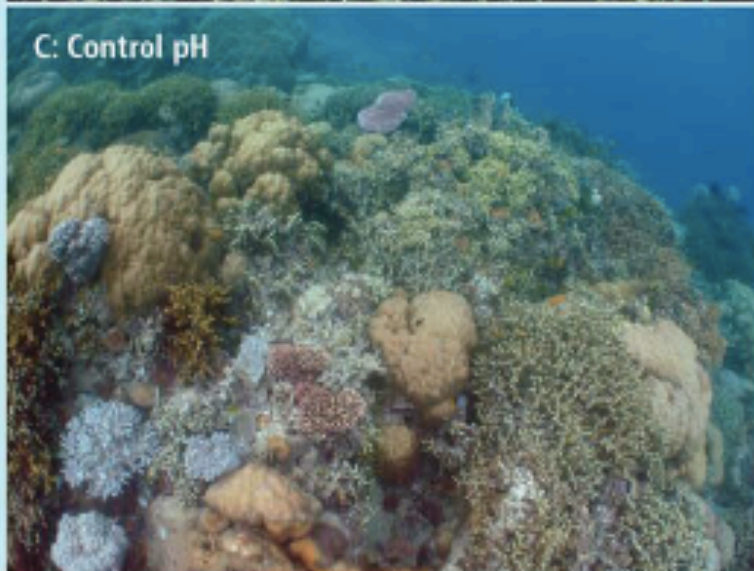
A: Before bleaching



B: After bleaching



C: Control pH



E

D: Low pH



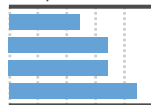
F

Risk-adaptation

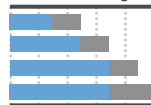
- With continuing climate change, local adaptation measures or a reduction in human activities, may not sufficiently offset global-scale effects on marine ecosystems (IPCC AR5 WGII).

POLAR REGIONS

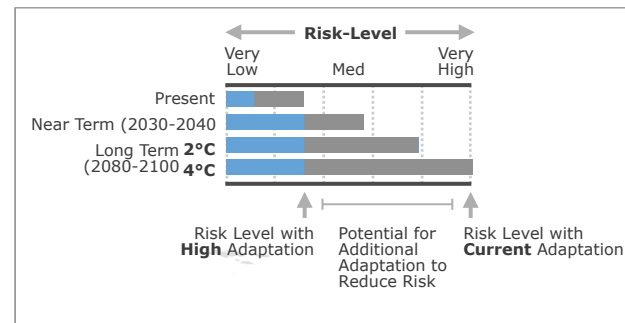
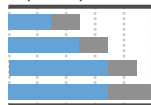
Risks for Ecosystems



Risks for Health and Well-Being

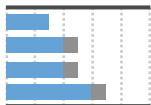


Unprecedented Challenges, Especially from Rate of Change

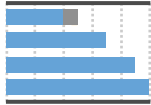


THE OCEAN

Reduced Fisheries Catch Potential at Low Latitudes



Increased Mass Coral Bleaching and Mortality

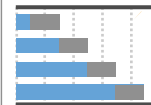


Coastal Inundation and Habitat Loss

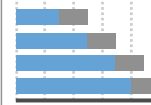


SMALL ISLANDS

Loss of Livelihoods, Settlements, Infrastructure, Ecosystem Services, and Economic Stability

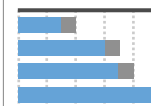


Risks for Low-Lying Coastal Areas



AUSTRALASIA

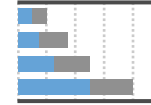
Significant Change in Composition and Structure of Coral Reef Systems



Increased Flood Damage to Infrastructure and Settlements



Increased Risks to Coastal Infrastructure and Low-Lying Ecosystems



Vulnerable groups e.g., indigenous community

- Costal indigenous populations are highly dependent on marine fisheries resources and as result, disproportionately vulnerable to environmental changes;
- Despite the high vulnerability of these communities, we have limited knowledge of their scale and impact with an account for their socio-cultural sensitivity.

Summary

- Ocean changes are altering the distribution, body size and abundance of marine species;
- This affects food security through redistributing fish catches; this affects commercial, subsistence and culturally important fisheries;
- Tropical regions are projected to reduce in catch and species diversity;
- Vulnerable ecosystems such as coral reefs are already being threatened;
- These impacts are not likely to fully avoided through adaptation, highlighting the need for reducing greenhouse gas emission.