

THE WORKING GROUP II

CONTRIBUTION TO THE IPCC'S FIFTH ASSESSMENT REPORT

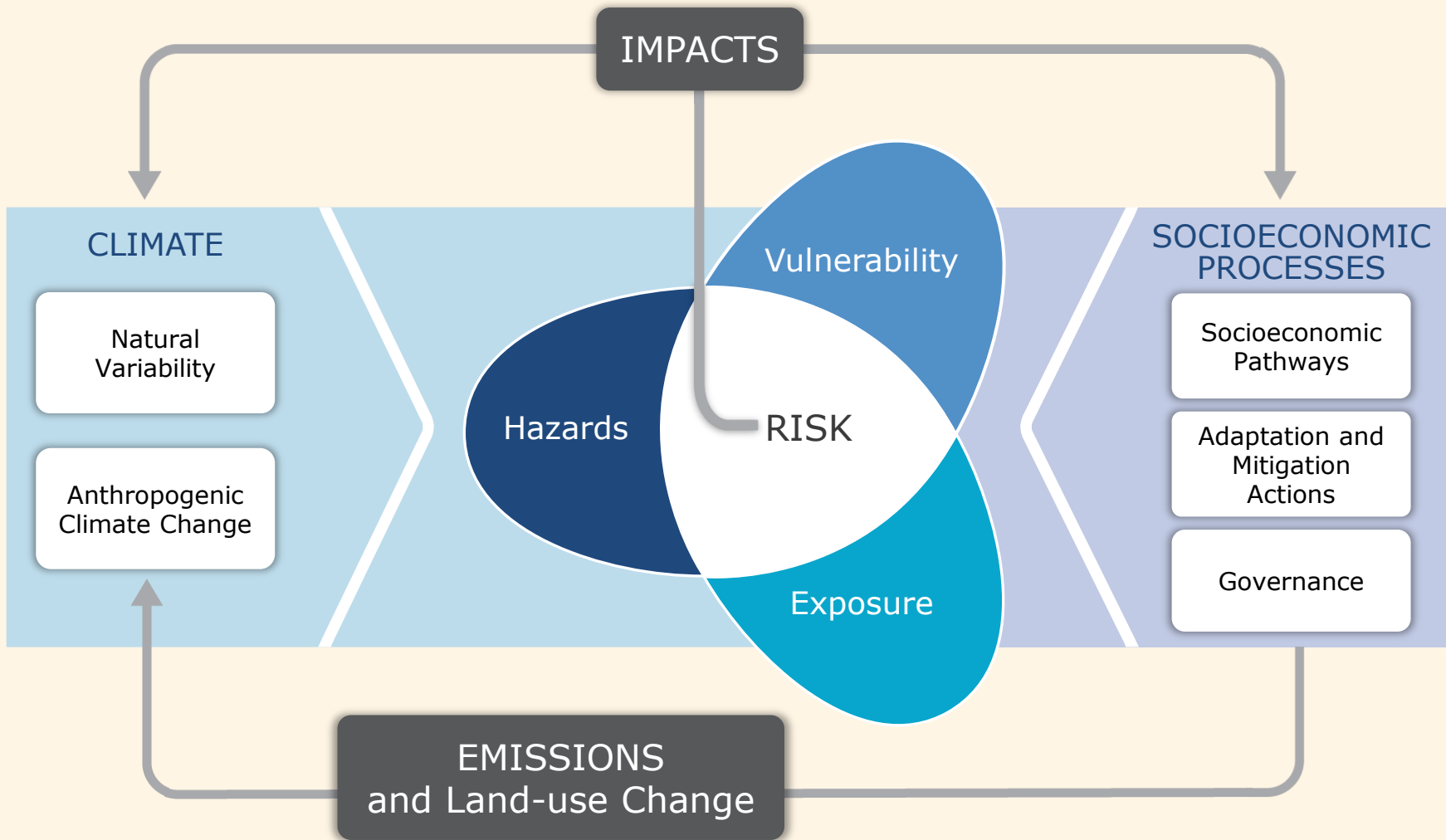
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LA SPM W2
CLA Chapter 27 WG2

CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY

KEY MESSAGES

- Climate change is already causing harm.
- The more we warm the climate the more risks we will face including the possibility of Irreversible damage.
- Effective and inclusive climate-change adaptation can help build a richer more resilient world in the near-term and beyond.



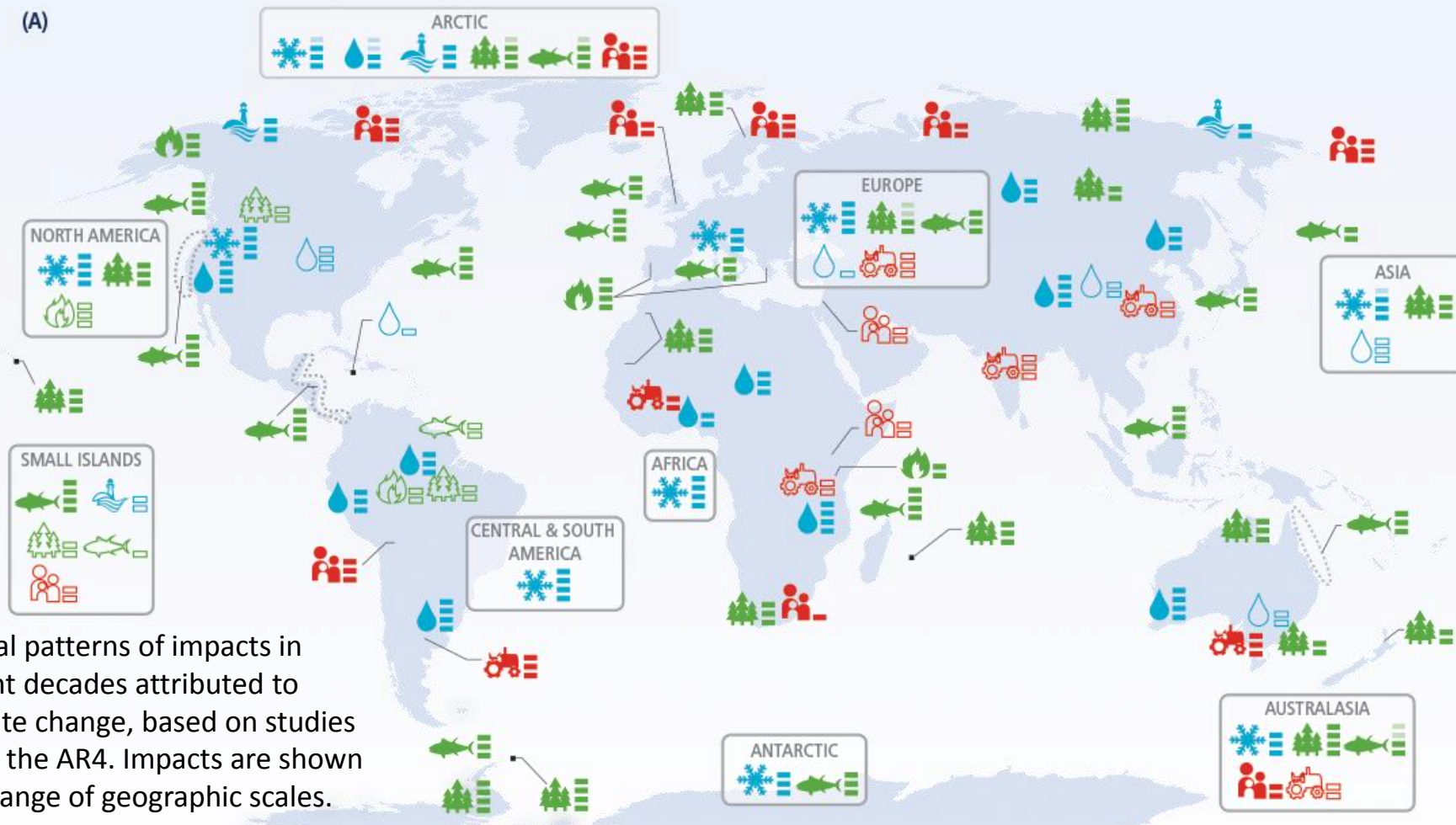




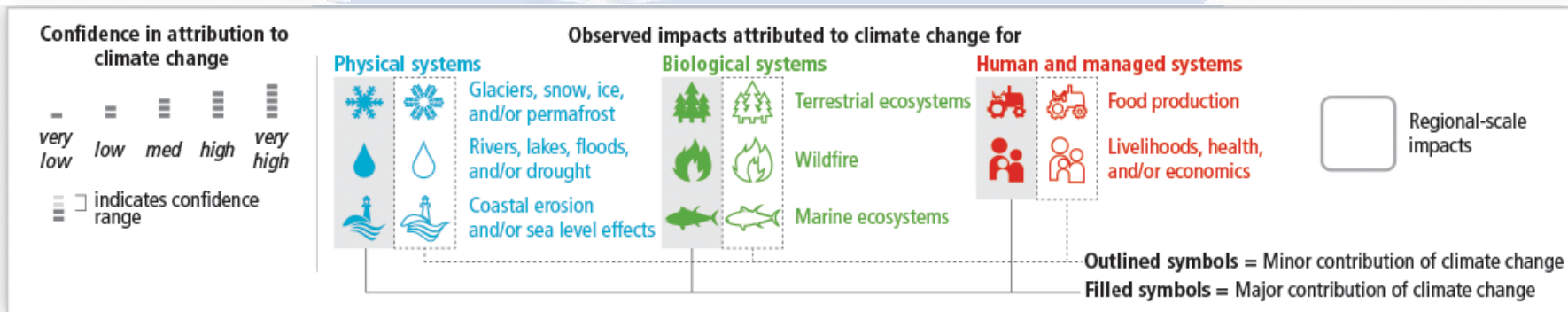
**WIDESPREAD
OBSERVED IMPACTS**

A CHANGING WORLD

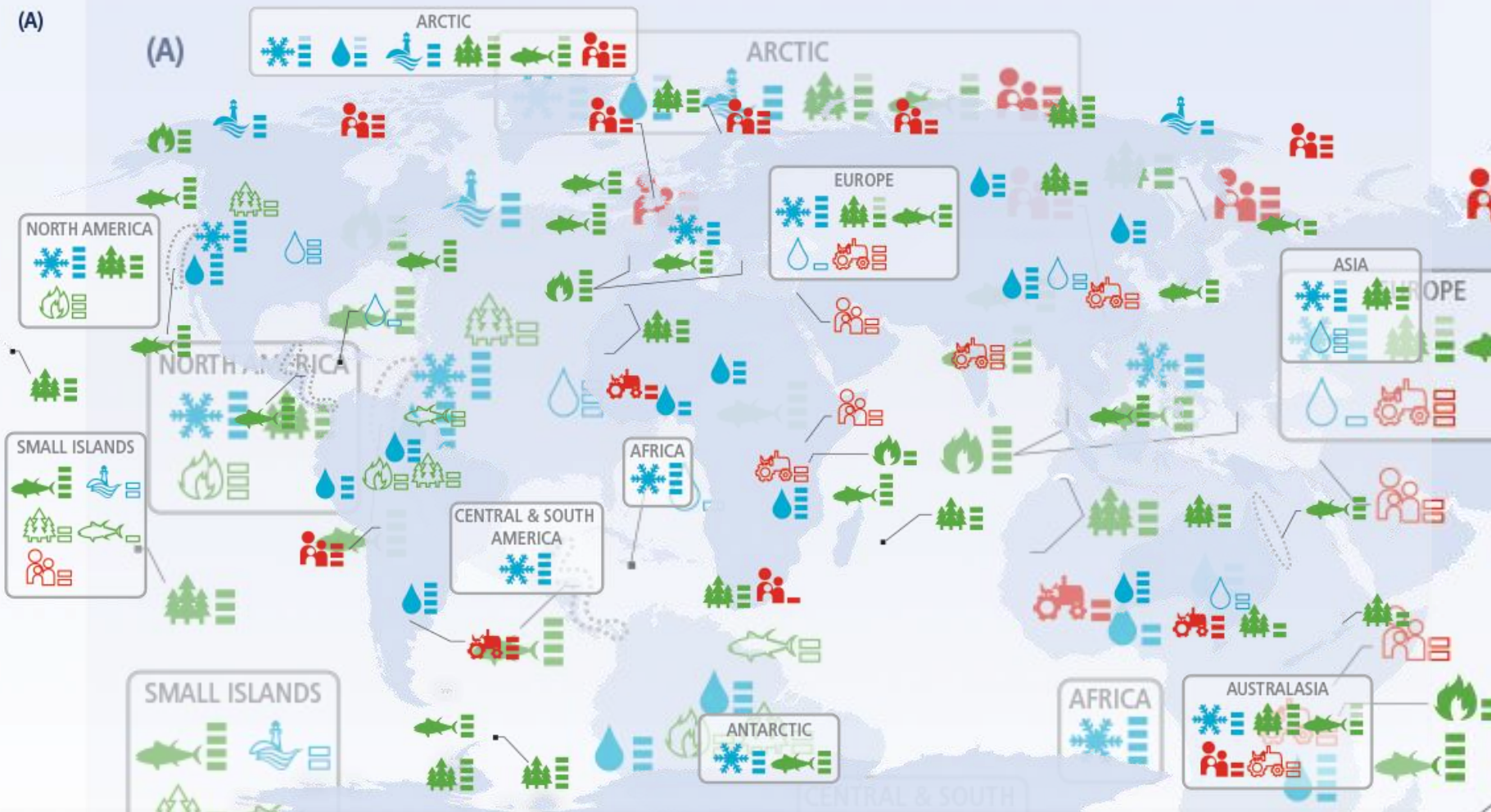
(A)



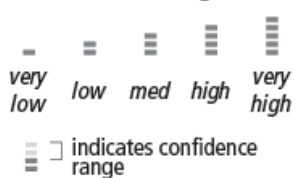
Global patterns of impacts in recent decades attributed to climate change, based on studies since the AR4. Impacts are shown at a range of geographic scales.



(A)



Confidence in attribution to climate change

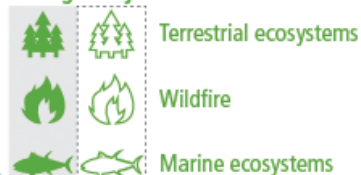


Observed impacts attributed to climate change for

Physical systems



Biological systems



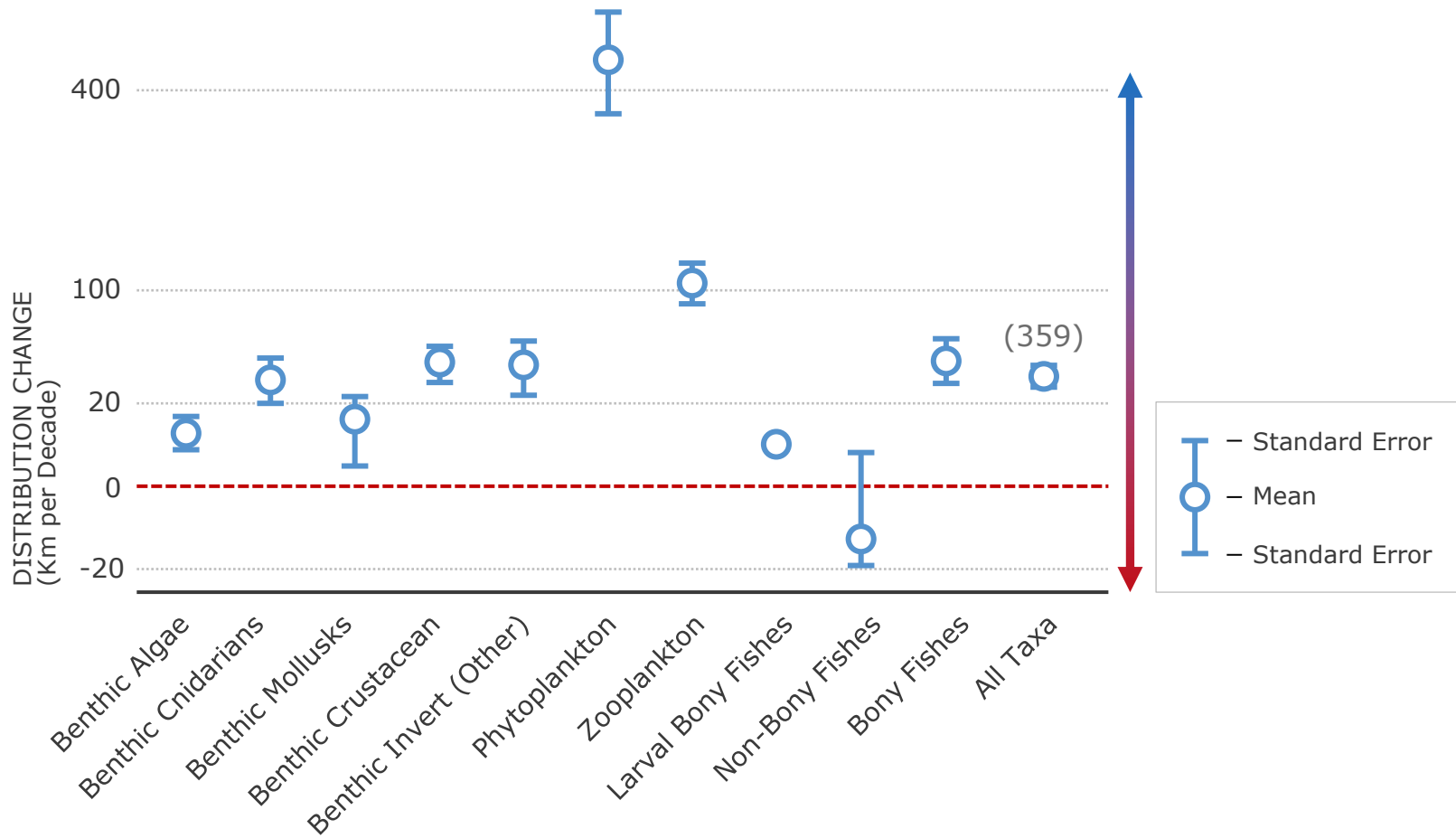
Human and managed systems



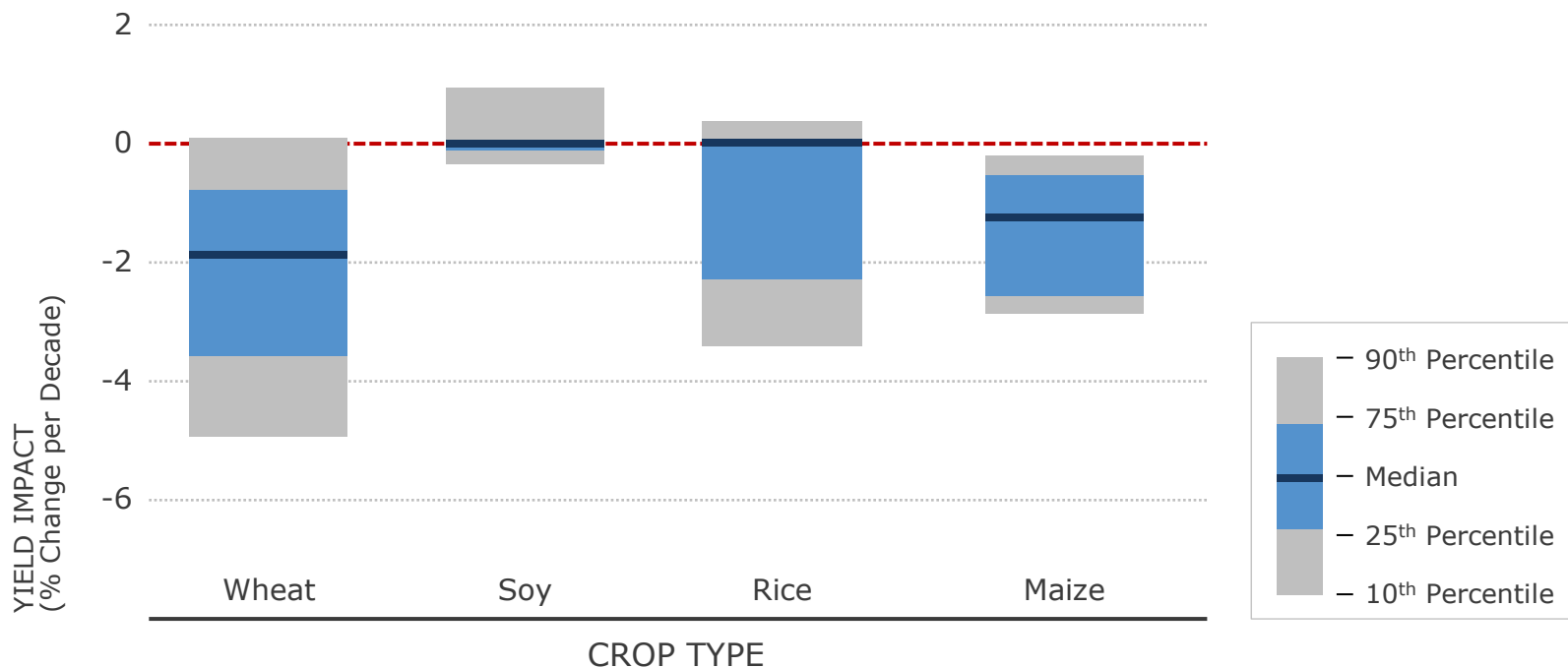
▭ Regional-scale impacts

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

Average rates of change in distribution (km per decade) for marine taxonomic groups based on observations over 1900-2010. Positive distribution changes are consistent with warming (moving into previously cooler waters, generally poleward). The number of responses analyzed is given within parentheses for each category.



Summary of estimated impacts of observed climate changes on yields over 1960-2013 for four major crops in temperate and tropical regions, with the number of data points analyzed given within parentheses for each category





VULNERABILITY AND EXPOSURE

AROUND THE WORLD

A photograph of a city street completely flooded with water. The water is dark and reflects the surrounding buildings and the overcast sky. On the left, a multi-story brick building with many windows lines the street. On the right, another multi-story building with a modern facade and a glass canopy over the entrance is visible. In the distance, a person in a red jacket is wading through the water, and a dark car is partially submerged. The overall atmosphere is somber and highlights the impact of flooding in urban areas.

VULNERABILITY AND EXPOSURE

AROUND THE WORLD



ADAPTATION IS ALREADY OCCURING



ADAPTATION IS ALREADY OCCURRING



CLIMATE CHANGE

REDUCING AND MANAGING RISKS

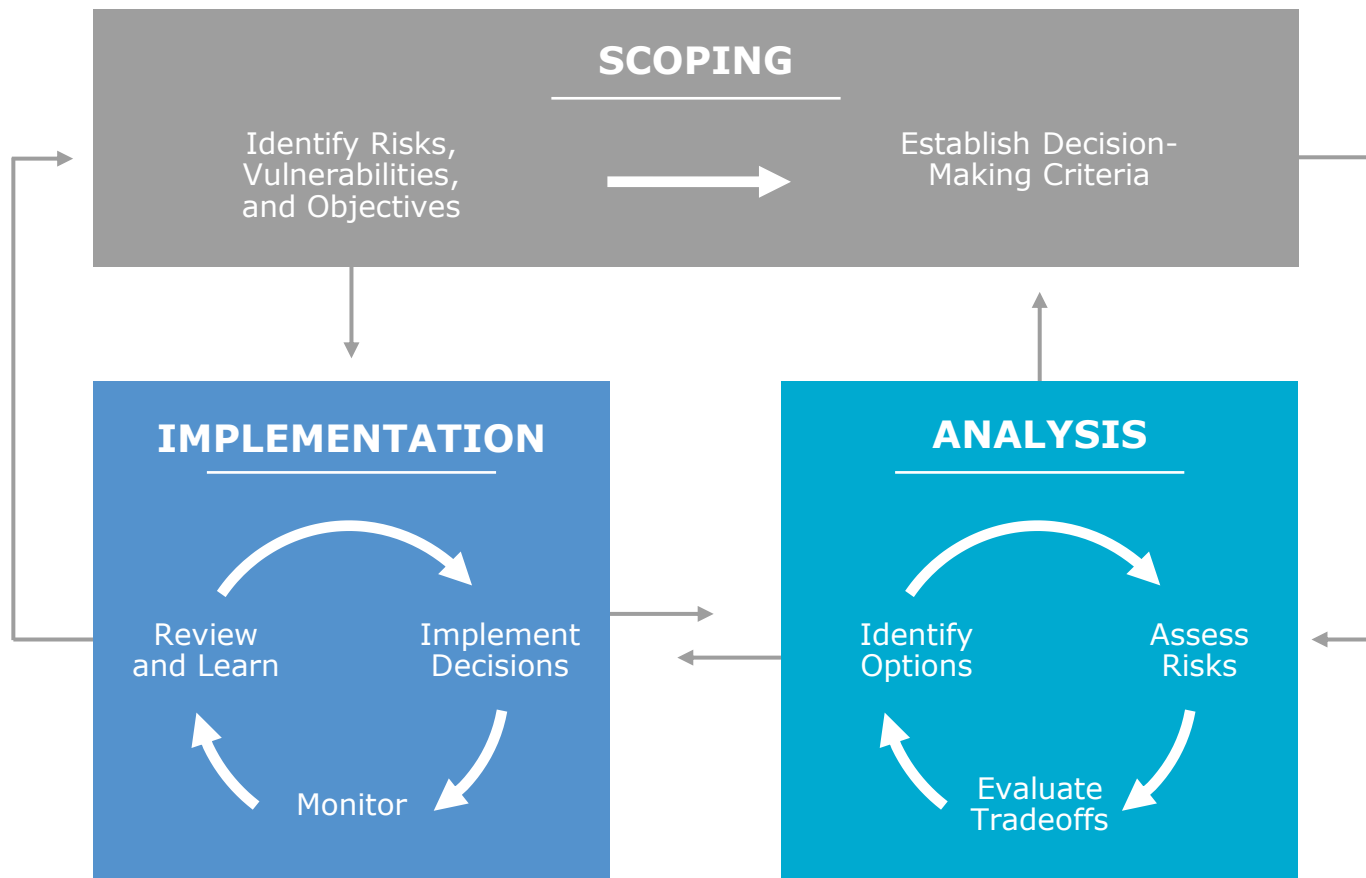
ipcc


INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

A large-scale wildfire is shown with thick, dark smoke rising into the sky. A firefighting plane is seen dropping water on the fire. The foreground shows a residential area with houses and trees, partially obscured by the smoke and fire. The overall scene is one of a major environmental disaster.

INCREASING MAGNITUDES
OF WARMING INCREASE
THE LIKELIHOOD OF

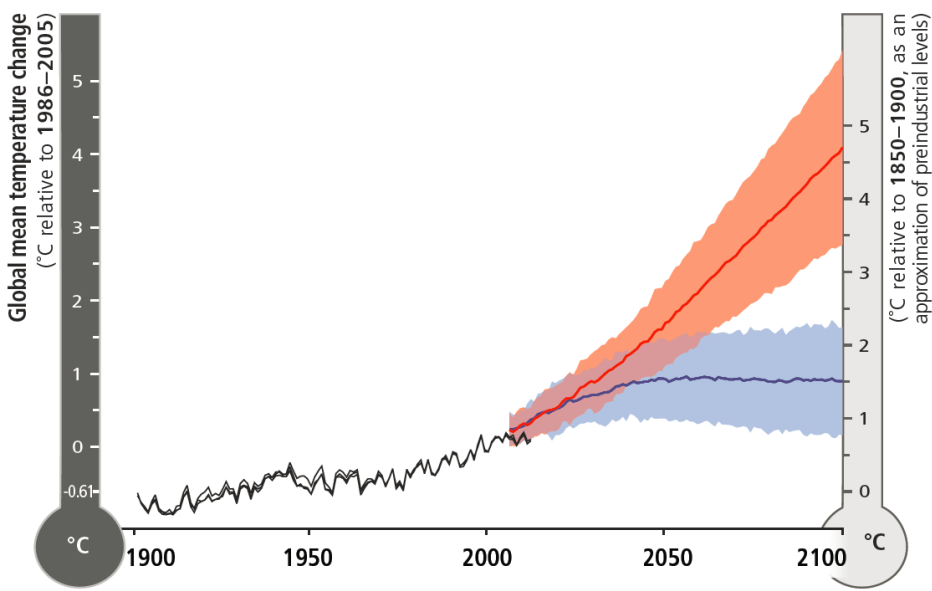
**SEVERE AND
PERVASIVE IMPACTS**



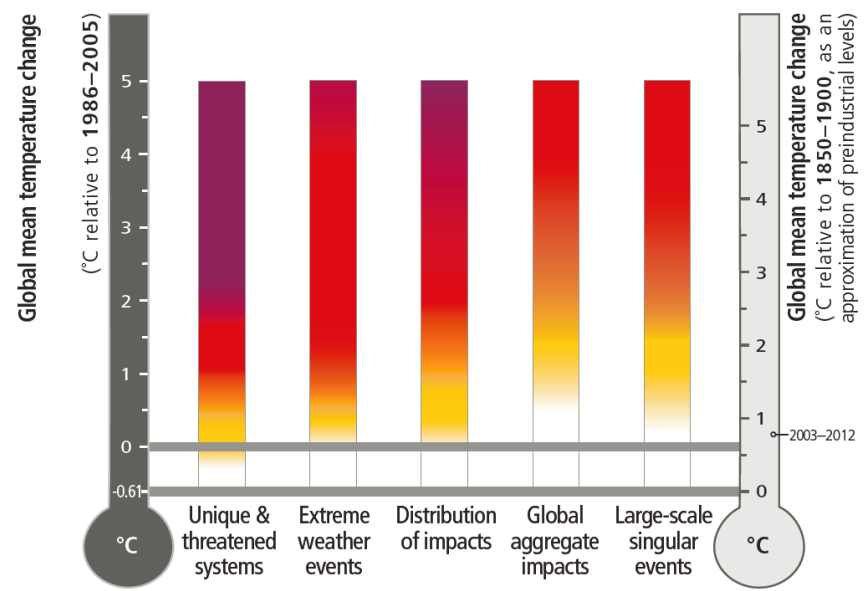


RISKS OF
CLIMATE CHANGE
INCREASE
WITH CONTINUED
HIGH EMISSIONS

Risk of climate-related impacts results from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability and exposure of human and natural systems. Changes in both the climate system (left) and socioeconomic processes including adaptation and mitigation (right) are drivers of hazards, exposure, and vulnerability.



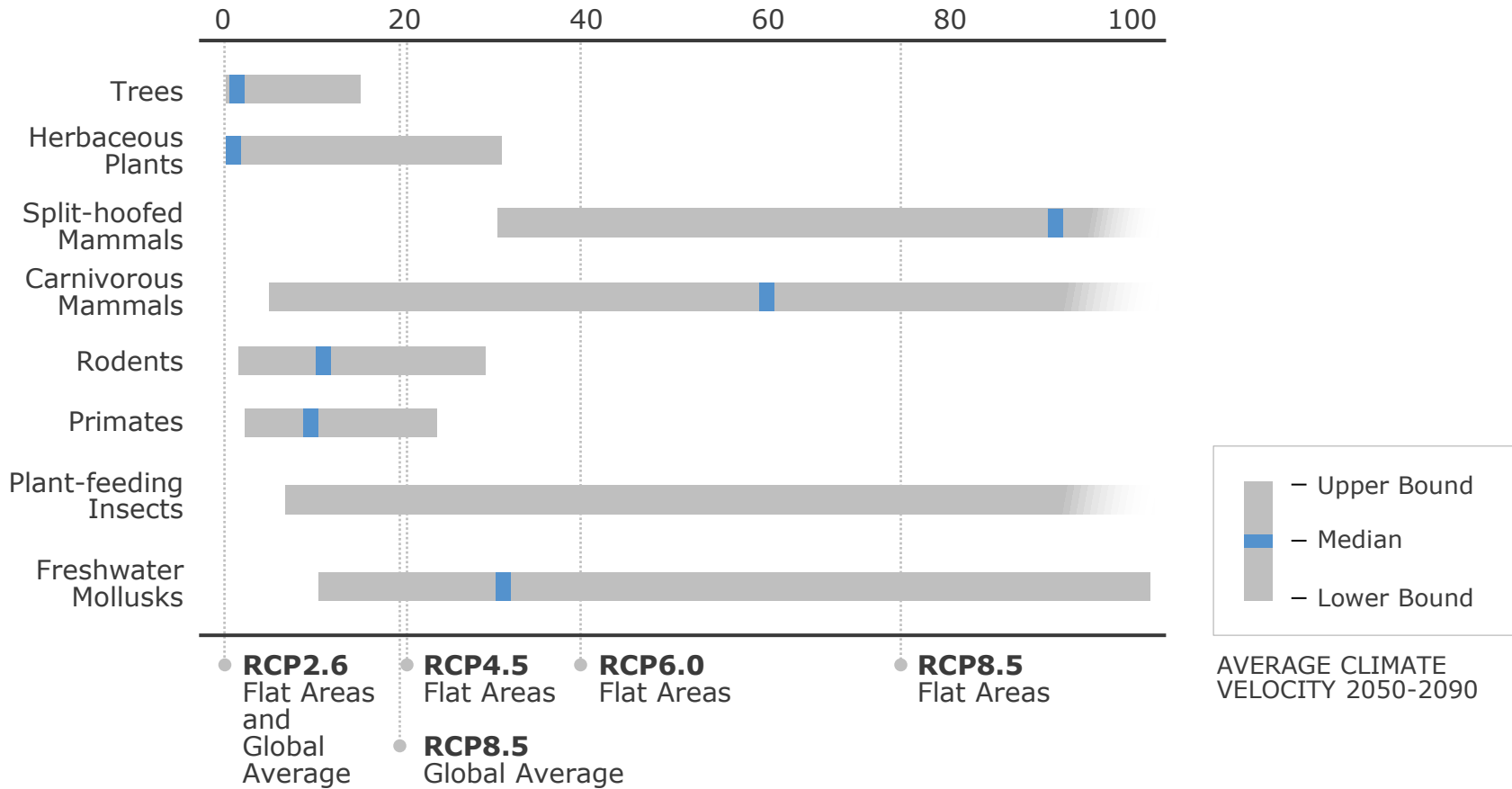
- Observed
- RCP8.5 (a high-emission scenario)
- Overlap
- RCP2.6 (a low-emission mitigation scenario)



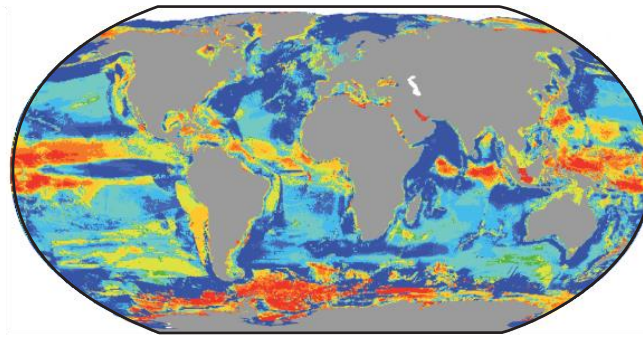
Level of additional risk due to climate change

Undetectable Moderate High Very high

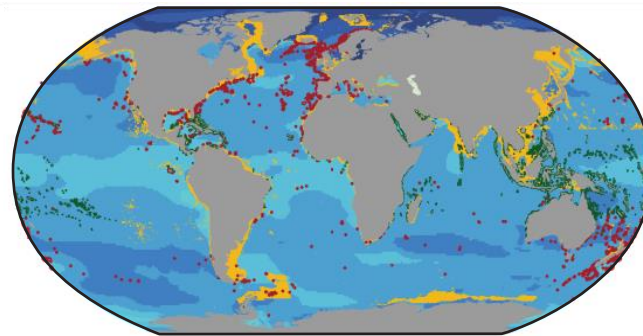
MAXIMUM SPEED AT WHICH SPECIES CAN MOVE (km per decade)



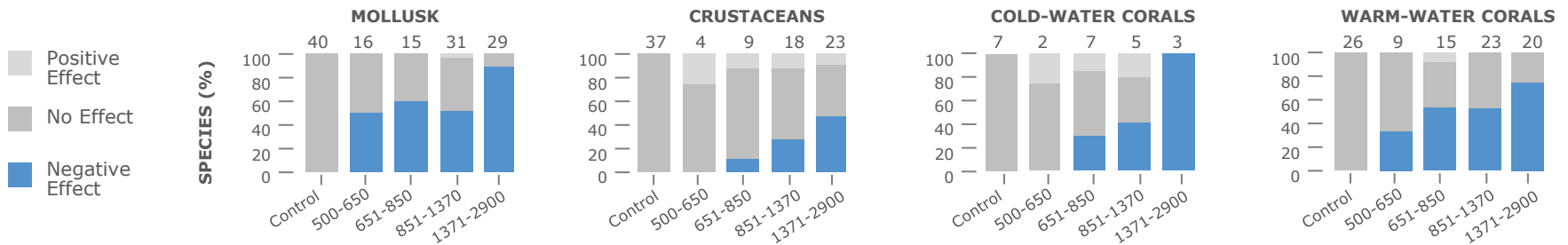
CHANGE IN MAXIMUM CATCH POTENTIAL (2051-2060 COMPARED TO 2001-2010, SRES A1B)



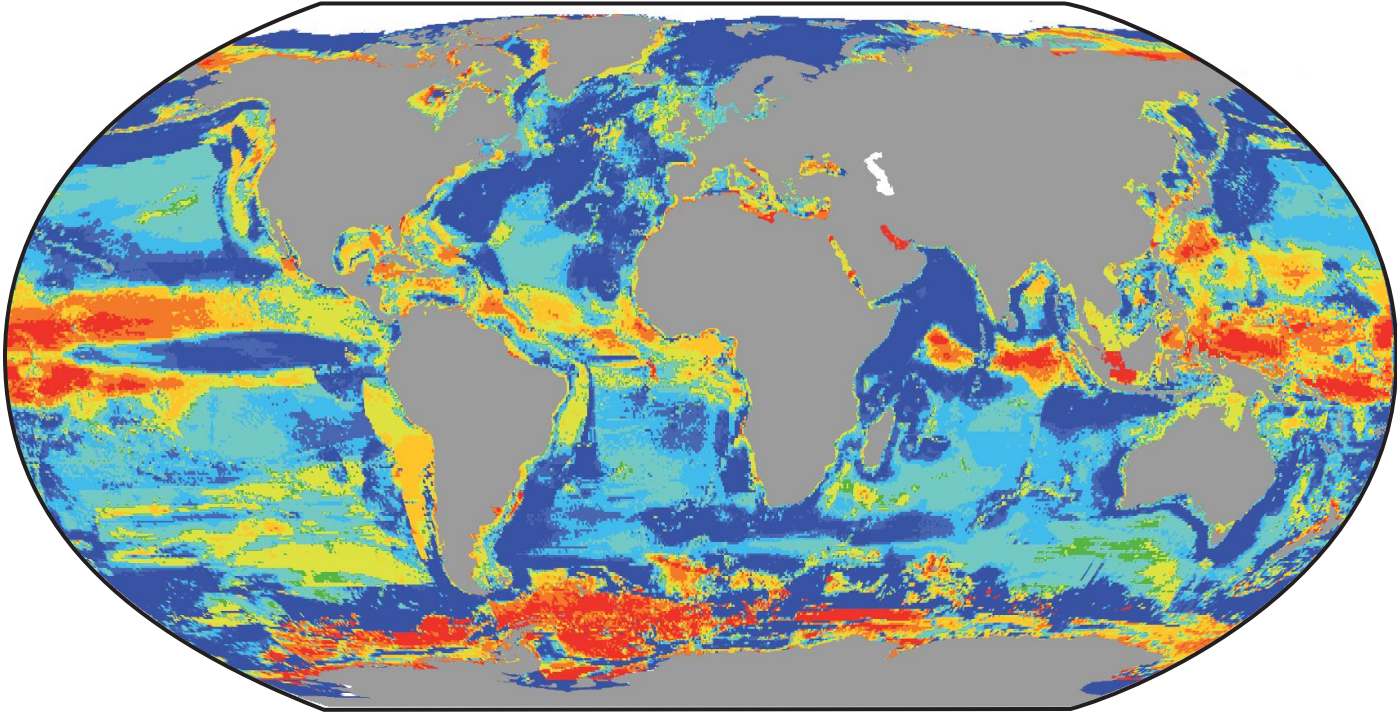
CHANGE IN pH (2081-2100 COMPARED TO 1986-2005, RCP 8.5)



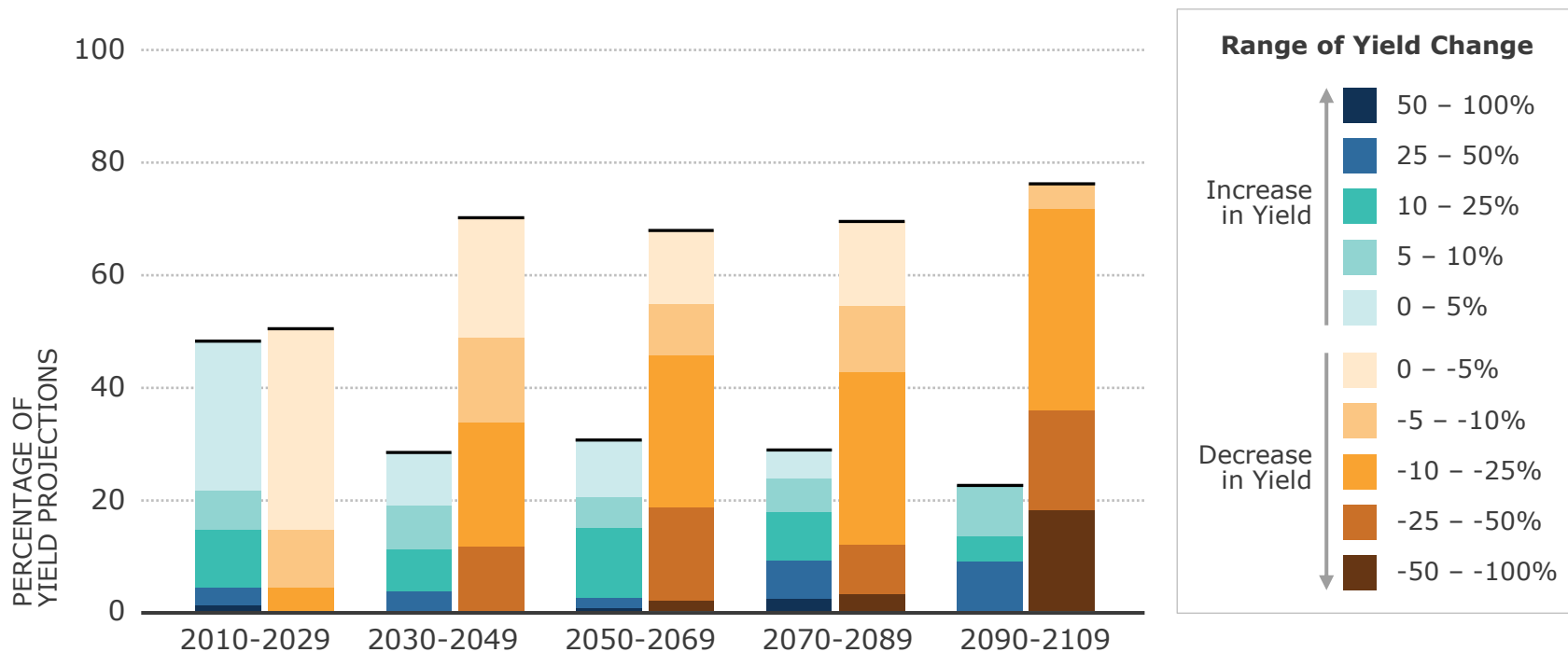
- Mollusk and Crustacean Fisheries Present-day annual catch rate ≥ 0.005 tonnes km^2
- Cold-Water Corals
- Warm-Water Corals



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

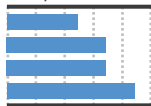


Summary of projected changes in crop yields, due to climate change over the 21st century. The figure includes projections for different emission scenarios, for tropical and temperate regions, and for adaptation and no-adaptation cases combined. Relatively few studies have considered impacts on cropping systems for scenarios where global mean temperatures increase by 4oC or more.

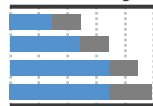


POLAR REGIONS

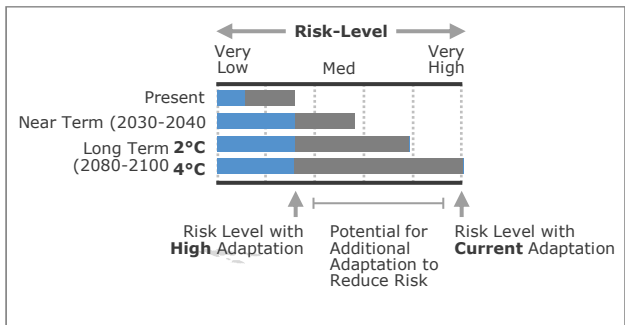
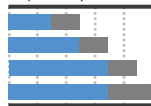
Risks for Ecosystems



Risks for Health and Well-Being

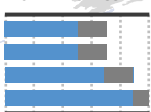


Unprecedented Challenges, Especially from Rate of Change

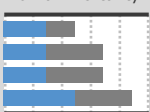


NORTH AMERICA

Increased Risks from Wildfires



Heat-Related Human Mortality



Damages from River and Coastal Urban Floods

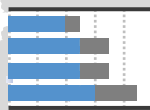


EUROPE



EUROPE

Increased Losses and Impacts from Extreme Heat Events

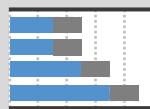


Increased Water Restrictions

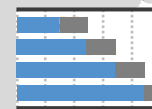


ASIA

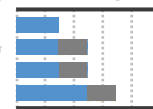
Increased Flood Damage to Infrastructure, Livelihoods, and Settlements



Heat-Related Human Mortality



Increased Drought-Related Water and Food Shortage

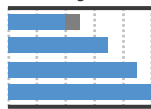


THE OCEAN

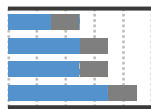
Reduced Fisheries Catch Potential at Low Latitudes



Increased Mass Coral Bleaching and Mortality

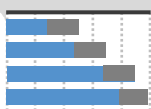


Coastal Inundation and Habitat Loss

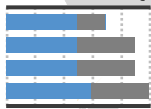


CENTRAL AND SOUTH AMERICA

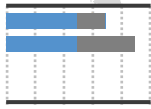
Reduced Water Availability and Increased Flooding and Landslides



Reduced Food Production and Quality

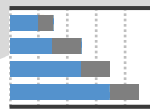


Vector-Borne Diseases

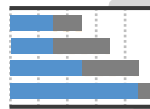


AFRICA

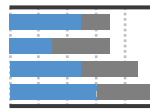
Compounded Stress on Water Resources



Reduced Crop Productivity and Livelihood and Food Security

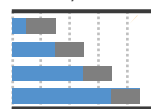


Vector- and Water-Borne Diseases

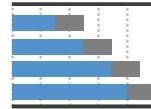


SMALL ISLANDS

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

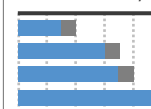


Risks for Low-Lying Coastal Areas

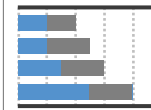


AUSTRALASIA

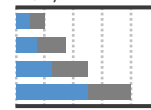
Significant Change in Composition and Structure of Coral Reef Systems



Increased Flood Damage to Infrastructure and Settlements



Increased Risks to Coastal Infrastructure and Low-Lying Ecosystems





EFFECTIVE CLIMATE CHANGE ADAPTATION

A MORE VIBRANT WORLD