

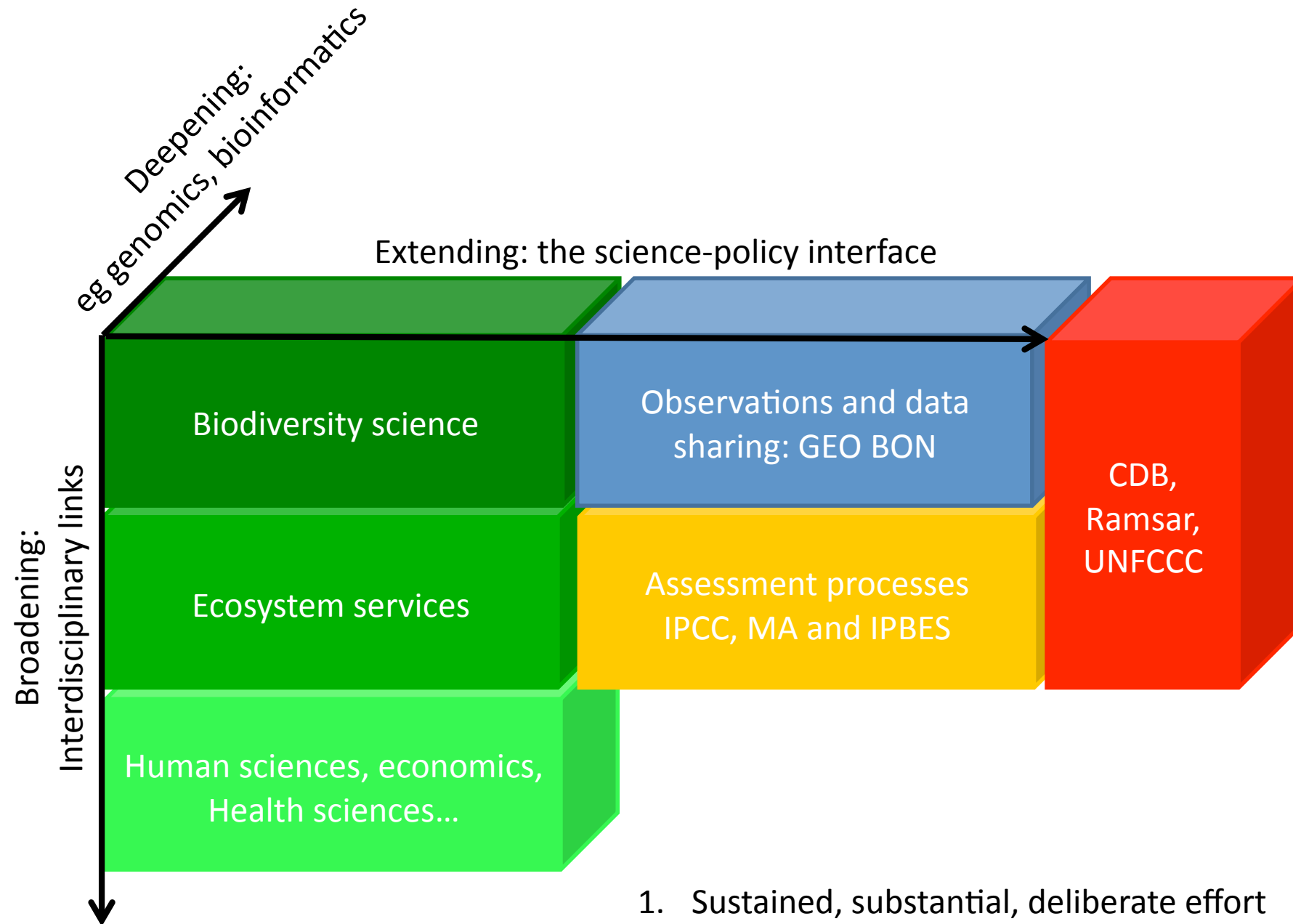


# Challenges and opportunities for biodiversity and ecosystem services research

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2 October 2014, Paris

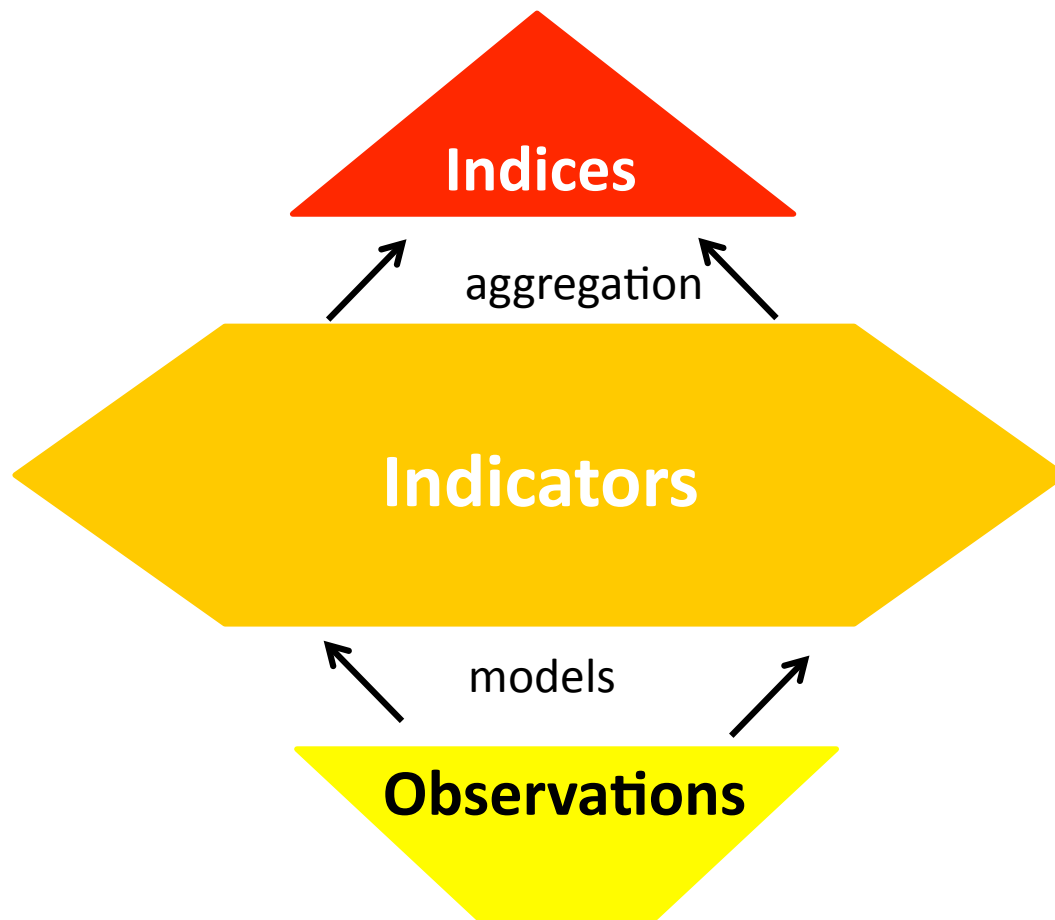
# What is new in our universe?

- Evidence of rapid, perhaps steepening, loss
  - Halfway to the Aiche 20-20 targets
- Intensifying pressures:
  - magnitude and rate of climate change
  - Food, energy and water insecurity
- A new assessment body, IPBES
- Draft of new sustainability targets, including two on biodiversity



1. Sustained, substantial, deliberate effort
2. Listen to users, but lead them also
3. In the policy space, timeliness trumps accuracy
4. The impact on funding is indirect

# The shape of an observation system

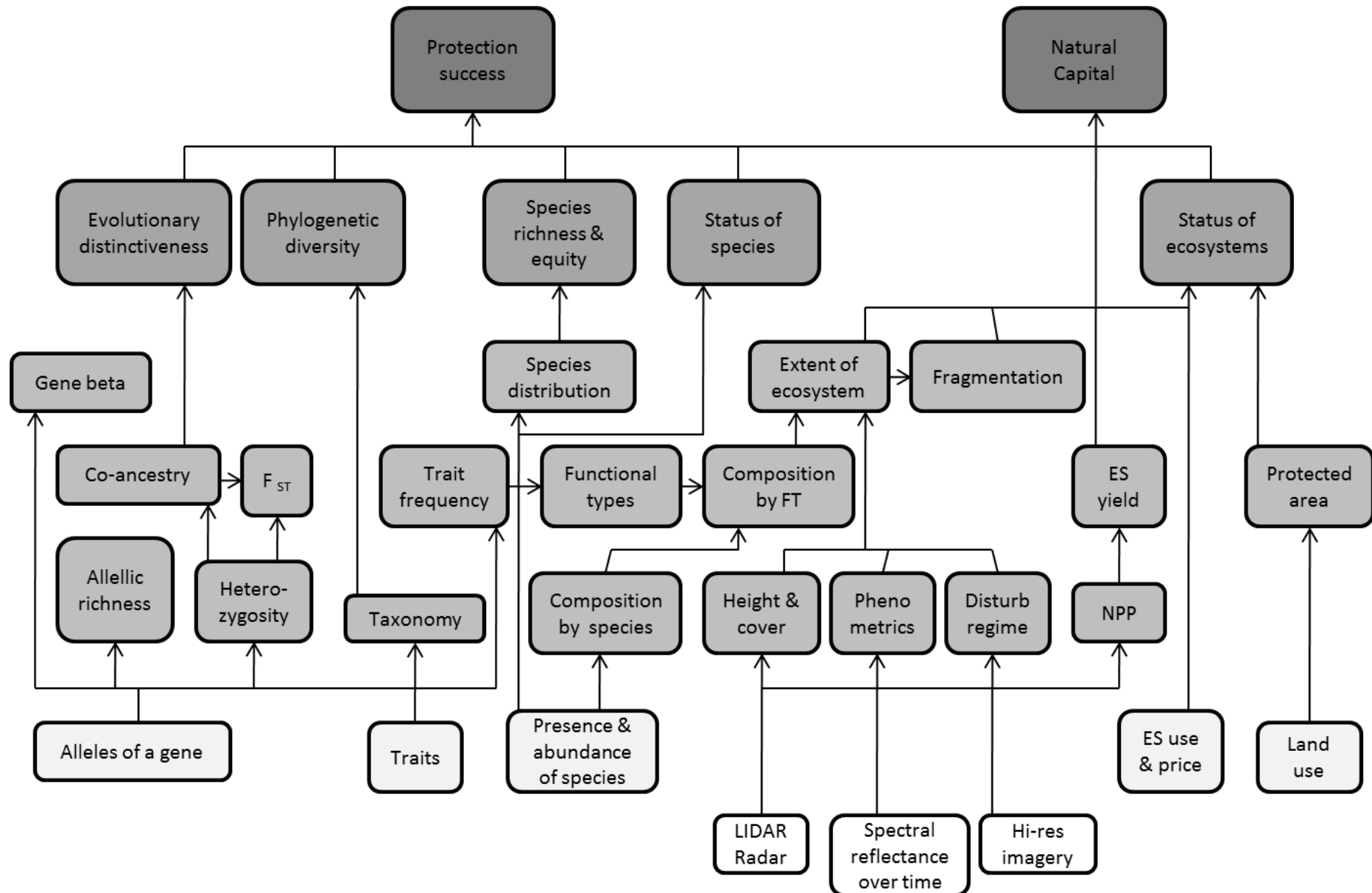


Very few, synthesising, expressed  
in decision-maker language

As many as you like  
Can change over time  
Defined in topic expert terms

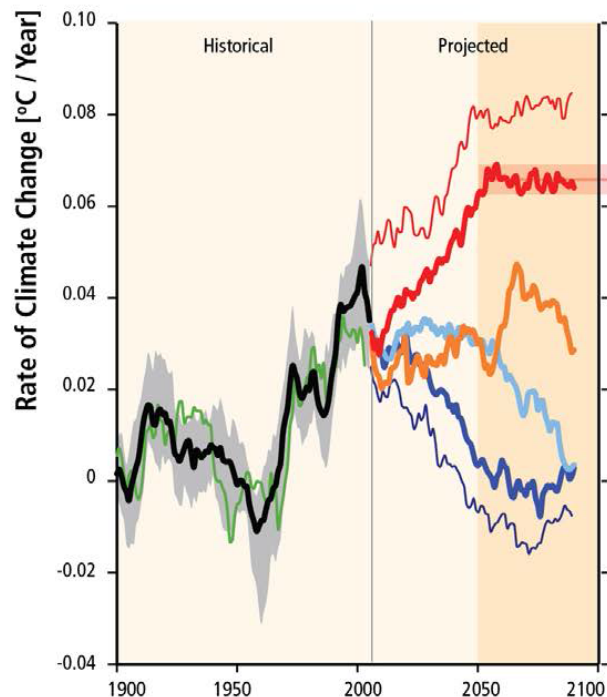
Relatively few,  
defined in stable repeatable  
terms independent of sensor

# A shared set of metrics looks feasible

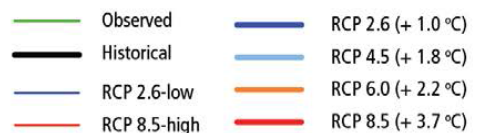


Pereira et al. "Essential biodiversity variables." *Science* 339.6117 (2013): 277-278.

## A. Climate Change Scenarios



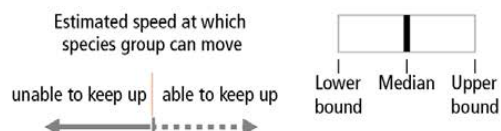
### A. Rate of Climate Change



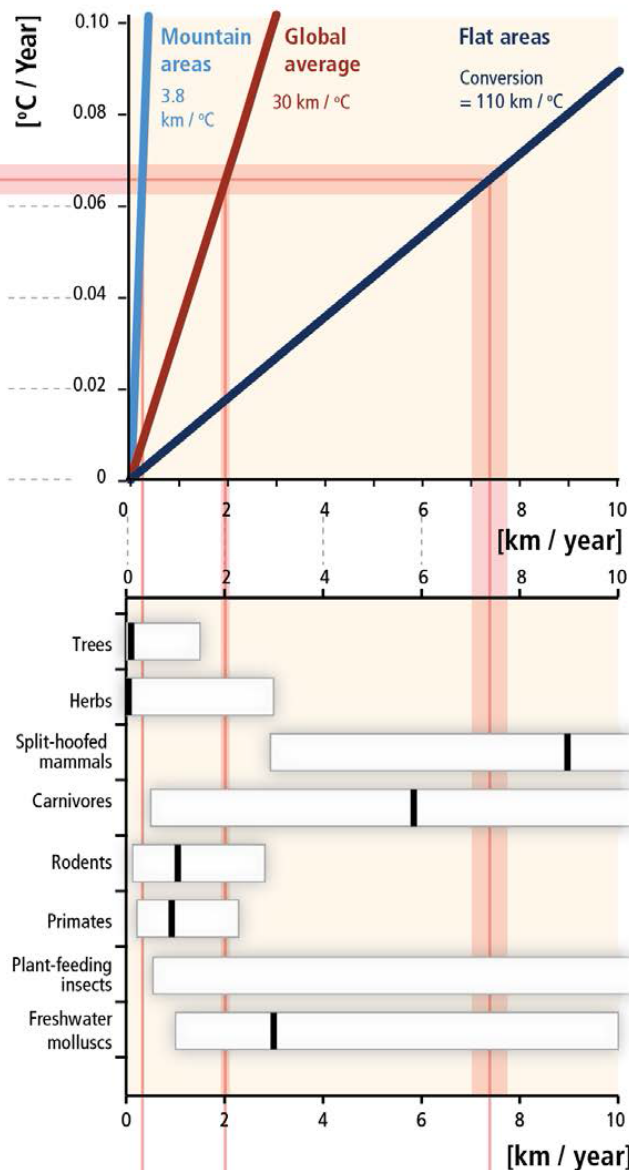
(Mean projected increase in global temperature for the period 2081-2100 (WGI, Chapter 12))

rate of temperature change under RCP 8.5 scenario between 2050 and 2100

### C. Species Displacement Rates



## B. Estimate of Climate Velocity to Determine Rate of Displacement



### C. Species Displacement Rates (required to track climate velocity)

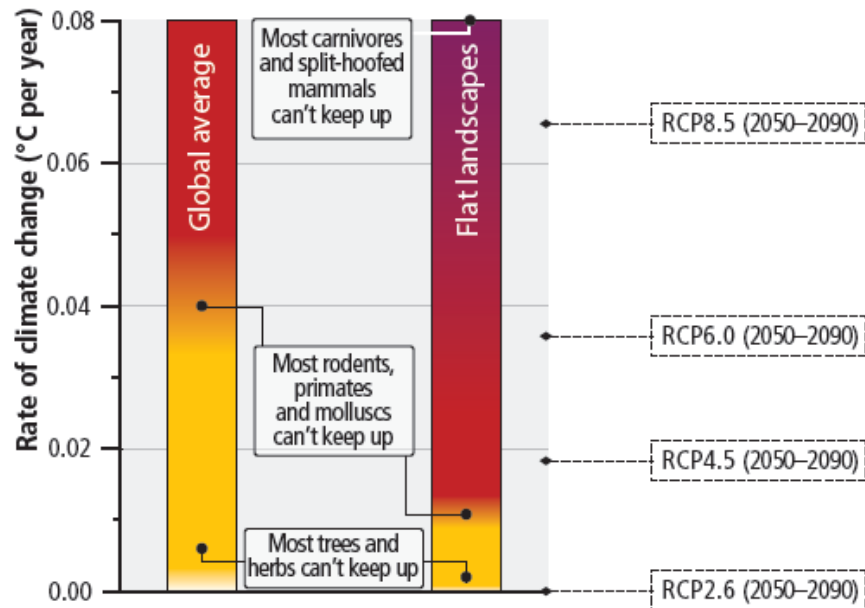
The *rate* of climate change is unsustainable for biodiversity

Settele et al 2014  
IPCC 5AR WG2 Ch4

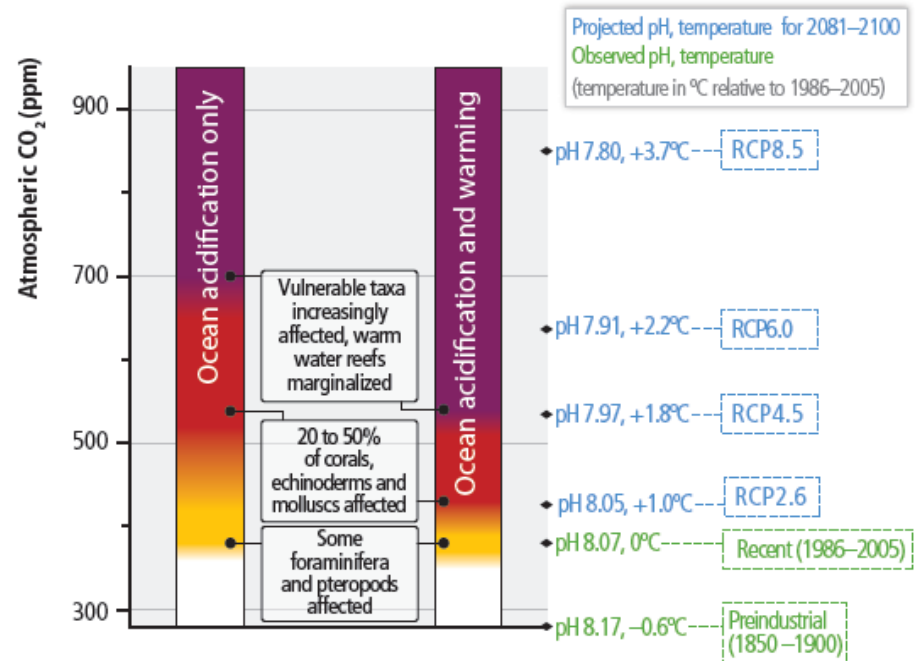
# Framing the global change problems as a risk management problem

## Increasing risk from RCP2.6 to RCP8.5

(A) Risk for terrestrial and freshwater species impacted by the rate of warming



(B) Risk for marine species impacted by ocean acidification only, or additionally by warming extremes



### Level of additional risk due to climate change

Undetectable Moderate High Very high

Requires explicit treatment of uncertainty and the process of decisionmaking under uncertainty

# Achieving policy simplicity in a complex world

- What is the biodiversity equivalent of the '2°C' target?
  - 'Zero loss' is not feasible or scientifically defensible
  - Are there any tipping points, thresholds or even discontinuities?
  - The 'planetary boundary' argument for biodiversity is weak
    - But there may be thresholds for some globally important ecosystems



# Is it the *bio* or the *diversity* that matters?



# **Towards a predictive science of biodiversity**

- Need to get beyond reactive stance
- Answer 'what if?' and 'so what?' questions
- Given the timeframes of change and the timeframes of ecological and evolutionary equilibrations, this requires dynamic ('transient') solutions rather than equilibrium solutions
- Functional attributes; physiological tolerances; ecological assembly rules

# Trend towards the regional scale

- Even for 'global problems', the regional scale is often the most natural scale for intervention
  - Greater likelihood of shared values
  - Easier to convene and fund
  - Gains the initial, steep 'benefits of scale' of moving beyond the local or national.



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