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# Winners & Losers

Wealth from Oceans Flagship

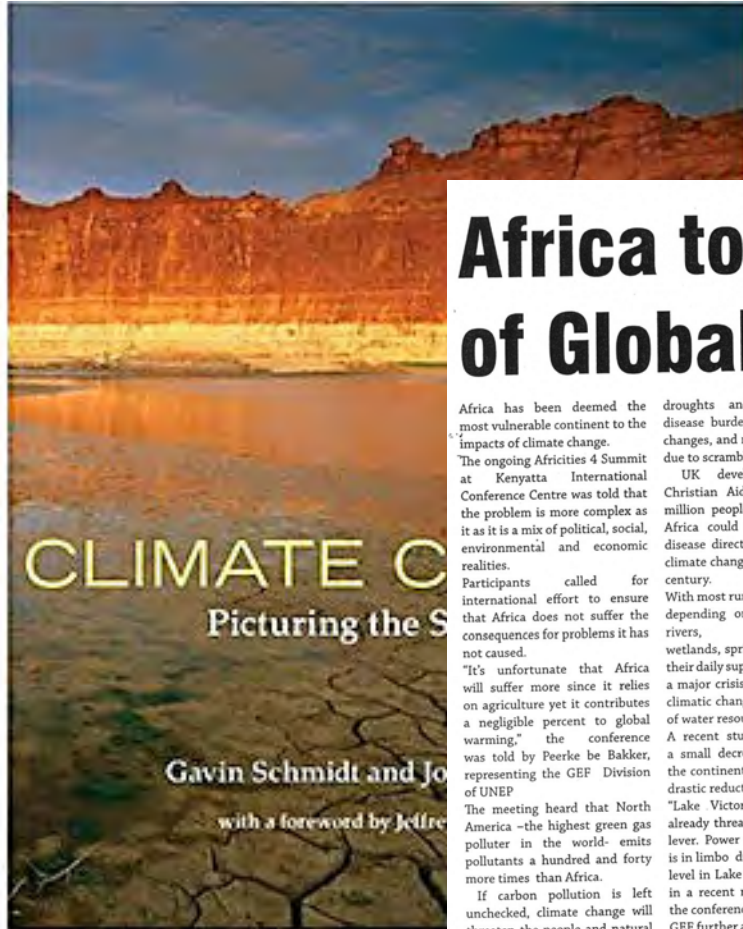
Beth Fulton

3 September 2008

National Research  
**FLAGSHIPS**  
Wealth from Oceans



# Broad Attention



## Africa to Bear the Brunt of Global Warming

Africa has been deemed the most vulnerable continent to the impacts of climate change.

The ongoing Africa4 Summit at Kenyatta International Conference Centre was told that the problem is more complex as it is a mix of political, social, environmental and economic realities.

Participants called for international effort to ensure that Africa does not suffer the consequences for problems it has not caused.

"It's unfortunate that Africa will suffer more since it relies on agriculture yet it contributes a negligible percent to global warming," the conference was told by Peerke be Bakker, representing the GEF Division of UNEP.

The meeting heard that North America –the highest green gas polluter in the world- emits pollutants a hundred and forty more times than Africa.

If carbon pollution is left unchecked, climate change will threaten the people and natural resources which will in turn contribute to more poverty. Consequences of climate change, the conference heard will be

droughts and floods, heavy disease burden due to weather changes, and numerous conflicts due to scramble for resources.

UK development agency, Christian Aid said that 182 million people in sub-Saharan Africa could die of increasing disease directly attributable to climate change by the end of the century.

With most rural Africans directly depending on surface water - rivers, wetlands, springs and lakes - for their daily supply, experts foresee a major crisis since the effect of climatic changes includes drying of water resources.

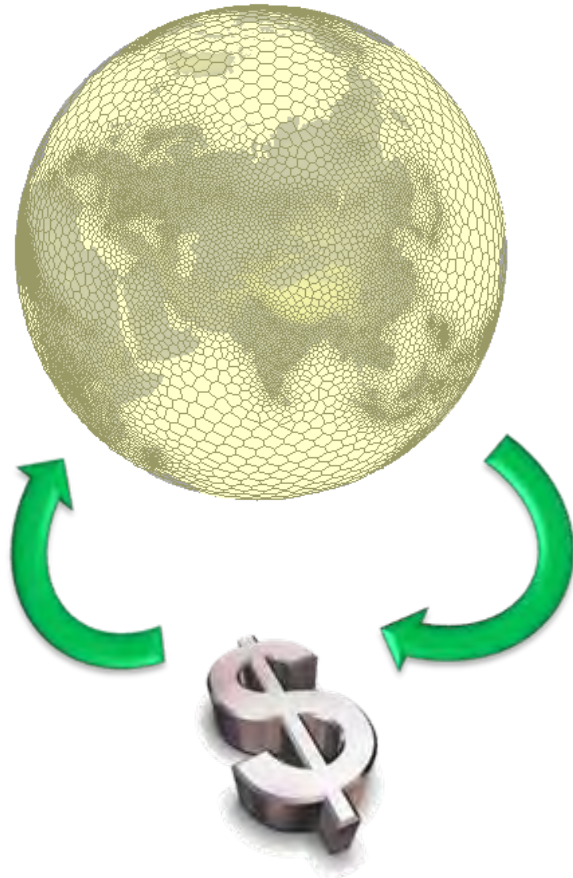
A recent study by GEF shows a small decrease in rainfall on the continent that could cause a drastic reduction in lakes.

"Lake Victoria and Chad are already threatened by low water level. Power supply in Uganda is in limbo due to residing water level in Lake Victoria," says GEF in a recent report presented at the conference.

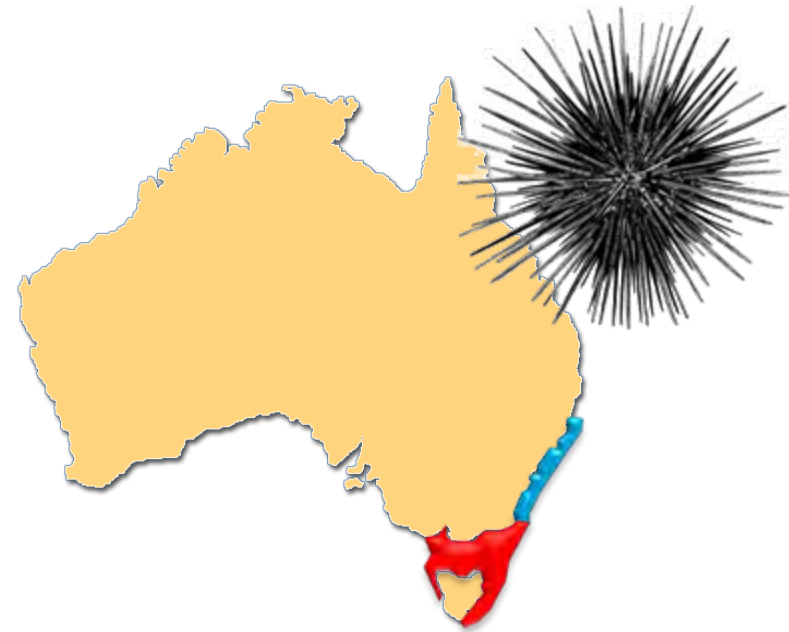
GEF further argues that a further 2% climate change in Kenya would wipe out tea industry. Currently, according to the UN Environment Programme



# Models (often 1 way)

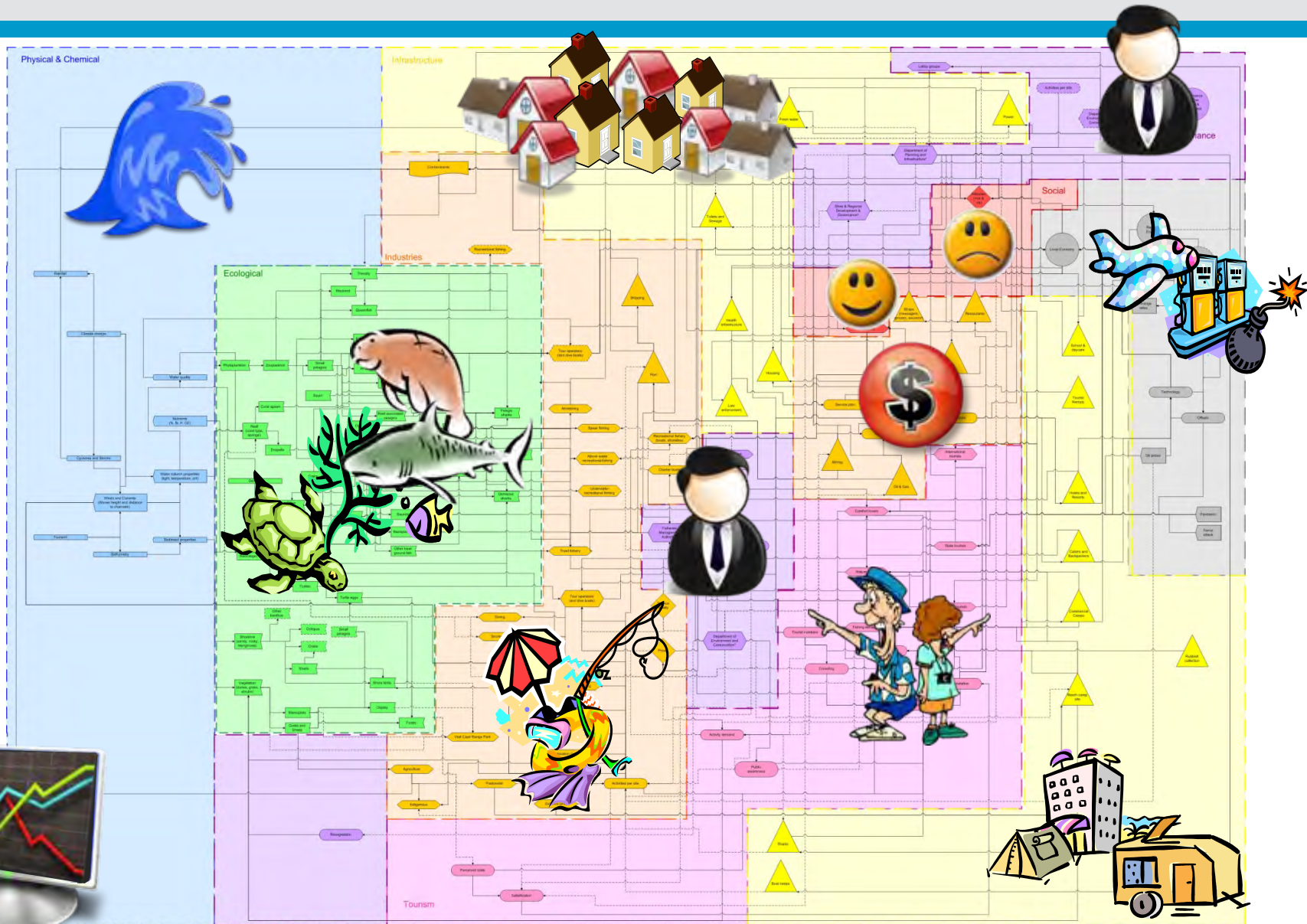


- GCM and IAM



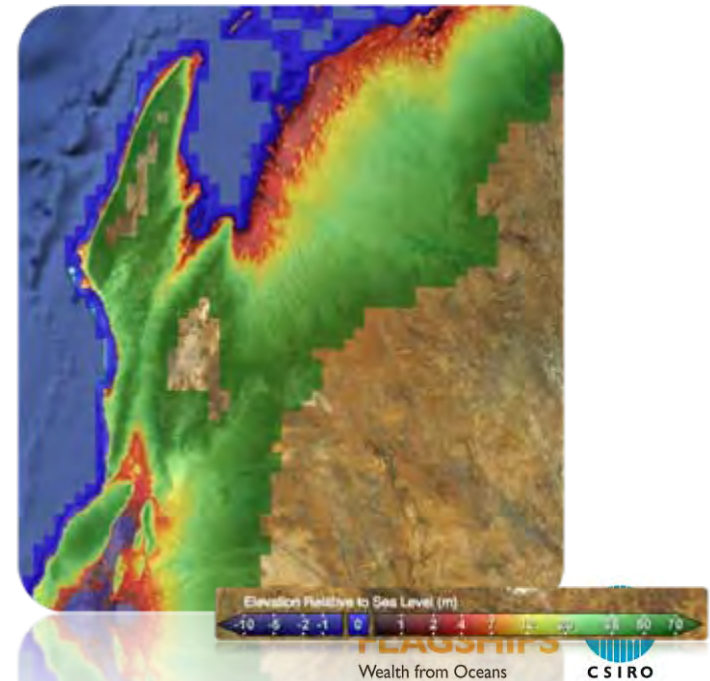
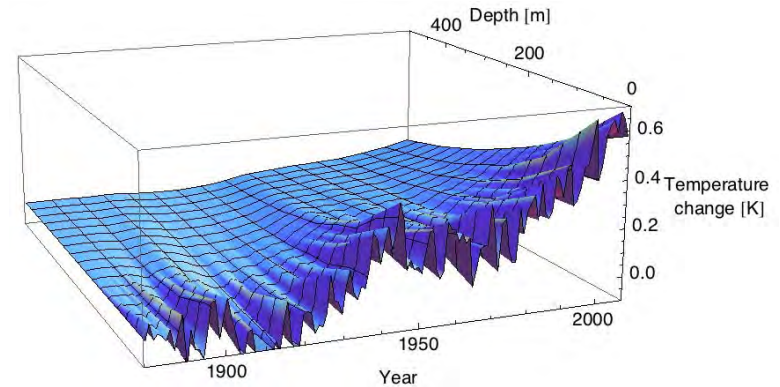
- Bioenvelopes

# End-to-End Models



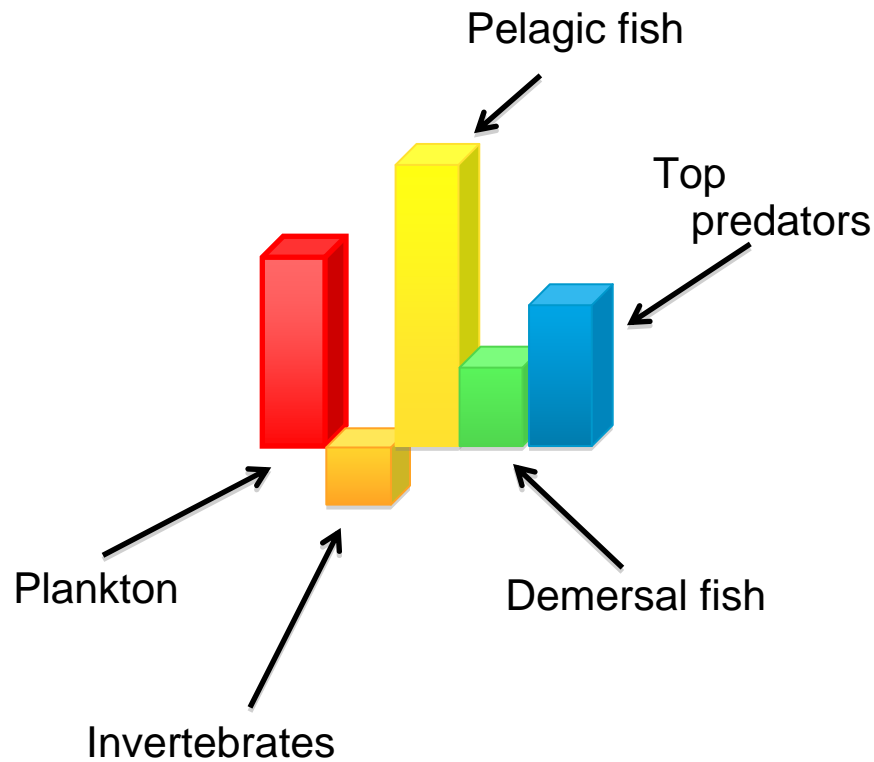
# Multifactor Modelling

- Production change
- Temperature effects
- Acidification effects
- Species distribution shifts
- Sea level rise
- Storm effects
- Major industries
- Regulation systems



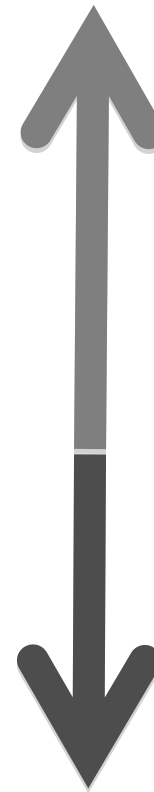
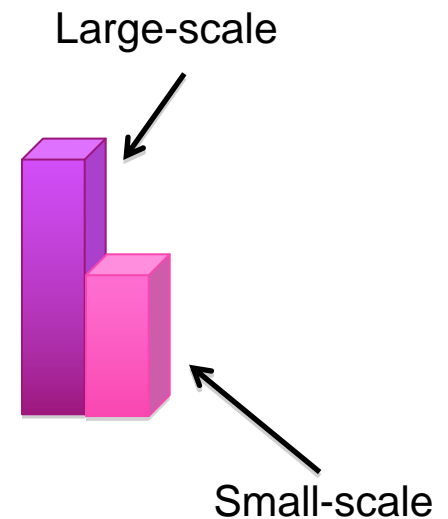
# Indicators

## Ecological



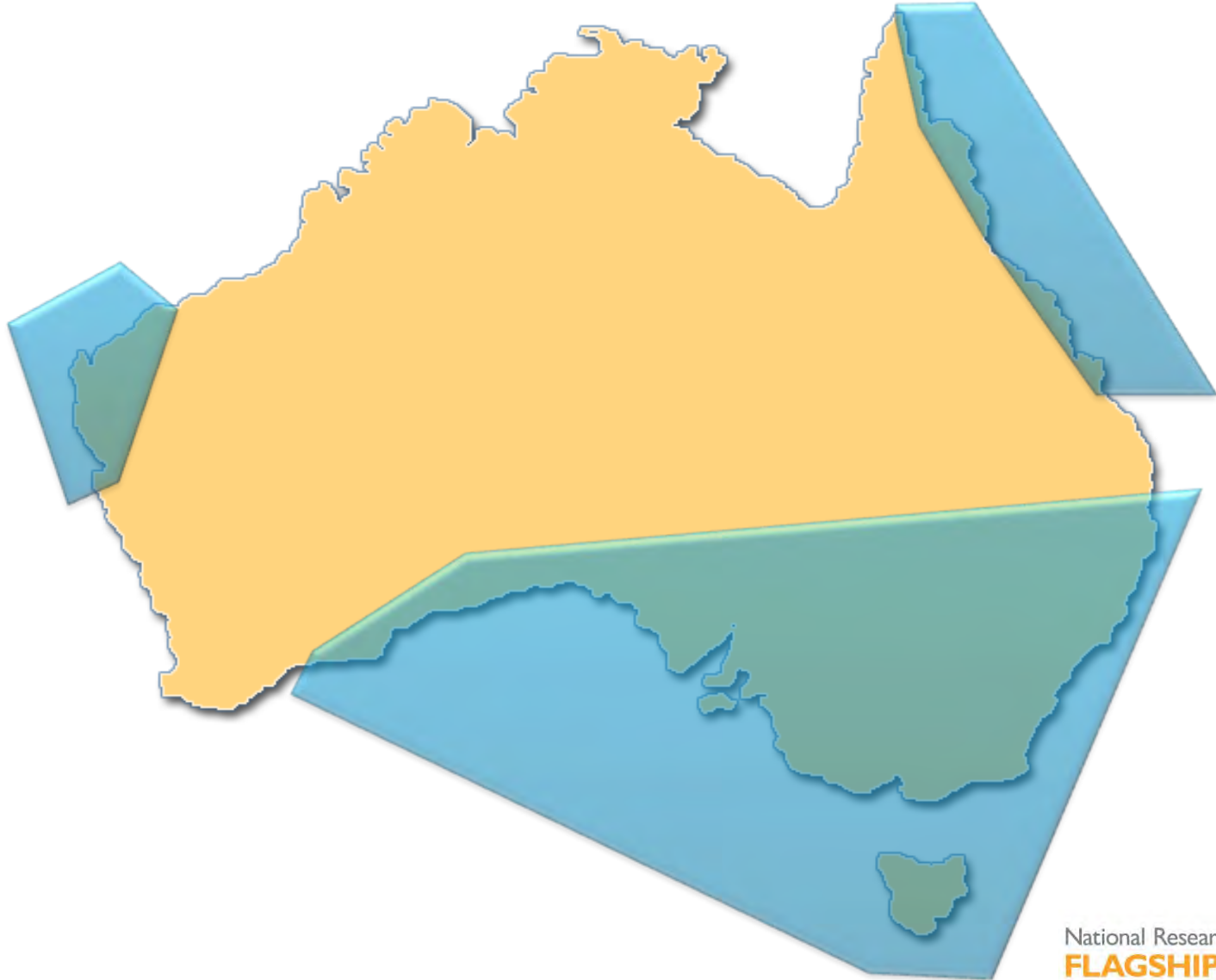
Rise

## Economic

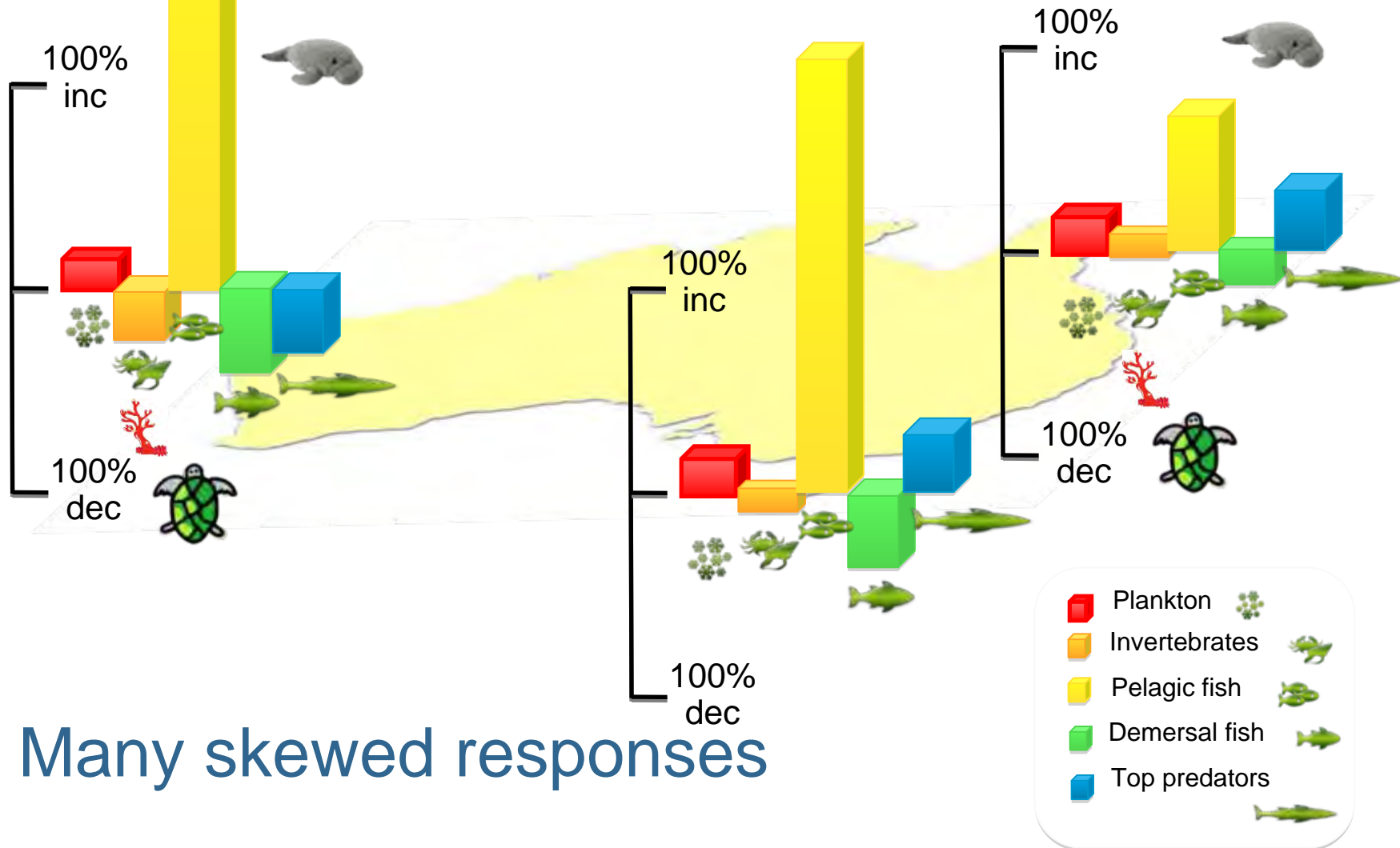


Fall

# Australian Focus



# Environmental Change

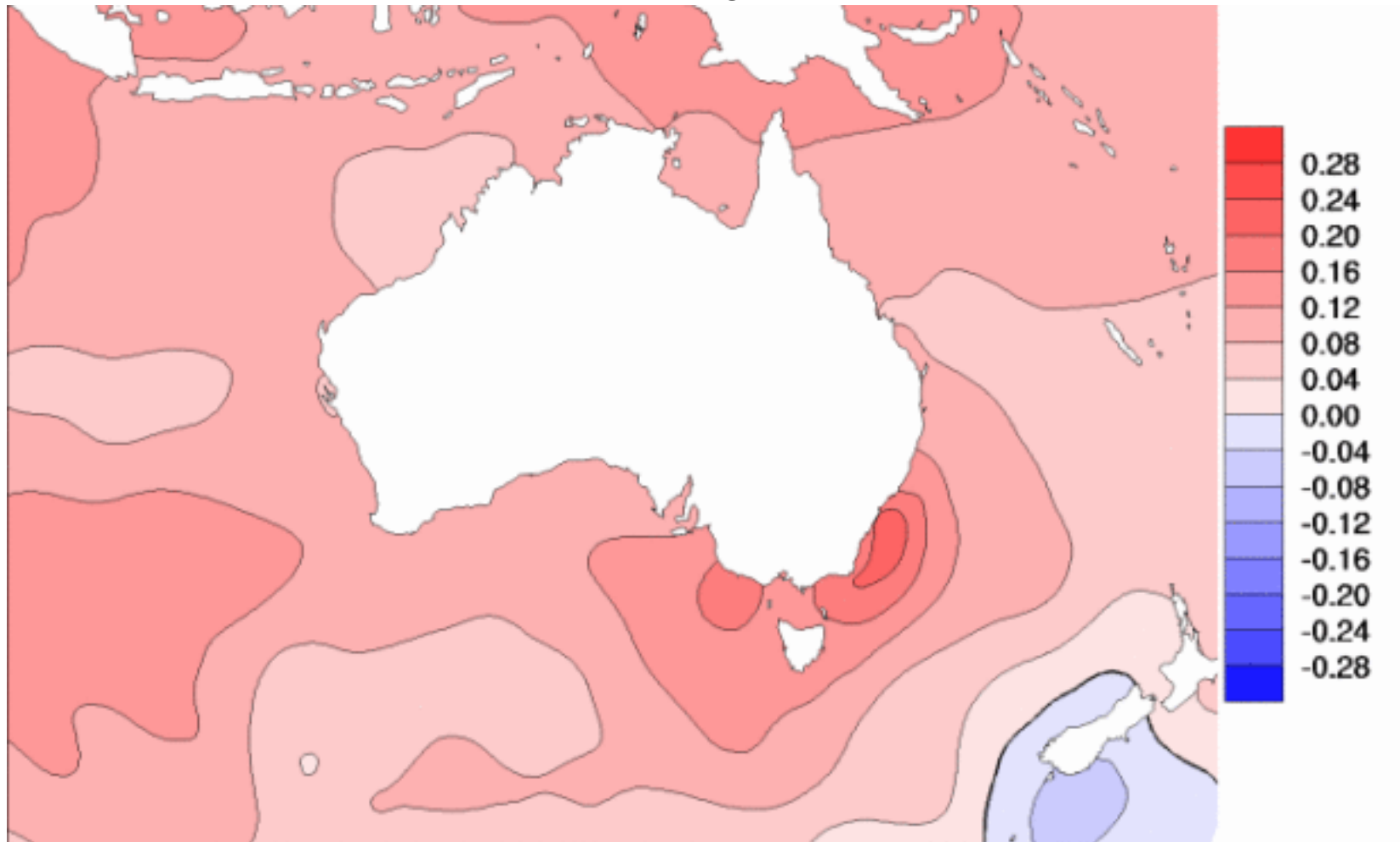


■ Many skewed responses



# Change is Upon Us

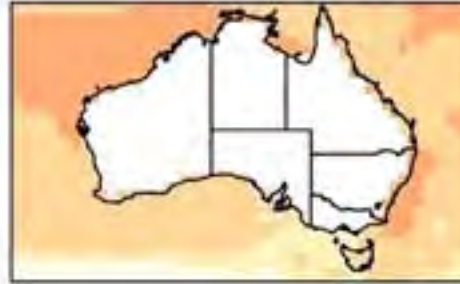
Trend in summer SST change 1950-2009



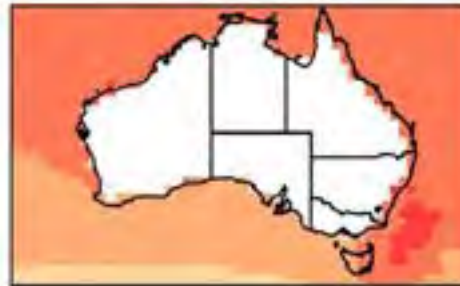
<http://www.bom.gov.au/cgi-bin/climate/change/>

# But Wait There's More

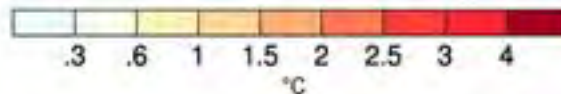
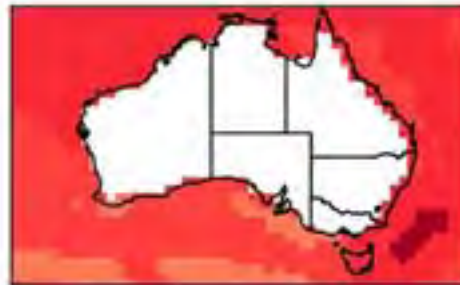
10<sup>th</sup> percentile



50<sup>th</sup> percentile

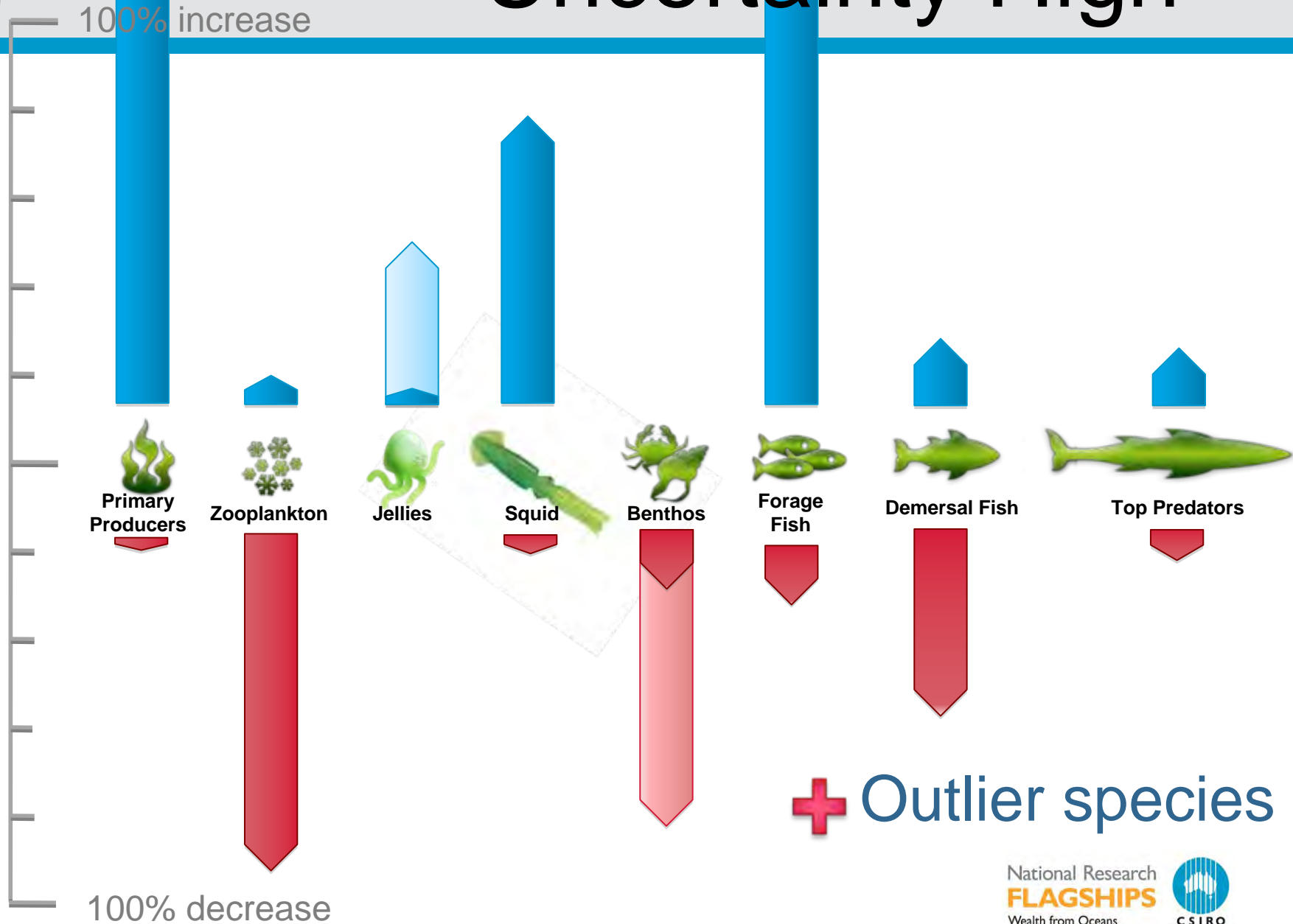


90<sup>th</sup> percentile

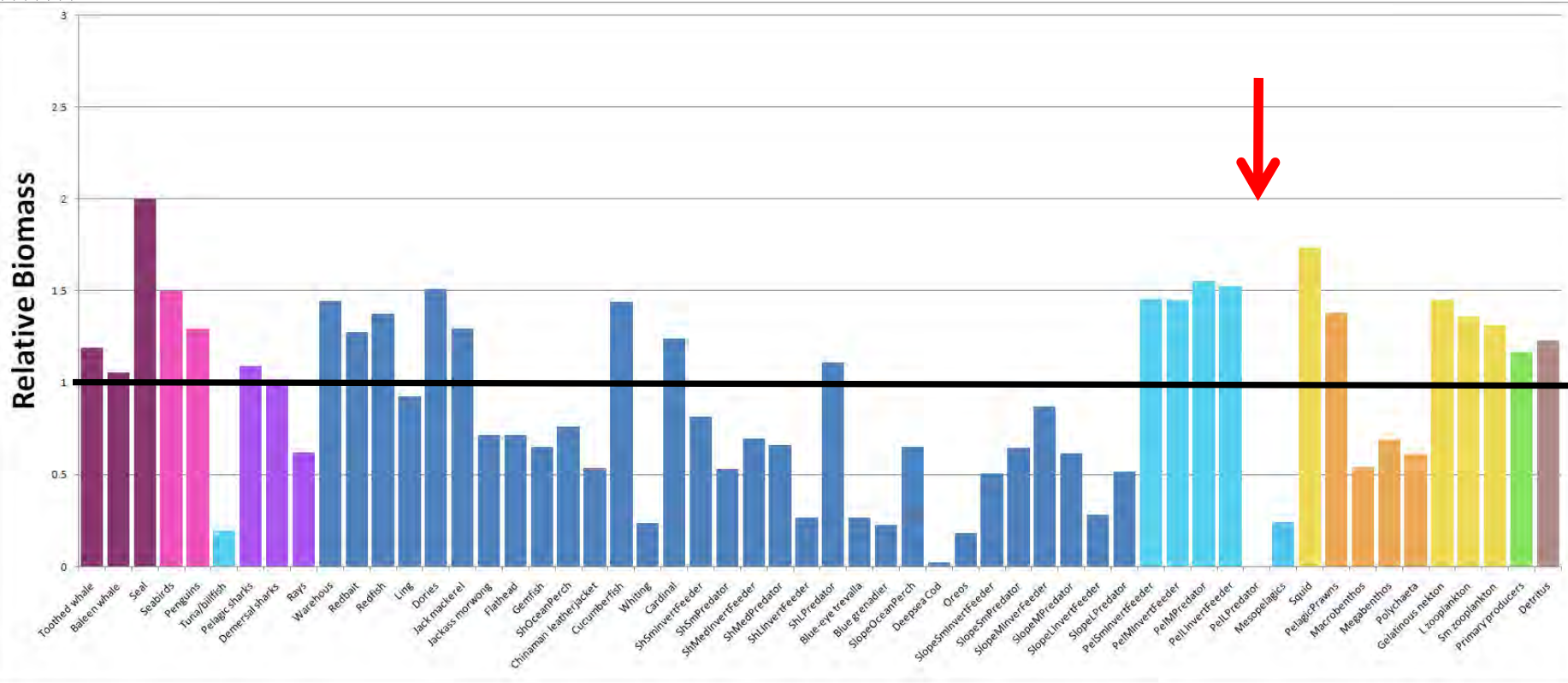


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# Uncertainty High

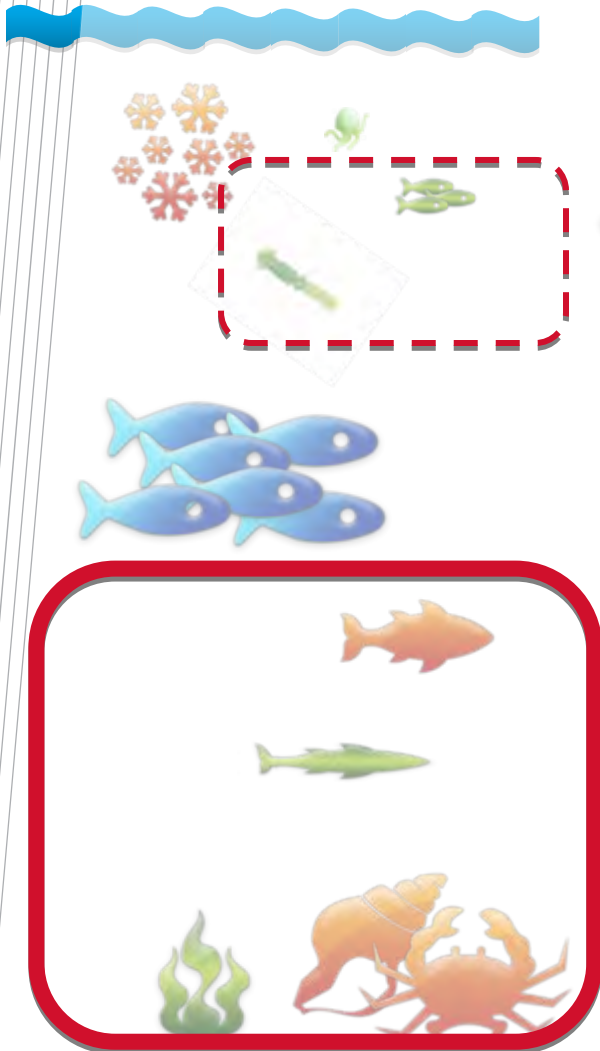


# Tripping Over Thresholds



# Regime Change

2010



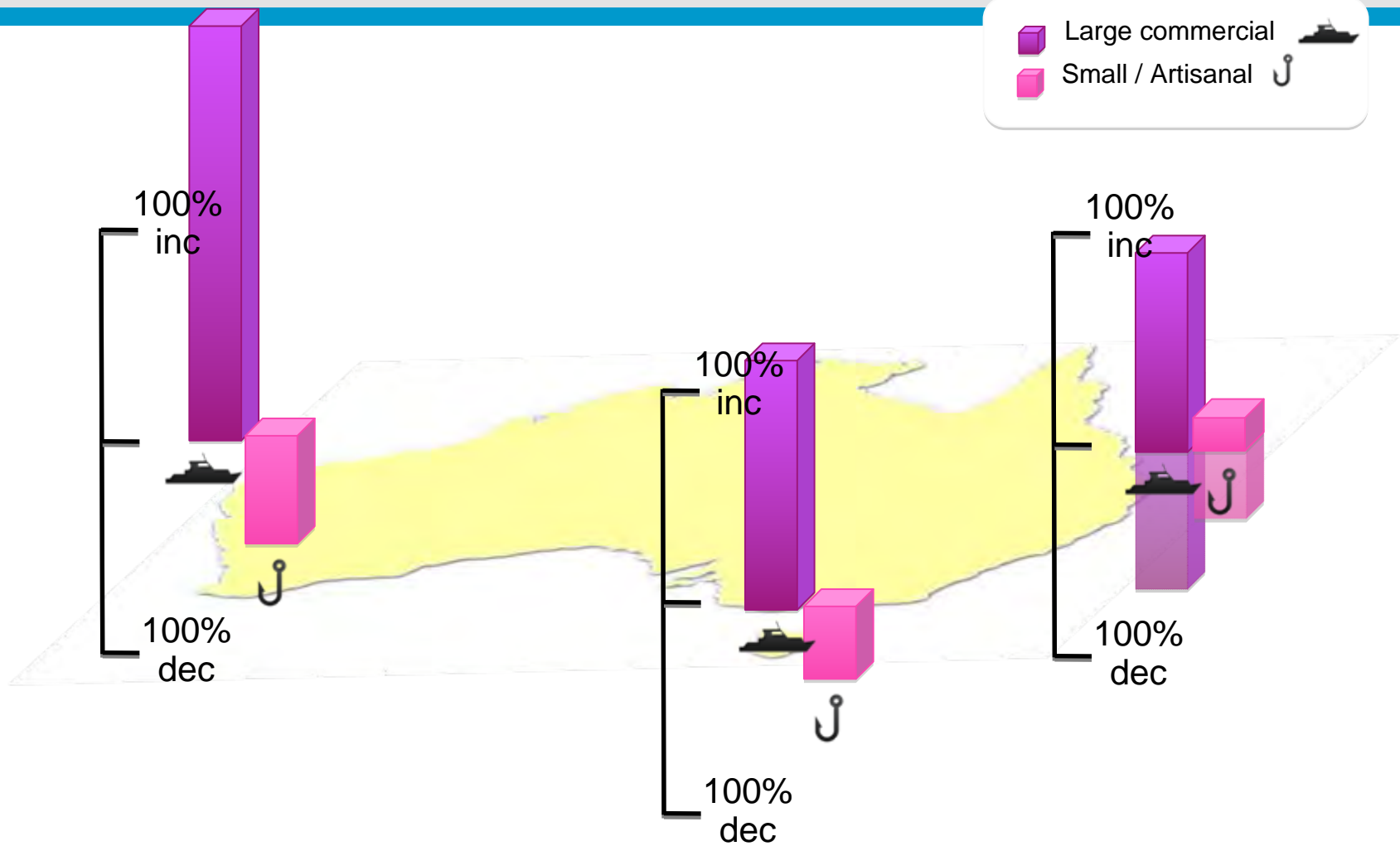
2040



2060



# Economic Implications



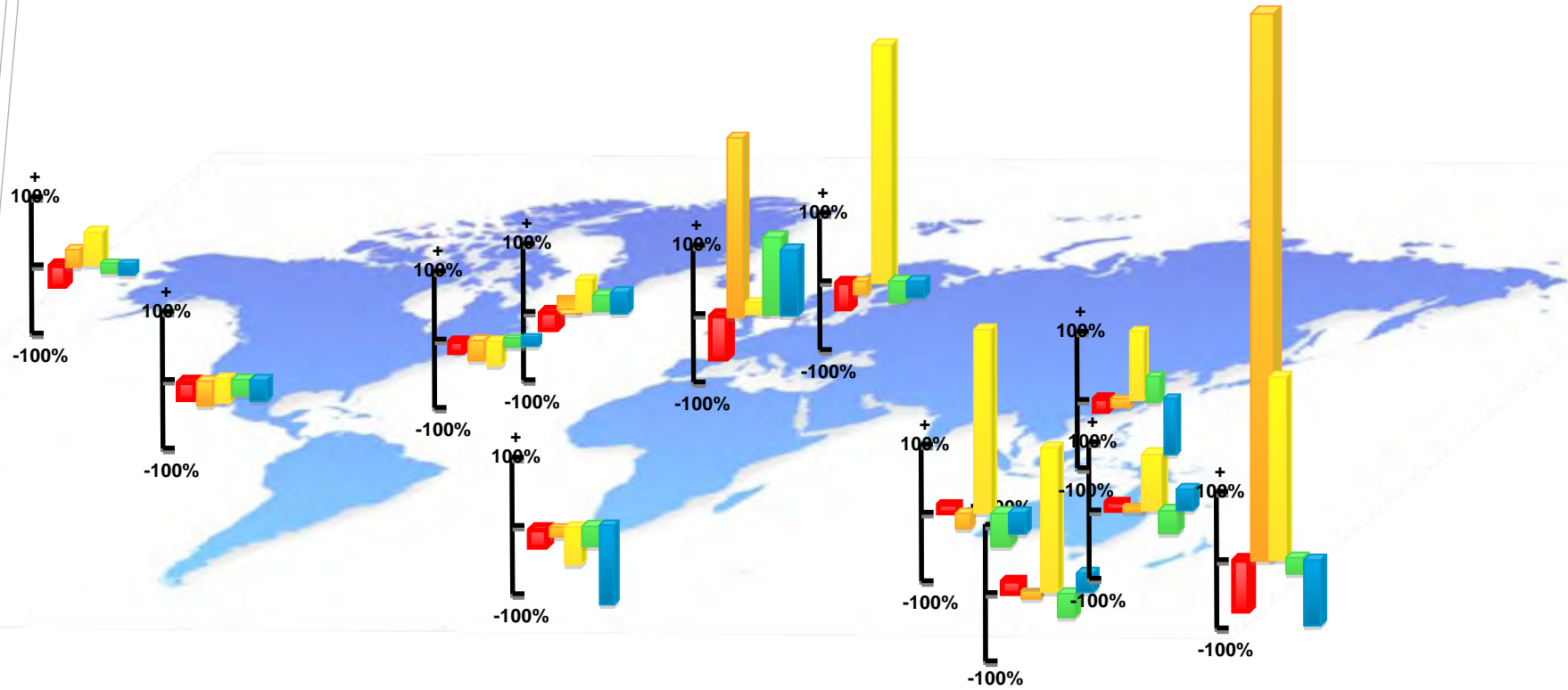
- Small group benefits, most suffer

# More Broadly

- Productive (and not)
- Some upwelling driven
- Temperate and tropical
- Heavy exploited
  - Some currently recovering
  - Some still overfished

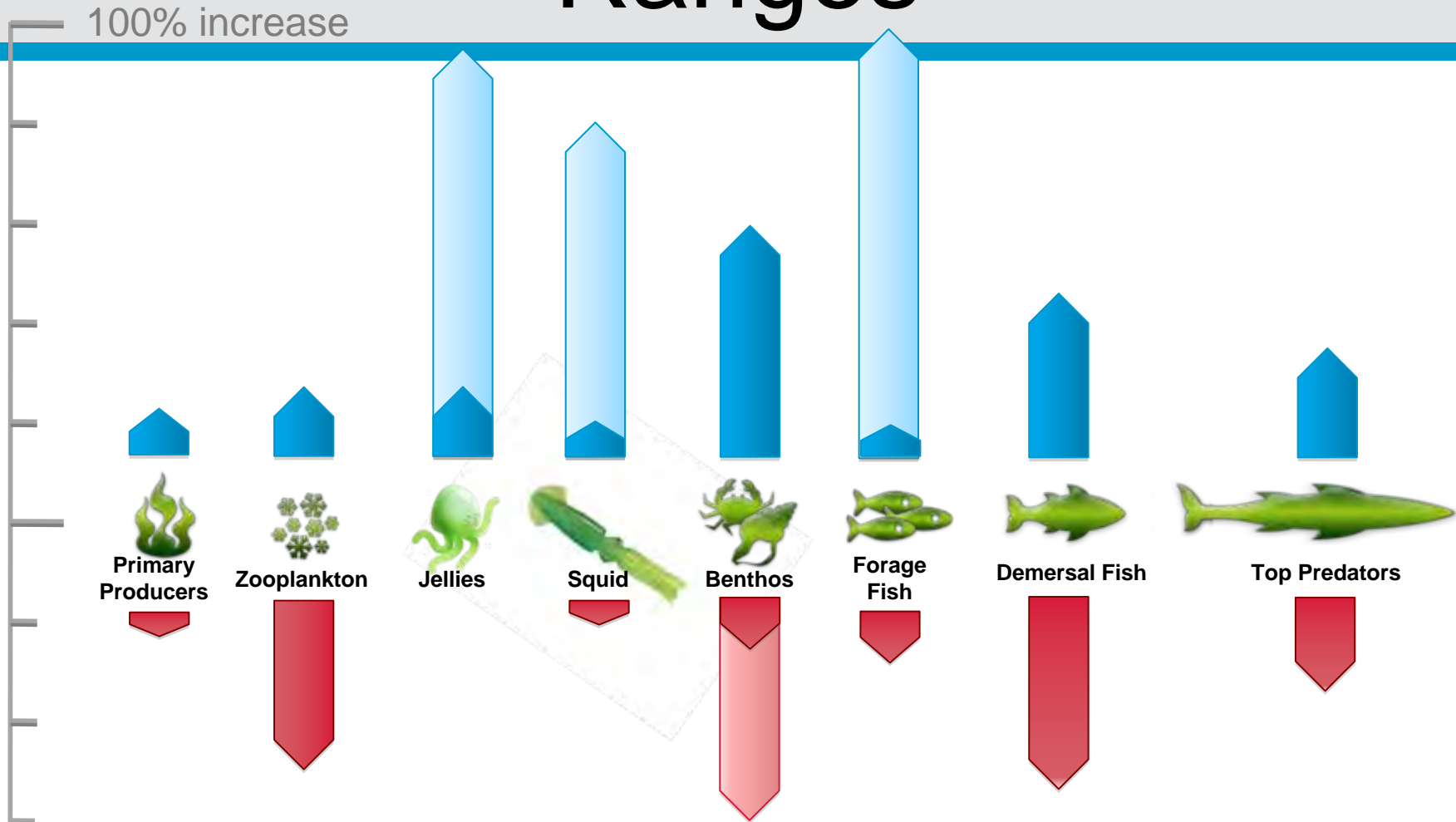


# Results



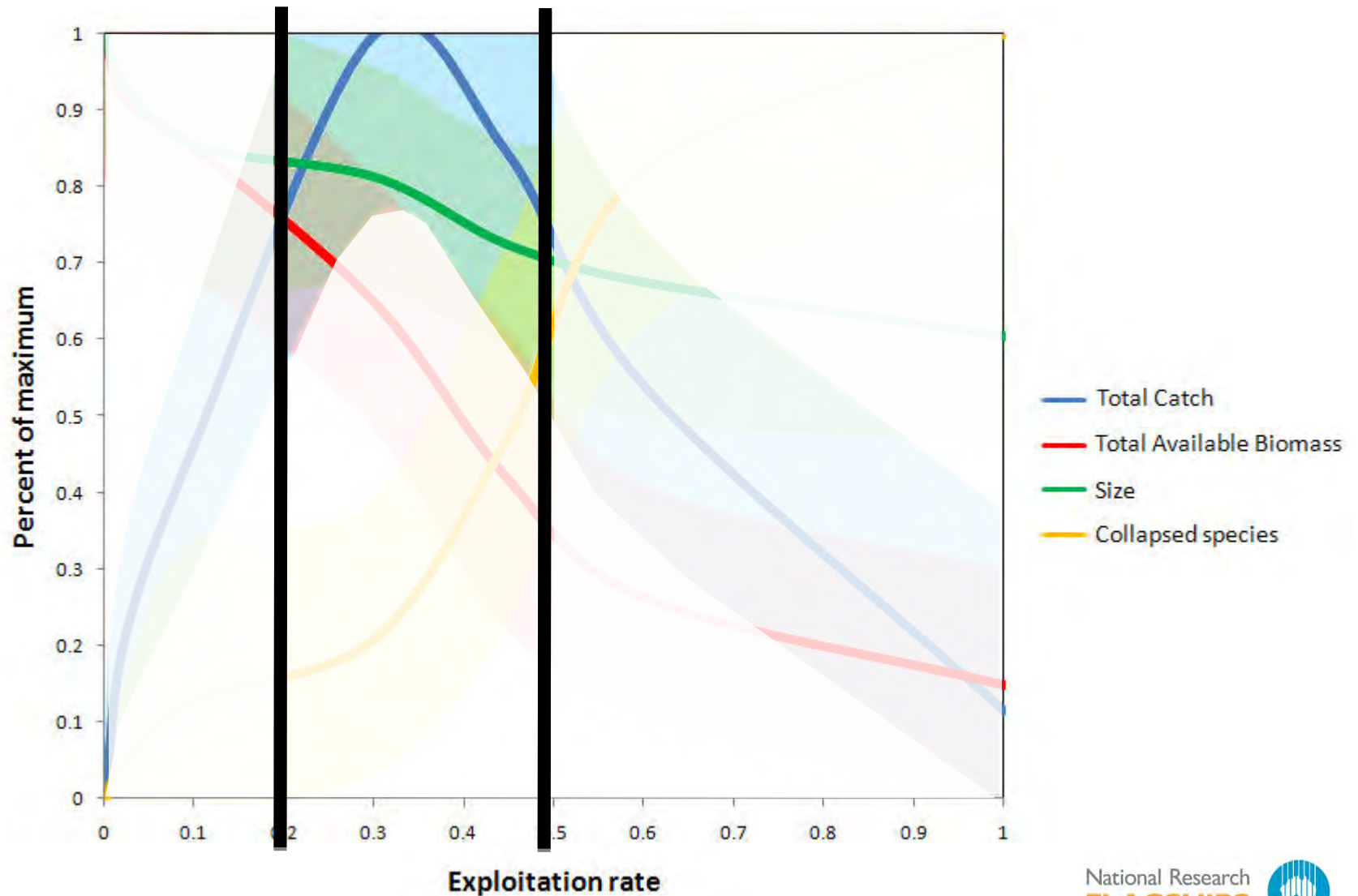


# Ranges



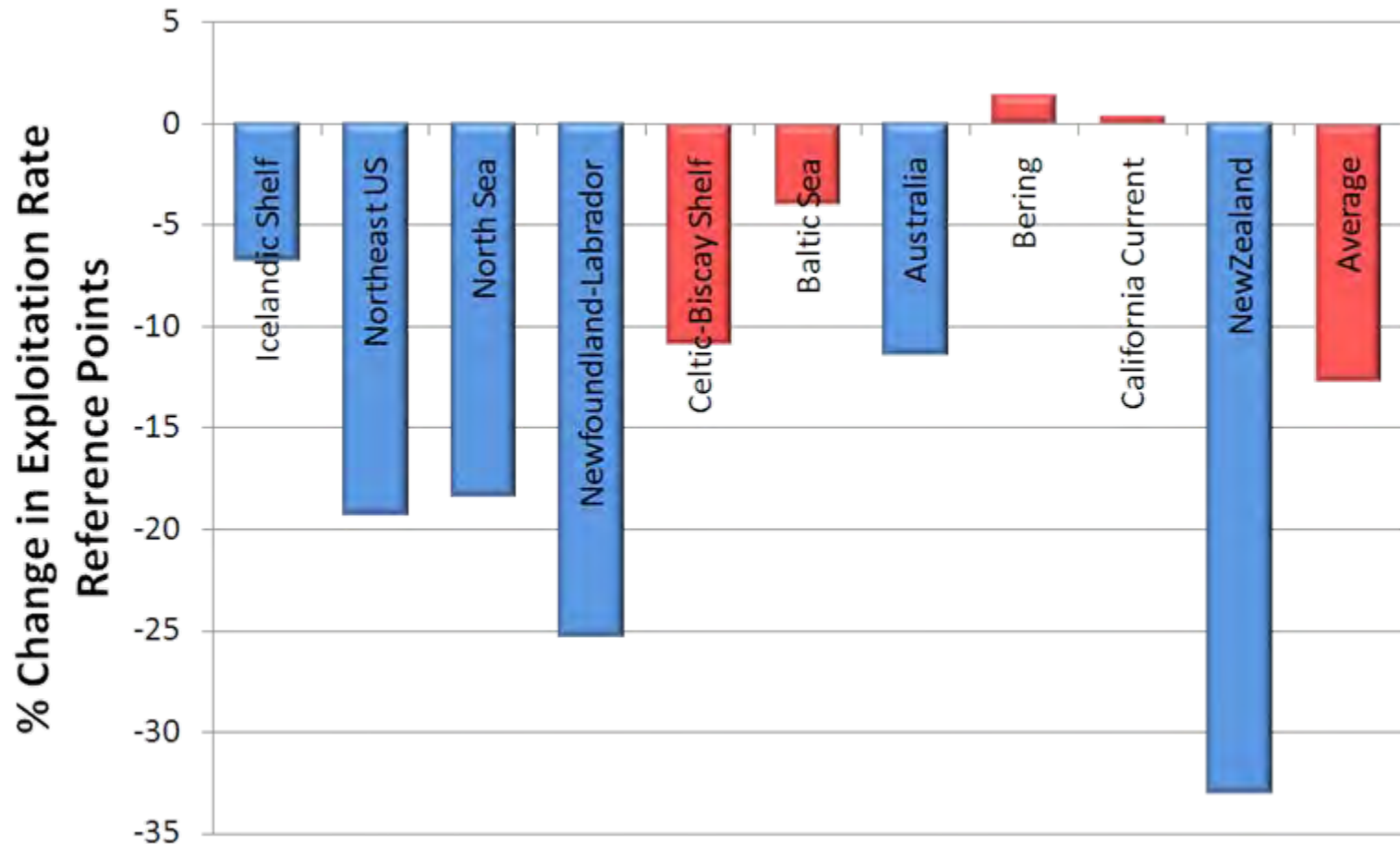
■ Adaptive capacity critical

# System Sustainable Yield



# Management implications

- Shifting reference points



# Change Is The Challenge

Climate change

Physical features impacted

Species composition changes

Bias, design, coverage,  
representativeness effected

Adaptive sampling?  
Avoid inconsistencies?

# Summary (Preliminary)

- Cumulative impacts
  - much (skewed) variation and uncertainty
  - regime shifts
  - pelagic fast turnover groups benefit most
  - system specific
  - adaptive capacity critical
  - skewed benefits
- Selective use, reduction in MMSY
  - scope for further change?
- Mix of management levers, evolve with system

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# Thank you

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Wealth from Oceans



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