

# From Climate Science to Adaptation Decision-Making

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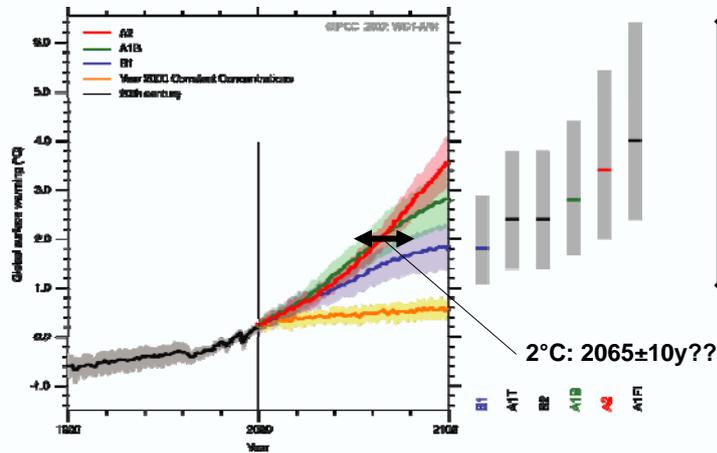
EIANZ Melbourne, 23<sup>rd</sup> October 2013



**Adapt, Innovate, Advocate –  
Business as Usual is not an Option**



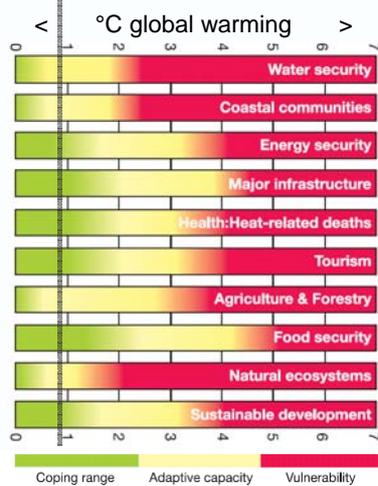
## IPCC 2007: 1.1-6.4°C? – probably not any more



IPCC (2007) Summary for Policy Makers (Fig.SPM.5)



## Australia: vulnerable among OECD nations



(a) Qualitatively different levels of impact, vulnerabilities and adaptation needs at 4°C compared to 2°C

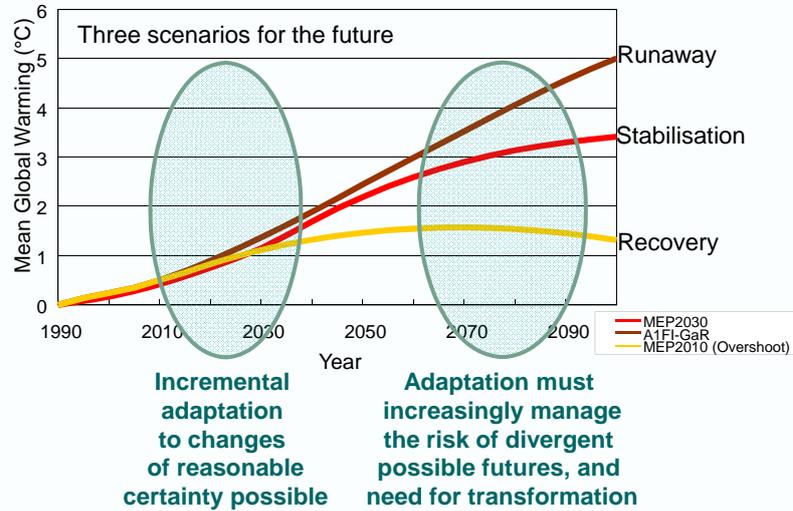
(b) Proactive adaptation needed to plan for stabilising at 2°C are very different to those needed for 2°C heading for 4°C+

*Could be disempowering...*

IPCC (2007) (Fig.11.4: Australia)



## Managing the risk from diverging possible futures



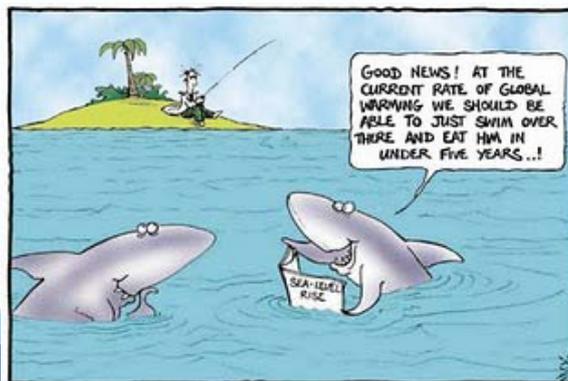
Stafford Smith et al 2011, Phil.Trans.Roy.Soc. 369



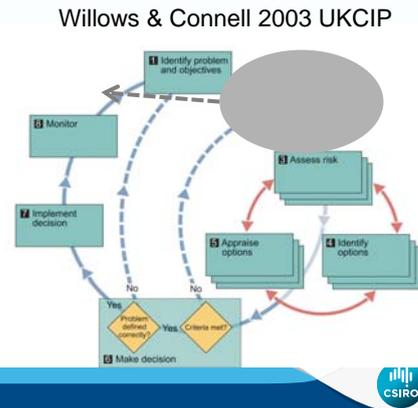
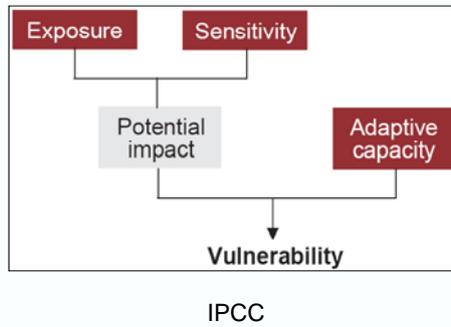
## Working towards *adaptation planning*

*It all seems disempoweringly complex...*

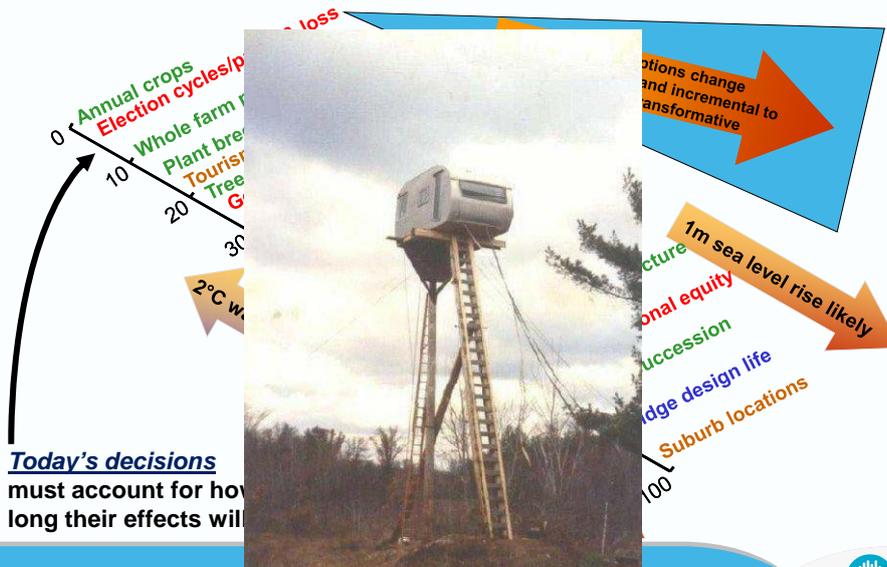
- Getting past impacts, vulnerability and adaptive capacity assessments, to adaptation decision pathways
  - Not all decisions are the same
  - Not all aspects of the future are equally uncertain
  - There *are* systematic approaches!



## Problem or solution-centred??



## Adaptation timing and priorities





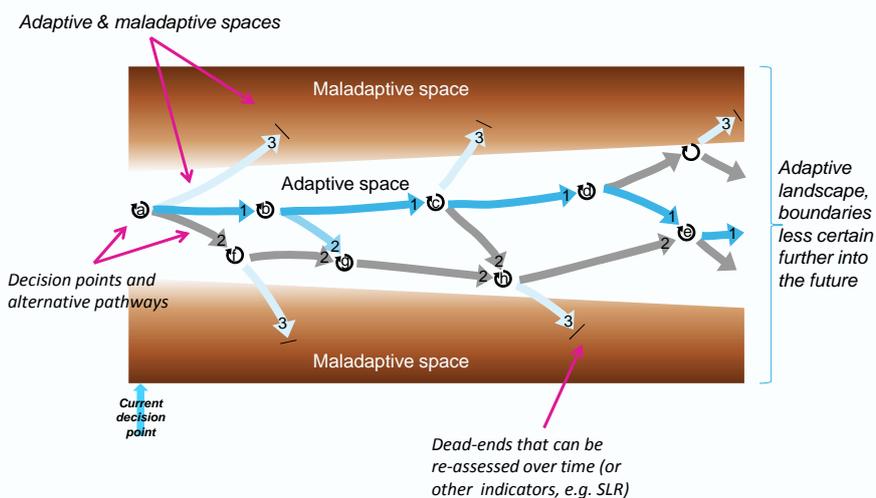
## Systematising responses

1. Short lifetime decisions
  - Mainly adapt incrementally, watch out for thresholds
2. Long lifetime decisions (where risk often falls to government)
  1. Monotonic, ~certain to occur, timing unsure
    - E.g. 2°C, 1m sea level rise, more hot periods, more extremes, more CO2
    - Plan for these, look for no regrets actions, use precautionary principle
  2. Direction sure but extent unsure
    - E.g. drying SW Australia and reduced water flows, fire risk in many areas
    - Use risk management, 'soft adaptations' to delay expensive decisions (but prepare for these), 'real options' analysis
  3. Even direction of response unsure
    - Robust decision-making, risk hedging against alternative futures, etc
3. And plan adaptation pathways, with critical decision-points
  - May include no action options, but deliberately!

Stafford Smith et al, *PhilTransRoySoc* 2010



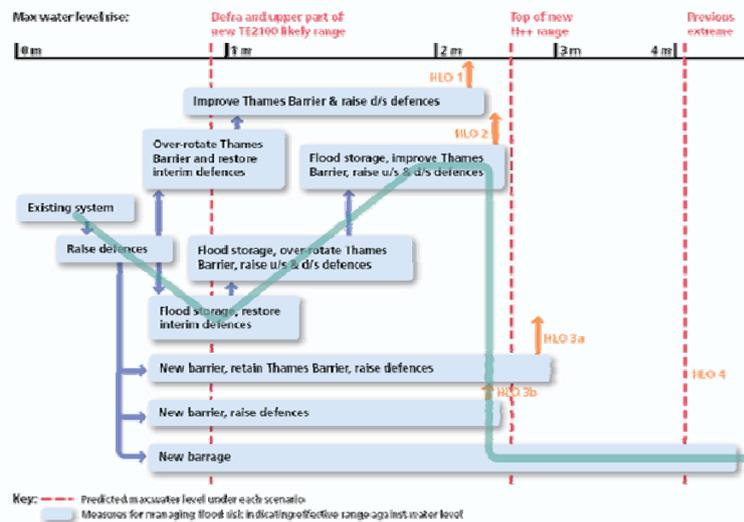
## The 'classic' adaptation pathway concept



Wise et al., *GEC* forthcoming



## Flexible decision pathways: Thames Estuary



Lowe et al, UK Met Office 2009

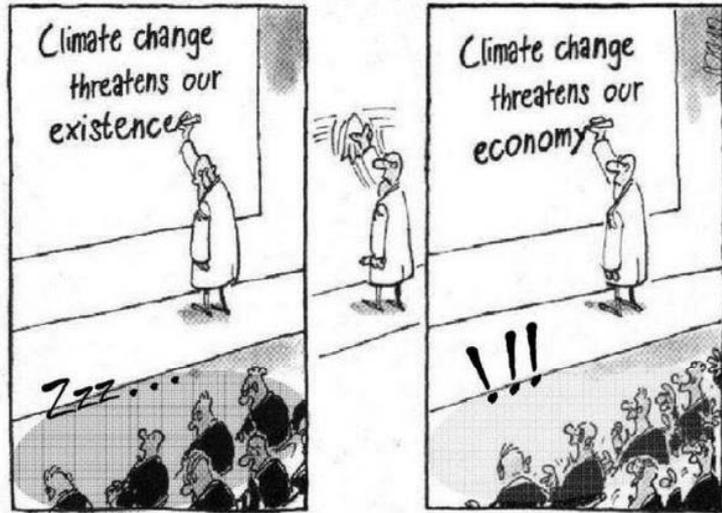


## Systematising a *decision*-centred approach...

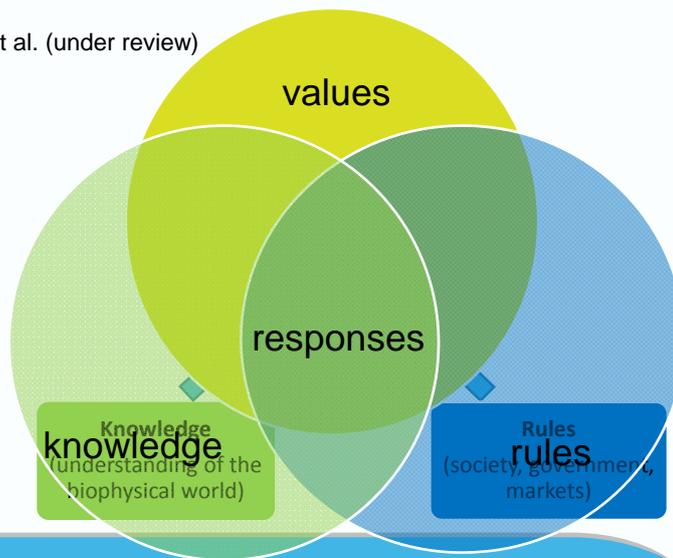
1. Not all decisions (& lifetimes) are equal
2. Not all threats are equal, nor equally uncertain
3. There are many approaches to managing risk
4. Adaptation will not be a once-off action >> adaptation pathways
5. Cycles of incremental and more transformative responses
  - *Evaluating whether adaptation is worthwhile...*



## Getting attention....



Gorddard et al. (under review)



Adaptation Services | R Wise et al.



## Assessing options, and related processes

1. Clear values and future risk profiles
  - Simple cost:benefits analyses, can be top-down study
2. Clear values but risk profiles uncertain
  - Real options with possible value of delay; can be fairly top-down
3. Values and risk profiles uncertain
  - Economic analysis flawed, need adaptive management/governance approaches, possibly MCAs; engagement processes essential
4. Values and risks uncertain, and institutions in contention
  - Analysis not yet possible, engagement and conflict resolution needed first

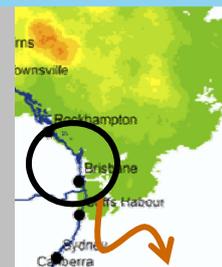
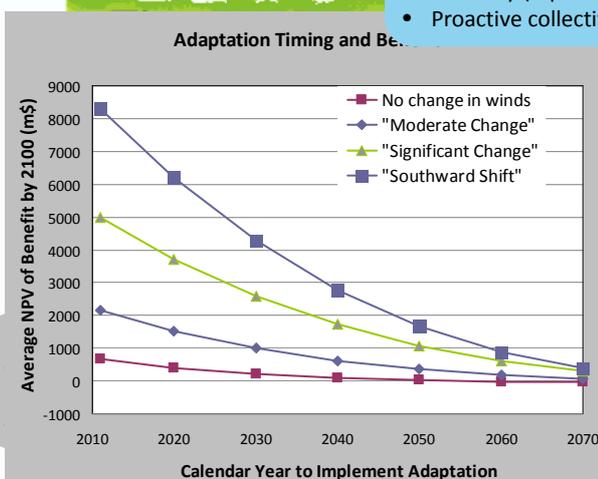
Russ Wise, Russell Gorddard, Tim Capon



### Specific decisions: Area

#### Key attributes

- No regrets (value even if no climate change)
- Robust (value for all scenarios)
- Act early (rapid decline in value over time)
- Proactive collective action (else delay)



Stewart & Wang, *Climate Adaptation Flagship*, 2011



## Queensland floods and cyclones 2010-11



## Extreme events, value chains & productivity

Unexpected high-intensity rain and other weather affects transport, energy and mining infrastructure

Intensities expected to increase in many areas



Ensham Mine, Queensland, 2008

- Production stopped for over a year
- \$mil

Yallourn, Victoria, 2007:

- Excessive rainfall caused a

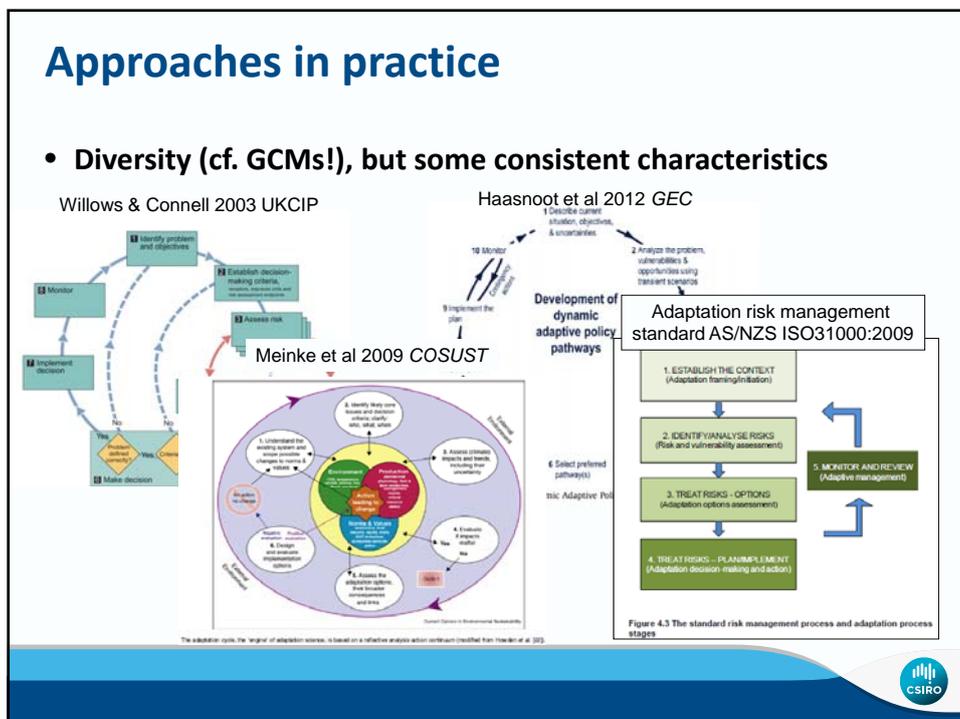
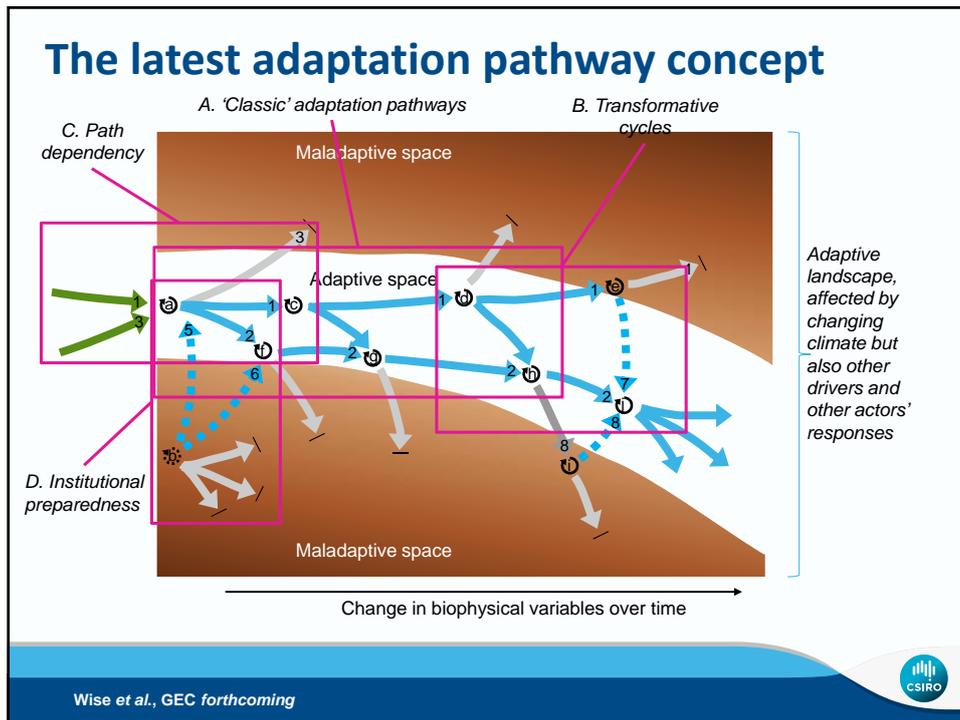
Pilbara, WA, 2006, 2009:

- Cyclones in 2006 and

**Despite major disruptions, evidence from surveys (2010) that mining industry in Australia is lagging behind**

- 'climate adaptation action' - 40% (Canada) vs. 10% (Australia), vs. 45% LGAs (Australia)





## Approaches in practice

- **Diversity (cf. GCMs!), but some consistent characteristics**
  - Decision/solutions-oriented
  - Iterative
  - Attentive to near-term decisions
    - avoiding maladaptation / closing options in face of uncertainty
  - With engagement
    - level required determined by Knowledge-Values-Rules limitations
- **Different levels of decision making**
  - National/regional adaptation planning
  - Prioritising within a specific sector, business, local government
  - Analysing options for a specific decision
    - etc



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