Certain to deeply uncertain: a decision-making teaser

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TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
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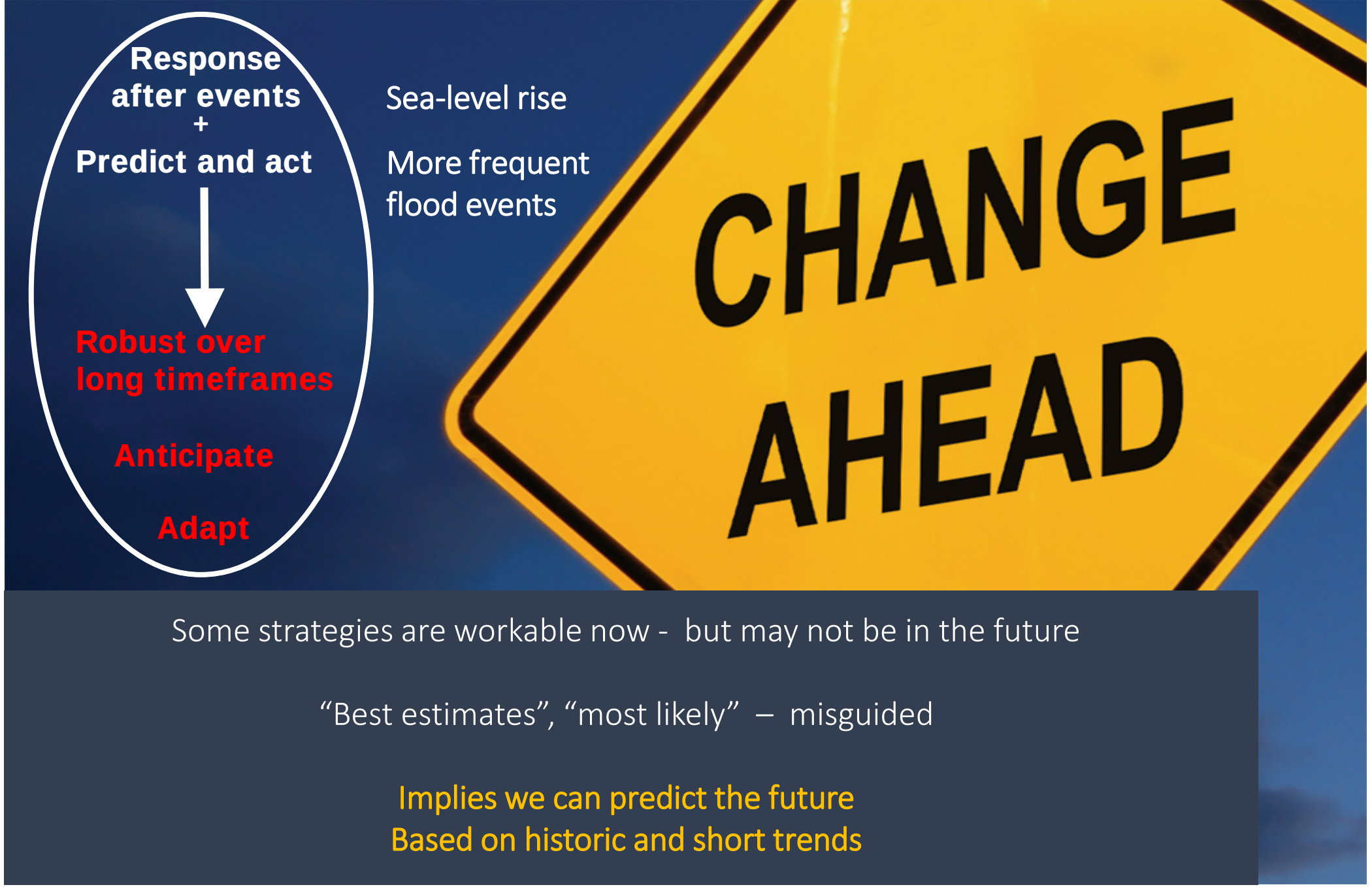


Some strategies are workable now - but may not be in the future

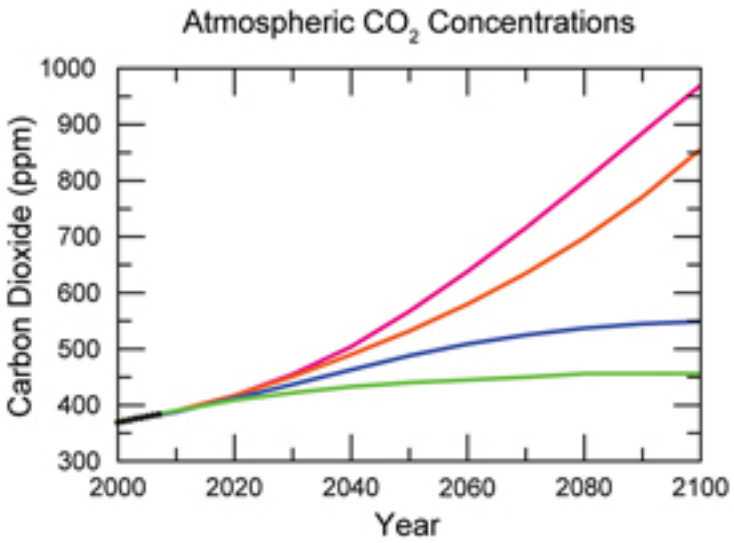
"Best estimates", "most likely" – misguided

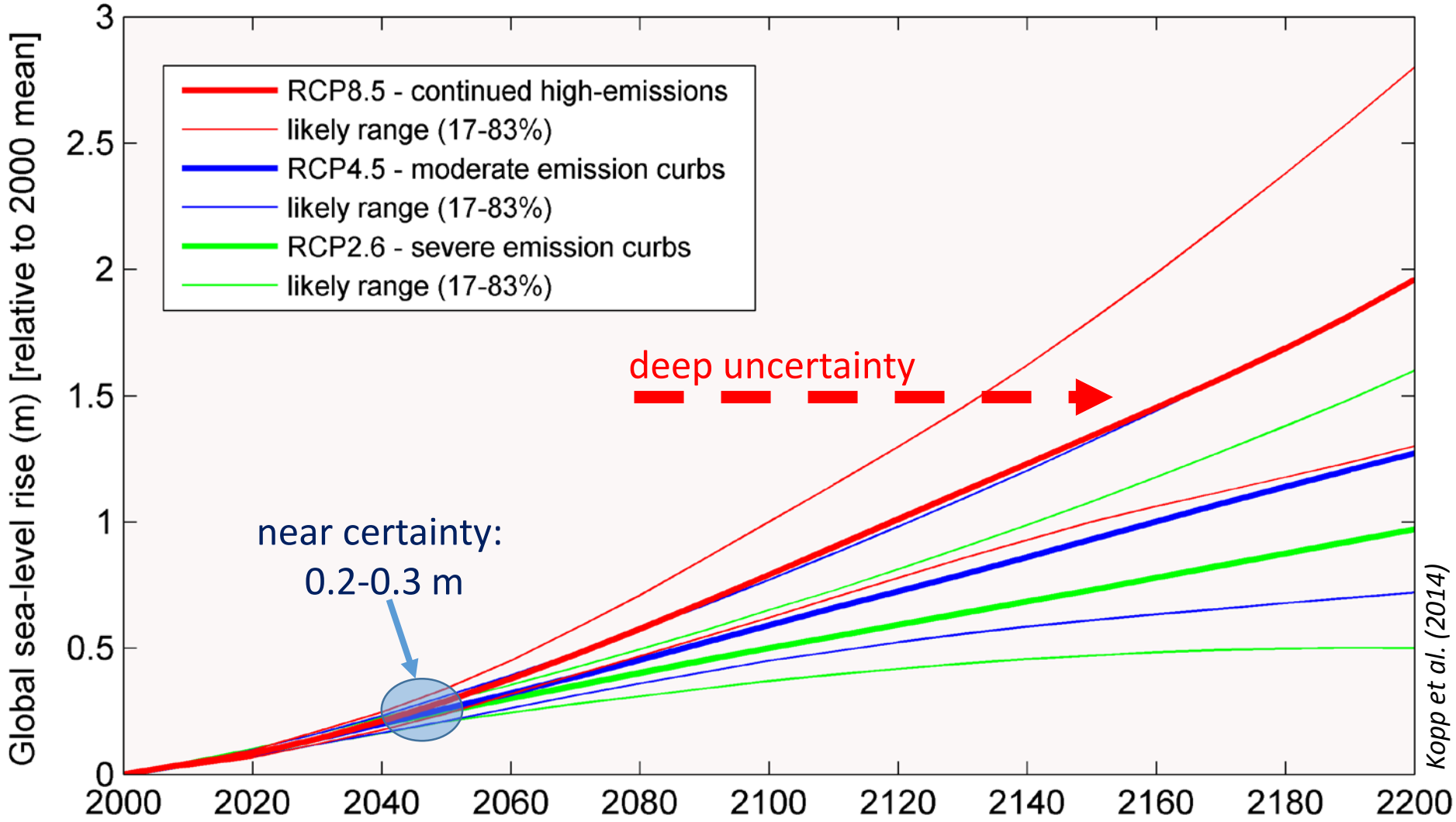
Implies we can predict the future
Based on historic and short trends

Source picture: http://www.ideachampions.com

Uncertainty problem

- People can't imagine 2117 and beyond
- Difficult for people to accept incurring costs for a future they can't even imagine
- But not all change is uncertain





- Near-term certainty with narrow range of SLR e.g. up to 2040s
- From mid-century on: increasing uncertainty incl. polar ice sheet instabilities

⇒ Need to test response options or actions with a range of scenarios

The Change problem

- Climate change is dynamic
- Policy design is often static in space and time
- Monitoring effectiveness of policy is difficult politically
- People prefer small and incremental change that doesn’t threaten way of life, values and sense of place

Policy problems are different

Types of climate change impacts

- *Slowly emerging impacts*—sea level and groundwater rise
- *Widening climate variability* –drought, flood frequency
- *Extremes*—coastal storm surge, intense rainfall, wind
- *Combos*
- *Cascades* to social and economic domains/ governance and legal

Capacity to act

- *Similar to existing variability*—capacity to adapt
- *Variability and impacts greater than current climate range experienced*—challenges institutions and organisations capacity to adapt
- *Outside current and lived experience with regime shifts*—challenges politics, institutions and ability to adapt fundamentally

Decision-making challenge

Managing **uncertainty and change**

- Over long timeframes
- With many organisations and actors
- Over interdependent scales of governance
- Requires mediation of different values and preferences
- Current and future generations

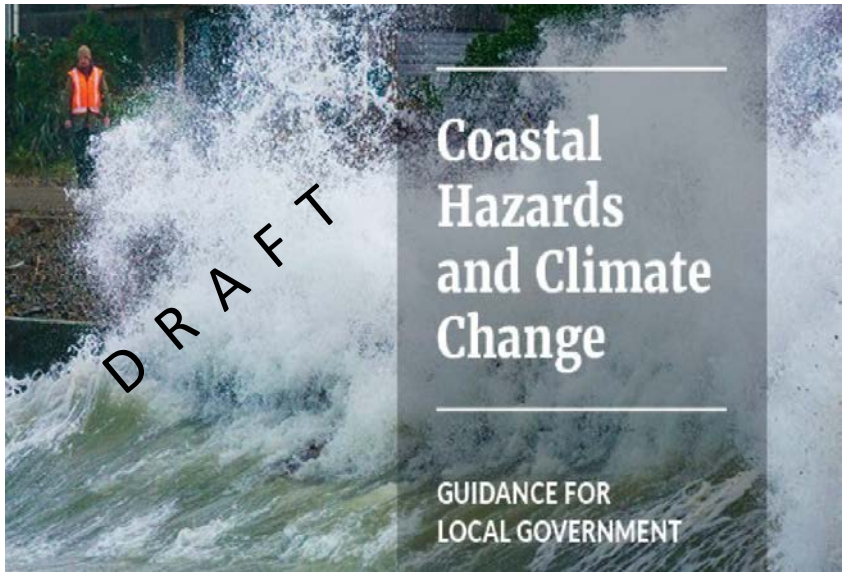
Decision processes and practices that **fit the problem space**

Requirements for decision makers

- Guidance that helps navigate a changing and uncertain future
- Guidance that helps mediate difficult conversations with stakeholders and between different experts
- Tools to give certainty yet flexibility
- Simple to understand and use
- Robust under a range of future conditions

Key elements of revised national coastal guidance

- Treatment of uncertainty and changing risk profiles
- Actions linked to types of uncertainty and decisions
- Values-based - different types and levels of community engagement
- Embeds dynamic adaptive pathways planning
- Supported by a monitoring/triggering for flexibility



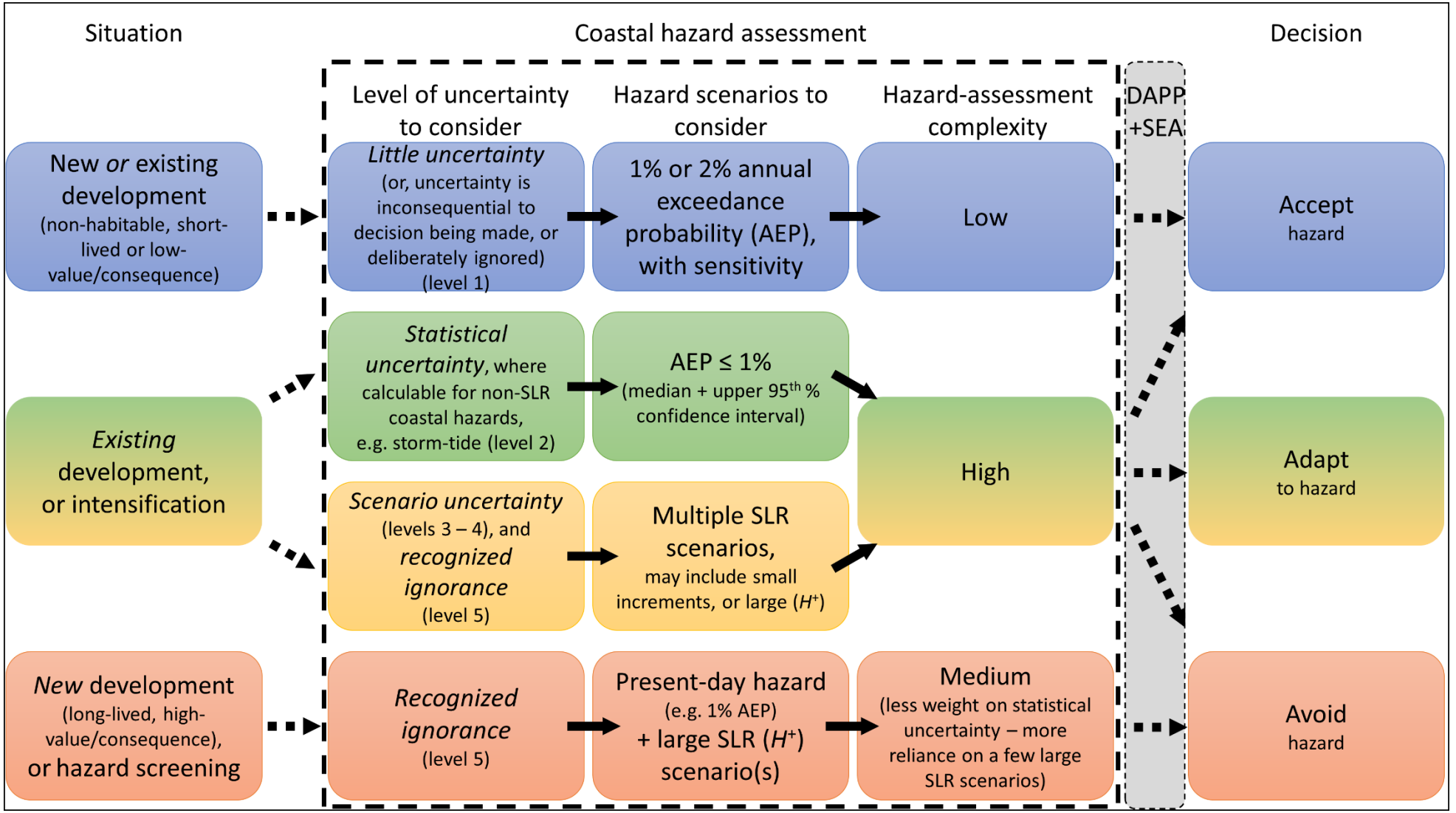
Decision cycle: NZ coastal hazards guidance

Adapted from UN-Habitat 2014

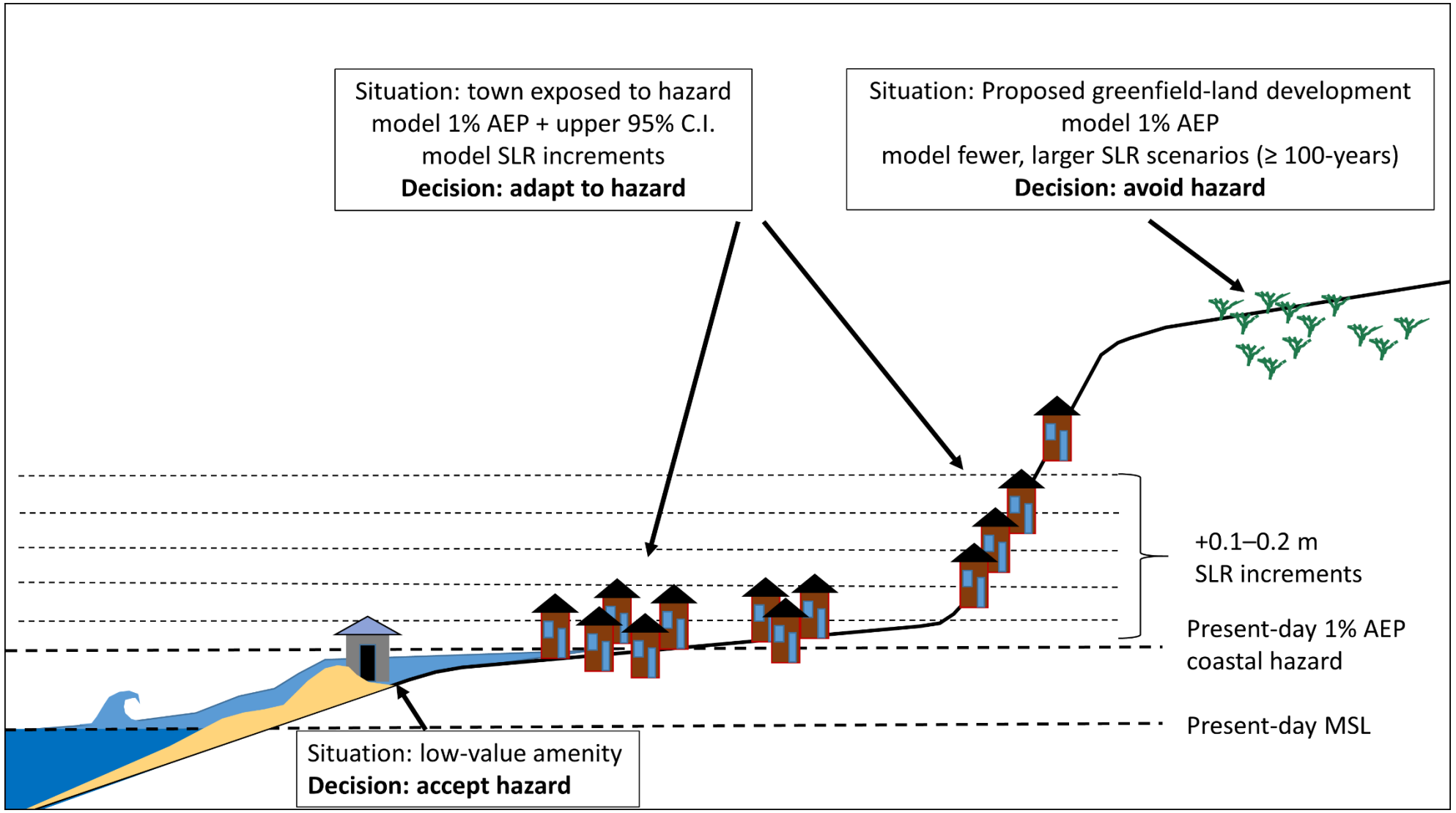
Adaptation—essential ingredients

- Legitimate engagement process that is transparent & collaborative
- Clear communication of uncertainties and how to address them
- Ability to switch pathways when objectives start to fail
- Mainstreamed across all council functions and processes
- Monitoring and review
- Committed governance over long timeframes

Decision types linked to uncertainty types: coastal hazard assessments



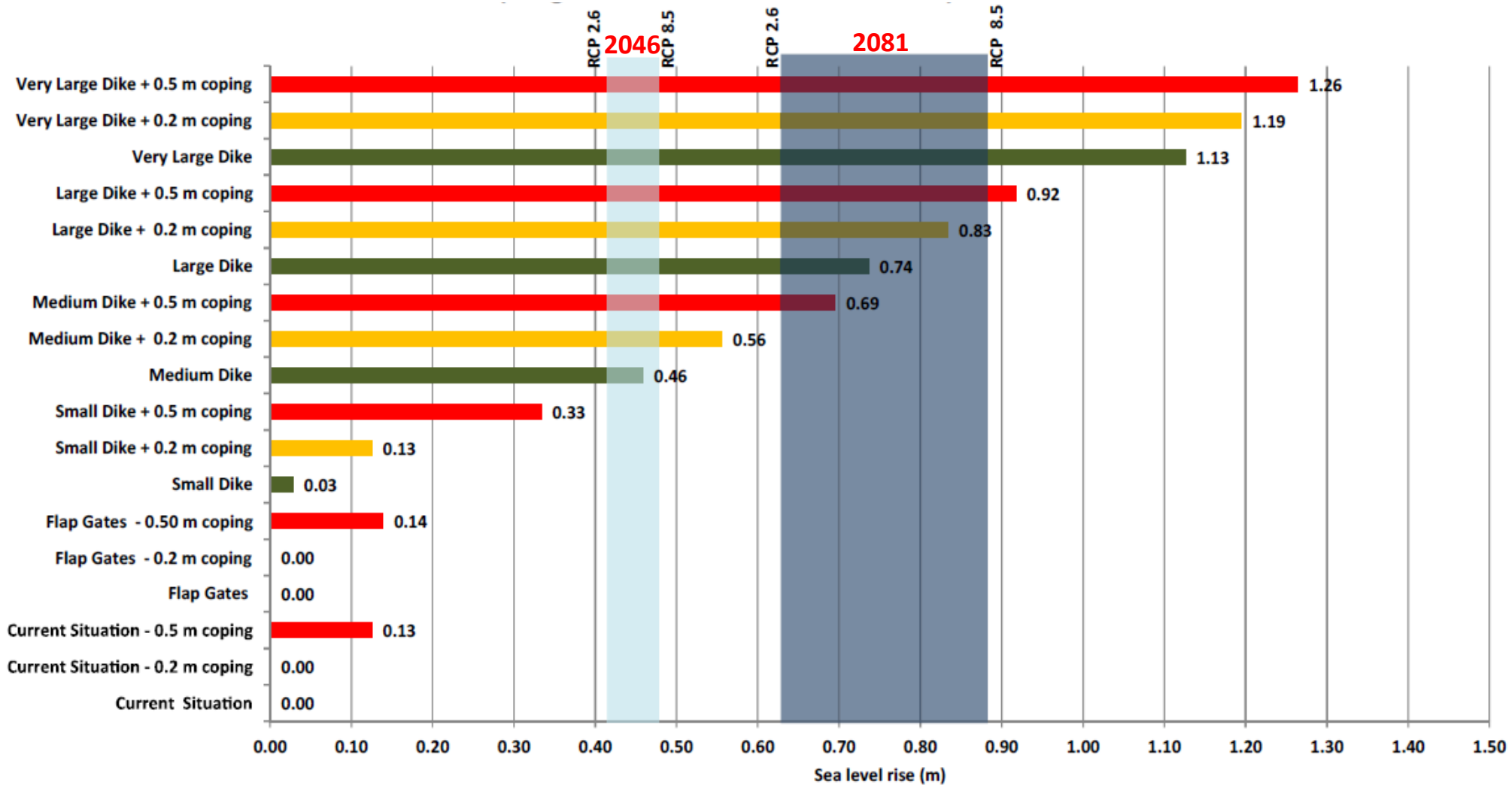
Hazard assessment linked to decision type



Stephens et al., 2017

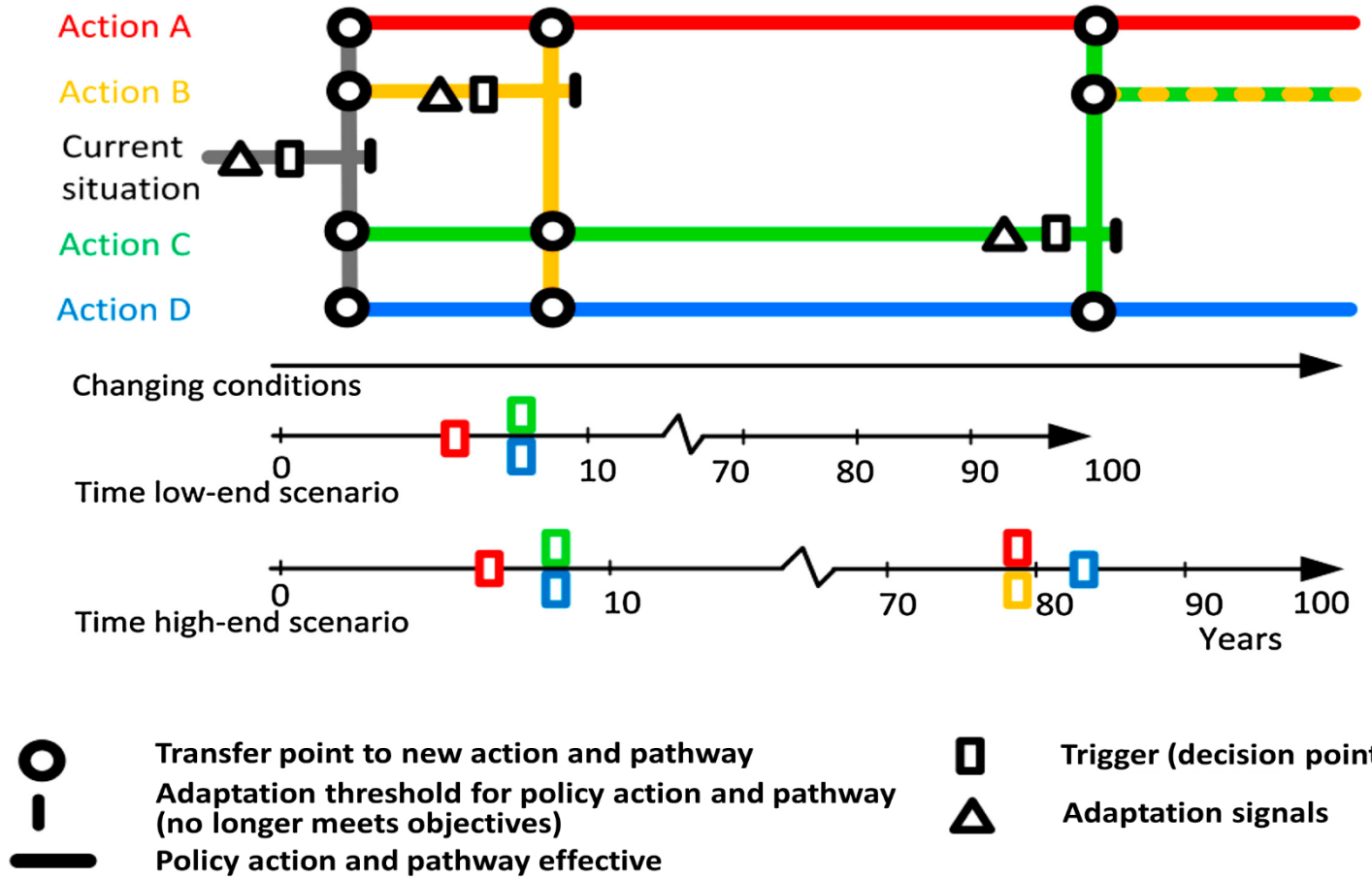
Building response options to shelf life

Effectiveness of flood protection measures against sea-level rise
Tipping point (objective fails): if ≥1% of total city area is flooded (end of bars)



Radhakrishnan et al., Climatic Change, 2017

Dynamic adaptive pathways planning



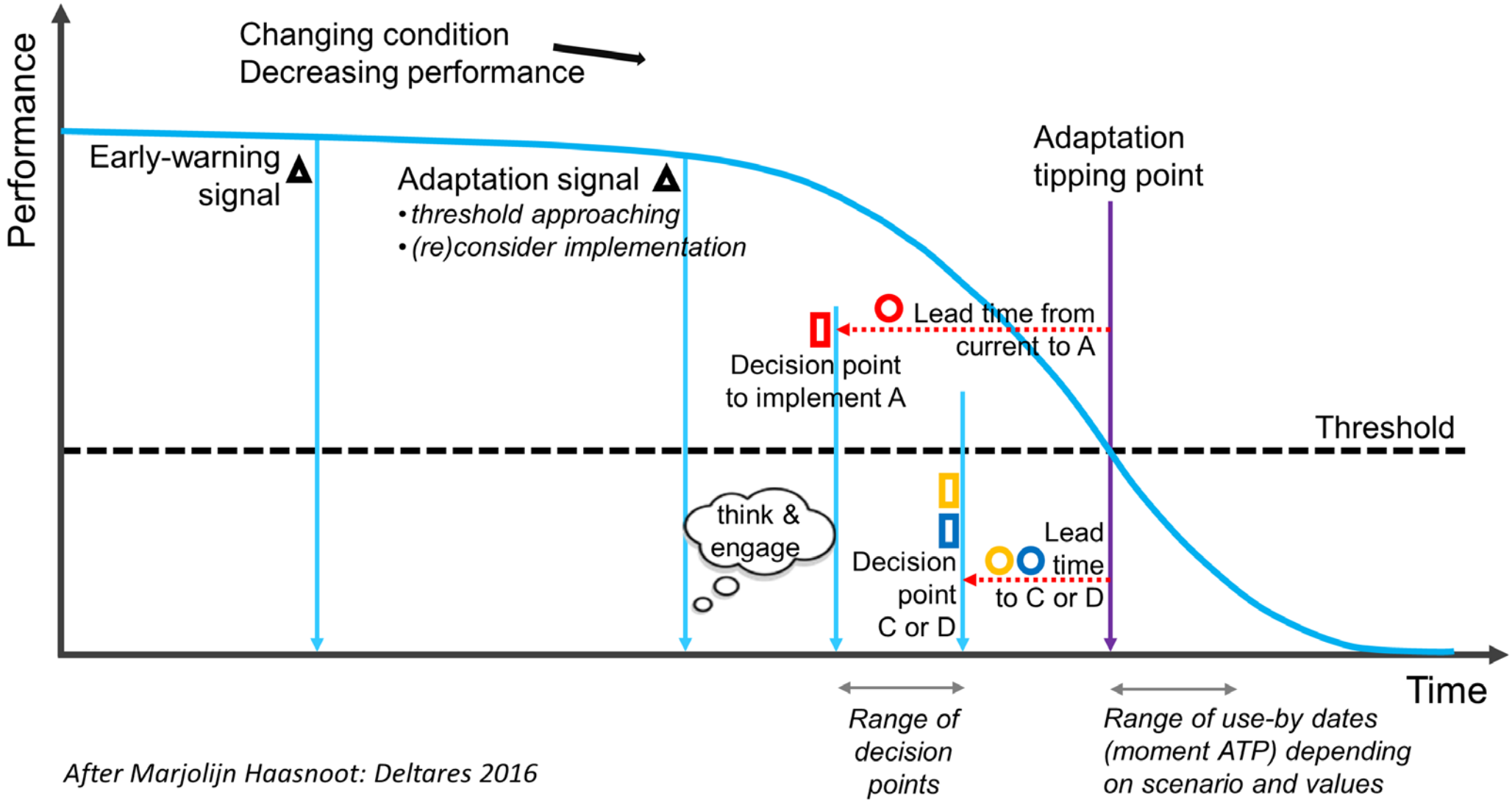
After Haasnoot et al. (2013), Hermans et al. (2017)

Pathways development and evaluation

Asks the following questions:

- Will the option meet the long term objective?
- If not, under what conditions will it fail requiring a switch to other options?
- Will it increase or decrease exposure to the changing hazard?
- What combination of options will give the greatest flexibility?
- What are their side effects? What is the residual risk?
- What other actions are required to meet the objectives? (e.g. planning controls, regulations, warning systems, information, funding, insurance/bank investment issues)

Lead time (signals, triggers and thresholds)



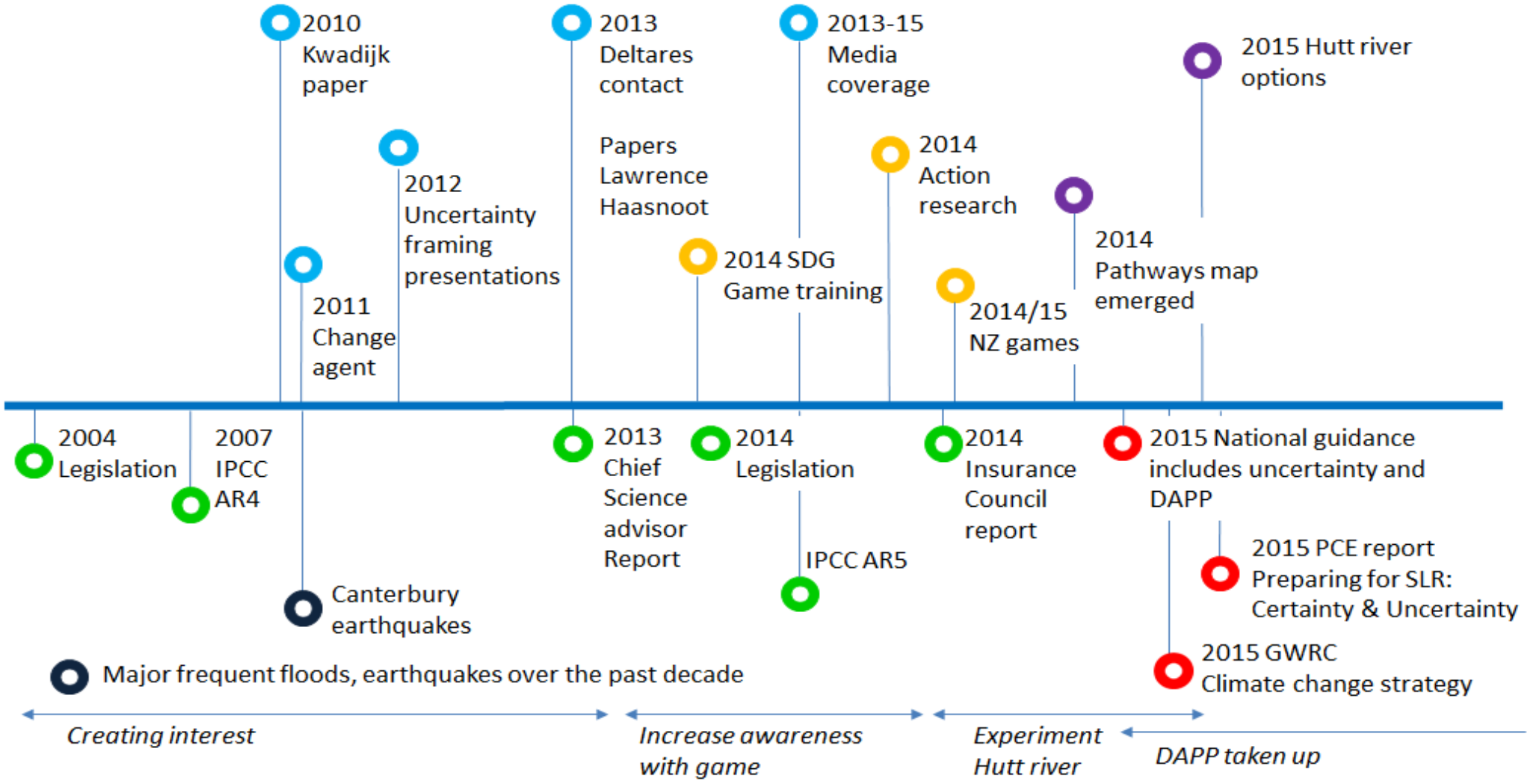
After Marjolijn Haasnoot: Deltares 2016

Managed retreat in the conversation

Considering uncertainties widens the decision space

- Pre-emptive or reactive?
- Scale of transition?
- Who initiates – who decides and how?
- Voluntary or compulsory?
- Funding, compensation and insurance issues

What it took to get to GO



Lawrence & Haasnoot 2017

Iterative learning-based approaches as catalyst

“We make short-term decisions. This game showed we can make long-term decisions by anticipating and adjusting ”

“ We experienced uncertainty and could chart a pathway ”

“ We got better results through negotiation with the other groups”

- Shared understanding of system functioning
- Promising solutions that are flexible and adaptive over time
- Solutions through conversations
- Can adjust decisions as conditions change
- Built **legitimacy, credibility and relevance**

Next steps

- National roadshow to socialise changed practice
- Develop signals and triggers for monitoring
- More applications and hybridise with other DMDU tools e.g. MCA and ROA, RDM
- Research on cascading impacts to other domains e.g. governance scales, social and economic sectors
- Climate Change Adaptation Technical Working Group
- Climate Change Commission proposed by new NZ Government
- Watch this space!

Questions?