Greenhouse Gas Strategies in a Changing Climate November 17, 2011

Plenary Panel: Climate Change – Effects and Adaptation

Making Water Resource Investments with a Changing Climate, a Corps of Engineers' Perspective on Sea Level Change

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"Rising sea levels dictate that we should increase our understanding of how this fact might impact our design of coastal projects and what our national policies should be concerning where to defend and where to retreat along the shoreline. We will be starting a study to look at these national implications and probably increasing our investment in the science and predictive science in some of these areas. "

- Gary Loew on Civil Works Programs Development, Defense and Execution--Status and Future, April 14, 2011

NRC Update Opportunity

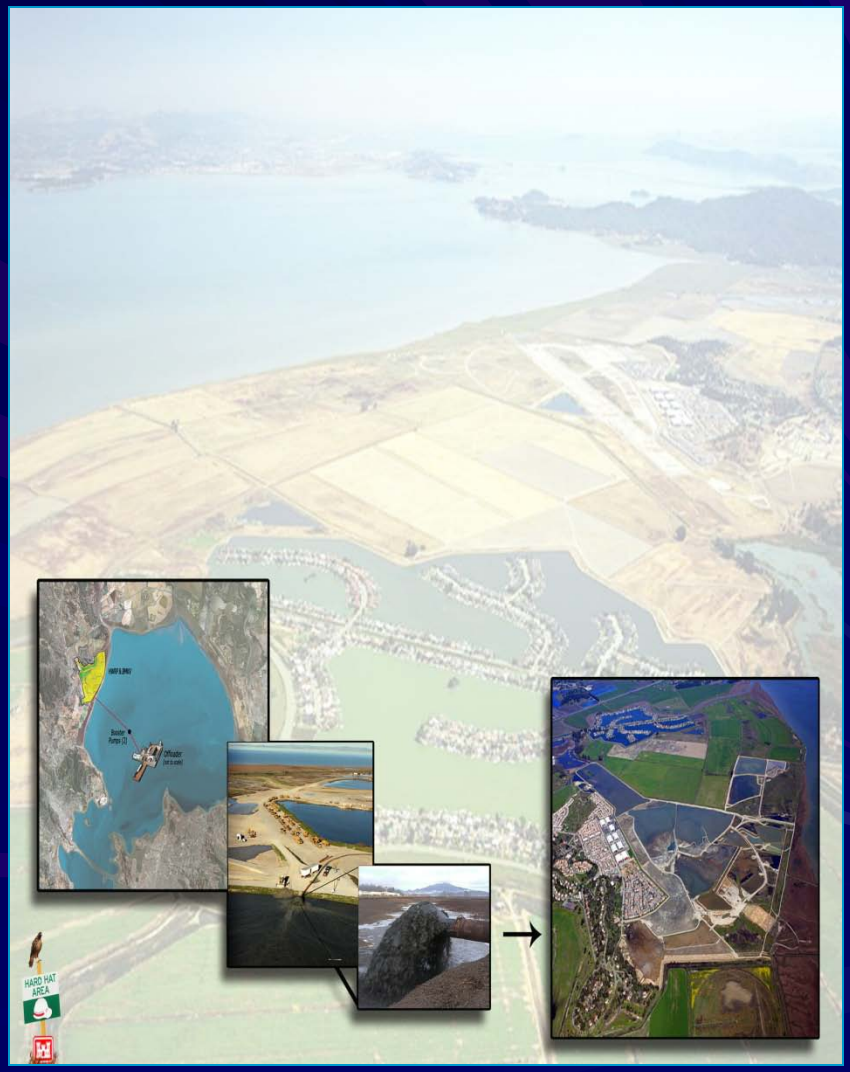
- CA/OR/WA/USGS/NOAA/COE funding an NRC update that can become new NRC source for guidance (more current than 1987 NRC source)

- CA EXECUTIVE ORDER
  S-13-08 (11/14/2008) The California Resources Agency… shall request that the National Academy of Sciences (NAS) convene an independent panel to complete the first California Sea Level Rise Assessment Report and initiate,… an independent sea level rise science and policy committee made up of state, national and international experts.

- 2011 scope: provide values or a range of values of global and local sea level rise for the years 2030, 2050, and 2100; and evaluate the uncertainties associated with these values for each timeframe. Draft report in internal NRC review as of November 2011 – release expected in late spring 2012.

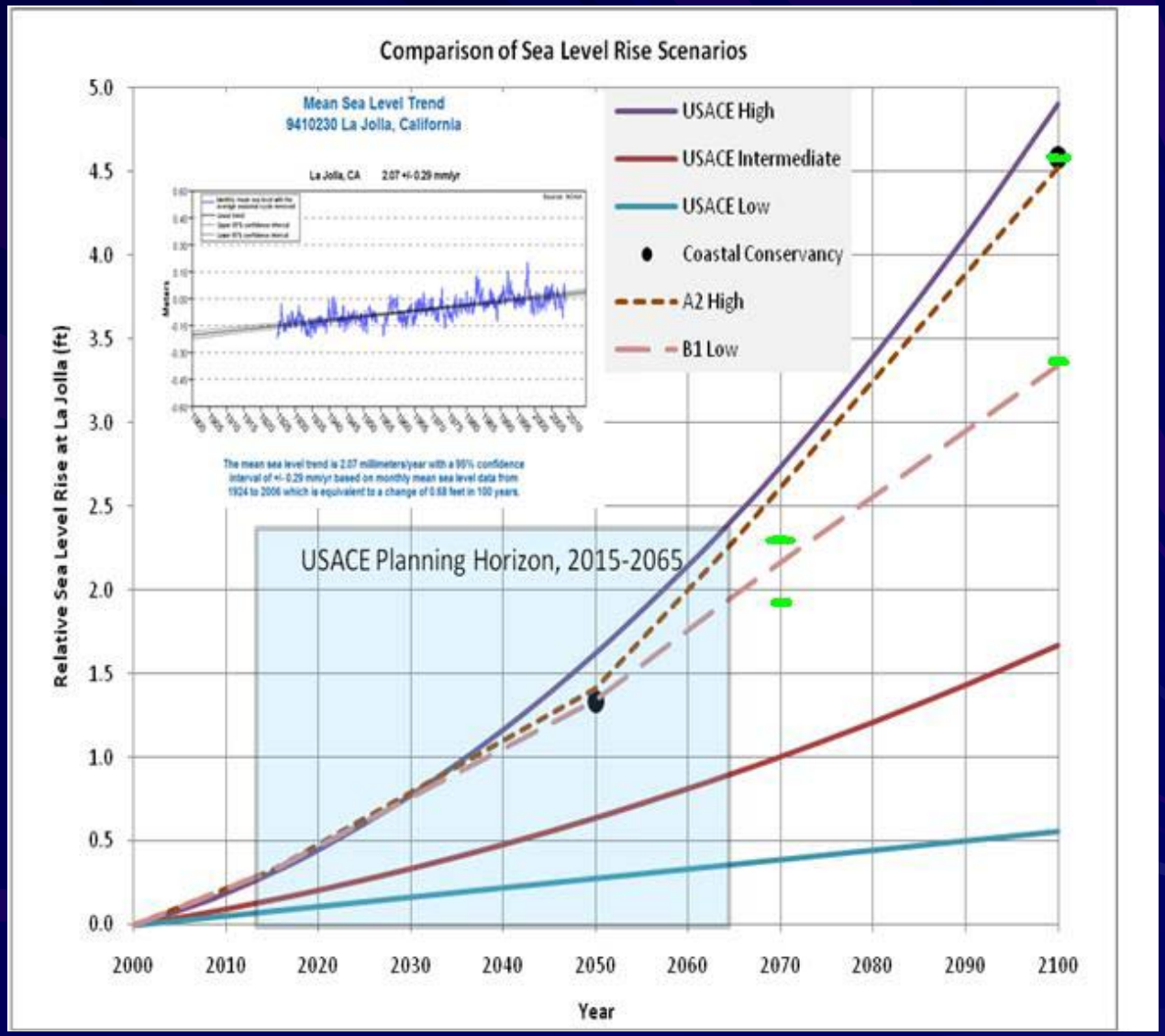
US Army Corps of Engineers: Why Sea Level Change is Important

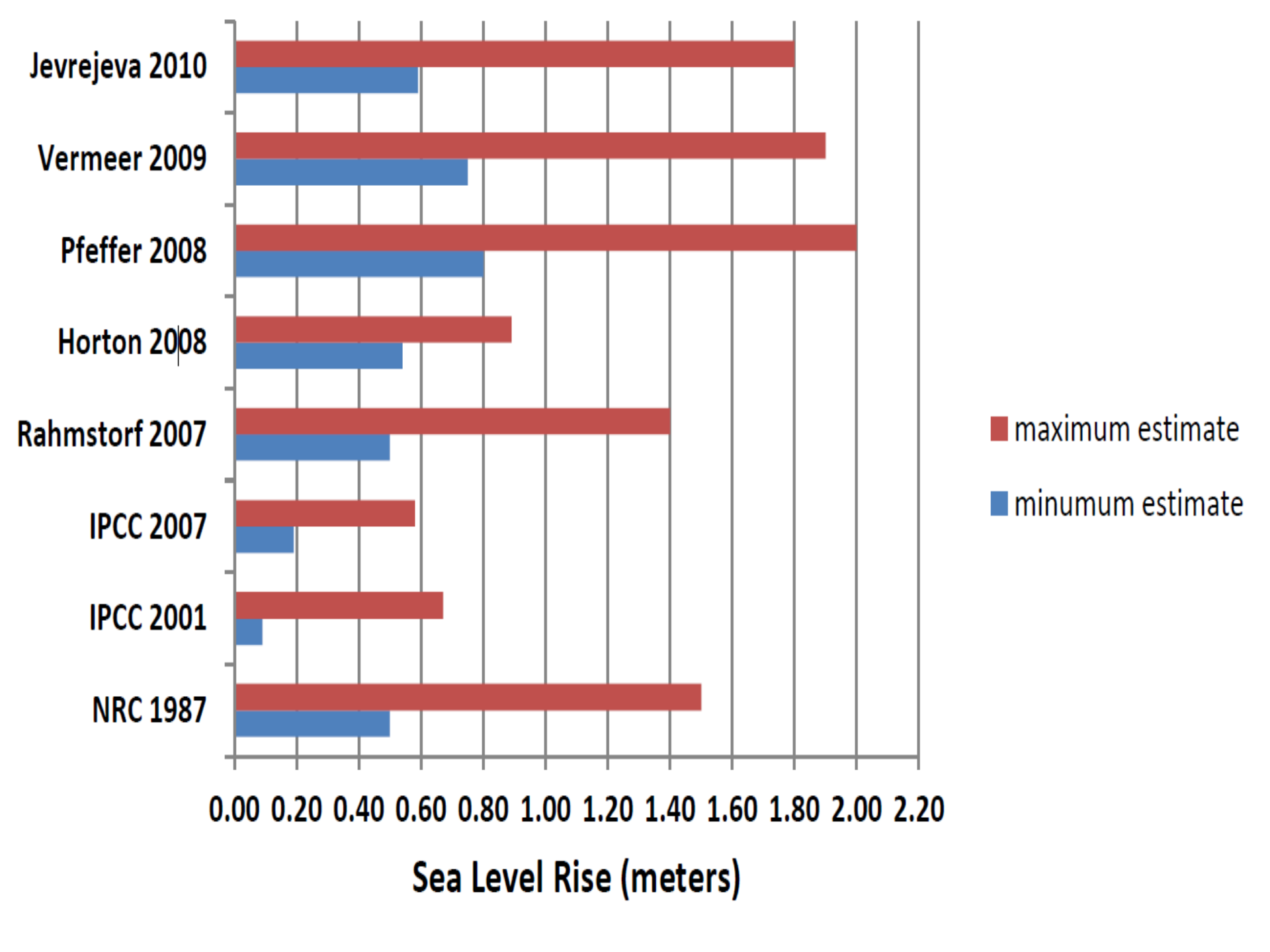
- We are an end user
- Water Resource investment decisions are now based on projections modified from the 1987 NRC study "**Responding to Changes in Sea Level: Engineering Implications** "
- Need an update!



Sea Level Change Planning

- EC 1165-2-211 1 July 2009
- Use Multiple Scenario Approach
- High: modified NRC 1987 curve III
- Intermediate: modified NRC 1987 curve I
- Low: historical trend




Jevrejeva 2010
Vermeer 2009
Pfeffer 2008
Horton 2008
Rahmstorf 2007
IPCC 2007
IPCC 2001
NRC 1987
0.00 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.20
Sea Level Rise (meters)
maximum estimate
minumum estimate

Planning Strategies

-Scope work according to sensitivity of conditions (decision metrics) to SLC; what are the consequences of being wrong?

-Think in terms of life-cycle; when are best times to act?

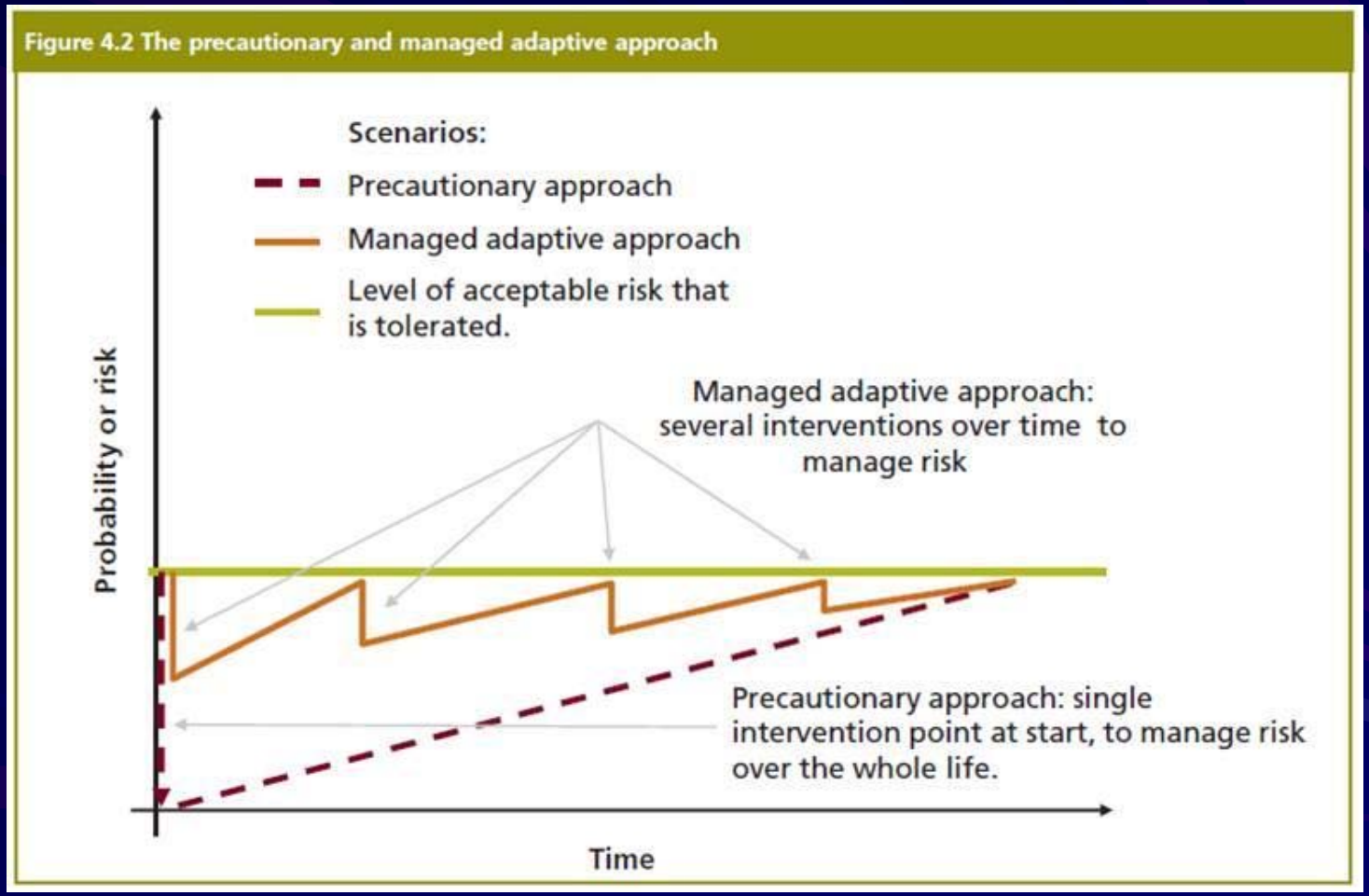
-Formulate array that includes adaptive, anticipatory, and reactive strategies

-Seek Robust Plans

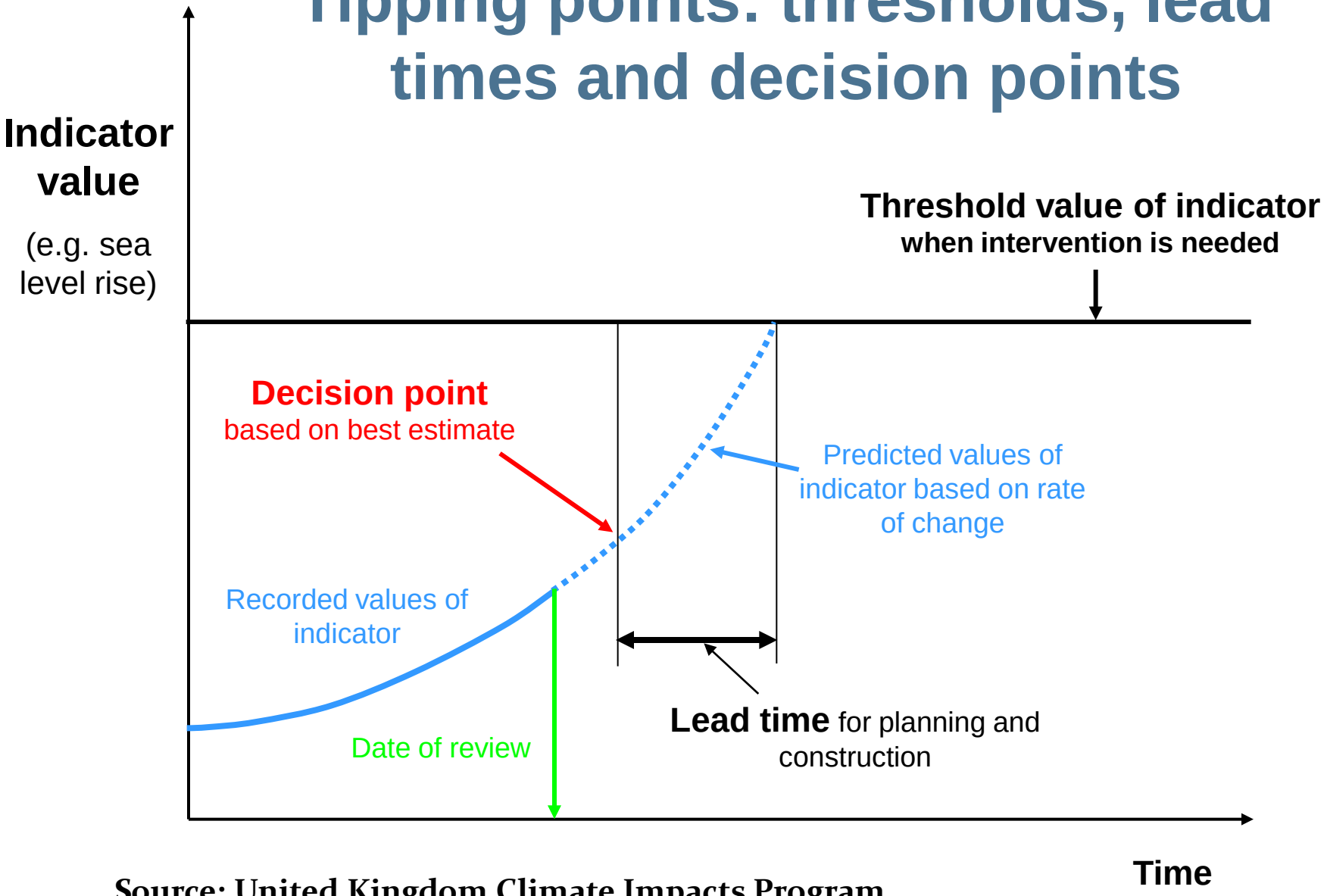
-Display cost-risk trade-offs

-Leads to Informed Decisions

Phased Investment Strategy



Tipping points: thresholds, lead times and decision points

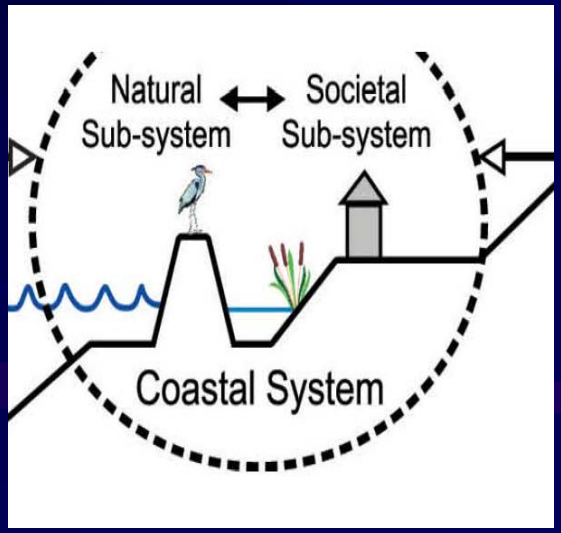


Source: United Kingdom Climate Impacts Program

ETL Team Members: Jonathan Simm, Robert Nicholls

Alternatives Development & Selection

- Adaptive Management
- Facilitate Future Modifications
- Design for the Future



	Scenario 1	Scenario 2	Scenario 3
Alt A	☺	**-2**	**-20**
Alt B	**-1**	☺	**-5**
Alt C	**-10**	**-6**	☺

Recommendation

- Robustness –performs well w/ all scenarios
- Regret-based approach
- Cost-risk trade-offs

► If cost-cost trade-off, no firm rule

► If trade-off of cost vs. safety, precautionary with respect to safety risk, minimize worst-case outcome