


+ ACCO March 2011

+ **Scientific Uncertainty and
Climate Change Risk Management**

+ Jay Gulledge, PhD
Senior Scientist and Program Director
Pew Center on Global Climate Change
&
Non-resident Senior Fellow
Center for a New American Security

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+ **Where We're "Certain"**


+ • Warming of the climate system is **unequivocal**

+ • Warming since 1950 is **very likely*** due mostly to manmade GHGs accumulating in the atmosphere

+ • Unabated emissions of GHGs will **very likely*** cause further warming in the range of 2 -11°F


+ • The climate will be unlike humans have ever known if warming exceeds a few degrees

+ ***very likely: >90% chance**

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+ Where We're "Uncertain"

- + • Equilibrium climate sensitivity
- + • Future GHG emissions and other forcings
- + • Timing and magnitude of future change
- + • Regional details of future change
- + • Timing/effects of positive feedbacks
- + • Thresholds/tipping points/irreversibility




+ Where We're "Uncertain"

- + • Equilibrium climate sensitivity

- + • Future GHG emissions and other forcings
- + • **These cast no doubt on climate change or its causation**
- + • **All imply the potential for greater damage than "expected"**
- + • **None are going away before decisions need to be made**

- + • Timing/effects of positive feedbacks
- + • Thresholds/tipping points/irreversibility



+ **Risk Management/Reduction**


+ *“Responding to climate change involves an iterative risk management process that includes both adaptation and mitigation...”*

+ IPCC 2007

+ **Risk: Probability X Magnitude (Severity)**

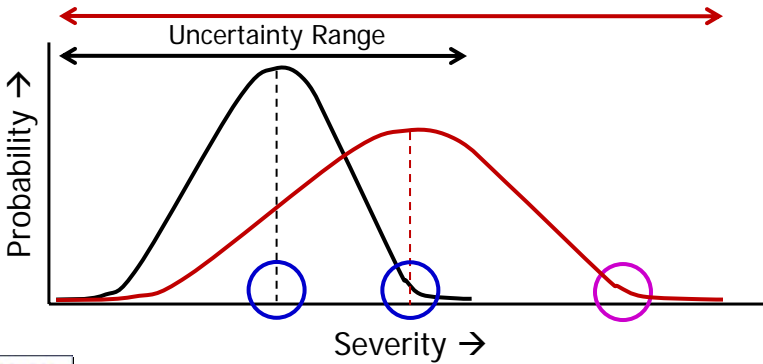

+ **Risk management:**

- Actions to reduce probability (*mitigation*)
- Actions to reduce potential severity (*adaptation*)



+ **Uncertainty and Risk**

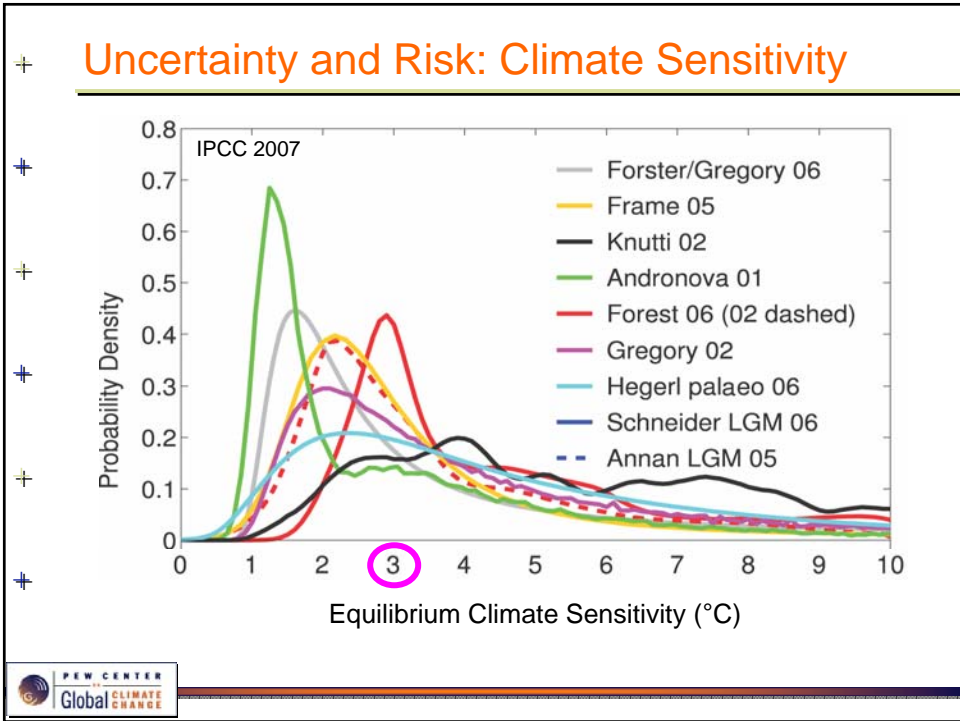
- Risk = Probability X Severity
- Risk can be significant when uncertainty is large
- Risk can be high when probability is low (**house fire**)

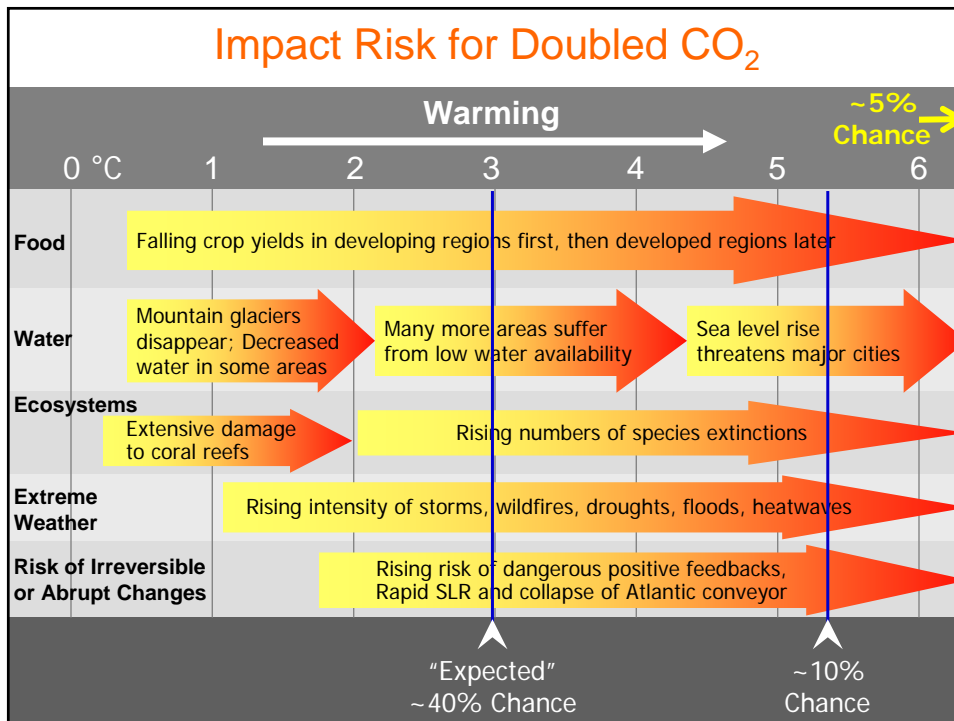
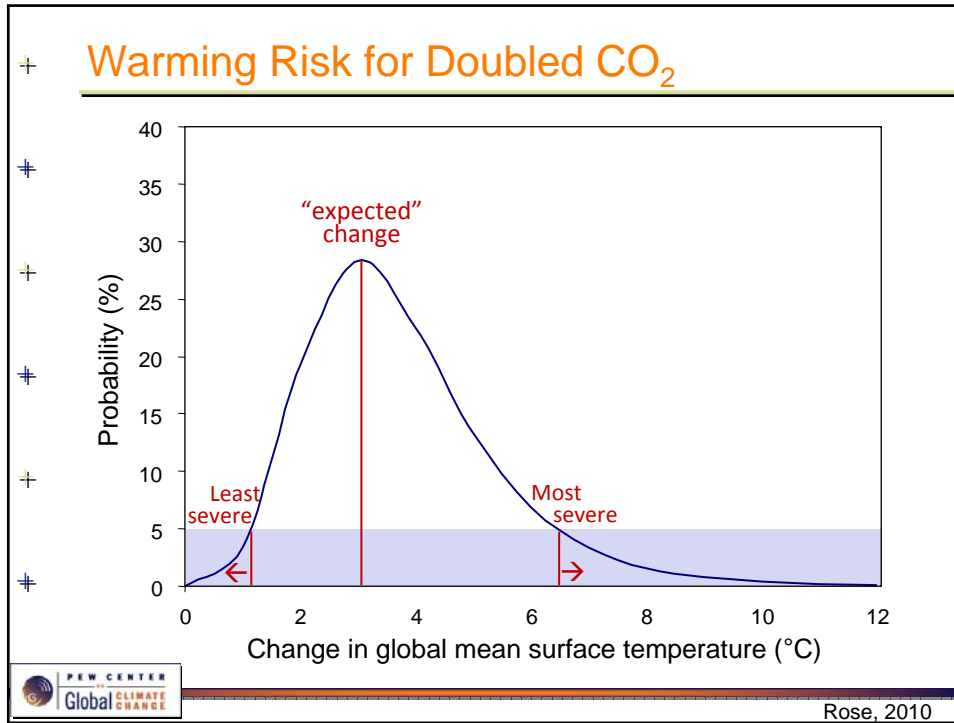



+ Uncertainty and Risk

- + • Risk = Probability X Severity
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- + • Risk can be high when probability is low (**house fire**)


- + • Scientific Uncertainty is **INFORMATION**
- + • Uncertainty **INFORMS** risk management

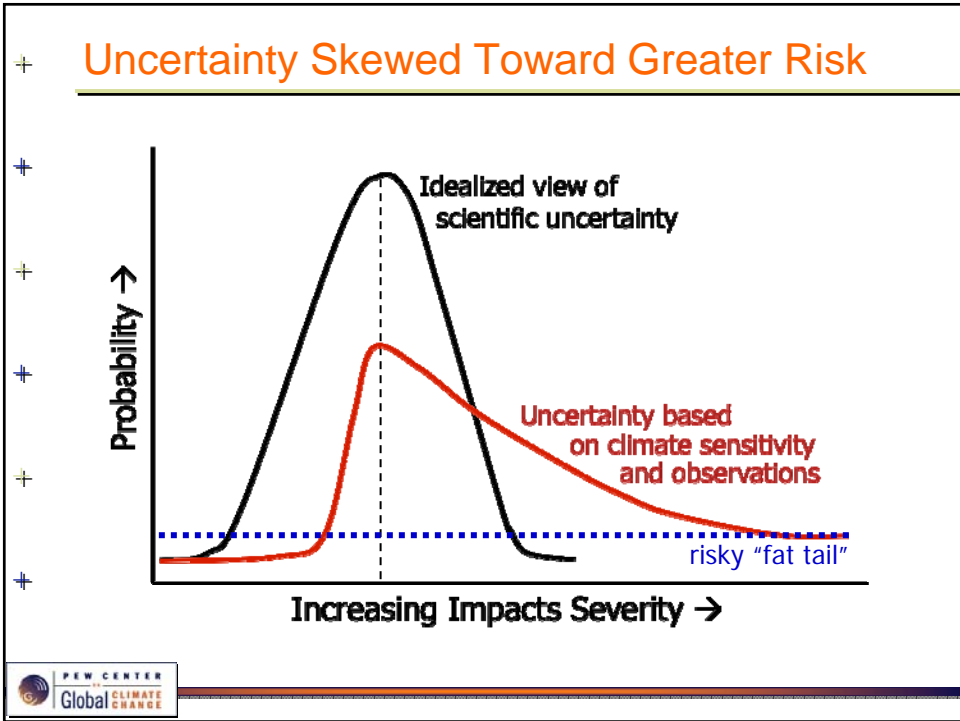


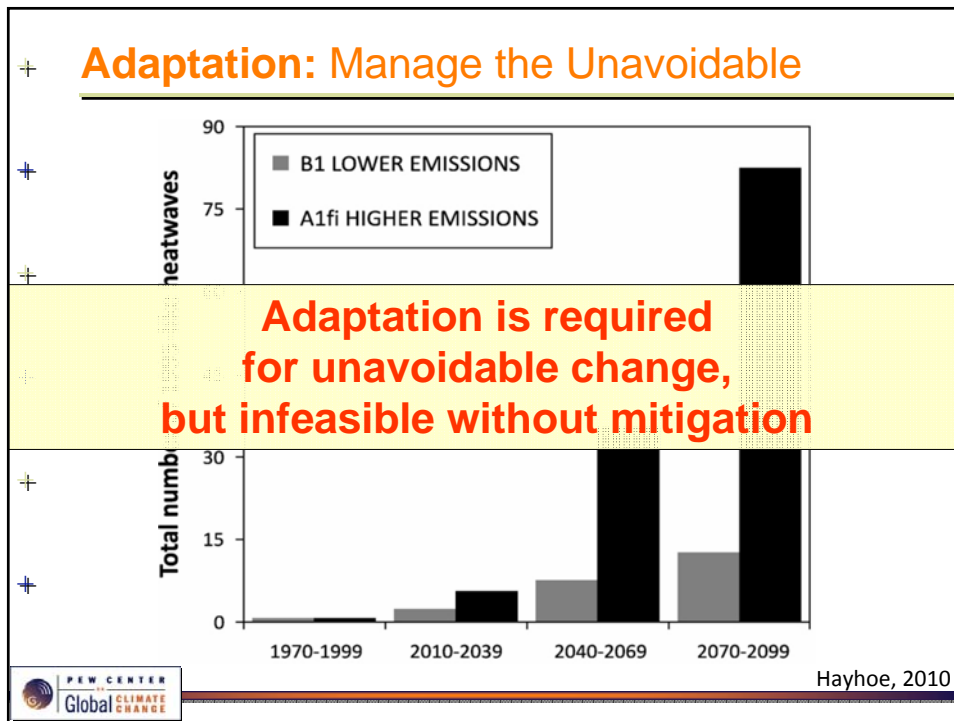
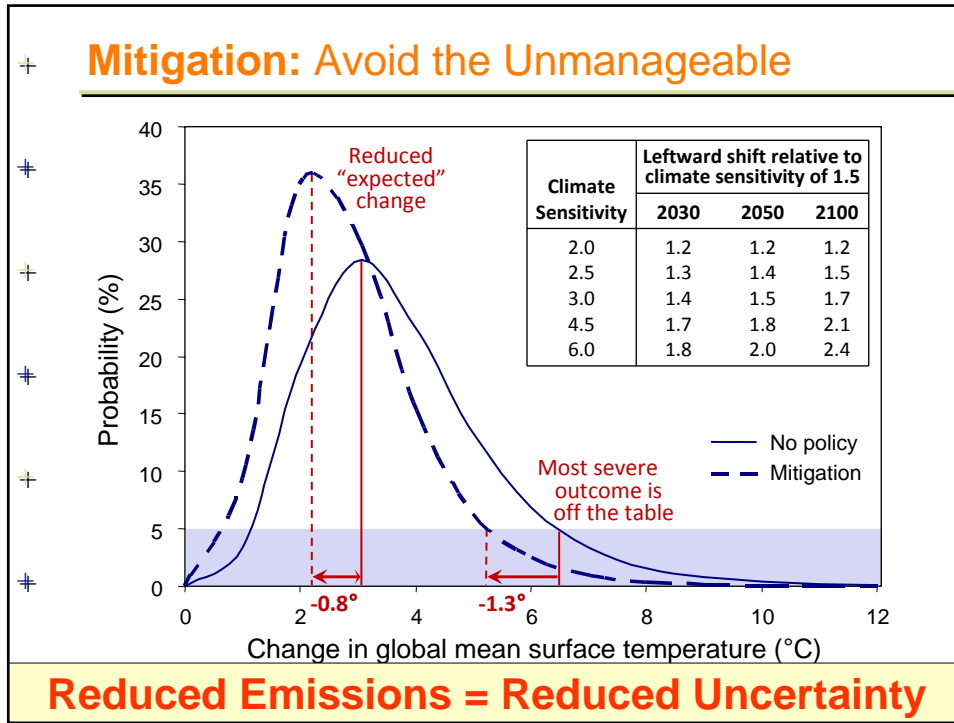


+ Underestimating The Problem?

- + ➤ Arctic sea ice loss is 3X faster than projected
(Stroeve et al. 2007, *Geophysical Research Letters*)
- + ➤ Sea level rise >50% faster than projected
(Rahmstorf et al. 2007, *Science*)
- + ➤ Polar ice sheets losing ice 100 years early
(IPCC 2007; Shepherd & Wingham 2007, *Science*)
- + ➤ Small glaciers & ice caps losing ice faster
(Meier et al. 2007, *Science*)
- + ➤ Boreal forests moving north sooner
(Soja et al. 2007, *Global & Planetary Change*)
- + ➤ Global precipitation changing 2X faster
(Wentz et al. 2007, *Science*; Zhang et al. 2007, *Nature*)








+ **Risk Management: Key Messages**

- + ➤ Scientific uncertainty is INFORMATION
- + ➤ Much evidence that risk is loaded to the high side
- + ➤ Risk is unavoidable but can be reduced through combined mitigation and adaptation
- + ➤ Benefits of risk management approach:
 - + – Makes use of uncertainty information
 - + – Facilitates decisions under uncertainty
 - + – Framework to reduces “expected” damages
 - + – Offers “Insurance” against catastrophe
 - + – Assures unavoidable change remains manageable



Degrees of Risk

Defining a Risk Management Framework for Climate Security

Nick Mabey, Jay Gullede, Bernard Finel and Katherine Silverthorne



<http://bit.ly/fNCTbj>



E3G