

The Problem Isn't Uncertainty, It's ...



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LEOPOLD LEADERSHIP PROGRAM

Stanford Woods Institute for the Environment

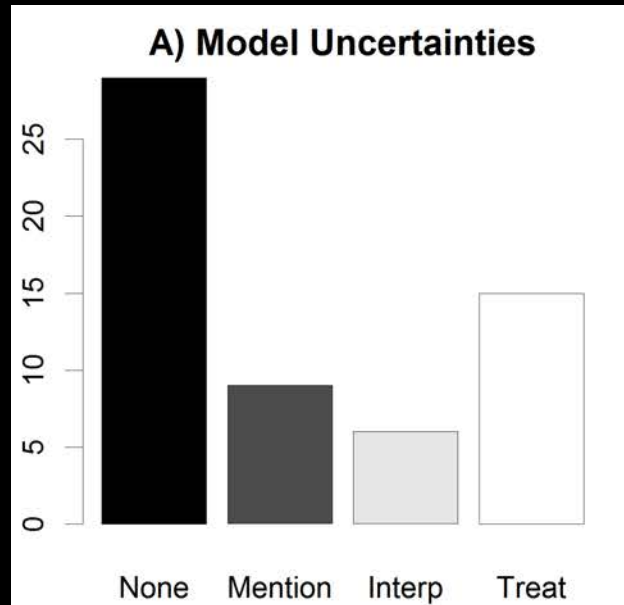


PICES.Apr 13, 2014

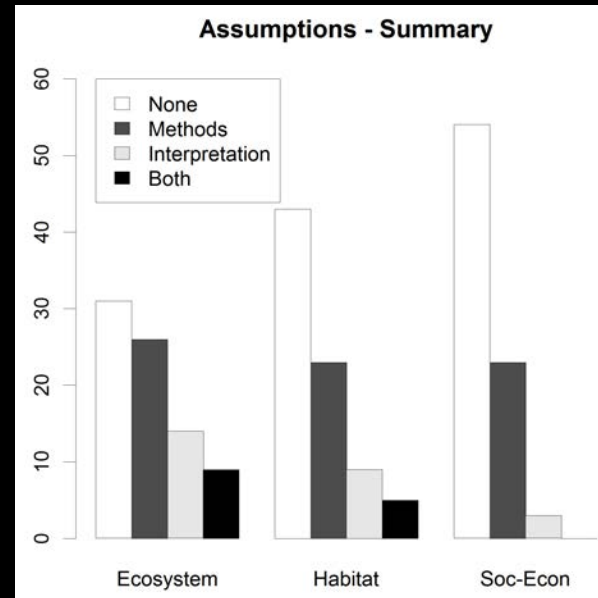
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Status Quo



(n=60)

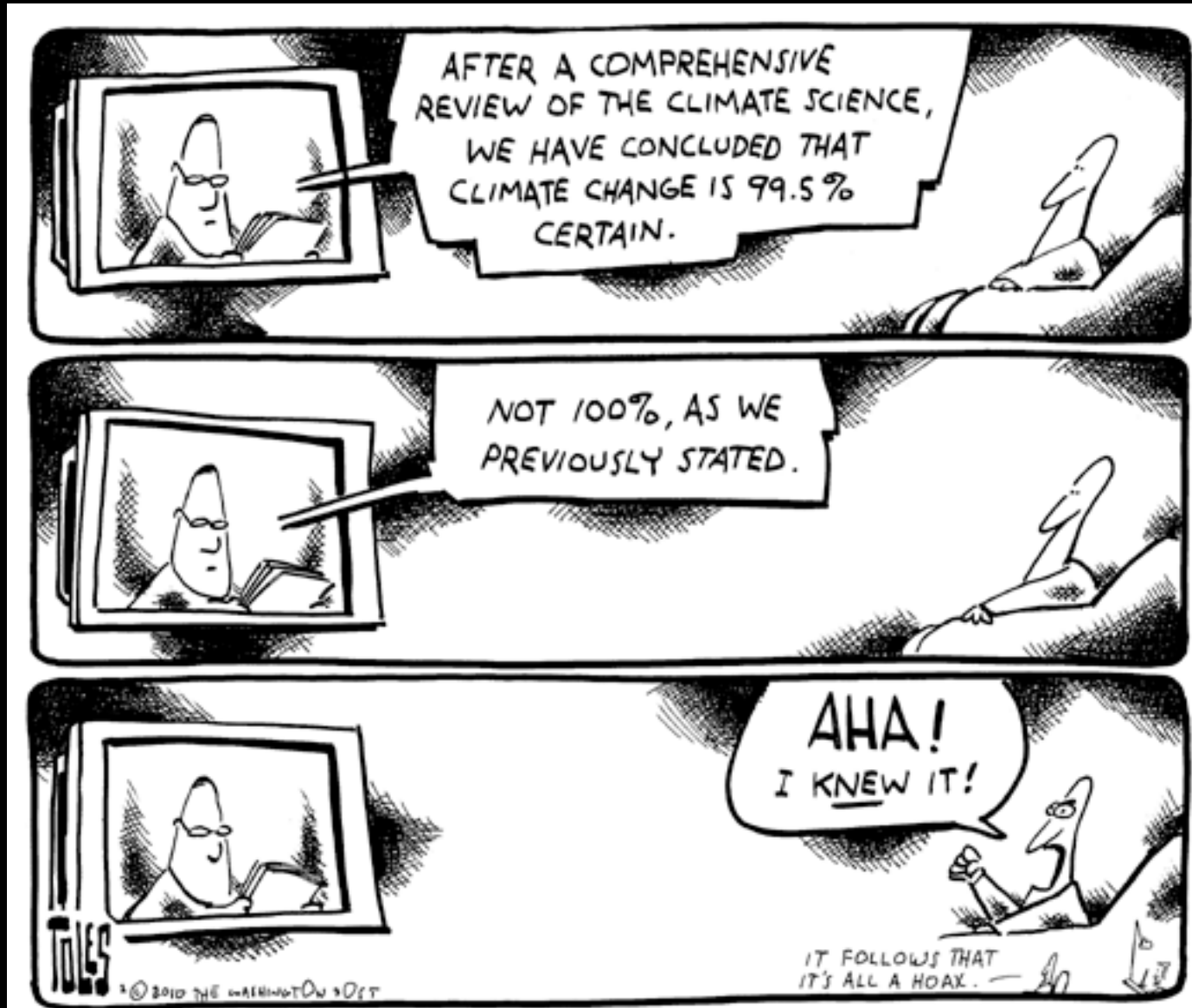


(n=4x20 per class)

Includes:
Extents
Resolution
Process
Data

- Over half of the studies largely ignored uncertainty
- Model design assumptions were mostly implicit

The Obstacle: Uncertainty



Uncertainty Is Not the Problem

Which will be more 'heard'?

- A. Scientists are >95% certain that a diet high in beta-carotene is associated with better vision in later life
- B. A new disputed scientific theory about congenital blindness suggests that a maternal diet high in beta-carotene may significantly increase the risk of newborn blindness

B will, even though it's far less certain

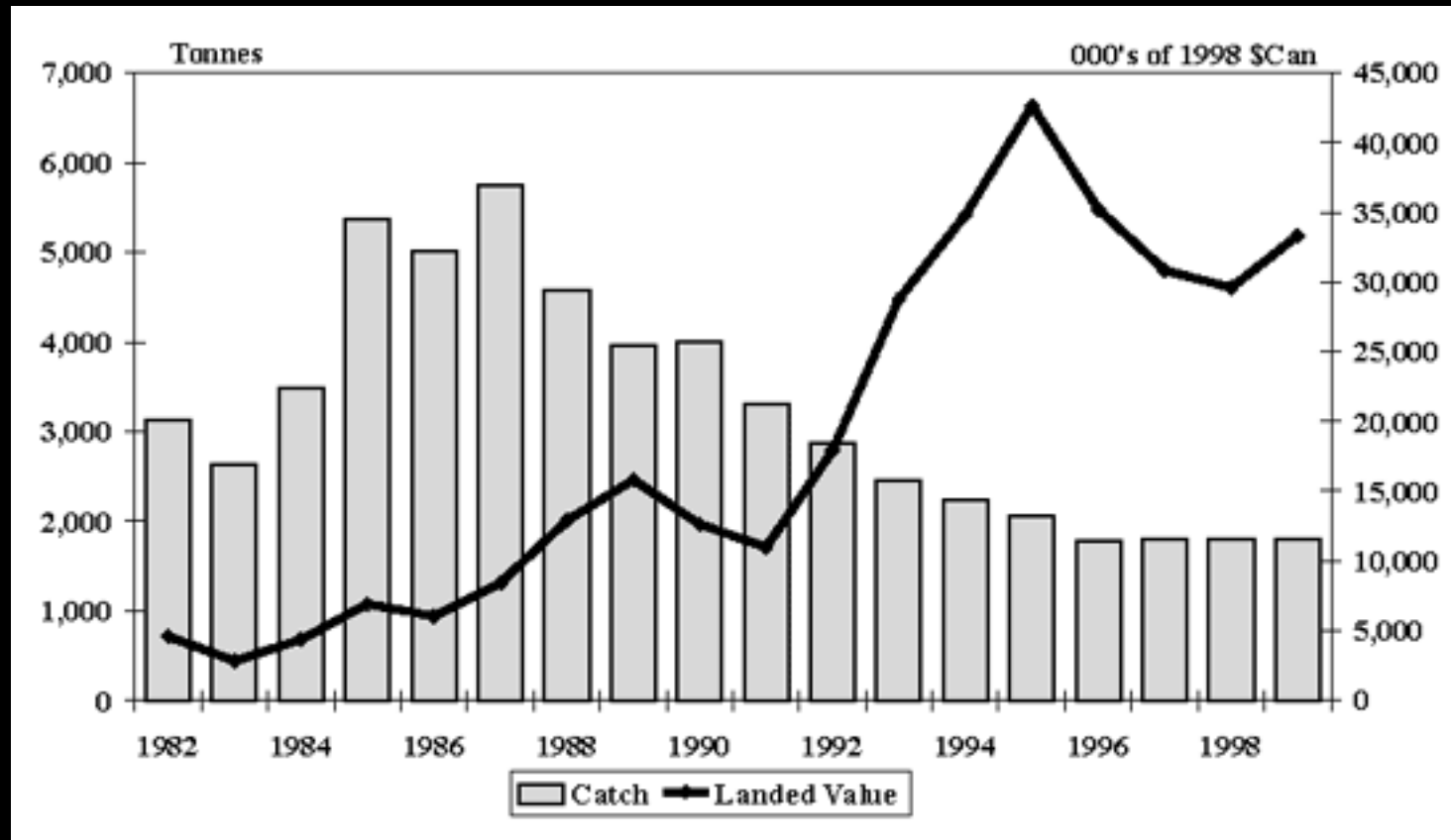
Take a Page from Journalists

“Unbury the lead”:

- A. There is a 60% chance that tropical storm Gordo will hit Bangkok and Kuala Lumpur tomorrow. If it does, foreign heads of state will postpone their Kona trip for a Western Pacific Caucus until Friday.
- B. Those travelling out of Kona airport on Friday should keep tabs on tropical storm Gordo, lest foreign dignitaries' change their travel plans and cause lengthy airport delays.

Tailor science to inform what matters, and certainty about it

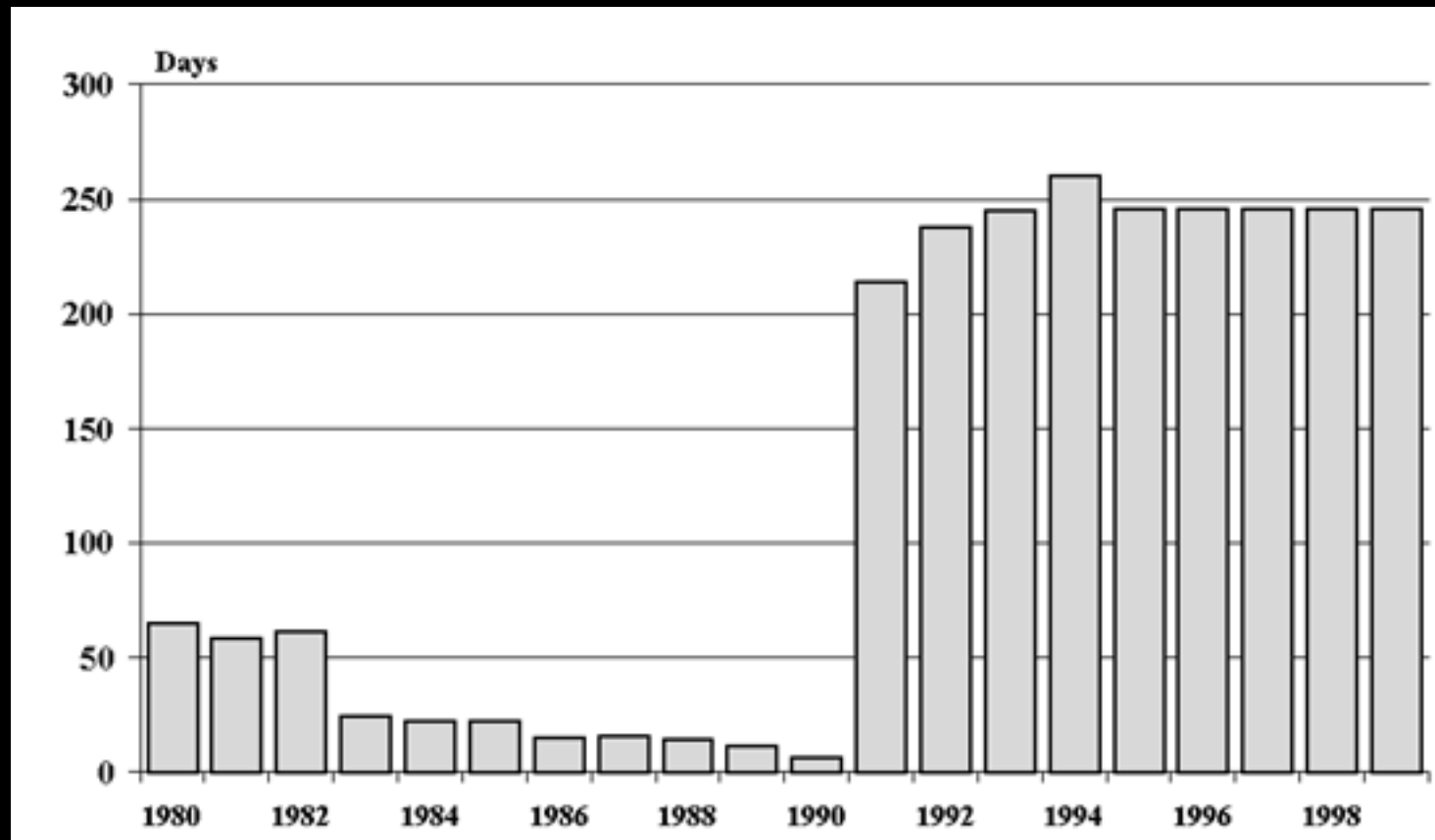
What Really Matters?



Canadian halibut fishery, IVQs introduced 1991

What Really Matters?

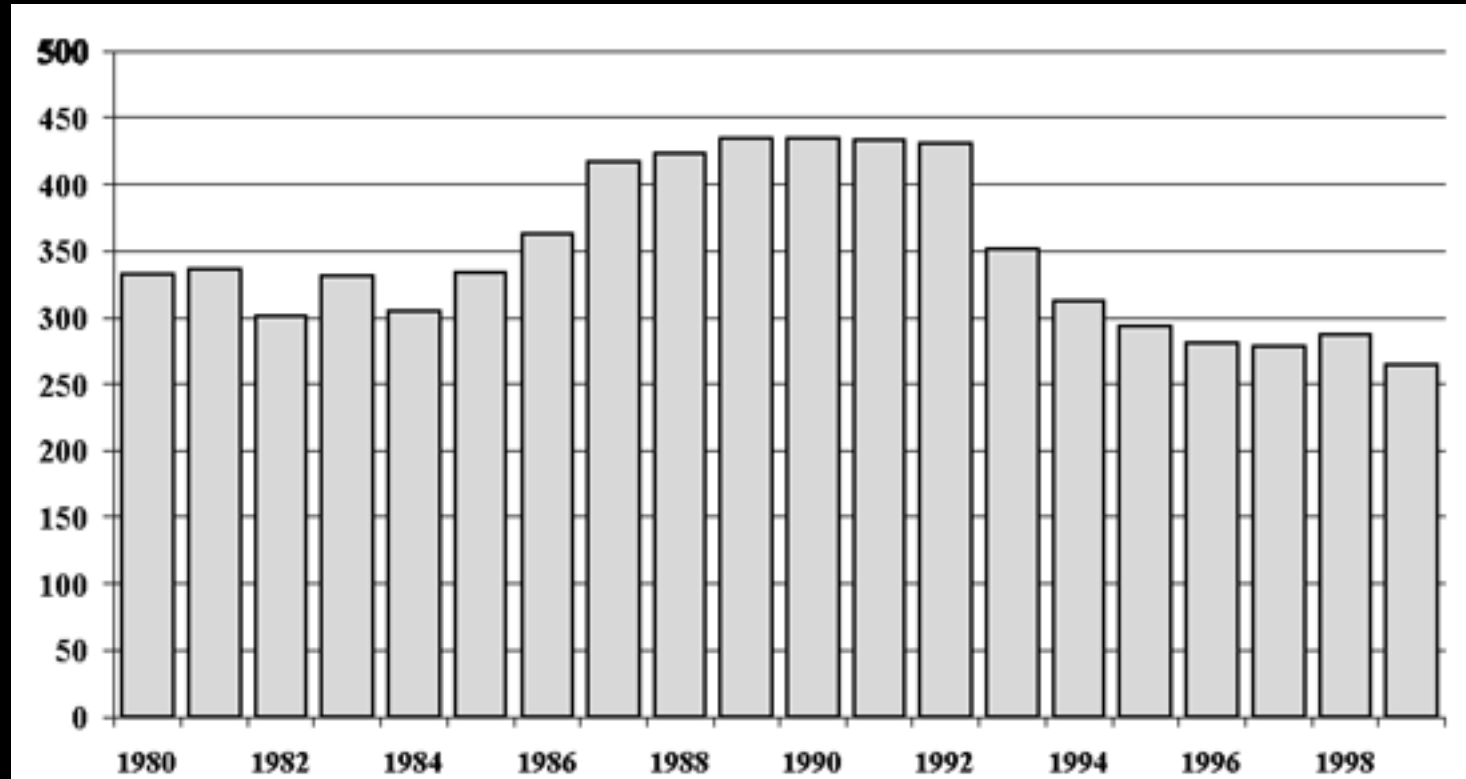
Season length



Canadian halibut fishery, IVQs introduced 1991

What Really Matters?

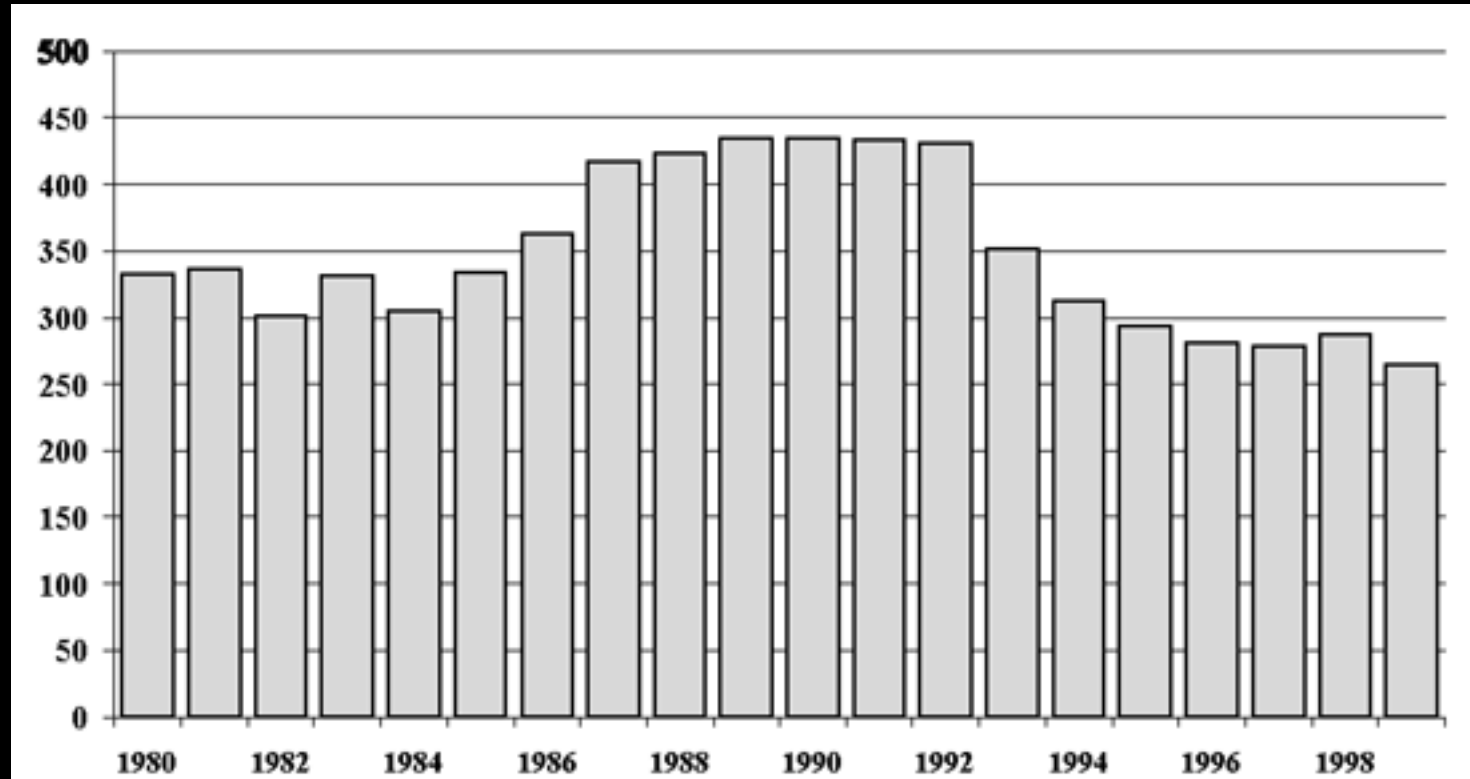
Number of active vessels



Obvious success, eh?

What Really Matters?

Number of active vessels



Flip side: employment, ownership, empowerment, subsistence catch for fishers & communities, etc.

Focus on the Scenario (*Integrated*)

- a. Bold clothes (or pretty pictures) attract attention
- b. A good talk requires attention
 - Therefore, my talk will be better if ... ???

False! Compartmentalized uncertainty poorly captures whole-scenario uncertainty

Parallel: Communities care about jobs;
Jobs require sustainable fish stocks;
Therefore ...

Sometimes It's All About Risk

Sometimes what matters is not different *things*, but different *metrics* of that thing

E.g., beta-carotene: better vision vs. newborn blindness

Concern for risk plays out elsewhere, too:

- finances (e.g., bankruptcy, foreclosure);
- politics (e.g., re-election, performance/projections);
- ecology & fisheries (ecological extinction, thresholds)

So What, for Marine Science?

To speak to what matters in relevant metrics, we must:

- Represent distributions of inputs
- Track distributions of outputs
- Be explicit about unquantified assumptions
- Figure out what matters—to *multiple audiences*
- Model 'social' explicitly; integrate with ecological

Close

The problem isn't uncertainty/accuracy ... *it's targeting*
--what matters, salient metrics, for scenarios



e.g., jobs, fishing access, blindness risk



e.g., total catch, better vision

Acknowledgements



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Questions?

References

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