



Introduction to creating quantitative scenarios from qualitative?

ALC3194: Scenario Planning Toward Climate Change Adaptation
Module 5

Module Developed by:
Sam Veloz
PRBO Conservation Science

Module Outline

1. Why use quantitative scenarios?
2. Qualitative vs. quantitative scenarios
3. Steps to building quantitative scenarios.
4. Examples
 1. IPCC
 2. Restoration planning, tidal marsh SF Bay

2

Module Objectives

By the end of the session, you should be able to:

- Identify when/why to use quantitative scenarios
- Define the trade offs of using qualitative vs quantitative scenarios
- Be able to outline the process for developing quantitative scenarios

3

Considerations for whether to use quantitative scenarios

- What is the goal of the exercise?
- What is the decision planning timeframe?
- Existing data?
- Number of stakeholders: large or small?
- Does the process need to be replicated?



4

Tradeoffs of qualitative vs. quantitative scenarios??

5

Quantitative vs. Qualitative

Qualitative Pros

- Allows more stakeholder engagement in scenario development
- May have greater plausibility (political)
- May not necessitate including all key factors
- More thinking out of the box

Qualitative Cons

- High potential for bias to affect scenario development (who participates)
- Impacts may be more difficult to assess

6

Quantitative vs. Qualitative

Quantitative Pros

- Includes most current information/expert opinion
- Ability to build scientific based consensus (IPCC)
- Allows for quantitative assessment of impacts for different scenarios

Quantitative Cons

- Introduce bias in models or other subjectivity
- Scenarios may not be politically feasible
- May lack stakeholder buy in/ difficult to communicate to stakeholders
- More expensive/time consuming to construct scenarios
- May lead to a false sense of accuracy

7

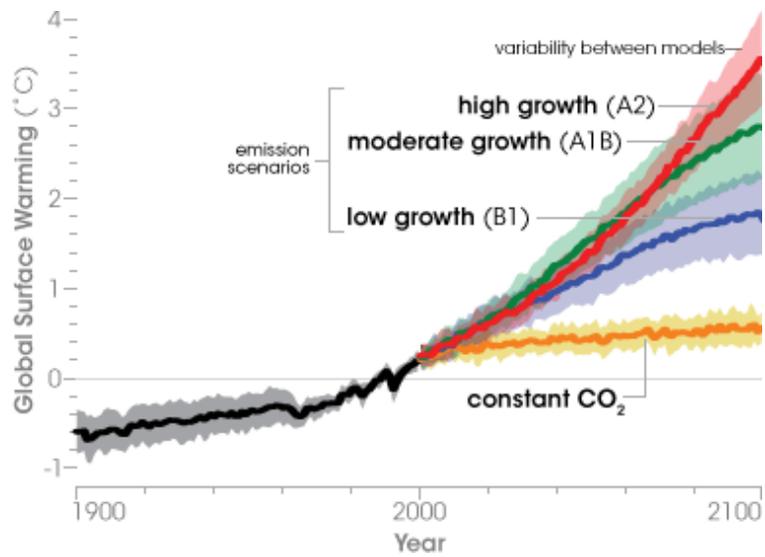
Steps to building quantitative scenarios

1. Specify boundaries
2. Select indicators
“a representation of the state of the system being studied that helps to distinguish between different scenarios”
3. Decide on model structure
4. Iteratively develop test, document, release models
5. Release final set of scenarios

8

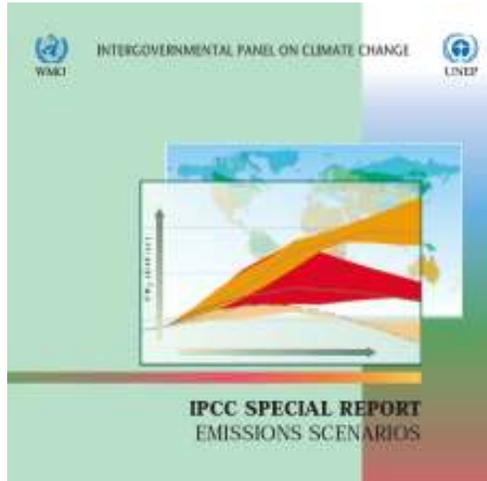
EXAMPLES OF QUANTITATIVE SCENARIOS

9



10

IPCC Special Report on Emission Scenarios



11

Example: IPCC Special Report on Emission Scenarios

1. Specify boundaries



12

Example: IPCC Special Report on Emission Scenarios

1. Specify boundaries
2. Select indicators



13

Example: IPCC Special Report on Emission Scenarios

1. Specify boundaries
2. Select indicators
3. Decide on model structure

A1 storyline and scenario family describes a future world of very rapid economic growth, low population growth and rapid introduction of new and more efficient technology. Major underlying themes are economic and cultural convergence and capacity building, with a substantial reduction in regional differences in per capita income. In this world, people pursue personal wealth rather than environmental quality.

A2 storyline and scenario family is a very heterogeneous world. The underlying theme is that of strengthening regional cultural identities, with an emphasis on family values and local traditions, high population growth, and less concern for rapid economic development.

B1 storyline and scenario family describes a convergent world with rapid change in economic structures, "dematerialization" and introduction of clean technologies. The emphasis is on global solutions to environmental and social sustainability, including concerted efforts for rapid technology development, dematerialization of the economy, and improving equity.

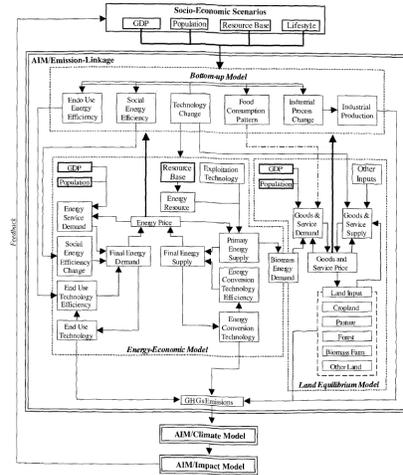
B2.....

14

Example: IPCC Special Report on Emission Scenarios

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Example modeling approach



15

Example: IPCC Special Report on Emission Scenarios

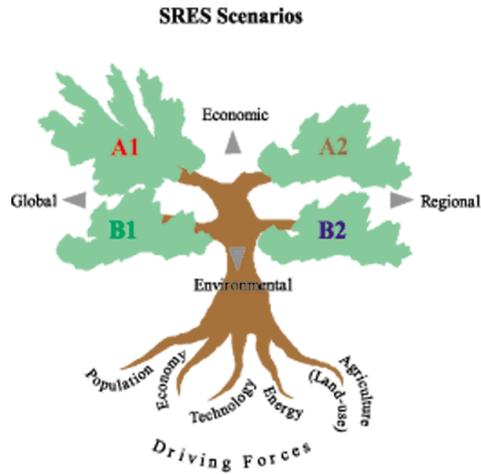
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16

Example: IPCC Special Report on Emission Scenarios

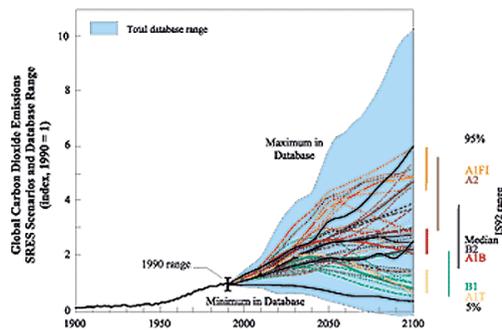
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17

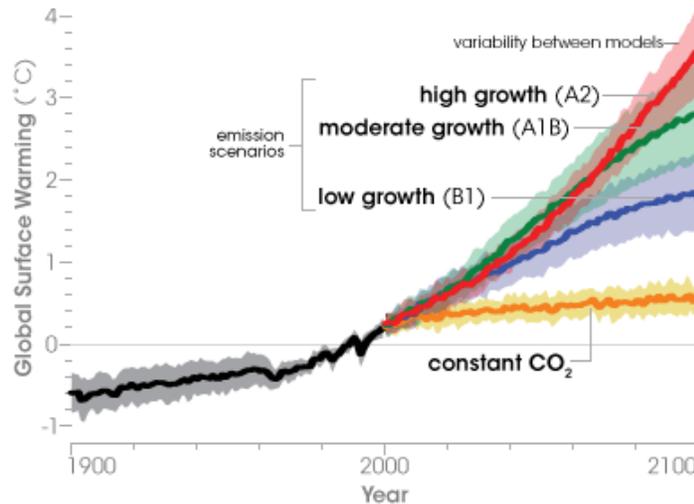
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18

IPCC: Assessing Impacts



19

Example: Tidal marsh restoration SF Bay with sea level rise

- ~90% of historical tidal marsh in SF Bay has been lost to human development
- Goals: 265% increase in tidal marsh habitat through restoration
- Will restoration projects be sustainable with sea level rise?
- Which projects should we prioritize?

20

Example: Tidal marsh restoration SF Bay with sea level rise

1. Specify boundaries



21

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22

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23

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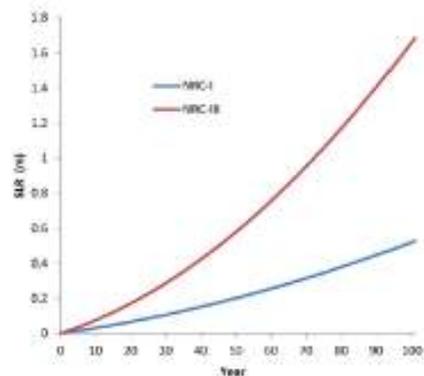
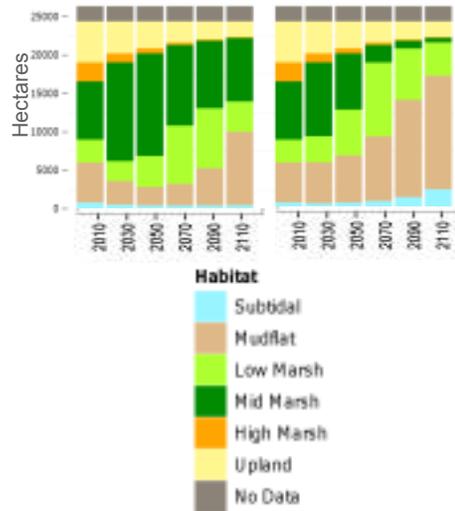


Figure 2. High (NRC-H) and low (NRC-E) sea-level rise trajectories used for climate change scenarios. Year 0 represents 2010 and year 100 represents 2110. doi:10.1371/journal.pone.0027388.g002

24

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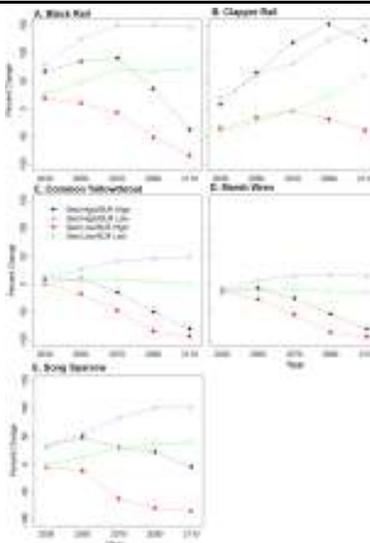
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25

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26

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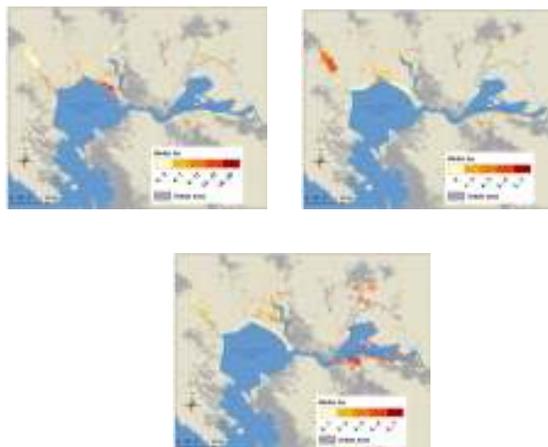
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27

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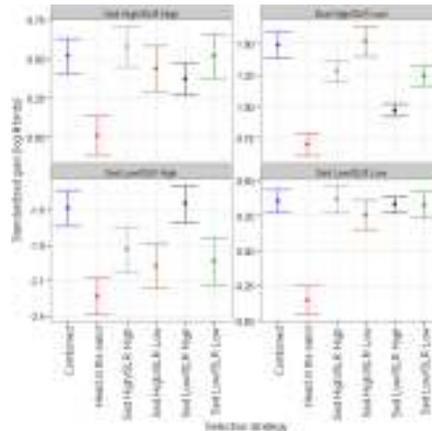


28

SF Bay: Assessing Impacts

of birds added with restoration projects in each scenario

Evaluating different project selection strategies



Veloz et al. 2013. Ecosphere

<http://www.esajournals.org/doi/abs/10.1890/ES12-00341.1>

29

Take home messages

- Quantitative scenarios can be useful but tradeoffs and goals should be considered.
- An important benefit is the ability to numerically assess the impacts of scenarios.
- It's important to communicate how scenario results should be interpreted (quantitative \neq more accurate)

30