

## Expert Elicitation

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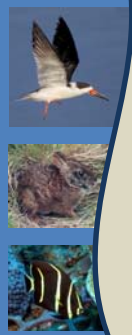
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## Situation



- You have incomplete or outdated data
- You're unsure of which models to use or how to parameterize them
- There are all kinds of other uncertainties
- You need to make a decision anyway

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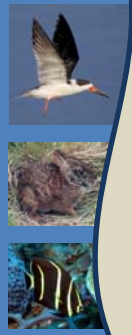
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## Expert Elicitation to the rescue!



- **Good for information decision-making when:**
  - Empirical data are missing or incomplete
  - Uncertainties are large
  - More than one conceptual model can explain existing data
  - Technical judgments are needed to evaluate assumptions

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## Other Benefits

- Can take advantage of integrated and contextual knowledge and understanding
- Generates buy-in, ownership
- Can be rapid, relatively low cost



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## Approaches in Conservation

- **Legally defensible examples:**
  - ESA: listing species and critical habitat designation
  - CERCLA: ecological risk assessment
  - NRDA: injuries to resources
- **Other examples**
  - State-level: identifying habitat acquisitions
  - Developing adaptation options



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## A few cautions

- If you're trying to quantify subjective judgment, you need a solid process
- Cutting corners leads to shoddy results
- Beware expert overconfidence and other errors made by experts
- Won't solve political or value-dependent problems

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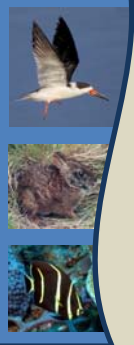
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## Who to “Invite”



- It Depends ☺
  - Questions being asked
  - Type of expertise needed
    - Geographic, Technical, Non-traditional
- Qualified Facilitator

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## Example - Florida

- Pilot of an available tool as part of a vulnerability assessment for a set of Florida species
  - Results used to inform the design of climate change adaptation strategies as part of the update process for the State Wildlife Action Plan (SWAP)



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## Climate Change Vulnerability Index

- Excel based tool
- Natural history, distribution, ecology of species
- Provides relative assessment of species vulnerability in relation to climate change
- Facilitates assessment of a complex problem by breaking it down into its constituent parts
- Quality of the analysis is dependent on the input **provided by participants**, and by available data

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## Expert Elicitation – Data Input

- Species experts
  - Initial phone call / follow-up if needed
  - Enter data into spreadsheet:
    - Select score for each factor
    - Answer a series of questions for underlying information
    - Qualitative Assessment of the associated uncertainty
  - Timeline set – complete assigned worksheets




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## Climate Change Vulnerability Index

### Species Sensitivity

**Section C: Sensitivity** (Generally applies across the range of a species)  
 Mark an "x" in all boxes that apply.

Effect on Vulnerability				
Greatly increase	Increase	Neutral	Decrease	Greatly decrease
		X		
			X	
				X
	X			
			X	
				X
		X		
			X	
				X
	X			
			X	
				X
X				
		X		
			X	
				X

**Factors that influence vulnerability** (\*at least 10 required)

- 1) Dispersal ability
- 2) Predicted sensitivity to temperature and precipitation changes
- 3) Predicted sensitivity to changes in temperature
  - a) marine sensitivity
  - b) estuarine sensitivity
- 4) Predicted sensitivity to changes in precipitation, hydrology, or
  - a) marine sensitivity
  - b) estuarine sensitivity
- 5) Dependence on a specific disturbance regime (likely to be unique)
- 6) Dependence on ice, ice-edge, or snow-cover habitats
- 7) Predicted habitat specificity
- 8) Reliance on interspecific interactions
  - a) Dependence on other species to generate habitat
  - b) Dietary sensitivity (terrestrial only)
  - c) Pollinator sensitivity (terrestrial only)
  - d) Dependence on other species for propagule dispersal
- 9) Forms part of a monophyletic not covered by Act 1
- 10) Migrations and movements (terrestrial only)
- 11) Genetic factors
  - a) Measured genetic variation
  - b) Occurrence of bottlenecks in recent evolutionary history (only imp)
- 12) Phenological response to changing seasonal temperature and pre

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## Expert Elicitation – Data Input

- Advantages:
  - Quicker, less investment of time and personnel resources
  - Easier to coordinate/carry-out




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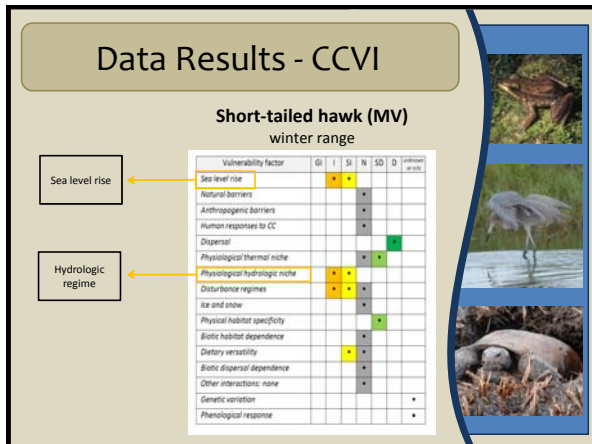
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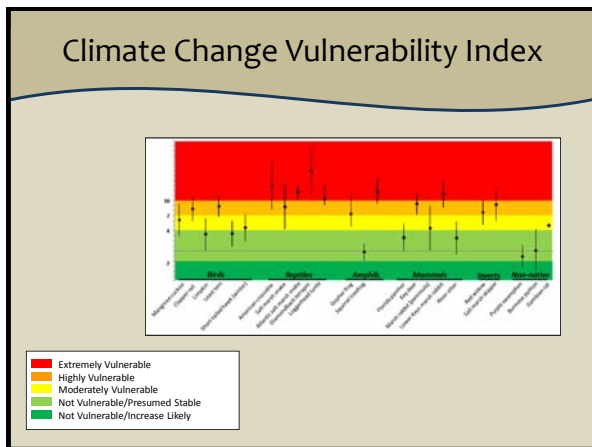
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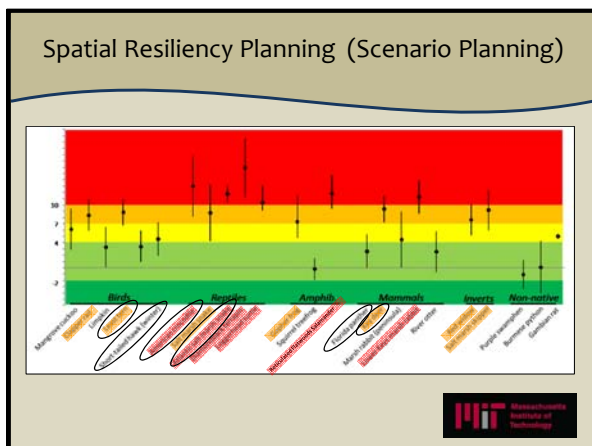
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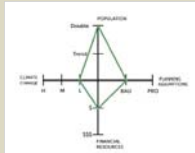
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## Scenario Planning

- Scenarios varied across 4 dimensions:
  - Climate change
  - Human population change
  - Land & water planning policies
  - Availability of public resources
- 50 years into the future
  - 2010, 2040, and 2060



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## Scenario Planning - Process

- Series of Workshops
  - Managers – Review/Select Scenarios
  - Habitat Experts – Identify loss/gain of potential habitat
  - Species and land Management Experts – Identify Strategies or Actions
- Maps
- Color-coded sticky notes

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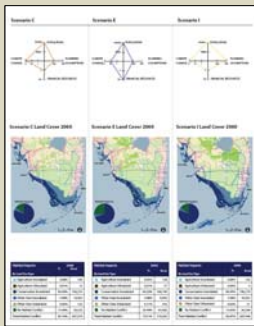
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## Scenario Planning



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## Scenario Planning - Results





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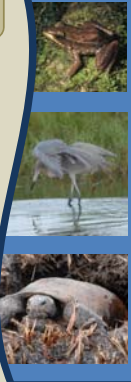
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## Scenario Planning





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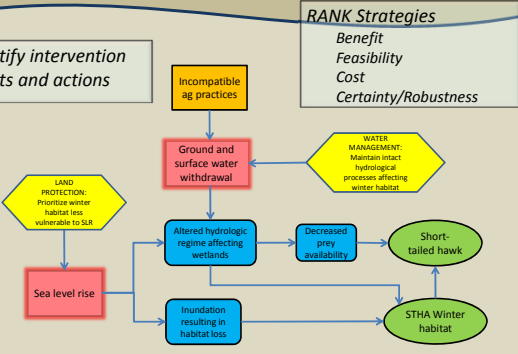
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## Scenario Planning - Results

*Identify intervention points and actions*

*RANK Strategies*  
Benefit  
Feasibility  
Cost  
Certainty/Robustness



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    graph TD
      SLR[Sea level rise] --> Land[LAND PROTECTION: Prioritize winter habitat less vulnerable to SLR]
      SLR --> Hydro[Altered hydrologic regime affecting wetlands]
      SLR --> Inundation[Inundation resulting in habitat loss]
      Land --> Hydro
      Land --> Inundation
      Hydro --> Inundation
      Hydro --> Prey[Decreased prey availability]
      Prey --> Hawk[Short-tailed hawk]
      Inundation --> Hawk
      Inundation --> STHA[STHA Winter habitat]
      Ag[Incompatible ag practices] --> Hydro
      Ag --> Inundation
      Water[WATER MANAGEMENT: Maintain intact hydrological processes affecting winter habitat] --> Hydro
      Water --> Inundation
  
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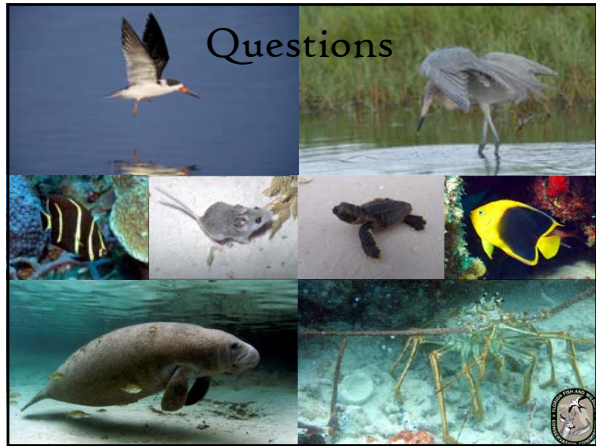
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Questions

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