

Vulnerability Assessment & Scenario Planning Workshop

Tuesday and Wednesday, August 16-17, 2016

Mission: To create a robust future in the face of climate change

How? Providing support, training, and assistance to make planning and management less vulnerable.



Climate change is affecting all ecosystems and will continue to do so for centuries to come, so...

We need to *incorporate climate change into long-term planning*

- Minimize risk of wasting time, money, and effort
- Maximize likelihood of success



Responding to Climate Change

Mitigation is what we do to decrease the potential of climate change itself.

Adaptation is how we prepare for and respond to the changes that we are already experiencing/expected to experience.



Third Response




**KEEP
CALM
AND
BURY YOUR HEAD
IN THE SAND**



**LALALALALA...I Can't
Hear You!**



Adaptation Ladder of Engagement®

7 Sharing

6 Evaluation

5 Integration

4 Implementation

3 Planning

2 Assessment

1 Awareness



State of Adaptation Program

finding out how people are fishing

Awareness to Action

teaching others to fish

Climate Adaptation Knowledge Exchange

connecting the fishing community

Adaptation Consultation

we fish for you

National Adaptation Forum

share your fishing stories

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Hawaiian Islands Climate Synthesis Project

- Develop science-based syntheses of current and projected future climate change impacts on, and adaptation options for, terrestrial and freshwater resources within each of the main Hawaiian Islands.

Project Objectives

- Workshop #1: Improve understanding of why important resources may be vulnerable to changing climate conditions
- Workshop #2: Identify what adaptation actions can be implemented to reduce vulnerabilities and/or increase overall resilience.
- Co-generate products to improve understanding of and capacity to reduce vulnerabilities.



Overarching Conservation Goal(s)

February 2016

- Species
- Habitats
- Ecosystems

1. Identify Conservation Target(s)

2. Assess Vulnerability to Climate Change

- Sensitivity
- Exposure
- Adaptive Capacity

Monitor, Review, Revise

- Changes in Policy
- Changes in Practice
- Institutional Changes

4. Implement Management Options

3. Identify Management Options

- Reduce Sensitivity
- Reduce Exposure
- Increase Adaptive Capacity



Focal Resources Selection

- Collaboratively identify important resources of broad concern across the islands
 - Management, cultural, or socio-economic concern
- Generated a draft list of 60+ habitats, species, and ecosystem services
- Identified the most common resources across the islands



Focal Resources List

Habitats

- Alpine/subalpine
- Wetlands (e.g., lowland bog, montane bog)
- Coastal (e.g., shrub, dune, coastal wetlands)
- Aquatic (e.g., anchialine pond, perennial streams, intermittent streams)
- Dry forest (e.g., lowland, montane)
- Moist forest (e.g., mesic/wet, lowland, montane)

Ecosystem Services (benefits people obtain from ecosystems)

- Food and fiber (e.g., taro, agriculture, wood)
- Ornamental resources (e.g., animal and plant products)
- Fresh water (supply, quality)
- Climate regulation (e.g., carbon sequestration, emitting of greenhouse gases)
- Flood and erosion control (e.g., sediment deposition)
- Cultural knowledge and heritage values (e.g., cultural landscapes, culturally significant species)
- Aesthetic values
- Recreation and ecotourism



What are all the changes that will happen and how can I respond?

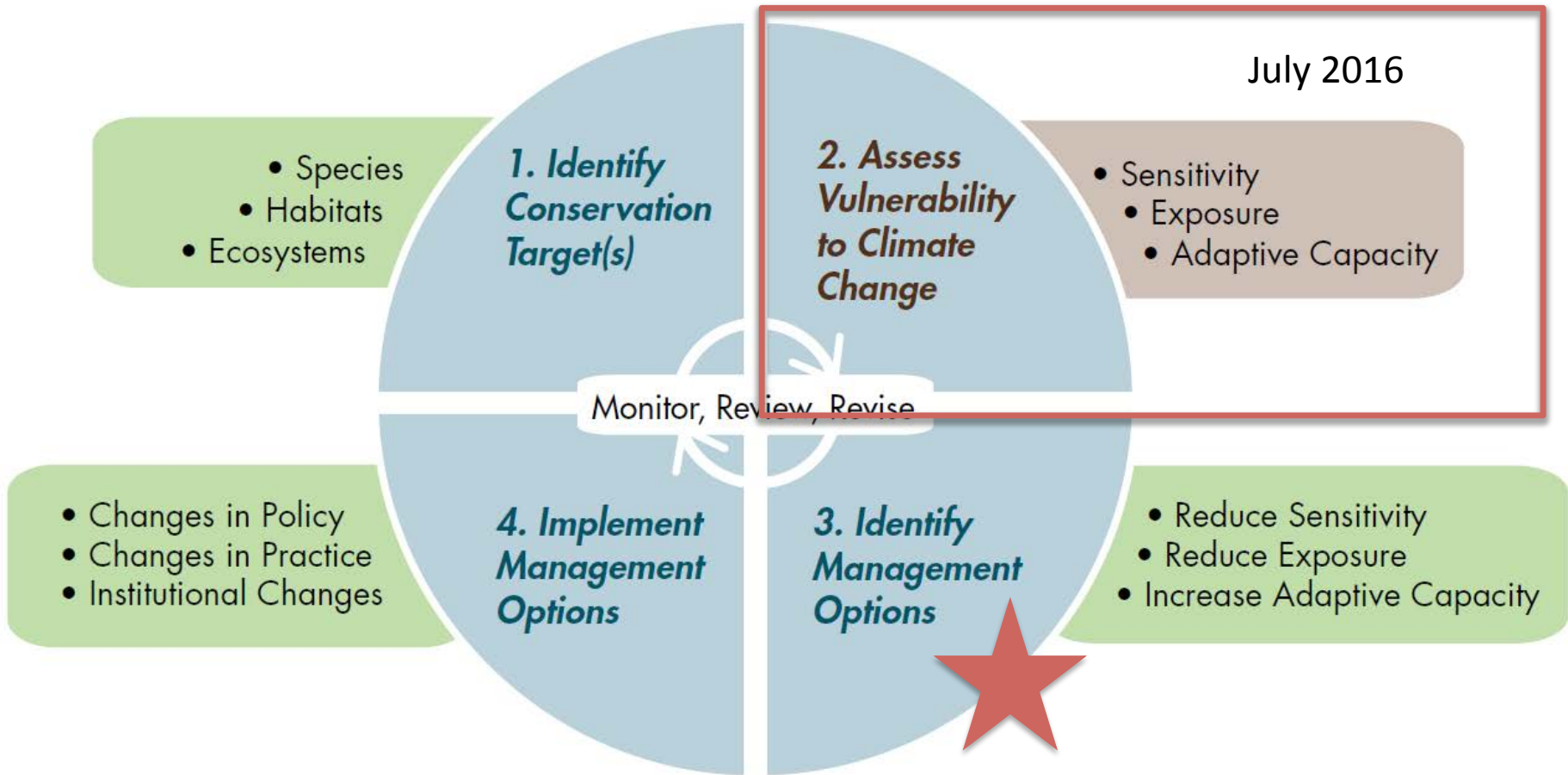


What are all the changes that will happen and how can I respond?

What do I do, and how should I adjust that for the reality of climate change?



Overarching Conservation Goal(s)



Introductions

Moving from Vulnerability to Adaptation

Rachel M. Gregg



Applying Vulnerability Assessment Results in Adaptation Planning

$$\text{Vulnerability} = \frac{\text{Exposure} \times \text{Sensitivity}}{\text{Adaptive Capacity}}$$

↓ Exposure

↓ Sensitivity

↑ Adaptive capacity



- **Reduce Sensitivity**

- *Example:* Reducing or eliminating invasive species that outcompete native species

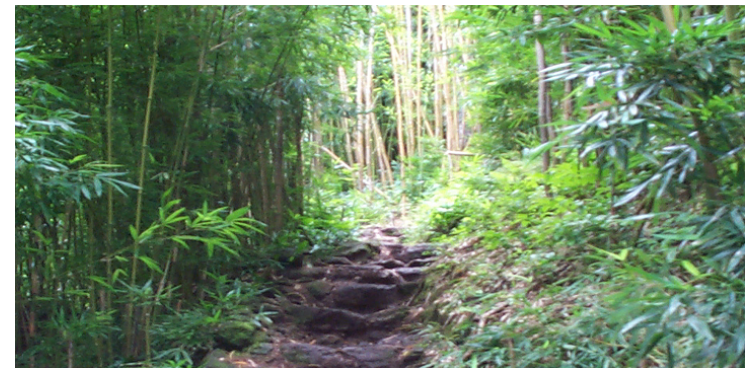


- **Reduce Exposure**

- *Example:* Protecting resources and infrastructure from flood damage

- **Enhance Adaptive Capacity**

- *Example:* Adjusting recreation timing or route of access



Vulnerability



Adaptation Strategies



Resistance



Resilience



Response

Knowledge

Collaboration

Resistance Strategies



Prevent the effects of climate change from reaching or affecting you.

Examples:

- Building a sea wall or berm in response to sea level rise
- Increase proactive management to prevent invasive weeds
- Reduce erosion potential to protect municipal water supplies and sensitive aquatic systems
- Identify and protect aquifer recharge zones



Resilience Strategies



Weathering the impacts of climate change by avoiding the effects of or recovering from changes.

Examples:

- Promote native genotypes and adapted genotypes of native species
- Restore coastal wetlands to buffer storm surge
- Remove or modify structures that affect longshore sediment transport



Response Strategies



Intentionally accommodate change and enable resources to adaptively respond to changing and new conditions.

Examples:

- Facilitate change to desired species assemblages
- Identify and protect refugia
- Accept loss of recreation sites and/or adjust the timing or route of access



Knowledge and Collaboration Strategies

Increase Knowledge



Monitor, model, and conduct research and adaptive management to support adaptation actions

Enhance Collaboration



Leverage resources and experiences across jurisdictional and political boundaries to create holistic approaches to adaptation



Examples?

UP NEXT!



Resistance



Resilience



Response



Knowledge



Collaboration



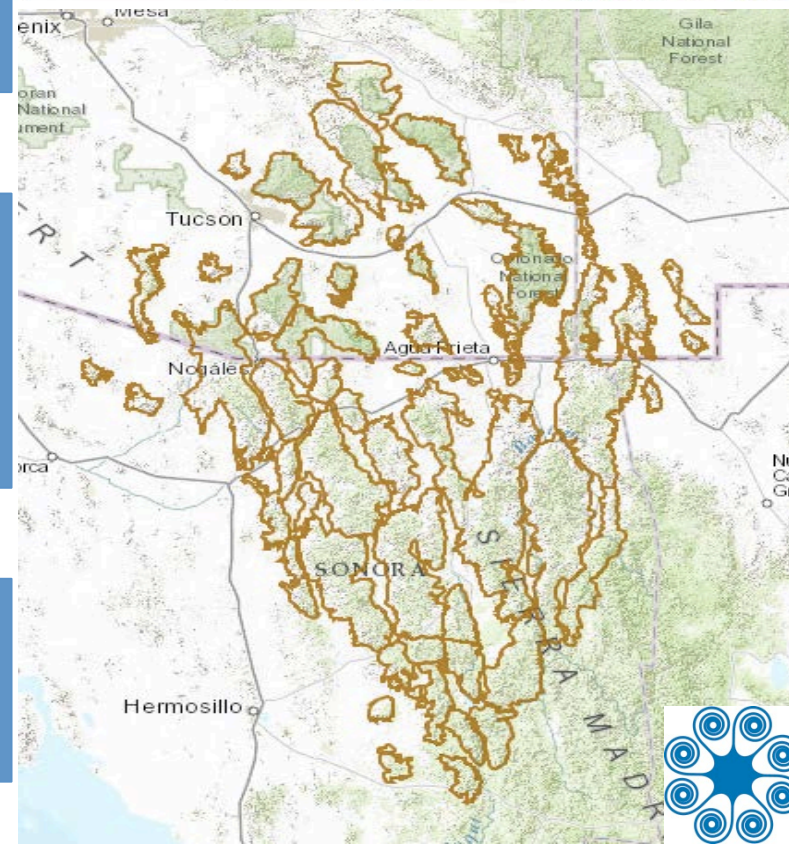
Sky Islands

Survey of Potential Participants
Identify most pressing regional threats

Workshop 1
Consider regional climate vulnerabilities, explore potential adaptation strategies

Workshop 2
Assess specific vulnerabilities and develop strategies by habitat (Madrean forest, semi-desert grassland, desert, riparian)

Workshop 3
Develop practical adaptation strategies, actions, and implementation plans for landscape-scale topics



Goal: Restore seeps and springs in the Sky Islands

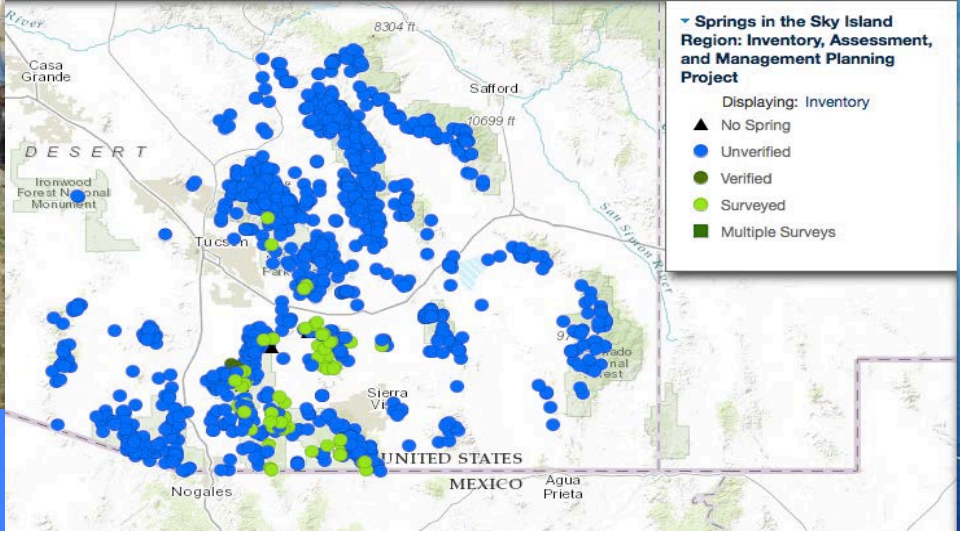


↑ Fire, Air Temperatures, Altered Precipitation Patterns, Drought

Priority adaptation strategies

1. Create climate-smart spring restoration methodologies
 - Develop a springs restoration manual and conduct trainings on its use
2. Restore upland habitat to increase recharge and decrease erosion
 - Assess upland grazing management for spring benefit/detriment
 - Conduct springs assessments ahead of planned restoration treatments
3. Improve infrastructure at spring sites to conserve water and provide habitat
 - Identify and implement evaporation-reducing devices for cattle tanks
 - Repair/restore infrastructure to conserve water
 - Identify springs where renovation or improvement of agriculture water sources can help take pressure off springs as water source





Actions

- Sky Island Alliance, USGS, BLM, TNC, NPS, private landowners
- Installed fencing around perennial spring on private property
 - Repaired a spring-fed pond and installed native plants
 - Installed wildlife entry/exit ramps at developed springs for endangered frogs
 - Developed a spring restoration guidebook for the region
 - Conducted spring inventories and assessments using trained volunteers and professional staff and instituted a citizen scientist “Adopt-A-Spring” monitoring



Greater Farallones NMS



Sea Level Rise, ↑ Coastal Erosion, Δ Hydrology, Δ Precipitation

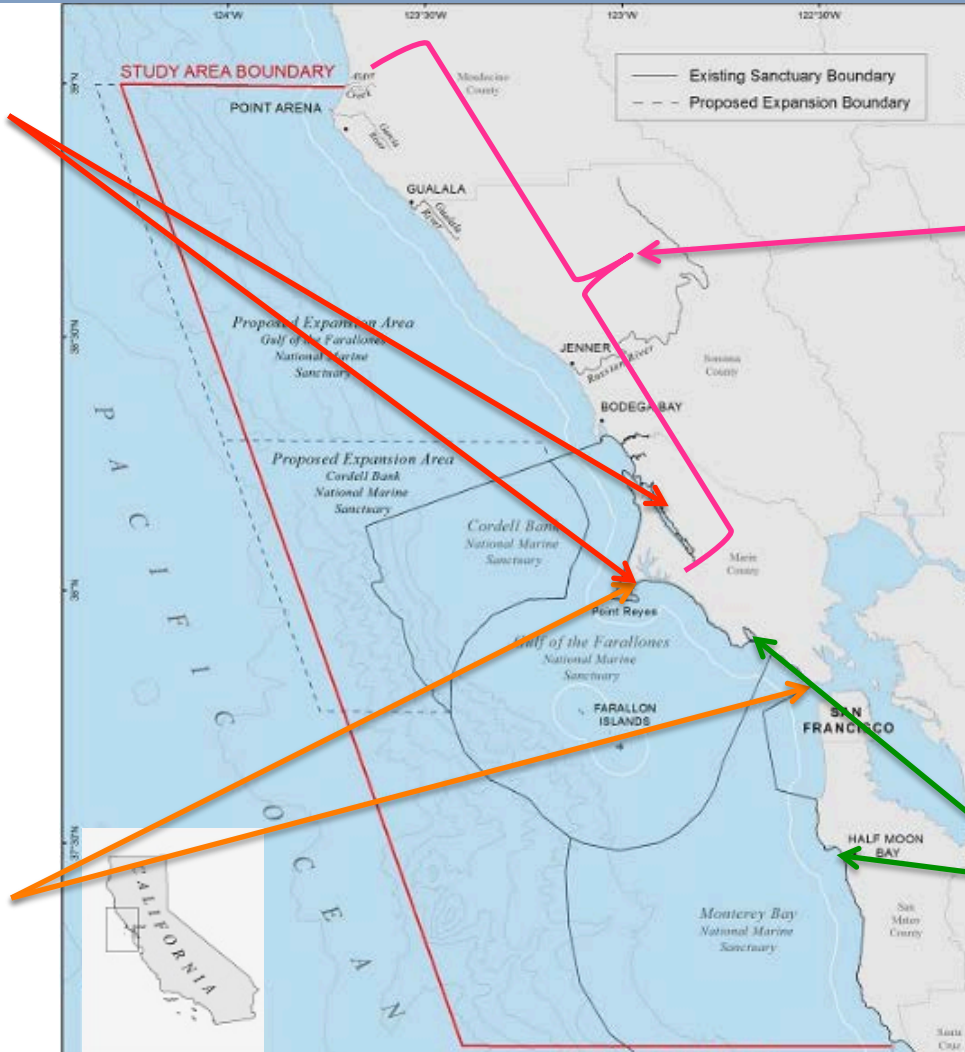
- 44 focal resources
- Most vulnerable: beaches/dunes, cliffs, estuaries, and rocky intertidal habitats
- Developed management goals for each habitat (e.g., protect existing cliff habitat from accelerated degradation; protect and enhance ecological integrity of beach and dune environment under present and future conditions)
- Developed adaptation strategies and actions



Greater Farallones: Coastal Habitats

Promote landward migration

Rapidly remove invasive species when detected



Images from GFNMS Ocean Climate Summit presentation, 2016

Let go of pocket beaches that can't retreat; no management intervention

Remove or modify structures that disrupt long-shore sediment transport and/or structures that contribute to erosion



Resistance



Resilience



Response

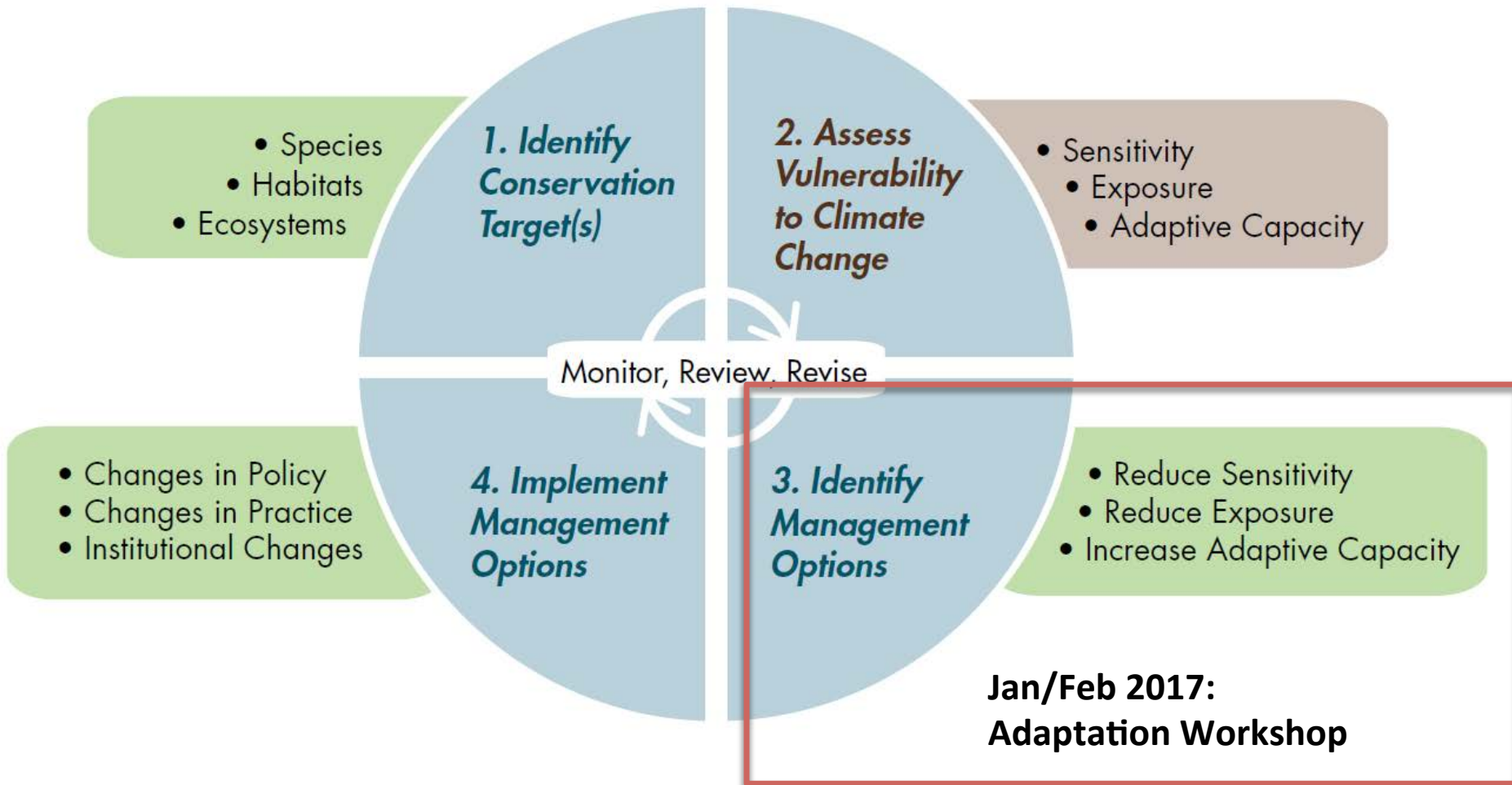
Why Engage in Adaptation Planning?

Adaptation planning **can help:**

- Shift the *way* you are implementing current actions
- Identify new approaches to management
- Prioritize no-regrets actions with high likelihood of success/impact
- Identify cross-resource opportunities that:
 - Accomplish objectives across a range of resources
 - Can be used to leverage funding, partnerships, etc.

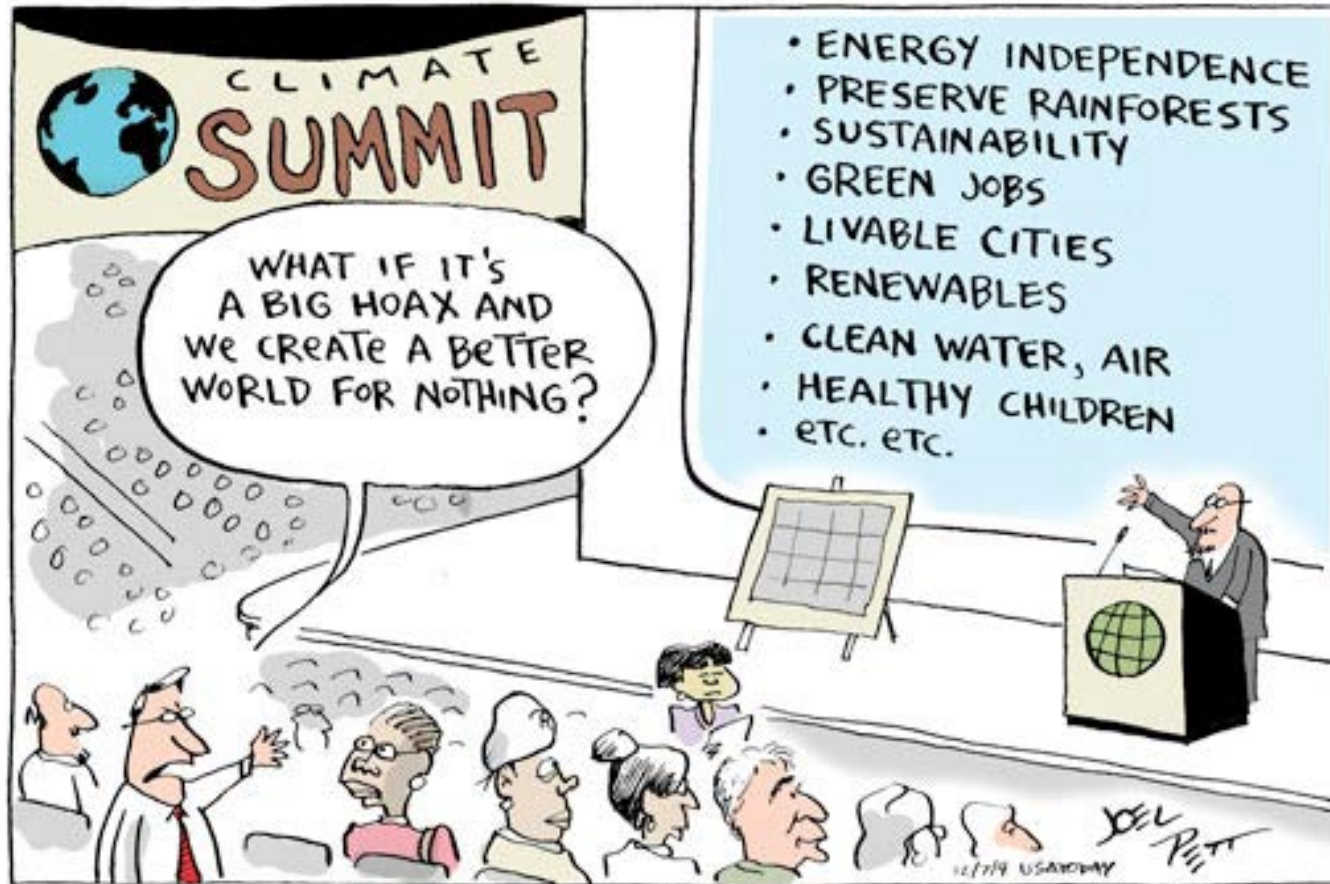


Overarching Conservation Goal(s)



Questions?

More examples available at CAKEx.org



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