Adaptation 101

Jennie Hoffman

EcoAdapt

CLIMAGEDDON

Climatic change is affecting all ecosystems, and will continue to do so for centuries, so…

- **We need to *incorporate climatic change into long-term planning***
  - **Minimize risk of wasting time, money, and effort**
  - **Maximize likelihood of success**

Adaptation is the closest thing we have to an **insurance policy** for protecting our investments from the effects climate change

Point of Clarification

- **<u>Mitigation</u>** is what we do to decrease global climate change itself.

  ↓*GHG emissions* = ***good road design***

- **<u>Adaptation</u>** is insurance given a non-zero probability that climate change will have an adverse affect on your investment

  limiting the impacts = ***wearing a seatbelt***

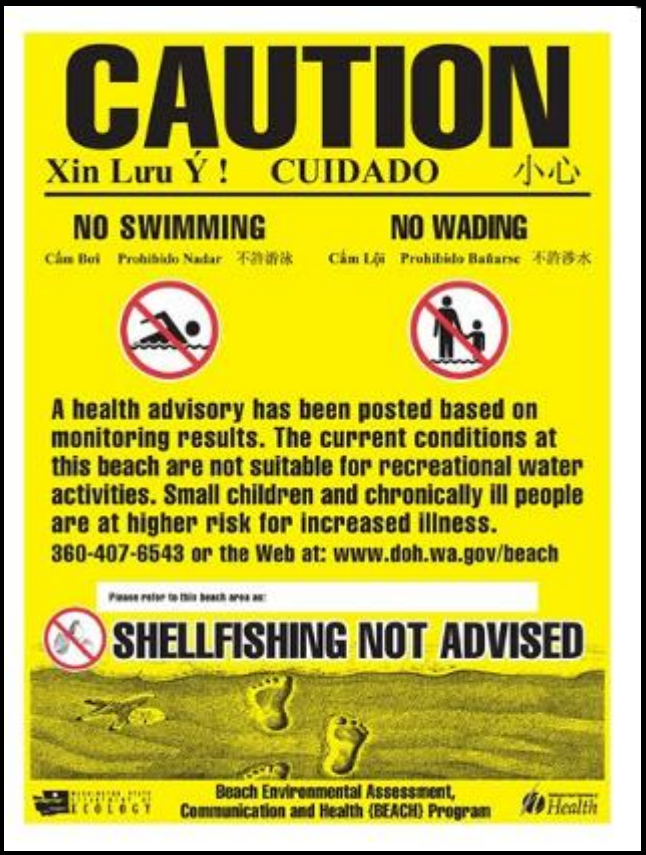
Species Protection

Goal: Protect Karner Blue butterfly by buying more habitat: Pine barrens/oak savannas on sandy soils; wild lupines are only known food plant of larvae.

Climate vulnerability: temperature change, loss of snowpack, shifting habitat range

Adaptation response: Protect more current habitat? Protect possible future habitat? Move the butterfly to alternate locations and plant lupines?

Water quality

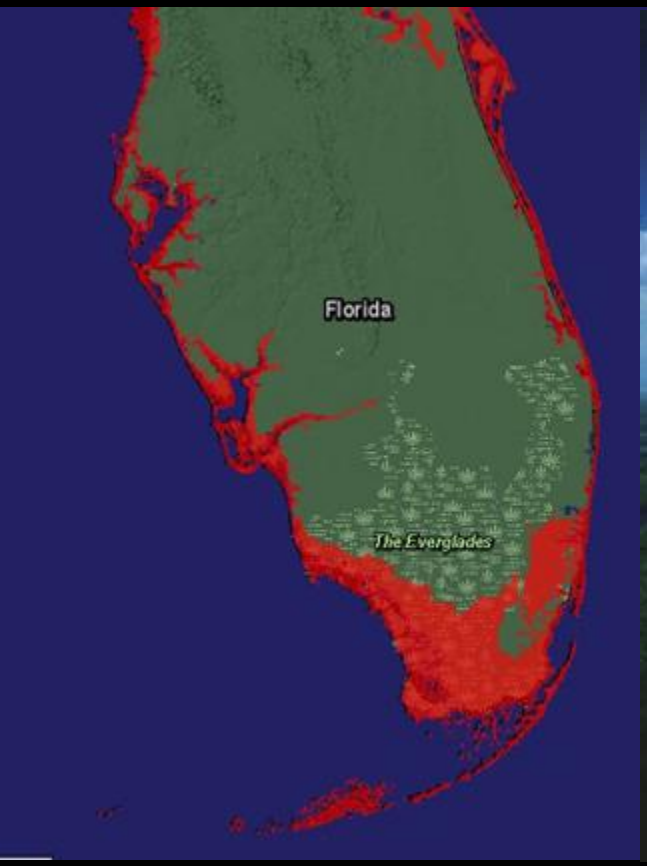


Goal: Regulate contaminant levels to protect water quality

Climate vulnerability: toxicity altered with increasing temp; reduced dilution, flushing; may increase vulnerability to changing temp, water quality

Adaptation response: Keep the same regulatory levels regardless of changing conditions? Make regulatory levels tighter? More flexible?

Restoration

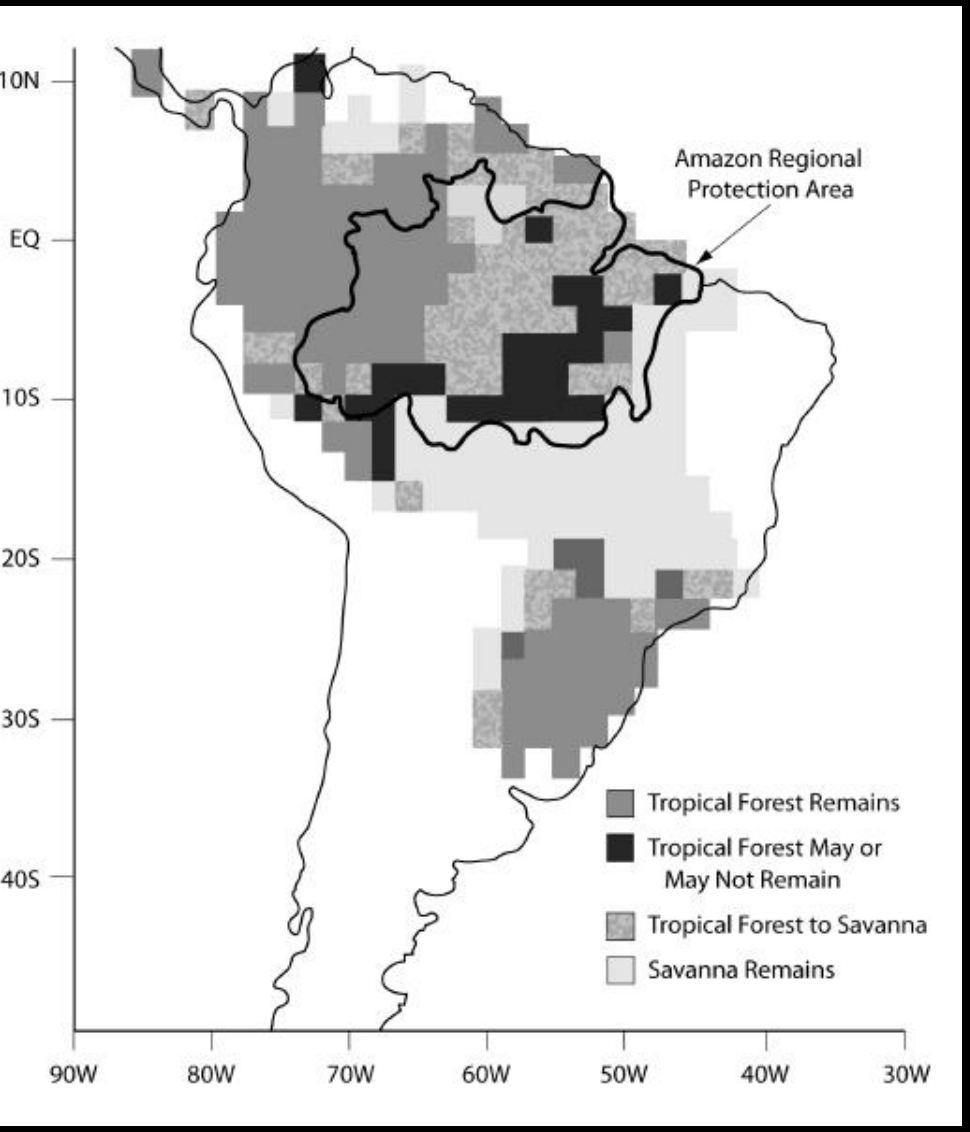


Goal: Restore the Florida Everglades (Billions of dollars)

Climate vulnerability: sea level rise, increasing storm intensity, altered freshwater input

Adaptation response: Include areas further inland? Enhance coastal accretion?

Protected areas



Goal: Protect core area of Amazonian rainforest

Climate vulnerability: Changing rainfall, temperatures, evapotranspiration

Adaptation response: Buy more land? Control land use in "hydroshed"?

Two Big Questions:

1. How vulnerable are the communities, ecosystems, species, social structures, etc. that we care about to climate change? [***vulnerability assessment***]

2. What can we do to limit or reduce vulnerability? [***adaptation planning***]

1. Limit Change

- Protect places that will naturally change less

- Limit local/regional change, e.g.
  - *Acidification*: limit NOx and SOx pollution
  - *Sea level rise*: Protect/restore processes supporting shoreline accretion (biological and physical)
  - *Temperature*: Restore/create shade

2. Support resistance, resilience, and response

Resistance

- Reduce interacting stressors
- Support evolutionary adaptation
- Address land-sea connections

Resilience

Response

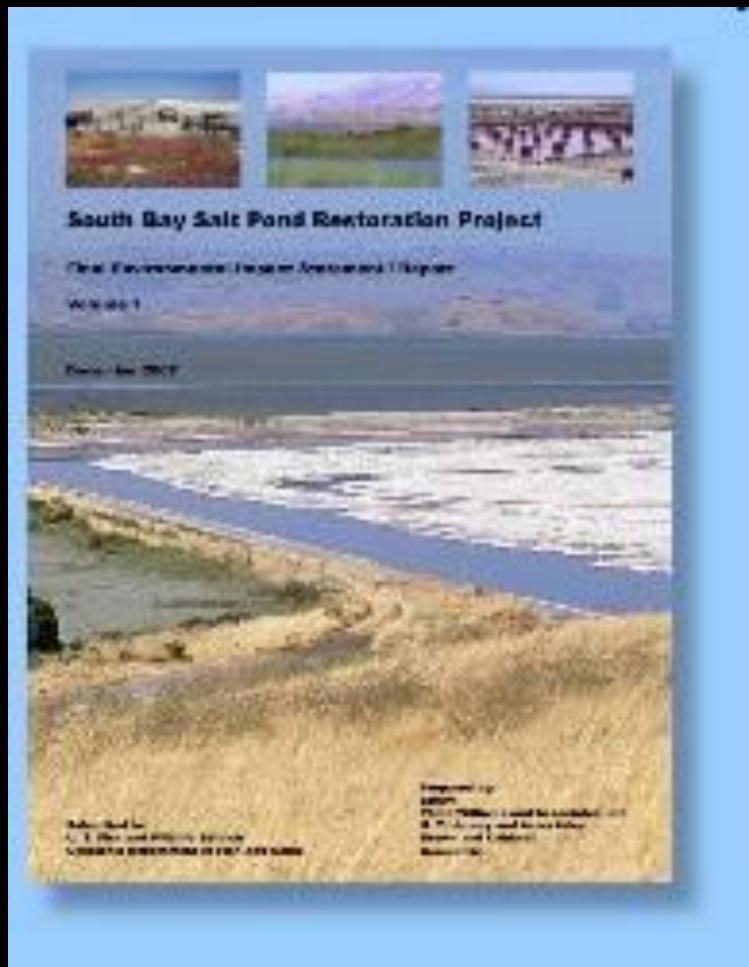
3. Manage for Uncertainty

- Natural resource management has always faced uncertainty
  - Anxiety about uncertainty often leads to “analysis paralysis”
  - Don’t deny it: embrace it!
- Three types of climate-related uncertainty
  - Future climatic changes
  - Ecological responses
  - Management effectiveness
- Uncertainty in directionality vs. magnitude

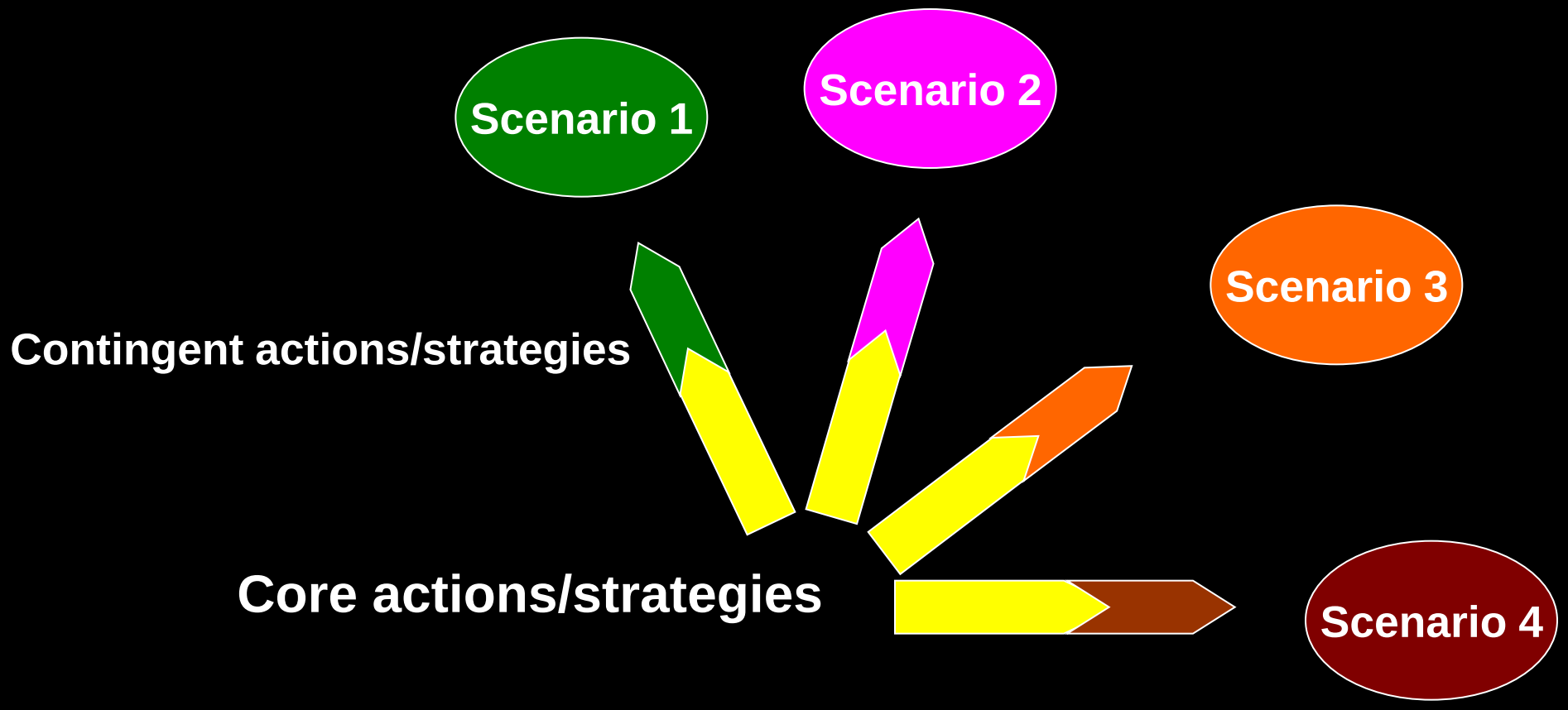
Active Adaptive Management:

South Bay Salt Pond Restoration Project

- 143 pages!!
- Specified **triggers** for action
- Specified **key uncertainties**
- Specified necessary **science and institutional structure** for adaptive management to work



Scenario Planning:
Robust vs. optimal decision-making



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

vs.

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

Adaptation

=

Science

+

Governance

+

Management/planning

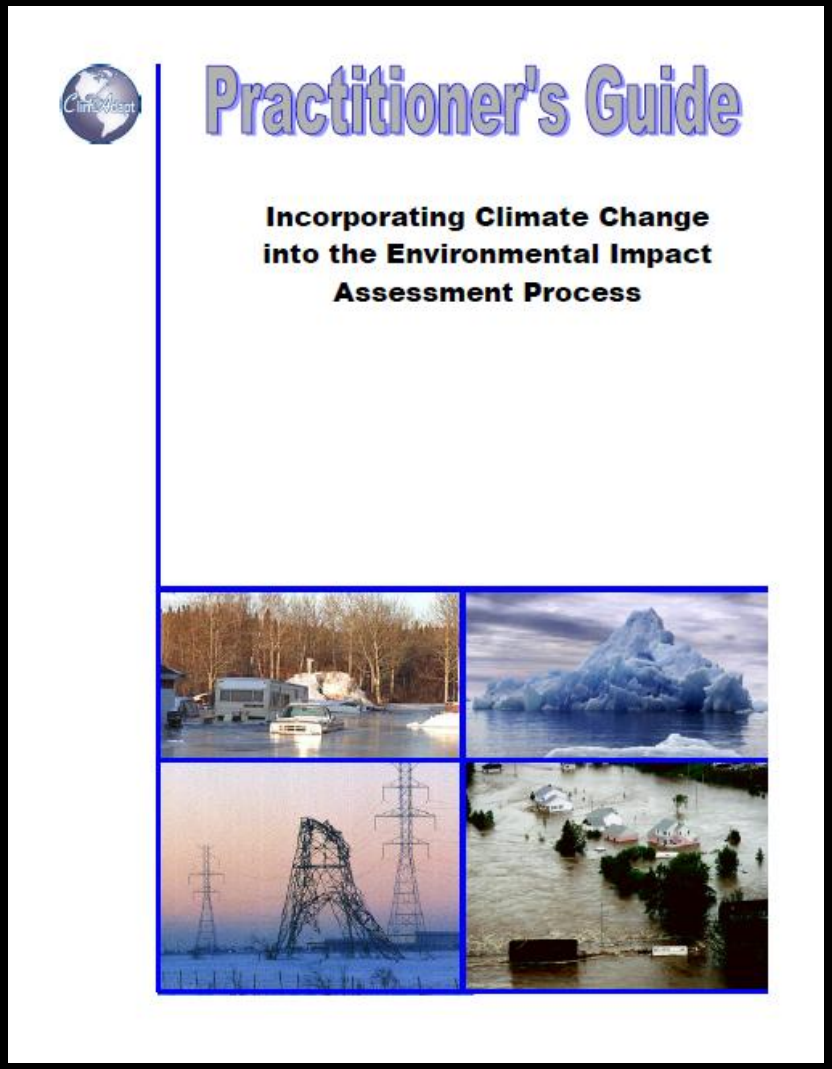
Adaptation action happens when

- *It is built into existing efforts*
- *It doesn't focus just on climate change*

Examples:

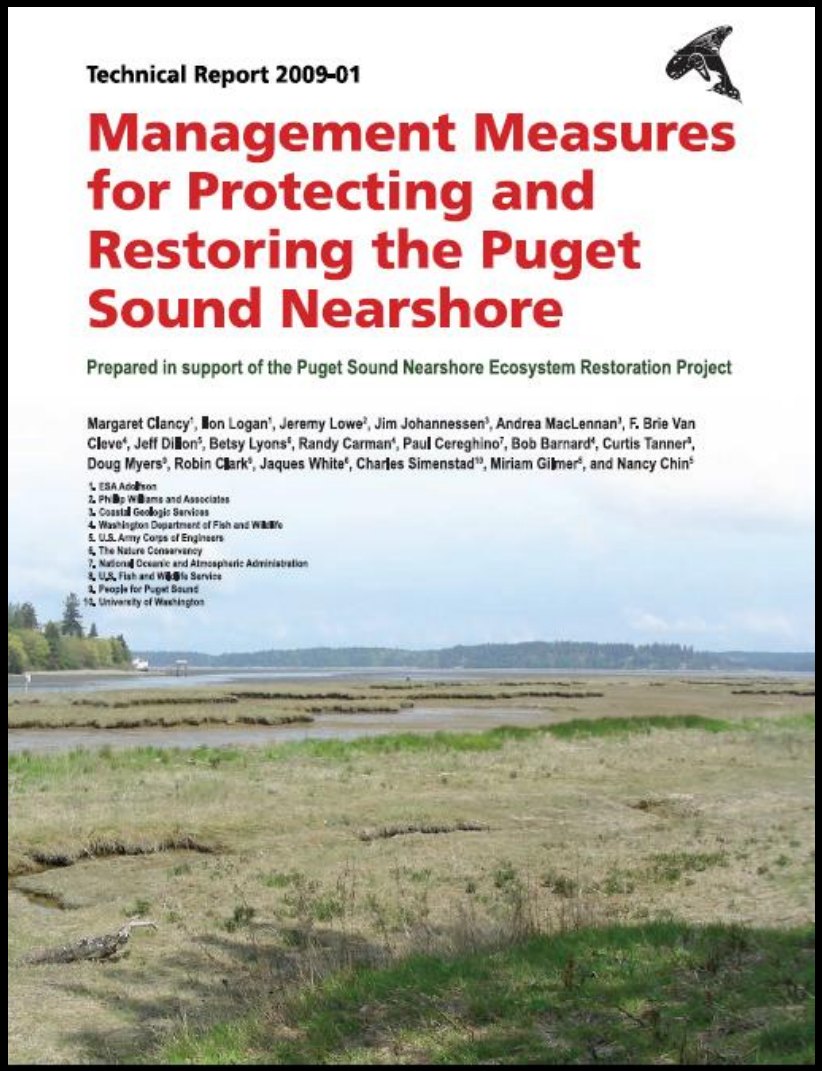
- Climate change + fisheries management
- Climate change + acceptable pollutant levels
- Climate change + critical habitat designations
- Climate change + EIAs
- Climate change + land acquisition decisions

Adapting Processes: Environmental Impact Assessment in Nova Scotia



- Walked through existing process
- Developed additional guidelines/steps
- Tested against existing projects

Adapting Management Measures:
Puget Sound Nearshore Ecosystem Restoration Partnership

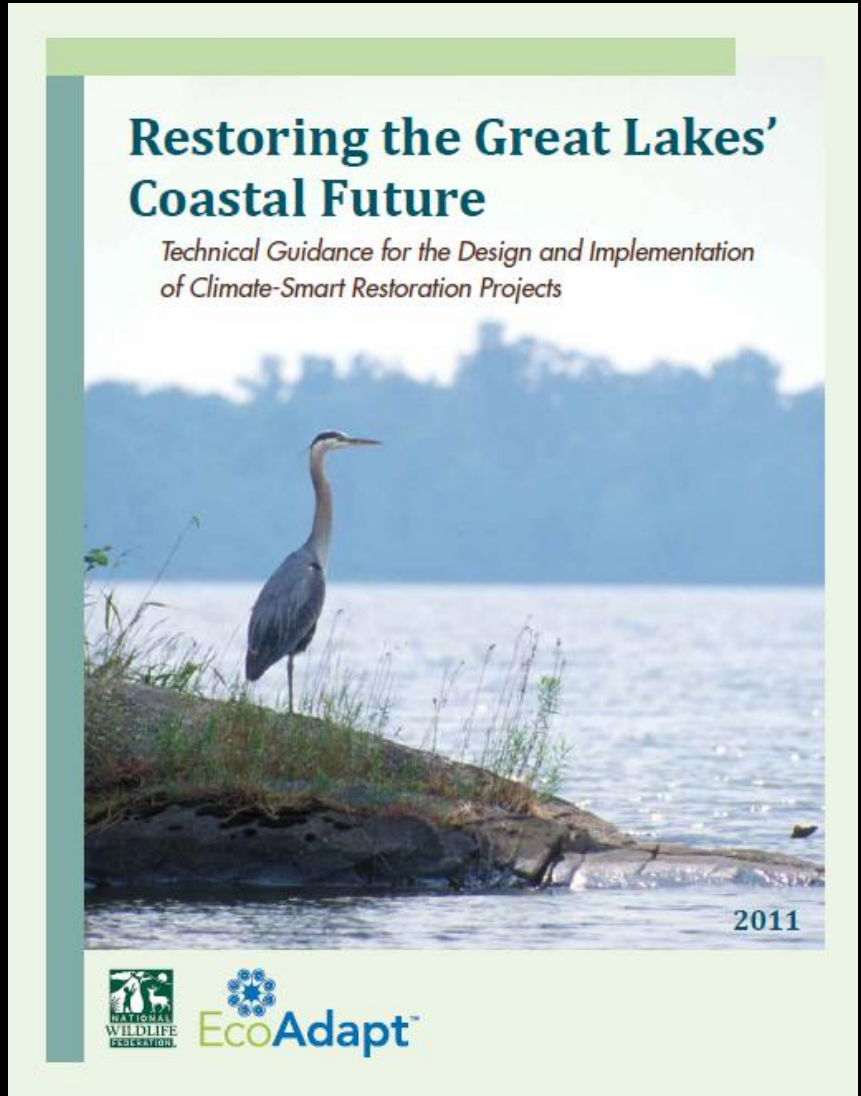


Appendix B: Sea Level Rise Risk Assessment

"This memorandum describes how each nearshore management measure is affected by SLR. The basic question being addressed here is whether projected rates of SLR pose a significant threat to our ability to successfully implement nearshore management measures."

Adapting Restoration plans:
Great Lakes Restoration Initiative Technical Guidance

- Framework for adapting projects to climate change
- Rough vulnerability assessment for typical goals, objectives, and strategies
- Suggestions for reducing vulnerability



Adjusting plants used in restoration: Breeding salt-tolerant bald-cypress trees in south-eastern US

Adjusting Critical Habitat Rules

Future habitat

Quino butterfly Critical Habitat Ruling includes current, future, and transitional habitat !

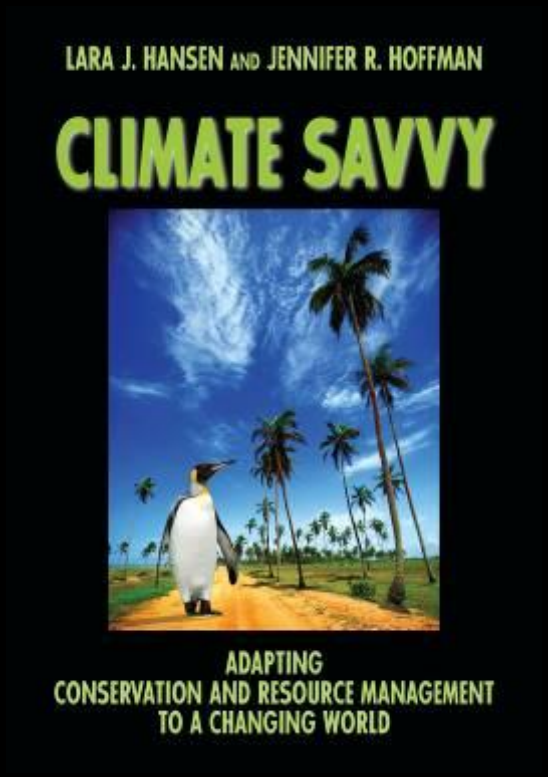
Current habitat

Solid evidence for range change, novel host plant use

Some final thoughts

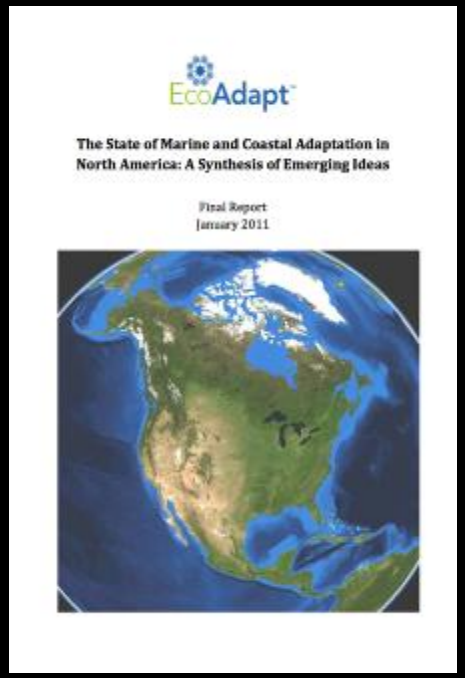
- Foster instinctive understanding of the implications of climate change in all staff, at all levels.
- Top down component: provide mandate, guidance and empowerment for bottom up development
- Bottom up efforts: foster them!
- Don’t lose site of underlying goals
- Focus on integration, not isolation of adaptation thinking; all work should be climate cognizant

Additional resources



climatesavvy.org

cakex.org



cake

Climate Adaptation
Knowledge Exchange

your online adaptation destination!

WWW.CAKEX.ORG