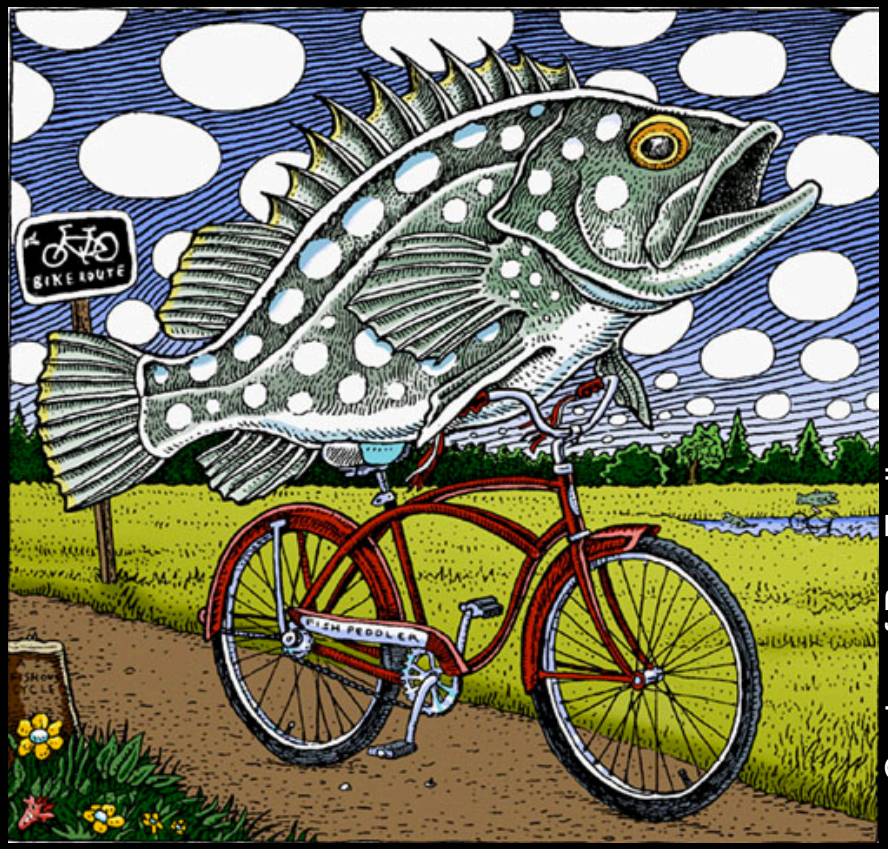


Genius of Ray Troll

Adapting your work to climate change: A Framework

Lara Hansen, Ph.D.
Chief Scientist and Executive Director
EcoAdapt

Point of Clarification

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

  ↓*GHG emissions = a safe car on a good road*

- **<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

Goals

- Understand tools for assessing climate sensitivity of species and habitats;
- Identify habitat restoration focus areas, techniques & projects to address climate change;
- Recognize examples ‘climate-change resilient’ restoration;
- Learn a process you can replicate at home;
- Develop strategies to address climate change in your own existing/planned restoration project.

Approach

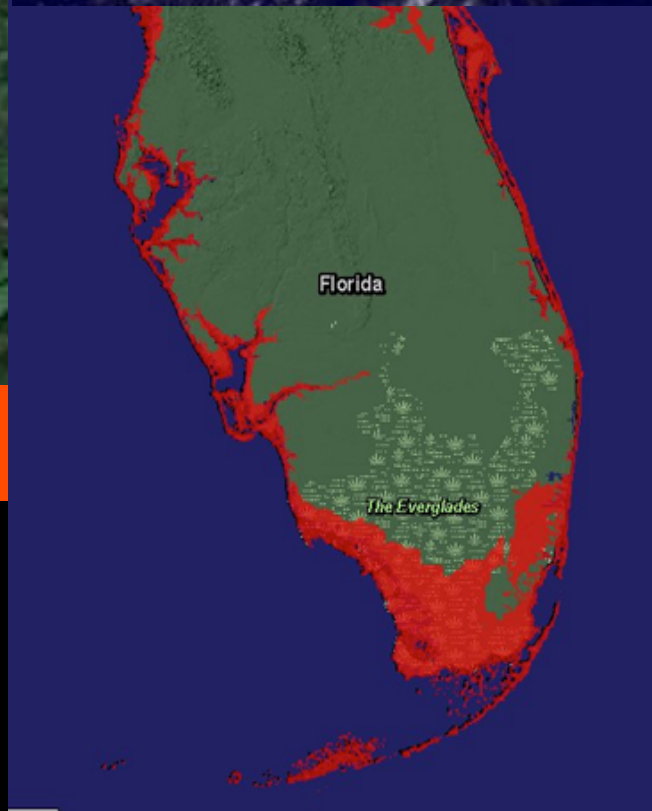
- *Gather new information*
- *Synthesize your existing knowledge*
- *Apply to your daily work*
- *Work with colleagues*
- *Create better long-term outcomes that incorporate the reality of climate change*

“Houston, we’ve had a problem.”

-Jack Swigert

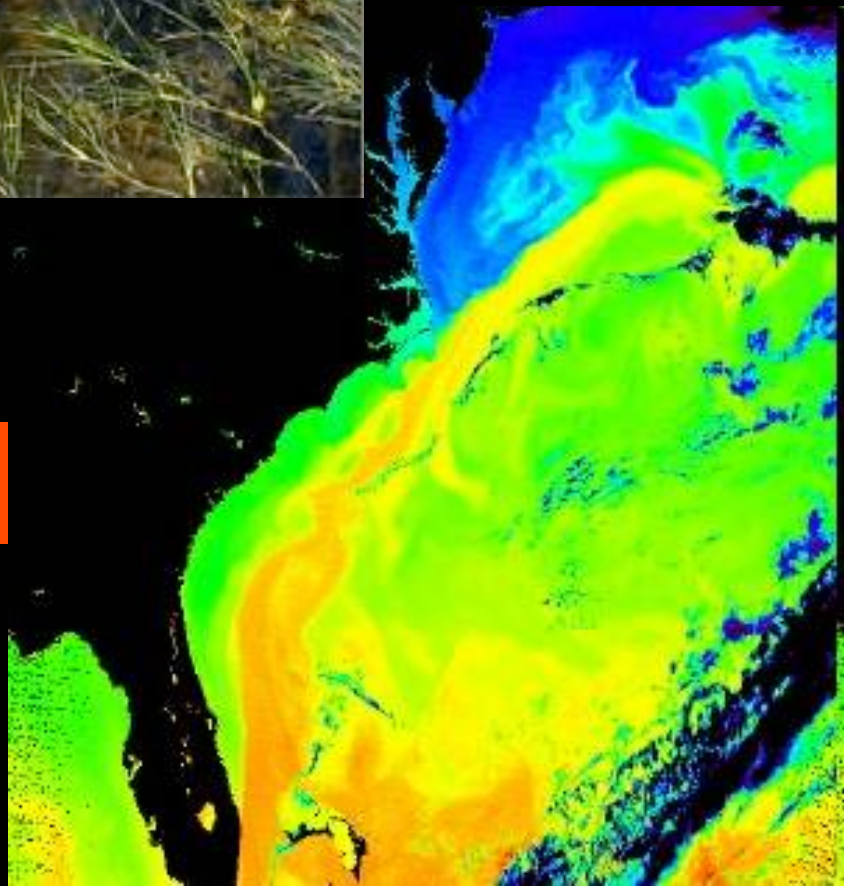
Astronaut, Apollo 13

Reserves for Endangered Species



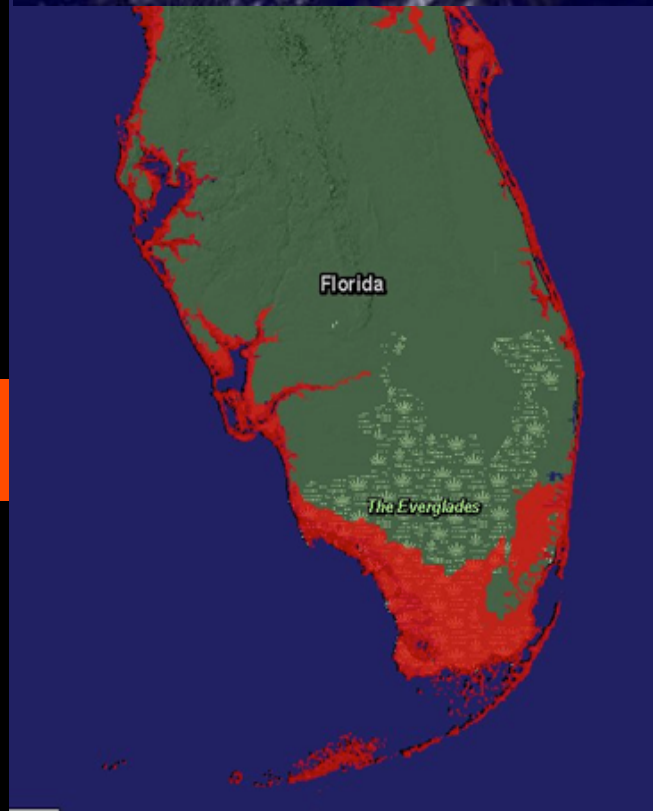
Sea Level Rise, ↑Storm Intensity

Restoration



Warming water, range shift

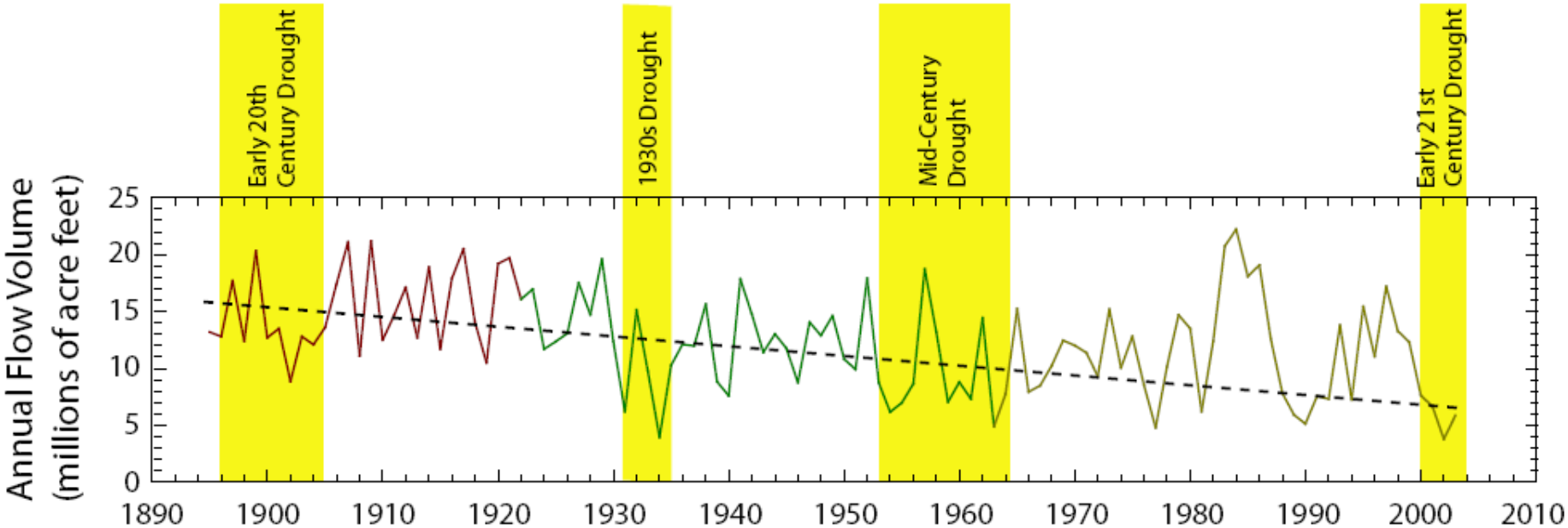
Restoration



Sea Level Rise, ↑Storm Intensity

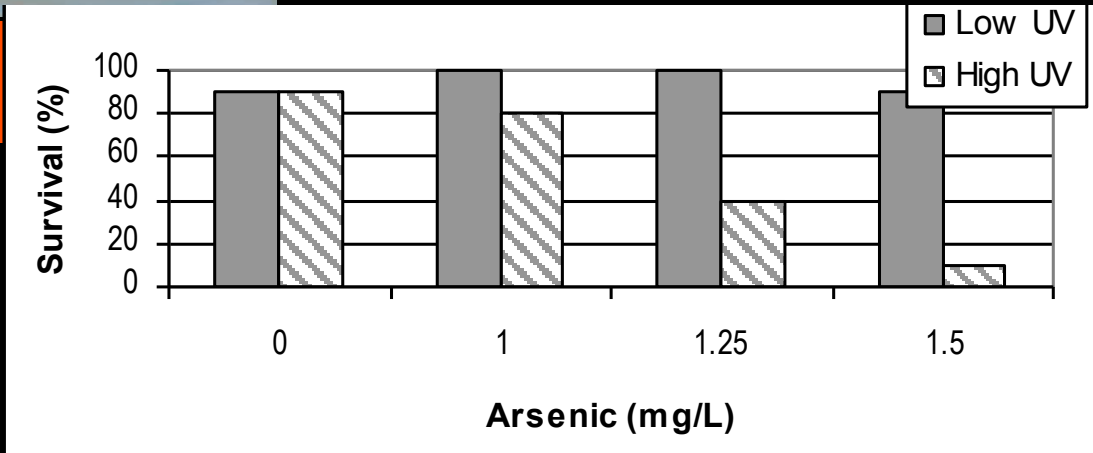
Water Allocation

Altered precipitation patterns



Improving water quality

Synergistic effects



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

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

Today

- *Learn about:*
  - *Change expected in the PNW (and Pacific Islands)*
  - *The basics of climate models*
  - *Tools that are available to assess species and habitat sensitivity and vulnerability*
- *Apply this to your own work*
- *Begin to explore what you can do about it!*

What is your goal or objective? *What are you trying to do?*

How might climate change affect your likelihood of success?

1 What is your organizational mission or project objective? *What are you trying to do?*	3 How might climate change affect your likelihood of success?	4 What can you do to increase your likelihood of success given these climate change effects?
2 How are you trying to achieve this goal? (Strategies, approaches, patterns)		

How are you trying to achieve this goal? (Strategies, approaches, patterns)

What can you do about it?

“Don’t Panic.”

-Douglas Adams

Hitchhiker’s Guide to the Galaxy

But what can I do
about climate change?

Adaptation Options

Resistance **Resilience** **Response**

For more on this, see the 3 Little Pigs Advice Column on www.cakex.org

Climate change is complicated,
I don’t know what’s going to happen!

How can I possibly know what to do?

Should I take my umbrella?

Reducing vulnerability

Vulnerability =
exposure + sensitivity
- adaptive capacity

↓ ***Reduce exposure***

↓ ***Sensitivity***

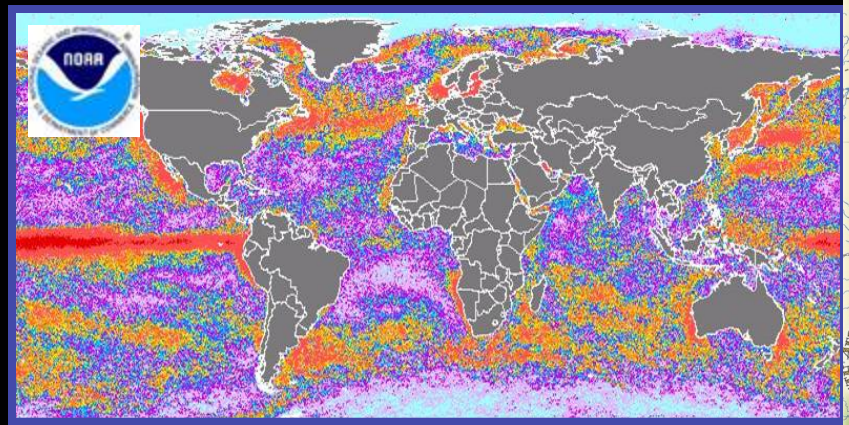
↑ ***Increase adaptive capacity***

EcoAdapt's Five Tenets of Climate Savviness

1) Protect adequate and appropriate *space* for a changing world

Plan spatially, think temporally!

- Refugia
- Gradients (Latitudinal/Elevational)
- Heterogeneity
- Gene flow/Connectivity
- Inclusion of other changes in the watershed/ landscape/seascape



2) Reduce non-climate stresses

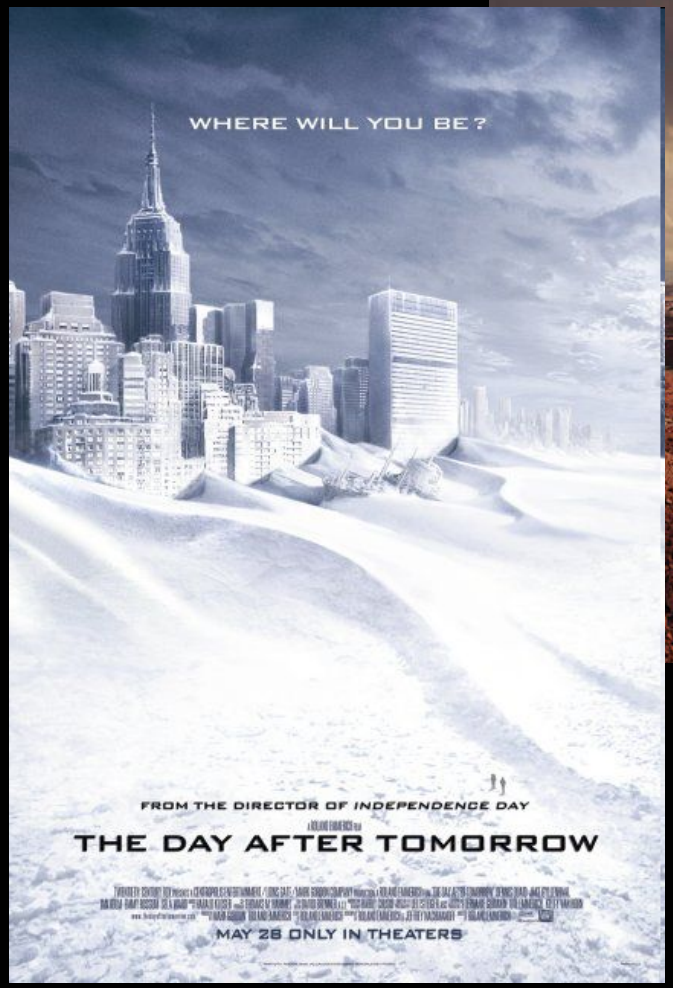
Invasive & Pest Species

Pollution & Habitat Degradation

Agriculture & Habitat Fragmentation

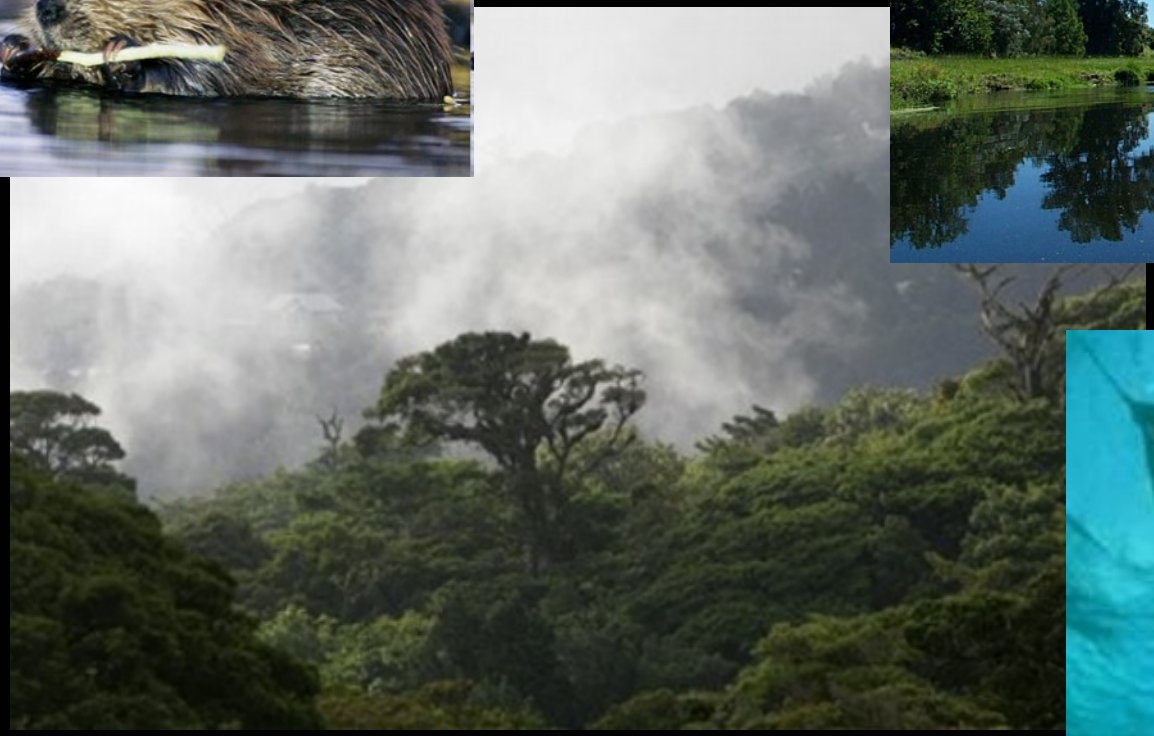
Unsustainable Harvest

3) Manage for Uncertainty

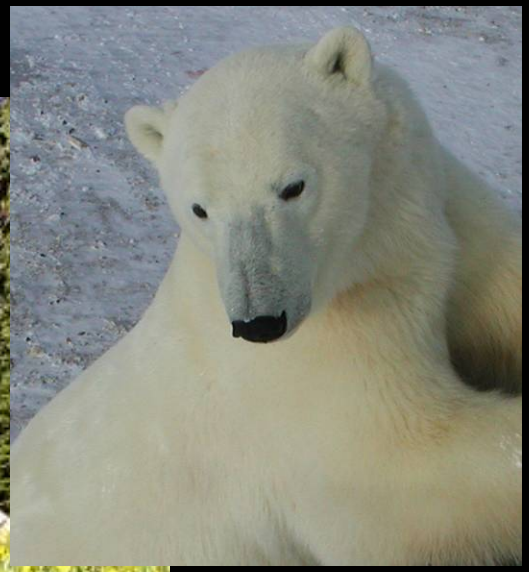


4) Reduce local and regional climate change

Michael S. Quinton, National Geographic

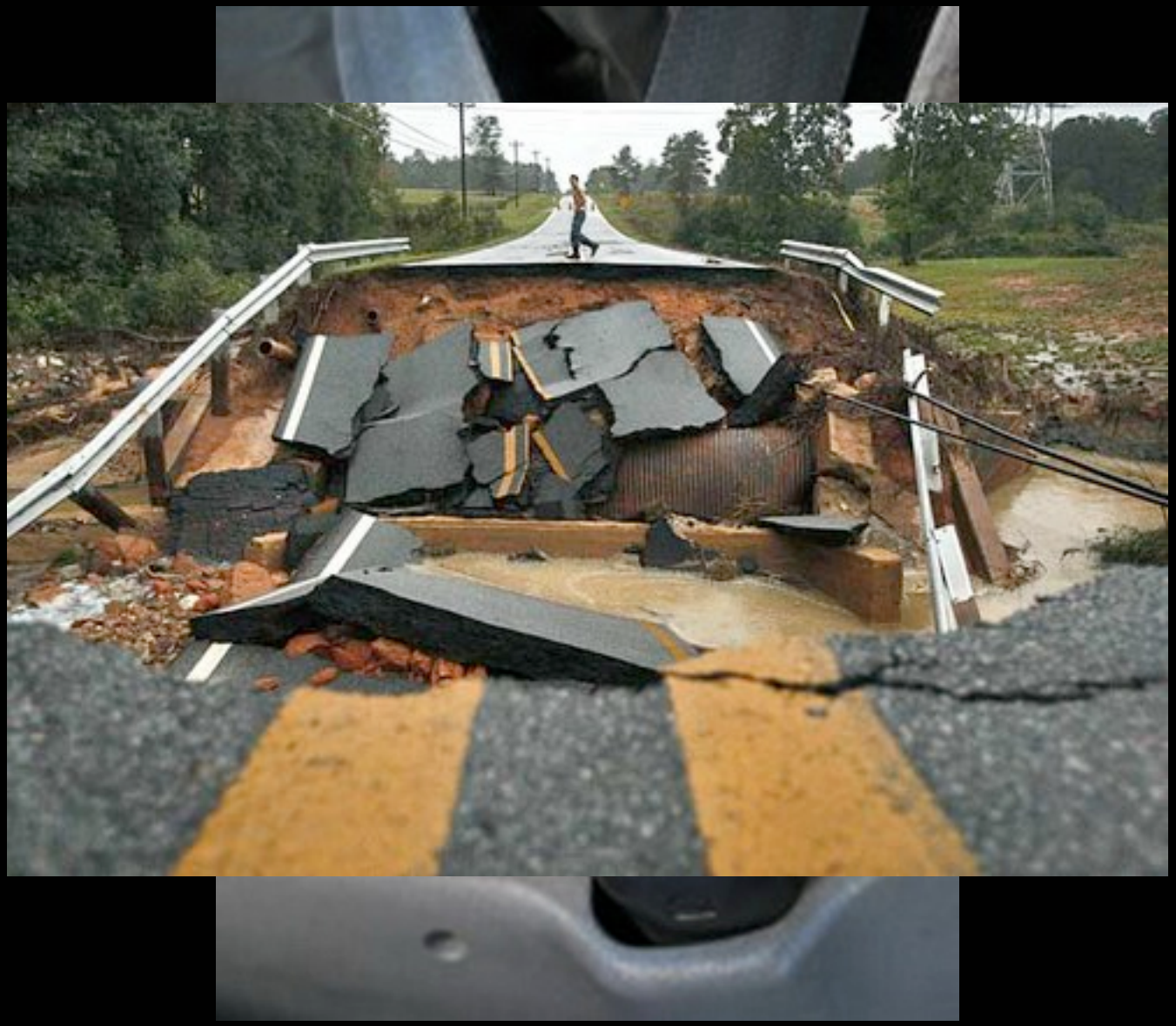


5) Reduce Greenhouse Gas Emissions



Resilience options have limits, some systems are very limited

Polar habitat, high elevation habitat, oceans…



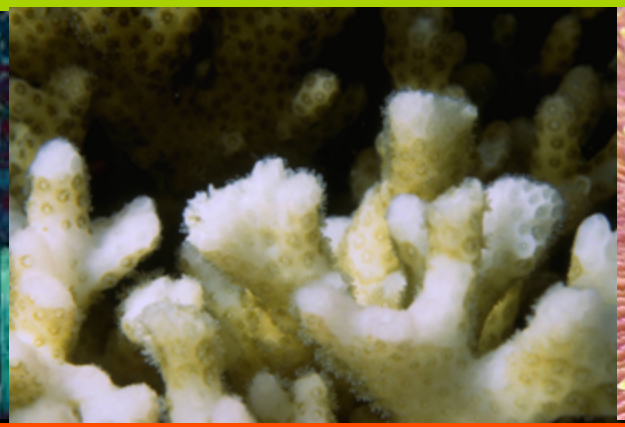
Manage water resources for Greater Yellowstone

Warmer temperature, altered precipitation

Solutions!

- Install and manage snow fences
- Reintroduce beavers
- Work with external partners to reduce water extraction

Protecting Coral Reefs

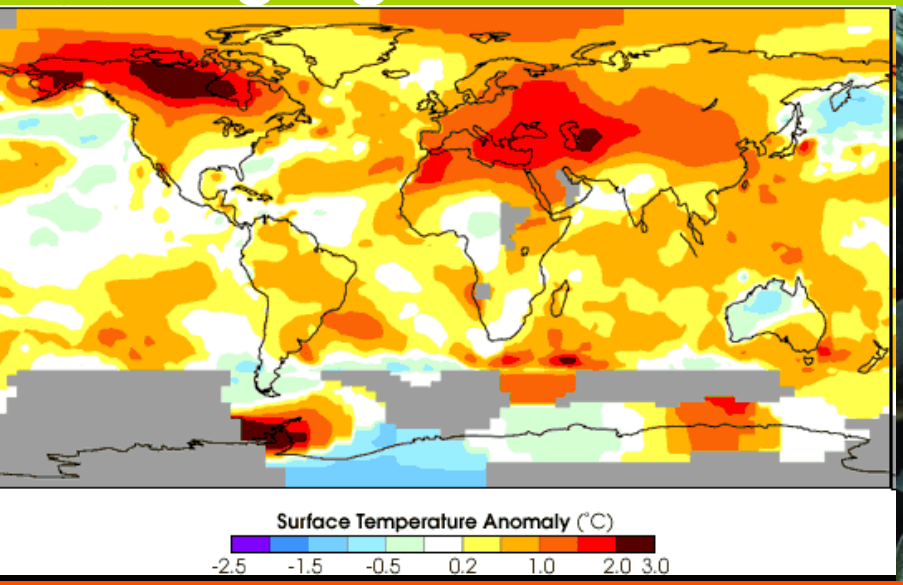

Warming waters, ocean acidification, synergasms

Solutions!

Great Barrier Reef: Reducing nutrient outflow to decrease synergistic effects between poor water quality and climate change

Florida Keys: Created Action Plan to reduce additional stressors, prioritize protection of resilient locations, restore reefs with resistant strains, demand action on mitigation

Managing Fisheries



↑ Temperatures, Acidification, Existing Management

Solutions!

- **"If you don't know, don't go" Closure of rapidly changing regions, especially those lacking management plans**

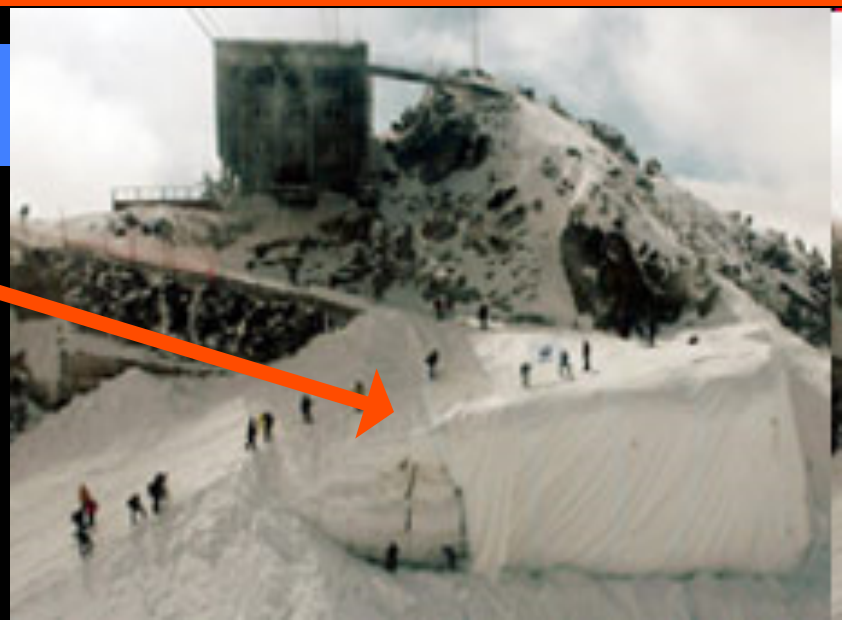
Protecting Snow and Ice




Warming air temperature, changing precipitation

Solutions!

- Cover glaciers with insulating blanket during summer months
- Reduce disturbance of glaciers



Building Infrastructure



↑ temperature, altered rainfall, existing codes

Solutions!

- Build on coasts planning for sea level rise
- Build roads planning for beach migration

“There is no box.”

-Amory Lovins

CAN MAKE
ADAPTATION HAPPEN

Tomorrow

- *Learn about:*
  - *Cold water species sensitivity*
  - *Invasive species and climate change*
- *Develop strategies to address your own work's vulnerabilities to climate change*

Creating Climate Savvy Restoration

- *Is your approach vulnerable?*
- *Does your correction reduce vulnerability?*
- *Is it feasible?*
  - *Are there barriers? Can you overcome them?*
- *What do you need to make it happen?*
  - *Resources, partners, conviction*
- *What are the steps to implementation?*