

ADAPTING TO CLIMATE CHANGE in the Olympic Coast National Marine Sanctuary

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May 17, 2013

OCNMS Advisory Council



*Climate Science in
the Public Interest*

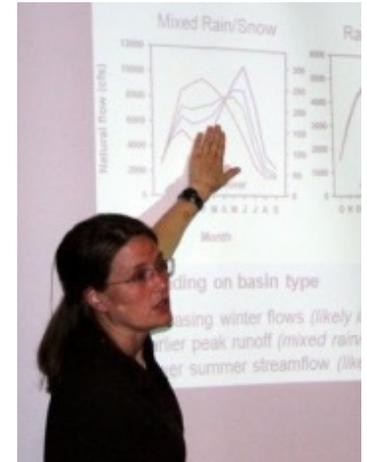
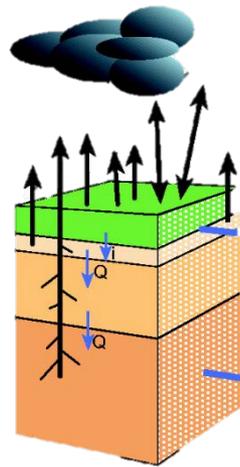
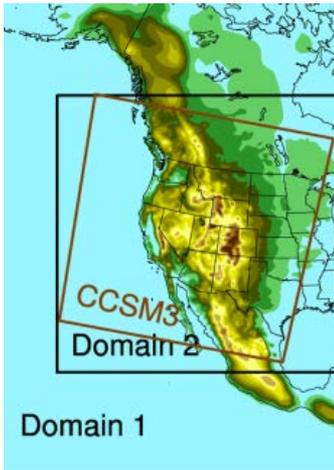


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The Climate Impacts Group

Connecting science and decision making to build climate resilience for communities and ecosystems in the Northwest and beyond.



Downscaling global climate models

Macro and fine-scale hydrologic modeling

Impacts assessments

Adaptation planning and outreach

Working since 1995 with a focus on:

- U.S. Pacific Northwest, Western U.S., Pacific Rim
- Water, forests, fish, coasts, energy, human health, urban areas
- Stakeholders: Private, public & non-governmental actors involved in climate-sensitive policymaking, planning and decision making

We live in a world of embedded climate expectations





But we are changing the climate...



Recap: OCNMS Climate Change Impacts

- Increasing temperature - Average annual temp increases +5.3°F (2.8-9.7°F) by end of century
- Increasing SST, ocean acidity
- Sea level fall and rise, depending on location.
- Shifts in community composition, competition, survival
- Altered phenology
- Non-native species interactions
- Range shifts
- (+) and (-) impacts to species or species groups

What are our choices
for dealing with this
(not so) new reality?





Option 1: Assume climate change is not a problem
(or deny it altogether)



Option 2: Wait until science has resolved the uncertainties, then decide what (if any) action to take



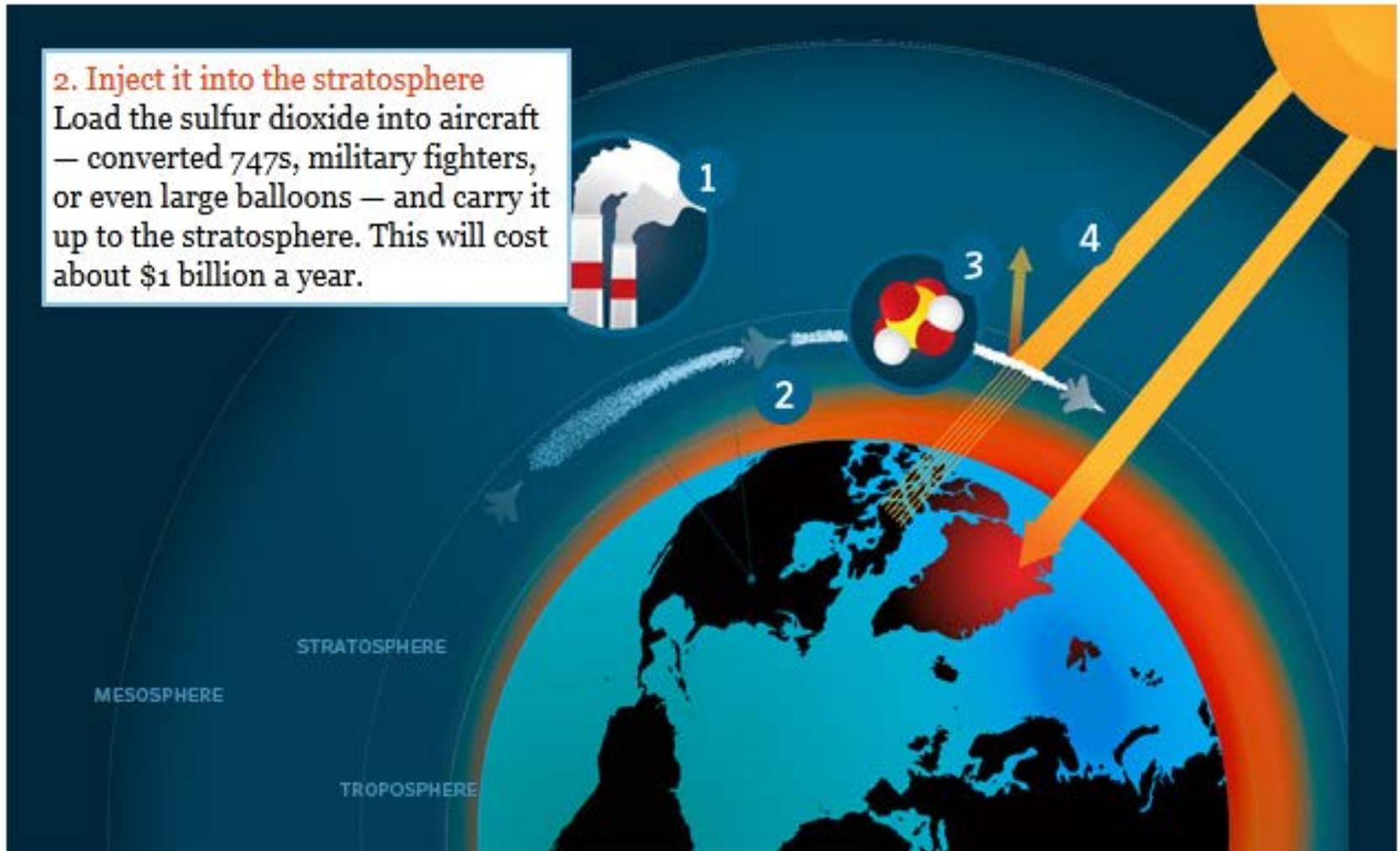
Option 3: Put **all** of our efforts into reducing greenhouse gases (mitigation)



Option 4: Put **all** of our efforts into preparing for climate change impacts (adaptation)

2. Inject it into the stratosphere

Load the sulfur dioxide into aircraft — converted 747s, military fighters, or even large balloons — and carry it up to the stratosphere. This will cost about \$1 billion a year.

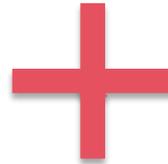


Option 5: Engineer our way out of the problem
(geoengineering)

Which single option is correct?

Technically speaking....none of them

Mitigation and adaptation are required



Mitigation

Reducing emissions of greenhouse gases

Adaptation

Preparing for and managing the change that occurs as mitigation strategies are implemented.

The Goal of Adaptive Planning

Developing “climate resilient” organizations, communities, economies, and ecosystems

What does this mean?

Taking steps to avoid or minimize those climate change impacts that can be anticipated

-- while also --

increasing the ability of human and natural systems to “bounce back” from the impacts that cannot be avoided (or anticipated)



What Does Adaptation Look Like?

A Two-Pronged Approach

Building Adaptive Capacity

Addressing institutional, legal, cultural, technical, fiscal and other barriers

Activities can be taken independent of specific climate projections

Delivering Adaptive Actions

Implementing actions to address specific climate vulnerabilities

Choice and timing of some actions may depend on specifics of the climate projections

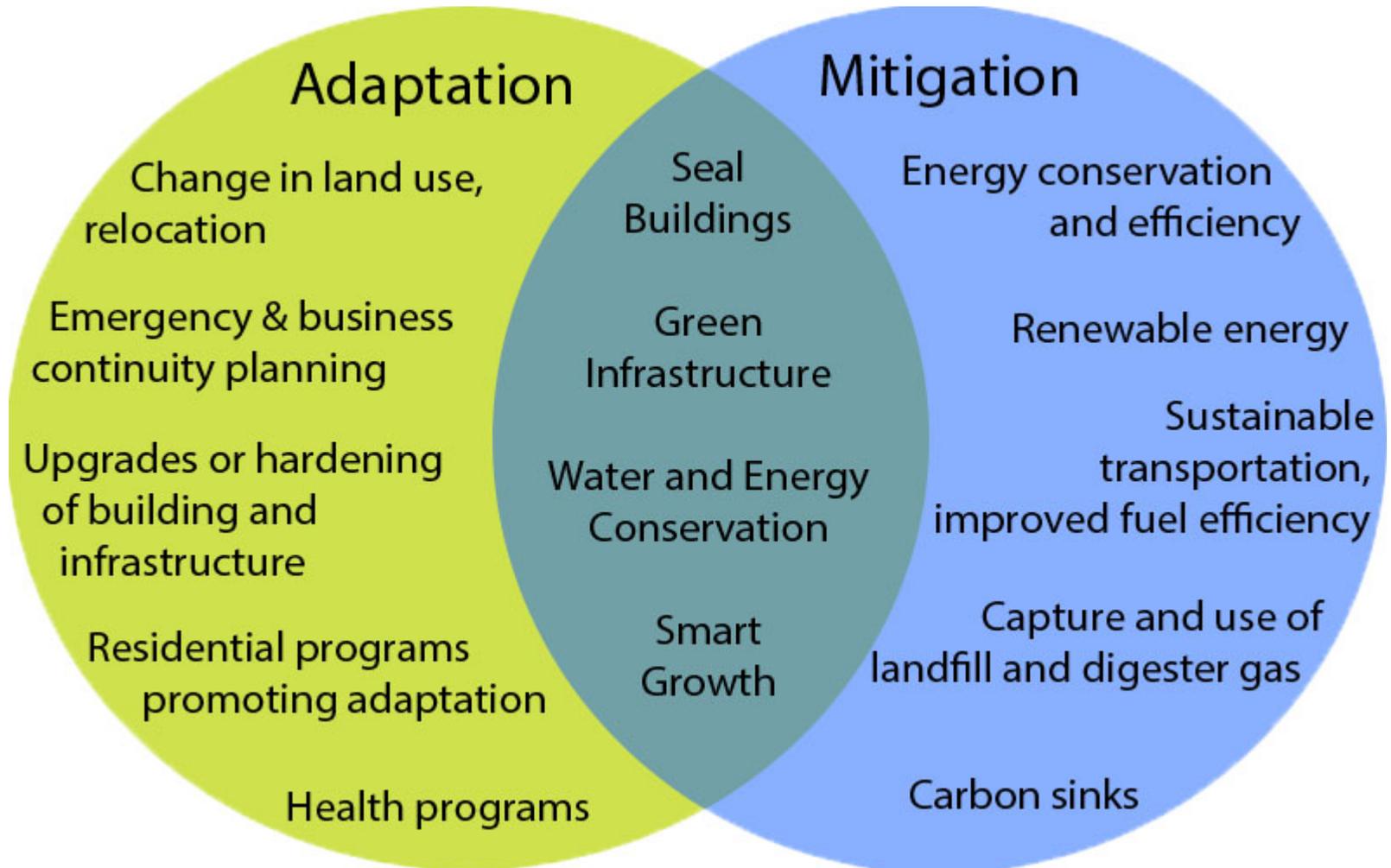
Examples of Building Adaptive Capacity

- Develop (and update) a strategy to guide adaptation activities in your organization/community
- Increase outreach and education to stakeholders
- Increase training opportunities and access to technologies that support adaptation needs
- Increase partnerships with organizations that can support adaptation needs
- Identify and address regulatory, institutional, and other barriers to adaptation planning

Examples of Delivering Adaptation Actions

- Increase water conservation measures
- Strengthen dikes and levees where appropriate
- Restore critical habitat for climate-sensitive species
- Plant tree species known to have a broad range of tolerances
- Improve the use of early warning systems for extreme heat events
- Increase use of setbacks or rolling easements for coastal land uses

Some Actions Address Both



Most importantly...

“Adaptation is not one activity or decision, but rather a **continuous** set of activities, actions, decisions, and attitudes undertaken by individuals, groups, and governments.”

-- Adger et al. 2005



The Three “Rs”

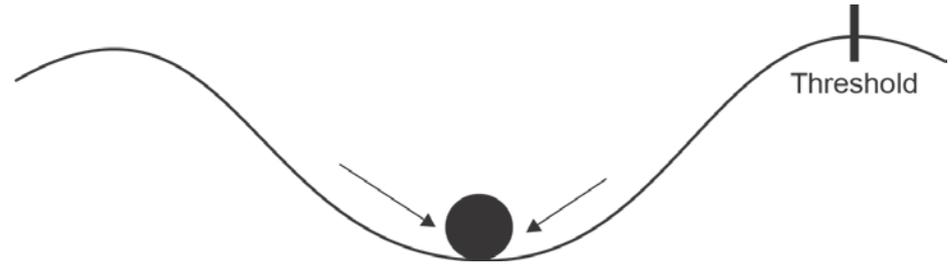
Adaptation likely to involve (simultaneously) helping species and ecosystems increase their:



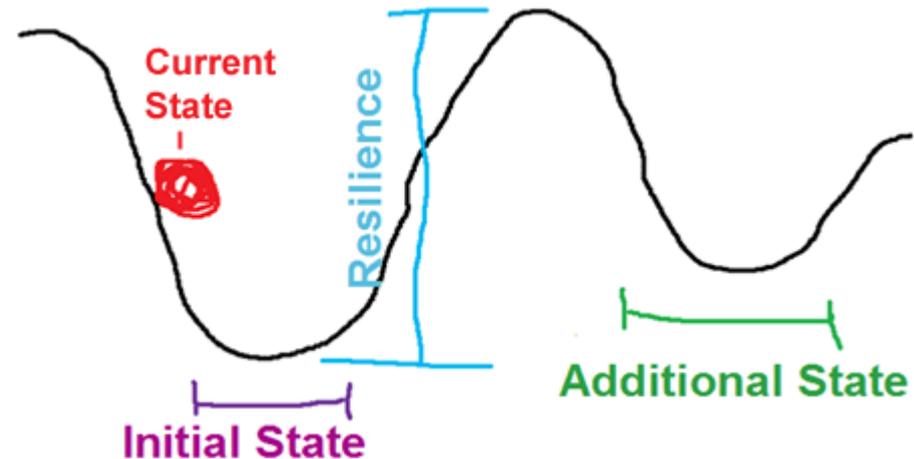
1. Resistance - Ability to avoid, prevent, or otherwise minimize climate impacts

The Three “Rs” cont’d

2. Resilience - Ability to recover to a prior condition quickly after a disturbance



3. Response - ability to accommodate change and transition to a new state.



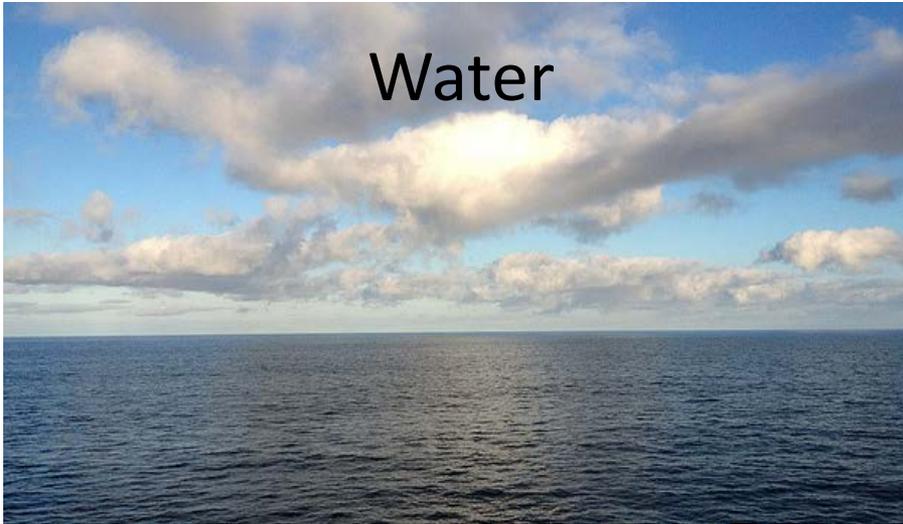
New Meaning in a Changing Climate?

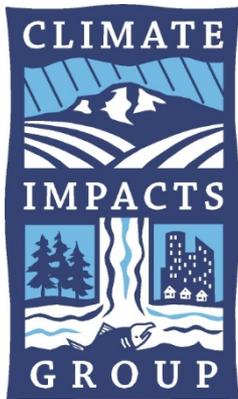
- **Maintain** – as it stands today? May require more effort, resources
- **Protect** – Protect as they exist today?
- **Preserve** – e.g. Mission Statement “...*conduct and apply research to preserve the areas ecological integrity...*”
- **Key** – e.g., Objective C2 “Monitor *key resources...*”
- **Restoration** – to what conditions? At what cost?

Suggested Guiding Principles for “Climate-smart” Conservation

1. Protect adequate and appropriate space to accommodate changing conditions.
2. Manage for uncertainty. Expect surprises.
3. Reduce non-climate stressors.
4. Mainstream climate adaptation.
5. Plan for both climate variability and climate change.
6. Reduce the rate and extent of climate change.

Possible Adaptation Actions





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