



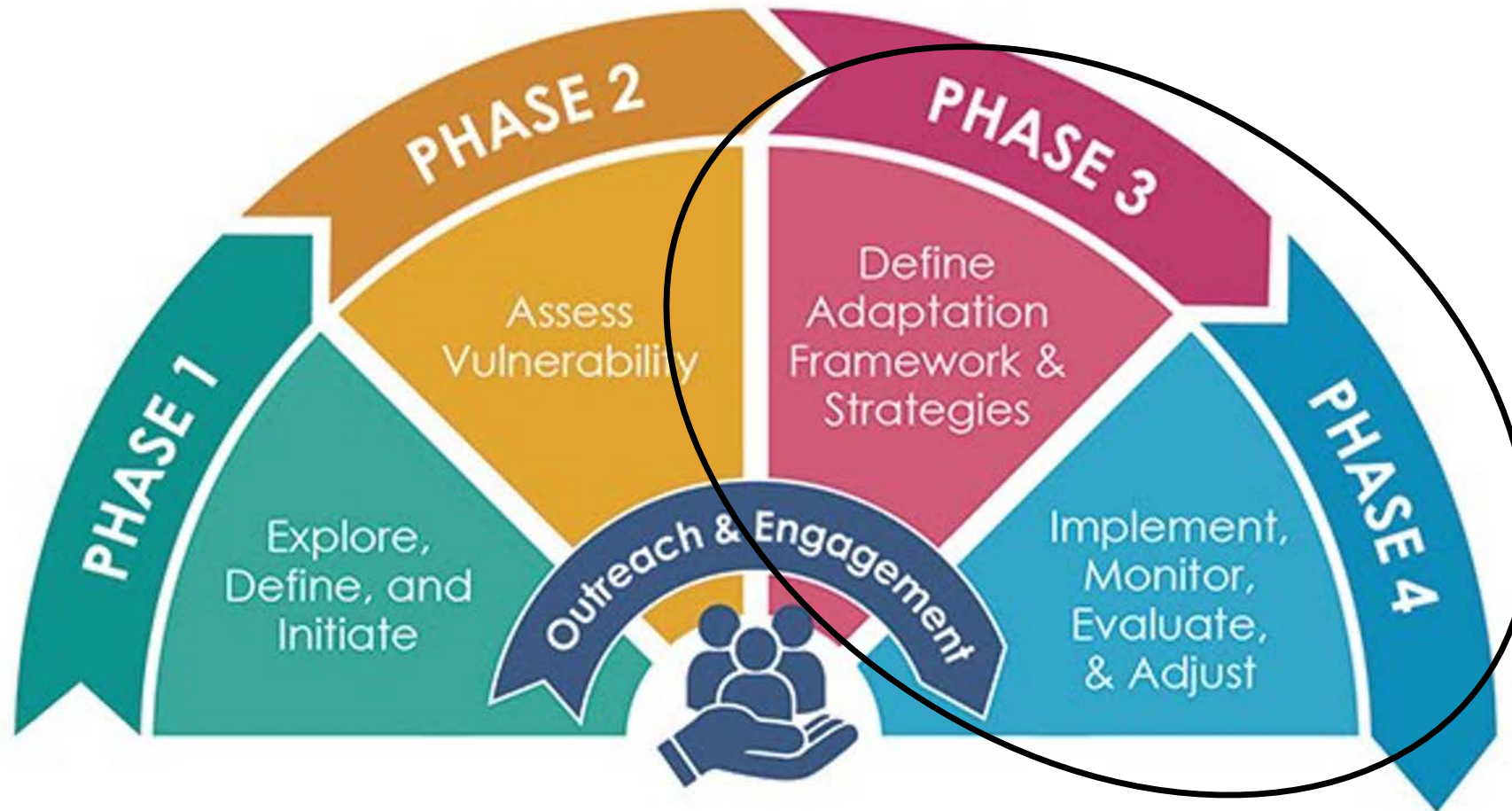
# Introduction to Adaptation Strategies

Butte-Silver Bow June 2022 Eric Mielbrecht





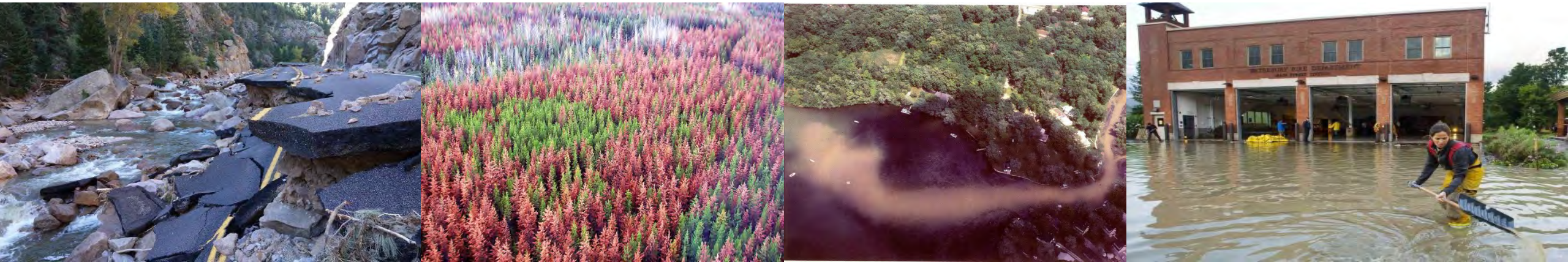
# Adaptation Planning Process



# Defining Adaptation

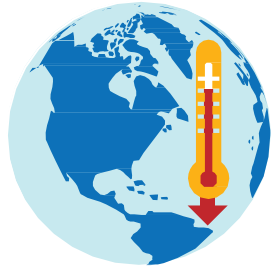


Adaptation refers to efforts to reduce the negative effects or take advantage of the opportunities provided by climate change



Adaptation strategies aim to reduce the impacts of climate change and/or increase the resilience of human, built, and natural systems.

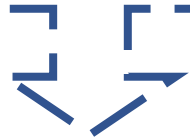
# Using Vulnerability Results in Adaptation



**Reduce climate impacts**  
*(likelihood & consequence)*



**Increase climate resilience**  
*(adaptive capacity)*



**Reduce climate change vulnerability**

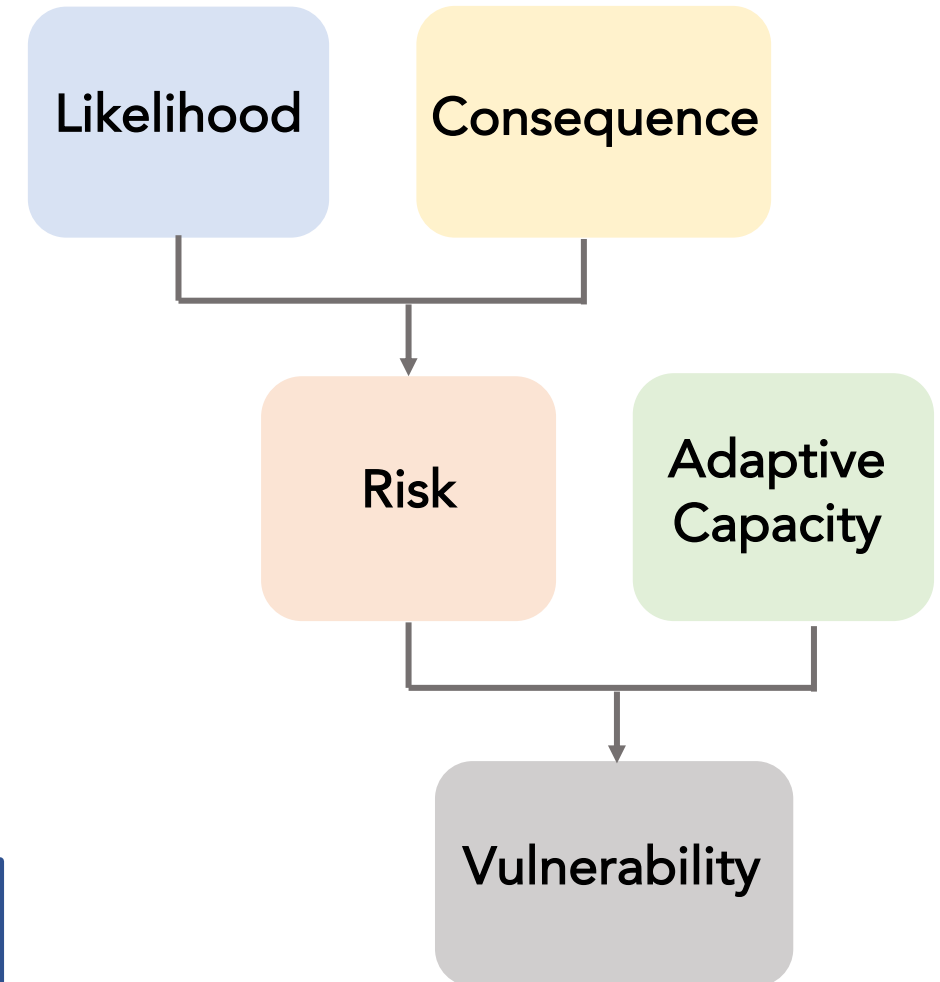
Likelihood

Consequence

Risk

Adaptive  
Capacity

Vulnerability





# Using Vulnerability Results in Adaptation



## ↓ Likelihood (*limit change*)

- Increase shading on pedestrian walkways, transit stops, and around county facilities
- Use cool pavement materials or reflective coatings to reduce heat absorption
- Reduce stormwater runoff within residential neighborhoods that flood frequently



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# Using Vulnerability Results in Adaptation



## ↓ Consequence (*minimize effects*)

- Retrofit or reroute pedestrian/bicycle trails and bridges in areas that are subject to flooding
- Plant heat- and drought-tolerant native species in landscaping projects
- Provide free transportation to cooling centers





## ↑ Adaptive Capacity (*improve ability to cope*)

- Offer professional development opportunities for staff to develop their technical expertise and skills to prepare for and respond to climate change impacts
- Create policies that encourage solar and other renewable energy generation
- Build partnerships between public, private, and nonprofit sectors to provide critical services to vulnerable populations





# Types of Adaptation Strategies



Adaptation strategies can reduce vulnerability through:

- ★ Programmatic activities
- ★ Plans, regulations, policies
- ★ Capital improvement/infrastructure projects
- ★ Knowledge/evaluation activities
- ★ Coordination/collaboration activities



# Programmatic Activities



Strategies aimed at creating new or expanding existing programs, activities, or initiatives



## Examples:

- Establish a shuttle system to cooling centers
- Integrate climate into public health programs and create a website that details health risks exacerbated by climate change and provides information that helps residents prepare for and respond to impacts
- Develop low-income energy programs



# Plans, Regulations, & Policies



Strategies aimed at developing or revising policies, plans, regulations, or guidelines



## Examples:

- Create hazard recovery plans and prioritize restoration of vital facilities and assets
- Revise zoning regulations to prohibit certain land uses in high-risk areas
- Require all new construction to make provisions for on-site stormwater management



# Capital Improvement/Infrastructure Projects



Strategies designed to address physical and functional deficiencies or needs in the built and natural environment



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## Examples:

- Construct water storage facilities and install efficient plumbing fixtures and equipment in buildings to conserve water
- Install heat-reducing roofs
- Fill in the basements of homes within the 100-year floodplain
- Use permeable pavement and rain gardens to reduce stormwater runoff

# Knowledge/Evaluation Activities



Strategies that aim to gather information about climate changes, impacts, and/or management effectiveness

- *May be a precursor to implementing another type of strategy*



Photo by Bill Butcher/USFWS (Public Domain)

## Examples:

- Inventory bridges and culverts to determine which are at high risk of failure during future storm events
- Explore feasibility of supply side diversification and resilient electrical distribution infrastructure to facilitate access to local, decentralized renewable energy



# Collaboration/Coordination Activities



Strategies that focus on strengthening partnerships and relationships, communicating information, expanding awareness, or coordinating across organizational, jurisdictional, or political boundaries



## Examples:

- Encourage neighborhoods to become familiar with residents who have skills and tools to assist others with special needs (e.g., develop maps and inventories of neighborhood assets)
- Work with local medical providers and hospitals to ensure that medical facilities are prepared to meet periods of increased demand



# Maladaptation



Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future. - IPCC 2014



## Example:

Relying solely on air conditioning in private homes to address extreme heat stress where energy is fossil fuel based.

- Renewable energy
- Reflective roof, building envelope
- Shared cooling centers



# Making Decisions in a Changing Climate



## New/different activities

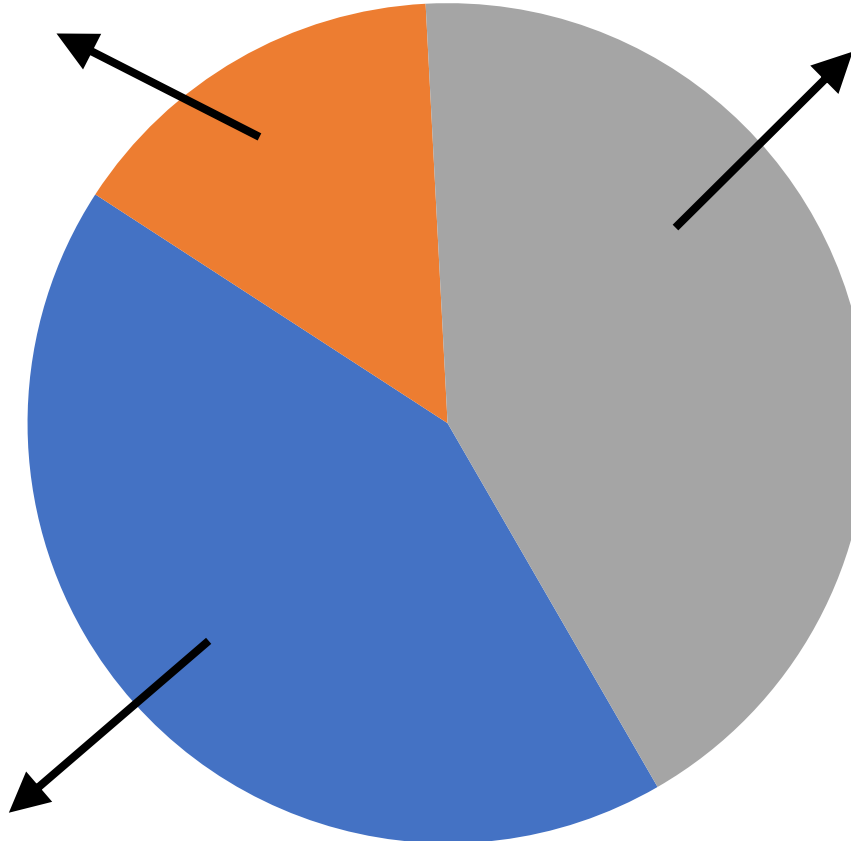
Assess potential climate change-induced population migration within and to the county

## Current/same activities

Educate public on water conservation

## Modifications to current activities

Plant drought-tolerant vegetation around municipal buildings



Adaptation reflects the **intentional** consideration of climate change... **but activities are not always different.**

# Case Study: Trabuco Creek Restoration



Existing restoration project focused on improving stream and riparian habitat quality, sustainability, and function

Primary project activities included removing barriers to fish passage (e.g., non-functioning fords and dams), adding channel complexity, and removing invasive vegetation



Purpose was to **re-evaluate project goals and activities** in light of climate impacts and vulnerabilities to determine if **planned activities help reduce impacts** and **identify additional activities** that could also help minimize vulnerabilities



# Case Study: Trabuco Creek Restoration



## STEP 1. IDENTIFY CLIMATE + NON-CLIMATE IMPACTS

- Flooding, drought, invasive plants, recreation

## STEP 2. DETERMINE WHETHER/HOW PLANNED ACTIVITIES REDUCE IMPACTS

- ACTION: Add channel complexity
  - ✓ Slows floodwaters to minimize erosion/scour
  - ✓ Increases water availability by creating pools
- ACTION: Remove invasive vegetation
  - ✓ Increases habitat quality and functioning
  - ✓ Reduces erosion risk





# Case Study: Trabuco Creek Restoration



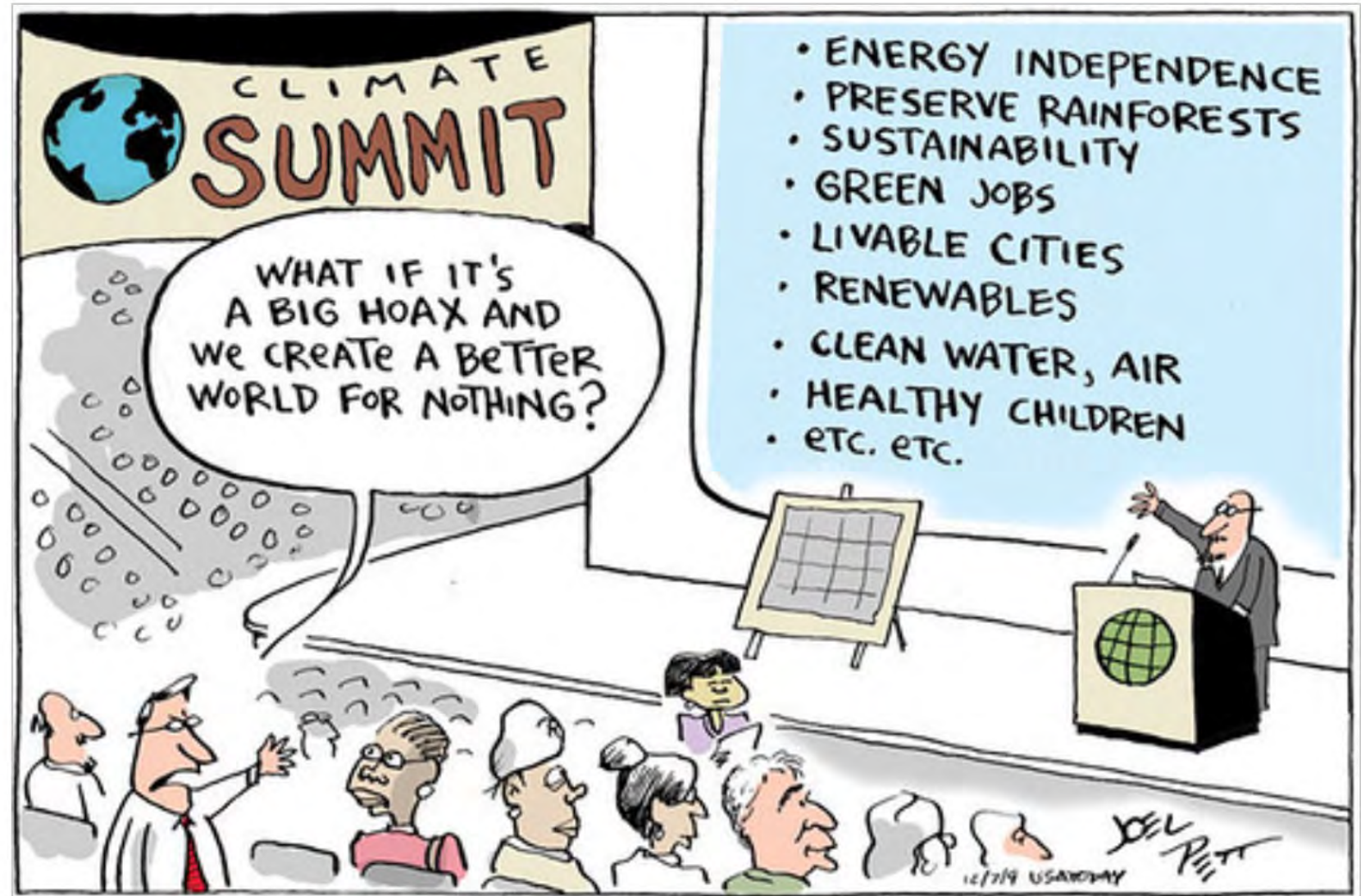
## STEP 3. IDENTIFY ADDITIONAL ACTIVITIES

- ACTION: Manage recreation in sensitive areas
  - ✓ Maintains habitat quality and functioning
  - ✓ Reduces erosion risk
- ACTION: Build a system water budget to better manage water and multiple uses
  - ✓ Increases habitat availability and connectivity and maintains water availability





# Questions?



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