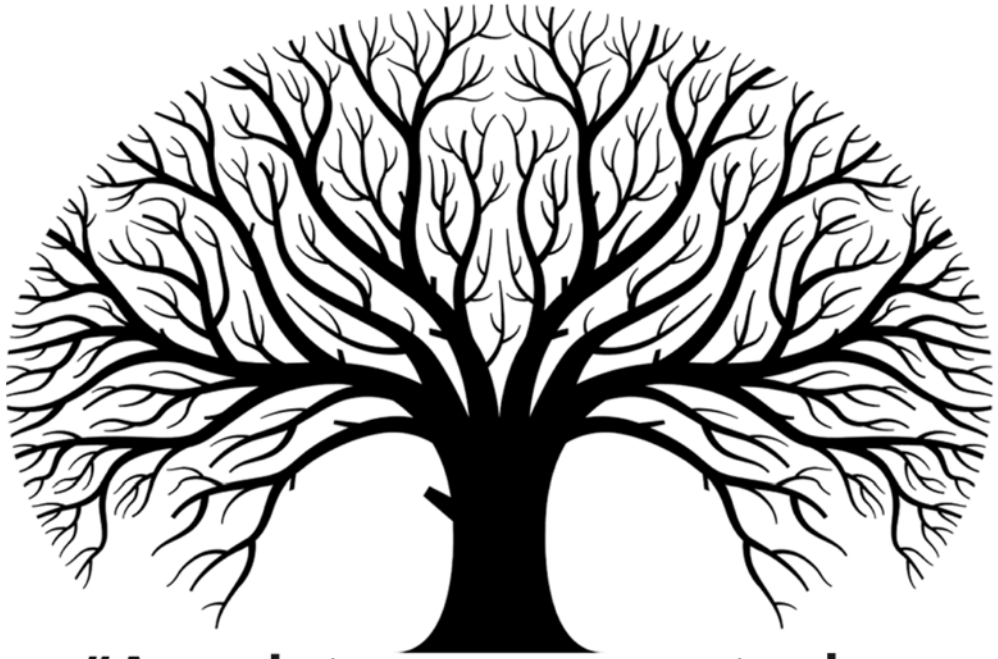
An Overview of Adaptation Planning

Jessi Kershner

EcoAdapt™
Meeting the challenges of climate change

Key need to incorporate climate change into <u>near-, medium-, *and* long-term planning</u>

- **<u>Minimize</u>** risk of wasting time, money, and effort
- **<u>Maximize</u>** likelihood of success



"A society grows great when old men plant trees whose shade they know they shall never sit in." Greek Proverb

Responding to Climate Change

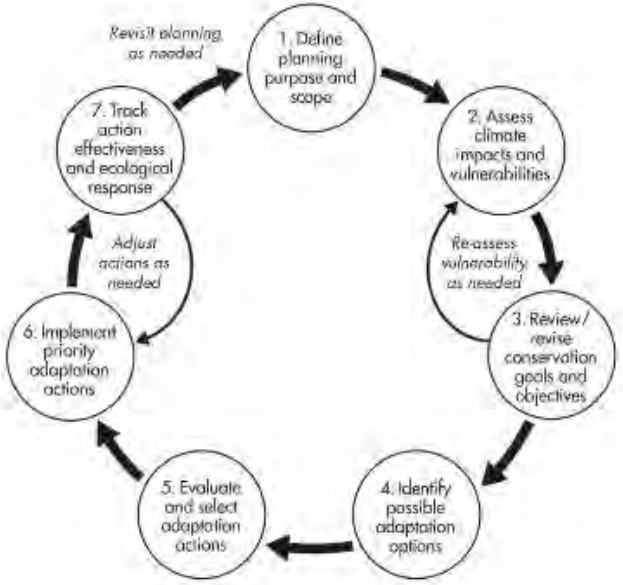
Mitigation is what we do to decrease the potential of climate change itself.

- ✓ Addresses the causes with a focus on reducing greenhouse gas emissions (e.g., driving less, using less energy, increasing carbon uptake & storage)

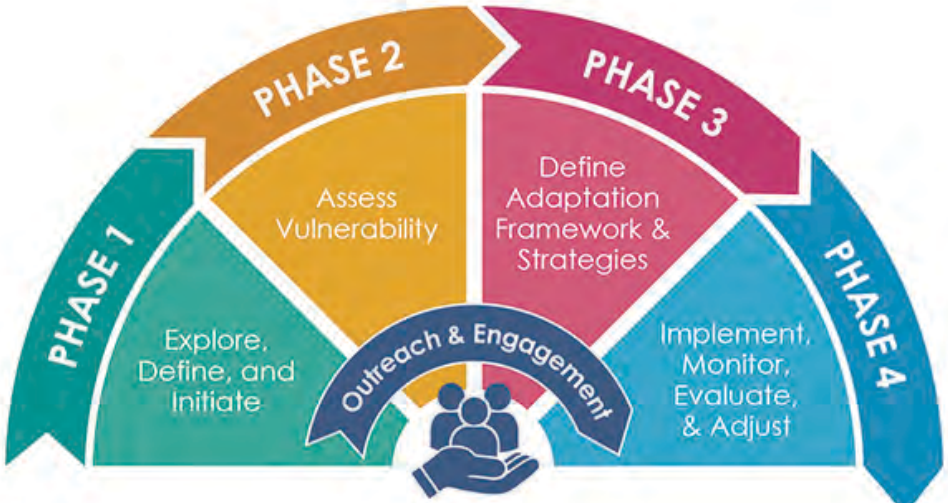
Adaptation is how we prepare for, respond to, and recover from the changes that we are already experiencing/expected to experience.

- ✓ Addresses the impacts of climate change with a focus on managing change

Many Adaptation Planning Processes



Many Adaptation Planning Processes



Adaptation Ladder of Engagement®

- Processes generally consist of same steps
- Participatory and iterative
- Generate place-based adaptation strategies

No right or wrong way – the most important thing is to get started!

Adaptation Planning Process

California Adaptation Planning Guide 2020

Adaptation Planning Process: Phase 1

PHASE 1. Project Scoping

- Identify goals, desired outcomes of process
- Set geographic boundaries and timeframe
- Identify key stakeholders
- Identify key climate and non-climate stressors
- Identify important community assets

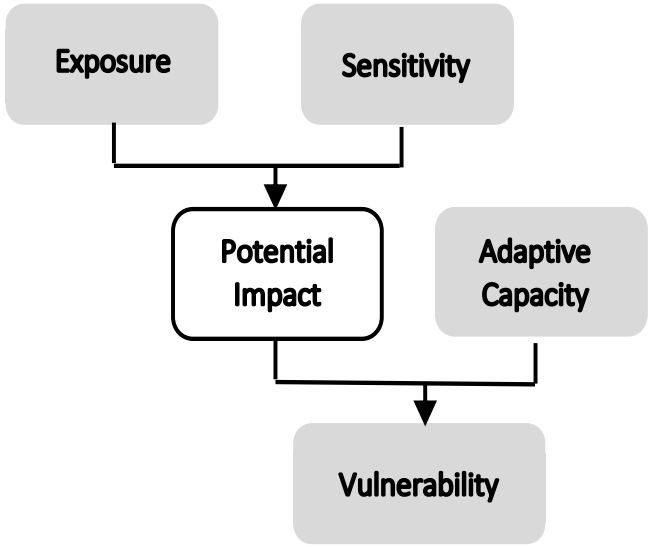
Adaptation Planning Process: Phase 2

Vulnerability =

The degree to which natural, built, and human systems are susceptible to harm

California Adaptation Planning Guide 2020

Adaptation Planning Process: Phase 2



Vulnerability =

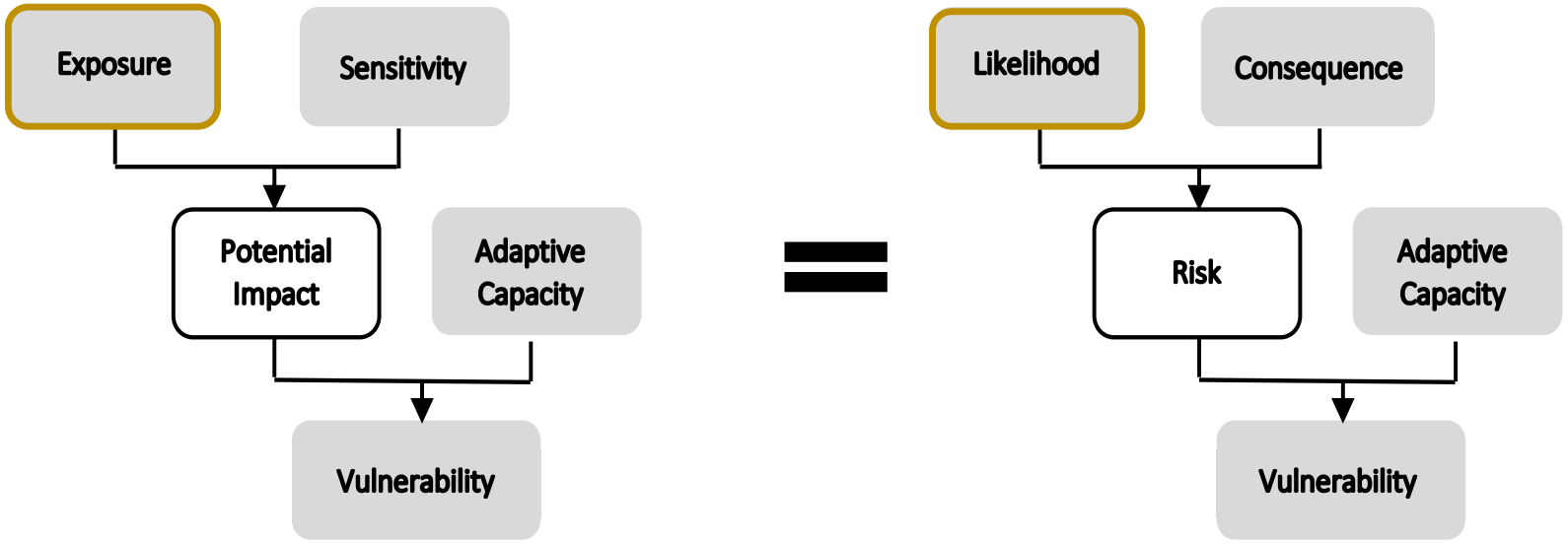
The degree to which natural, built, and human systems are susceptible to harm

A function of the ***sensitivity*** *of a particular resource to climate changes, its* ***exposure*** *to those changes, and its* ***capacity to adapt*** *to those changes* (IPCC 2007)

Why Assess Vulnerability?

- Identify **what** is most vulnerable (e.g., people, places, assets, elements) and **why**
- Helps you to develop a range of adaptation responses

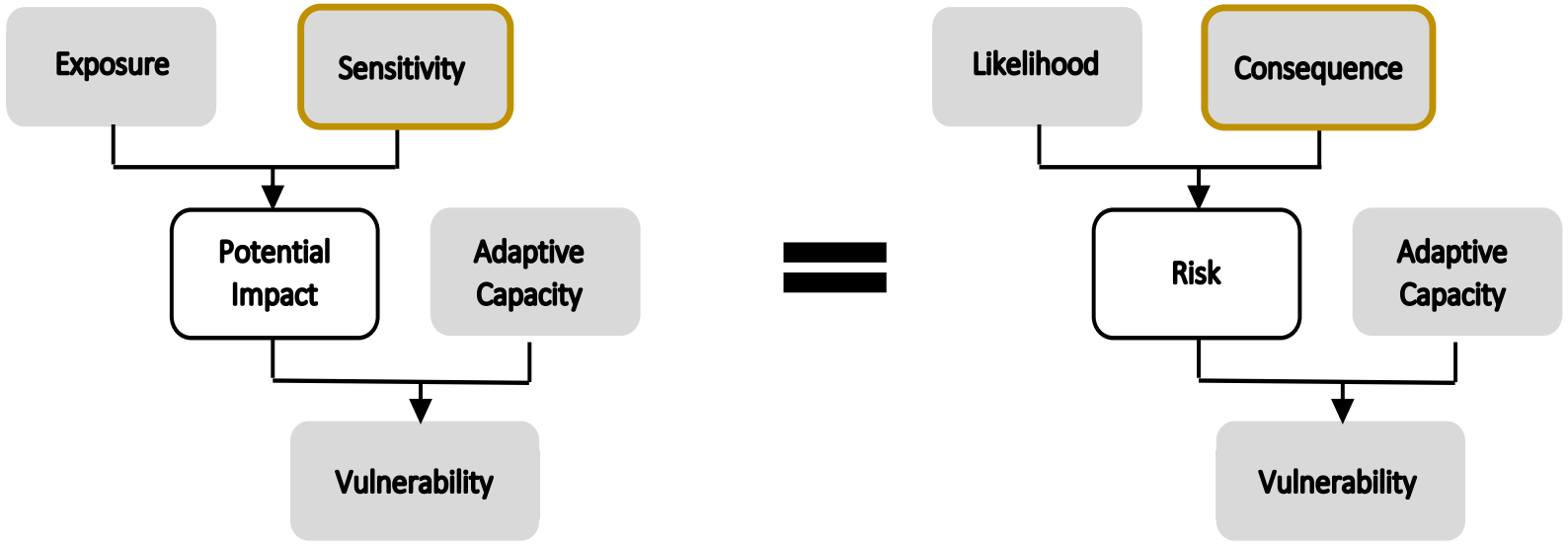
Vulnerability Assessments: Exposure/Likelihood



Likelihood (Exposure):

Degree to which an element or asset is exposed to significant changes in climate (i.e. how likely is it that an asset will be exposed to a given climate hazard?)

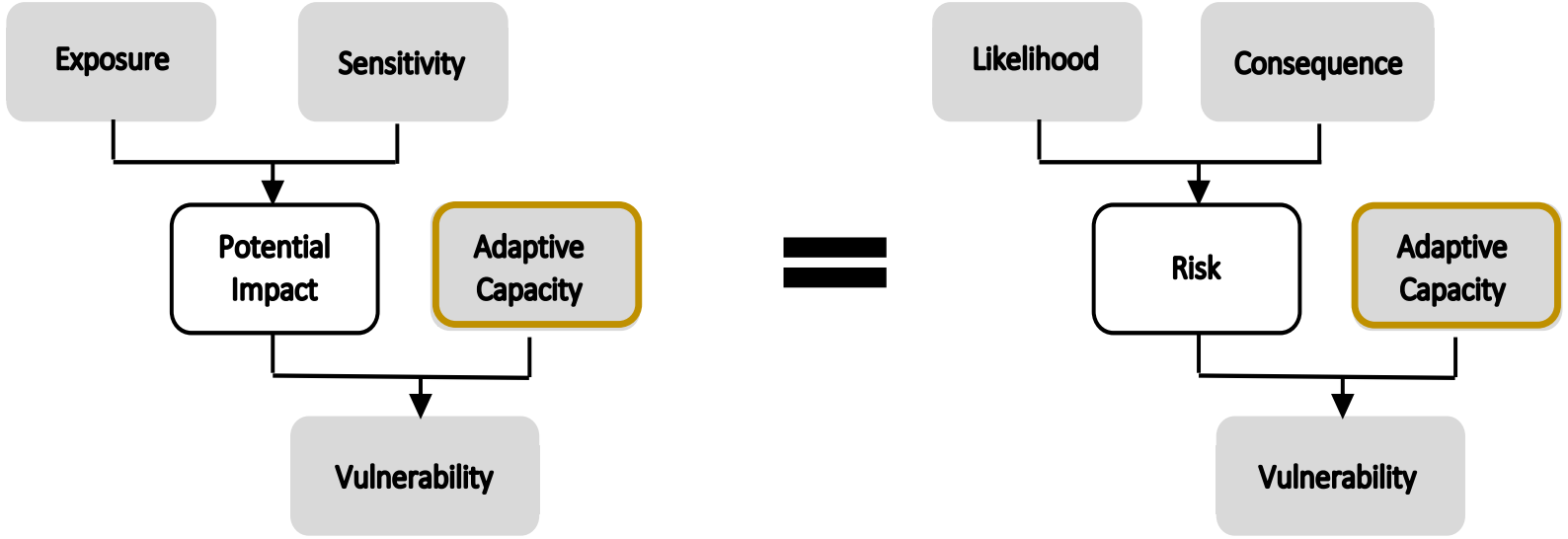
Vulnerability Assessments: Sensitivity/Consequence



Consequence (Sensitivity):

Degree to which an element or asset is affected by exposure to a changing climate (i.e. how significant is the effect of the climate impact?)

Vulnerability Assessments: Adaptive Capacity



Adaptive Capacity:

The ability to adjust to climate change to moderate potential damages, take advantage of opportunities, or cope with consequences

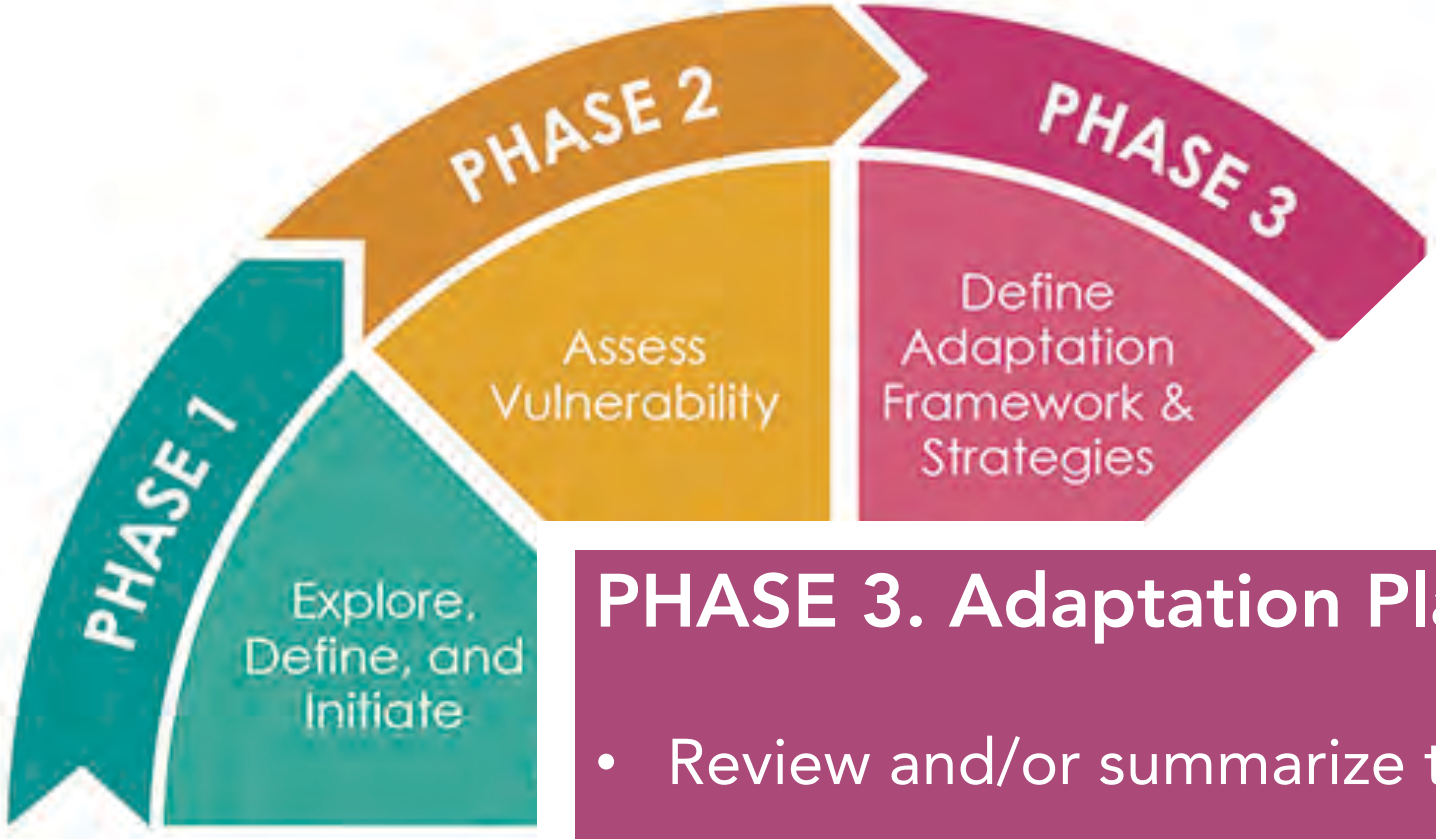
Adaptation Planning Process: Phase 2

PHASE 2. Assess Vulnerability

- Identify current and projected future changes in climate factors/hazards (Likelihood/ Exposure)
- Identify impacts of climate change on community elements (Consequence/ Sensitivity)
- Characterize the current ability to moderate or cope with impacts (Adaptive Capacity)

California Adaptation Planning Guide 2020

Adaptation Planning Process: Phase 3



PHASE 3. Adaptation Planning

- Review and/or summarize the major climate vulnerabilities
- Identify adaptation strategies that reduce vulnerabilities and/or increase resilience
- Prioritize adaptation strategies

California Adaptation Planning Guide 2020

Adaptation Strategies

- Aim to reduce the negative effects or take advantage of the opportunities provided by climate change

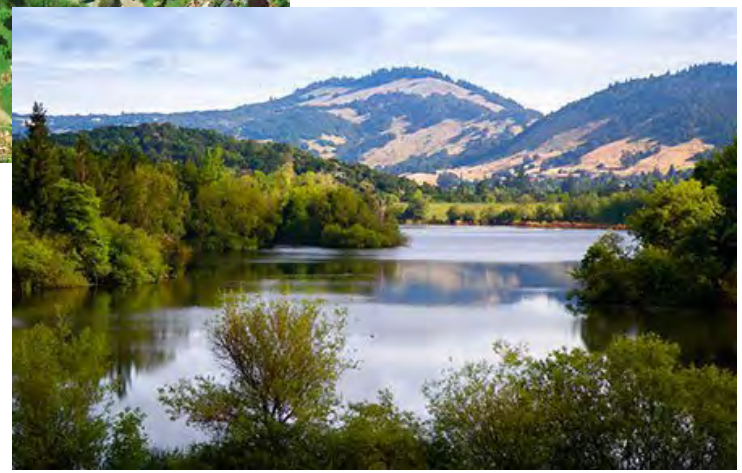
- Can be:
  - Programmatic
  - Plans, regulations, policies
  - Capital improvement/infrastructure projects
  - Education/outreach/coordination/collaboration
  - Monitoring and evaluation

- Identify co-benefits (e.g., GHG reduction, public health improvement, etc.

"Create a wildfire smoke hazard mitigation program for vulnerable communities."

Why Engage in Adaptation Planning?

- Shift how, where, or when to implement current actions
- Identify new strategies and actions to implement
- Prioritize no-regrets actions
- Identify cross-element opportunities



Prioritizing Adaptation Strategies

- To help prioritize strategies, consider factors such as:
  - Cost
  - Funding
  - Effectiveness/Benefit
  - Co-benefits
  - Equity
  - Timing
  - Legality
  - Administrative Operability

Adaptation Planning Process: Phase 4

PHASE 4. Implement, Monitor, Evaluate

- Put adaptation strategies into action
- Create a monitoring program to track implementation
- Evaluate strategies to determine what is/is not working and adjust, as needed

California Adaptation Planning Guide 2020

Examples?

Case Study #1: Waterbury, VT

Case Study #2: Flagstaff, AZ

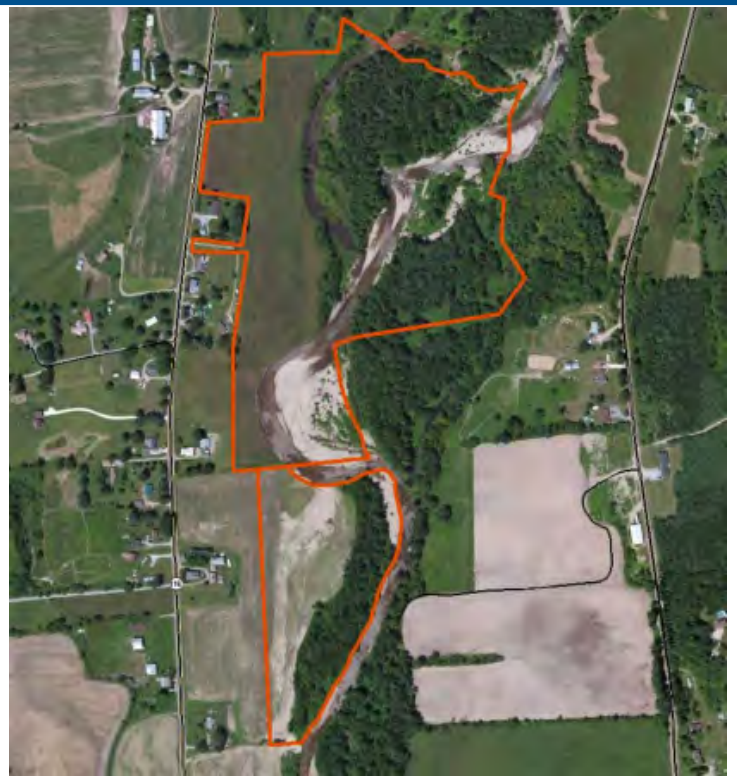
Case Study #3: Bainbridge Island, WA

Case Study #1: Waterbury, VT

Flood Risk, Extreme Events

TROPICAL STORM IRENE 2011

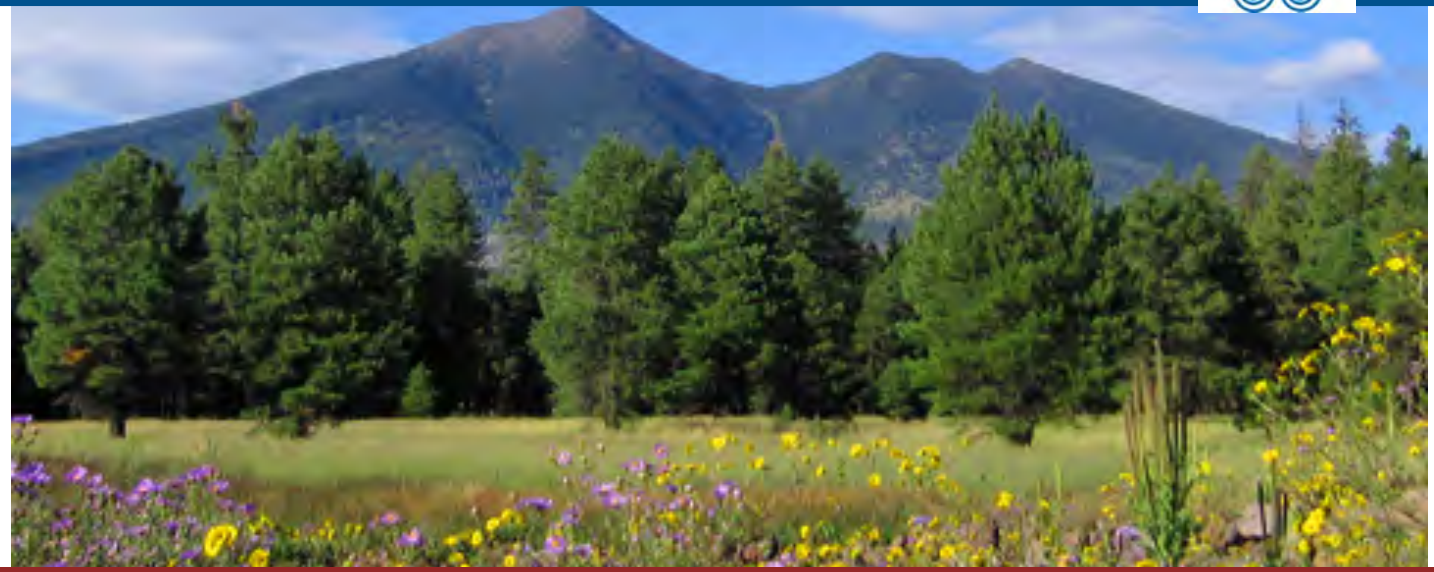
Case Study #1: Waterbury, VT



Adaptation Strategies

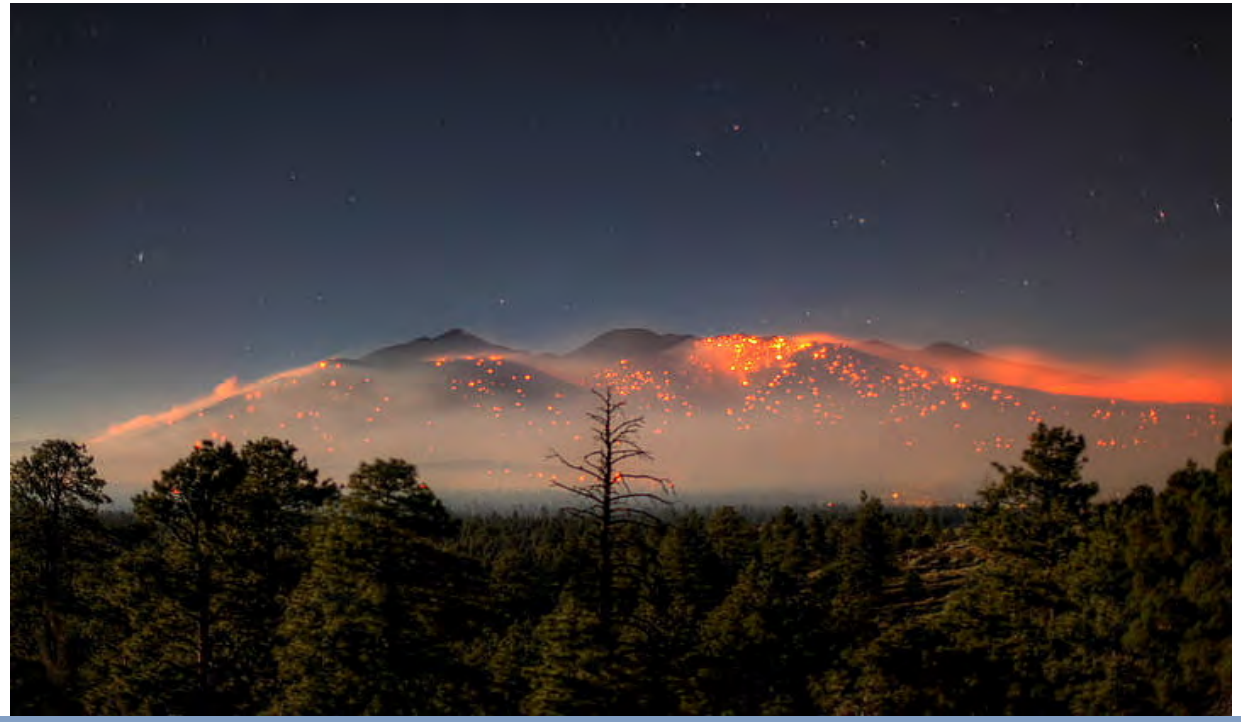
- Created a Flood Inundation Mapper to **identify areas exposed to damage** during real-time flooding to aid emergency responses
- Created home elevation and ground floor/basement fill-in **pilot projects** to elevate homes in 100-year floodplain
- **Inventoried bridges and culverts** to evaluate how structure could fail
- Established a Property Acquisition Program to **target land conservation for flood resilience**

Case Study #2: Flagstaff, AZ



Fire, Flash Flooding and Erosion

Case Study #2: Flagstaff, AZ



PACE + SCALE

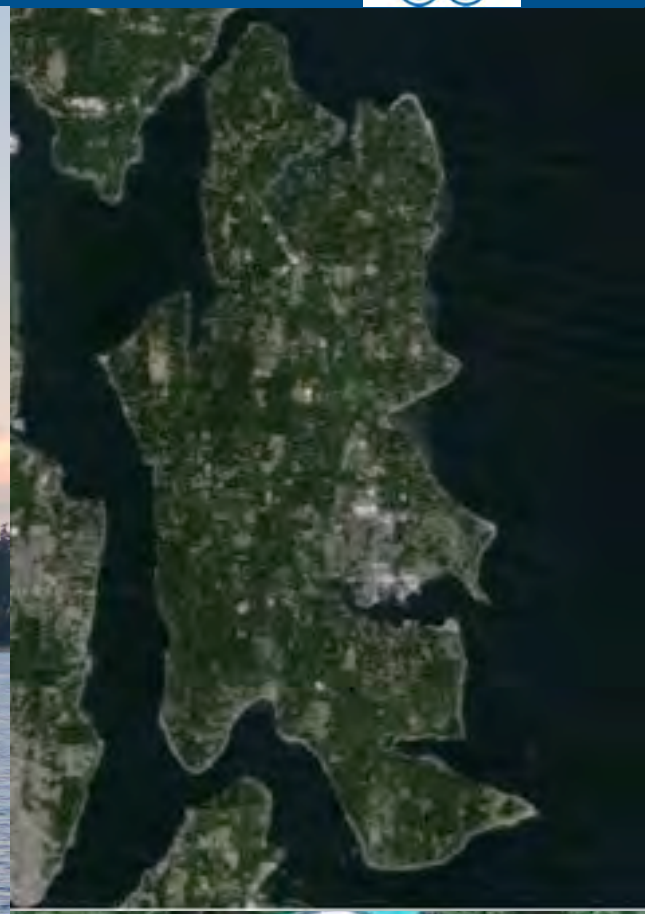
Adaptation Strategies

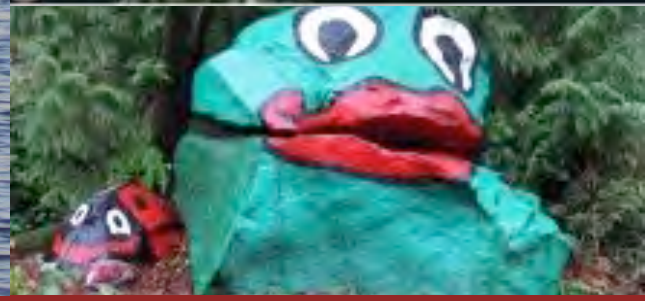
Flagstaff City Council placed $10 million bond measure on ballot to fund forest health plan to reduce potential for high severity fire and subsequent impacts on water supply –74% voter approval

FLAGSTAFF WATERSHED PROTECTION PROJECT (https://flagstaffwatershedprotection.org/)

- Using traditional ground-based equipment in combination with cable and helicopter logging
- Designing treatments to be surrounded by undisturbed areas to act as buffers for absorbing runoff
- Implementing best management practices to protect water resources

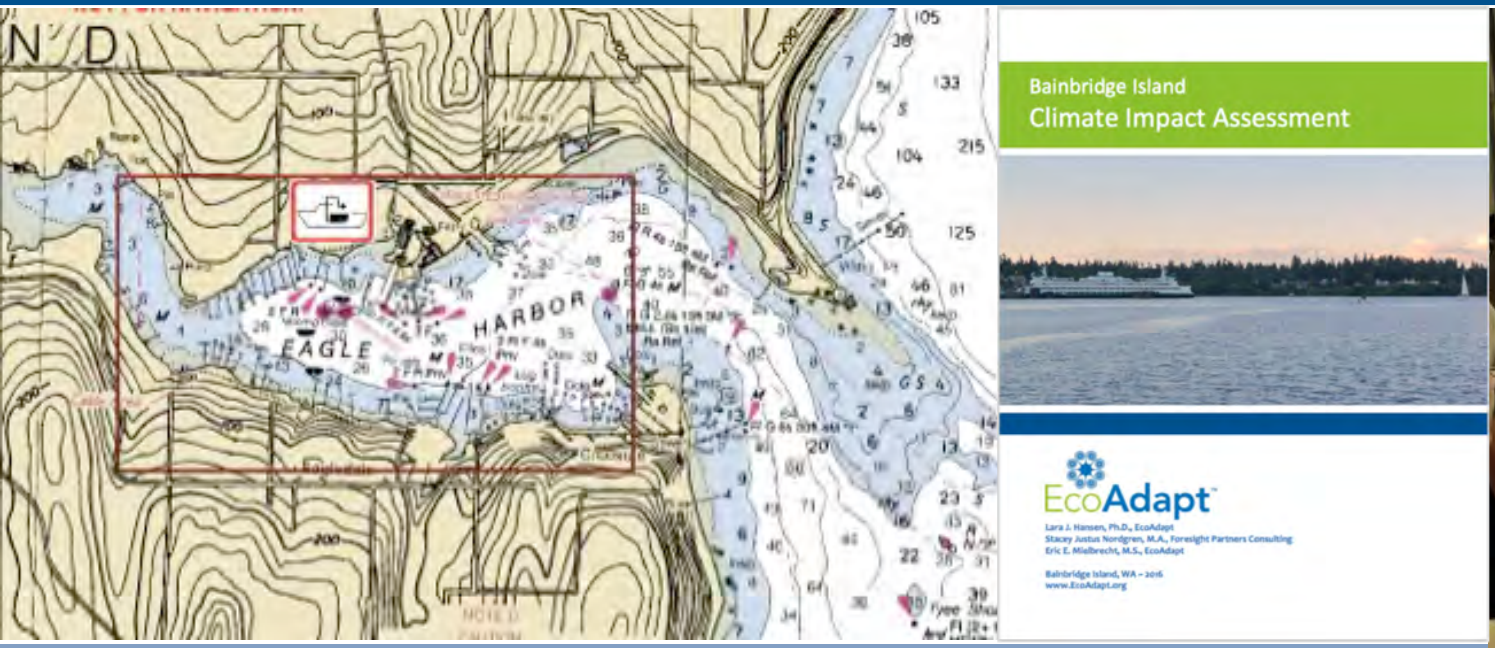
Case Study #3: Bainbridge Island, WA





Sea Level Rise, Δ in precipitation → drought & flooding, vegetation change

Case Study #3: Bainbridge Island, WA



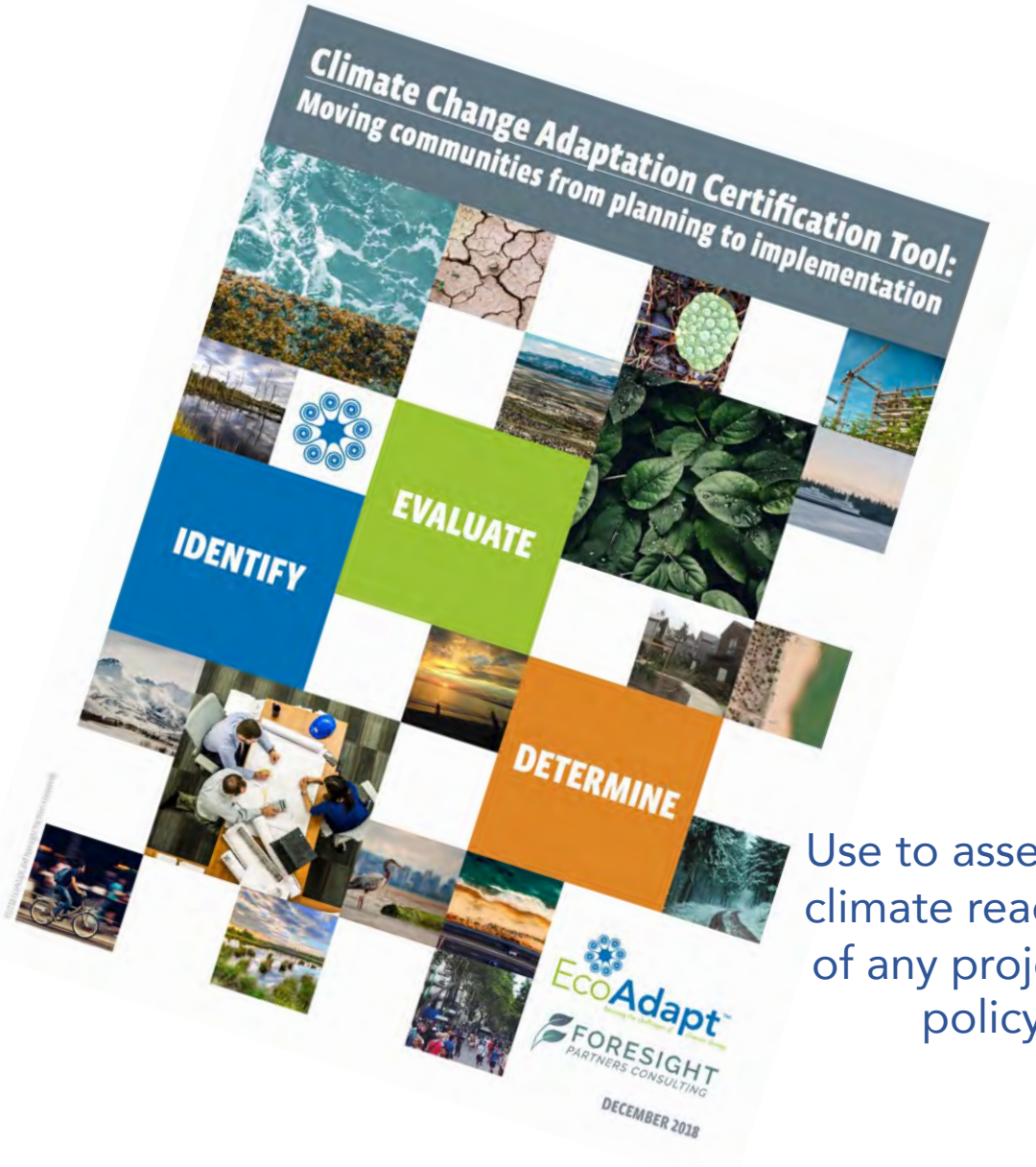
Adaptation Strategies

The City of Bainbridge Island included climate change in the update of their Comprehensive Plan, following stakeholder co-production of a Bainbridge Island Climate Impact Assessment. This led to the creation of a Climate Change Advisory Committee that created a list of 180 actions needed to make the Plan update a reality. Early actions have included:

- Testing the Climate Change Adaptation Certification Tool to evaluate permits and capital expenditures
- Community engagement to build support for City actions, and encourage partner actions
- Conduct Greenhouse Gas Inventories every five years to monitor progress on mitigation goals

Tools Used in this Workshop

Use to assess vulnerability across the community and its many sectors and develop adaptation responses



Use to assess the climate readiness of any project or policy

Questions?

This material is based upon work supported by the National Science Foundation under Grant No. 1811534. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.