Northern California Climate Adaptation Project

Focal Resources & Scenario Planning Workshops
March 7-10, 2016
Eureka, CA (March 7-8) and Redding, CA (March 9-10)

Jessi Kershner, Lead Scientist
EcoAdapt

EcoAdapt™ Meeting the challenges of climate change

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

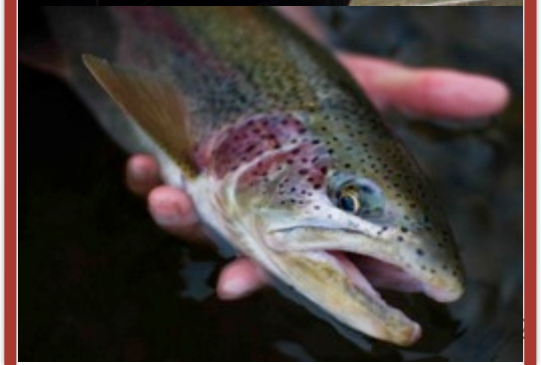
CONSERVATION BIOLOGY INSTITUTE

EcoAdapt

1. **State of Adaptation Program**
   finding out how people are fishing
2. **Climate Adaptation Knowledge Exchange**
   (CAKE; www.cakex.org)
   connecting fishermen
3. **Awareness to Action**
   teaching others to fish
4. **Adaptation Consultation**
   fishing for you
5. **National Adaptation Forum**
   gathering at the fish market

EcoAdapt™
Meeting the challenges of climate change


Photos: J. Armstrong



Northern California Project Goals

- Improve understanding of why important Northern California resources may be vulnerable to changing climate conditions, and
- Identify what adaptation actions can be implemented to reduce vulnerabilities and/or increase overall resilience.

Credit: J. Armstrong

Project History

- **2012-2014:** EcoAdapt & partners lead the Climate Adaptation Project for the Sierra Nevada with funding from California LCC
- **2014-2016:** EcoAdapt & partners lead the Southern California Climate Adaptation Project
- **2015:** EcoAdapt awarded funding to start the Northern California Climate Adaptation Project

Project Need

USFS

- Climate Scorecard
- Forest Plan Revisions
- Northwest Forest Plan Revision

BLM

- Resource Management Plan Revisions

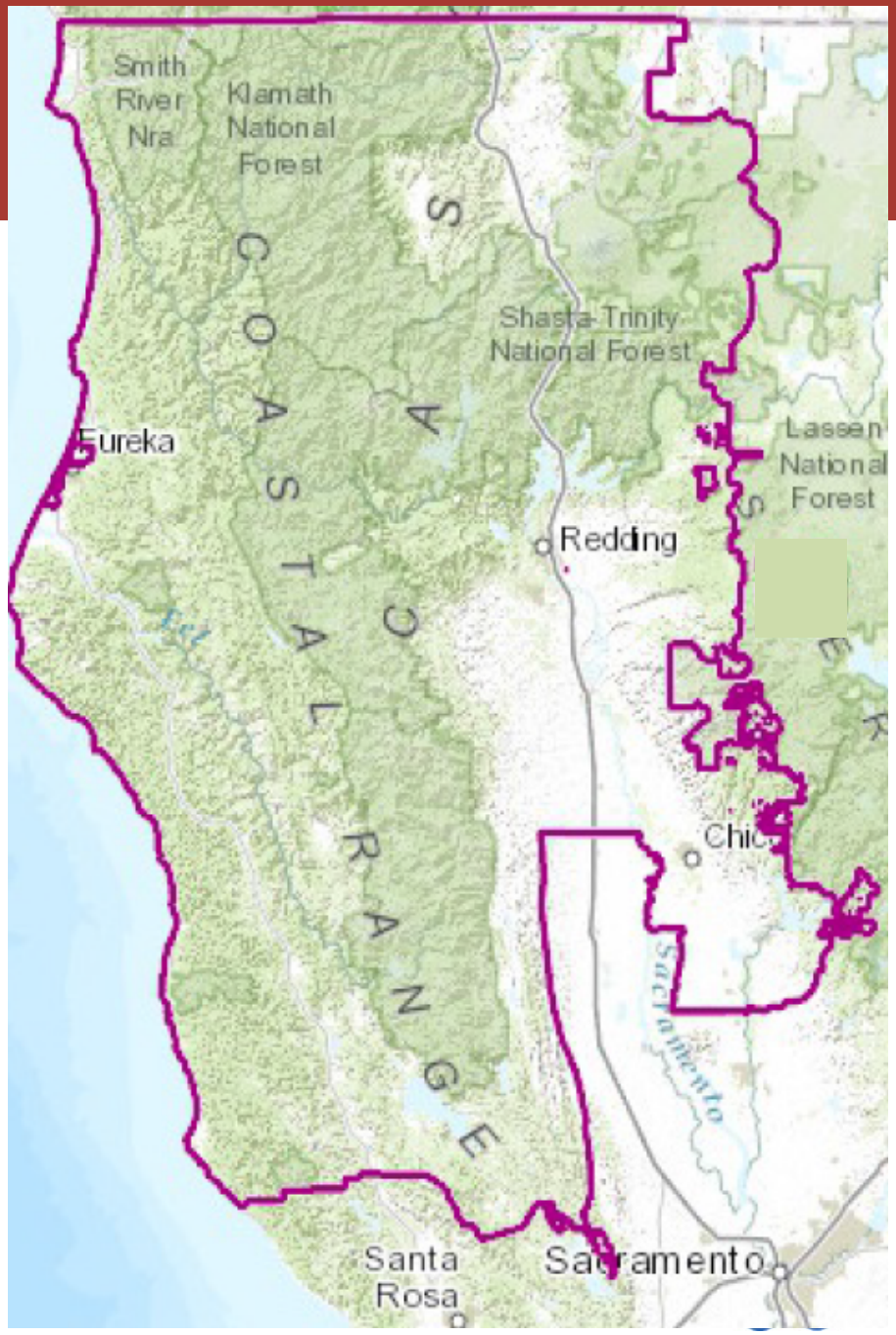
Project planning & NEPA

The Forest Service Climate Change Performance Scorecard, 2011 (version 1.3)
To be completed annually by each National Forest or Grassland (Unit).

Scorecard Element	Unit Name	Yes/No
Organizational Capacity		
1. Employee Education	Are all employees provided with training on the basics of climate change, impacts on forests and grasslands, and the Forest Service response? Are resource specialists made aware of the potential contribution of their own work to climate change response?	
2. Designated Climate Change Coordinators	Is at least one employee assigned to coordinate climate change activities and be a resource for climate change questions and issues? Is this employee provided with the training, time, and resources to make his/her assignment successful?	
3. Program Guidance	Does the Unit have written guidance for progressively integrating climate change considerations and activities into Unit-level operations?	
Engagement		
4. Science and Management Partnerships	Does the Unit actively engage with scientists and scientific organizations to improve its ability to respond to climate change?	
5. Other Partnerships	Have climate change related considerations and activities been incorporated into existing or new partnerships (other than science partnerships)?	
Adaptation		
6. Assessing Vulnerability	Has the Unit engaged in developing relevant information about the vulnerability of key resources, such as human communities and ecosystem elements, to the impacts of climate change?	
7. Adaptation Actions	Does the Unit conduct management actions that reduce the vulnerability of resources and places to climate change?	
8. Monitoring	Is monitoring being conducted to track climate change impacts and the effectiveness of adaptation activities?	
Mitigation and Sustainable Consumption		
9. Carbon Assessment and Stewardship	Does the Unit have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks? Is the Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?	
10. Sustainable Operations	Is progress being made toward achieving sustainable operations requirements to reduce the environmental footprint of the Agency?	

Project Overview

- **1˚ Audience:** land & resource managers
- **Scope:** Northern California
- **Forests:** Klamath, Six Rivers, Mendocino, Shasta-Trinity
- **BLM Lands:** Arcata, Redding, portions of Ukiah
- **Vulnerability & Adaptation:**
  - Habitats (coarse filter)
  - Species (fine filter)
  - Ecosystem services

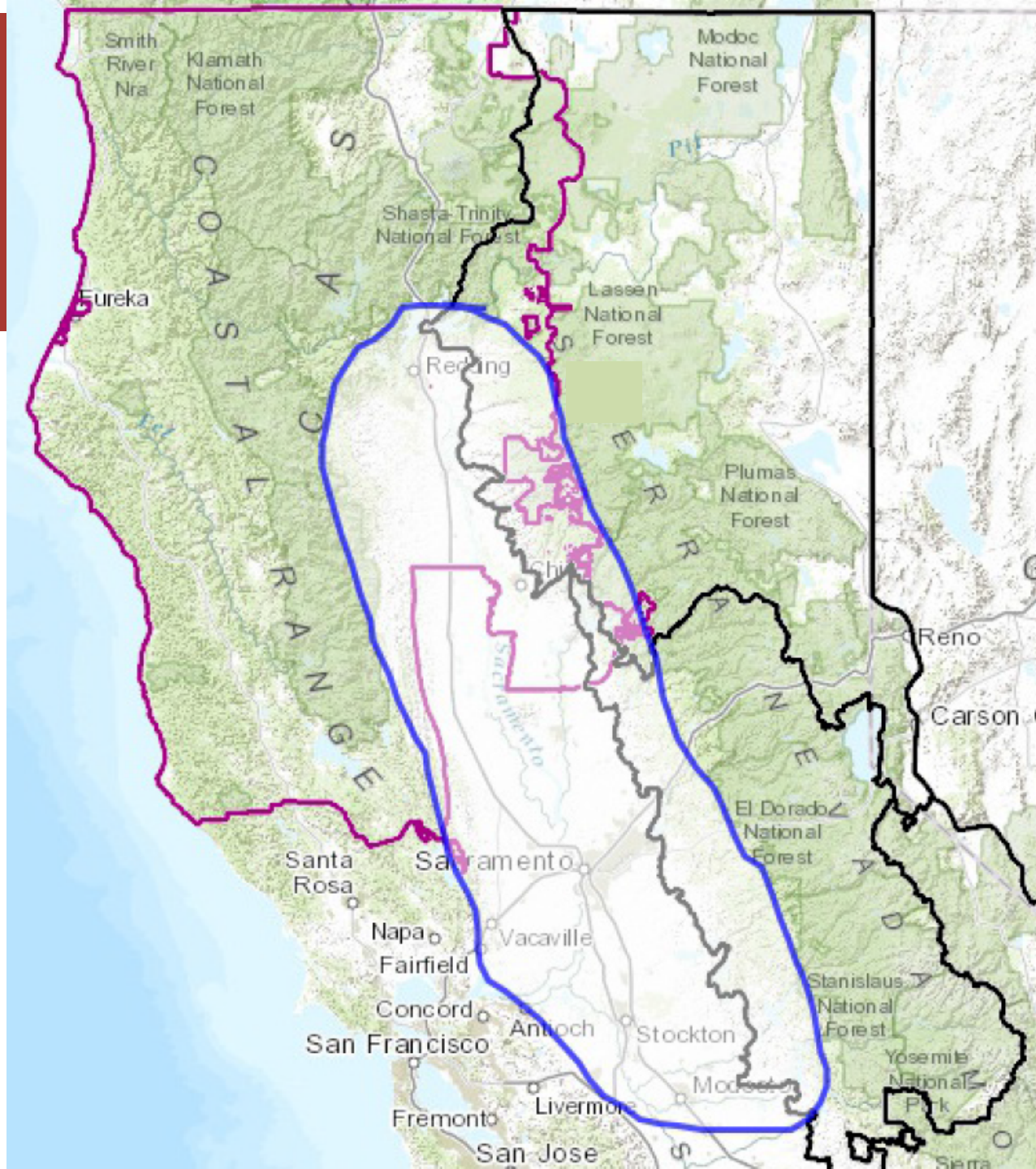


Project Geography

Pink = Northern California project

Blue = Central Valley project

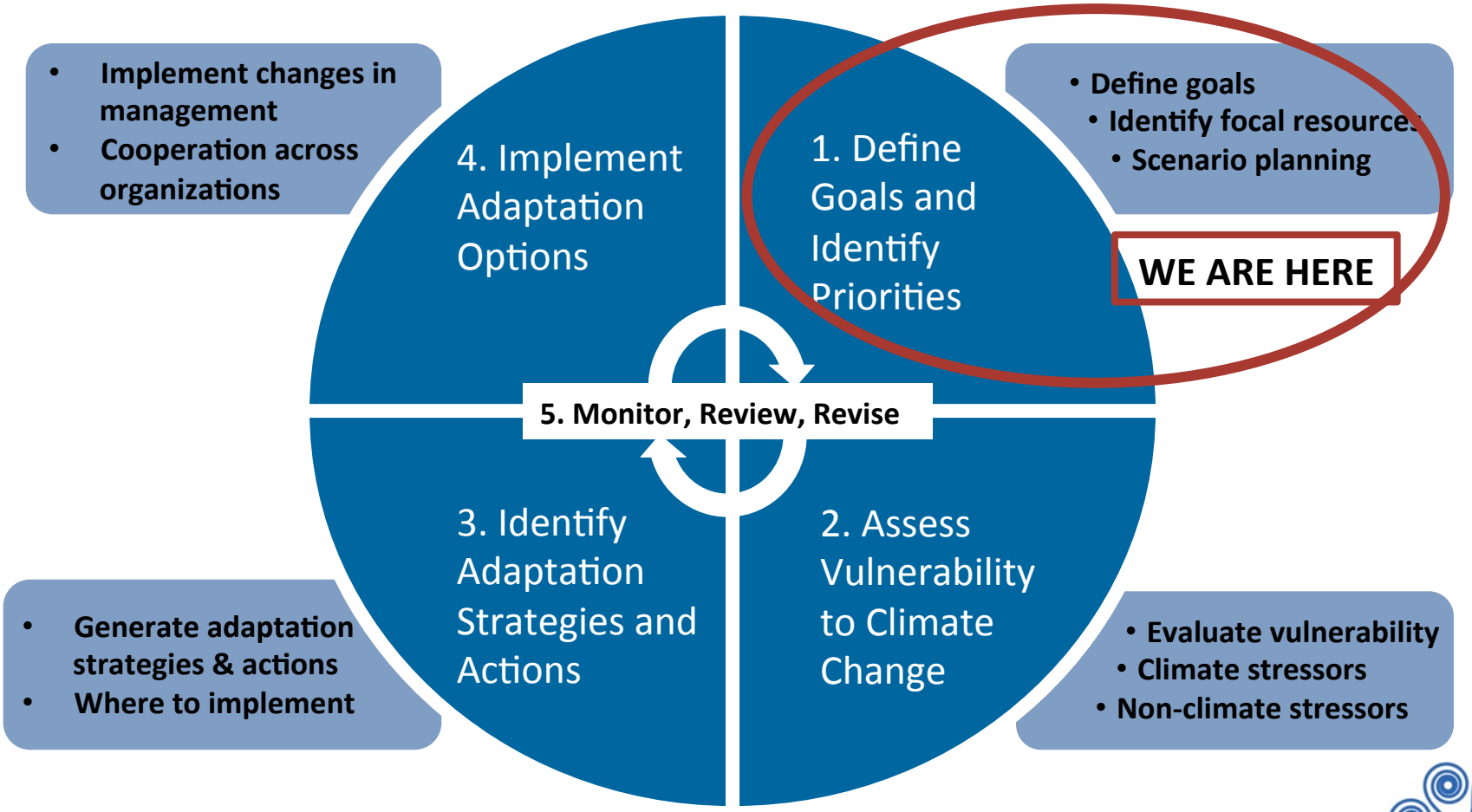
Black = Sierra Nevada project



Central Valley Project:
http://climate.calcommons.org/project/central-valley-landscape-conservation-project

Sierra Nevada Project:
http://ecoadapt.org/programs/adaptation-consultations/calcc

Climate-Smart Planning Process



Identify Priorities

GOAL: Collaboratively identify regionally important resources

- Management, cultural, or socio-economic concern
- Habitats, Species/Species groups, Ecosystem services

- Stakeholder Working Group identifies draft list of habitats
- Convene Focal Resources Workshop to:
  - Review/Revise focal habitats
  - Identify focal species
  - Identify ecosystem services

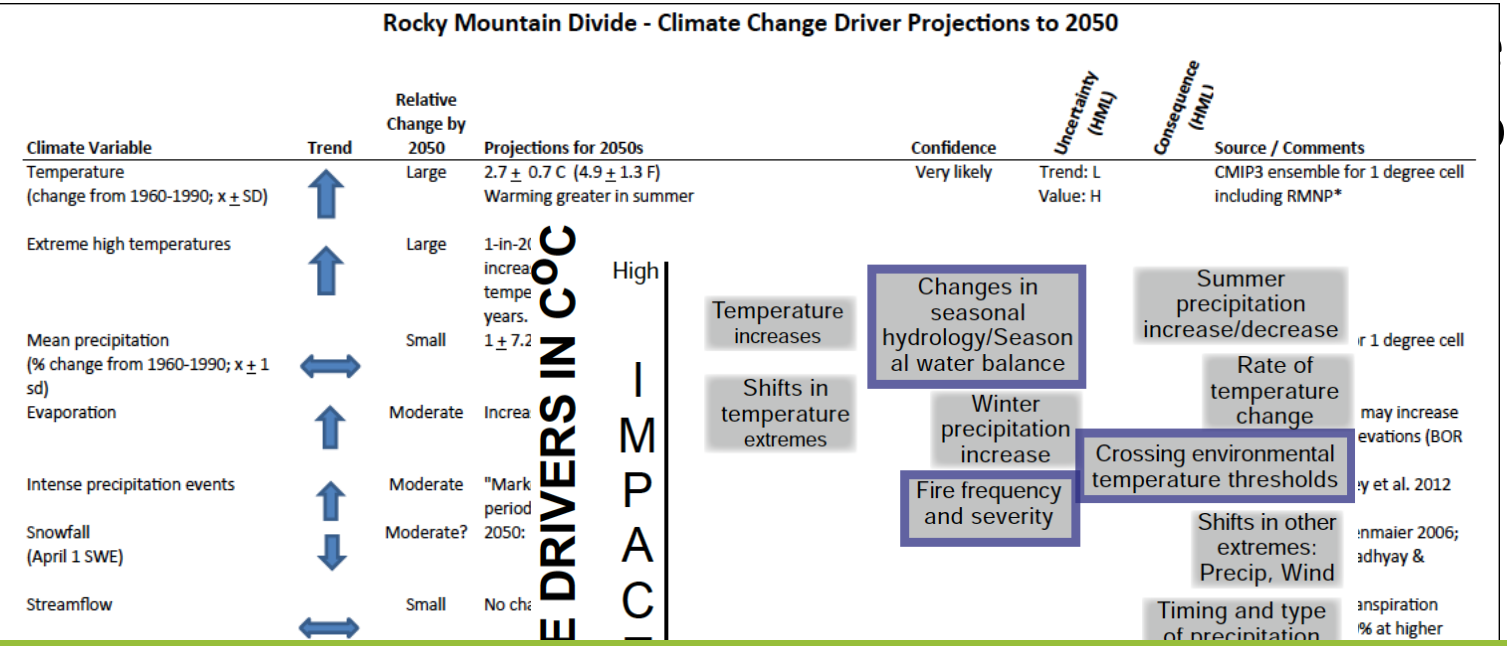
Product: Final suite of regionally important resources

- Habitats, Species/Species groups, Ecosystem services

Identify Priorities

GOAL: Explore alternative future climate scenarios for the region

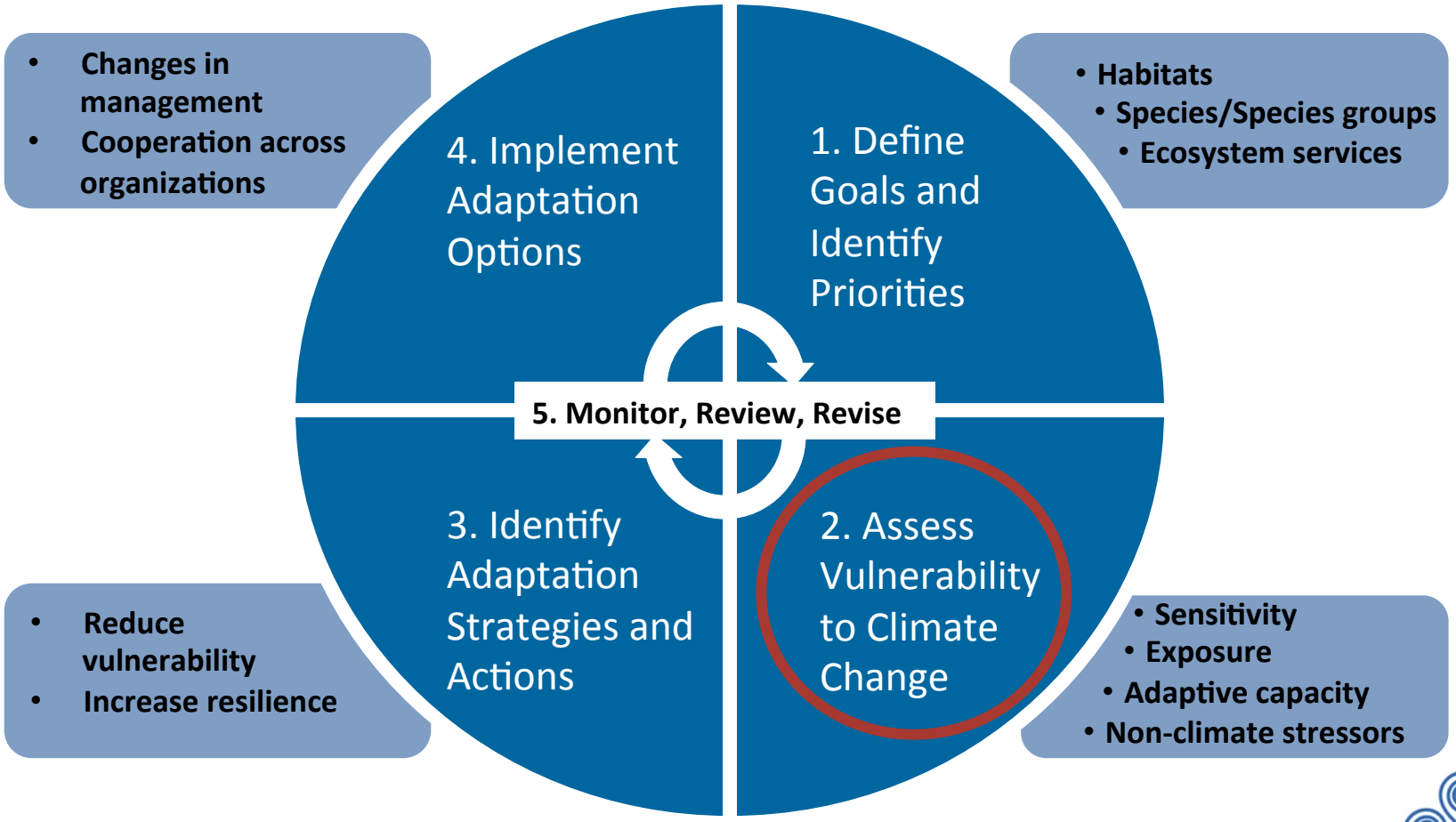
- Assemble relevant climate change info from scientific literature (historical and projected future)



climate
urces

Product: Summary of anticipated, general impacts of future climate scenarios on focal resources

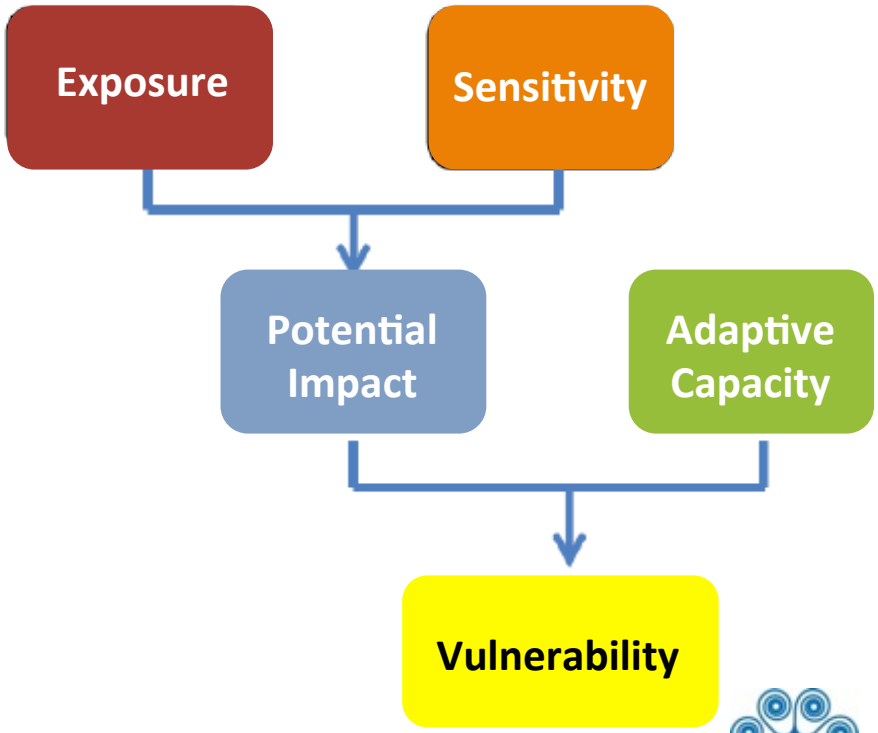
Climate-Smart Planning Process



Assess Vulnerabilities

GOAL: Assess vulnerabilities of focal resources to climate and non-climate stressors by considering sensitivity, exposure, and adaptive capacity

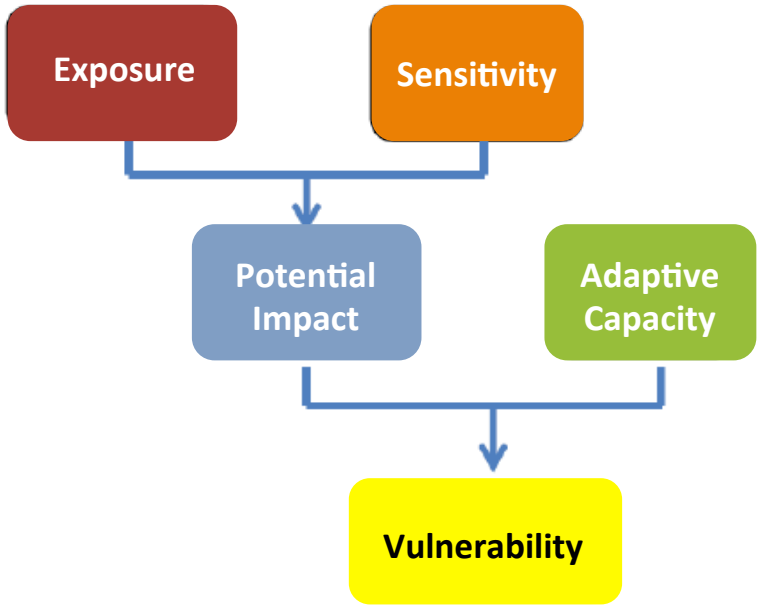
- Evaluate resource vulnerabilities through review of the scientific literature
  - Rank components of vulnerability; summarize key information from the literature
- Scientists, managers, and other stakeholders provide input into the assessment, review and evaluate draft results



Assess Vulnerabilities

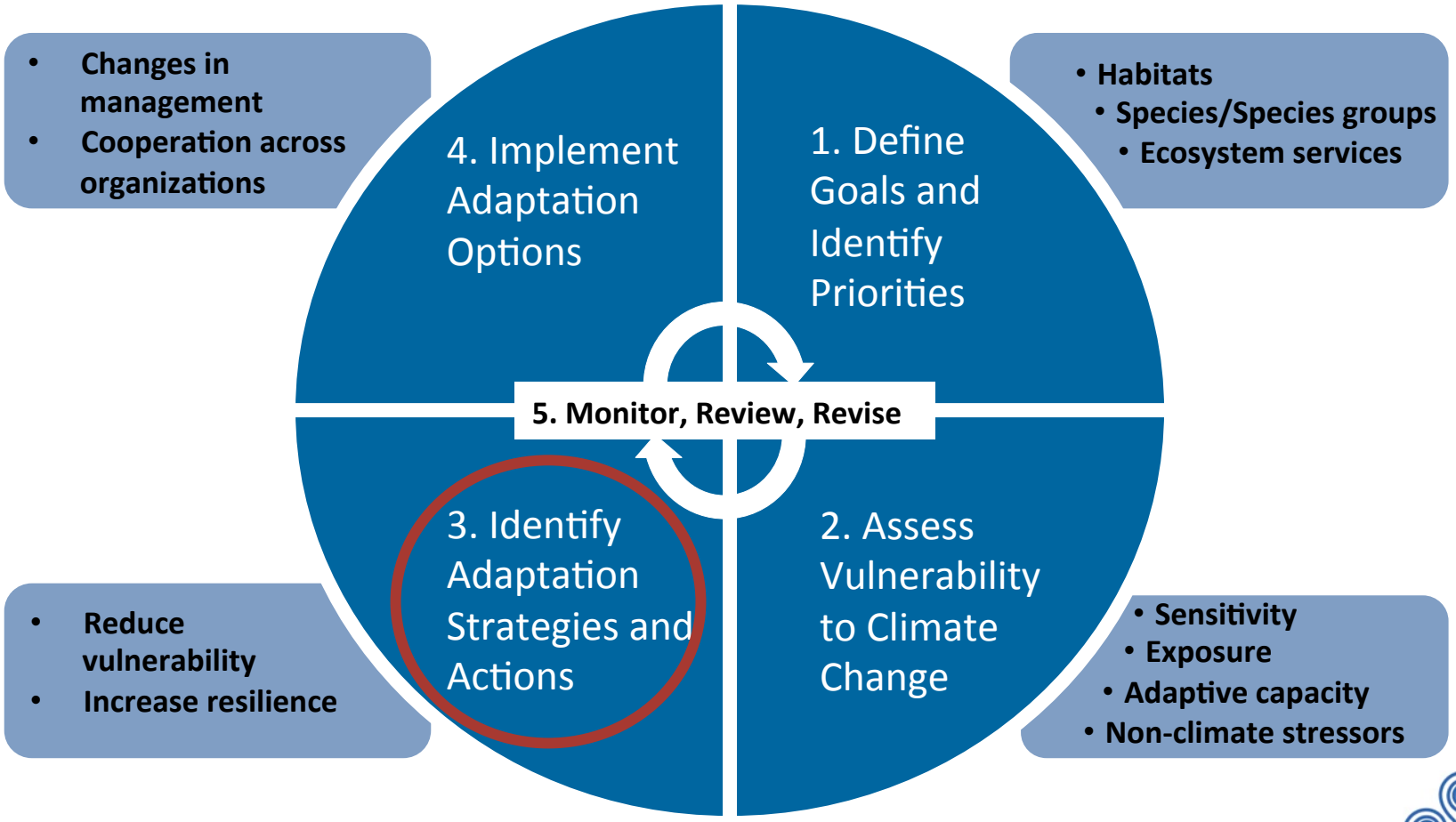
GOAL: Assess vulnerabilities of focal resources to climate and non-climate stressors by considering sensitivity, exposure, and adaptive capacity

- Evaluate resource vulnerabilities through review of the scientific literature
- Scientists, managers, and other stakeholders provide input into the assessment, review and evaluate draft results



Product: Vulnerability assessment rankings and summaries for all focal resources

Climate-Smart Planning Process



Identify Adaptation Strategies

Goal: Develop climate-smart adaptation strategies and actions to reduce vulnerabilities or increase resilience of focal resources

ADAPTATION STRATEGIES PART #1

- Generate a suite of adaptation strategies and actions to reduce vulnerabilities and increase positive, long-term outcomes for regional management goals
  - Where, when, and how those actions can be applied
  - Implementation feasibility and effectiveness
  - Ways to modify existing actions to reduce vulnerabilities and/or increase resilience

Identify Adaptation Strategies

Adaptation Strategy	Adaptation Actions
Identify and protect oak climate refugia to use as priority areas for conservation and restoration	• Prioritize areas where water deficit is expected to be minimal • Establish extra protection for priority refugia areas using management designations, action plans, and by excluding humans and browsers
Facilitate oak translocation by planting "climate-smart" seedlings in areas that will be climatically suitable in the future	• Plant existing genotypes that are better adapted to future conditions • Plant seeds from a greater geographic range or from drier, warmer climates • Maintain genetic diversity
Maintain and enhance landscape habitat connectivity and function to support top predators, which will reduce herbivory thus limiting synergistic impacts on oak woodlands	• Identify and prioritize top predators for re-introduction and evaluate habitat needs • Implement habitat mapping to locate priority areas now and in the future • Use connectivity modeling to identify important pinch points for protection

Identify Adaptation Strategies

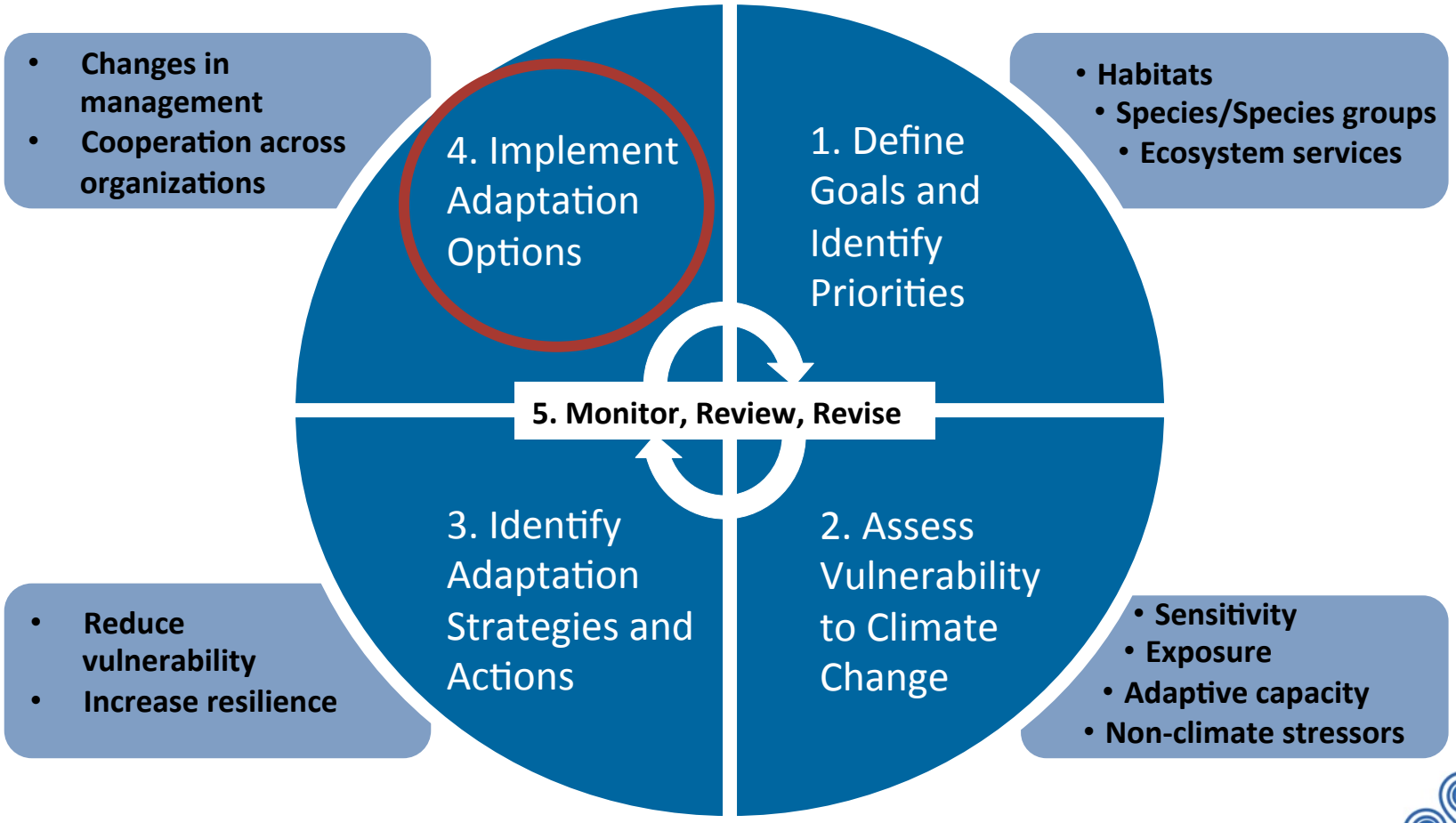
Goal: Develop climate-smart adaptation strategies and actions to reduce vulnerabilities or increase resilience of focal resources

ADAPTATION STRATEGIES PART #1

- Generate a suite of adaptation strategies and actions to reduce vulnerabilities and increase positive, long-term outcomes for regional management goals
  - Where, when, and how those actions can be applied
  - Implementation feasibility and effectiveness
  - Ways to modify existing actions to reduce vulnerabilities and/or increase resilience

Product: Adaptation strategies and actions to help achieve regional management goals for focal resources

Climate-Smart Planning Process



Implement Adaptation Options

Goal: Generate adaptation implementation plans; integrate climate information into on-the-ground projects

ADAPTATION STRATEGIES PART #2

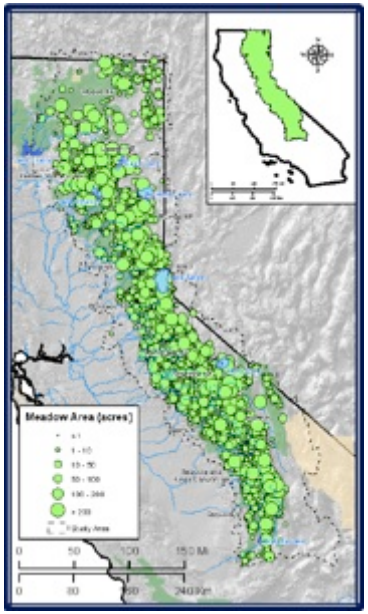
- Generate adaptation implementation plans for management/conservation priorities
  - E.g., climate refugia for focal resources, wildlife connectivity
- Collaboratively integrate vulnerability and adaptation information into on-the-ground projects
- Use climate-informed maps to identify where management actions could be implemented

Implement Adaptation Options

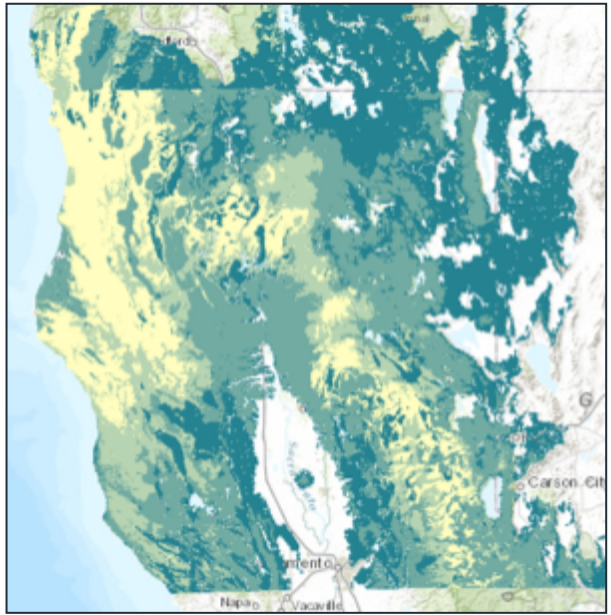
Goal: Generate adaptation implementation plans; integrate climate information into on-the-ground projects

ADAPTATION STRATEGIES PART #2

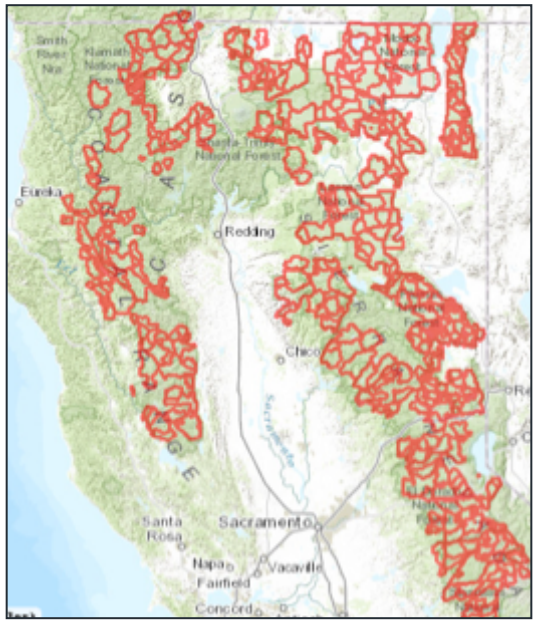
- Use climate-informed maps to identify where management actions could be implemented



+



+



Implement Adaptation Options

Goal: Generate adaptation implementation plans; integrate climate information into on-the-ground projects

ADAPTATION STRATEGIES PART #2

- Generate adaptation implementation plans for management/ conservation priorities
  - E.g., climate refugia for focal resources, wildlife connectivity
- Collaboratively integrate vulnerability and adaptation information into on-the-ground projects
- Use climate-informed maps to identify where management actions could be implemented

Product: Adaptation implementation plans and case studies demonstrating where/how to integrate climate information into current projects and plans

Final Products

- Vulnerability assessment report
- Adaptation strategies report
- Two-page resource briefs describing key climate and non-climate vulnerabilities and adaptation options
- Webinars to present project methods and results

Example products from other efforts:

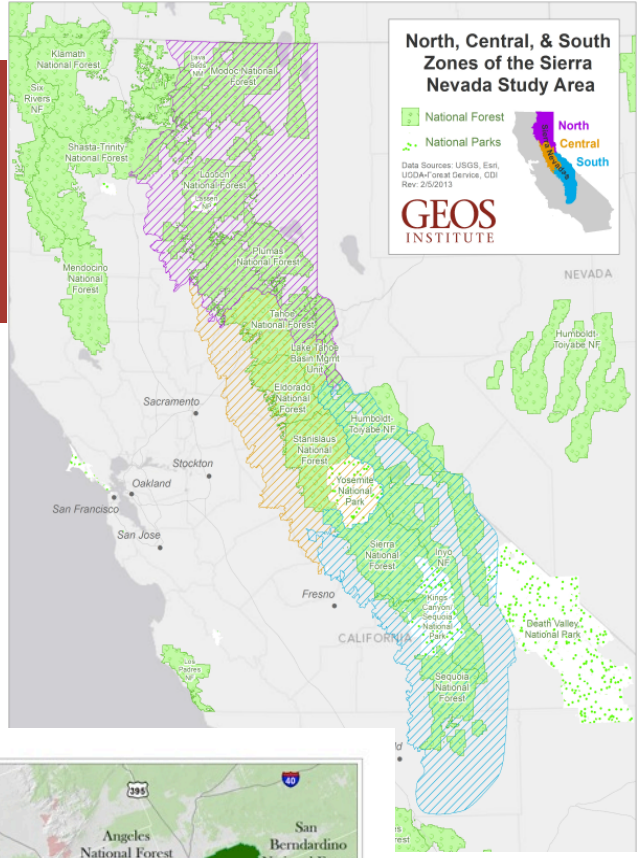
- Climate Adaptation Project for the Sierra Nevada
  - http://ecoadapt.org/programs/adaptation-consultations/calcc
- Southern California Climate Adaptation Project
  - http://ecoadapt.org/programs/adaptation-consultations/socal

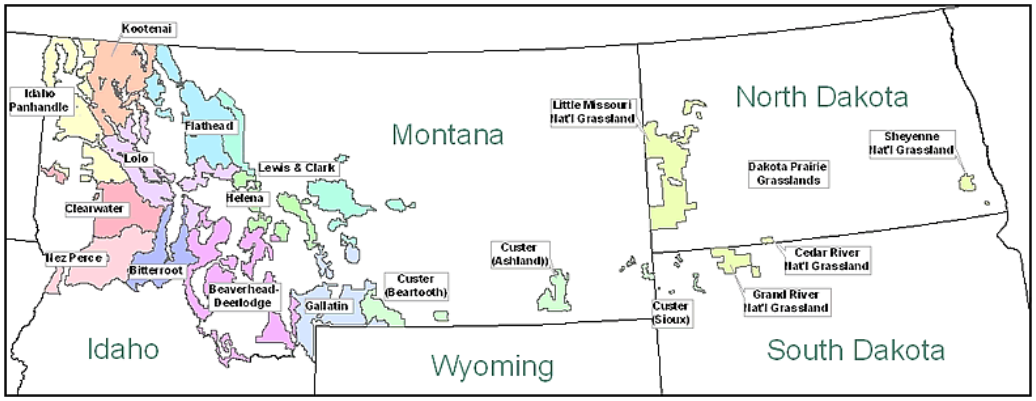
Benefits From A Collaborative Climate-Smart Process

- Identifies *WHAT* is most vulnerable and *WHY*
- Informs stakeholders and partners of climate change impacts on regional resources
- Creates buy-in and provides a suite of potential actions
- Highlights cross-sector opportunities; leveraging of resources and partnerships
- Identifies data and information gaps for future research and scientific studies

Broader Impacts & Application

- Sierra Nevada forests
- Southern California forests
- Idaho/Montana forests
- Greater Farallones National Marine Sanctuary
- Central Valley





Questions?

Contact:

Jessi Kershner, EcoAdapt

jessi@ecoadapt.org

EcoAdapt™ Meeting the challenges of climate change

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

CONSERVATION BIOLOGY INSTITUTE

Today: Workshop Goal

To develop a list of focal resources that reflect regional efforts and existing conservation goals

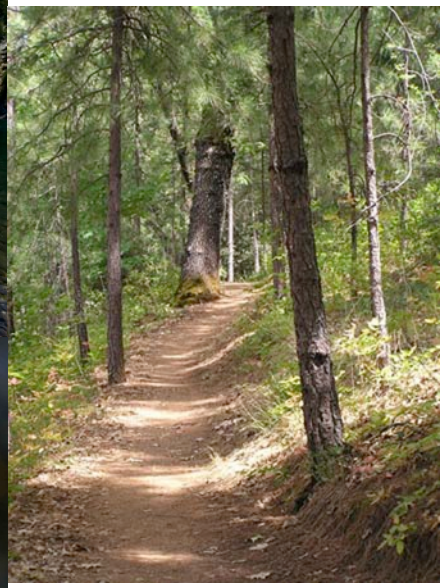
Agenda

10:00-10:30	**Welcome and introductions**
10:30-11:00	Northern California project overview
11:00-12:00	Selecting focal habitats
12:00-1:00	**Lunch (provided)**
1:00-2:00	Selecting focal species
2:00-2:30	Selecting ecosystem services
2:30-2:45	**Break**
2:45-3:30	Large group discussion
3:30-3:55	Revisit and revise focal resources
3:55-4:00	**Wrap up and adjourn by 4 pm**

Overview of Group Exercise

Desired Outcomes: Habitats, species/species groups, and ecosystem services prioritized for vulnerability assessment and adaptation strategies

- Three parts:
  - Habitats
  - Species/Species Groups
  - Ecosystem Services



Overview of Group Exercise

Desired Outcomes: Habitats, species/species groups, and ecosystem services prioritized for vulnerability assessment and adaptation strategies

Review the **sub-habitats** included in your habitat group and:

A. Consider whether any can be grouped together

B. Add any missing sub-habitats

C. Prioritize those that should be included in the vulnerability assessment (select those that are "Essential" to include and, optionally, a few to include "If Possible")

Sub-Habitat	Priority
Combine perennial and annual grasslands into "Grasslands"	Essential
Open ocean	If possible

Example Habitats

Southern California
Alluvial Scrub
Chaparral
Conifer
Desert
Endemic
Grassland
Oak Woodlands
Pinyon-Juniper
Riparian
Rivers & Streams
Sage Scrub
Subalpine

Central Valley
Chaparral & Serpentine Shrublands
Oak Woodland
Dunes
Grasslands
Vernal Pools & Swales
San Joaquin Desert
Permanent Wetlands
Rice Croplands
Seasonal Wetlands
Flooded Croplands
Riparian Vegetation
Stream Channel

Sierra Nevada
Alpine/Subalpine
Yellow Pine/Mixed Conifer
Wet Meadows
Red Fir
Oak Woodlands
Chaparral
Sagebrush
Aquatic

Overview of Group Exercise

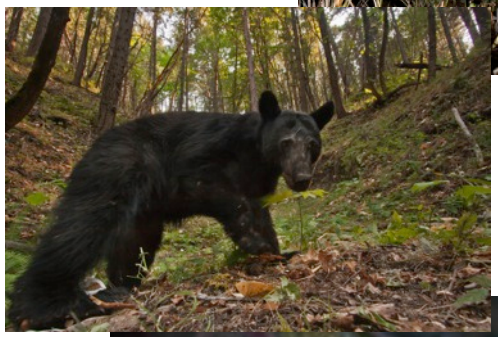
Desired Outcomes: Habitats, species/species groups, and ecosystem services prioritized for vulnerability assessment and adaptation strategies

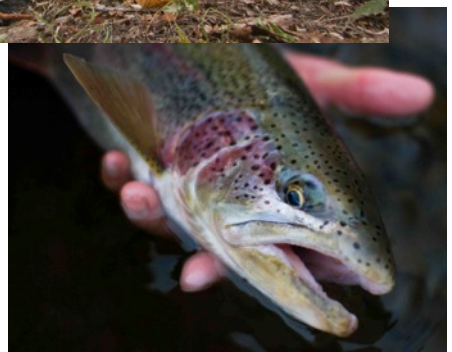
Brainstorm focal **species/species groups** included in your habitats by:

A. Considering those of management, cultural, or socio-economic concern

B. Considering listed status

C. Noting any species that would be adequately addressed by an "Essential" habitat





Overview of Group Exercise

Desired Outcomes: Habitats, species/species groups, and ecosystem services prioritized for vulnerability assessment and adaptation strategies

Brainstorm focal **species/species groups** included in your habitats by:

D. Grouping species that could be addressed together

E. Prioritize those that should be included in the vulnerability assessment ("Essential" to include vs. "If Possible")

Species/Species Group	Priority
Pacific fisher (proposed for listing)	Essential
Sage grouse (management concern)	Essential
Salmonids	Essential
Blue oak (may be addressed by Oak Woodlands habitat)	If possible

Example Species/Species Groups

Sierra Nevada
Bristlecone pine
Whitebark pine
Bighorn sheep
Fisher
Willow flycatcher
Aspen
Red fir
Marten
Blue oak
Black oak
Wood rat
Mountain quail
Sage grouse
Sierra Nevada yellow-legged frog

Central Valley
Cavity Nesters & Roosters
Western Bumblebee & Pollinators
Wide-ranging Mammals
Burrowing Mammals
Vernal Pool Crustaceans
Wetland-dependent Mammals
Wetland-dependent Reptiles
Wetland-obligate Plants
Wintering Waterbirds & Shorebirds
Breeding Waterbirds & Shorebirds
Dragonflies & Damselflies
Riparian Nesting Birds
Amphibians
Salmonids

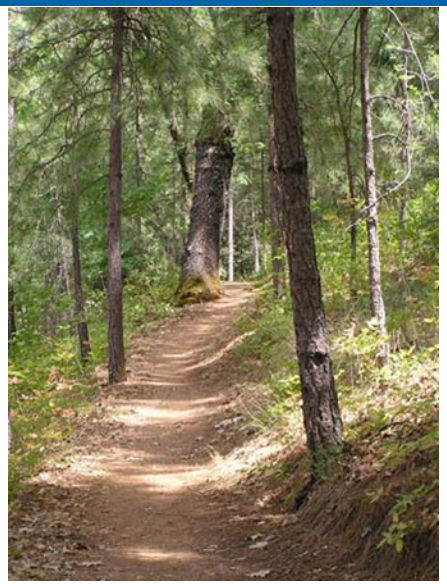
Central Valley
Yellow-billed Magpie
Valley Oak
Red-legged Frog
Yellow-legged Frog
California Tiger Salamander
Blunt-nosed Leopard Lizard
Tricolored Blackbird
Green Sturgeon
Pacific Lamprey

Overview of Group Exercise

Desired Outcomes: Habitats, species/species groups, and ecosystem services prioritized for vulnerability assessment and adaptation strategies

Identify the **ecosystem services** included in your habitat group and:

A. Prioritize those that should be included in the vulnerability assessment ("Essential" to include vs. "If Possible")



Ecosystem Services	Priority
Fresh water	Essential
Cultural heritage values	Essential
Pollination	If possible

Example Ecosystem Services

Nez Perce-Clearwater National Forest
Aesthetics
Clean Air
Clean Water
Cultural Values
Forage
Recreation
Timber

Sierra Nevada
Fire
Carbon storage
Recreation
Timber/Forest products