Northern California Climate Vulnerability & Adaptation Workshop

Upper Lake, CA
October 3-4, 2017
Northern California
Climate Adaptation Project

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.
Project Overview

USFS
- Forest Plan Revisions
- Northwest Forest Plan Revision

BLM
- Resource Management Plan Revisions

Project planning & NEPA
Facilitate partnerships & collaboration

Other regional conservation efforts
Project Methodology

Focal Resources

Step 1
Identify focal resources; gather relevant data and info

Vulnerability Assessment

Step 2
Assess vulnerability of focal resources

Adaptation Planning

Step 3
Use assessment results to identify adaptation options

Adaptation Implementation

Step 4
Develop implementation plans for on-the-ground action

Phase 1: Vulnerability Assessment

Phase 2: Adaptation Planning
Project Timeline

* All workshops will be held in both Eureka and Redding
Step 1: Identify Priorities

GOAL: Collaboratively identify regionally important resources
- Management, cultural, or socio-economic concern
- Habitats, Species/Species groups, Ecosystem services
<table>
<thead>
<tr>
<th>Step 1: Product</th>
<th>Habitats</th>
<th>Species/Species Groups</th>
</tr>
</thead>
</table>
| Coastal        | • Coastal Dune Forest (dune grassland, non-tidal wetlands, forest mosaic)  
                 • Coastal/Bluff Scrub (coastal bluff scrub, prairie) | • Anadromous Fish (salmonids, lamprey, sturgeon) |
| Woodland       | • Oak Woodlands  
                 • Mixed Conifer Woodlands/Mixed Evergreen Forest | • Native Ungulates (Roosevelt elk, deer)  
                 • Tanoak  
                 • Black oak |
| Shrub/Grassland| • Chaparral  
                 • Mixed Grasslands (non-alpine)  
                 • Alpine Grassland/Shrubland | • Native Pollinators  
                 • Migratory Birds |
| Forest         | • Coastal Redwood  
                 • Mixed Conifer/Ponderosa (dry and moist)  
                 • Coastal Conifer Hardwood (incl. pygmy forest)  
                 • Coastal Pine Forest  
                 • True Fir Forest  
                 • Subalpine | • Salamanders (Pacific Giant, endemic)  
                 • Late Successional-Dependent Species (marten, fisher, northern spotted owl)  
                 • Marbled Murrelet  
                 • Rare Trees (spruce, cedar, alpine, cypress, enriched conifers)  
                 • Sugar pine |
| Freshwater     | • Rivers, Streams, Floodplain  
                 • Lakes, Ponds  
                 • Marshes, Vernal Pools  
                 • Seeps, Springs, Groundwater  
                 • Wet Meadows, Freshwater Wetlands, Fens  
                 • Riparian | • Frogs (Northern Red-Legged, Foothill Yellow-Legged, Tailed)  
                 • Port Orford Cedar  
                 • Western Pond Turtle  
                 • Riparian Nesting Birds (warblers, grosbeak)  
                 • Native mussels |
| Endemic        | • Rock Outcrops, Cliffs, Talus, Caves | • Bats |
Step 2. Assess Vulnerabilities

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

- Scientists, managers, and other stakeholders evaluate resource vulnerabilities
- Add information from scientific literature
- Stakeholders/Experts review draft vulnerability assessment results

Which focal resources are most vulnerable to climate change, and why?
Step 2. Products

1. **Ranked List**
   - Most to least vulnerable

2. **Vulnerability Syntheses**
   - State-of-the-science assessment
   - Examines key vulnerabilities and provides in-depth discussions of potential impacts

3. **Vulnerability Brief**
   - Vulnerability snapshot
   - Lists key vulnerabilities, and provides brief description of primary impacts

### Table: Habitat Vulnerability

<table>
<thead>
<tr>
<th>HABITAT</th>
<th>VULNERABILITY</th>
<th>CONFIDENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinyon-Juniper</td>
<td>Moderate-High</td>
<td>High</td>
</tr>
<tr>
<td>Alluvial Scrub</td>
<td>Moderate-High</td>
<td>High</td>
</tr>
<tr>
<td>Riparian</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Desert</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>River &amp; Streams</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

### Note:
- Alluvial scrub habitats are commonly found near washout areas, river wash deposits, and riverine deposits at canyon mouths. These habitats are also highly vulnerable to climate change and other factors. The table above outlines the vulnerability levels for different habitats, with Pinyon-Juniper and Alluvial Scrub showing the highest vulnerability combined with high confidence.

- The ranked list provides a prioritized approach for addressing the most vulnerable habitats first.

- Vulnerability syntheses elaborate on key vulnerabilities and their potential impacts, offering a comprehensive overview of the issue.

- The vulnerability brief offers a succinct overview of key vulnerabilities and their primary impacts.
Step 3. Adaptation Planning

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

- Generate a suite of adaptation strategies and actions

<table>
<thead>
<tr>
<th>Adaptation Strategy</th>
<th>Specific Adaptation Actions</th>
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</thead>
</table>
| Restore fluvial processes to streams that support alluvial scrub vegetation | • Remove dikes, mining operations, and recharge basins that obstruct the migration ability of streams and sediment deposition areas  
• Require undeveloped buffers along streams  
• Raise roads out of washes |
| Maintain and/or restore the natural and historical characteristics of a watershed | • Designate critical habitat where the most sensitive species are found, and in areas where the home ranges of several species overlap |
| Promote species that are tolerant of climatic changes       | • Build a reserve of seeds and plants that are tolerant of disturbed conditions  
• Restore habitat with native species that are tolerant of disturbed conditions and climatic extremes |

- Where, when, and how those actions can be applied
- Implementation feasibility and effectiveness
- Stressors action helps to reduce or minimize
Step 3. Products

1. Adaptation Summaries
   - Tables of adaptation options
   - Adaptation actions linked to stressors
   - Feasibility & Effectiveness figure

2. Adaptation Brief
   - Adaptation snapshot
   - Lists key adaptation options, and provides brief description of implementation feasibility and effectiveness
Step 4. Adaptation Implementation

Goal: Create adaptation implementation plans for and/or integrate climate information into selected sites/projects

- Collaboratively integrate vulnerability and adaptation information into on-the-ground projects
  - Adaptation actions to implement first
  - How to implement
  - Lead organization/entity
  - Capacity needed
Step 4. Products

1. Implementation Plans
   • Outline steps to take in what order, lead entity, capacity needed

2. Case Studies
   • Demonstrate how to integrate climate vulnerability and adaptation information into on-the-ground projects
Opportunities for Collaboration

1. **Vulnerability assessment**: Review draft assessments for resources of interest

2. **Adaptation planning**: Review draft strategies/actions

3. **Adaptation implementation**: Participate in workshops (date TBD)
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Phase 2: Adaptation Planning
Workshop Objectives

Day 1
• Provide participants with an overview of projected future trends for the region
• Assess vulnerabilities of habitats to climate change and identify adaptation strategies

Day 2
• Present case studies of moving from adaptation planning to implementation
• Assess vulnerabilities of species groups/species and identify adaptation strategies
Questions?

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