Santa Cruz Mountains Climate Adaptation Project

Climate Change Adaptation Planning Workshop

December 1-2, 2020

EcoAdapt™
Meeting the challenges of climate change

Pepperwood
PRESERVE
Inspiring conservation through science

Agenda

Workshop Series:

- Part 1. Dec 1st: Review vulnerability assessment results

- Part 2. Dec 2nd: Develop adaptation strategies

9:00	**Welcome**, project overview, introductions
9:30	Climate-driven trends in vegetation distribution
11:00	**Break**
11:10	Vulnerability assessment results for habitats and species
11:40	Identifying priorities for adaptation planning
12:00	**Adjourn**

Santa Cruz Mountains Climate Adaptation Project Overview

1. **Project Scoping Meeting (June 2019)**
   - Select natural resources of interest, define project boundary, identify climate variables and timeframes for spatial analysis

2. **Vulnerability Assessment (Fall 2019)**
   - Vulnerability Assessment Workshop: Oct 2019
   - Synthesize vulnerability information: 2020

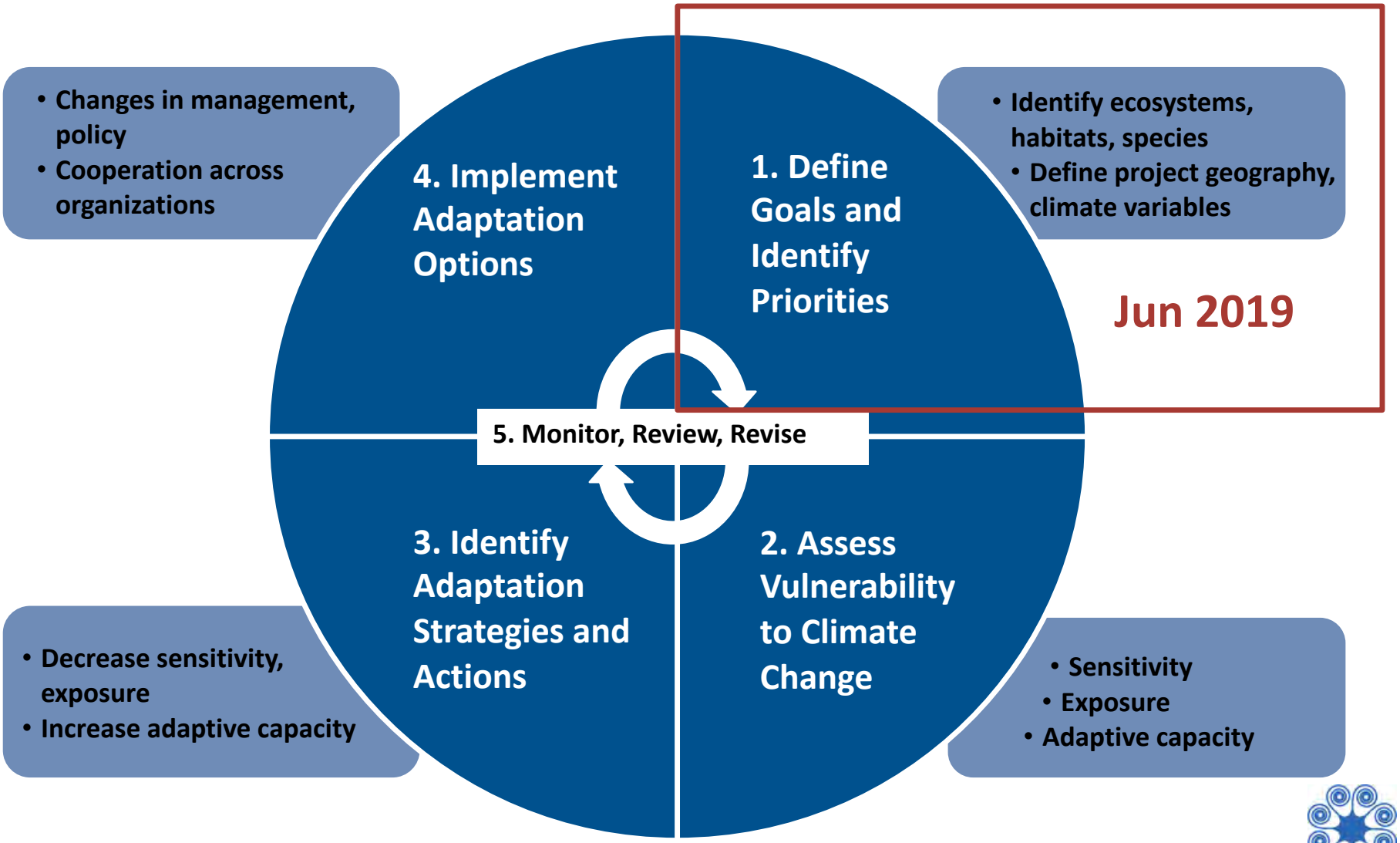
3. **Spatial Analysis (Summer 2019-Summer 2020)**
   - Downscaled maps and trends for climatic and hydrologic variables, vegetation, and fire

4. **Adaptation Planning (Fall 2020)**
   - Two workshops (Midpen, SCMSN): Nov/Dec 2020
   - Synthesize adaptation information: Winter 2021

5. **Final climate vulnerability and adaptation products, spatial analysis (Spring 2021)**

Santa Cruz Mountains Climate Adaptation Project Boundary

Climate Adaptation Framework



From Glick et al. 2011 *Scanning the Conservation Horizon*

Focal Resources List

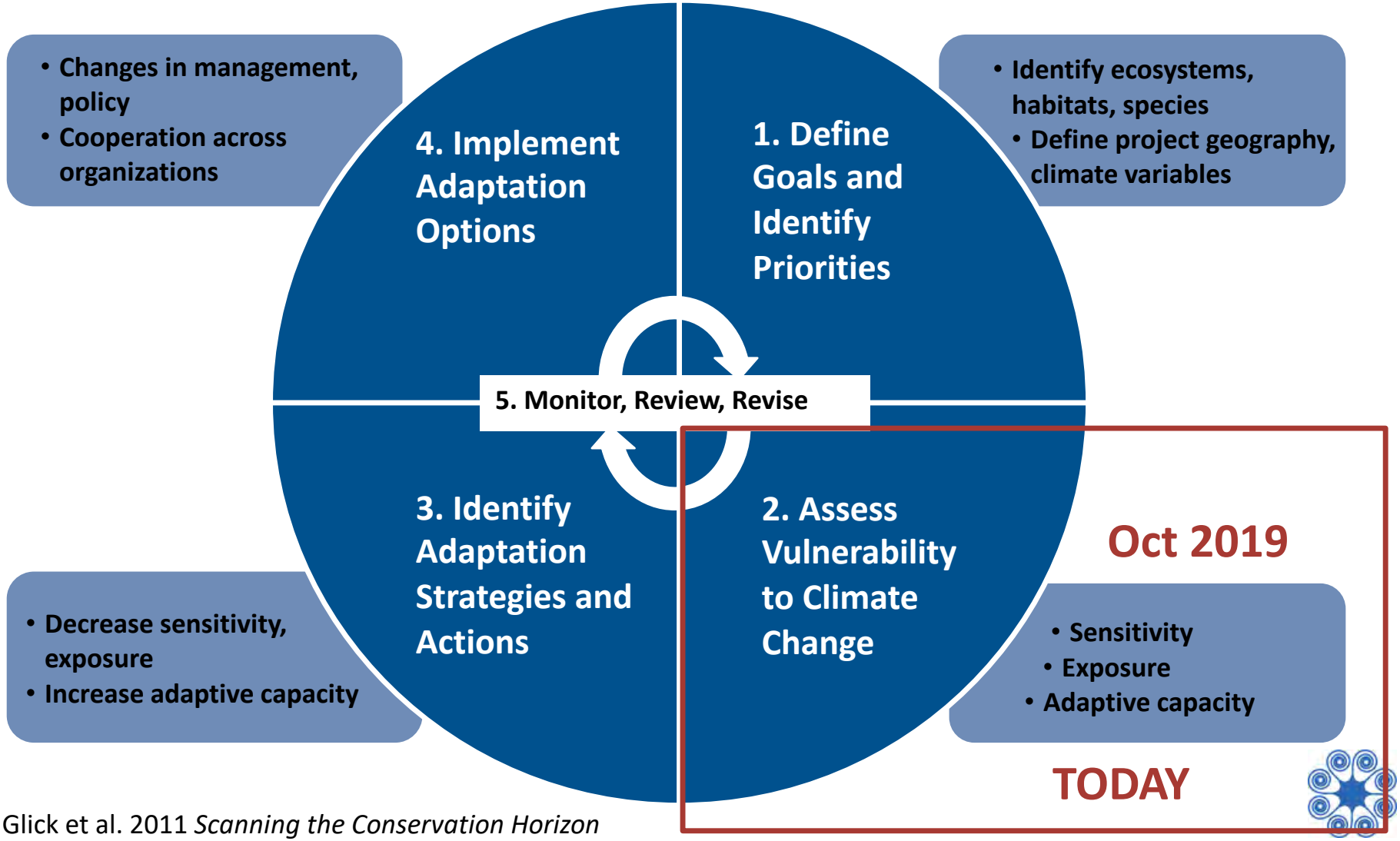
Habitats

- Coastal dunes, wet meadows, and prairie
- Coastal scrub
- Mixed grasslands
- Chaparral shrublands
- Oak woodlands
- Mixed evergreen/montane hardwood forests
- Coastal redwood forests
- Rivers, streams, and floodplains
- Freshwater marshes, wetlands, and ponds
- Seeps and springs

Species/Species Groups

- American badger & western burrowing owl
- Bats
- Butterflies
- California red-legged frog & San Francisco garter snake
- Coyote brush
- Marbled murrelet
- Salamanders
- Salmonids
- Wide-ranging mammals

Climate Adaptation Framework



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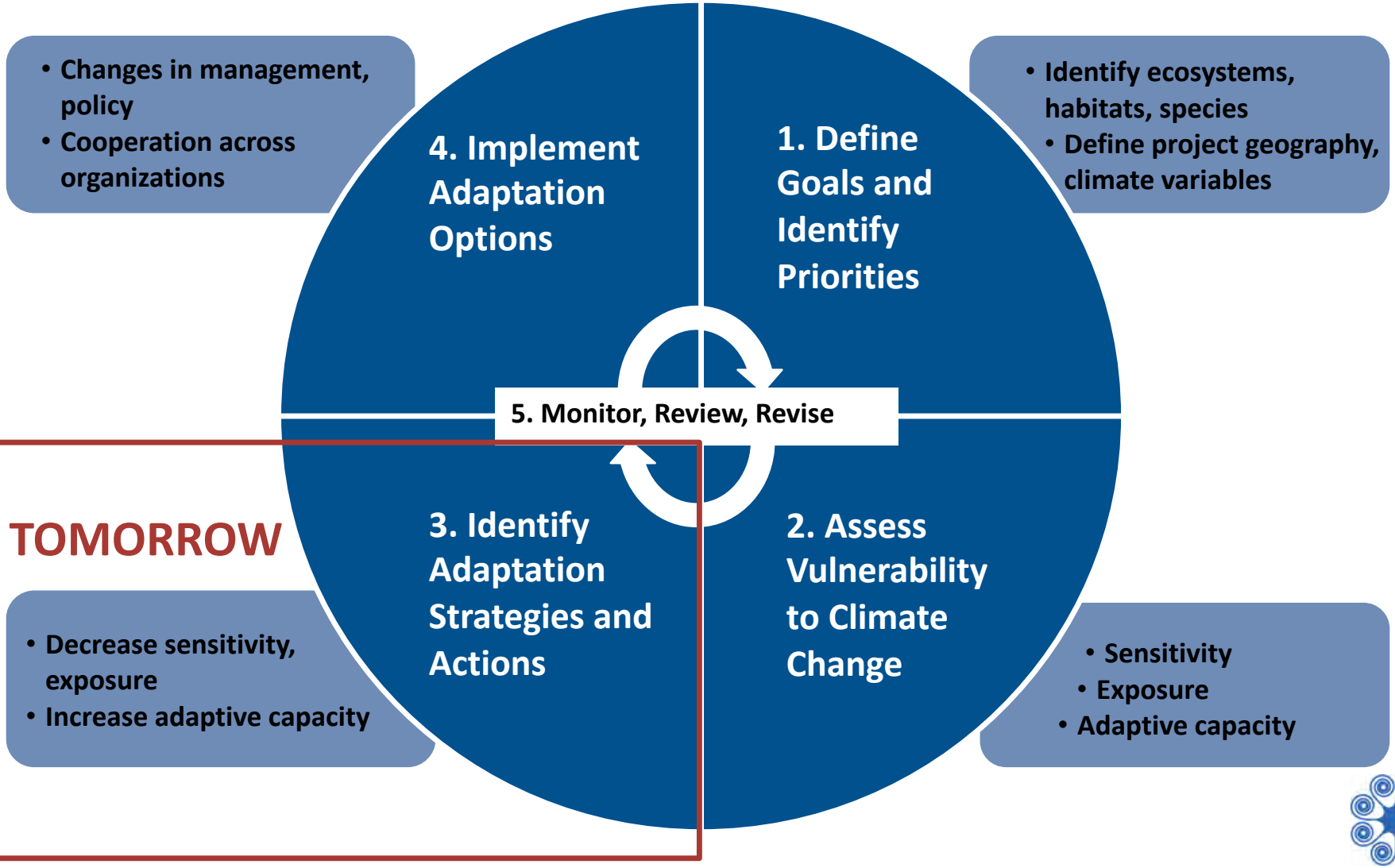
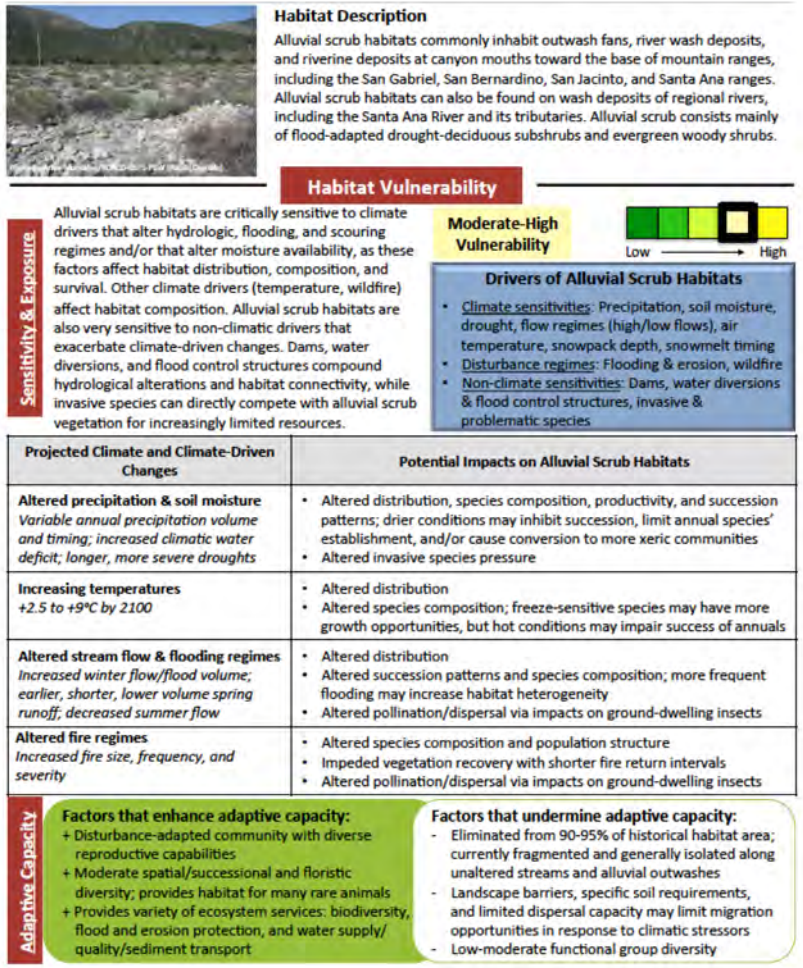
Climate Adaptation Framework



Final Products

1. Short synthesis report on climate data, vulnerability assessment trends, and adaptation options
2. Vulnerability-adaptation briefs for resources
3. Short report summarizing workshop proceedings
4. Print-ready maps and GIS layers



Habitat Description

Alluvial scrub habitats commonly inhabit outwash fans, river wash deposits, and riverine deposits at canyon mouths toward the base of mountain ranges, including the San Gabriel, San Bernardino, San Jacinto, and Santa Ana ranges. Alluvial scrub habitats can also be found on wash deposits of regional rivers, including the Santa Ana River and its tributaries. Alluvial scrub consists mainly of flood-adapted drought-deciduous subshrubs and evergreen woody shrubs.

Habitat Vulnerability

Sensitivity & Exposure

Alluvial scrub habitats are critically sensitive to climate drivers that alter hydrologic, flooding, and scouring regimes and/or that alter moisture availability, as these factors affect habitat distribution, composition, and survival. Other climate drivers (temperature, wildfire) affect habitat composition. Alluvial scrub habitats are also very sensitive to non-climatic drivers that exacerbate climate-driven changes. Dams, water diversions, and flood control structures compound hydrological alterations and habitat connectivity, while invasive species can directly compete with alluvial scrub vegetation for increasingly limited resources.

Moderate-High Vulnerability

Low → High

Drivers of Alluvial Scrub Habitats

- Climate sensitivities: Precipitation, soil moisture, drought, flow regimes (high/low flows), air temperature, snowpack depth, snowmelt timing
- Disturbance regimes: Flooding & erosion, wildfire
- Non-climate sensitivities: Dams, water diversions & flood control structures, invasive & problematic species

Projected Climate and Climate-Driven Changes	Potential Impacts on Alluvial Scrub Habitats
Altered precipitation & soil moisture *Variable annual precipitation volume and timing; increased climatic water deficit; longer, more severe droughts*	• Altered distribution, species composition, productivity, and succession patterns; drier conditions may inhibit succession, limit annual species' establishment, and/or cause conversion to more xeric communities • Altered invasive species pressure
Increasing temperatures *+2.5 to +9°C by 2100*	• Altered distribution • Altered species composition; freeze-sensitive species may have more growth opportunities, but hot conditions may impair success of annuals
Altered stream flow & flooding regimes *Increased winter flow/flood volume; earlier, shorter, lower volume spring runoff; decreased summer flow*	• Altered distribution • Altered succession patterns and species composition; more frequent flooding may increase habitat heterogeneity • Altered pollination/dispersal via impacts on ground-dwelling insects
Altered fire regimes *Increased fire size, frequency, and severity*	• Altered species composition and population structure • Impeded vegetation recovery with shorter fire return intervals • Altered pollination/dispersal via impacts on ground-dwelling insects

Adaptive Capacity

Factors that enhance adaptive capacity:

+ Disturbance-adapted community with diverse reproductive capabilities
+ Moderate spatial/successional and floristic diversity; provides habitat for many rare animals
+ Provides variety of ecosystem services: biodiversity, flood and erosion protection, and water supply/quality/sediment transport

Factors that undermine adaptive capacity:

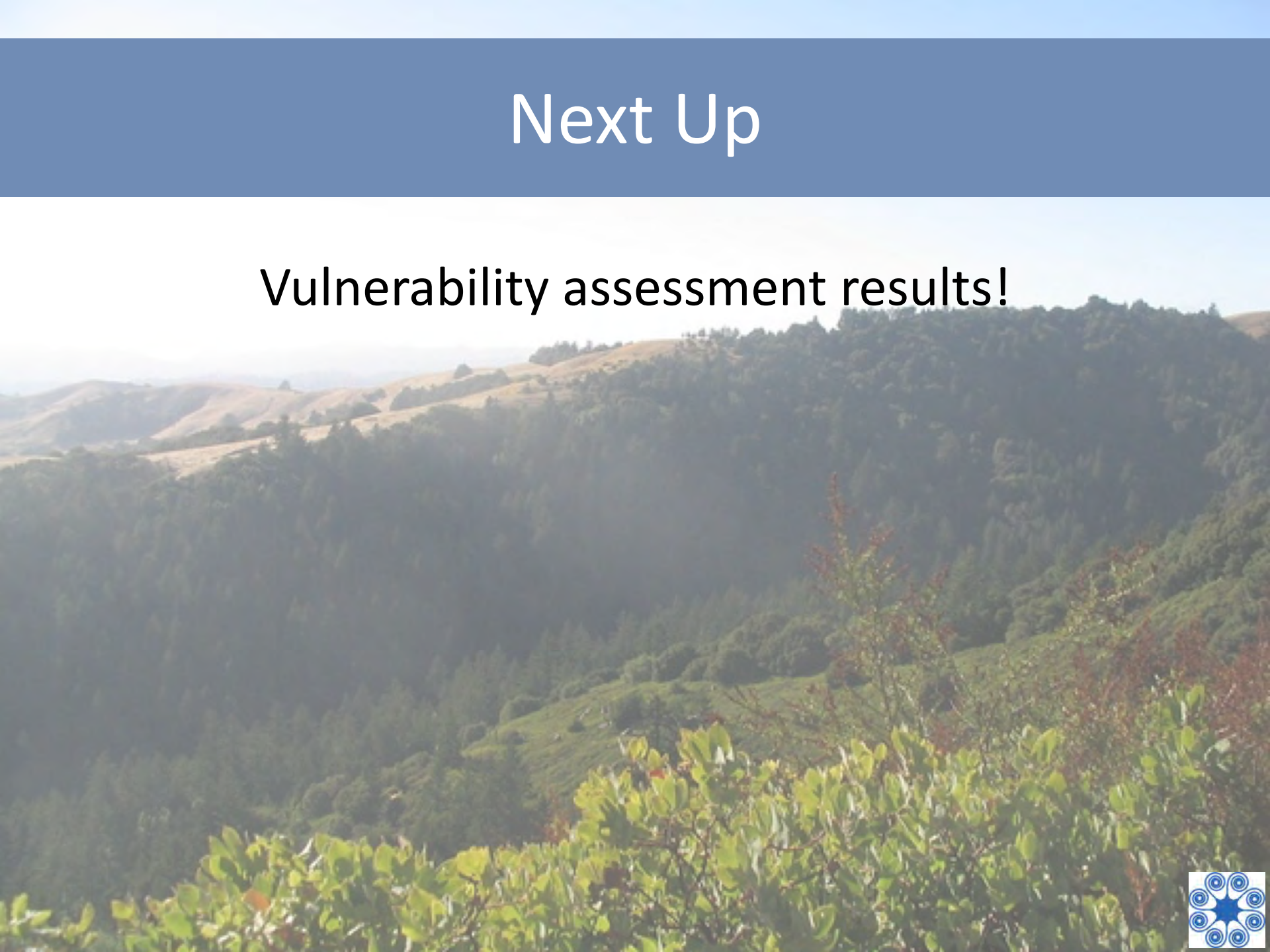
- Eliminated from 90-95% of historical habitat area; currently fragmented and generally isolated along unaltered streams and alluvial outwashes
- Landscape barriers, specific soil requirements, and limited dispersal capacity may limit migration opportunities in response to climatic stressors
- Low-moderate functional group diversity

Introductions

- Name
- Brief description of site or habitat that you work on regularly and primary challenges

Next Up

Vulnerability assessment results!



Identifying Adaptation Priorities

Habitats		Activities/Topics		Sites/Projects
Coastal grasslands		Increased prevalence of SOD		Instream habitat /Riparian restoration projects
Redwoods		Nexus of wildfire risk and shifts in vegetation communities		
Grasslands (badger, burrowing owl, connectivity)		Climatic water deficit		
Oak woodlands				
Springs, seasonal ponds				

Identifying Adaptation Priorities

SCENARIOS BY HABITAT

Oak woodlands

- warmer/wetter (increased SOD)
- hotter/drier (decreased SOD, recruitment)

Shrublands/grasslands

- wetter (increased coyote brush expansion)
- drier (reduced encroachment of coyote brush, possible expansion of mixed grasslands)

Wetlands/ponds

- warmer/wetter, including increases in extreme precipitation (longer hydroperiods, more flooding/landslides)
- hotter/drier (shorter hydroperiods, increased fire raises risk of post-fire landslides)

Rivers/streams

- warmer/wetter, including increases in extreme precipitation (increased flows and connectivity with floodplains, more flooding/landslides)
- hotter/drier (reduced flows and loss of connectivity, increased fire raises risk of post-fire landslides)

Mixed evergreen/montane hardwood forests

- Warmer/wetter (increased SOD and associated changes in species composition)
- Hotter/drier (decreased SOD, increased fire risk)

CLIMATE-READY NORTH BAY SCENARIOS

- **Massive drought-induced oak-dieback**
- **Catastrophic fires on the landscape**
- **Wetter, warm future**