

The background of the slide is a photograph of a landscape. It shows rolling hills covered in dry, yellowish-brown grass. Several large, leafless trees with dark, intricate branch structures are scattered across the hills. The sky is a pale, hazy orange-brown color, suggesting a sunrise or sunset. The overall mood is serene and natural.

Vulnerability Assessment Overview

Kirk Klausmeyer
The Nature Conservancy

Outline



Highlight the need for vulnerability assessments



Outline the concepts

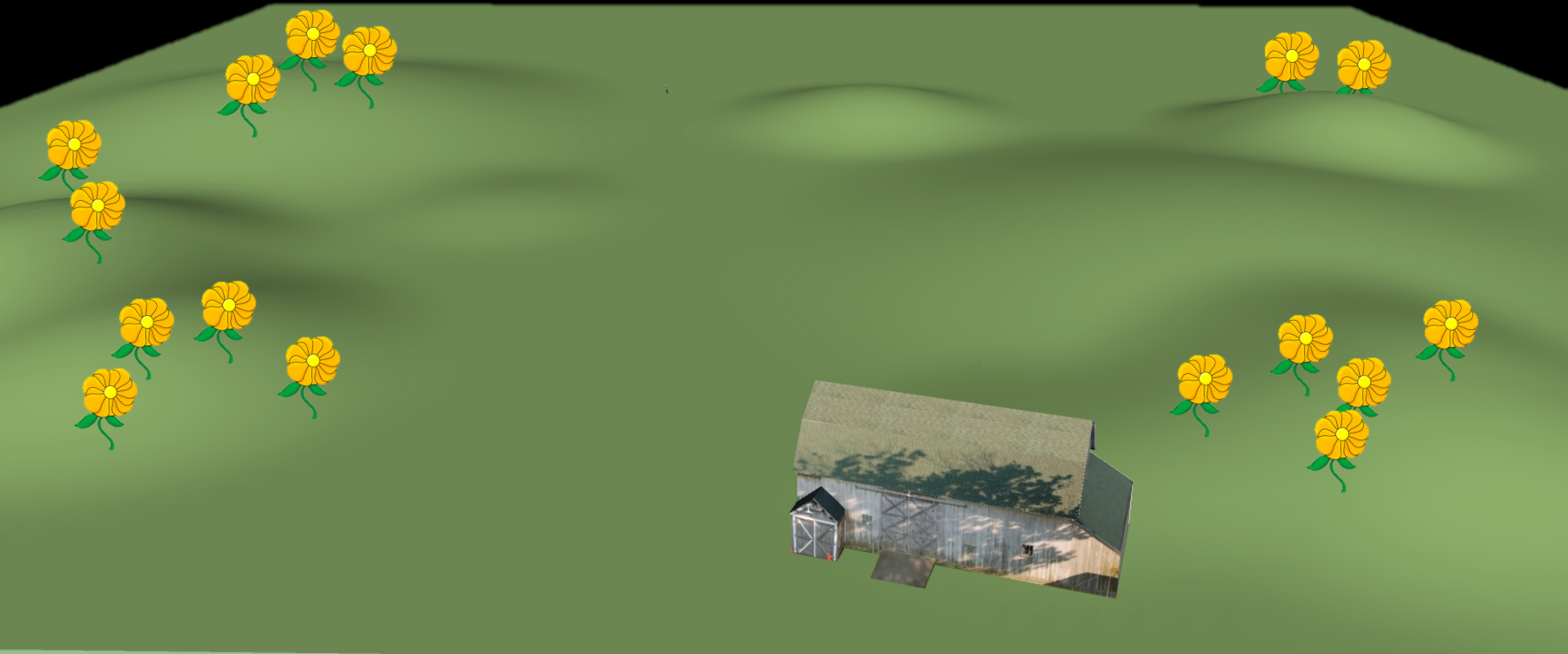


How to streamline



Identify more resources

Goal 1: Sustainable populations of



Plan: Protect and manage key populations



Action: Remove invasive  from key populations



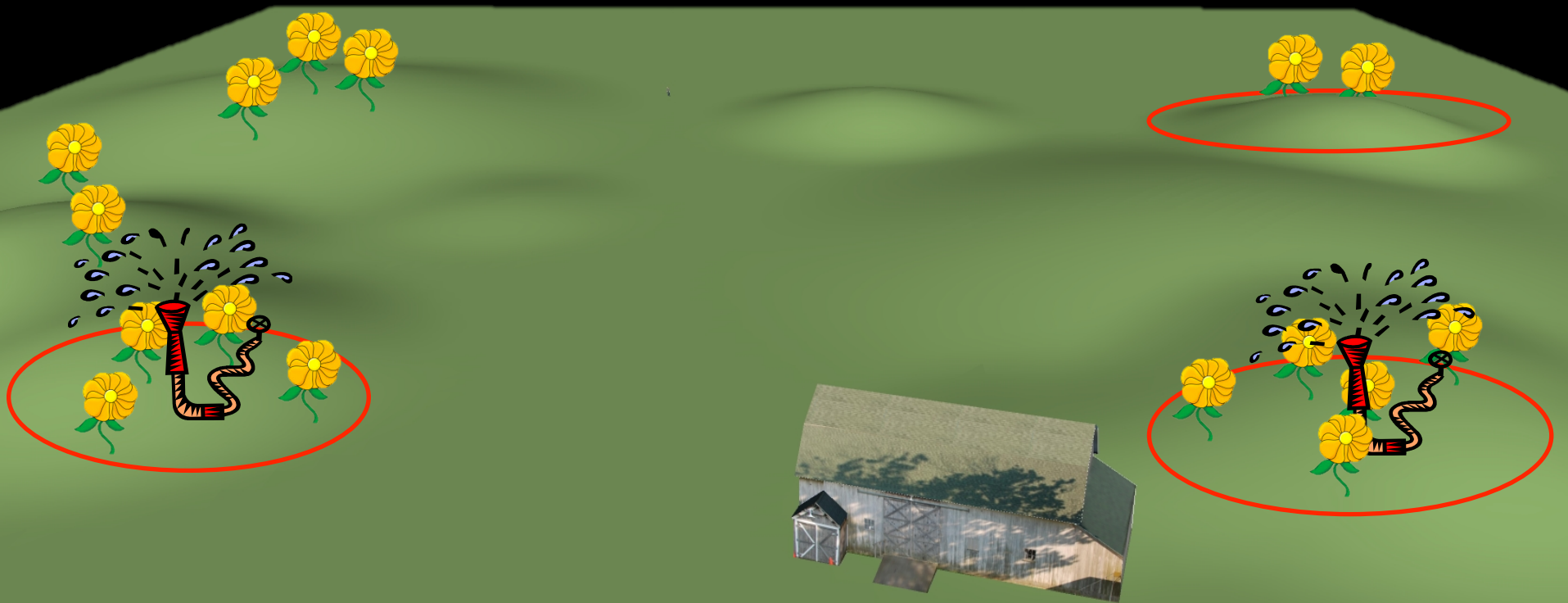
New Threat: Mega drought

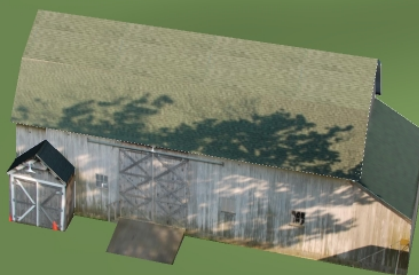
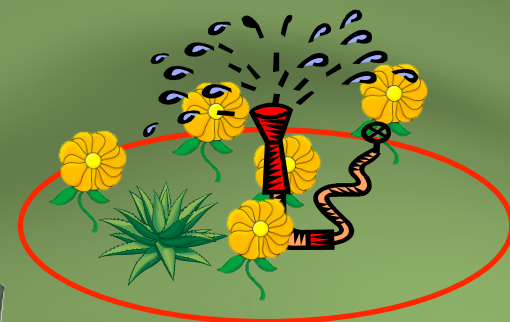
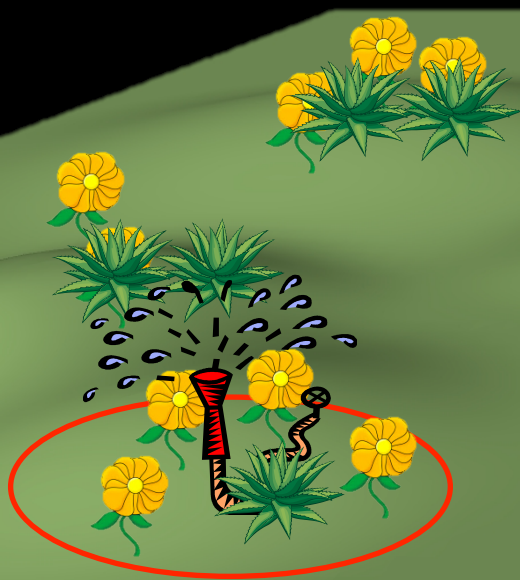


Result: Goal not met



Vulnerability Assessment: Manage diverse populations and prepare for drought





Result: Goal Met



Vulnerability Assessment

Structured thinking, research, and analysis to determine:

1. What species/habitats are most likely to be impacted by climate change
2. Why they are likely to be vulnerable

Vulnerability Assessment

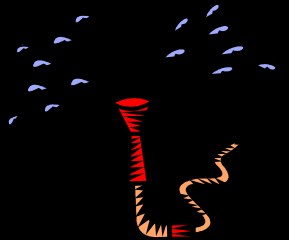
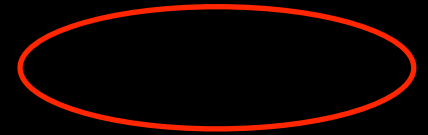
Key Motivations:

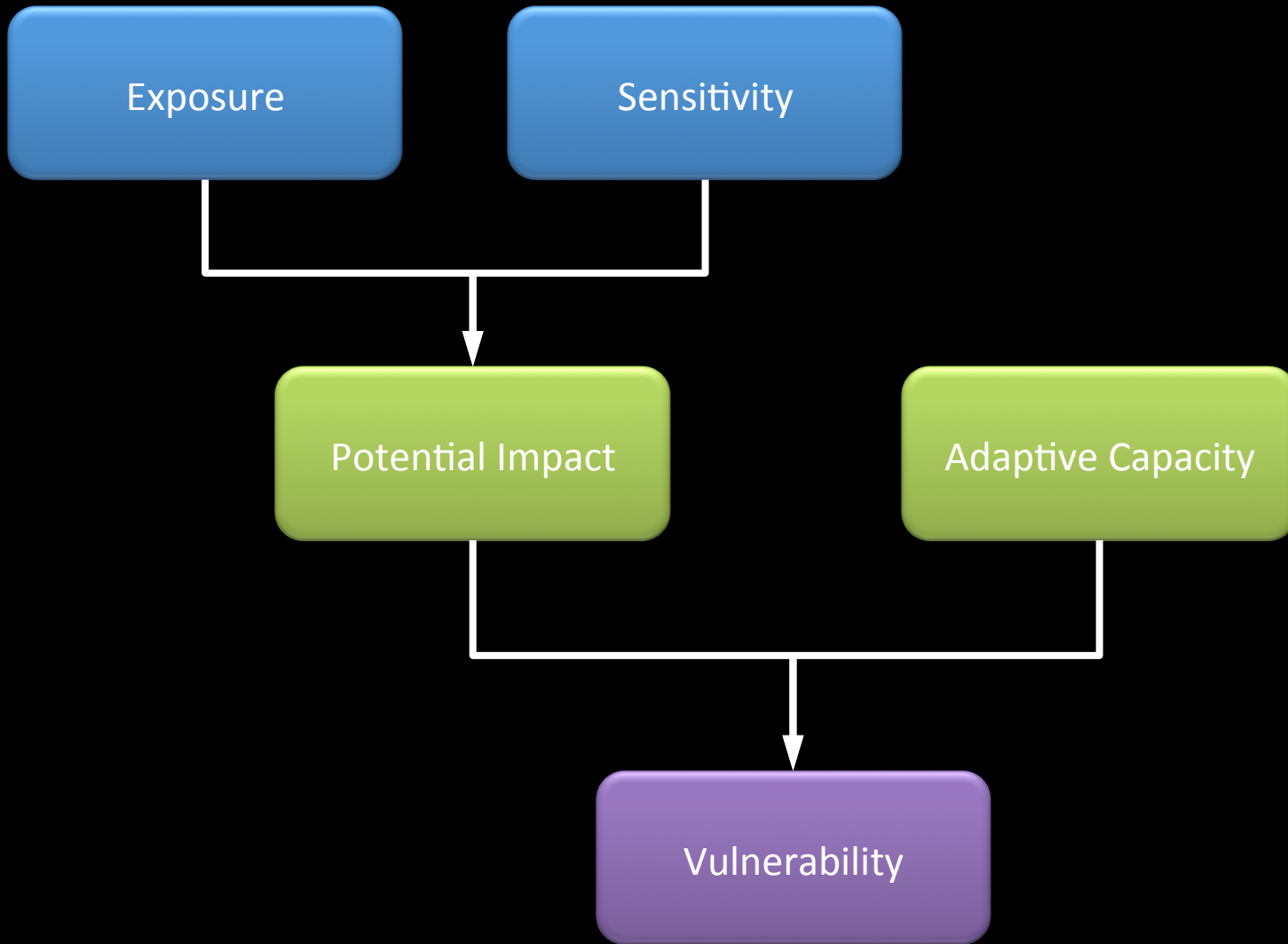
1. To fill out the “climate change” section in the update of the plan
 2. To produce a large document.
- 

Vulnerability Assessment

Key Motivations:

1. Help set management and planning priorities
2. Assist in informing and crafting adaptation strategies
3. Enable more efficient allocation of scarce resources

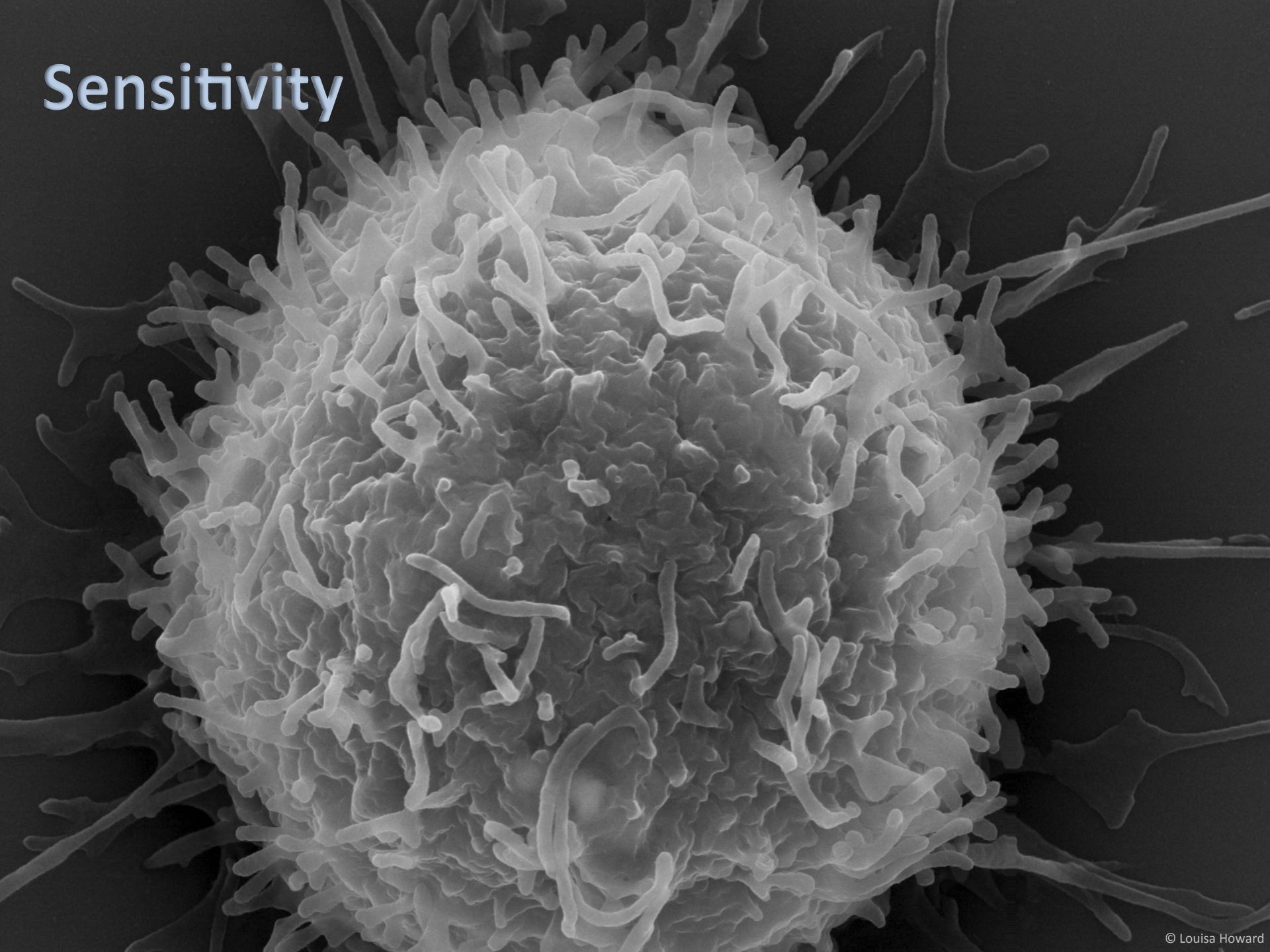




Exposure

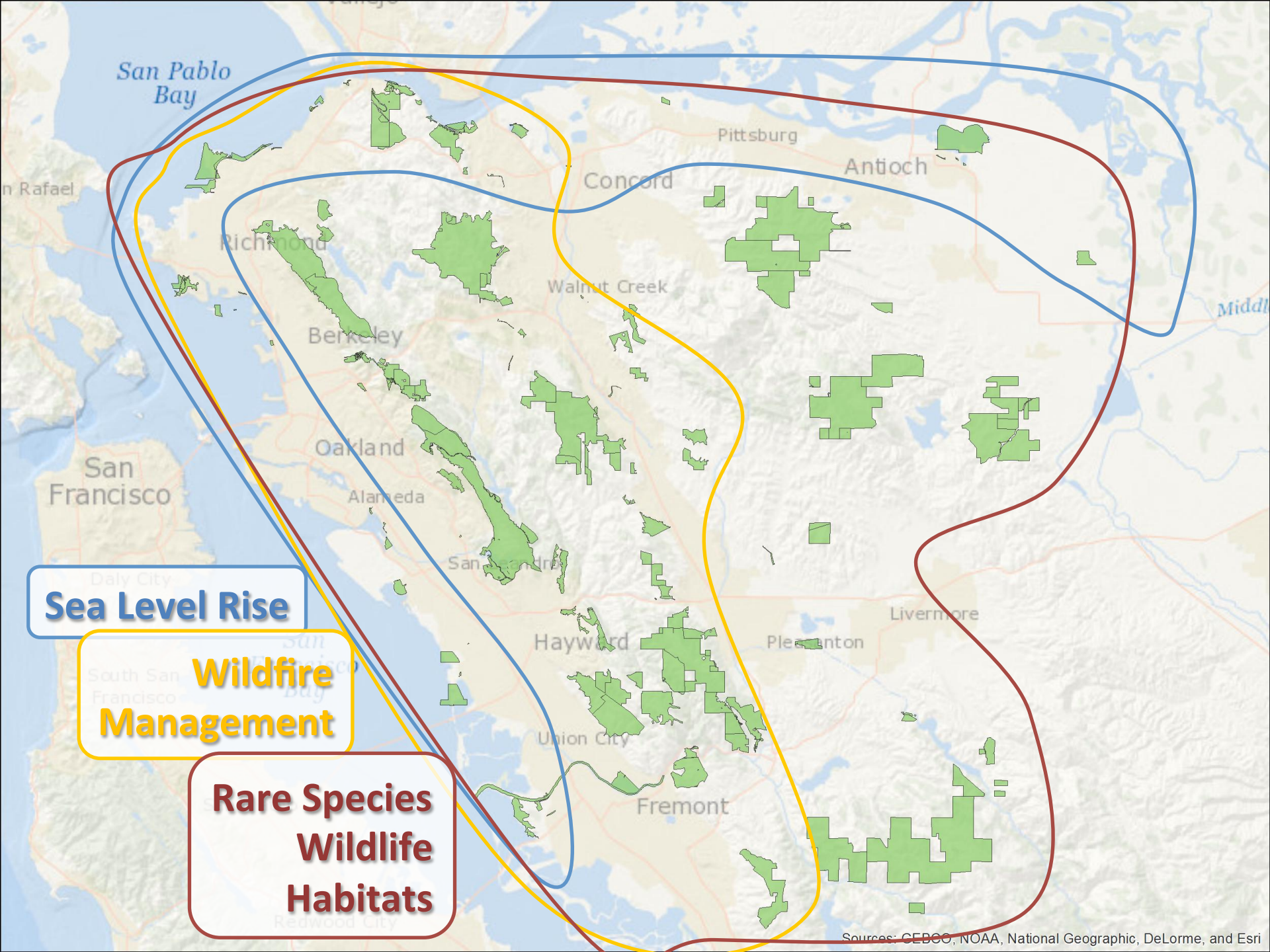


Sensitivity



Adaptive Capacity





Sea Level Rise

**Wildfire
Management**

**Rare Species
Wildlife
Habitats**

Landscape-scale indicators of biodiversity's vulnerability to climate change

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Citation: Klausmeyer, K. R., M. R. Shaw, J. B. MacKenzie, and D. R. Cameron. 2011. Landscape-scale indicators of biodiversity's vulnerability to climate change. *Ecosphere* 2(9):art88. doi:10.1890/ES11-00044.1

Abstract. Climate change will increase the vulnerability of species across the globe to population loss and extinction. In order to develop conservation strategies to facilitate adaptation to this change, managers must understand the vulnerability of the habitats and species they are trying to manage. For most biodiversity managers, conducting vulnerability assessments for all of the species they manage would be prohibitively costly, time consuming, and potentially misleading since some data required does not yet exist. We present a rapid and cost-effective method to estimate the vulnerability of biodiversity to climate change impacts across broad areas using landscape-scale indicators. While this method does not replace species-specific vulnerability assessments, it allows biodiversity managers to focus analysis on the species likely to be most vulnerable and identify the categories of conservation strategies for implementation to reduce biodiversity's vulnerability to climate change. We applied this method to California, USA to map the portions of the state where biodiversity managers should focus on minimizing current threats to biodiversity (9%), reducing constraints to adaptation (28%), reducing exposure to climatic changes (24%), and implementing all three (9%). In 18% of the state, estimated vulnerability is low so continuing current strategies and monitoring for changes is likely sufficient, while in 12% of the state, vulnerability is so high that biodiversity managers may have to reassess current conservation goals. In combination with species-specific vulnerability assessments or alone, mapping vulnerability based on landscape-scale indicators will allow managers to take an essential step toward implementing conservation strategies to help imperiled species adapt to climate change.

Key words: adaptation strategies; adaptive constraints; California; climate change; climate stress; conservation; landscape exposure; landscape vulnerability.

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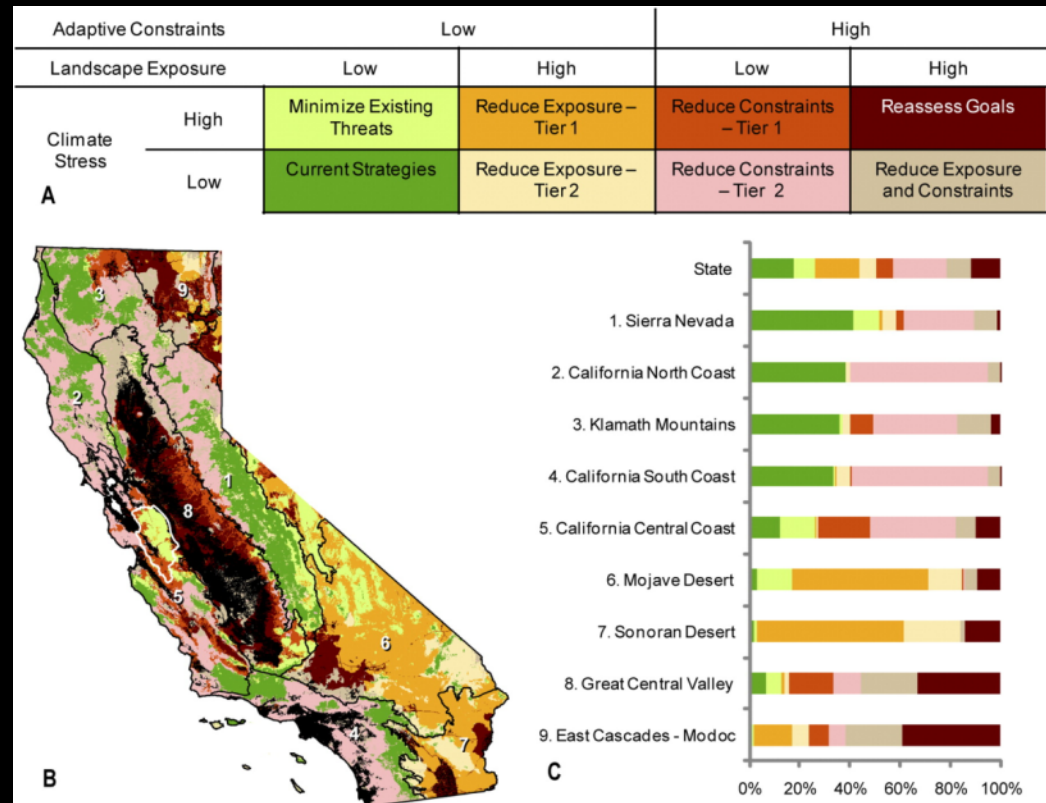
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INTRODUCTION

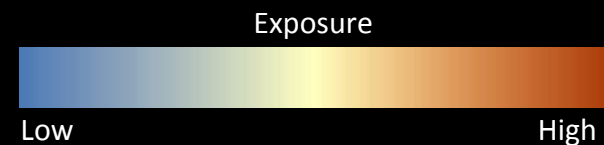
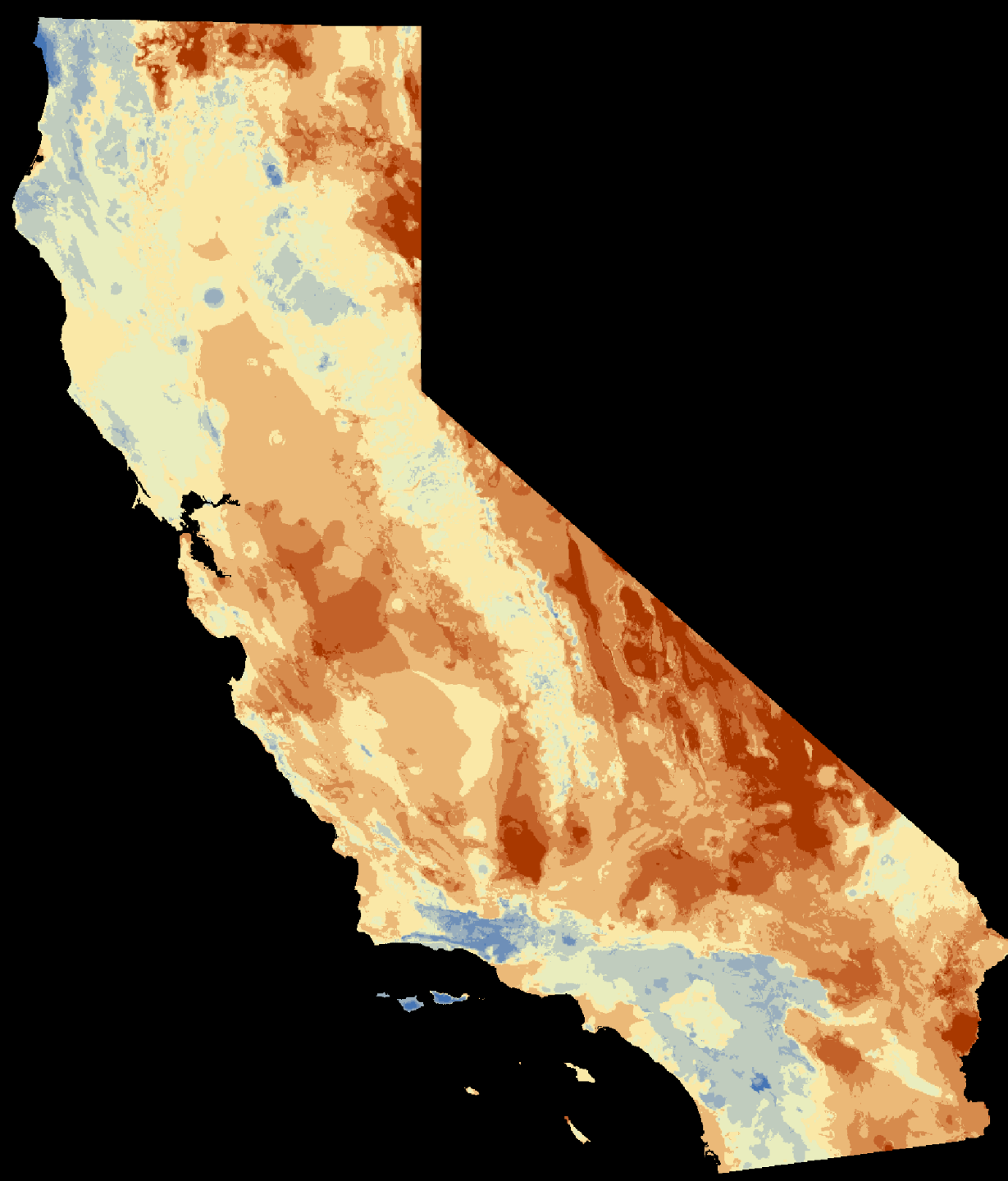
Climate change threatens global biodiversity, ecosystem function, and human systems (IPCC 2007). Already, observed impacts of climate change on species range from changes in phenology to local extirpations (Walther et al. 2002, Root et al. 2005, Parmesan 2006, Pounds et

al. 2006). Even if greenhouse gas emissions are held at year 2000 levels today, the history of past greenhouse gas emissions will contribute to unavoidable warming in the future (IPCC 2007). Instead, recent emissions rates continue to rise above the highest greenhouse gas emissions scenario utilized by the Intergovernmental Panel on Climate Change (IPCC) for global



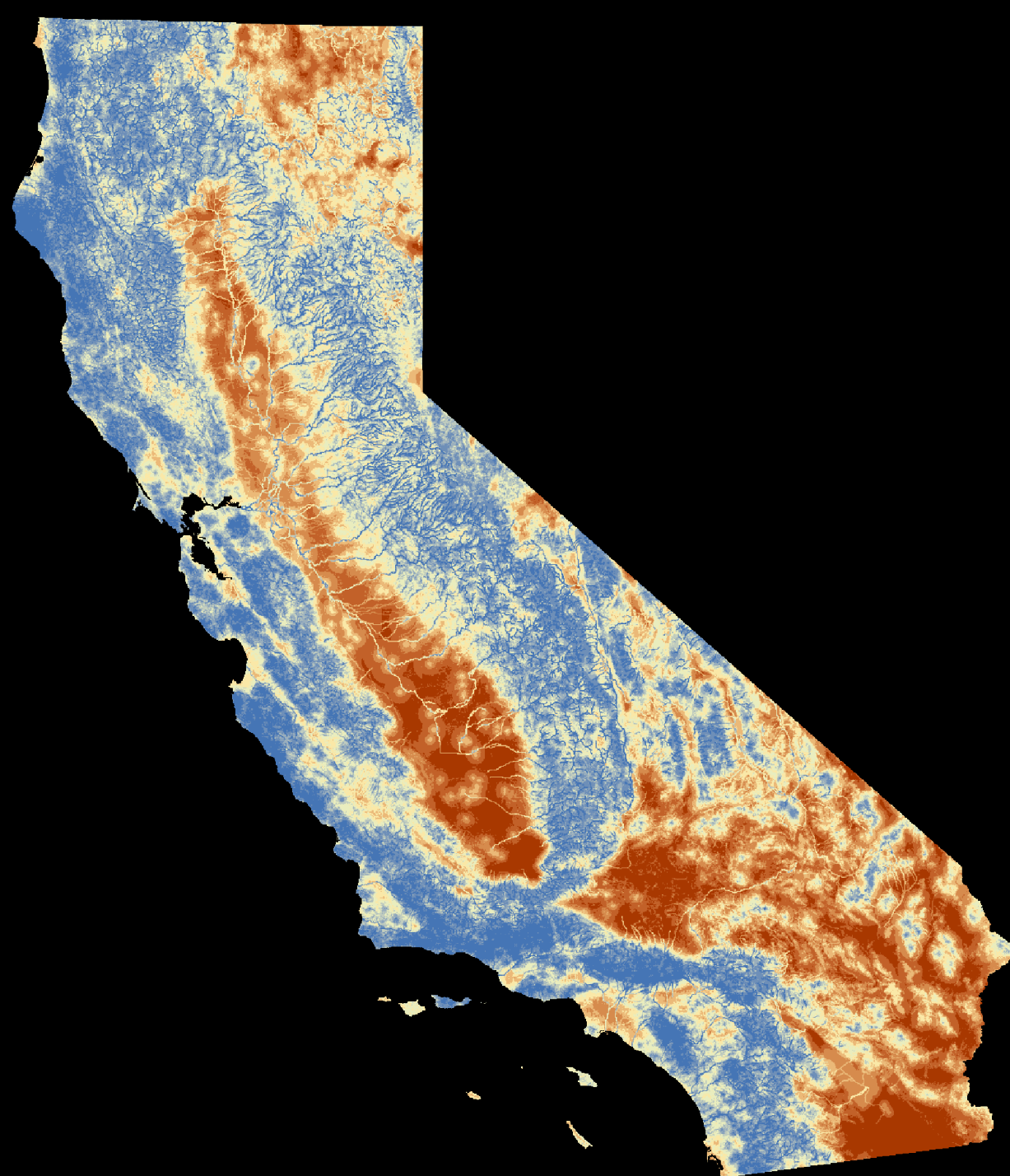
Exposure

Summer temperature
Winter temperature
Annual precipitation



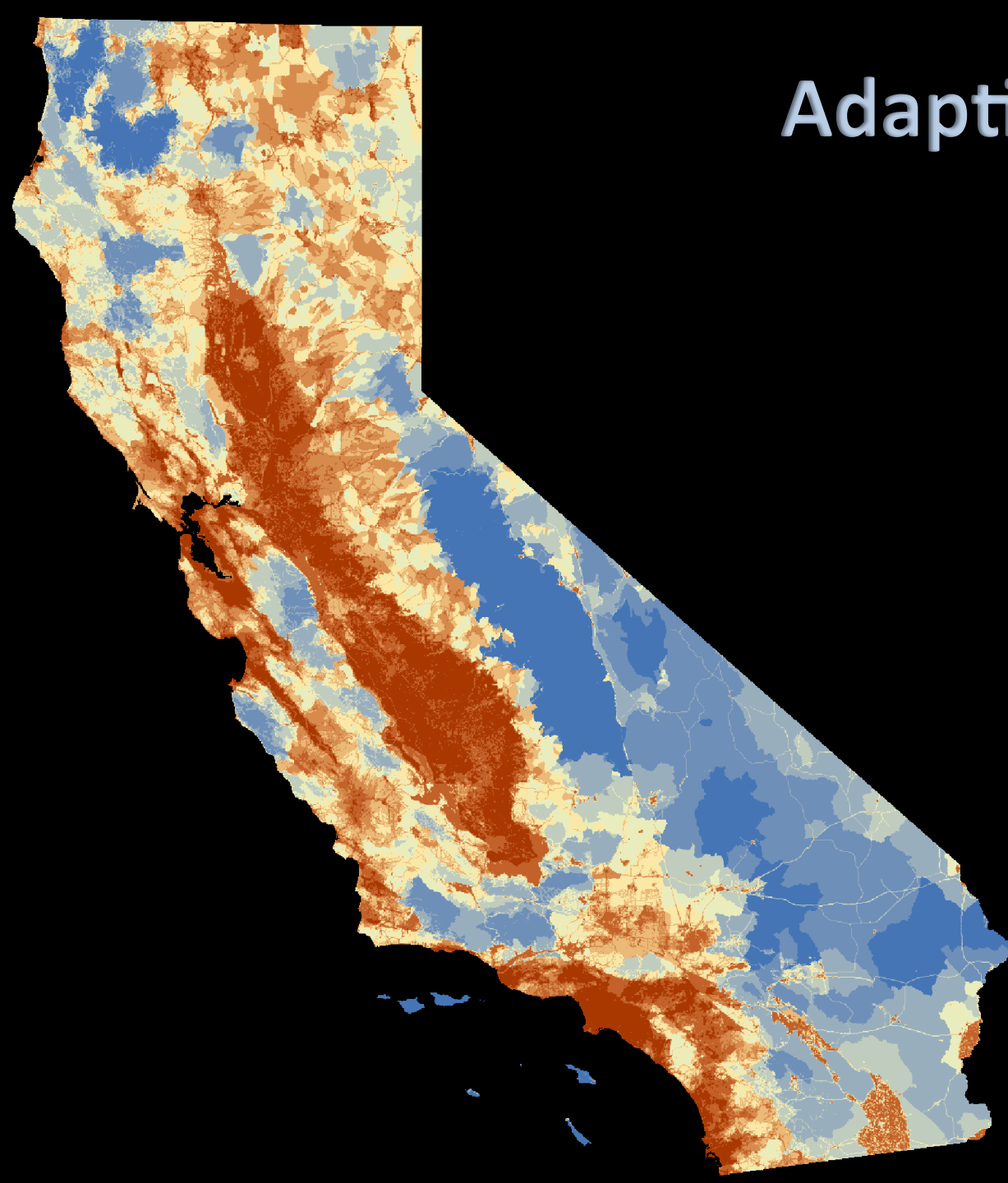
Sensitivity

Topographic Diversity
Elevation Gradients
Riparian Corridors
Distance to Coast
Distance to Water



Adaptive Constraints

Habitat Loss
Fragmentation



Adaptive Constraints



Low

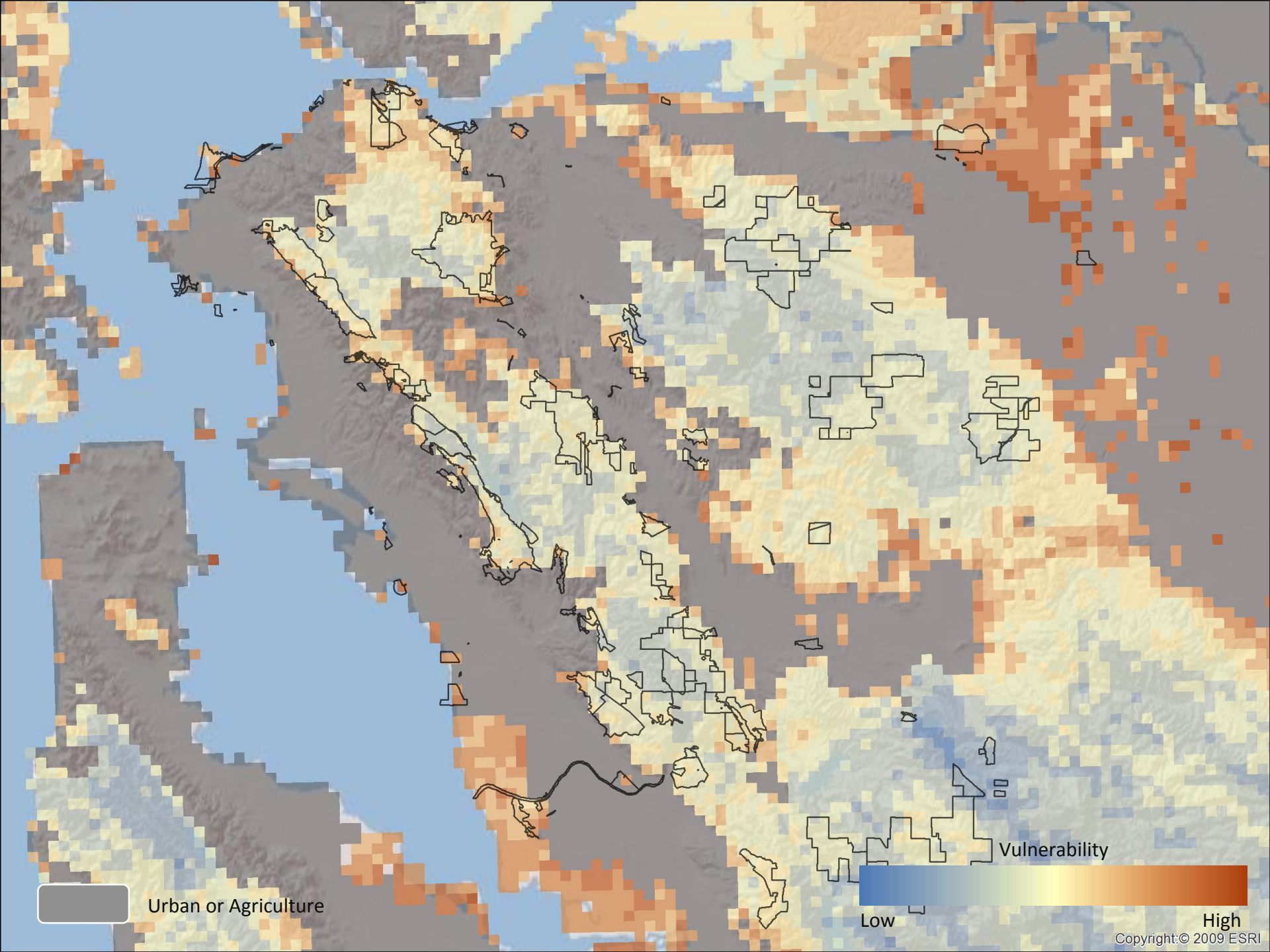
High

Vulnerability

Exposure
Sensitivity
Adaptive Constraints

Urban or Agriculture





Urban or Agriculture

Vulnerability

Low

High

Adaptation Actions

Action

Exp.

Sens.

A.C.

Current
Strategies

Low

Low

Low

Minimize
Threats

High

Low

Low

Restore and
Connect

Low

Low

High

Restore and
Connect
Tier 1

High

Low

High

Enhance
Resilience

Low

High

Low

Enhance
Resilience
Tier 1

High

High

Low

Restore, Connect,
Enhance
Resilience

Low

High

High

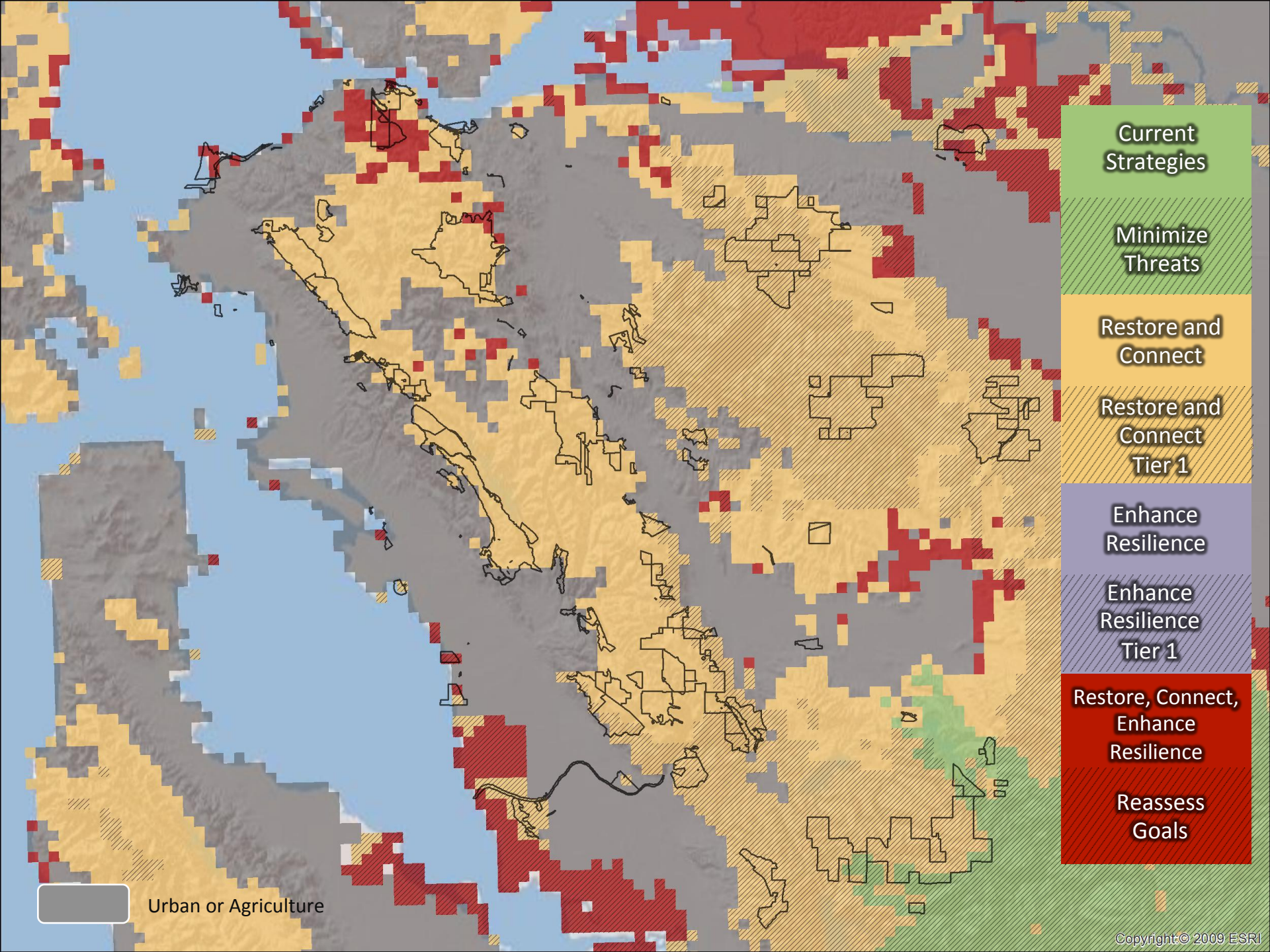
Reassess
Goals

High

High

High

Urban or Agriculture



Current
Strategies

Minimize
Threats

Restore and
Connect

Restore and
Connect
Tier 1

Enhance
Resilience

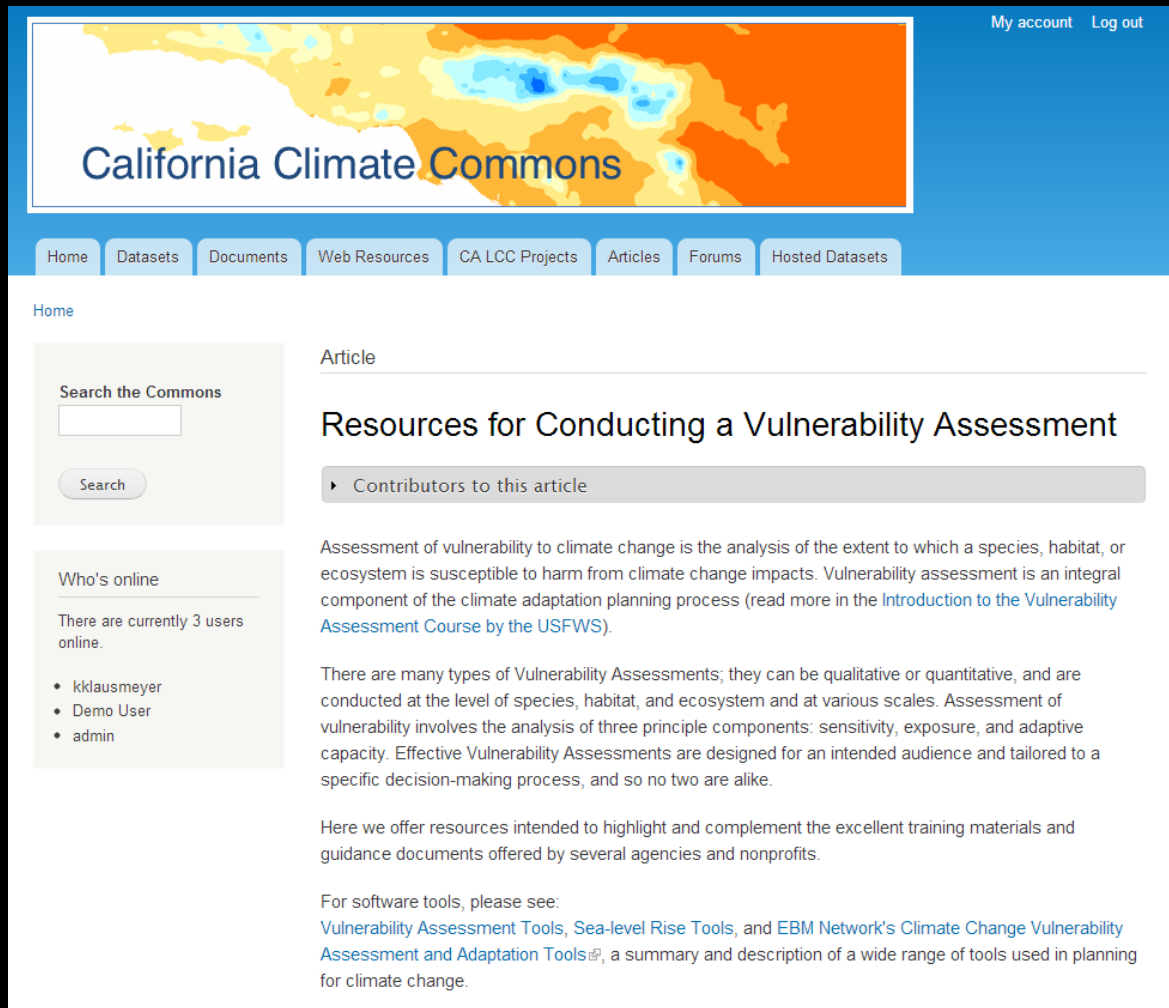
Enhance
Resilience
Tier 1

Restore, Connect,
Enhance
Resilience

Reassess
Goals

Urban or Agriculture

Key Resources



The screenshot shows the California Climate Commons website. At the top, there is a blue header with a map of California and the text "California Climate Commons". To the right of the map, there are links for "My account" and "Log out". Below the header, there is a navigation bar with links for "Home", "Datasets", "Documents", "Web Resources", "CA LCC Projects", "Articles", "Forums", and "Hosted Datasets". The main content area is divided into two columns. The left column contains a search bar labeled "Search the Commons" and a "Who's online" section showing "There are currently 3 users online" with a list of users: "kklausmeyer", "Demo User", and "admin". The right column features an article titled "Resources for Conducting a Vulnerability Assessment". Below the title, there is a section for "Contributors to this article". The article text discusses the assessment of vulnerability to climate change and provides links to various resources.

My account Log out

California Climate Commons

Home Datasets Documents Web Resources CA LCC Projects Articles Forums Hosted Datasets

Home

Search the Commons

Search

Who's online

There are currently 3 users online.

- kklausmeyer
- Demo User
- admin

Article

Resources for Conducting a Vulnerability Assessment

Contributors to this article

Assessment of vulnerability to climate change is the analysis of the extent to which a species, habitat, or ecosystem is susceptible to harm from climate change impacts. Vulnerability assessment is an integral component of the climate adaptation planning process (read more in the [Introduction to the Vulnerability Assessment Course by the USFWS](#)).

There are many types of Vulnerability Assessments; they can be qualitative or quantitative, and are conducted at the level of species, habitat, and ecosystem and at various scales. Assessment of vulnerability involves the analysis of three principle components: sensitivity, exposure, and adaptive capacity. Effective Vulnerability Assessments are designed for an intended audience and tailored to a specific decision-making process, and so no two are alike.

Here we offer resources intended to highlight and complement the excellent training materials and guidance documents offered by several agencies and nonprofits.

For software tools, please see: [Vulnerability Assessment Tools](#), [Sea-level Rise Tools](#), and [EBM Network's Climate Change Vulnerability Assessment and Adaptation Tools](#), a summary and description of a wide range of tools used in planning for climate change.

<http://climate.calcommons.org/>

Key Resources

Scanning the Conservation Horizon

*A Guide to Climate Change
Vulnerability Assessment*



<http://www.nwf.org/vulnerabilityguide>



Questions?

Restore and Connect



Manage Dams



Restore Riparian Habitat

