



NATURE-BASED

CLIMATE SOLUTIONS

California's Climate Smart Lands Strategy

NATURAL AND WORKING LANDS CLIMATE SMART STRATEGY

DRAFT FOR PUBLIC COMMENT



OCTOBER 11, 2021



EXECUTIVE SUMMARY

Natural and Working Lands Climate Smart Strategy

DRAFT FOR PUBLIC COMMENT

Our lands are a critical yet underutilized sector in California's fight to achieve carbon neutrality and build resilience to the impacts of climate change.

Healthy land can sequester and store carbon emissions, limit future carbon emissions into the atmosphere, protect people and nature from the impacts of climate change, and build resilience to future climate risks. Unhealthy lands have the opposite effect – they release more greenhouse gases than they store, increase climate risks to people and nature, and are more vulnerable to future climate change impacts.

In October 2020, Governor Newsom outlined a comprehensive and results-oriented nature-based solutions agenda for California in Executive Order N-82-20.

It called for accelerated use of nature-based solutions that deliver on our climate change goals and other critical priorities, such as improving public health and safety, securing our food and water supplies, and increasing equity.

This Strategy:

- Defines California's eight natural and working landscapes.
- Describes how these lands can deliver on our climate change goals.
- Highlights priority nature-based climate solutions to address the climate crisis.
- Explores opportunities for regional climate smart land management.
- Identifies options to track nature-based climate action and measure progress.
- Outlines nearly 200 opportunities to scale climate smart land management across regions and sectors in California.

Successful climate smart land management will reflect local and regional circumstances and often require trusted partnerships given the complexity of land ownership in California, importance of meaningful community engagement, and opportunity to leverage resources.

California is committed to taking urgent climate action in the natural and working lands sector now, and continuously improving our approach over time.



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SECTION ONE
INTRODUCTION



Sacramento Valley, CA

SECTION ONE INTRODUCTION

OUR CHALLENGE AND OPPORTUNITY

California is doubling down on our efforts to achieve carbon neutrality and build resilience to the impacts of climate change. In October 2020, Governor Newsom called for accelerated use of nature-based solutions to deliver on California’s climate change goals through Executive Order (EO) N-82-20.

The EO outlined a comprehensive and results-oriented nature-based solutions agenda for California, including the development of a Natural and Working Lands Climate Smart Strategy to align relevant existing state efforts under one cohesive strategy and identify land

management actions that help protect climate vulnerable communities, achieve carbon neutrality, improve public health and safety, and expand economic opportunity.

“Nature-based solutions” describe actions that work with and enhance nature to help address societal challenges. This term is an umbrella concept being used across the world to describe a range of ecosystem-related approaches that protect and restore nature to deliver multiple outcomes, including addressing climate change, protecting public health, increasing equity, and protecting biodiversity.¹

California's Natural And Working Lands

Natural and working lands are a cornerstone of California's nature-based climate solution sector. These lands cover approximately 90 percent of the state's 105 million acres,² including California Native American tribes' ancestral and cultural lands and waters and the iconic landscapes we know and love:

Natural And Working Lands

These Lands consist of eight landscapes, organized by land cover (a description of what is physically at a location) and developed by a team of scientific experts from multiple state agencies. They are consistent with international carbon accounting methodologies, and set an aligned foundation on which we can model, analyze, and measure climate action on our lands.

In this strategy, ocean and coastal areas are found within three of California's natural and working landscapes - sparsely vegetated lands; seagrasses and seaweeds; and wetlands.

Lakes, reservoirs, rivers, and oceans that don't overlay seagrasses and seaweeds are identified as "open water."

The Landscapes

FORESTS

Lands with greater than or equal to 10% canopy cover comprised of live trees, such as oak woodlands, riparian forests, and conifer forests.

SHRUBLANDS AND CHAPARRAL

Lands with greater than or equal to 10% canopy cover comprised of shrubs or chaparral. These lands are dominated by woody plants such as manzanita, sage brush, and huckleberry oak.

DEVELOPED LANDS

Lands developed for human use, such as urban, suburban, and rural communities; urban forests; and physical infrastructure.

WETLANDS

Lands saturated by water for all or portions of a year, such as coastal wetlands, floodplains, peatlands, mountain meadow wetlands, and vernal pools.

SEAGRASSES AND SEAWEEDS

Seagrasses are marine flowering plants, such as eelgrass and surfgrass. Seaweeds are algae, such as kelp.

CROPLANDS

Lands with annual or perennial crops and fallow land, such as perennial orchards and irrigated annual crops.

GRASSLANDS

Lands with less than 10% tree canopy cover that are dominated by grasses or herbaceous vegetation.

SPARSELY VEGETATED LANDS

Lands characterized primarily by low levels of vegetation, including deserts, beaches, and areas covered by ice, snow, and bare rock.

Healthy landscapes can sequester and store carbon emissions, limit future carbon emissions into the atmosphere, protect people and nature from the impacts of climate change, and build resilience to future impacts of climate change. Unhealthy landscapes have the opposite effect – they release more greenhouse gases than they store, increase climate risks to people and nature, and are more vulnerable to coming climate change impacts.³

Our natural and working lands are a critical yet underutilized sector in the fight against climate change. International leaders recognize this timely opportunity. According to the United Nations Environment Program, “By working with nature, we have the potential to reduce emissions by more than a third of what is needed by 2030 without nature, we will not be able to achieve 1.5°C or net-zero emissions by 2050, nor will we achieve the Sustainable Development Goals.”⁴

Managing our lands to deliver climate benefits, which is known as climate smart land management, requires taking action now and playing the “long game” by establishing and maintaining consistent, patient approaches and programs. Plants, soils, and trees operate on decadal time scales; to achieve climate benefits over time, we must act today.⁵

WHAT IS THE CONNECTION BETWEEN LANDS AND GREENHOUSE GAS EMISSIONS?

Greenhouse gases act like a blanket around Earth, trapping heat near the surface and raising the temperature. It is a natural process that keeps the planet warm enough to support life. However, greenhouse gas emissions from fossil fuel combustion, other human activities, and disturbance of our lands are creating an alarming and worsening imbalance in this natural process, and causing the largest threat to humanity of our time – climate change.⁶

The Earth’s carbon cycle transfers carbon between land, oceans, and the atmosphere, and in turn, facilitates the life cycle of all living things globally. During photosynthesis, plants and algae take carbon from the atmosphere and store it in their biomass. Fire, plant respiration, and decomposition release carbon into the atmosphere. This cycle of dynamic carbon exchange has continued throughout Earth’s history. Human activities and other natural factors can result in a net loss of total carbon stored in lands in some years, and a net gain in other years.

However, not all the carbon lost is emitted to the atmosphere as **carbon dioxide**. Some carbon leaves the land but persists in durable wood products. Other losses are part of a normal ecosystem function, such as some level of loss due to fire, pests, and other disturbances. To better understand both the loss and gain of ecosystem carbon in the state, the California Air Resources Board (CARB) publishes an inventory of carbon for natural and working lands. The amount of gains and losses of ecosystem carbon will fluctuate going forward; what is important is the long-term carbon trends for our natural and working lands.⁷

Carbon Dioxide

Carbon dioxide is a naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes.

California is committed to achieving **carbon neutrality** by 2045. According to the Intergovernmental Panel on Climate Change (the global body for assessing the state of scientific knowledge related to climate change), reducing emissions in transportation, industry and buildings are not enough to avert catastrophic climate change - lands must be part of the climate solution.⁸

Scientific assessments tell us the same is true in California; we know climate smart land management is needed to achieve carbon neutrality, and that our lands have potential to be either a significant barrier or a helpful solution to reaching this goal.⁹

Carbon Neutrality

Carbon neutrality is the term we use to describe carbon dioxide and other greenhouse gas emissions generated by sources such as transportation, power plants, and industrial processes being less than or equal to the amount of carbon dioxide that is stored, both in natural sinks and mechanical sequestration.

WHAT ARE THE CLIMATE RISKS PROJECTED TO IMPACT OUR NATURAL AND WORKING LANDS?

While the impacts vary in different regions of California, every area of the state is already experiencing climate change impacts.

Between 2020-2021:

- Governor Newsom declared drought emergencies covering most California counties; 2021 is on track to be the third driest on record in terms of statewide precipitation.¹⁰
- Five of California's six largest fires in modern history burned at the same time, burning more than 4 million acres across the state - double the previous record.¹¹

- The planet experienced the second-hottest year on record. In California, a Death Valley temperature reading hit 130 degrees Fahrenheit - the third hottest temperature ever recorded on Earth and the hottest temperature recorded on the planet since 1931.¹²

The best available science tells us these impacts will continue into the future:

- **Heat** - Annual temperature increases experienced over most of California have already exceeded 1°F, with some areas exceeding 2°F. The daily maximum average temperature, an indicator of extreme temperature shifts, is expected to rise between 4.4– 5.8°F by 2050 and 5.6– 8.8°F by 2100.¹³

Heat | Did You Know?

Among natural disasters in California, heat is responsible for the most deaths in the last 30 years. Heat is responsible for more deaths than any other natural hazard in the United States.

- **Rain and Snow** - California is known for its highly variable precipitation and multi-year wet or dry periods. The science points to more extreme precipitation events, increased drought severity, and more dry years in the future.¹⁴

Rain and Snow | Did You Know?

The snowpack in California's mountains is a key source of surface and groundwater in the state, and rising temperatures will cause a decline in snowpack by more than a third by 2050 and more than half by 2100 - even if precipitation levels remain stable.

- **Wildfires** - Wildfires are affected by multiple, complex, and interacting factors such as the weather, land use, and human activity that can make future wildfires difficult to predict. A model developed for California's Fourth Climate Change Assessment projected a 77 percent increase in average area burned and a 50 percent increase in the frequency of extreme fires by 2100.¹⁵
- **Ocean Warming, Hypoxia, and Acidification** - The world's oceans absorb excess heat (~90%) and carbon dioxide (~30%) from greenhouse gas emissions, the former contributing to ocean warming and the latter to ocean acidification. Both warming and acidification can be catastrophic to marine habitats (e.g. disease, degradation, bleaching) and the coastal communities and industries that rely on them. Relatedly, deoxygenation of surface waters can lead to dead zones inhospitable to marine life.¹⁷

Wildfires | Did You Know?

The 2020 wildfires resulted in the largest wildfire season recorded in California's modern history that was characterized by nearly 10,000 fires that burned over 4.2 million acres. The 2020 August Complex fire has been described as the first "giga-fire" with over 1 million acres burned, making it California's largest recorded wildfire.

- **Sea Level Rise, Flooding, and Erosion** - Sea level rise is the most well-documented indicator of climate change and is affecting California's coasts at an accelerating rate. Two-thirds of Southern California beaches could be lost to sea level rise by end of century. It is certain that sea levels will rise substantially over the 21st century and beyond, affecting the frequency and extent of coastal flooding and shoreline erosion.¹⁶

Sea Level Rise, Flooding, and Erosion Did You Know?

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- **Pests and Invasive Species** - Increasing winter temperatures affects life cycles of insects and exacerbates challenges addressing invasive crop and forest pests. Climate change is also driving species migration and crop dislocation. In addition, climate change often favors the spread of invasive aquatic and terrestrial species that can be less resilient to climate change, store less carbon, or put stored carbon at risk compared to native species.¹⁸

WHY ARE NATURE-BASED SOLUTIONS IMPORTANT?

Nature-based solutions deliver on many of California's priorities. Numerous examples of effective nature-based solutions are readily available:

- **Natural Vegetation** - Introducing more natural vegetation in cities and communities, like trees and parks increases carbon sequestration and builds resilience to extreme heat and flooding. This suite of nature-based solutions can also create high-road jobs, improve neighborhood quality, drive down building energy costs, reduce vehicle-miles traveled, allow soils to better absorb and retain water, expand access to nature, enhance biodiversity, improve mental and physical health and wellbeing, and increase social cohesion and quality of life for communities.¹⁹

- **Wetlands and Riparian Areas** - Climate smart management of wetlands and riparian areas allow for greater carbon storage, and reduce risks of flooding and soil erosion. These nature-based solutions can also improve water quality; increase the richness and diversity of our soils and coastal habitats; sustain important cold-water habitat for California’s native species; and create outdoor recreation opportunities.²⁰

Riparian Areas

Riparian areas describe lands along rivers, creeks and streams. They can be found on many of our natural and working landscapes.

- **Agricultural Practices** - Climate smart agricultural practices increase soil carbon and function for improved fertility, crop production, and forage growth. They can also increase water storage for flood and drought resilience; contribute to our economy; increase food security; improve water and air quality; support biodiversity; and on grasslands, can reduce the risk of extreme wildfire.²¹
- **Forest Management** - Climate-smart forest management reduces the threat of catastrophic wildfire and supports long-term carbon storage. Nature-based solutions that address climate change in our forests also capture and clean our water supply, improve air quality, provide habitat for wildlife, create high-road jobs, and support local economies through tourism, recreation, and forest products.²²

The reasons Californians value healthy lands are as diverse and important as the outcomes those lands can deliver.²³ This strategy is intended to elevate and accelerate the role of healthy lands in achieving our climate change goals. Its focus, therefore, is on nature-based solutions that

advance carbon neutrality and climate resilience – which they often do simultaneously. While this strategy focuses on land management to advance our climate change efforts, the actions discussed in this strategy advance other priorities, including building a more equitable state and preserving ecosystems and biodiversity.

HOW CAN NATURE-BASED SOLUTIONS ADVANCE EQUITY?

While we all pay a price when our lands are unhealthy – with our health, our economic growth, and our security – some of us are burdened more than others. **Climate vulnerable communities** experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. These disproportionate effects are caused by historical government practices, physical (built and environmental), social, political, and/or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, class, mobility, environmental hazards, pollution exposure, income inequality, neighborhood quality, housing security, and historical exclusion in the decision-making process.²⁴

Climate Vulnerable Communities

Climate vulnerability describes the degree to which natural, built, and human systems are at risk of exposure to climate change impacts.

We are actively working to address a legacy of unjust government practices, racism, discrimination, and systemic injustices placing disproportionate burdens on many Californians, especially California Native American tribes and communities of color.²⁵ These structural injustices influenced land protection, ownership,

access, use, and management of land in California, and resulted in dispossession and attempted destruction of tribal communities and vast inequities for communities of color, including increased concentrations of environmental pollution, limited access to nature, limited community engagement, reduced opportunities to farm and manage land, and loss of sacred lands and species and the ability to steward them.²⁶

We are committed to acknowledging and transcending this legacy, by working with California Native American tribes and climate vulnerable communities to advance equal access and opportunity; advocate for those who have been historically disadvantaged; and consider the resources needed for all to succeed.²⁷ Increasing diversity of those who work with and enjoy our natural assets will bring a rich array of experiences and perspectives, and support an inclusive, well-rounded, and intersectional approach to nature-based climate solutions.²⁸

Climate smart land management can increase equity in California through:

- **Protecting vulnerable communities -** Climate change exacerbates existing inequities, and disproportionately impacts those with the least capacity to prepare for, respond to, and recover from the impacts of climate change.²⁹ Targeted nature-based solutions can reduce climate risks for and build climate resilience of the most vulnerable among us.
- **Addressing California's historical wrongs toward California Native Americans -** California Native American tribes' lifeways, culture, and economies are closely linked with climate sensitive resources. California Native American tribes have been dislocated from their natural resources and lands through past wrongs, and are disproportionately vulnerable to the impacts of climate change.³⁰ We must address these historical wrongs and develop strong partnerships with California Native American tribes to implement Governor Newsom's Native American Ancestral Lands Administration Policy and ensure tribal Traditional Knowledges and expertise can be respectfully and properly employed to address the climate crisis.³¹
- **Preserving and protecting traditional cultural resources and landscapes -** Accelerating nature-based climate solutions is an opportunity to incorporate best available science and Traditional Knowledges into our portfolio of nature-based solutions. This effort will support the protection of traditional cultural resources and landscapes at risk from climate change, and can be achieved through partnership with California Native American tribes and federal and state research institutions.³²
- **Dismantling structural racism -** According to a 2020 study, formerly redlined neighborhoods are on average five degrees hotter in the summer than formally greenlined areas that were previously favored for housing loans. Some cities experience differences of up to 12 degrees between formally red- and greenlined areas." These neighborhoods consistently have far fewer trees and parks that provide shade and clean the air, and have more paved surfaces that absorb and radiate heat.³³ Nature-based solutions that practice equity and address community priorities can contribute to closing this equity gap.³⁴
- **Expanding economic opportunity -** Nature-based solutions can create paths towards wealth building in multiple ways, such as multibenefit/multisector approaches that emphasize local economic development opportunities associated with land stewardship. It is important to ensure new

jobs in the natural and working lands sector are good quality jobs (for example, in terms of pay and benefits, working conditions, and advancement opportunities) and to create access to these jobs through workforce development and career pathway strategies that focus on individuals and communities that have been historically excluded.³⁵

- **Increasing access to nature** - Six of every ten Californians live in park-poor neighborhoods and four of every ten Californians have no access to open space within walking distance of their home.³⁶ Nature-based climate solutions can close these gaps, while also delivering multiple other benefits such as protection from extreme heat and flooding, improved public health, and habitat for biodiversity.³⁷
- **Empowering communities** - Local communities need to be involved in all aspects of climate smart decision-making, from planning to implementation, including workforce development, to ensure equity and sustainability.³⁸ This meaningful engagement will benefit from scheduling and holding meetings at appropriate times and locations that facilitate the ability of members of the public to participate and, where appropriate, providing interpretation in public meetings and translation of accompanying visuals, handouts, and presentations.³⁹ Local communities need information in plain, straightforward language, avoiding technical terms as much as possible.⁴⁰ Additionally, equitable implementation of nature-based solutions will be bolstered through education, incentives, technical assistance, and capacity building.⁴¹

As we accelerate nature-based solutions to address climate change, a core goal for California is to do so in a manner that increases equity and environmental justice. Outcomes must benefit all California tribes, peoples, and communities.

HOW CAN NATURE-BASED SOLUTIONS ADVANCE BIODIVERSITY?

California is considered one of the world's 36 "biodiversity hotspots" because of our high concentration of unique species that are also experiencing unprecedented threats.⁴² We need to move beyond managing endangered species at the brink of extinction to a more holistic approach that keeps our plant and animal communities healthy and resilient to climate change and our world-renowned biodiversity intact. Conserving and restoring nature, which hosts our state's range of diverse ecosystems for all life forms, is central to protecting our biodiversity. Nature-based solutions on both natural and working lands play a critical role in supporting this shift.

Overarching Goals of this Strategy

THIS 2021 NATURAL AND WORKING LANDS CLIMATE SMART STRATEGY IS INTENDED TO ADVANCE SEVERAL GOALS.

1. Align existing state efforts impacting natural and working lands under one cohesive strategy, and identify opportunities to improve our approaches over time.
2. Increase awareness of nature-based climate solutions and their ability to deliver environmental, economic, public health, and equity improvements in California.
3. Guide and accelerate both near-term and long-term climate action on California's lands, prioritizing durable solutions that deliver multiple outcomes.
4. Advance equity and opportunity for all regions and residents of California as we implement nature-based climate solutions, and prioritize climate vulnerable communities.
5. Begin to track and measure our collective efforts to accelerate climate smart land management and meet natural and working lands targets identified in the state's Climate Change Scoping Plan.

In Appreciation

This Strategy is a direct result of the insights, experience, and expertise shared by a diverse and growing coalition of nature-based climate solutions partners. We are deeply grateful to you all; past, present and future.



The North Campus Open Space (NCOS), Santa Barbara County, CA

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SECTION TWO

WORK UNDERWAY



Morrison Creek Clean Up event in Sacramento, CA

SECTION TWO WORK UNDERWAY

EXISTING STATE EFFORTS

The State of California is already advancing a broad range of climate smart land management initiatives, summarized in this section and detailed in Appendix D.

LEGISLATIVE DIRECTIVES

The California legislature has played a key role in advancing climate smart land management by codifying the importance of the state’s natural and working lands in achieving carbon neutrality and building climate resilience. For example:

- **Senate Bill (SB) 1386** - (Wolk, Chapter 545, Statutes of 2016) declared protecting and managing natural and working lands as an important strategy in meeting greenhouse gas reduction goals a policy of California, and required all state entities to consider this policy when carrying out activities related to the protection and management of natural and working lands.
- **Assembly Bill (AB) 1482** - (Gordon, Chapter 603, Statutes of 2015) recognized climate smart land management of our natural and working lands as a critical pillar of our state adaptation efforts.

- **Assembly Bill (AB) 691** - (Muratsuchi, Chapter 592, Statutes of 2013) requires local trustees that manage state lands to assess vulnerability to state lands and assets from sea level rise and describe potential adaptation strategies for their protection and resiliency.

STEWARDSHIP OF STATE-OWNED LANDS

California state government owns and manages approximately 2.9 million acres of land, about 2.6 percent of the state’s land mass. While this is a small portion of overall land, state agencies can lead the way demonstrating effective land management policy. Many state agencies directly implement climate smart land management:

- The Department of Parks and Recreation (State Parks), manages 1.6 million acres of land across 281 parks in every region in the state. As a stewardship agency, State Parks works to restore degraded lands while managing its intact landscapes and extensive coastal holdings to be resilient to climate change impacts. State Parks’

educational mission seeks to inspire and empower the public with knowledge about how to address the state's emerging climate challenges.

- The Department of Fish and Wildlife (CDFW) conserves, manages, enhances, and restores one million acres on 700+ properties, as well as the state's network of 124 Marine Protected Areas (MPA's). Actions taken to promote climate resilience include conserving critical habitat linkages to provide movement corridors and targeting invasive species to protect native biodiversity.
- The Department of Transportation's (Caltrans) Landscape Architecture program applies compost and mulch along transportation infrastructure, preserves existing highway vegetation, and utilizes nature-based solutions to address sea level rise. Additionally, Caltrans' Advance Mitigation Program is set up to address future potential impacts from transportation projects to natural resources.
- The California State Lands Commission manages nearly 4.5 million acres of land, and monitors land legislatively granted in trust to local jurisdictions. All applications for permits and leases for the use or occupation of these lands are evaluated for climate change considerations. Where applicable, provisions relating to climate change resilience, adaptation, and protection are included.
- The Department of Forestry and Fire Protection (CAL FIRE) undertakes research projects and experimental harvest techniques on nine Demonstration State Forests, which cover approximately 72,000 acres. These efforts explore how to balance the effects of management in dynamic forests, and help inform management practices for California's many private forest landowners.

STRATEGIES AND PLANS

- This strategy reflects and reinforces a number of related state strategies and plans calling climate action on our natural and working lands, including within the Water Resilience Portfolio (2020), Wildfire and Forest Resilience Action Plan (2021), Strategic Plan to Protect California's Coast and Ocean 2020-2025 (2020), the 2021 Climate Action Plan for Transportation Infrastructure, the High-Speed Rail Climate Adaptation Plan (2021), State Wildlife Action Plan (2015), Forest Carbon Plan (2018), State Park's Sea Level Rise Adaptation Strategy (2021), CARB's Scoping Plan (2017), the Department of Water Resources' Agricultural and Land Stewardship Framework (2014), the State Coastal Conservancy's Southern California Wetland Recovery Project's Regional Strategy (2018), the Baylands and Climate Change Science Update (2015), and the Lake Tahoe Basin Forest Action Plan (2019).
- Several forthcoming strategies and plans will inform future Natural and Working Lands Climate Smart Strategies, such as the 2022 Scoping Plan to achieve our greenhouse gas reduction and carbon neutrality targets, 2021 State Adaptation Strategy, Tahoe Conservancy's Lake Tahoe Basin Climate Adaptation Action Plan, Delta Stewardship Council's Delta Adapts, San Francisco Bay Conservation and Development Commission's Bay Adapt, CDFW's Biodiversity-Climate Change Response Strategy, and the interagency Sustainable Pest Management Work Group's long-term, system-wide pest management strategies.
- The State Planning Priorities, developed by the Legislature, prioritize infill development and equity, the protection of natural and working lands, and efficient development patterns overall. The Governor's Office of Planning and Research (OPR) encourages

local planning activities that are consistent with the State Planning Priorities by providing guidance, tools, and technical assistance.

- Caltrans' Transportation and Community Planning Program comments on local development proposals affecting the state highway system and recommends mitigation that supports smart growth development patterns, conservation of our natural resources, and protection of the global commons. Specifically, Caltrans supports strategies and recommendations of no build in low lying flood prone/tidal inundation areas, prime farmland, forests, and rangelands.

GRANT FUNDING

California currently operates nearly 160 grant programs that fund on-the-ground climate smart land management technical assistance and projects (details in Attachment D), such as urban forestry and agriculture, community greening, landscape restoration, forest health, healthy soils, and more.

PARTNERSHIPS

Land ownership in California is complex and diverse; trusted partnerships are therefore essential for successful climate action on our natural and working lands. Illustrative examples of successful collaboration include:

- The State of California and the U.S. Forest Service are implementing a Shared Stewardship Agreement signed in 2020 outlining a long-term, coordinated, and science-based forest management strategy. As the U.S. Forest Service owns 57 percent of California's forests, this partnership is central to our climate smart forest management efforts.

- The California Workforce Development Board's High Road Training Partnership Initiative is supporting:
 - An 18-month training program for over 2,000 individuals to become certified tree trimmers in California in partnership with the International Brotherhood of Electrical Workers 1245 and the California Nevada Joint Apprenticeship and Training Committee of the Line Construction Industry. The program will reduce wildfire risk, build community resilience, and increase worker safety, job quality, and wages.
 - The Community Revitalization and Ecosystem Workforce training program to increase capacity of California Native American tribal crews in the Sierra Nevada region to utilize Traditional Knowledges; secure government contracts to perform restoration work on their ancestral lands; and train workers in forest health, ecology, wildfire risk reduction, etc. Among others, partners include the Sierra Institute for Community and Environment and Calaveras Healthy Impact Solutions, and others.
- The Tahoe Central Sierra Initiative is a partnership of state, federal, nonprofit, and private entities to improve the health and resilience of the Sierra Nevada through large landscape forest restoration. To date, partners have secured over \$32 million in grant funds to implement high-priority forest health projects that sequester carbon and reduce the risk of wildfires.
- Redwoods Rising is a partnership among the non-profit organization Save the Redwoods, the National Parks Service, and State Parks to accelerate redwood forest recovery and help protect their remaining old-growth groves. Redwood National and State Parks are home to almost half of the world's remaining

protected ancient old-growth redwood forests. These ancient redwoods store more carbon per acre than any other forests on Earth.

- The Healthy Soils Initiative is a whole of government approach involving 15 state agencies and departments to increase the pace and scale of healthy soils practices throughout California through program and regulatory alignment, leveraging resources, and cultivating public-private partnerships.

California also encourages partnerships through a variety of programs, such as:

- The Department of Conservation's (DOC) Regional Forest and Fire Capacity Program, which increases regional capacity to advance projects that improve forest health, boost fire resilience, and increase carbon sequestration in forests throughout California.
- The Department of Pesticide Regulation's Alliance Grants Program, which brings together collaborative teams to encourage and assist growers, urban pest managers, school staff, and other interested parties to adopt promising and proven reduced-risk alternatives to conventional pest management practices.

SCIENCE, RESEARCH, DATA, ANALYSIS

California conducts analysis and funds a broad range of research to advance climate smart land management:

- California's Climate Change Assessments fund research to help us understand what climate change means for California's future, and empower us to plan accordingly. Many of the research topics focus on natural and working lands. For example, what does increased likelihood of drought mean for food production? What are the implications

of decreased snowpack on water supply? How might we quantify the benefits of healthy natural and working lands?

- CARB's Inventory of Ecosystem Carbon in California's Natural & Working Lands helps California understand trends in our ecosystem carbon stocks. The inventory tracks how much carbon exists in California's ecosystems and where that carbon is located at discrete moments in time. It also estimates how much carbon is moving in and out of the various land types and carbon pools.
- The Department of Water Resources' (DWR) Greenhouse Gas and Subsidence Reversal Research Program measures and monitors greenhouse gas fluxes throughout the Delta – where land subsidence is causing the annual release of approximately 2 million metric tons of carbon (the equivalent of amount of carbon sequestered by 11 million acres of California forests in one year).



- California’s Ocean Protection Council and San Francisco Estuary Institute are partnering to create a coastal wetlands, beaches, and watersheds inventory. This effort will improve the state’s ability to identify and implement successful **blue carbon** projects.

Blue carbon

Blue carbon is the term used to describe carbon captured and held in coastal vegetation, such as seagrasses and wetlands. The U.S. was the first nation to include blue carbon in its national greenhouse gas emissions inventory. According to the National Oceanic and Atmospheric Administration, “this addition means that conservation and restoration partners can provide authoritative numbers on the carbon-storing capacity of their coastal projects—and potentially make a profit, too, through carbon-trading financial markets. Credit for the inventory addition goes to NOAA’s land cover program, which has documented coastal land cover data and change over more than three decades.”

The state also supports external research that advances nature-based climate solutions.

For example:

- CDFA’s Healthy Soils Program Demonstration Projects aims to improve soil health, sequester carbon and reduce atmospheric greenhouse gases by funding on-farm demonstration projects that collect data and/or showcase conservation management practices to promote widespread adoption of climate smart agricultural management throughout the state.
- The Strategic Growth Council’s Climate Change Research Grant Program is supporting research that evaluates the carbon sequestration potential of soil

amendments, and creates data and tools for more effective forest management.

- CAL FIRE’s Forest Health Research Grant Program funds scientific studies that provide critical information and tools to support climate smart forest management.
- The Delta Stewardship Council funds scientific research that furthers our understanding of how climate change will impact vulnerable communities and ecosystems in the Sacramento-San Joaquin Delta; examines how different wetland restoration strategies promote carbon sequestration and affect greenhouse gas fluxes; and identifies strategic opportunities to address sea level rise.

POLICIES AND REGULATIONS

California manages and protects its natural and working lands through several policies and regulations. For example:

- Governor Newsom’s Ancestral Lands Policy calls for increased access and co-management of state lands and the return of state excess lands to tribal nations’ ownership and control.
- California High Speed Rail incorporates a range of nature-based solutions and criteria requirements in construction contracts, such as utilizing vegetation to reduce the impacts of flooding, green storm-and-wastewater infrastructure, fire-resistant landscaping, and constructed wetlands.
- The Sustainable Groundwater Management Act (SGMA) requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. SMGA empowers local management of the basins through

Groundwater Sustainability Agencies and Plans, which are required to address climate change conditions over the long-term in their planning efforts.

- The California Public Utilities Commission requires utilities to file climate vulnerability assessments. These assessments become the basis by which utilities plan infrastructure investments. Additionally, utilities must file Wildfire Mitigation Plans that outline effective actions to reduce utility-related wildfire risk, including approaches for vegetation management.
- The Coastal Commission and the Bay Conservation and Development Commission work to protect and enhance natural resources of and access to our coast and ocean through implementation of California's Coastal Management Program. This includes ensuring coastal resources and public access ways to the coast are safe from hazards such as sea level rise and erosion.
- The State Board of Forestry regulates commercial timber production to protect ecological health of forests.
- The California Natural Resources Agency's Cutting Green Tape Initiative is increasing the pace and scale of ecological restoration and stewardship by improving interagency coordination, partnerships, and agency processes and policies.

OUTREACH, EDUCATION, CAPACITY AND TECHNICAL SUPPORT

California invests in outreach and education, capacity development, and technical support to support landowners and managers implement nature-based climate solutions. For example:

- CARB provides publicly available methodologies and tools for estimating greenhouse gas emission reductions and

co-benefits and determining benefits to disadvantaged and low-income communities.

- The Department of Resources Recycling and Recovery manages the Community Composting for Green Spaces Grant Program, which supports small-scale composting programs, environmental education, and compost-related job training in communities across California.
- DOC provides capacity and planning grants to resource conservation districts, land trusts, local land use agencies, and others to support regional conservation partner development and strategic planning.
- DWR supports local, regional, state, and Federal agencies in making informed groundwater management decisions based on current and projected climate impacts by providing statewide datasets and tools.
- The San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides program prepares climate vulnerability assessments and adaptation tools to increase resilience in the San Francisco Bay Area.

LEVERAGING FUNDING AND FINANCE

Several state programs leverage funding and finance to support climate smart land management, such as:

- The California Infrastructure and Economic Development Bank's (IBank) Climate Catalyst Fund, which was created to provide low-interest loans for projects that deliver on priority actions to meet the state's climate goals, and where technologies and infrastructure exist that should be deployed at much greater speed and scale, yet face barriers in the private market.

- CAL FIRE's California Forest Improvement Program, which encourages private and public investment in California forest lands and resources, including management planning, tree purchase and planting, timber stand improvement, habitat improvement, and land conservation practices.
- The California Tahoe Conservancy's Livable Communities Program, which helps reduce greenhouse gas emissions by supporting equitable smart growth. The Program transfers development rights from environmentally sensitive lands to town centers to increase climate resilience for natural communities interspersed within urban areas.
- CDFW's Regional Conservation Investment Strategy Program, which uses a science-based approach to identify habitat conservation and enhancement opportunities that can contribute to species adaptation to climate change and resiliency. These strategies can be used as a basis to provide advanced mitigation through the development of credits or to inform other conservation investments.

MARKET MECHANISMS

California aims to make climate smart land management cost-effective through the implementation of market mechanisms.

- One of the state's largest market mechanisms is its Cap-and-Trade program, managed by CARB. The Cap-and-Trade program establishes a declining limit on greenhouse gas emissions and creates a powerful economic incentive for investment in efforts that support greenhouse gas reductions and carbon neutrality. To meet its compliance obligations under the program, a regulated entity may use offsets from one of the six approved compliance offset protocols.

Two of these protocols include forestry and urban forestry nature-based solutions.

- The Voluntary Carbon Market allows regulated and non-regulated sources of greenhouse gas emissions to offset their emissions through purchase of credits derived from projects that support carbon neutrality. A team lead by the Sacramento-San Joaquin Delta Conservancy has received approval by the American Carbon Registry on a voluntary market protocol that allows landowners to convert their land to managed wetlands or rice fields to stop subsidence and related carbon emissions. The team continues to work with landowners to convert lands.
- OPR is co-chairing a Climate-Related Risk Disclosure Advisory Group with Stanford University's Sustainable Finance Initiative. The group is charged with providing recommendations to the state on climate risk disclosure standards, which support informed decision-making and more targeted climate investments, including nature-based solutions.

EQUITY

California is also working to intentionally integrate equity into our climate smart land management efforts. Examples include:

- CAL FIRE, the California Department of Corrections, California Conservation Corps, and the Anti-Recidivism Coalition are supporting a joint collaborative to train former inmates to become wildland fire fighters and provide targeted re-entry support at the Ventura Training Center.
- The State Lands Commission, Coastal Commission, and BCDC have all worked to integrate environmental justice into their regulatory programs to ensure

equitable climate adaptation and resilience measures, as well as meaningful community involvement in their permitting and leasing processes.

- DOC's Sustainable Agriculture Land Conservation Program team is conducting racial equity outreach to increase participation from socially disadvantaged farmers and ranchers and increase benefits to surrounding disadvantaged communities.

sensors and/or monitoring programs to inform how climate variables affect biodiversity management targets over time.

TRACKING ACTION AND MEASURING OUTCOMES

Several of California's climate smart land management initiatives monitor, track, and evaluate their impacts. Examples include:

- CNRA is designing a Project Tracking and Reporting System to track and assess the performance of the agency's projects that, for example, restore land health, conserve lands, protect critical habitat, sequester greenhouse gases, and build resilience to climate impacts.
- CNRA's forthcoming Statewide Timberland Ecosystem Monitoring and Assessment Program will use science and data to track the health of California's forests to understand how management and harvest practices impact forest and watershed health.
- DOC's Farmland Mapping and Monitoring Program produces maps and statistical data used for analyzing impacts on California's agricultural resources to inform decision-making. Agricultural land is rated according to soil quality and irrigation status; with best quality land deemed Prime Farmland.
- Through its Climate-Biodiversity Sensor Network, CDFW is installing climate sensors on selected CDFW lands alongside ecological

03

SECTION THREE

PRIORITY ACTIONS AND APPROACHES



Arial View, Sacramento County, CA

SECTION THREE

PRIORITY ACTIONS AND APPROACHES

CLIMATE ACTION POTENTIAL AND PRIORITY APPROACHES

This section describes how natural and working lands can support California’s climate change goals, and identifies priority nature-based climate solutions. Successful climate smart land management will reflect local and regional circumstances and contribute to our collective effort to utilize land management to combat climate change and advance other state priorities. Climate action on all of California’s natural and working lands will be guided by a set of principles:

- Prioritizing and practicing equity.
- Advance collaborative, landscape-level approaches that engage communities, support economic prosperity, and deliver multi-benefit, multi-sector outcomes.
- Empower all Californians (and youth in particular) through technical assistance, education, outreach, increased access to nature, and training pathways into high road jobs.
- Align, leverage, and scale resources.
- Partner with California Native American tribes to increase co-management; restore

and enhance natural cultural resources, traditional foods, and cultural landscapes; and support tribes’ implementing Traditional Knowledges.

- Protect landscapes that are likely to persist under future climate conditions and have high carbon storage capacity.
- Conserve established and potential climate change **refugia**, and considering migration, range shifts, and connectivity to support biodiversity.

Refugia

Refugia are places where plants and animals can thrive in a changing climate.

The actions called for in this strategy contribute to California’s climate goals, and support other important environmental, cultural, economic, and equity goals. Opportunities to enhance our land management for climate benefits are discussed below across California’s eight natural and working landscape types.



Redwood Forest, Northern CA

FORESTS

CLIMATE ACTION POTENTIAL

Forests cover 27% of California (28.7 million acres).⁴³ Including trees, soils, other plant materials, forests currently store the largest proportion of carbon on California's lands.

Over the past century, forests have largely served as a carbon sink that removed carbon from our atmosphere. Prior to the policy of excluding wildfire from our landscapes, which began just over a century ago, fire played an important role in supporting healthy forests.⁴⁴ Many California Native American tribes recognized this interdependence between fire and the environment and used prescribed burning to maintain and restore environmental health.⁴⁵ Whether through natural ignition or cultural burning, fire in our forests encouraged fire-resilient species to thrive, reduced the risk of catastrophic fires by decreasing the amount of vegetation that could catch and spread fire, supported diverse ecosystems, and shaped forests that were predominantly open with very large and resilient trees.⁴⁶

The combination of a century of fire exclusion practices that have generated far greater fuel loads, historic timber harvesting methods that removed many of the largest, most fire-resilient trees, and climate change impacts have culminated in far more large, catastrophic wildfires.⁴⁷ Our forests are, or are becoming, a carbon source - emitting more carbon than they remove from the atmosphere.⁴⁸ Without climate smart forest management, we cannot count on them being carbon sinks in the future.

Large portions of our forests now consist of smaller, tightly spaced trees that are vulnerable to drought, disease, and pests.⁴⁹ These smaller trees are also much more vulnerable to high-severity wildfire – a risk that is further compounded by the approximately 163 million trees that have died since 2010, a mortality strongly correlated to the effects of the 2012-2016 drought.⁵⁰ Between 2000-2019, wildfires added an average of 14 million metric tons of CO₂ emissions into the atmosphere per

year.⁵¹ The associated carbon losses (greenhouse gas emissions released into the atmosphere) of these wildfires contribute to the very problem healthy forests naturally help solve.

Climate smart management can help return forests to a stable carbon sink, limit the release of significant emissions due to catastrophic wildfire activity and drought, and build forest resilience to better withstand the impacts of climate change.⁵² In the near term, climate smart land management calls for building forest health and reducing excess fuels that contribute to high-severity wildfire.⁵³

While these actions may result in short-term emissions, they will deliver healthy and resilient forests in the long-term⁵⁴ that contribute to carbon neutrality through:

- **Limiting Future Carbon Losses** - Large wildfires, drought, unsustainable harvesting practices, land use change, conversion, etc. results in significant carbon loss from losing trees and plants and soil degradation. Without additional climate smart management, there will be an increase in greenhouse gas emissions, a decrease in carbon sequestration, and a decrease in carbon stocks on the landscape.⁵⁵ Healthy forests experience lower severity wildfires, and fewer drought impacts. They can store carbon in larger, more resilient trees,⁵⁶ and demonstrate greater flexibility for future adaptive management.
- **Sequestering Carbon** - Currently forests in California sequester over 8 million metric tons of carbon a year.⁵⁷ This is the equivalent of the amount of methane emitted by California landfills in a year. Healthy forests continue to sequester carbon under a broader range of stressful conditions, with some continuing to sequester significant amounts even during the recent drought.⁵⁸ As drought is expected to become more

common under climate change, this additional capacity will become increasingly important.

- **Storing Carbon** - Healthy forests can serve as reliable carbon sinks, both because they are able to store significant amounts of carbon and because they are at a lower risk of carbon loss due to climate impacts such as wildfire and drought. After large, high-severity fires, some of California's forests may convert to shrublands and grasslands⁵⁹ that are not capable of supporting the same level of carbon storage as forests.

Climate smart forest management will advance climate resilience by:

- **Supporting resilient communities and natural systems** - Forests provide much of the state's water supply and protect essential biodiversity.⁶⁰ Climate smart forest management can strategically protect vulnerable communities and California Native American tribal resources; cool habitat⁶¹ and migration corridors that salmon, steelhead, and other native species need to survive increasing temperatures; and increase the resilience of forests to withstand future impacts from climate change.⁶²
- **Supporting resilient economies** - Many forests contribute to California's economy through tourism and recreation. Expanding sustainable commercial activities using forest materials, California mill capacity, and markets for non-merchantable timber will improve forested economies and drive long-term climate smart forest management.⁶³

PRIORITY NATURE-BASED SOLUTIONS

FORESTS

A

Advance proactive vegetation management, ecological thinning, managed and science-based grazing, prescribed and cultural burns, and managed natural wildfire to reduce the risk of catastrophic wildfire.

B

Increase active reforestation efforts in areas recovering from severe wildfires and suffering from reduced natural regeneration as a result. Timely post-wildfire reforestation efforts can also prevent conversion of forest to shrublands⁶⁴ and reduced water storage capacity in watersheds.

C

Restore riparian forest ecosystems.

D

Expand capacity of public and private nurseries and native seed banks to increase amount and variety of seedlings available to be used in reforestation and post-fire recovery, and to prepare for changing climate conditions.

E

Increase commercial thinning to achieve disturbance-resilient forest structure on federal and privately owned forested parcels.

F

Utilize conservation easements, particularly working forest conservation easements, to deliver durable climate benefits and protect our water supply.

G

Reconnect aquatic habitat within forests to help fish and wildlife endure drought and adapt to climate change.

H

Increase cultural easements for cultural burns and to ensure California Native American tribes have access to natural cultural resources and cultural landscapes.

Restore Riparian Forest Ecosystems

Did You Know?

Beavers contribute to climate action on our natural and working lands! The dams they build support ecosystem health in many ways, and deliver a number of climate benefits.

A few examples



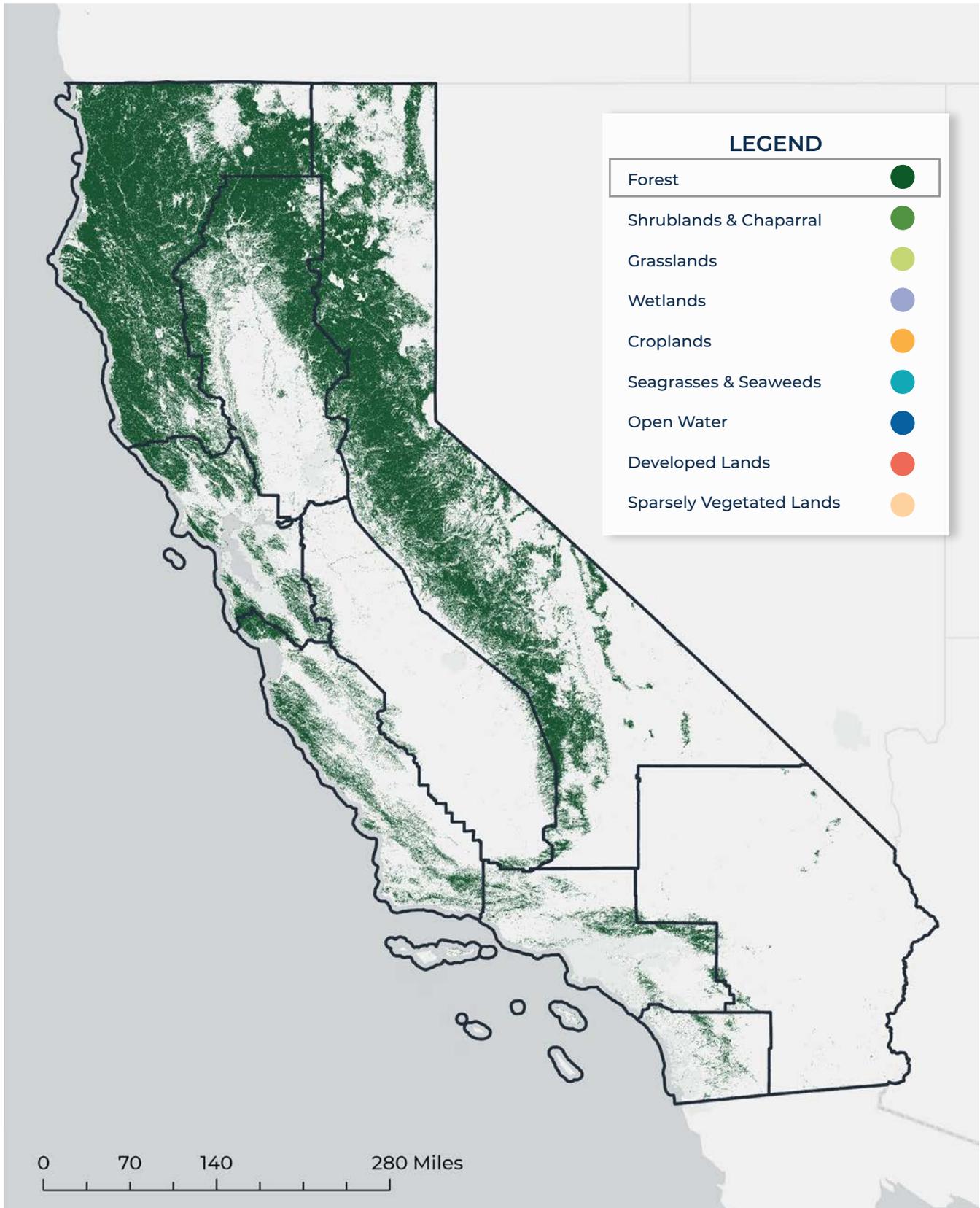
They store and slow down water, which can reduce flood risk, replenish groundwater, and build drought resilience.

They keep water cool, supporting native fish and wildlife's ability to survive increasing temperatures.

They expand wetlands, which can act as fire breaks and reduce erosion.

STATEWIDE LAND COVER MAP

FORESTS





Pinnacles National Park, CA

SHRUBLANDS AND CHAPARRAL

CLIMATE ACTION POTENTIAL

Shrublands and chaparral cover 31% of California (32.9 million acres).⁶⁵ These landscapes include manzanita, chamise, toyon, ceanothus, and many other shrubs, but lack tree cover. They are present from the far north of the state to the south, and from the Pacific Ocean to the borders of Nevada and Arizona. Shrub and chaparral lands are largely open space and habitat, with some areas having significant residential development intermixed. As a result of their broad distribution, shrublands are owned and managed by every type of owner: governmental, non-governmental organization, or private. Like

forests, shrublands and chaparral are dominated by woody plants.

Shrublands are differentiated from forests by their unique structure, ecologies, carbon dynamics, fire regimes, and working land uses. Despite having roughly comparable land area to forests, shrublands and chaparral store substantially less carbon, and the dynamics of their growth and disturbance are less well known.⁶⁶ Evidence indicates that shrublands in California are burning more frequently than they would have historically,⁶⁷ leading to degraded

conditions, possible conversion to grasslands, and reduced carbon storage in above ground biomass.⁶⁸

Given the fire prone nature of this landcover and the driver of human-caused ignitions, managing shrublands and chaparral to provide stable storage and sequestration of carbon is challenging, situational, and does not have a broad consensus on a best approach. Techniques adopted from the management of forests, such as thinning or fuel breaks may only reduce fire risks and may not prove effective in modifying fire behavior. However, when utilized in conjunction with fire suppression forces, strategically-placed fuel breaks provide an opportunity to defend threatened communities and protect natural resources.

Enabling shrub and chaparral landscapes as a contributor to achieving carbon neutrality will require:

- **Limiting Future Carbon Loss** - Avoid the long-term loss of biomass and soil carbon to high frequency or high severity fires, land degradation, land type conversion to grasslands, or conversion to developed landscapes.
- **Sequestering Carbon** - Manage these landscapes using approaches informed by science with sequestration targets appropriate to these land cover types. Actively restore areas burned at a high severity to prevent conversion to grasslands.
- **Storing Carbon** - In the absence of disturbance, shrub and chaparral lands can store carbon at the decade to century timescale. Reduce ignition sources and use fuel breaks in higher risk areas to reduce the potential for fire entering these systems. Fires at a higher frequency lead to loss of carbon through conversion to grasslands, slower recovery, and degraded conditions. Additional study is needed to determine

appropriate management actions and to set carbon storage targets.

Climate smart management of California's shrublands and chaparral will also advance climate resilience by:

- **Supporting resilient communities and natural systems** - Improving our management of shrubland and chaparral landscapes can reduce the risk of wildfire, protect water supplies, stabilize eroding slopes, and provide habitat for biodiversity. Shrublands and chaparral also provide recreational opportunities and have cultural significance to many Californians.
- **Supporting resilient economies** - A lowered risk of catastrophic fires leads to reduced disruption and risk to the economy. It also protects the communities from post-fire flooding and debris flows.

PRIORITY NATURE-BASED SOLUTIONS

SHRUBLANDS AND CHAPARRAL

A Promote infill development to avoid conversion to developed lands to reduce the permanent loss of carbon on the landscape.

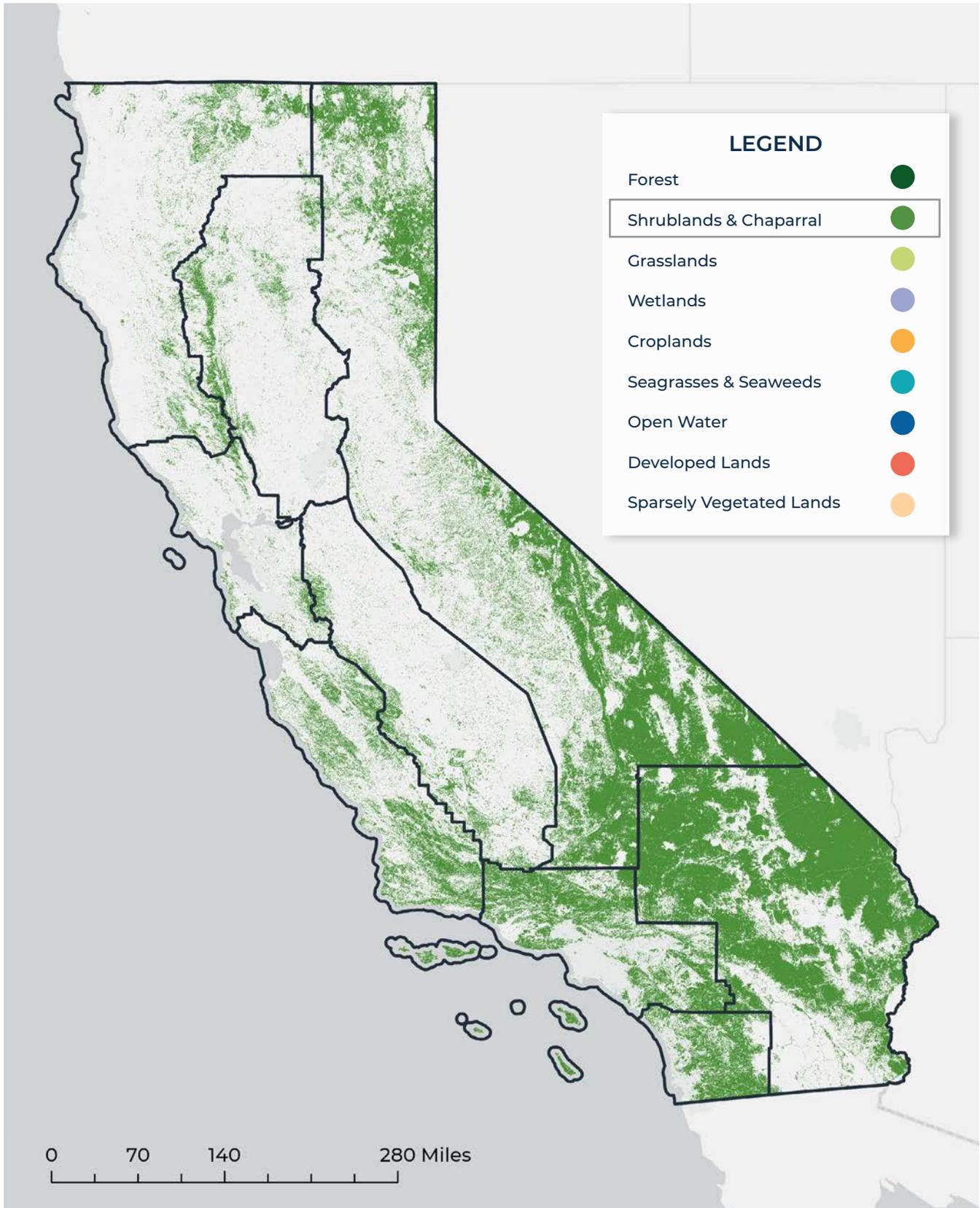
B Build healthy soils, and avoid conversion to grassland which stores less carbon.

C Develop buffer zones; provide management and treatment to high priority areas and sources of ignition such as residential areas and transportation infrastructure to reduce the chances of high frequency fires.

D Apply prescribed and cultural burning practices.

STATEWIDE LAND COVER MAP

SHRUBLANDS AND CHAPARRAL





Vineyards, Central Valley, CA

CROPLANDS

CLIMATE ACTION POTENTIAL

California's croplands cover nine percent of California (9.5 million acres)⁶⁹ and make the state a global leader in agriculture. These croplands include a mix of annual (planted each year) and perennial (producing for multiple years) crops that provide over a third of all vegetables and two-thirds of the fruits and nuts in the United States. These 400+ commodities represent an essential economic engine for key portions of the state including the San Joaquin Valley, Sacramento Valley, coastal and inland valleys, and other regions across the state.⁷⁰

Perennial crops, particularly orchards, can store biomass carbon with densities that approach that of some forests. Annual crops, however, generate negligible biomass carbon storage from year to year and instead soils represent the primary carbon reservoir. Soils on these croplands currently have low to moderate carbon content and represent an opportunity to store additional carbon with modified practices.⁷¹

Croplands' carbon stocks are relatively stable relative to risks from fire because they are heavily managed and generally irrigated landscapes.

Water availability, changes in agricultural practices, fallowing or crop replacement, and conversion to urban development are significant risks to the carbon stocks in California's croplands.

Agriculture is an economic sector centered around providing food security. California's croplands are managed to produce food and fiber for both financial gain and societal benefits. While being stewards of the land, farmers in California are also concerned about increased costs of production. Adding to the complexity of land management, a significant portion of the state's croplands are owned by non-operating landowners. Roughly 41% of all California farms are rented or leased including 3.7 million acres of irrigated cropland and 2.1 million acres of irrigated rangeland.

The intersection of management for carbon sequestration and food crop production is an area of active research and practical application. There remain knowledge gaps around how long carbon is stored through carbon farming practices, such as applying organic soil amendments. The opportunities to increase carbon storage through climate smart land management actions are substantial, though generally dependent on continuing those practices or other conservation practices within decadal-to-secular time horizons.

Climate smart cropland management can contribute to carbon neutrality through:

- **Limiting Future Carbon Losses** - Avoiding conversion of croplands to developed lands prevents both a loss of existing carbon and the curtailment of carbon sequestration on those lands.
- **Sequestering Carbon** - Through carbon farming techniques such as organic soil amendments, nutrient management, conservation tillage, and other management

practices, farmers in California can increase carbon storage in the state's croplands.⁷²

- **Storing Carbon** - Croplands represent an opportunity to store additional carbon in a managed landscape while reducing risk from fire.

Climate smart cropland management can also contribute to climate resilience through:

- **Supporting resilient communities and natural systems** - Agricultural lands provide food security to California, and can support climate resilience through provision of habitat, flood management, pollination services, buffering against fires, and groundwater recharge.⁷³ These outcomes benefit all Californians, and are particularly important for rural, climate-vulnerable communities.
- **Supporting resilient economies** - Agriculture is a critical sector of California's economy. Climate smart cropland management promotes a resilient agricultural economy, can buffer communities from extreme heat, and provide local food sources for the future.

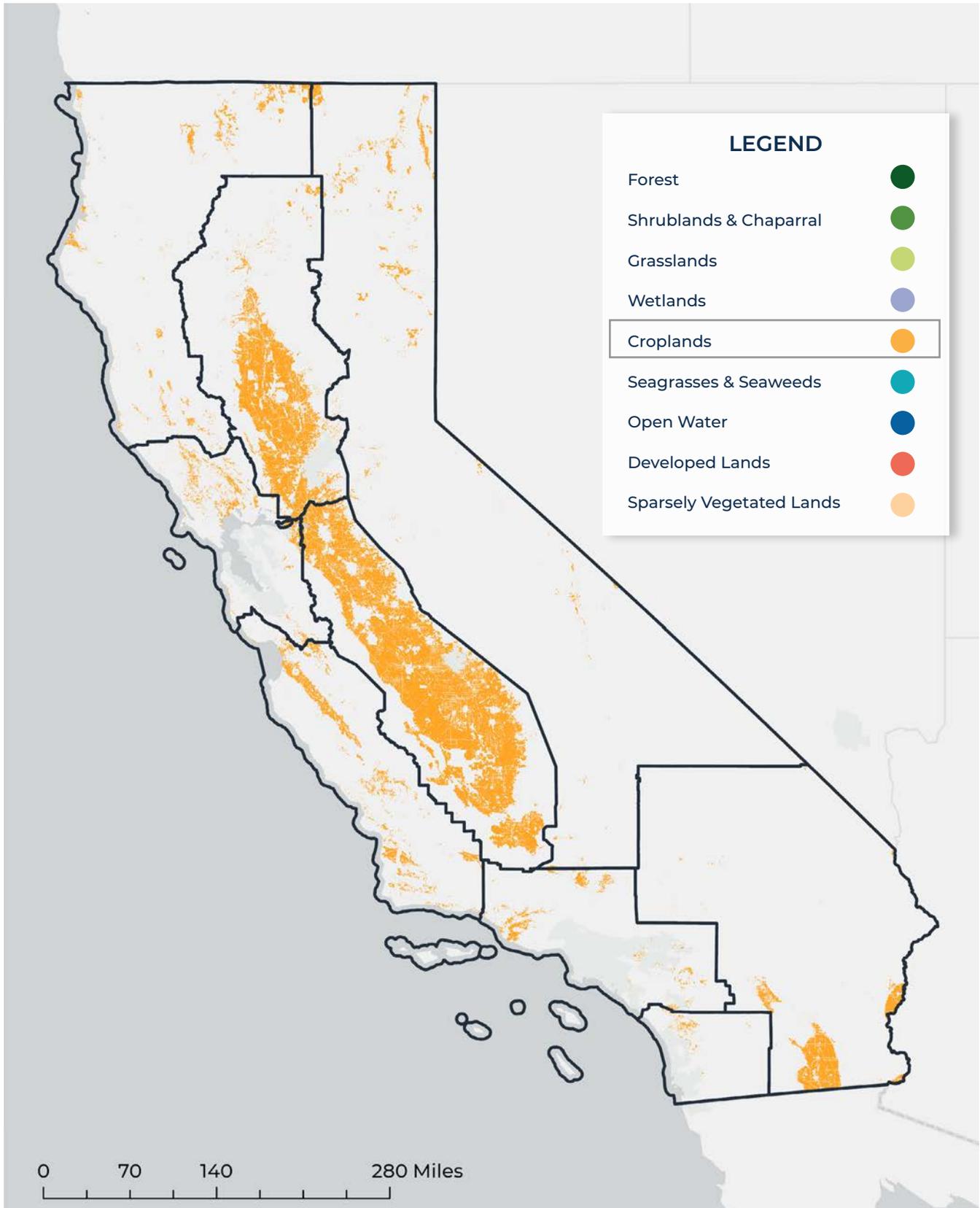
PRIORITY NATURE-BASED SOLUTIONS

CROPLANDS

- A** Scale up soil health practices for carbon storage, climate resiliency, soil water retention, improved water and air quality, integrated pest management, biodiversity and more. Practices include, but aren't limited to cover cropping; production and application of organic amendments, such as compost; hedgerows; grass filter strips; minimum or no-till; and incorporation of livestock for managed and science-based grazing.
- B** Develop more comprehensive vulnerability assessments for agricultural lands that integrate biophysical and environmental stressors, heat, and socioeconomic factors.
- C** Promote comprehensive farm management plans, such as whole-farm conservation plans, carbon farm plans and organic system plans.
- D** Protect agricultural lands from development through conservation easements.
- E** Increase water and nutrient use efficiency; plant water-wise crops to decrease reliance on large amounts of water, install climate smart irrigation systems; etc.
- F** Increase managed groundwater recharge on working croplands that capture rain and storm runoff as well as redirection of water during periods of extended high flows to allow water to sink into aquifers, in a manner that does not exacerbate water quality issues and ensures diversions are protective of native fish and wildlife.
- G** Repurpose cropland retired or fallowed due to lack of water supply for environmental, cultural and societal benefits, such as sequestering carbon, capturing floodwater, recharging aquifers, reducing dust, and providing habitat.
- H** Enhance circular economies for organic waste utilization, including manure and biomass through compost utilization, manure markets, whole orchard recycling and mulch utilization.
- I** Maximize participation of socially disadvantaged farmers in existing programs through prioritization and focused outreach.
- J** Expand outreach and utilization by tribes of CDFA Climate Smart Agriculture Incentive Programs and other grant programs to facilitate planting, harvesting, and sustaining culturally and historically significant food crops.
- K** Reactivate flood plains on working croplands, including rice fields to improve flood resiliency and aquifer recharge as well as enhance biodiversity.
- L** Advance safer, more sustainable pest management practices and tools to support the accelerated transition away from harmful pesticides.

STATEWIDE LAND COVER MAP

CROPLANDS





WETLANDS

CLIMATE ACTION POTENTIAL

Wetlands cover 2 percent of California (1.7 million acres).⁷⁴ They are defined as land that is covered or saturated by fresh, brackish, or salt water for all or portions of a year. These include both inland and coastal wetlands, such as vernal pools, peatlands, mountain meadows, salt marshes, and mudflats.

Wetlands are highly productive and biologically diverse ecosystems that have experienced significant habitat degradation and loss in the last century.⁷⁵ The history of wetlands is one of reclamation, diking, draining, and dredging for the primary purpose of supporting the present needs of surrounding communities. It is estimated that less than 10 percent of California's historical wetlands

remain.⁷⁶ Such land-use changes have complicated management around wetland habitats as the interests of various stakeholders are often in conflict.

There has been increasing recognition of wetlands as a significant carbon sink,⁷⁷ with their storage capacity varying across wetland types, location, and environmental conditions. Coastal wetlands are sometimes referred to as “blue carbon” ecosystems; momentum has been building over the last decade to gather site-specific data on carbon storage and sequestration rates. Many threats to wetlands are also the ultimate causes of climate change; for example, coastal erosion can release carbon dioxide.⁷⁸

Climate smart wetland management can contribute to carbon neutrality through:

- **Limiting future carbon losses** - Preventing the filling or draining of wetlands is key to limiting carbon losses. Delta peat lands represent a well-studied opportunity to re-saturate former wetlands to stop substantial carbon emissions directly to the atmosphere from the drained peat.⁷⁹ Additionally, coastal wetlands are threatened by sea level rise and if these wetlands are not given space to migrate upland, we may lose them and the benefits they provide.⁸⁰
- **Sequestering Carbon** - Wetlands are capable of sequestering relatively large amounts of carbon.⁸¹
- **Storing Carbon** - Wetlands are also considered highly effective at storing carbon for long periods of time. This is because, as the name suggests, wetland soil remains wet - thus the breakdown of organic material is relatively slow. Certain wetlands (e.g., tidal marshes, mudflats) respond to rising seas by trapping more sediment which stores more carbon. Carbon storage potential varies greatly across wetland types and within and across sites.

Climate smart management of wetlands can also provide many climate resilience benefits to Californians, including:

- **Supporting resilient communities and natural systems** - Healthy wetlands can improve water quality and supply, easing the effects of drought; provide shoreline stability and erosion control, reducing flood risk; provide ecological refugia for shorebirds and other species during warming temperatures; and provide habitat for commercially important species from juvenile Dungeness crab to halibut.⁸² Mountain meadow wetlands improve groundwater storage, reduce and

delay peak flows, improve water quality, and support native species habitat.⁸³

- **Supporting resilient economies** - In some places, wetlands are our coasts' first line of defense, protecting communities, ecosystems, and built infrastructure from the impacts of sea level rise, flooding, and storms. Many commercial and recreational fisheries are dependent on healthy wetlands as important nursery habitat⁸⁴ (for example, the Bay Delta supports Steelhead and Chinook Salmon). Healthy wetlands can also support resilient economies through a voluntary carbon market incentive to restore wetlands in California.

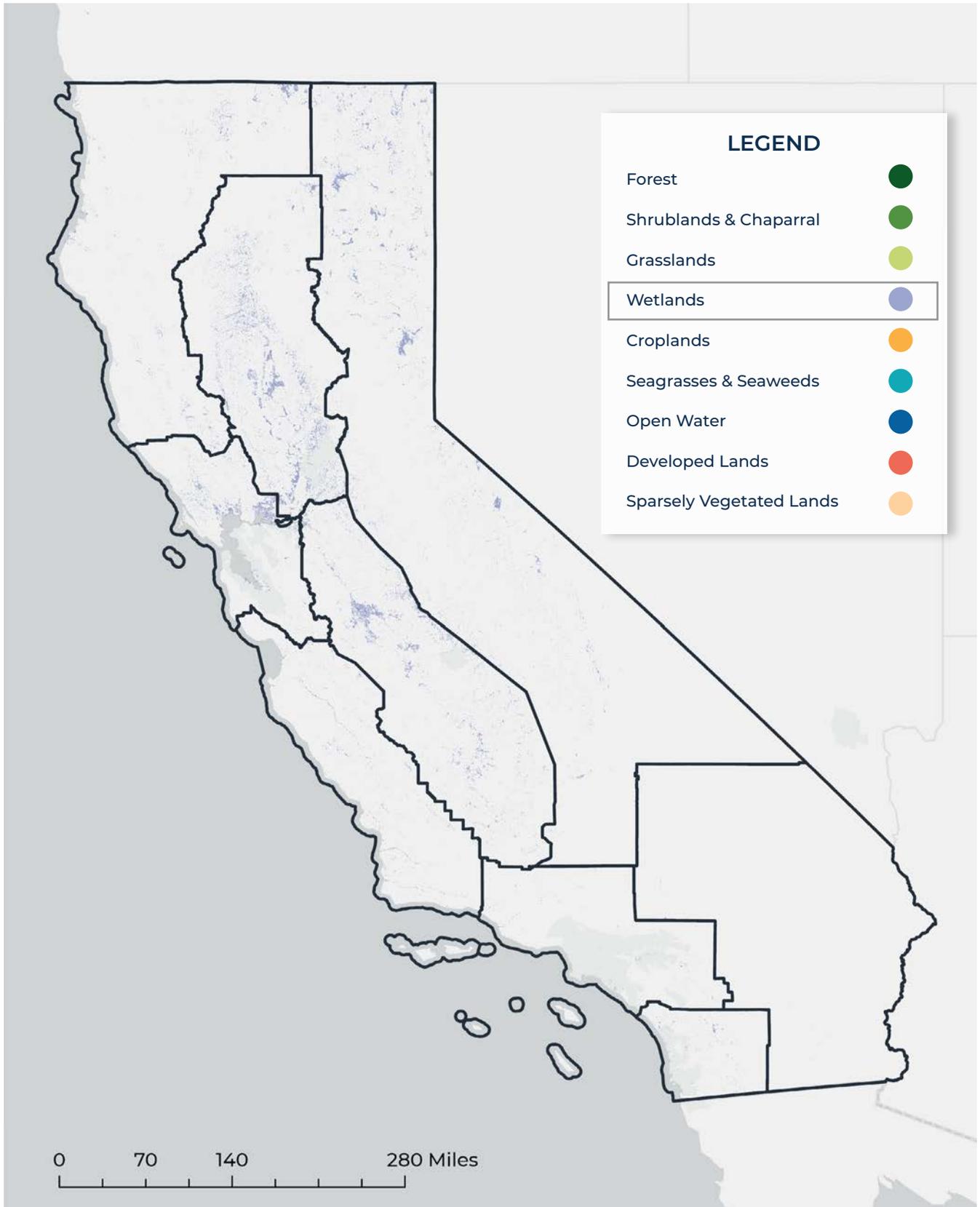
PRIORITY NATURE-BASED SOLUTIONS

WETLANDS

- A** Restore and enhance coastal wetlands and salt marshes to maintain and protect these habitats from future sea level rise.
- B** Protect against habitat loss and fragmentation, particularly near urban boundaries and in coastal habitats, to help maintain carbon sequestration, protect biodiversity and culturally-significant species, limit exposure to climate risks, and increase climate resilience.
- C** Identify and prioritize wetland restoration near climate vulnerable communities where climate smart land management can improve groundwater quality and provide public recreational green space.
- D** Restore Delta tidal wetlands to improve ecological function and flood protection.
- E** Encourage conversion of Delta tidal wetlands to rice cultivation and managed wetlands in the deeply subsided area of the Delta to stop subsidence and resulting carbon emissions.
- F** Conserve inland areas to allow for upland migration of coastal wetlands to outpace sea level rise.
- G** Restore rivers and floodplains, and facilitate their natural function.
- H** Partner with California Native American tribes to preserve, restore, enhance, and create wetlands on tribally owned and trust lands.
- I** Treat water through nature-based solutions such as constructed wetlands and treatment channels, which can often store recycled and/or treated potable water, provide habitat for wildlife, and increase access to nature, educational opportunities, and recreation.
- J** Identify opportunities to reconstruct wetlands and saltmarshes where possible, for example during construction projects in areas where these nature-based solutions could deliver climate and other beneficial outcomes to communities.
- K** Construct living shorelines, which are protected, stabilized shorelines constructed with natural materials that can sequester carbon and maintain carbon stores of the wetlands they protect, build resilience to sea level rise, improve water quality, and provide habitat.

STATEWIDE LAND COVER MAP

WETLANDS





Pacific Ocean, CA

SEAGRASSES AND SEaweEDS

CLIMATE ACTION POTENTIAL

Seagrasses and seaweeds account for 0.1% of California's land cover (15,000 and 55,000 acres respectively).⁸⁵ Seagrasses (e.g. eelgrass, surfgrass) and seaweeds (e.g. kelp, fucoids) are found in shallow coastal areas. Despite similar and often overlapping ranges, seagrasses and seaweeds are different vegetation types. Seagrasses are marine flowering plants, and seaweeds are algae.

Seagrasses and seaweeds need sunlight to grow and sequester carbon.⁸⁶ Seagrasses are most often found in muddy environments such as estuaries and wetlands, restricting

them to shallow waters. In some regions, seagrass occurs intertidally, but risk of drying out can prevent expansion. In contrast, seaweeds typically occur on the open coast where water clarity is much better.

In recent years, California has seen dramatic declines of both seagrass and kelp.⁸⁷ The leading causes of seagrass loss are nutrient pollution, poor water clarity, disease, and disturbance. The main causes of kelp loss are related to multiple climate-related stressors including a marine heat wave and mass die-off of seastars in 2014, and subsequent overgrazing of the kelp by sea urchins.⁸⁸

These losses have impacted fisheries and critical ecosystem services, including the degradation of natural storm protection and buffering against acidifying ocean conditions.⁸⁹ These declines have impacted local economies by reducing tourism, and contributing to the collapse of major recreational and commercial fisheries. These losses have also impacted tribes' ability to gather traditional foods. Restoration efforts are on the rise, providing the added potential benefit of increasing short- and long-term carbon stores, bolstering shoreline protection, and building broader climate resilience within the coastal zone.

Climate smart management of seagrass and seaweeds can support California's efforts to achieve carbon neutrality through:

- **Limiting Future Carbon Losses** - Preventing the loss of or disturbance to seagrass and seaweed habitats will limit future carbon losses.
- **Sequestering Carbon** - Despite the relatively small footprint, seagrasses and seaweeds are recognized as potentially significant carbon sinks, earning the moniker shared by salt marsh and mangrove systems of being "blue carbon" habitats.⁹⁰
- **Storing Carbon** - The majority of the carbon stored in seagrass habitats is not from seagrass itself (e.g. standing biomass), rather it is from material that is carried into and trapped by seagrass.⁹¹ Conversely, nearly all the carbon stored by seaweeds is locked up in its biomass. The carbon storage potential in seagrass is large, yet variable. In kelp forests, carbon storage potential remains a substantial data gap; their high growth rates (up to 18 inches per day) may allow them to serve as substantial short-term stores.⁹²

There are many climate resilience benefits to climate smart seagrass and seaweed management, including:

- **Supporting resilient communities and natural systems** - Seagrasses and seaweeds can improve water quality;⁹³ act as storm buffers to developed coastlines; and protect sensitive species such as oysters and mussels.⁹⁴
- **Supporting resilient economies** - Seagrasses and seaweeds serve as important habitat for many culturally and commercially important species of fishes and invertebrates, facilitate the recovery of local fisheries,⁹⁵ and present opportunities for aquaculture. They also provide educational and tourism opportunities through SCUBA, snorkeling, kayaking, and more. Additionally, kelp provides highly valued services related to food and nutritional supply, fertilizer, and biofuel production.⁹⁶

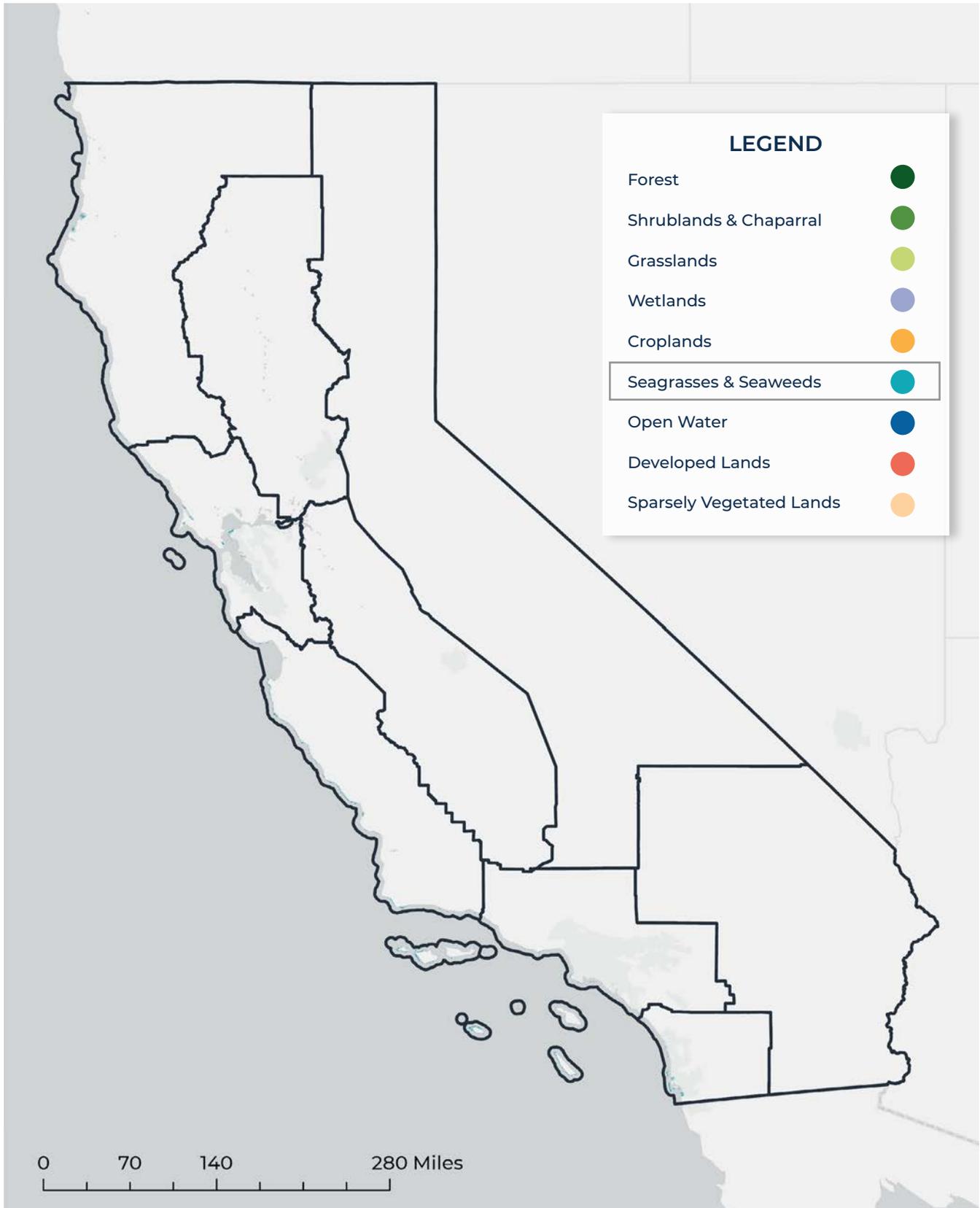
PRIORITY NATURE-BASED SOLUTIONS

SEAGRASSES AND SEAWEEDS

- A** Restore seagrass ecosystems to maintain and protect these habitats from future sea level rise, nutrient pollution, poor water clarity, disease, and disturbance.
- B** Develop and implement proactive, climate-smart strategies for the protection and restoration of California's kelp forests in the face of changing ocean conditions.
- C** Continue science-based adaptive management of California's statewide network of marine protected areas to protect biodiversity in a changing climate, and further explore the role of these areas in providing resilience to climate impacts.
- E** Construct living shorelines, which are protected, stabilized shorelines constructed with natural materials, such as native seagrasses. Living shorelines can support carbon sequestration and storage, build resilience to sea level rise, improve water quality, and provide habitat.
- G** Increase aquaculture that supports California Native American tribes' subsistence, cultural, and commercial practices; a sustainable blue economy; and ecosystem health.
- H** Identify opportunities to reduce the loss of seagrasses and seaweeds vulnerable to sea level rise.

STATEWIDE LAND COVER MAP

SEAGRASSES AND SEAWEEDS





DEVELOPED LANDS

CLIMATE ACTION POTENTIAL

Developed lands cover six percent of California (6.8 million acres).⁹⁷ These lands include a broad-range of urban and rural settings, from city centers to transportation and water infrastructure. Urban forests, landscaping, community greenspaces and parks, vegetation along infrastructure, gardens, and the soils are all part of the developed lands.

California Public Resources Code defines urban forests as “those native or introduced trees and related vegetation in the urban and near-urban areas, including, but not limited to, urban watersheds, soils and related habitats, street trees, park trees, residential trees, natural

riparian habitats, and trees on other private and public properties.”⁹⁸ Urban forests are our opportunity to apply climate smart land management in the places most Californians call home. The character of urban forests is diverse, which heavily influences the localized selection of management options and outcomes related to both carbon storage and co-benefits.

Carbon stocks within urban forests and all urban greenspaces, vegetation, and soils are not uniformly distributed across the state. Stocks vary depending on the climate, design, historic investment and planning decisions, and character of the urban space and forest. As treed

landscapes, urban forests have the potential to sequester carbon at a rate that can help address climate change.⁹⁹

Appropriate climate smart land management will depend on the local character of the landscape and may draw from methods developed for non-urban forests or for urban applications. Because vegetation can be tightly mixed with impervious surfaces and highly varied in size and type, improvements in the detail of mapping and scientific sampling of vegetation are important to understanding the carbon stocks and sequestration.

The way developed lands are designed and managed can contribute to achieving carbon neutrality through:

- **Limiting Future Carbon Losses** - Urban forests, vegetation, and soils managed to encourage healthy densities, avoid disease, and other disturbance or conversion reduce the risk of losing existing carbon stocks.
- **Sequestering Carbon** - Urban forests can sequester carbon in both natural and managed trees, vegetation, and soils.¹⁰⁰
- **Storing Carbon**- With appropriate stewardship, the trees, vegetation, and soils in urban landscapes can provide a stable or increasing store of carbon. At end of life, urban trees can be turned into wood products furthering the carbon storage period for carbon sequestered in the tree during its lifetime.

Developed lands can also contribute to climate resilience through:

- **Supporting resilient communities and natural systems** - Nature-based climate solutions on developed lands can address climate risk in many ways, such as mitigating extreme heat, providing groundwater infiltration, improving air and water quality,

and serving as a refuge for both people and species. Nature-based climate solutions can also provide significant health benefits that include reduced stress levels, increased physical activity, mental restoration, and social cohesion.¹⁰¹

- **Supporting resilient economies** - Most of California's jobs and residences are located in developed areas. Nature-based climate solutions can deliver economic benefits in a number of ways, such as improving public health outcomes during extreme heat events; creating and maintaining high quality local urban forestry jobs; reducing risk of costly property damage through flood protection; and decreasing energy costs through strategic shading of homes and buildings.¹⁰²

PRIORITY NATURE-BASED SOLUTIONS

DEVELOPED LANDS

A

Integrate nature-based climate solutions into (new and retrofit) community infrastructure investments, particularly pedestrian walkways, housing, transportation, stormwater, and recreational spaces. Examples include, but are not limited to bioswales; rain gardens; tree-shaded sidewalks and bike lanes; green roofs; community compost; bioretention ponds; etc.

B

Protect against habitat loss and fragmentation, particularly near urban boundaries and in coastal habitats, to help maintain carbon sequestration, protect biodiversity, limit exposure to climate risks, and increase climate resilience.

C

Invest in land acquisition, improvements, urban greening, on site organic material recycling, and high-quality, low-chemical management of parks and open spaces in and around cities to benefit underserved communities who are often the most negatively affected by health impacts related to air pollution and extreme heat caused by urban heat islands.

D

Prioritize protection of public safety by ecologically treating vegetation near roads and energy infrastructure.

E

Utilize safer, more sustainable pest management tools and practices to combat invasive species and accelerate the transition away from harmful pesticides.

F

Increase development and maintenance of both urban tree canopy and green spaces to moderate urban heat islands, decrease energy use, and contribute to carbon sequestration. Close the tree canopy gap in low-income/disadvantaged communities, particularly those vulnerable to the impacts of extreme heat, hazardous air quality, and/or with the least access to nature.

G

Utilize place-based tree and plant selection and intensity, to ensure the species selection process considers climate, water, and locally-specific circumstances.

H

Connect communities with greenways/greenbelts; consider how these landscapes can protect communities (particularly the most vulnerable) from climate impacts such as flooding, fires, heat, etc.

I

Restore urban river/streams, riparian areas, and corridors.

J

Increase water-reuse and recycled water for urban green spaces, particularly in priority communities.

K

Maintain urban trees to provide vital ecosystem services for as long as feasible; seek the highest and best use for trees and other biomass that must be removed, due to pests and disease or for valid management purposes.

L

Increase urban agriculture, and address known barriers such as water hook ups, fencing, community knowledge and capacity, and local infrastructure for packaging and storage for local and regional markets.

M

Scale community land stewardship, including through neighborhood gardens, school food gardens, community clean-ups, residential composting, and youth-focused land management programs.

N

Prioritize nature-based climate solutions that protect vulnerable communities from projected impacts of climate change in developed lands (such as those that absorb floodwater, prevent the spread of wildfire, and reduce temperatures) and deliver benefits beyond climate that deliver on community priorities (such as reduced air pollution, increased access to nature, and high road nature-based careers).

O

Implement healthy soils practices, including through native plant landscaping and mulch and compost application.

P

Increase drought-tolerant yards and landscaping through, for example, native plant species replacements and lawn removal and by adopting, implementing and enforcing the State's Model Water Efficient Landscaping Ordinance.

Q

Ensure brownfield revitalization supports community efforts to become more resilient to climate change impacts by incorporating adaptation and mitigation strategies throughout the cleanup and redevelopment process. These efforts also increase equity, as many climate vulnerable communities live close to brownfields and other blighted properties.

R

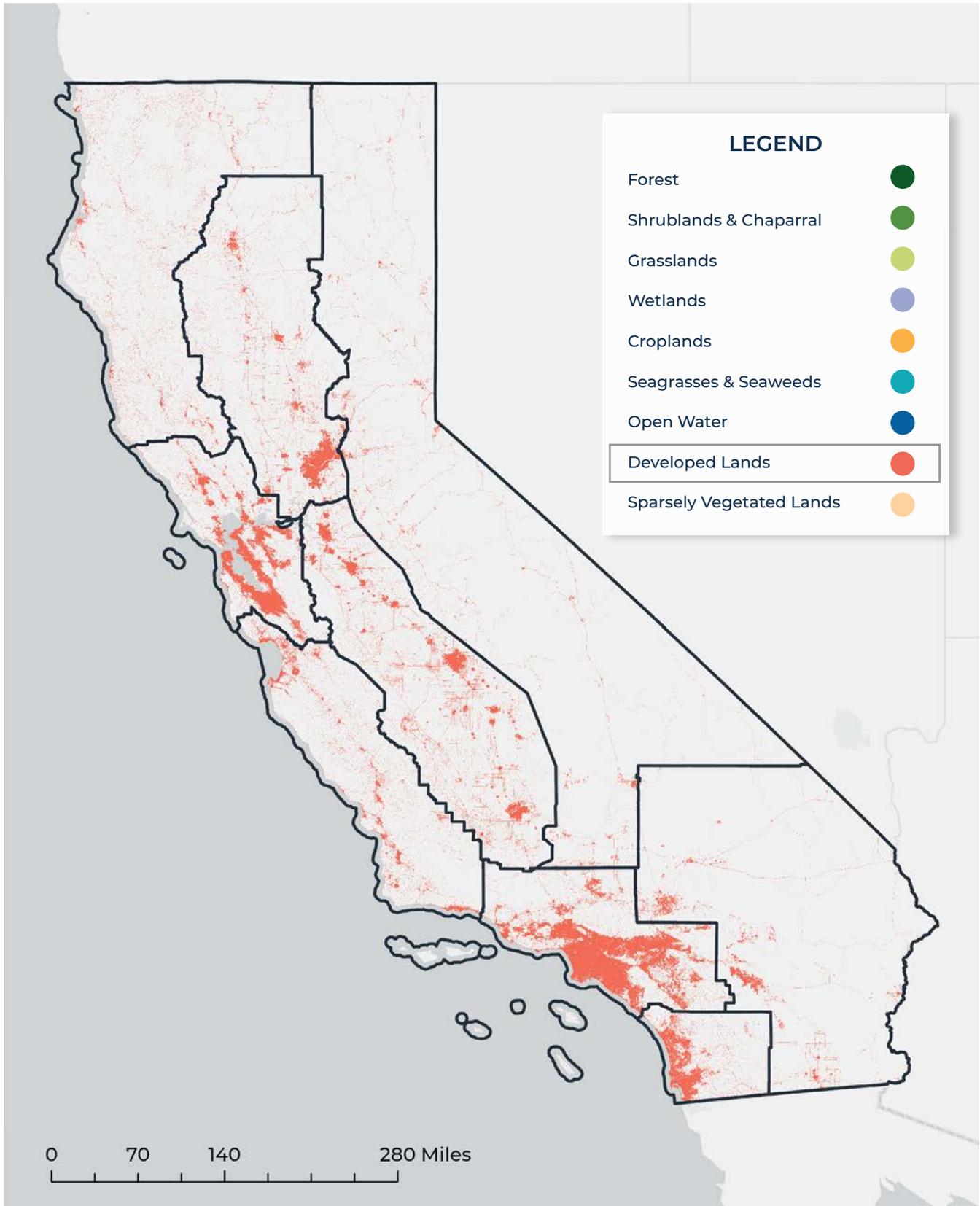
Utilize urban forest related efforts to help create high quality local jobs where they are needed most and provide training and workforce development opportunities for priority communities to enhance the effectiveness of the urban forest economic sector.

S

Support community land stewards, gardeners, and composters to reclaim empty or unused urban spaces; engage communities and support education around the benefit of nature and community based climate solutions.

STATEWIDE LAND COVER MAP

DEVELOPED LANDS





GRASSLANDS

CLIMATE ACTION POTENTIAL

Grasslands cover 9% of California (9.7 million acres).¹⁰³ They consist of areas dominated by grasses or herbaceous vegetation, where tree and shrub canopies account for less than 10% of the vegetation cover. They provide open space and wild habitat. Ownership of grasslands spans almost all categories, including federal, state, tribal, and local government; non-governmental organizations; and private ownership by both individuals and commercial organizations.

Although grasslands are vulnerable to disturbances from both extreme drought and wildfires, they are less susceptible to temporary heat waves and can include more drought tolerant species. Grassland resilience is highly

dependent on both management intensity and species diversity and abundance.¹⁰⁴

In grasslands, the bulk of carbon storage is in soil and root systems versus standing biomass. Native perennial grasses with large root systems have been reduced by invasive annual grass species across California over the past few centuries.¹⁰⁵

California's grasslands can contribute to the state's carbon neutrality goals through:

- **Sequestering carbon** - While aboveground vegetation contributes to carbon sequestration, the majority of sequestration

in grasslands occurs through the growth of root systems in the soil. Applying compost¹⁰⁶ or other soil amendments¹⁰⁷ offers potential avenues for enhancing carbon sequestration rates. More is known about the stability of native grasses, and it is unclear if invasive grass species increase or decrease carbon sequestration as they replace native species.

- **Storing carbon** - Grasslands could represent a long-term stable carbon sink,¹⁰⁸ as carbon is stored more heavily in the soil and root systems underground where it is less vulnerable to extreme climatic events (e.g., drought). Removing invasive grasses and managed, science-based grazing may help protect existing carbon stores by decreasing the impacts from disturbances such as fire.¹⁰⁹
- **Limiting future carbon losses** - The spread of invasive species and other disturbances can degrade carbon stores. Although climate smart agriculture can compensate for some grassland carbon sequestration losses, long term soil carbon stock losses and increases in greenhouse gas emissions may persist.

Climate smart land management of the state's grasslands can also build climate resilience through:

- **Supporting resilient communities and natural systems** - Protecting refugia in grasslands that include a high diversity of native species can increase production, improve resilience to disturbance, and provide habitats that support higher biodiversity and connectivity. These lands also contribute to groundwater recharge and water filtration that are critical for supporting ecosystems throughout the state.
- **Supporting resilient economies** - Managing these lands through regenerative practices such as prescribed and science-based grazing are important tools for both

protecting and restoring grasslands while also providing opportunities for climate-smart agriculture.¹¹⁰

PRIORITY NATURE-BASED SOLUTIONS

GRASSLANDS

A

Increase climate smart and regenerative practices on grasslands, such as prescribed and science-based grazing to increase the amount of deep rooted, quality rangeland grasses for improved vegetation for feed, carbon and water storage, and fire resiliency.

B

Scale existing technical assistance and rancher-to-rancher networks and demonstration projects to accelerate the uptake of nature-based climate solutions.

C

Preserve and enhance native plant species; combat invasive species; and replant or restore perennial native grasses.

D

Protect grasslands from development.

E

Increase utilization of conservation easements to deliver durable climate benefits on grasslands.

F

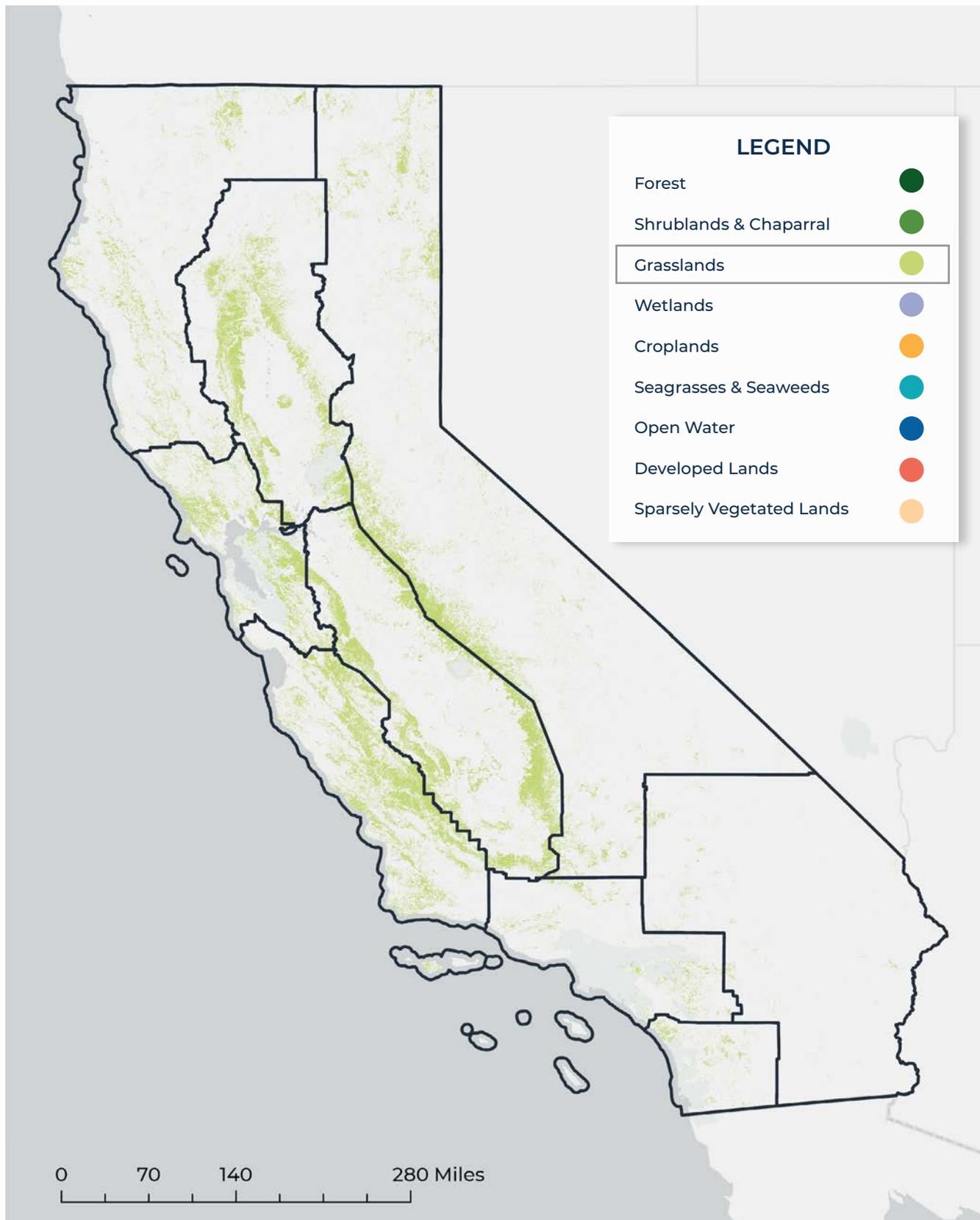
Apply compost on grasslands.

G

Link waste diversion goals with soil health practices by increasing adoption of compost production on farms and application of compost on rangeland for improved vegetation and carbon storage.

STATEWIDE LAND COVER MAP

GRASSLANDS





Bakersfield Desert, CA

SPARSELY VEGETATED LANDS

CLIMATE ACTION POTENTIAL

Sparsely vegetated lands cover 10% of the state (10.2 million acres),¹¹¹ and include deserts, beaches and dunes, bare rock landscapes, and areas covered in ice or snow such as those above the tree line in mountainous regions. This landscape also includes barren lands with hostile growing conditions resulting from lack of soil or high levels of disturbance. These lands are largely publicly owned, and can provide open space and support unique habitats.

Sparsely vegetated lands can help California achieve its carbon neutrality goals through:

- **Sequestering carbon** - The more vegetated areas of this landscape can account for meaningful carbon sequestration in vegetation and soils. Additional carbon sequestration in desert soil with low vegetation is possible, but the extent and rate of sequestration is still unclear.¹¹²

- **Storing carbon** - Similarly to sequestration rates, the level of carbon storage in desert soils is unclear and the duration or stability of carbon in these habitats are unknown. However, the more vegetated areas are better understood, and can still account for meaningful stable carbon benefits in vegetation and soils.
- **Limiting future carbon losses** - Soil disturbance and habitat loss are the greatest risks for carbon loss in deserts.¹¹³ Although the rate of carbon sequestration is unclear in these ecosystems, it is possible the regeneration of these carbon stocks after disturbance will be additionally slowed by the sparse and relatively slow vegetative growth resulting from the harsh growing conditions.¹¹⁴

These lands can help California build resilience to climate change through:

- **Supporting resilient communities and natural systems** - Reducing soil disturbance will increase public health through improved air quality. Many of these lands serve as wildlife corridors connecting diverse habitats throughout the state, and provide unique habitats. Additionally, beaches and dunes can act as storm buffers to protect communities, ecosystems, and built infrastructure along California's coast.¹¹⁵
- **Supporting resilient economies** - Many beaches, deserts, and sparsely vegetated lands provide substantial opportunities for sustainable recreation. Some of the more isolated areas within this landscape category represent rare opportunities for scientific and educational programs, due to their unique environments and minimal light or noise pollution. In addition, beaches and dunes protect public safety and critical infrastructure, bolster tourism, and generate revenue for coastal businesses and communities.

PRIORITY NATURE-BASED SOLUTIONS

SPARSELY VEGETATED LANDS

A Conserve desert lands to protect them from disturbance, particularly where these efforts protect public health and/or **endemic species**.

B Combat invasive species, including through reducing desert uses that spread them.

C Restore native desert plants and animals.

D Increase use of prescribed and cultural fire.

E Construct living shorelines, which are protected, stabilized shorelines constructed with natural materials. Living shorelines include a variety of strategies including beaches and vegetated dunes. Living shorelines can sequester carbon and maintain carbon stores of the wetlands they protect, build resilience to sea level rise, improve water quality, and provide habitat.

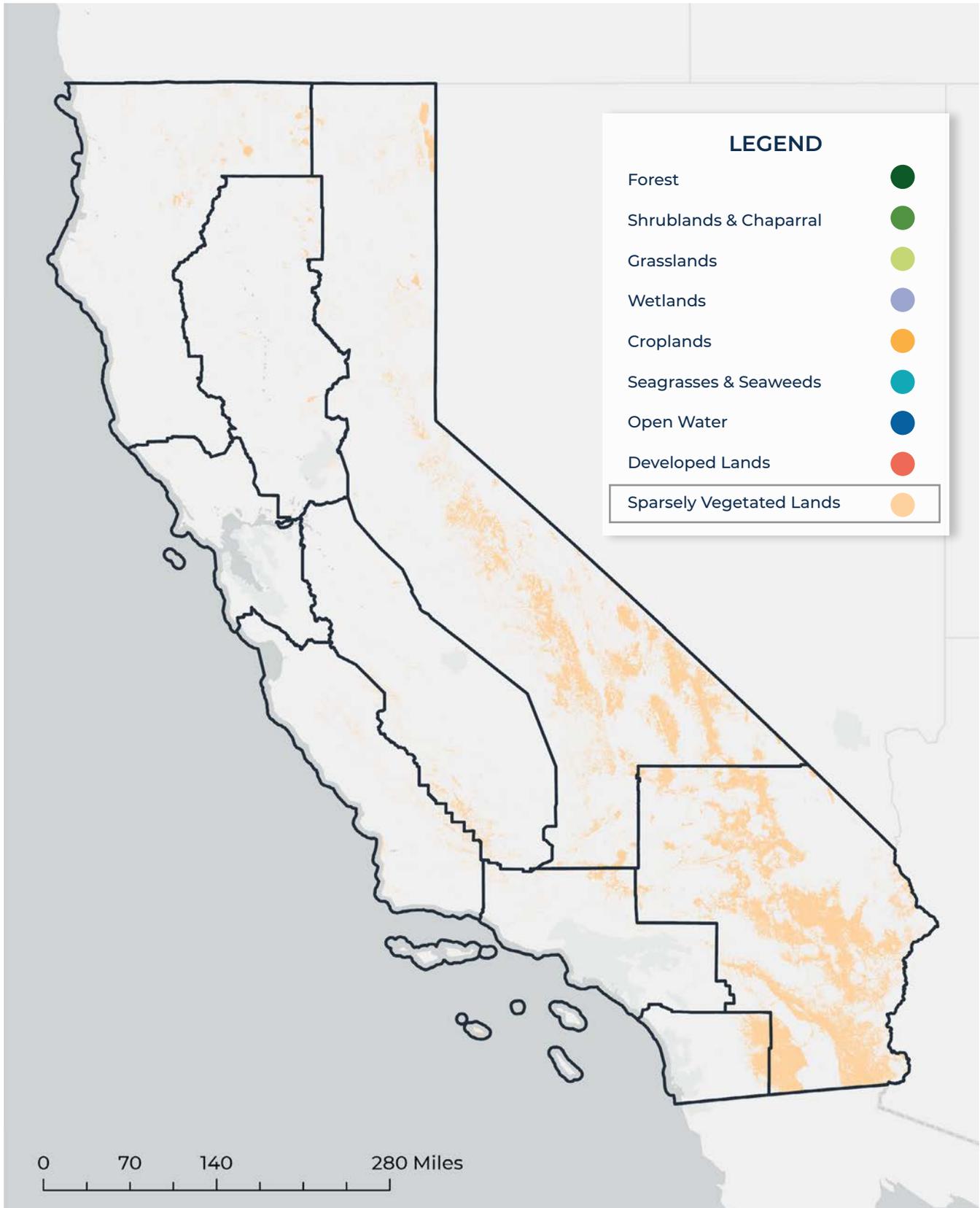
F Identify beach habitats that are vulnerable to sea level rise and develop approaches for addressing loss of these habitats

Endemic Species

Endemic species are plants or animals that exist only in one geographic region. They store and slow down water, which can reduce flood risk, replenish groundwater, and build drought resilience.

STATEWIDE LAND COVER MAP

SPARSELY VEGETATED LANDS



04

SECTION FOUR

TRACKING PROGRESS AND MEASURING OUTCOMES



Kings County, CA

SECTION FOUR

TRACKING PROGRESS AND MEASURING OUTCOMES

California is committed to taking urgent climate action in the natural and working lands sector now, and continuously improving our approach over time.

We will work to track nature-based climate solutions and their outcomes, as well as to improve our understanding and ability to measure outcomes of climate smart actions. To improve over time, our efforts will need to be flexible; successful climate smart land management requires adaptive approaches that are continually reassessed as ecosystems are affected by climate change and our understanding of the processes at work grows.

INTEGRATED, COORDINATED MONITORING AND TRACKING

Lack of project communication and coordination and data sharing are currently some of the most significant issues with environmental tracking and monitoring. Programs currently exist for tracking and monitoring separate facets of climate change, ecosystem carbon, landscape resilience, public health, regional and local land use planning, biodiversity and more.

Moving forward, it is essential that greater communication and collaboration is established between these efforts. This includes increased

cooperation between all stakeholders involved in environmental tracking and monitoring within governments, academic institutions, and private organizations. Related, sustained investment in open data and open science practices are critical for nimble, data-based decision making and to facilitate community engagement.¹¹⁶

Opportunities to increase integration and coordination of environmental monitoring successfully include:

- Explore the potential for a central registry to track climate smart land management in California.
- Expand and enhance the use of open data and open science practices.
- Link relevant monitoring efforts to climate goals and outcomes achieved.
- Track impacts on communities and/or ecosystems.
- Regular and meaningful community engagement.
- Ensuring our monitoring and tracking efforts reflect the needs of and are accessible and understandable to all Californians.

PARTNERSHIPS

Due to the complexity and diversity of our natural and working lands, climate smart land management often requires partnerships to be successful. To understand the scope and scale of collaborations in this sector, and to identify trends for their success, it would be useful to track:

- Nature-based solution goals, and outcomes achieved for communities, ecosystems, and workers.

- Significant barriers to implementation.
- Number and diversity of partners.

DEMONSTRATION PROJECTS

Projects that demonstrate new approaches to solve problems pave the way for future successful efforts. Nature-based solutions tested through successful demonstration projects represent opportunities to scale climate smart land management, and share lessons learned such as:

- Nature-based solution goals, and outcomes achieved for communities, ecosystems, and workers.
- Number and diversity of partners.
- Level of investment required.

TRACKING AND CATALYZING INVESTMENTS

Increased and accessible public and private capital is required to scale nature-based solutions at the speed and scale necessary to deliver durable climate outcomes. Information to track collective investment and outcomes may include:

- Nature-based solution, location, and size.
- Number and diversity of partners.
- Goals and outcomes achieved by landscape.
- Impacts on communities and/or ecosystems.
- Aggregate funding amount supporting nature-based climate solutions.
- New private investment mobilized in California for these practices, as a multiple of public capital committed.

- Improved access to investment capital for practitioners of climate-smart land strategies.
- Economic multipliers in California communities resulting from increased investment in climate-smart land strategies.
- Improvements in economic productivity of lands managed using climate-smart strategies.
- Changes to gross state product, state and local tax bases as a result of climate-smart land strategies.

This information can also be used to quantify the investments needed to implement nature-based solutions based on type, location, and size.

ENABLING POLICY

State, tribal, and federal policy must evolve to support and accelerate nature-based climate solutions. It will also be important to understand and track how corporate, finance, and land use planning policies evolve to support nature-based solutions. Policy action that facilitates climate smart land management can be tracked, evaluated, and adjusted through improved understanding of:

- Policies established to enable nature-based climate solutions.
- Policies amended to advance nature-based climate solutions.
- Changes in corporate and finance policy.
- Economic development created by nature-based industries.
- Workforce development in high road nature-based jobs.

SCIENCE TO INFORM ACTION AND MEASURE SUCCESS

Data development, coordination, acquisition, analysis, synthesis, and utilization are central to any successful efforts for tracking nature-based solutions, their costs, outcomes, as well as to identify trends and recommend adjustments. State-wide surveys of land-use and land use change, land cover and land cover change, vegetation health, changes in GHG emissions from natural and working lands, and other variables will be needed on a regular basis both to support research and to monitor progress. Well-monitored research landscapes are needed to provide baselines and an evaluation of changes from baseline that will allow for quantitative measures of outcomes and informing adaptive management responses.

The metrics used to evaluate success in these efforts may include:

- Number of spatial layers, areas covered, gaps identified.
- Number of non-spatial data types and how many link to the spatial data.
- Level of data integration across state and non-state entities.
- Type and level of effort managing data and analytics.

ADDITIONAL METRICS FOR SUCCESS

Additional metrics to track collective climate smart land management actions and measure outcomes delivered include:

1. Ecosystem Carbon and Greenhouse Gas Indicators

- Metric tons of carbon stored in lands or metric tons of carbon dioxide equivalent sequestered or avoided as emissions.

2. Ecological Indicators

- Acres of natural and working lands conserved or restored, such as:
 - Acres of lands that provide climate benefits as determined by TerraCount, Comet Planner or related tools.
 - Acres of land under durable conservation easements that include climate-smart management requirements.
 - Acres of land with restoration efforts underway.
 - Acres of lands that contribute to the state's 30x30 goal through delivering climate benefits.
 - Average trend of high severity wildfire patch size and occurrence.
- Acres of land covered with landscape level planning.
- Percent increase in urban tree canopy.
- Percent decrease in ambient temperature during high heat months in urban areas.
- Percent of agricultural acres with on-farm technical assistance, demonstration projects, and incentives.
- Percent change in soil organic matter on California agricultural lands.
- Percent change in soil moisture content.

- Percent of infrastructure projects that incorporate nature-based solutions.
- Land cover and land use changes, such as:
 - Acres of each land cover type gained and lost, and what land cover they transitioned to.
 - Changes in land use, measured in acres devoted to an activity, or economic measures.
- Percent of desert landscapes whose crust and vegetation are undisturbed.
- Percent of the state in mature/resilient Wildlife Habitat Relationship habitat classifications.

3. Economic Indicators

- Number of workers contributing to climate smart land management.
- Numbers of workers trained and placed into jobs, disaggregated by race, ethnicity and geography, with wages and other job quality indicators.
- Number of high road jobs created or maintained.
- Units of climate smart wood products sold.
- Number of training opportunities provided that provided meaningful, transferrable skills for nature-based career development.
- New investment motivated by nature-based climate solutions.
- Economic multipliers associated with investment in nature-based climate solutions.

4. Infrastructure Indicators

- Soil water holding capacity.
- Regional and local traditional food harvesting, food processing, storage and related infrastructure to support the agriculture industry and food security.
- Managed Aquifer Recharge capacity.
- Changes in the timing of watershed runoff.

5. Social Justice/Equity Indicators

- Number of acres managed, transferred to, and owned by California Native American tribes.
- Availability and utilization of programs that engage and support nature-based solutions that deliver environmental, equity, and economic benefits to climate vulnerable communities.
- Prioritization of climate vulnerable communities, including socially disadvantaged communities, farmers of color and small and mid-scale producers for financial incentives, technical assistance and other resources to scale up this work.

6. Public Health Indicators

- Emergency department visits / hospitalizations associated with heat, wildfires, wildfire smoke, etc.
- Physical activity levels associated with outdoor activities, e.g., hiking, walking, cycling, etc.
- Food security.
- Water security.
- Access to nature or green spaces.
- Air quality.
- Water quality.

05

SECTION FIVE
**REGIONAL
PROFILES**



Monterey County, CA

SECTION FIVE REGIONAL PROFILES

Every region in California can contribute to our climate change goals through climate smart land management in line with the priority nature-based solutions identified in this strategy. California is a large, diverse, and complex state; successful climate action must reflect locally and regionally specific circumstances and priorities.

It is important to note that every region in California is also the ancestral homelands and homewaters of the many California Native American tribes, containing many places of deep cultural significance. Accelerating climate action on our natural and working lands is also an important opportunity to consult and partner with California Native American tribes.

Regional Profiles

California's 4th Climate Change Assessment identified how climate change is projected to impact our state's diverse regions. The Assessment served as a key input to this Strategy, including through our approach to defining regions.

THE NORTH COAST

The North Coast is home to approximately 370,000 people.¹¹⁷ This region makes up 12% of the state's land area,¹¹⁸ and includes the entirety of Del Norte, Siskiyou, Trinity, Humboldt, Mendocino, and Lake counties.

The North Coast region is notable for its extensive natural ecosystems, higher annual precipitation, cooler overall temperatures, and abundance of water. Many of the region's native plants and animals, including endangered plant, wildlife, and fish species, are dependent on these cool, wet conditions.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Forests: 70%

Croplands: 2.3%

Shrublands and Chaparral: 9.6%

Sparsely Vegetated Lands: 1.6%

Grasslands: 5%

Wetlands: 0.96%

Developed Lands: 3.2%

Seaweeds and Seagrasses: 0.05%

The remaining 6.41% of the region's land cover is open water.

LAND OWNERSHIP

Private: 48.8%

Local Government: 0.1%

Federal Government: 48.1%

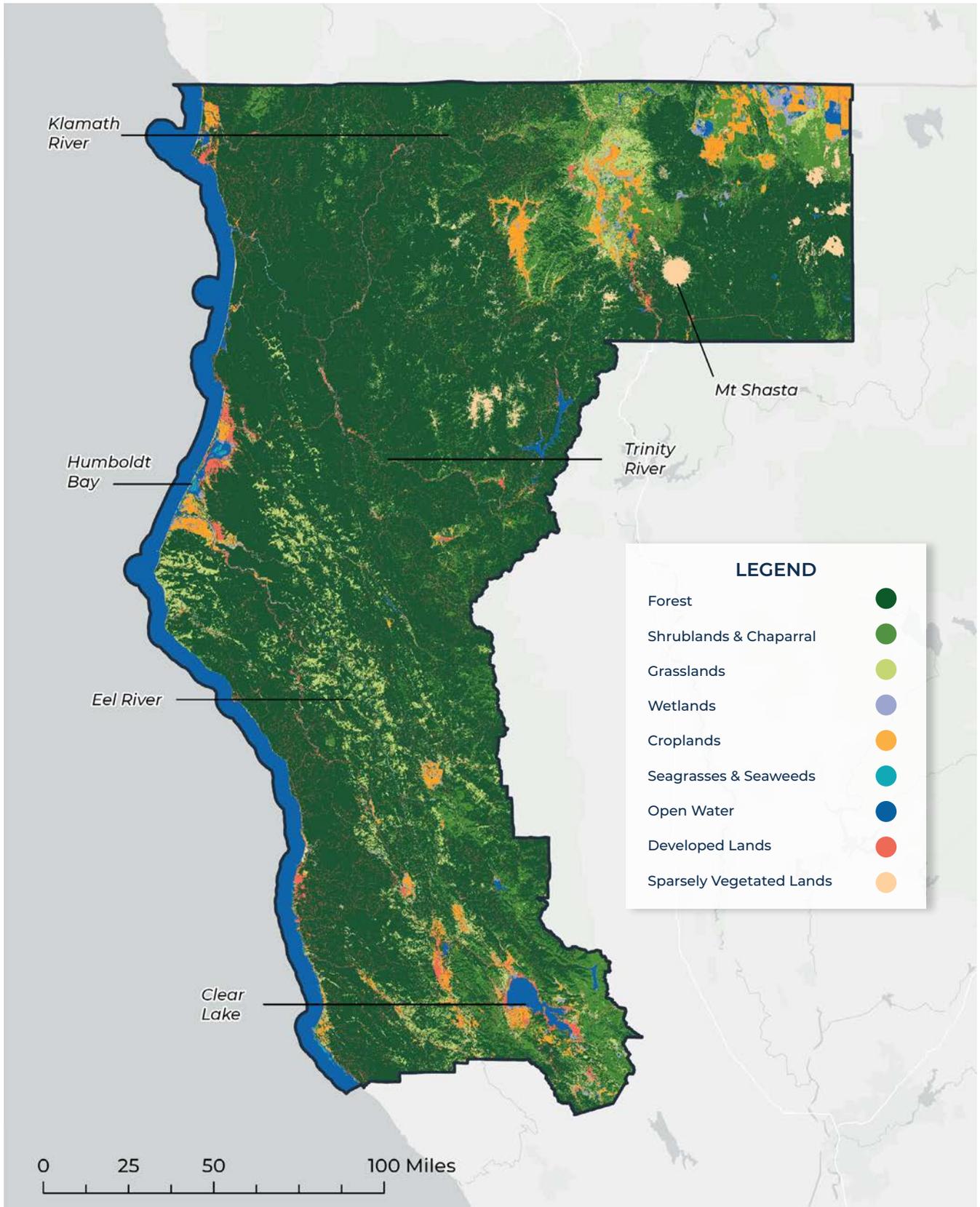
Non-profit: 0.6%

State Government: 2.4%



Klamath River in Siskiyou County, CA

REGIONAL LAND COVER MAP NORTH COAST



PROJECTED CLIMATE CHANGE IMPACTS

- **Increased temperatures**
By the end of the century, average annual maximum temperatures are likely to increase by 5-9°F throughout the region. Interior regions will experience the greatest degree of warming. Summer season temperatures will increase 3-5°F by mid-century and 6-9°F by end of century. Winter season temperatures are expected to warm by a greater magnitude: 5-7°F by mid-century and 8-11°F by end of century.
- **Variable precipitation**
Change in overall annual precipitation is expected to be small; however, an “average” rainfall year will become less common as the variability in precipitation is likely to increase with a higher likelihood of extreme wet years and extreme dry years. More intense storms within a shorter wet season are expected.
- **Decreased snowpack**
Snow and total snowpack will be a small fraction of its historical average. As a result, the region is expected to experience prolonged dry seasons and reduced soil moisture conditions, even if annual precipitation stays the same or moderately increases. River stream flows are expected to decline in the dry season and increase in the winter. The rise in extreme precipitation events will increase the frequency and extent of flooding, particularly along the coast where flood risk is also enhanced due to sea level rise.
- **Sea level rise**
Projections of sea level rise in the North Coast are significant, and differ within the region due to different rates of vertical land motion. As a result, land subsidence (sinking of the ground’s surface) is occurring along the Pacific Northwest coast and driving sea level rise in some places at a rate 34

percent greater than the global average. Recent estimates indicate that Humboldt Bay has the highest local sea level rise rate in California, greater than both global and regional rates, due to land subsidence in and around the bay. This suggests that global sea level rise will impact the Humboldt Bay area faster than other parts of the U.S. west coast.

- **Increased wildfire**
Projections suggest a longer fire season, an increase in wildfire frequency, and an expansion of the area susceptible to fire. Temperature increases are expected to extend fire season throughout the region, especially in higher elevation sites with variable and decreasing snowpack. Lightning-ignited wildfires are likely to increase due to a longer fire season and more available fuels. Increased populations will also increase the probability of human-ignited wildfire.
- **Shifting habitat**
As the climate warms and precipitation patterns change, the North Coast’s cool, wet habitats may shift or disappear from the landscape.¹¹⁹

REGIONAL INPUT

A public workshop was held on May 4, 2021 to understand what nature-based climate solutions are important in the North Coast, and how this strategy can support the region’s environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the North Coast region included:

- Fire ecosystem resilience; no longer a threat, but brings diversity and richness
- Forests restored to old growth conditions

- Healthy communities, even in the event of climate disasters
- Community stewardship
- Restored wetlands and oak woodlands
- Rivers full of fish
- Co-management of lands with California Native American tribes is common
- Expanding training for climate smart land management, and ensuring nature-based careers, such as restoration jobs, pay a living wage
- Creating community forests to create climate smart wood products

Some of the nature-based solutions identified as priorities for the region included:

- Prescribed and cultural burning, working forest conservation easements, extended rotations in timberlands and managing them for old growth
- Riparian and meadow restoration
- Managed grazing
- Living shorelines and restoration of estuaries, dunes, and wetlands
- Enhance and protect cold water refugia
- Carbon farming
- Community greening through, for example, capturing rainwater runoff and planting in empty lots
- Increased tribal land stewardship through co-management and land agreements

Opportunities to increase equity in the region through nature-based solutions included:

- Protecting cultural artifacts
- Increasing education to reconnect people with nature through, for example, incentives for parents to accompany school nature field trips

SAN FRANCISCO BAY REGION

The San Francisco Bay Region consists of nine counties surrounding the San Francisco Bay and the Sacramento-San Joaquin River Delta. It includes the entirety of Marin, Sonoma, Napa, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco Counties as well as the western extent of Solano County. The region occupies approximately 4.7% of California's total land area,¹²⁰ and is home to approximately 7.5 million people.¹²¹

The San Francisco Bay Region has a Mediterranean-type climate with cool, wet winters and warm, dry summers. Like other regions in California, the San Francisco Bay Region experiences highly variable precipitation. This climate supports high biological diversity and successful wine and dairy industries.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Forests: 28.9%

Croplands: 5.2%

Developed Lands: 19%

Wetlands: 3.3%

Grasslands: 17.9%

Sparsely Vegetated Lands: 0.3%

Shrublands and Chaparral: 7.7%

Seaweeds and Seagrasses: 0.17%

The remaining 17.4% of the region's land cover is open water.

LAND OWNERSHIP

Private: 74.8%

Local Government: 11.3%

Federal Government: 5.5%

Non-profit: 1.9%

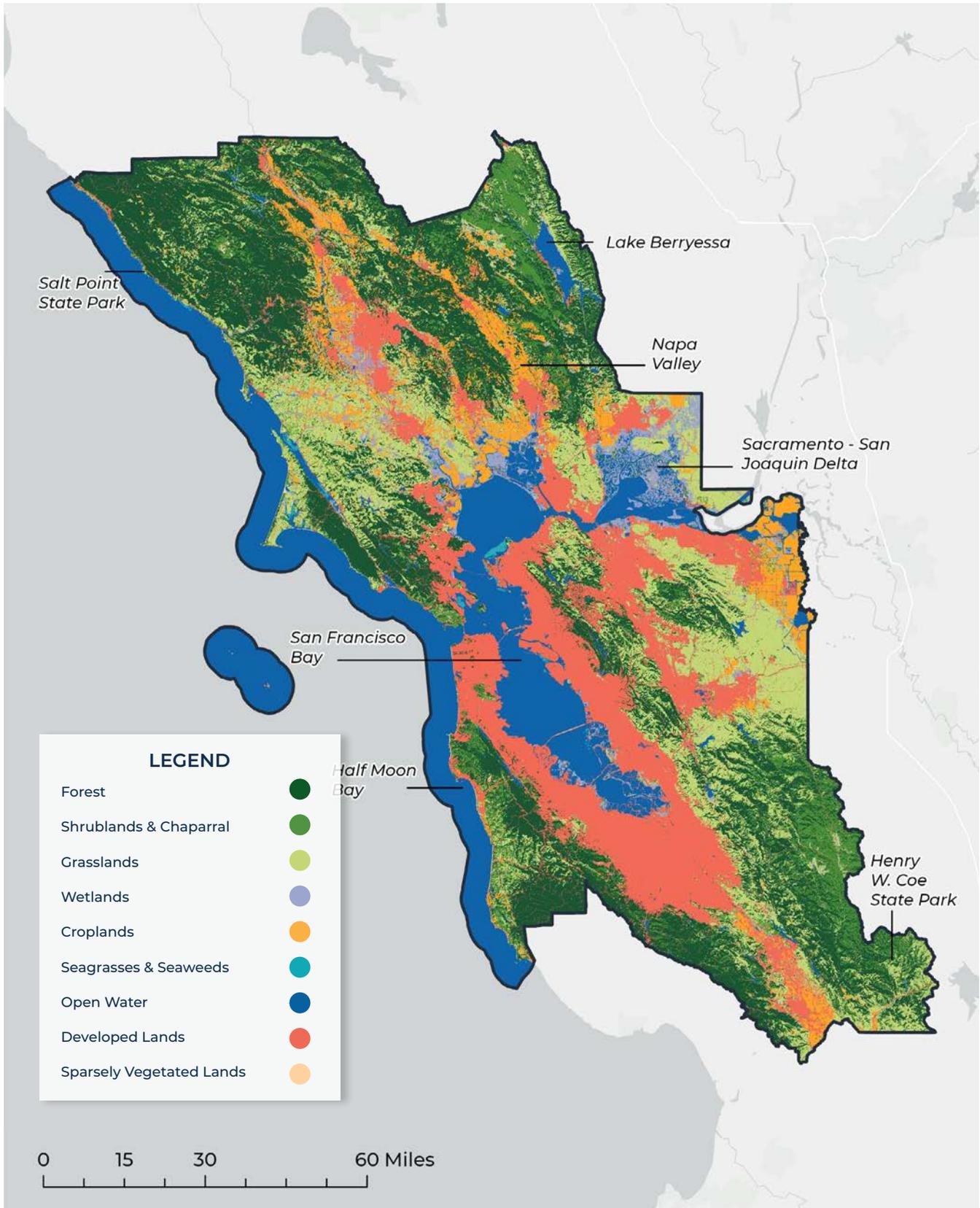
State Government: 6.5%



San Francisco, CA

REGIONAL LAND COVER MAP

SAN FRANCISCO BAY REGION



PROJECTED CLIMATE CHANGE IMPACTS

- **Significant temperature increases**
By mid-century, the Bay Area is expected to warm around 3-4.5°F. By 2100, the region is projected to warm between 5.5-8°F. The inland areas of the San Francisco Bay region are projected to experience more warming than their coastal counterparts.
- **Continued variable precipitation, with intensified winter storms**
Due to anticipated warming, droughts will likely be longer and more severe, causing major stress to water supplies, natural ecosystems, and agriculture.
- Sea level rise, with consequences for the region including but not limited to destructive flooding, especially when combined with high tides or storms
The region is expected to see sea levels rise between 2.4 feet and 4.5 feet by 2100. However, newer science, including the modeling of Antarctic ice sheet melt, has suggested that sea levels could rise nearly 10 feet by 2100.
- Increased fire risk, due to warming temperatures and development into the wildland-urban interface
As the region becomes more urbanized, some of the risk may be mitigated.¹²²

REGIONAL INPUT

A public workshop was held on April 21, 2021 to understand what nature-based climate solutions are important in the San Francisco Bay region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the San Francisco Bay region included:

- Vibrant, green communities

- Regenerative economy
- Nature for everyone, everyday
- Sustainable funding for nature-based solutions
- Oyster populations return to pre-1930 levels
- Expanded job opportunities in climate smart land management
- Net negative greenhouse gas emissions from agriculture

Some of the nature-based solutions identified as priorities for the region included:

- Regenerative agriculture
- Green communities – urban parks, green schoolyards, green infrastructure, community forests, residential composting
- Living shorelines and levees, saltmarsh restoration, oyster and kelp farming and traditional gathering
- Wetland and riparian area protection and restoration
- Prescribed and cultural burning, redwoods protection, agroforestry, reforestation
- Grazing, native plant restoration
- Corridor protection to facilitate range shifts

Opportunities to increase equity in the region through nature-based solutions included:

- Increasing land access for historically marginalized groups
- Expanding the use of community greening to reduce the impacts of pollution
- Support nature-based curriculum and experiences in underserved community schools
- Build workforce development capacity through climate smart land management job training, apprenticeship opportunities, and California Conservation Corps programs
- Engage and listen to historically disadvantaged leaders and communities
- Increase tribal capacity to scale climate smart land management

CENTRAL COAST

Home to 1.5 million residents,¹²³ and stretching from the Monterey Bay south to the Channel Islands, the Central Coast includes all of Santa Cruz, Monterey, San Benito, San Luis Obispo, and Santa Barbara Counties. The region covers approximately 11,000 square miles or 8% of the state's land area.¹²⁴

The Central Coast region is notable for its extensive natural ecosystems, many of which will be impacted by climate change. Hardwood forests, scrublands, and herbaceous grasslands comprise most of its land cover, with low-intensity agriculture and small-to medium-sized cities in the region. The region has a varied geography and topography. The highest peaks in the Santa Lucia Mountains form a wall behind coastal hillsides that traps cooler marine air, affecting air temperatures, humidity, and other climate factors.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Shrubland and Chaparral: 28%

Grasslands: 22%

Forests: 19.5%

Developed Lands: 6.2%

Cropland: 6%

Sparsely Vegetated Lands: 2%

Wetlands: 0.94%

Seaweeds and Seagrasses: 0.38%

The remaining 14.6% of the region's land cover is open water.

LAND OWNERSHIP

Private: 68%

Federal Government: 27%

State Government: 2.6%

Local Government: 1.1%

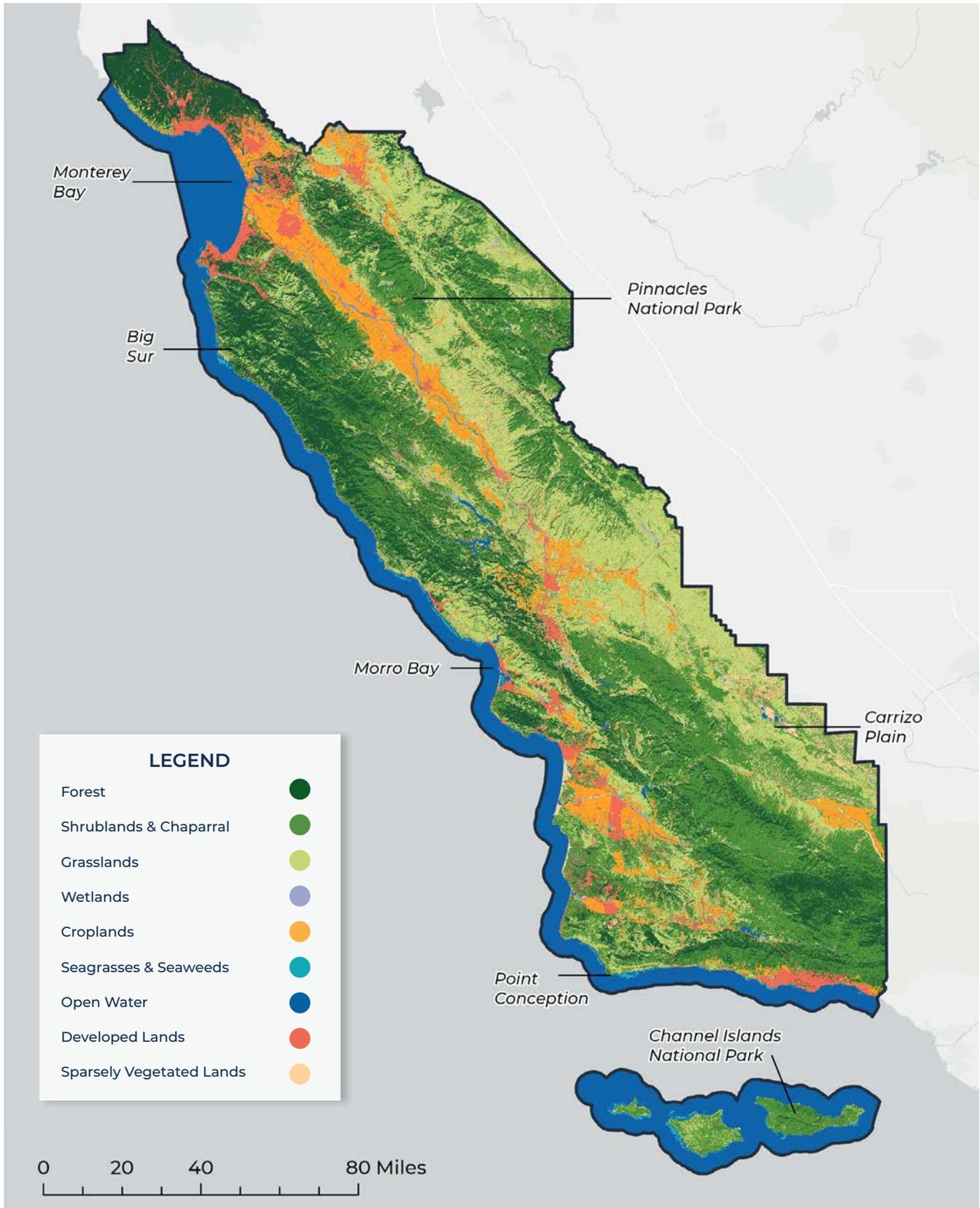
Non-profit: 1.3%



San Luis Obispo, CA

REGIONAL LAND COVER MAP

CENTRAL COAST



PROJECTED CLIMATE CHANGE IMPACTS

- **Overall decrease in annual precipitation**
The Central Coast varies in precipitation depending on location, with the coastal mountain ranges receiving high amounts while inland locations receive less per year. The region is projected to experience substantially increased variability in precipitation. Across the Central Coast region, extremely wet and dry years may become more severe. For example, the wettest day of the year is expected to increase up to 35 percent. In addition, projected future droughts are likely to be a serious challenge to the region's already stressed water supplies.
- **Increasing temperatures**
Temperatures vary depending on distance from the coast, with coastal temperatures being lower and less variable than inland temperatures. However, maximum and minimum temperatures for the Central Coast will continue to increase through the next century, with greater increases in the inland region. By mid-century, the average annual maximum temperature is expected to rise between 4-5°F across all five counties.
- **Sea level rise**
This climate impact is accelerating and poses a significant threat to the regions' coastal communities. Sea level rise will cause as many as two-thirds of the beaches to be completely lost over the next century, along with the ecosystems supported by those beaches. The landward erosion of beaches will be driven by accelerating sea level rise combined with a lack of sediment, effectively drowning the beaches between the rising ocean and the backing cliffs and/or urban environments. Future flooding is also a serious concern. Sea level rise and flooding pose significant threats to coastal California Native American tribal lands and sacred sites.

- **Wildfire**

The Central Coast is projected to experience more frequent and sometimes large wildfires, as well as more lengthy post-fire recovery times.¹²⁵

REGIONAL INPUT

A public workshop was held on April 27, 2021 to understand what nature-based climate solutions are important in the Central Coast, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the Central Coast region included:

- Rivers full of water and fish
- Resilient communities
- Landscapes dominated by native species
- Negative emissions
- Collaborative partnerships
- Green jobs
- Co-management with California Native American tribes

Some of the nature-based solutions identified as priorities for the region included:

- Restore kelp, wetlands, dunes, salt marsh; build living shorelines; protect land that can be future habitat for coastal habitat migration inland
- Restore sediment flow, and cool streams through riparian corridor restoration

- Traditional Ecological Knowledge, prescribed and cultural burning, oak woodland restoration; open space as fire buffer; control invasive plants
- Green stormwater infrastructure; accessible, shaded parks and trails; green communities
- Regenerative agriculture practices, agroecology, cooperative farming, rangeland protection
- Expand nature-based education and job opportunities
- Increased capacity for California Native American tribes to manage and steward lands through co-management and land agreements

Opportunities to increase equity in the region through nature-based solutions included:

- Increasing nature-based education opportunities through, for example, subsidized trips to sustainable agriculture farms and family nature programs
- Engaging in deep listening with communities and supporting community-based organizations that accelerate nature-based solutions
- Expanding access to job opportunities in nature-based industries
- Making nature more accessible through, for example, more public trails and ADA accessible outdoor recreation, restoration of degraded sites, and creating green spaces in communities

LOS ANGELES REGION

The Los Angeles Region consists of five counties in Southern California situated on the coast between the San Diego and Central Coast Regions and bordered on the eastern side by the Inland Desert Region. The region is home to about 18 million people.¹²⁶ At about 9,900 square miles, it represents 6.8% of California’s land area¹²⁷ and includes the entirety of Ventura, Los Angeles, and Orange Counties and the western portions of San Bernardino and Riverside Counties.

The Los Angeles region is characterized by a Mediterranean climate with hot, dry summers and cool, wet winters. Countless ecosystems thrive throughout the region’s coasts, mountains, and interior landscapes. Substantial agricultural production occurs here, taking advantage of the bountiful sunshine and generally warm temperatures. Snow-based water from the Sierra Nevada (and Colorado Rockies) have, to date, largely satisfied the region’s huge residential, industrial, agricultural, and ecological freshwater demands. Cars, and especially solo driver traveling, remain the primary mode of transportation, leading to notoriously congested roadways with related problems of poor air quality blanketing the region.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Shrubland and Chaparral: 40.2%

Cropland: 2.8%

Developed Lands: 27.2%

Sparsely Vegetated Lands: 2.6%

Forests: 10.8%

Wetlands: 0.32%

Grasslands: 4.0%

Seaweeds and Seagrasses: 0.20%

The remaining 11.9% of the region’s land cover is open water.

LAND OWNERSHIP

Private: 58.7%

Local Government: 4.1%

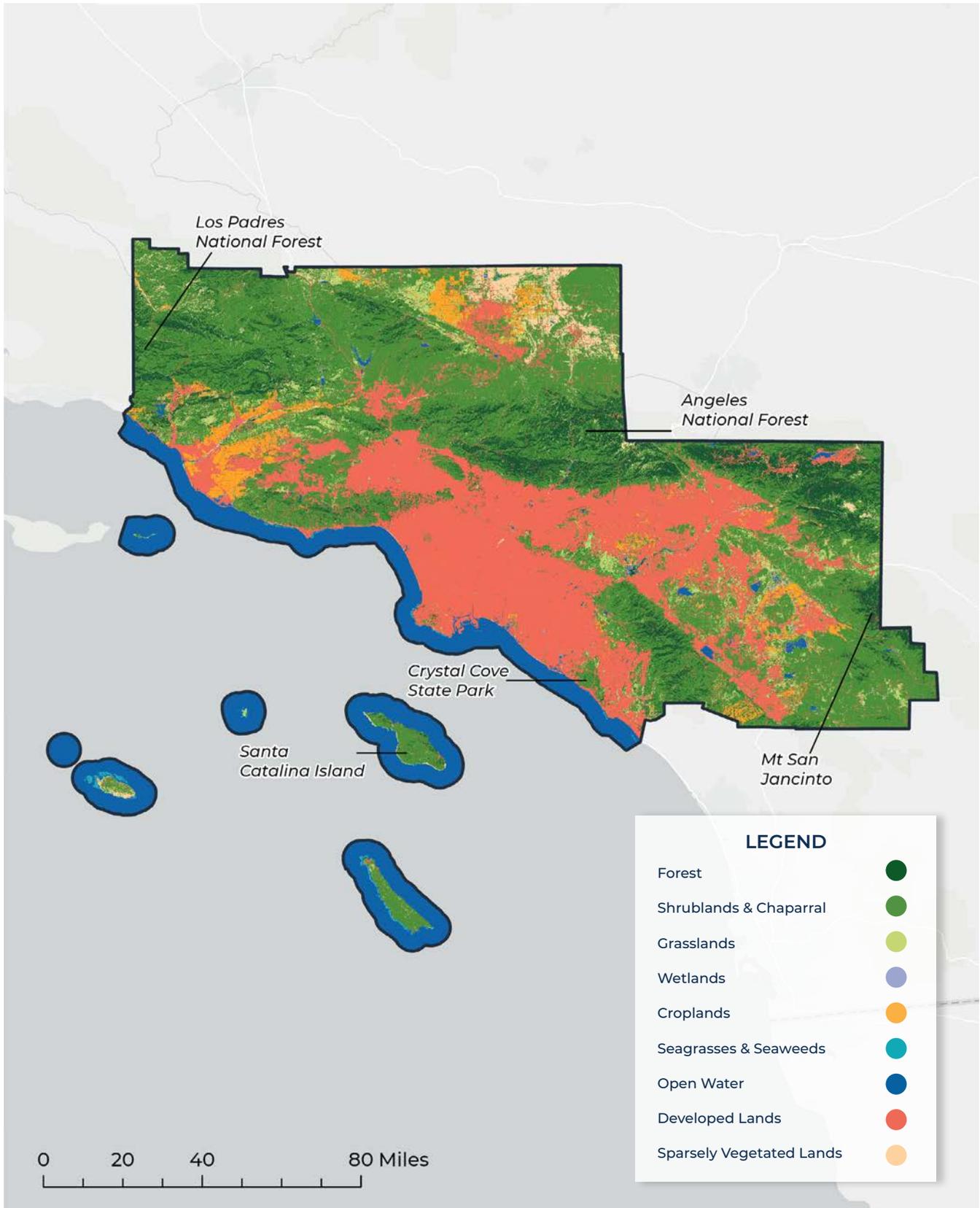
Federal Government: 33.9%

Non-profit: 0.9%

State Government: 2.3%



REGIONAL LAND COVER MAP LOS ANGELES REGION



PROJECTED CLIMATE CHANGE IMPACTS

- **Significant temperature increases**

By mid-century, average maximum temperatures across the Los Angeles region are projected to increase 4-5°F and by late-century, 5-8°F. Extreme temperatures are also expected to increase. The hottest day of the year may be up to 10°F warmer for many locations across the LA region by late-century. The number of extremely hot days is also expected to increase across the region. The interior regions are expected to experience the highest amounts of average warming, up to 10°F in late-century.

- **Increased dry and wet extremes**

By late-century, the wettest day of the year is expected to increase across most of the LA region, with some locations experiencing increases of 25-30 percent. Increased frequency and severity of rain events are also projected to occur for this region, as well as potentially a doubling in frequency of extremely dry years over southern California by late-century.

- **Sea level rise**

The best available science suggests the Los Angeles region will experience sea levels to rise by roughly 1-2 feet by the mid-century. The most extreme projections anticipate 8-10 feet of sea level rise by the end of the century.

- **Increased wildfire**

Nearly 80 percent of wildfires occur during the summer and fall, with a quarter of annual wildfires occurring during the Santa Ana winds. Projections indicate that wildfire may increase over southern California, but there remains uncertainty in quantifying future changes of burned area over the LA region.¹²⁸

REGIONAL INPUT

A public workshop was held on May 5, 2021 to understand what nature-based climate solutions

are important in the Los Angeles region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the Los Angeles region included:

- Climate resilient communities and nature
- Clean air and water
- Green economy
- Abundant native plants, green infrastructure, and urban parks
- Public awareness and support for nature based solutions
- Restorative environmental justice
- Deep community stewardship, including youth
- Improved public health

Some of the nature-based solutions identified as priorities for the region included:

- Wetland protection and restoration
- Marine Protected Areas
- Living shorelines
- Community greening - river corridors, green stormwater infrastructure, urban forest planting and maintenance, greenbelts, school greening, parks, preserving mature trees, accessible and shaded trails
- Native plant restoration – sage, grasslands, riparian areas, kelp, eelgrass, oak savannahs
- Increase tribal engagement in climate smart land management through, for example, co-management and land agreements

Opportunities to increase equity in the region through nature-based solutions included:

- Build a pipeline of nature-based professionals in the region through workforce development, such as conservation corps programs, internships, and efforts to expand urban greening and address extreme heat
- Create and maintain green spaces in communities, prioritizing those with the least access to nature
- Support environmental education programs through, for example, schoolyard restoration programs, subsidized field trips, multi-language interpretation, and native plant demonstration gardens

SAN DIEGO REGION

The San Diego region includes only San Diego County with a land area of about 4,500 square miles, approximately 2.8% of the state.¹²⁹ The region is home to 3.3 million people.¹³⁰

The San Diego region is known for its mild year-round climate, beaches, low inland mountains, deserts, and highly variable Mediterranean climate. The region contains markedly different climate zones where relatively mild coastal conditions transition rapidly to harsher interior valleys, foothills, and low mountains. Climate change impacts will play out in different ways across the various climates within the region.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Shrubland and Chaparral: 48.7%

Grasslands: 4.7%

Developed Lands: 17.6%

Cropland: 1.5%

Sparsely Vegetated Lands: 12%

Wetlands: 0.94%

Forests: 7.7%

Seaweeds and Seagrasses: 0.34%

The remaining 6.5% of the region's land cover is open water.

LAND OWNERSHIP

Private: 39.6%

Local Government: 6.9%

Federal Government: 29.2%

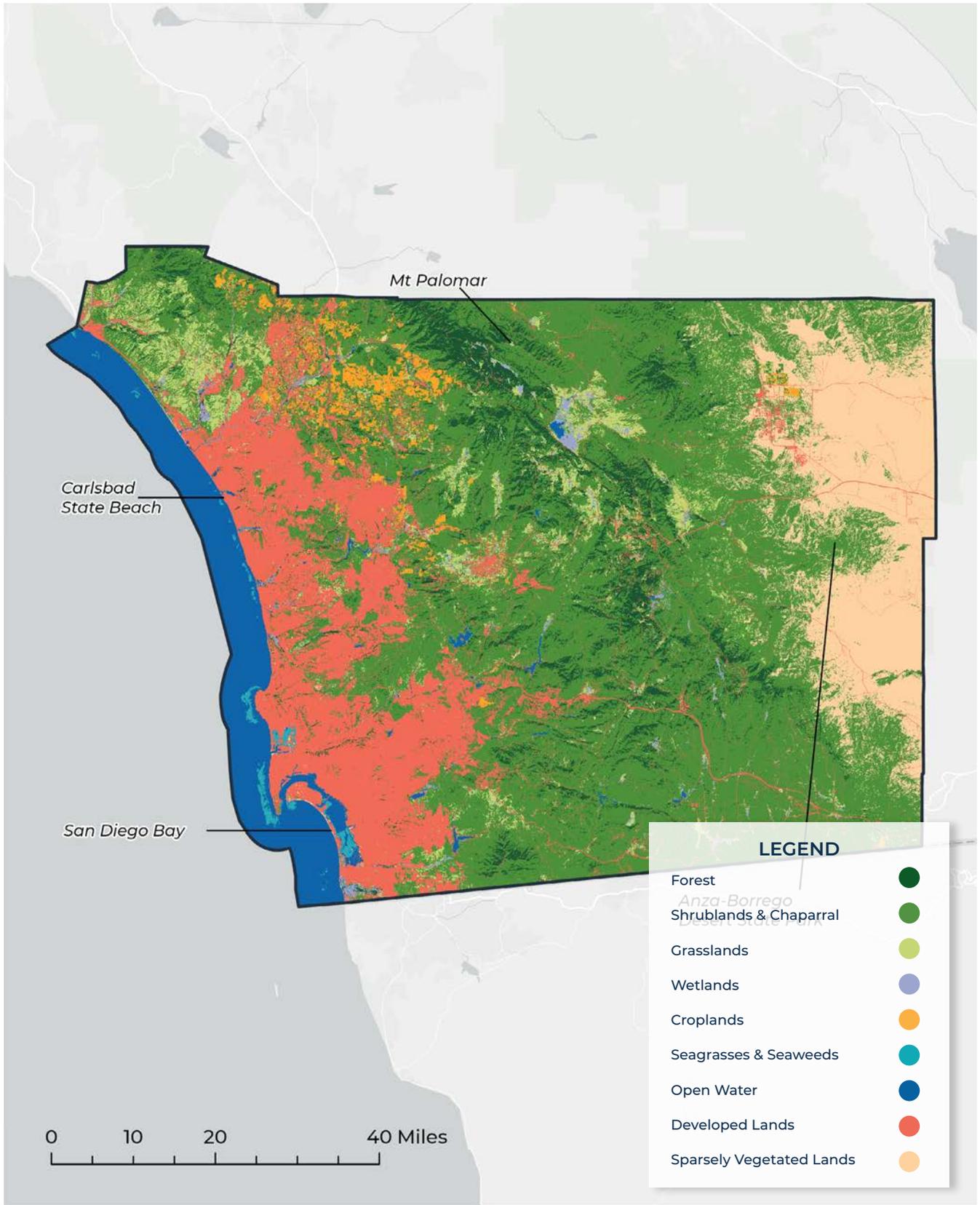
Non-profit: 1%

State Government: 23.3%



Torrey Pines State Beach, San Diego, CA

REGIONAL LAND COVER MAP SAN DIEGO REGION



PROJECTED CLIMATE CHANGE IMPACTS

- Extreme heat, with substantial temperature increases projected by 2100 – between 5 to 10°F. Along with average temperature, heat waves will be more frequent, more intense, and will last longer. The number of heat wave days is projected to increase between 20-50 percent with a temperature increase of 6°F. Higher amounts of warming are expected in inland areas compared to coastal areas.
- Precipitation shifts, including wetter winters, drier springs, and more frequent and severe droughts. Changes in annual total precipitation are uncertain, but most models indicate that there will be fewer wet days, but with more intense precipitation. Longer dry, warm seasons with less daytime humidity will cause stronger seasonal dryness of the landscape and more dry years. More dry years also result in an increase in longer, more frequent and severe droughts in the future, leading to larger water deficits across the landscape.
- Sea level rise, which is expected to reach approximately 1 foot by mid-century and 3 feet or more by 2100. For the next several decades, high tides combined with elevated shoreline water levels will drive extreme events. Projections suggest sea level rise will increase rapidly in the second half of the century.
- Wildfire, due to increasingly warm and dry landscapes and longer dry seasons coupled with occasional dry windy weather patterns. The largest fires in this region typically start during strong, dry Santa Ana winds, which occur within a broad season from September through May, but most intensely in December and January. Increased drought, less moisture for vegetation, and dead vegetation are likely to increase wildfire risk during dangerous fire weather extremes caused by Santa Ana winds.¹³¹

REGIONAL INPUT

A public workshop was held on May 11, 2021 to understand what nature-based climate solutions are important in the San Diego region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the San Diego region included:

- Living coastlines, return of native wetlands and kelp forests
- Blue-green economy
- Climate smart agriculture
- Green communities, deep community commitment to nature
- Abundant native plants
- Science-based land management and monitoring
- Partnerships, funding, and planning for nature-based solutions

Some of the nature-based solutions identified as priorities for the region included:

- Keep landscapes intact, protect habitat corridors, manage lands holistically
- Prescribed burning; restore oak woodlands; protect native species from wildfire
- Restore wetlands, estuaries, kelp forests, eel grass, saltmarshes; build living shorelines; protect coastal habitat; beach nourishment; Marine Protected Areas.
- Increase urban parks; connect parks with green corridors; restore native trees and plants; green stormwater infrastructure; neighborhood gardens.

- Regenerative agriculture, community/local farming, managed grazing; soil regeneration
- Opportunities to scale nature-based education and businesses

Opportunities to increase equity in the region through nature-based solutions included:

- Creating nature parks in urban areas, and ensuring they are safe, accessible, and meet community needs such as being ADA compliant
- Expanding educational opportunities for nature-based learning, such as science programs for girls, community gardens, outdoor education programs, multilingual signage, and nature curriculum in schools
- Increasing access to employment and job training in climate smart land management, for example through youth internships and programs that leverage state and national Conservation Corps initiatives.

SACRAMENTO VALLEY REGION

The Sacramento Valley Region is just north of the Sacramento-San Joaquin Delta, and is made up of the 11 counties in the Central Valley between the Sierra Nevada Mountains and Northern Coast Range. This includes the entirety of Butte, Colusa, Glenn, Sacramento, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, as well as the western extent of Placer County and eastern extent of Solano County. The region makes up 9.2% of the state's land area or just over 15,000 square miles.¹³² The Sacramento Valley Region currently has about 3.1 million residents,¹³³ and supports a thriving agricultural industry. Historically, the region has been characterized by mild winters and dry, hot summers.

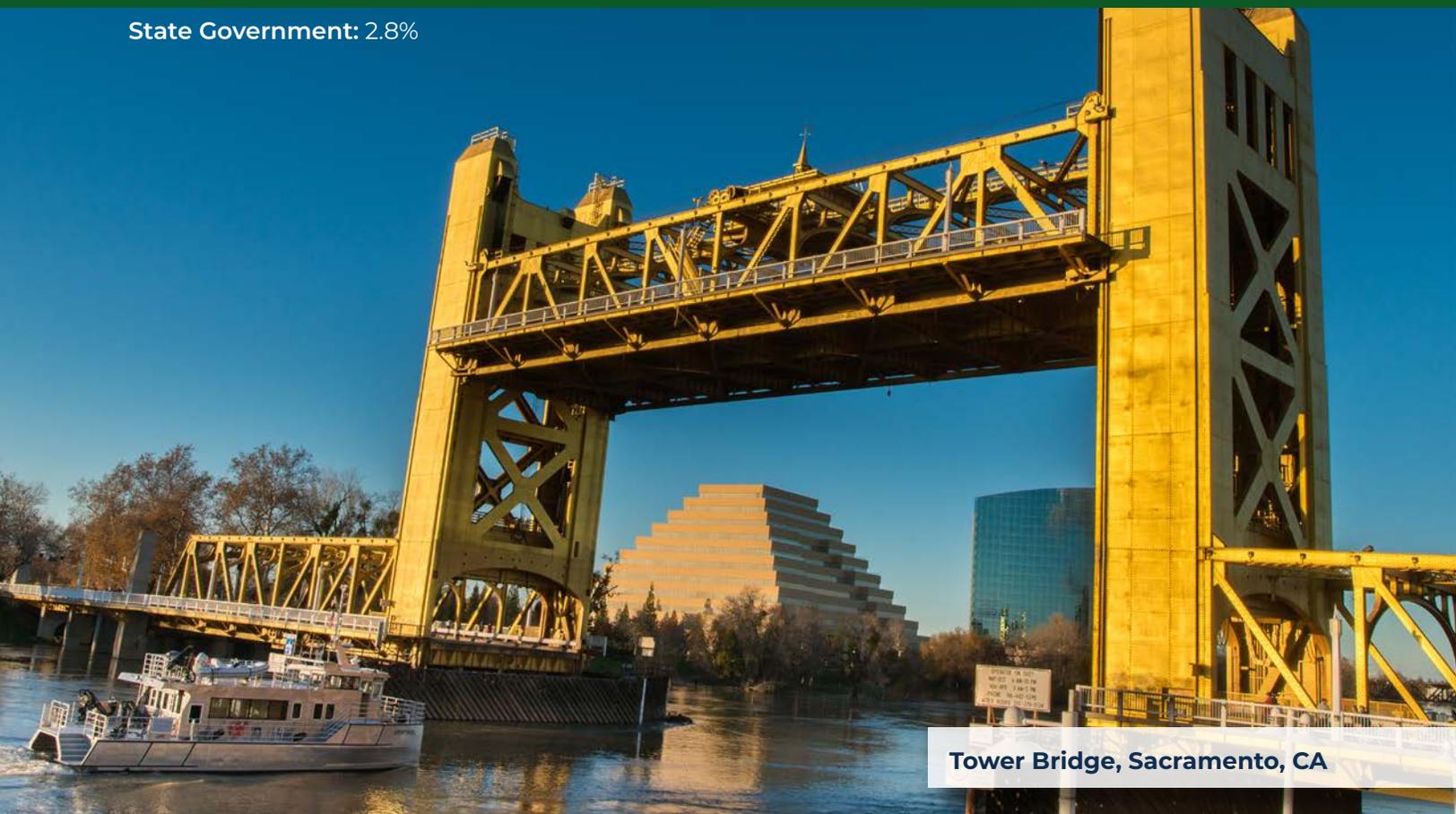
NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Forests: 38.7%	Developed Lands: 7%
Cropland: 20.9%	Wetlands: 4.9%
Grasslands: 15.7%	Sparsely Vegetated Lands: 1%
Shrubland and Chaparral: 9.8%	Seaweeds and Seagrasses: 0%

The remaining 1.7% of the region's land cover is open water.

LAND OWNERSHIP

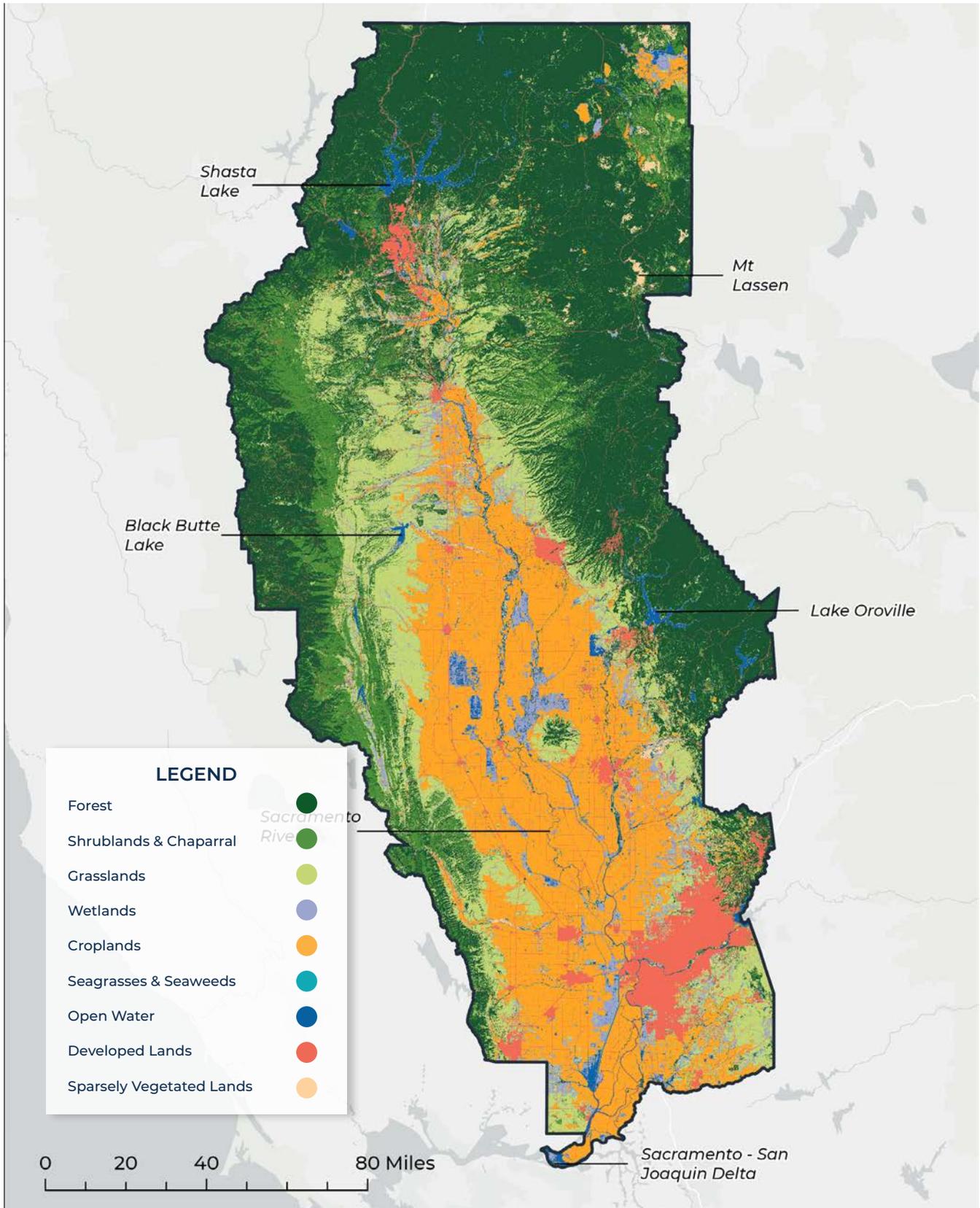
Private: 74.7%	Local Government: 0.6%
Federal Government: 21.6%	Non-profit: 0.3%
State Government: 2.8%	



Tower Bridge, Sacramento, CA

REGIONAL LAND COVER MAP

SACRAMENTO VALLEY REGION



PROJECTED CLIMATE CHANGE IMPACTS

- Increased temperatures, including more frequent and intense heat waves that are anticipated to have higher daytime and nighttime temperatures, last longer, and have a larger geographic extent.
- Relatively similar annual precipitation; however, wetter years are anticipated to become wetter and drier years will likely become drier. Extreme storms are likely to become more intense and cause flooding to the Sacramento Valley region. Due to increased temperatures, snow will increasingly fall as rain, and snowpack will diminish in the Sacramento Valley region.
- Increased flooding due to sea level rise in the San Francisco Bay. These flood waters are also likely to push salty ocean water into the fresher waters of the Sacramento-San Joaquin Delta.
- Increased large summer and fall wildfires due to earlier spring conditions, wetter winters, and drier summers. Fires both within the Sacramento Valley and in other parts of the state will impact air quality in the region, as experienced during recent large fire events.¹³⁴

REGIONAL INPUT

A public workshop was held on April 20, 2021 to understand what nature-based climate solutions are important in the Sacramento Valley region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the Sacramento Valley region included:

- Thriving, healthy communities and ecosystems

- Sustainable funding for nature-based solutions, such as endowments and farmland conservation easements
- Net zero emissions
- Invasive species are in check
- Oak woodland and salmon populations restored
- Environmental literacy
- Equitable community engagement

Some of the nature-based solutions identified as priorities for the region included:

- Green communities – urban forests, connected parks, shaded fuel breaks and trail systems, rain gardens, floodplain parks, urban agriculture, community gardens, native plant buffers, stormwater capture and recharge basins
- Wetland restoration, floodplain expansion and connectivity, post-wildfire reforestation
- Regenerative agriculture, healthy soils, managed grazing, carbon farming, hedgerows, riparian restoration
- Forest and oak woodland restoration, prescribed and cultural burning, watershed protection and restoration
- Building tribal and community capacity to manage and steward lands through, for example, increased co-management and Increase tribal engagement, co-management, and land agreements

Opportunities to increase equity in the region through nature-based solutions included:

- Increasing economic resilience through climate smart land management workforce development programs, such as urban forestry, outdoor recreation, and urban agriculture
- Investing in nature-based solutions that protect vulnerable populations from climate impacts, and build community resilience.
- Involving a broader range of community stakeholders in decision-making
- Connecting young people with opportunities to learn about and enjoy nature

SAN JOAQUIN VALLEY REGION

The San Joaquin Valley is home to approximately 4 million residents.¹³⁵ The region includes the entirety of the Kings, Merced, San Joaquin, and Stanislaus Counties, and the western extents of Fresno, Kern, Madera, and Tulare Counties. At about 17,000 square miles, the San Joaquin Valley makes up 10.4% of the state's total land area.¹³⁶

The region comprises the southern portion of California's Central Valley, south of the Sacramento Valley. The San Joaquin Valley was historically a humid region with ephemeral rivers and lakes. However, 95% of these wetlands have been lost. The San Joaquin Valley is the most productive agricultural region in the United States.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Cropland: 46.7%

Forests: 4.6%

Grassland: 21.4%

Wetlands: 3.1%

Shrubland and Chaparral: 10.9%

Sparsely Vegetated Lands: 2.2%

Developed Lands: 9.2%

Seaweeds and Seagrasses: 0%

The remaining 1.7% of the region's land cover is open water.

LAND OWNERSHIP

Private: 91.6%

Local Government: 0.4%

Federal Government: 5.6%

Non-profit: 1.2%

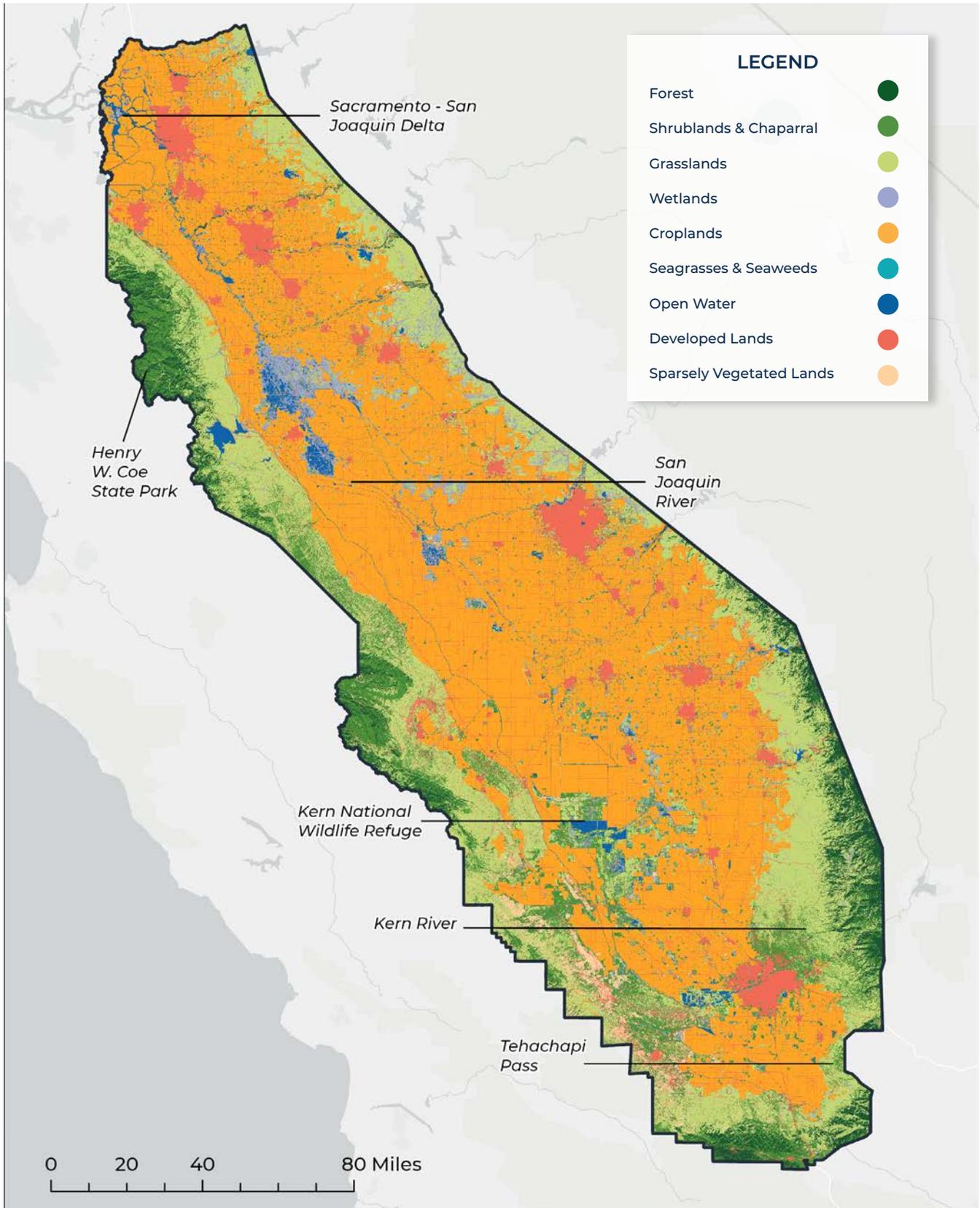
State Government: 1.1%



The Sacramento-San Joaquin Delta, CA

REGIONAL LAND COVER MAP

SAN JOAQUIN VALLEY REGION



PROJECTED CLIMATE CHANGE IMPACTS

- **Continued rising temperatures**
The annual average maximum temperature is projected to increase 4 °F to 5 °F by mid-century, and 5 °F to 8 °F by 2100. This has grave consequences for the region as many agricultural workers work outdoors and are increasingly at risk for heat-related illnesses.
- **Longer dry seasons, as precipitation patterns change**
This may lead to increased groundwater pumping, causing further subsidence and impacts to infrastructure. Additionally, snowpack decline in the Sierra Nevada is increasing water scarcity in the San Joaquin Valley. These will have dramatic impacts on the agricultural sector, as well as drinking water supplies, especially in the face of drought. Drought will have dangerous impacts on this region, as was evidenced by the 2012-2016 drought, when hundreds of wells ran dry and hundreds of thousands of residents lost water security.
- Faster snowmelt, threatening dam stability and increasing the risk of catastrophic flooding. Although not a coastal region, sea level rise is also a concern, as it will threaten Delta communities, including San Joaquin County, with increased flooding.
- The San Joaquin Valley will likely experience more frequent wildfire, which will further threaten drinking water supplies and increase soil erosion.¹³⁷

REGIONAL INPUT

A public workshop was held on April 29, 2021 to understand what nature-based climate solutions are important in the San Joaquin Valley region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the San Joaquin Valley region included:

- Sustainable, green jobs
- Nature-based solution education and cultural shift towards nature-based solutions
- Restored oak woodlands
- Increased prescribed grazing
- Clean water and sustainable water use
- Sustainable food production and institutional procurement for organic products
- Authentic partnerships
- Traditional Ecological Knowledge

Some of the nature-based solutions identified as priorities for the region included:

- Native, drought-resilient planting
- Carbon farming
- Managed grazing
- Increased community greenspace and urban habitat, such as pocket parks, removing asphalt to restore natural areas, and planting native species.
- Nature-based solutions workforce development
- Tribal land management
- Riparian forest restoration
- Prescribed and cultural burning
- Wetland restoration and creation

Opportunities to increase equity in the region through nature-based solutions included:

- Increasing access to nature, including through creating parks and greenways in low-income communities, expanding outdoor education, and creating multilingual interpretation.
- Increasing community engagement, and supporting community-led nature-based solutions.
- Expanding workforce development for careers in climate smart land management, such as native plant restoration.

INLAND DESERT REGION

The Inland Desert Region represents the three counties that comprise the southeastern corner of California. Characterized by low mountains and arid desert valleys, the region includes all of Imperial County and the majority of eastern Riverside and San Bernardino Counties. The Inland Desert Region supports a population of 1.2 million people.¹³⁸ At 28,000 square miles, this region makes up 18% of the state's land area.¹³⁹

The Inland Desert region has the largest amount of protected lands in the state – 7,448 square miles of National Parks and Monuments, as well as significant tourism and agricultural sectors. Containing both the Mojave and Sonoran deserts, this region historically has the hottest and driest climate throughout the state. It is known for high temperatures with a high frequency of extremely hot days (days with temperatures over 95°F). Like other regions, specific climate conditions vary depending on elevation in the inland deserts. Precipitation historically averages 5 inches per year, but it can be extremely variable in amount and location from year-to-year.

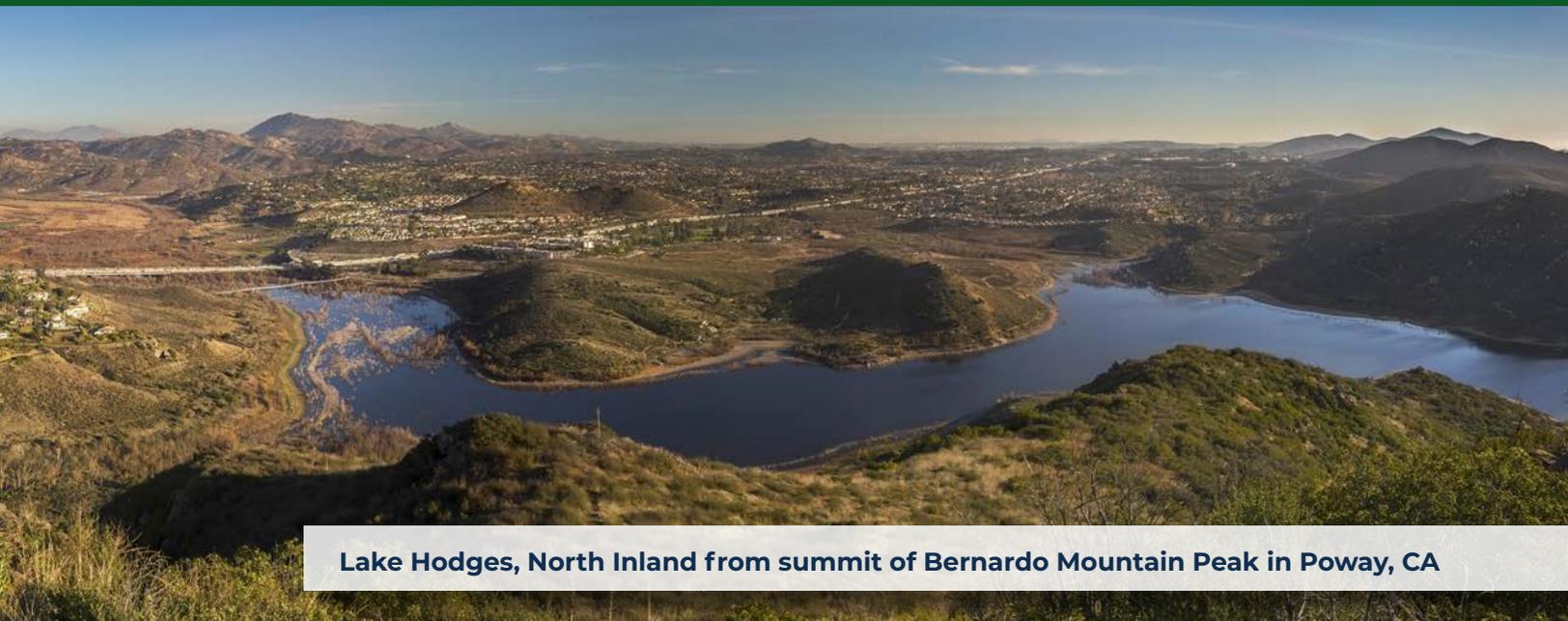
NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Shrubland and Chaparral: 61.2%	Forests: 0.8%
Sparsely Vegetated Lands: 29.8%	Grasslands: 0.7%
Cropland: 3.7%	Wetlands: 0.02%
Developed Lands: 2.3%	Seaweeds and Seagrasses: 0%

The remaining 1.4% of the region's land cover is open water.

LAND OWNERSHIP

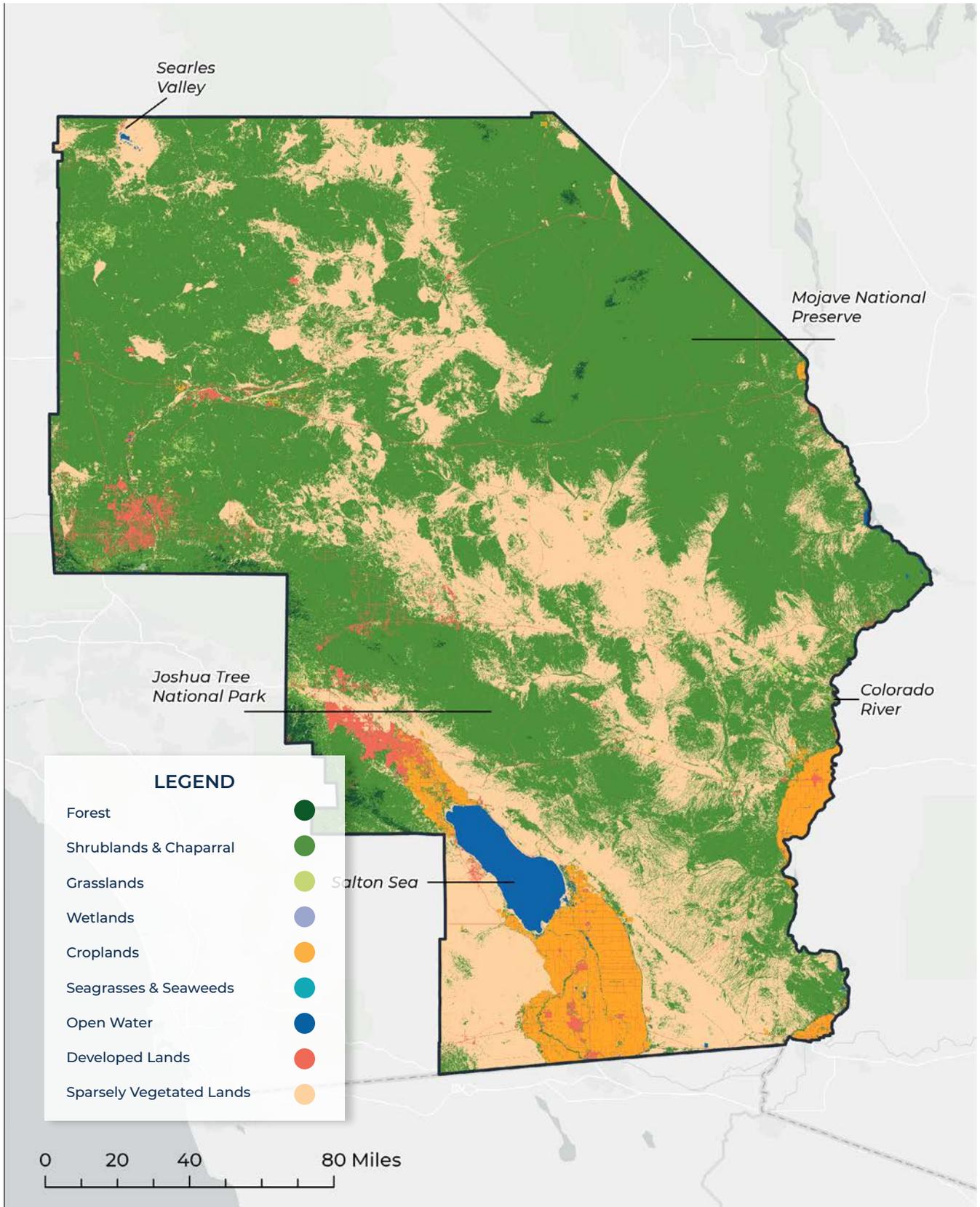
Private: 18.8%	Local Government: 0.7%
Federal Government: 77.4%	Non-profit: 0.3%
State Government: 2.8%	



Lake Hodges, North Inland from summit of Bernardo Mountain Peak in Poway, CA

REGIONAL LAND COVER MAP

INLAND DESERT REGION



PROJECTED CLIMATE CHANGE IMPACTS

- Extreme heat, with temperatures expected to increase 6-10°F by mid-century and 8-14°F by late-century. The number of extremely hot days per year in the region is also projected to increase, with up to 141 extremely hot days in the Mojave and 179 in Palm Springs, which is over a 50% and 30% increase, respectively, from historical averages. These increased temperatures will stress an already-limited regional water supply.
- Similar average precipitation, but the dry periods will likely become drier and the wet periods wetter. Warmer and drier conditions may increase the likelihood of severe drought in this region.
- Depending on vegetation, increased wildfire activity. Inland desert vegetation growth is driven by precipitation, which will remain highly variable for this region.¹⁴⁰

REGIONAL INPUT

A public workshop was held on May 6, 2021 to understand what nature-based climate solutions are important in the Inland Desert region, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the Inland Desert region included:

- Green economies and jobs, with members of historically disadvantaged communities represented in leadership positions
- Increased education on nature-based solutions, particularly those in the desert
- Healthier communities
- Water for wildlife
- Secure water sources

- Restoration of historic desert ecosystems
- Management based on Traditional Ecological Knowledge

Some of the nature-based solutions identified as priorities for the region included:

- Protect groundwater supply
- Urban farming
- Keep deserts intact
- Control non-native grasses and restore native plants
- Wildlife crossings and land conservation for species movement
- Create and protect urban greenspaces
- Increased co-management with California Native American tribes
- Increased education

Opportunities to increase equity in the region through nature-based solutions included:

- Engage and invest in communities
- Support environmental justice
- Small parks accessible to seniors and community members with disabilities
- Tribal-led interpretive education programs
- Community gardens
- Financial incentives to invest locally
- Trails that are accessible to community members with disabilities
- Accelerate the just transition through workforce development in nature-based solutions, for example removing invasive species and native species restoration

SIERRA NEVADA REGION

The Sierra Nevada Region covers approximately 45,000 square miles, or 29% of the state's total land area.¹⁴¹ The region includes the entirety of Alpine, Amador, Calaveras, El Dorado, Inyo, Lassen, Mariposa, Modoc, Mono, Nevada, Plumas, Sierra, and Tuolumne Counties as well as the eastern extents of Fresno, Kern, Madera, Placer, and Tulare Counties. It supports a population of approximately 750,000 people.¹⁴²

The Sierra Nevada region is famous for its picturesque mountains and deep desert basins. The region is characterized by geographic, ecological, and climatological diversity. Historically, the Sierra Nevada region has experienced cool, wet winters, and dry, warm summers. Given that this region varies significantly in elevation, different portions of the region experience different climates. For example, the southern Sierra are much higher in elevation and tend to be snowier compared to the northern Sierra.

The climate of the Sierra Nevada region has also historically been characterized by variation where annual precipitation totals have fluctuated substantially when compared to the rest of the United States.

NATURAL AND WORKING LANDSCAPE TYPES AND TOTALS

Shrubland and Chaparral: 38%

Forests: 37.7%

Sparsely Vegetated Lands: 11.9%

Grassland: 6.5%

Wetlands: 1.5%

Developed Lands: 1.3%

Cropland: 1.2%

Seaweeds and Seagrasses: 0%

The remaining 1.9% of the region's land cover is open water.

LAND OWNERSHIP

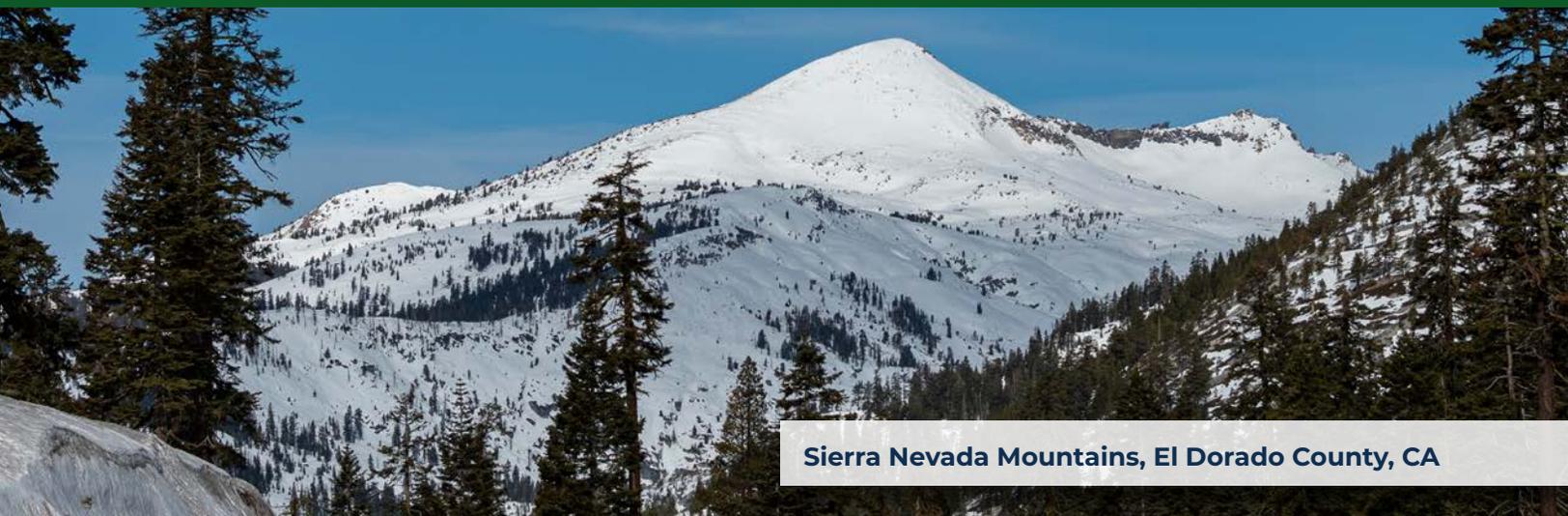
Private: 26.7%

Federal Government: 70.3%

State Government: 1.3%

Local Government: 1.5%

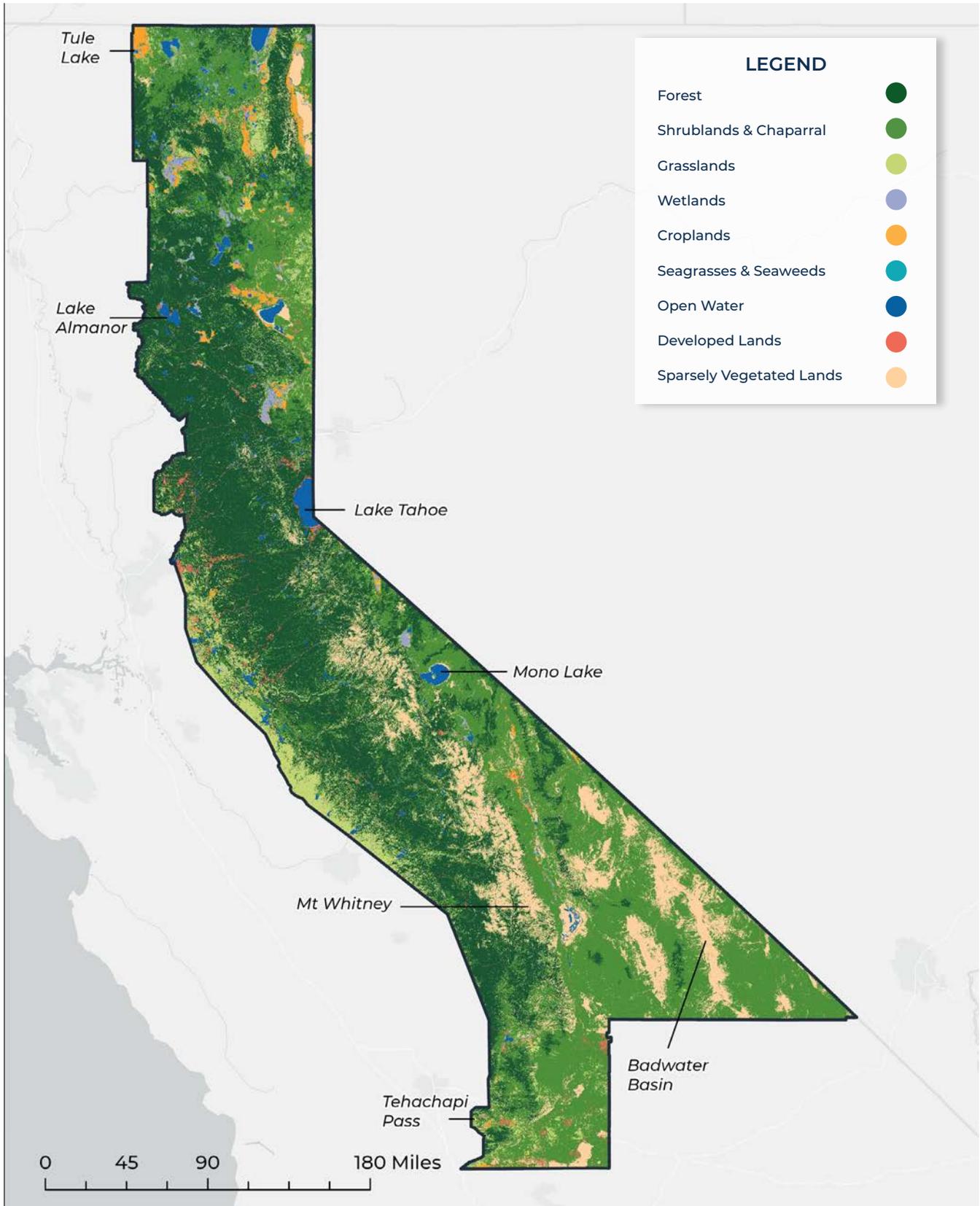
Non-profit: 0.2%



Sierra Nevada Mountains, El Dorado County, CA

REGIONAL LAND COVER MAP

SIERRA NEVADA REGION



PROJECTED CLIMATE CHANGE IMPACTS

- **Increasing temperatures**
By the end of this century, the Sierra Nevada region is expected to warm by 6-9°F on average, which will stress the region's trees. This warming will have impacts on precipitation at certain elevations-- more will fall as rain where it has historically fallen as snow.
- **Precipitation extremes**
On average, precipitation in the Sierra Nevada is not anticipated to change much. However, precipitation extremes are projected to increase as both rain/snow and drought. Again, the region's differences in elevation will mean that these projected increases in extremes will not be felt uniformly across the region. The highest elevations (the southern Sierra) will likely feel more extreme precipitation changes than the lower elevations in the region.
- **Reduced snowpack**
Even though precipitation is not projected to change much on average, warming will have detrimental impacts to the Sierra Nevada snowpack. The region's snowpack is projected to decline by 60% with snow eradicated below 6,000 feet in elevation. Scientists now believe that these snowpack projections could be underestimates, as there are complex, less understood feedback loops between temperature rise and snowmelt. This loss of snowpack will have damaging consequences for the region, including impacts to water bodies and stress to wildlife.
- **Increased wildfire**
A major climate impact facing the Sierra Nevada region is wildfire. Large wildfires are projected to be more frequent and area burned by wildfire is expected to increase in this region.

REGIONAL INPUT

A public workshop was held on April 28, 2021 to understand what nature-based climate solutions are important in the Sierra Nevada, and how this strategy can support the region's environmental, economic, and equity priorities.

Input on what long-term success looks like for climate smart land management in the Sierra Nevada region included:

- Healthy ecosystems
- Equitable and thriving communities
- Adequate resources
- Land trusts and conservation easements
- Increased public awareness and commitment
- Meaningful partnerships and collaborations

Some of the nature-based solutions identified as priorities for the region included:

- Prescribed and cultural burning, fuel reduction, natural fire regimes, reforestation of deforested areas, composting for fire scarred land, tree removal, forest thinning and sustainable forestry.
- Prescribed and science-based grazing.
- Landscape connectivity, conservation easements, the creation of wildlife corridors, habitat restoration and protection
- Traditional Ecological Knowledge.
- Wetland protection, conservation, and restoration
- Build partnerships with and expand stewardship capacity of California Native American tribes

- Education, outreach, improved outdoor education on nature and ecosystems, partnerships with schools and youth outdoor programs

Opportunities to increase equity in the region through nature-based solutions included:

- Community engagement, particularly local youth in underserved communities
- Local and regional collaboration to:
 - Increase access to nature, for example through more parks in underserved areas
 - Expand nature-based education, for example through outreach, improved outdoor education on nature and ecosystems, partnerships with schools and youth outdoor programs
 - Workforce development, for example through programs for interested underserved community members to train for permanent opportunities in climate smart land management
- Programs to engage underserved and historically disadvantaged communities

06

SECTION SIX

OPPORTUNITIES TO SCALE ACTION



Kids Day at California State Fair in Sacramento, CA

SECTION SIX

OPPORTUNITIES TO SCALE ACTION

ADDRESSING CLIMATE CHANGE

Managing our lands to address climate change requires urgent and sustained action (time and effort) across all regions and sectors of California. Communities, businesses, farmers and ranchers, land managers, investors, tribal/state/local/federal governments, youth, philanthropists, scientists, planners and more can all play a role. The pace of implementation depends on the level of our collective commitment and availability of resources.

State agencies have been privileged to hear from partners across California on how best to achieve the vision for nature-based climate solutions in Governor Newsom's Nature-Based Solutions Executive Order (EO N-82-20). Many of their ideas are captured in this section to facilitate consideration of how we can each contribute to accelerating and scaling nature-based solutions.

They are organized into the following broad categories of opportunity:

- Partnerships and Collaboration
- Science, Research, Data, and Analysis
- Technical Assistance, Capacity, and Outreach
- Funding, Finance, and Market Mechanisms
- Workforce and Organization
- Incentives and Procurement
- Policy and Regulation

As you consider this draft, we would be grateful to understand which actions (a) you consider to be top priorities for climate action in California (b) are missing (c) you or your organization can advance (d) the state can most usefully advance.

PARTNERSHIPS AND COLLABORATION

1. Explore opportunities to partner with California Native American tribes to accelerate nature-based climate solutions through, for example, nature-based workforce development, capacity building, co-management and co-ownership agreements, and land returns.
2. Collaborate with tribal partners to incorporate tribal expertise and Traditional Knowledges to better inform prescribed burning plans and coordinate healthy forest management activities.
3. Facilitate and resource local, state, federal and tribal government partnerships to increase prescribed burns, accelerate healthy forest management actions, and foster increased coordination and information sharing.
4. Launch a partnership dedicated to greening every school yard in California, prioritizing schools in climate vulnerable communities.
5. Set climate smart land management goals on publicly and privately owned lands.
6. Launch the Healthy Soils Partnership Framework, in which partnerships with the private sector, philanthropy, NGOs and federal government fund training, incentives, and infrastructure for healthy soil management practices.
7. Explore incentivizing climate smart land management through state transportation infrastructure funding programs, as recommended in the Climate Action Plan for Transportation Infrastructure.
8. Convene Nature Based Solutions Leadership Circles to support successful and urgent implementation in communities, regions, and sectors across California.
9. Support high road nature-based solutions workforce programs that advance California's environmental, equity, and economic goals.
10. Add collaboration and partnership with California Native American tribes as requirements in relevant grant funding programs.
11. Work with California Native American tribes to incorporate Traditional Knowledges into innovative and sustainable cropland management plans.
12. Explore opportunities to increase and improve data collection that supports climate smart land management outcomes for interested landowners.
13. Partner with relevant retailers to allow shoppers to add money to their purchase that will support climate smart land management – outdoor apparel industry, supermarkets/co-ops/farmers markets, etc.
14. Collaborate with Visit California to increase public awareness and contribution to nature-based solutions with tourism-based businesses that rely on healthy natural and working lands (ex. wine, recreation, and hospitality industries).
15. Partner with the federal government to support research that will increase our understanding of the risk mitigation potential of climate-smart strategies on croplands, forests, grasslands, and shrubland and chaparral. There is currently a lack of research and information to enable many climate smart land management practices to meet FEMA Benefit Cost Analysis requirements. Investments in measurable/quantifiable risk mitigation benefits from climate smart practices that are eligible for FEMA Hazard Mitigation Assistance funding would provide more opportunities to leverage state and federal funding. This research should also incorporate information on future climate risk, not just backward looking risk data.

16. Convene utilities, water districts, and local governments to identify how rate payer and other local funds can be distributed or coordinated in a manner that accelerates urban reforestation.
17. Launch a Manure Products Working Group to address water quality and climate issues and identify synthetic fertilizer alternatives.
18. Create an information clearinghouse for woody biomass feedstock supplies, to support end-use and tracking of feedstock generation.
19. Partner with coastal landowners to create collaborative projects that protect and adapt shorelines to sea level rise impacts.
20. Update/adopt Local Coastal Plans to include nature-based climate solutions.
21. Support communities and local governments to identify opportunities to support climate action on California's natural and working lands that also deliver on local/regional environmental, equity, and economic priorities.
22. Identify and remove barriers for small businesses in nature based industries and provide new incentives to open new business in these industries.
23. Partner with the nursery industry to develop a broader variety of tree/plant species that are climate smart and non-invasive.
24. Partner with local health departments, tribal health consortia, and other public health partners to maximize the health benefits of nature-based climate solutions.
25. Build and maintain regional approaches to improve the health and resilience of California's diverse landscapes by supporting and utilizing the state's nine conservancies. The state conservancies work directly with regional partners, understand regional needs and challenges,

and support work to restore resilience, while improving the environmental, economic, and social well-being of the Region's they serve.

SCIENCE, RESEARCH, DATA, AND ANALYSIS

26. Lands and coastal waters should be evaluated for current and historical carbon storage, the potential for future carbon sequestration with restoration or management, and the stability of the stored carbon and risk of carbon loss due to climate change or land use change.
27. Identify statewide foundational natural and working lands data sets and the staffing and infrastructure needs to support their analysis, use, and appropriate updates. These include high resolution topographic, vegetation, land cover, land use and supporting scientific sampling and should be made openly available to all users when possible.
28. Align the use of tools such as TerraCount and COMET-Planner with GGRF programs and investments so that more programs can support the implementation of climate action plans integrating nature-based climate solutions.
29. Connect land use decision makers with technical and analytical resources to better price risk into land use decisions and minimize liabilities to local taxpayers or the state.
30. Support tribal elders and cultural practitioners to research Traditional Knowledge and develop baselines of historical conditions.
31. Expand ongoing utilization of airborne and satellite remote sensing data to assess the efficacy of nature based solutions and other management measures in providing multi-benefits in the face of a changing climate.

32. Convene experts to develop recommendations on the role of crop insurance and risk management in incentivizing and disincentivizing climate-smart practices.
33. Develop new and/or amplify existing tools that will support California Native American tribes and land managers in understanding the impacts of climate change, and that will facilitate resource-sharing in the event of climate disasters.
34. Research ecosystem services valuation to account for the benefits of nature-based climate solutions in California. For example, ensure that nature-based carbon sequestration projects in critical watersheds account for and utilize the value of resulting water savings. Incorporate pricing strategies into state investment decision making to value land-based systems and benefits not currently captured.
35. Convene California experts to estimate the funding gap to implement nature-based climate solutions needed to deliver ambitious climate action on our natural and working lands.
36. Conduct economic analysis of climate smart practices to increase understanding of short and long term economic feasibility and economic benefits of implementing climate smart land management practices.
37. Use public health, climate change vulnerability, job quality, natural cultural resource, and cultural landscape protection indicators to inform climate smart land management decisions.
38. Research the impacts of human activity and disturbances on deserts. Use this information to determine the degree to which protecting the soil and vegetation will limit/minimize the impacts from ongoing disturbance or habitat loss and contribute to carbon neutrality and climate resilience.
39. Fund research that identifies coastal areas suitable for wetland restoration.
40. Collaborate with tribal partners to incorporate tribal expertise and Traditional Knowledges in data collection and research.
41. Identify research opportunities to accelerate healthy soil management practices.
42. Research the feasibility and design of a transfer of development rights program in California to mitigate greenhouse gas emissions by preserving landscapes needed for carbon sequestration/storage, protecting natural areas, safeguarding water supplies, and protecting vulnerable communities.
43. Improve climate and carbon sequestration science related to healthy soils:
 - Improve documentation on sequestration to support funding and resources, increase understanding about the results of specific practices, the longevity of benefits, and where implementation is most efficient.
 - Increase soil sampling density and frequency throughout natural and working lands; compile a soil sample database and maps to help set and assess progress toward carbon targets that incorporate soils.
 - Partner with California Native American tribes to incorporate Traditional Knowledges and tribal expertise into healthy soils practices.
44. Develop and standardize environmental and community impact accounting practices, in partnership with local governments.
45. Support studies that analyze impacts of climate change on natural resource availability, especially groundwater.
46. Support identification of innovative and environmentally safe solutions to post-fire salvage logging, where merchantable logs are being chipped and sent to landfills.

For example, storing post-fire salvage logs in reservoirs could help promote carbon sequestration by preserving the logs until there is capacity for them to be milled.

47. Support use of mass timber manufactured from dimensional or structural composite lumber sourced from forest management activities (i.e. small diameter, mostly) through testing how different species (and different diameters) behave in different types of mass timber (ex. cross-laminated timber vs. Mass plywood panels).
 48. Research and assess current and future impacts to California's coastal ecosystems, species, and cultural resources due to climate change and changing ocean conditions.
 49. Expand long-term monitoring of key species, habitats, and oceanographic variables to support multiple priorities in ocean and coastal management (e.g. marine protected areas, kelp forest ecosystem resilience, etc.).
 50. Scale up pilot kelp restoration projects, and use results to develop a statewide kelp restoration "toolkit" that includes information on the environmental and ecological circumstances under which various kelp restoration options are likely to be most effective. Develop methods to predict changes in kelp abundance based on known drivers.
 51. Develop an approach for predicting climate-driven changes in rocky intertidal and beach ecosystems, including habitat loss due to sea level rise and species range shifts due to ocean warming. Identify the most endangered rocky intertidal and beach habitats.
 52. Develop a state-wide network of reference sites (for wetlands, seagrasses and kelp) and associated monitoring programs against which restored habitats are compared.
- Reference analogous, naturally occurring habitats to assess the trajectory of restored habitats.
53. Consider using the Canada National Forest Carbon Monitoring, Accounting, and Reporting System in California.
 54. Improve data collection and dissemination on all natural and working lands to track current management practices as well as the goals of those actions. This effort will help determine how actions and their intended outcome affect carbon stocks through time.
 55. Improve and centralize tracking of state supported/authorized climate smart land management actions.
 56. Streamline climate quantification tools required by state programs and provide common metrics and guidance to estimate and track climate benefits associated with climate smart land management actions. This will increase use of these tools, allowing for more consistent and comparable data across programs and accelerated climate action in the natural and working lands sector.
 57. Require monitoring and evaluation programs for living shorelines and dunes projects for sea level rise resiliency and wetland restoration projects to inform best practices.
 58. Identify measurable economic or public health benefits to disadvantaged or low-income agricultural workers, including improved safety associated with the use of safer, more sustainable pest management tools and practices or increased wages due to higher organic commodity prices as a result of intersecting conservation and climate efforts.

TECHNICAL ASSISTANCE, CAPACITY, AND OUTREACH

59. Build community capacity, particularly through younger generations. Structural racism has especially impacted the capacity of communities of color to undertake community development projects. Proactively resourcing technical assistance and capacity building in vulnerable communities more generally is a key part of improving community investments. For example, state funded “access” grants should support community organizing across vulnerable communities to address the structural challenges to access. This is particularly important for the younger generations who will inherit the results of many actions taken today and need to be set up with the tools to grow and lead these projects in the future.
60. Launch a Nature-Based Solutions Technical Assistance Initiative to support and increase the capacity of California landowners, Native American tribes, land managers, communities, and others to accelerate climate smart land management in California. Specific technical assistance may include:
 - Facilitating meaningful community engagement.
 - Identifying opportunities to incorporate nature based climate solutions into relevant plans, programs, and infrastructure investments, based on community input.
 - Utilizing relevant tools to quantify climate outcomes.
 - Connecting funding needs with opportunities.
 - Building capacity to propose, develop, implement, and maintain nature-based solutions.
61. Partner with community-based organizations, landscape architects, urban foresters, urban agricultural experts, and developers for five years to support the efforts of communities, local and regional governments, California Native American tribes, and others to implement nature-based climate solutions. This support could include technical assistance, training, and comprehensive, community-led planning processes.
62. Increase culturally-sensitive and relevant technical assistance and ensure an accessible application process for climate smart land management resources.
63. Reconvene the Climate Smart Infrastructure Working Group to develop design guidance and best practices for priority nature-based climate solutions.
64. Analyze engagement of climate vulnerable communities in efforts to support climate smart land management, to understand whether adjustments in the outreach approach to these partners are needed.
65. Develop a menu of options for new planning strategies, policies, and incentives to help direct growth away from natural and working lands, to protect and conserve open space, and critical natural infrastructure at the urban edge.
66. Develop guidance on ways to elevate climate smart land management strategies in local (City and County) land use and related plans, such as General Plans, Climate Action Plans, transportation and community resilience plans, groundwater sustainability plans, drought response

plans, hazard mitigation plans, and housing plans. Link these to state incentives and regulations.

67. Support large-scale restoration and stewardship of less productive agricultural landscapes for climate resilience through funding and the development of guidance and implementation strategies.
68. Establish best practices to guide broader application of conservation and cultural easements to support achieving carbon neutrality and/or building climate resilience.
69. Create a Best Management Practices training for preventative fire management and thinning, working with appropriate state and federal agencies, community colleges, and tribal representatives.
70. Support, promote, and provide technical assistance for land use analysis tools available in California to help inform complex land use decisions and optimize climate benefits in local jurisdictions.
71. Create a one-stop shop for California state climate smart land management programs, funding, tools, and information.
72. Create a California Native American tribal one-stop shop for tribal specific climate smart land management programs, funding, tools, and information.
73. Host new and expanded natural and working lands data sets on CA Nature as an authoritative clearinghouse of natural and working lands data for local planners.
74. Build out a robust nature-based solutions public awareness campaign to help people understand the benefits of these actions and empower them to contribute.
 - Draw connections between the climate benefits of natural and working lands and healthy food, community safety and public health.
 - Support demonstration projects to encourage acceptance: farmer-to-farmer, neighbor-to-neighbor, municipality-to-municipality.
- Host annual nature-based climate solutions forum to increase public awareness, explore current issues, exchange lessons learned, build networks, address critical challenges, report on progress, etc.
- Take into consideration language access needs, including translation of accompanying visuals, handouts, and presentations. Local communities need information in plain, straightforward language, avoiding technical terms as much as possible.
- Provide culturally relevant and sensitive messaging, if feasible, with input from our partners (i.e., California Native American tribes, NGOs, CBOs, etc.)
75. Develop a nature-based solutions curriculum for California public school students.
76. Support regular and sustained access to nature for California's youth through schools, community-based organizations, recreational opportunities, and more.
77. Amplify the benefits of healthy soils practices on water quality in Irrigated Lands Regulatory Program guidance.
78. Work with and advise local governments on strong policies and plans for improved management of urban forests. Facilitate adoption of best management practices to improve long term urban forest outcomes and achieve local and statewide goals.
79. Create a toolkit to advance inclusion of cultural heritage into climate vulnerability index assessments to create more holistic, intersectional, and larger landscape tools to inform climate action decisions.
80. Support pathways for California Native

Americans to effectively share traditional practices with the next generations.

81. Explore the development of a statewide, climate-smart monitoring program.
82. Assist agricultural operations in developing and implementing climate change mitigation and adaptation plans, such as Carbon Farm Plans.
83. Support conventional producers in transitioning to organic farm management in ways that increase biodiversity on-farm and reduce the use of synthetic inputs.
84. Support historically disadvantaged small-scale farmers in climate smart land management through, for example: farmworker cooperatives and land trusts; first-time farm ownership assistance for former farmworkers, tenant farmers, and historically disadvantaged new and beginning farmers; grants and zero/low-interest loans and capital assistance programs; tribally-led land-based projects; and additional financial and technical assistance programs.

FUNDING, FINANCE, AND MARKET MECHANISMS

85. Recognize and explore opportunities to address the barriers that may limit access to funds, such as processes that require extensive application knowledge and time, as well as funding through reimbursement that limits the opportunity to only those who are able to fund up front.
86. Explore opportunities to make existing and new funding for nature-based climate solutions more efficient through, for example, rolling applications; extra points for cooperation of multiple participants; increased capacity building; uniform advanced payments where appropriate; paying invoices sooner; funding total costs of project, including: planning, education,

outreach, and maintenance.

87. Leverage the investment programs at IBank to attract private capital providers with an interest in supporting climate-smart land strategies.
88. Include paid opportunities for community members to participate and contribute to climate smart land management such as native species planting, landscape restoration, and community science initiatives.
89. Explore targeted loan guarantees to community lenders that support nature-based solutions, particularly for those traditionally excluded from investment opportunities.
90. Support park projects in disadvantaged communities, including in rural and unincorporated communities, including for operations and maintenance.
91. Increase the portfolio of nature-based solutions in California's federal hazard mitigation funding.
92. Support interagency teams to expedite the permitting of large-scale restoration projects.
93. Establish a carbon market for nature-based climate solutions that is designed to inspire/match private contributions, and be accessible to a diverse suite of project implementers.
94. Explore potential new funding sources for nature-based climate solutions, such as restoring a portion of tidelands revenues for natural and working lands; leveraging insurance products to increase stability of annual expenditures and facilitate proactive investments; etc.
95. Identify, amplify, and access federal funds to deliver urban nature-based climate solutions in California.

96. Explore long-term stable and dedicated funding sources for natural climate solutions; target and prioritize resources for tribal governments and historically disadvantaged communities; re-examine current funding regimes and modify them as needed to prioritize funding for community organizing and engagement. It is important to recognize and address the barriers that may limit access to funds, such as processes that require extensive application knowledge and time, as well as funding through reimbursement that limits the opportunity to only those who are able to fund up front.
97. Explore the potential to include endowment funding for state nature-based climate solution investments.
98. Support California Native American tribes and smaller landowners with initial costs associated with developing an offset project, which are often a barrier.
99. Explore funding for demonstration projects aimed at improving measurement and verification practices for nature-based climate solutions.
100. Explore tribal set asides, such as tribal-only grants, formula, and non-grant funding opportunities to support tribes as partners in implementing the EO.
101. Work with insurance companies to lower rates for landowners implementing nature-based climate solutions that reduce risk.
102. Work with philanthropy to create a fund that issues recoverable grants for rural climate smart infrastructure. Prioritize adding value to regionally grown materials and bridging historic wealth gaps through job creation.
103. Explore development of a new Nature-Based Solutions Bank, potentially building off of Catalyst Fund at IBank, or how to build greenhouse gas carbon sequestration into existing conservation banking.
104. Advance the combined use of conservation easements and carbon markets, using the Buckeye Forest as a replicable approach.
105. Provide additional capital to IBank's Catalyst Fund expressly for purposes of flexible, low-interest lending across the practices in this strategy.
106. Reduce cost share requirements, if any, for projects on natural and working lands owned or managed by California Native American tribes and socially disadvantaged farmers and ranchers.
107. Launch a public-private partnership to facilitate the development of new markets for nature-based climate solutions, and identify opportunities for existing ecosystem services markets to scale nature-based climate solutions in California.
108. Consider inclusion of a wetland restoration protocol as part of California's cap-and-trade program.
109. Develop viable financial frameworks that address the current misalignment between project structures and investment needs through, for example:
 - California Native American tribes, project developers and local governments could bundle and/or diversify nature-based climate actions to achieve investment scale and reduce risk.
 - Local governments and insurers could develop innovative insurance models to bring private investment and community approaches to nature-based resilience and climate solutions.
 - The California Department of Insurance could develop mechanisms to increase the insurability of forest assets.
110. Public pension leaders could promote investment in nature-based climate action that aligns with long-term funding goals.

- 111. Use reverse auctions in grantee selection processes to reveal price points for nature-based climate solutions.
- 112. Explore the development of a “Debt for Natural and Working Lands Program” to protect critical landscapes and acquire community parcels that can become greenspace.
- 113. Provide guidance to local governments on how to treat urban forests/greenspaces like essential infrastructure (rather than amenities) to increase access to existing local government budgets.
- 114. Coordinate with efforts to create carbon mitigation banks that integrate nature-based solutions.
- 115. Identify and consider whether landowners eligible for climate smart land management funds live in disadvantaged communities rather than simply location of company offices, and whether investment will directly benefit the local community.
- 118. Create a pipeline of trained forestry workers (arborists, tree trimmers, pruners, landscapers, etc.), firefighters, and wood products industry workers; expand apprenticeship opportunities and High Road Training Partnerships in these sectors; and prioritize local job-seekers from climate vulnerable communities.
- 119. Support the addition of wraparound services for youth nature-based solutions workforce development programs. Examples of wraparound services include tutoring, family support, transportation, mental health services, and connections to key community resources.
- 120. Invest in organizational diversity and capacity of nature-based solution organizations. Elevate voices by further diversifying state and regional conservancies and build partnerships with those underrepresented or missing from nature-based solutions coalitions.
- 121. Create an advisory council or taskforce to support identification of any structural inequities in nature-based solutions initiatives, and opportunities to address them. Require training and resources for staff to understand the history of racism and inequity in the natural resource sector.

WORKFORCE AND ORGANIZATION

- 116. Explore the development of a Nature-Based Solutions Workforce Development Program that is connected to regional and sector strategies and prioritizes job-seekers from climate vulnerable communities. Convene regional roundtables to identify opportunities that support local priorities as well as the hiring needs of nature-based solutions employers offering quality jobs.
- 117. Explore the development of a program for justice involved individuals to get training for careers in the nature-based solutions industries through classroom-based learning, apprenticeships, industry-recognized certifications, hands-on community greening projects, and job application skills.
- 122. Include measurable metrics and targets to ensure support for efforts of climate vulnerable communities to scale nature-based climate solutions.
- 123. Explore creating an Office of Small Farms within CDFA to support implementation of nature-based climate solutions on lower-acreage operations.
- 124. Support, align, and leverage existing workforce development programs, such as the local and state conservation corps, and California Climate Action Corps, to urgently scale climate smart land management. Identify opportunities to expand

successful efforts; close gaps; engage educational institutions, community based organizations and the public workforce system; expand apprenticeships and create linkages to High Road Training Programs; and leverage federal funding.

125. Partner with Labor Workforce Development Agency and the state's education partners to work with high school, undergraduate and graduate work study programs and California Native American tribes to support nature based solution work job opportunities, work-based learning, and career pathways at the community level.
126. Support financial incentives and mentorship programs for native students majoring climate smart land management fields in California Community College, California State University, and University of California schools.
127. Expand relevant education programs to increase volume along pathways to higher education disciplines in the natural sciences. Support universities and community colleges with programs that build and support the climate smart land management workforce and increase diversity within these professions. Create new apprenticeships and training pathways for these roles.
128. Explore opportunities to increase recruitment of and training/support for registered professional foresters, including through the creation of an apprenticeship program.
129. Coordinate all state programs engaged in urban forestry and greening - programs to utilize best planting and management practices, follow state guidance on best urban forestry practices, ensure quality job creation and connection to sustainable careers, and consult or coordinate with CAL FIRE for technical assistance– the state's designated authority on urban forestry.

130. Support the California Conservation Corps' urban programs to maintain urban greenspaces and trees.
131. Work with communities to provide training and certification for community and on farm compost development; and prioritize local job-seekers from climate vulnerable communities.
132. Increase training and apprenticeship programs that train farmworkers to become farm managers or farm owners.
133. Develop community workforce agreements to scale nature-based climate solutions.
134. Include more experts in Traditional Knowledge and nature-based climate solutions in decision-making bodies.
135. Inventory unmaintained, dilapidated buildings to identify opportunities for replacement with community greenspace.

INCENTIVES AND PROCUREMENT

136. Review existing incentives to identify and amend those that have unintended consequences for the health of our natural and working lands.
137. Explore financial incentives for nature-based climate solution investments. For example:
 - Incentivize private landowners and local governments to enter into co-management agreements with California Native American tribes.
 - Incentive-based monitoring pilot program for climate smart land managers.
 - Incentivize urban landowners to undertake climate smart land management actions such as creating urban landscapes that sequester carbon, utilizing drought-resistant and/or native plants, and protecting large, established trees.

- Incentivize biological agricultural production practices and inputs (such as organic fertilizers) to support healthy soils, water, and air resources and to improve health outcomes, particularly for rural agricultural communities.
 - Incentivize solar developers and farmers/ranchers to partner in development of large-scale solar projects that would protect prime farmland and diversify landscapes prioritized for solar installations, provide shade to livestock, cool soils, and provide renewable energy to the grid.
 - Incentivize shading along critical waterways to cool water and protect native fish.
 - Partner with banks and credit unions to identify, create, and package lending programs that incentivize small businesses to grow in the innovative wood sector.
 - Incentivize large industrial landowners to employ climate smart practices.
 - Create and promote land lease models that support and reward climate smart land management.
 - Incentivize small timber-based businesses and foresters to provide thinning and other fire prevention services.
138. Develop a climate smart certification program for products, suppliers, and purchasers that support nature-based climate solutions.
139. Explore changes to the Williamson Act to support farmers who fallow under the Sustainable Groundwater Management Act (or pursuant to forbearance agreements or otherwise in response to drought conditions) are not penalized for doing so and address climate change. Tools like TerraCount and COMET-Planner could be used to support implementation by counties and landowners.
140. Make organic certification easier and stronger through a program like the Renewable Portfolio Standard for organic land managers.
141. Support fee-to-trust applications for parcels owned by tribes; waive all state tax requirements for these applications.
142. Financial incentives for implementing climate smart land management should include requirements that benefit workers and nature. These actions must be intentional, with agreements developed to ensure communities are benefiting from projects as intended.
143. Explore preferential buying/procurement requirements that support nature-based climate solutions. For example:
- Establish procurement requirements for nature-based acquisitions to achieve, over time, 100% “carbon friendly/climate resilient” status; include labor, workforce, and employer/contractor standards in procurement contracts to ensure job quality, job access, and quality of work.
 - Establish contracting requirements or preferential bid awards that incorporate nature-based solutions, increase the uptake of low-carbon materials derived from natural and working lands, support high road employers and jobs, etc.
 - Utilize the purchasing power of State food programs such as school lunches, state-funded hospitals and prisons to prioritize procurement of climate smart agricultural products.
144. Explore developing sole-sourcing relationships with tribes and their entities for cultural resource identification, cultural monitoring, restoration, etc.

- 145. Utilize the market power of school food/EBT/SNAP programs through requiring a certain percentage of socially disadvantaged farmers get preference.
- 146. Explore the potential for universal regenerative organic school meals in California.

POLICY AND REGULATION

- 147. Convene an internal working group to identify opportunities to integrate nature-based solutions into existing efforts and review existing nature-based solution efforts to ensure they are contributing to our collective climate change goals.
- 148. Increase the number of climate smart properties that are SITES certified, and consider adopting this certification program into capital construction programs.
- 149. Incorporate nature-based solutions that achieve multiple benefits into the Education Department's Construction Division regulations. Outcomes include reduced school energy costs and pollution exposure; cooler indoor and outdoor environments for schoolkids; expanded stewardship and education through food garden construction; increased access to nature.
- 150. Establish an equity framework for climate smart land-related resource allocation. This would involve identifying climate vulnerable communities and prioritizing resources for them (ex. funding, loans, incentives, facilities, training, jobs, and leadership/decision-making opportunities).
- 151. Support park development in low-income affordable housing developments.
- 152. Add job creation, job access, and responsible employer/contractor measures (e.g., standards and targets) and job quality to procurement contracts that support climate smart land management in CA.
- 153. Utilize fairgrounds for food and other resources-based industries targeting local and regional markets.
- 154. Integrate climate smart land management practices and partnership into state land leases, particularly with California Native American tribes.
- 155. Require energy developers and project owners to consider alternatives to clear-cutting vegetation under infrastructure, as well as opportunities for climate smart land management throughout the project's lifetime.
- 156. Prohibit or strongly disincentivize large-scale clearing of native habitats.
- 157. Evaluate how to phase out and ban chemicals (like glyphosate and many others) that cause biodiversity loss, chronic illness, and widespread pollution in our air and waterways.
- 158. Require statewide and consistent sea level rise adaptation plans that are protective of blue carbon habitats.
- 159. Implement new policies that acknowledge and respect tribal jurisdiction and rights for traditional, cultural, subsistence, and commercial harvesting, gathering, and management in all state lands, including coastal waters and state parks.
- 160. Explore opportunities to include California Native American tribes in the management and decision making for state lands, waters, coastlines, and resources within their ancestral territories and coastal waters. This can be done through joint powers agreements, memoranda of understandings, and co-management agreements.
- 161. Streamline compost production regulations to minimize organic waste in landfills and build healthy soils, while ensuring food safety.

162. Amend composting policies to clarify and simplify the regulations for on-farm composting; allow for compost to be moved from one farm to another; increase compost supply; and evaluate mammalian composting.
163. Explore opportunities to better evaluate climate smart land management activities through revisions to the CEQA statute and the CEQA greenhouse gas emissions guidelines. For example:
- Require project proponents evaluate and mitigate the greenhouse gas emission impacts associated with conversion of natural and working lands, and outline a greenhouse gas mitigation hierarchy that prioritizes mitigation locally, as consistent with the Scoping Plan.
 - Require CEQA analyses to include impacts to biological carbon and loss of carbon sequestration.
 - Establish a standardized mitigation program for land use conversion, subdivision, and down-zoning of resource lands to smaller ownership minimum acreages
164. Provide a regulatory “credit” in the Irrigated Lands Regulatory Program for climate smart land management practices.
165. Amend scoring of Integrated Regional Water Management Program application scoring to award higher points for priority nature-based solutions in grant applications.
166. Ensure policies and programs support non-federally recognized tribes’ ability to implement nature-based climate solutions.
167. Amend Public Resources Code and Fish and Game Code to allow tribes to participate as conservators of lands, similar to non-profits and public agencies.
168. Incorporate California Native American tribal considerations into the work of the Regional Water Boards.
169. Amend the cap-and-trade regulations to make it easier for tribal governments to participate:
- Aggregation of projects to add newly acquired parcels into compliance projects;
 - Buffer swaps for flexibility to shift which parcels are held as buffers and which are used for carbon offsets; and
 - Implement cost-saving measures, specifically regarding the verification of credits process.
170. Consider recommendations from the cap-and-trade offset task force established by AB 398 that align with AB 32 requirements. Some of the recommendations include: making the program more accessible for smaller forest landowners; reviewing ways to reduce monitoring and verification costs; allowing for aggregation of projects to add newly acquired parcels into compliance projects; providing mechanism for swaps in buffer lands to increase flexibility in which parcels are held as buffers and which are used for carbon offsets; and implementing cost-saving measures, specifically regarding the verification of credits.
171. Increase the use of easements to deliver climate outcomes; develop common easement language that could accelerate this recommendation.
172. Expand safer, more sustainable pest management alternatives to harmful pesticides and support the increased reliance on biological pest control to protect worker and public health, and support scaled up training for integrated pest management technical assistance providers.

173. Address barriers for implementing climate-smart practices for farmers, particularly historically underserved farmers, who lease land on agricultural land owned by non-operating landowners.
174. Require use of local native plants in state-funded projects involving landscaping and/or plants, with the opportunity to provide exceptions if clearly justified (for example, for urban forestry programs and the Healthy Soils Program).
175. Where appropriate and applicable, Departments should rely on the Class 33 categorical exemption for small habitat restoration projects in the CEQA Guidelines
176. Consider stricter density in local planning and zoning requirements to safeguard undeveloped land and promote infill development.
177. Elevate the role of climate smart land management in SB 375.
178. Streamline reporting for the Irrigated Lands Regulatory Program and other environmental compliance requirements to incentivize implementation of healthy soil management and biodiversity practices (e.g. riparian planting).
179. Consolidate mitigation requirements through the Department of Conservation for any state required agricultural mitigation, building on their administration of HSRA's Agricultural Lands Mitigation Program.
180. Coordinate all relevant vegetation treatment permits under the CAL VTP including permits from WaterBoards, CDFW, CEQA, and any other relevant agencies or departments to ensure wildfire resilient activities have an ecologically sound and efficient path to environmental oversight.
181. Explore a regulatory process that combines all relevant permit processes (e.g., Water, Coastal, and Fish and Wildlife permits) into a single application to promote nature based solution projects.
182. The Department of Fish and Wildlife should continue to explore and advance options for permitting large-scale restoration projects by means of a combined approach to a Section 2081(a) take authorization under the California Endangered Species Act and a lake and streambed alteration agreement authorization pursuant to Section 1600, et seq and look for opportunities to ensure consistency with the SWRCB's General Order.
- Prioritize agroecological practices in agricultural climate smart land management efforts; maximize climate, public health, and economic benefits to climate vulnerable communities:

Prioritize programs and projects that promote safer, more sustainable pest management practices and tools and reduce the use of harmful pesticides, promote healthy soils, improve water and air quality, and reduce public health impacts. In addition, support strategies that achieve co-benefits of safer, more sustainable pest management practices and the health and preservation of ecosystems.
 - Prioritize programs and projects with measurable reductions in fertilizer runoff and leaching to reduce groundwater contamination in rural communities.
 - Prioritize programs and projects that provide co-equal benefits of health and safety improvements for farmworkers exposed to extreme heat and wildfire smoke.

The background is a solid teal color with abstract, light-colored lines that suggest a landscape. On the left, there are several triangular shapes radiating from a point, resembling a sunburst or a stylized mountain peak. Below this, there are several curved, wavy lines that suggest rolling hills or a field. The overall composition is clean and modern.

NATURAL AND WORKING LANDS CLIMATE SMART STRATEGY

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