



California Landscape Conservation Cooperative Science-Management Framework



December 2013



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CA LCC Purpose

Purpose

The Science-Management Framework (Framework) identifies the process by which the CA LCC provides scientific support for natural resource managers to incorporate climate-smart* conservation strategies into their management actions. This 5-year Framework is part of the CA LCC Strategic Plan, developed with the assistance of the Science-Management Team and adopted by the Steering Committee. Participants of the Science-Management Team can be found in Appendix B.

CA LCC Strategic Plan Highlights**

VISION

California supports diverse and thriving ecosystems through lasting cooperative conservation partnerships.

FIVE-YEAR GOAL

A growing community of resource managers, scientists, conservation practitioners, and others that are successfully collaborating to advance and implement actions that promote resilient and adaptable ecosystems across the landscape in the face of environmental change.

KEY SCIENCE-MANAGEMENT STRATEGIES

- Identify key science needs and improve delivery of usable scientific information to enable effective implementation of conservation strategies.
- Identify and facilitate efficient ways to engage partner collaboration.
- Support and promote place-based projects in ecoregions that demonstrate and advance conservation at a landscape scale.
- Promote, support and coordinate cross-sectoral† understanding of ecosystem processes and services to advance climate-smart conservation at a landscape scale.

* Climate-smart is defined as the intentional and deliberate consideration of climate change in natural resource management, realized through forward-looking goals and linking actions to key climate impacts and vulnerabilities. A full glossary can be found in Appendix A.

** Adopted May 2013

† Cross-sectoral is defined by the CA LCC as working with more than one group, agency, discipline or area.

About CA LCC

Background

CA LCC landscapes are a diverse and dynamic mix of ecosystem types that are a center for biodiversity, endemism, and conservation concerns. This complex environment spans alpine mountains, mixed coniferous forests, riparian corridors, woodlands, shrublands, grasslands, and wetlands and the coastal ocean (Figure 1). Ocean processes are important drivers for the estuarine, marine and other coastal ecosystems of the CA LCC given its location along the Pacific Coast. Many distinctive ecosystem types occur within the geographic region, examples include: kelp forests, dunes, vernal pools, old growth redwood forest, offshore islands, and many ecosystems that support a variety of endemic species.

California has the highest total number of species and endemic species compared to other states in the United States. California endemic species include the following taxa: 2,153 vascular plants, 20 freshwater fishes, 17 mammals, 17 amphibians, 5 reptiles, and 2 bird species (Department of Fish and Wildlife 2003). California leads the nation in the number of rare species, with 31% of its species identified as at risk (CA Department of Fish



Figure 1. R. G. Bailey ecoregions found within the CA LCC.

and Wildlife 2003). California has 91 Federally listed Endangered species and 39 Federally listed Threatened species (USFWS 2013).

California has several of the nation's biological diversity "hotspots" and is one of 25 worldwide "hotspots" (Stein et al. 2000), with the CA LCC itself situated within one of these (CA Floristic Province). The high biodiversity of California can be attributed to our complex geologic history, highly variable terrain, Mediterranean climate and the sheer size of the state.

This diverse landscape is susceptible to the unprecedented rates of change from both natural and anthropogenic-induced modifications to the landscape, including climate change. Non-climate change stressors to California environments include natural resource extraction, intensifying agriculture, land development, introduced species, water

"California has the highest total number of species and endemic species compared to other states in the United States."

About CA LCC



Figure 2. Designated Ecoregions being used to identify and prioritize place-based projects that demonstrate and advance conservation at a landscape scale.

diversion which all result in habitat loss and fragmentation, altered hydrological and fire regimes (National Fish, Wildlife and Plants Climate Adaptation Partnership 2012). These stressors present important management concerns for terrestrial and aquatic ecosystems. Coastal and marine non-climate stressors include runoff and pollution, over harvesting, freshwater diversion, and coastal land development. Many species including rare or endemic species are vulnerable to landscape change and other human impacts.

Impacts associated with changes in our climate include warmer temperatures, rising sea levels, drought conditions, snowpack loss, variable precipitation and altered phenology – which separately and collectively results in new or exacerbated stresses for ecosystems, communities and species

(National Fish, Wildlife and Plants Climate Adaptation Partnership 2012). Current and future projected rates of climate change will alter ecosystem composition, structure, and function presenting new challenges to natural resource managers and other decision-makers (Appendix C). The challenges with non-climate and climate stressors and their potential synergistic effects will vary across the landscape and are important to consider in conservation efforts.

In order to capture the diversity and uniqueness of CA LCC landscapes and ensure that all parts of the region are reached, we used R.G. Bailey's ecoregions, adapted by the USDA Forest Service, California Department of Fish and Wildlife, and others (Figure 1; Bunn et al. 2007) to delineate distinct sub-regions (Ecoregions) within the CA LCC. The CA LCC encompasses over 56 million acres which have been portioned into seven terrestrial Ecoregions and one Marine Ecoregion for Framework implementation (Figure 2). These Ecoregions will be used to develop and support projects specific to these biogeographic domains, as well as projects that address issues related to ecosystem processes and natural resource management challenges common across these sub-regions.



CA LCC Ecoregions



“Impacts associated with changes in our climate include warmer temperatures, rising sea levels, drought conditions, snowpack loss, variable precipitation and altered phenology – which separately and collectively results in new or exacerbated stresses for ecosystems, communities and species.”

National Fish, Wildlife and Plants Climate Adaptation Partnership 2012

CA LCC Ecoregions

NORTH COAST

The North Coast is a mix of rural and urban landscapes with the largest city being Santa Rosa. A small portion of the North Coast Ecoregion consists of coastline including Pt. Reyes National Seashore, Bolinas Lagoon, and the Bodega Bay region which includes important rocky intertidal, tidal wetlands, beach and dune habitats. Sonoma Creek, Petaluma River, Napa River, and portions of the Russian River are found here and have important stream and riparian habitats. Most of the landscape includes vineyards, light use agriculture and grazing. This is intermixed with oak woodlands that include valley and coastal live oaks, chaparral, grasslands and vernal pools. In addition, this area has coastal redwood forests along the Russian River valley and the historic Muir Woods.

BAY-DELTA

The San Francisco Bay and Sacramento/San Joaquin River Delta, the nation’s second largest estuary, supports economically important commercial fisheries and provides essential breeding habitat for several endangered fish and wildlife species. In addition, it provides wintering habitat for tens of thousands of migratory shorebirds and waterfowl and was recently designated as a

CA LCC Ecoregions

wetland of international importance (The Ramsar Convention on Wetlands, 2013). This Ecoregion is highly urbanized, with over 8 million people and major cities such as San Francisco, San Jose, and Oakland. Prominent ecosystem types are open estuarine and brackish water with adjacent mudflats, freshwater rivers and riparian areas. Upland ecosystem types include oak woodlands, grasslands, and chaparral.



CENTRAL COAST

The Central Coast Ecoregion comprises an ecologically heterogeneous series of mountain ranges and valleys paralleling the coast between San Francisco Bay and Point Conception. The climate is semi-arid and heavily influenced by marine upwelling and fog on the coast and orographic rain in the mountains, producing complex microclimates and diverse plant assemblages. Many plant and animal species find their northern or southern range limits in this transition zone between coastal coniferous forests to the north and fire-prone shrublands to the south. The region is sparsely populated and has extensive wilderness, but also includes some of the most valuable, intensively-farmed land in the nation, notably

the Pajaro, Salinas, and Santa Ynez valleys. Prominent ecosystem types are grasslands, chaparral, mixed-evergreen forest, and rain-fed mountain creeks. Notable coastal ecosystems are rocky intertidal, coastal dune systems, marine kelp forests, and brackish and freshwater slough systems. The submarine Monterey Canyon is one of the world's more notable underwater features.

CENTRAL VALLEY

At over 12 million acres, the Central Valley Ecoregion is the second largest Ecoregion in the CA LCC. It is a large north-south trending alluvial valley extending over 450 miles from the southern Cascade Mountains in the north to the Tehachapi Mountains in the south. The Sacramento River, with a mean annual flow of 22 million acre-feet, drains an area of 27,000 square miles and is the largest river in California. The San Joaquin River, with a mean annual flow of 7.5 million acre-feet, drains an area of 32,000 square miles and represents the river with the second largest flow in California. Both rivers flow into the Sacramento-San Joaquin Delta. Over 65% of the Ecoregion has been converted to agricultural and urban land uses and relatively little land in the Ecoregion is protected. The Central Valley



historically supported extensive grasslands, riparian corridors, wetland complexes, and vernal pools that provided habitat for large herds of elk and pronghorn, grizzly bear and other predators, and vast flocks of waterfowl. Extensive management of Sierran Rivers and diversion and draining of Valley wetlands has greatly altered much of the remaining riparian and wetland habitats in the Ecoregion. The Central Valley is one of the most important agricultural regions on the planet, with grasslands that provide important rangeland for livestock operators, and tens of thousands of acres of row crops, orchards, vineyards, and rice, contributing more than \$25 billion per year to California's economy.



SIERRA NEVADA

Comprising the largest Ecoregion in the CA LCC, the Sierra Nevada rises from the Central and Owens Valleys to over 14,000 feet at its highest points. It is primarily granitic, with areas of volcanic and ultramafic minerals in the north, and patches of carbonate in the south that contain karst features. The more gently ascending west slope supports oak woodland and chaparral shrubland at the lower elevations, transitioning to conifer forest, subalpine conifer woodland, and finally alpine vegetation. On the drier and steeper east

slope, sagebrush shrublands in the foothills transition to conifer woodlands, montane and subalpine forests, and alpine vegetation at the highest elevations. The range supports about 400 regularly occurring vertebrate species, representing about two-thirds of California's birds and mammals, and about half the reptiles and amphibians. The Sierra Nevada stores a substantial fraction of the state's agricultural and domestic water supply in the form of winter snow as well as reservoirs.

SOUTH COAST

The South Coast Ecoregion supports the largest urban population in the state at nearly 20 million people. Most of this population resides in the highly converted coastal plains and inland valleys, while the Transverse and Peninsular Mountain Ranges are largely undeveloped. Due to the extensive conversion of habitats, it supports the highest number of threatened and endangered species in California. Many of the species are associated with coastal and maritime scrub habitats, vernal pools, coastal marshes, and other wetlands and riparian habitats that are greatly reduced in their extent relative to historic acreages. The Ecoregion still supports extensive chaparral, oak woodland, and conifer ecosystems.



“Along with diverse habitats, California supports more species than any other state and has the greatest number of endemic species, that is, species that occur nowhere else.”

CA LCC Ecoregions



BAJA CALIFORNIA

The Baja California Ecoregion represents the southern-most extent of the California Floristic Province and supports unique ecosystems in the CA LCC. The north coastal portion of Baja has been extensively modified by development in the Greater Tijuana region, but much of the Ecoregion continues to support high quality natural resources and species not found in other parts of the CA LCC. In particular, the Baja California Ecoregion still supports high quality coastal bays and wetlands that are important for a variety of species and serve as critical migratory stopover and wintering areas for waterfowl, and unique mesa vernal pool habitats. Landscape connectivity between coastal-inland habitats is still high, but connectivity to the South Coast Ecoregion to the north is highly compromised by increasing anthropogenic development.

MARINE

The Marine Ecoregion is the central portion of the extensive California Current System, a pattern of winds and cold south-flowing water with extensive effects, including subsidiary eddies, jets, and gyres that generate dynamic ecosystems. Driven

by northerly winds, dry-season upwelling along the coast and over the continental shelf brings cold, nutrient-rich water to the surface, fueling highly productive yet highly variable coastal ecosystems including kelp forest, rocky reef, shelf break and open ocean, which in turn support valuable fisheries for salmon, groundfishes and coastal pelagic fish such as sardines and anchovies. The Ecoregion has the greatest diversity of rockfish species in the world. Abundant micronekton (small-bodied pelagic animals) support the largest and most diverse seabird and marine mammal communities in the continental USA, including many migrant species. Geographic and bathymetric features such as capes and



submarine canyons focus productivity and influence the distribution of organisms. A major biogeographic break from subarctic to subtropical marine species occurs at Point Conception, the northern limit of the warm Southern California Eddy. Human influences on this Ecoregion include a billion-dollar fishery, oil and gas development, and intensive shipping traffic. The sensitivity of the Current System to climate change remains a major uncertainty.

Science-Mangagement



“Climate-Smart conservation will bring on-the-ground tools for achieving clearly defined goals within a changing environment.”

Science-Management Needs and Delivery

During the last three years the CA LCC has conducted workshops, trainings and interviews to assess natural resource managers’ science needs. These managers and the Science-Management Team consistently identified a set of high-priority needs that focused on useful science information, decision support and the need to incorporate climate change impacts into management strategies and actions. Those identified actions include:

Science Information Delivery and Exchange -

Information that is accessible, relevant and useful to support resource manager decision making.

Decision-Support -

Methods, tools and processes (e.g., vulnerability assessment, conservation design) that are relevant and useful to support resource manager decision making.

Climate-Smart Principles Strategies and Actions -

New and promising conservation practices and “on-the-ground” tools for achieving clearly defined goals within a changing climate.

Goals, Objectives & Strategies

Goals, Objectives and Strategies



CONSERVATION GOALS

The Science-Management Team developed a set of broad conservation goals to help guide the Framework over the next five years. These goals are the desired long-term outcomes for the landscapes within the LCC. Specific science-management Objectives and Strategies are outlined below that will help reach our Conservation Goals. Our conservation goals are:

- Conserve resilient, adaptable and self-sustaining aquatic and terrestrial ecosystems that maintain California's biodiversity.
- Promote landscape-scale connectivity and ecological and physical processes that function within current and future ranges of variability to support diverse and thriving ecosystems.
- Ameliorate the impacts of climate change and other co-occurring stressors to ecosystems and species.

OBJECTIVES AND STRATEGIES

The CA LCC strives for meaningful contributions towards achieving these Conservation Goals by pursuing four measurable objectives that add value to existing efforts, lead to climate-smart conservation outcomes for priority resources on the ground, and transfer successful approaches and lessons learned across the landscape. The Objectives and Strategies will implement the Five-year Goal of the CA LCC Strategic Plan, as well as address the key science needs previously discussed – information delivery and exchange, decision-support methodologies, and climate-smart conservation strategies and actions.



Critical to accomplishing the Objectives are strong partnerships among scientists, managers, tribes, agencies, institutions and stakeholders. These partnerships serve as the foundation for collaborative projects that lead to implementation of climate-smart actions on the ground. Projects supported by the CA LCC will address priority resources, key management needs and will apply climate-smart principles.

CLIMATE-SMART PRINCIPLES

The CA LCC Strategic Plan stresses the importance of promoting resilient and adaptable ecosystems across the landscape in the face of a changing climate. Accordingly the Science-Management Framework stresses the pursuit of climate-smart conservation outcomes. The following set of climate-smart principles has been adapted from work by the National Wildlife Federation and others who are working on a Practitioners Guide to Climate-Smart Conservation that will be available in 2014.

- Link actions to climate impacts
- Embrace forward looking goals
- Adopt strategies robust in an uncertain future
- Collaborate and communicate across sectors
- Employ agile and informed management

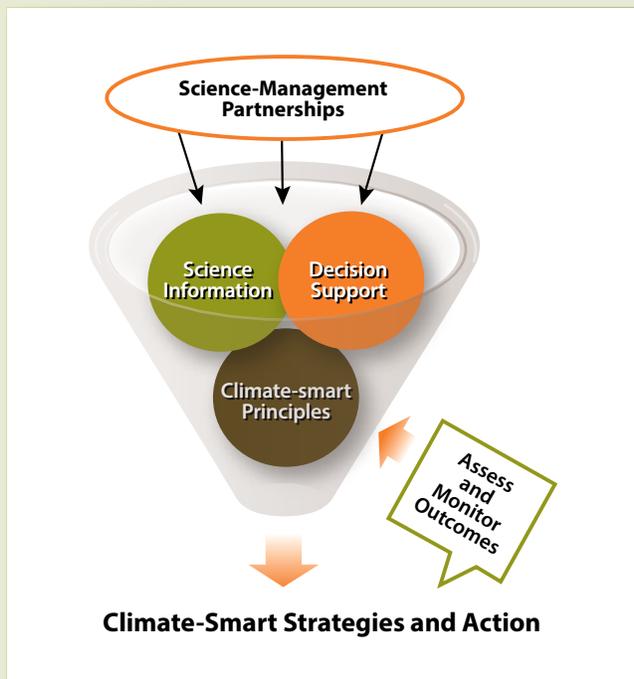


Figure 3. CA LCC conceptual model to support climate-smart conservation outcomes.

“The CA LCC Strategic Plan stresses the importance of promoting resilient and adaptable ecosystems across the landscape in the face of a changing climate. Accordingly the Science-Management Framework stresses the pursuit of climate-smart conservation outcomes.”

Objective 1

Objective 1

Support ten or more place-based projects distributed across all CA LCC Ecoregions that lead to climate-smart conservation actions by resource managers.*

STRATEGY 1

Support the design and implementation of place-based projects that advance climate-smart conservation.

Place-Based Projects will include five key components:

1. Partnership: Build a collaborative, ongoing partnership and communication network among scientists and managers representing a wide range of organizations and stakeholders (including tribes where applicable). Include willing partners who are already engaged and can take actions on the ground to leverage and coordinate ongoing efforts.
2. Information: Collect, compile and synthesize existing relevant science information and Traditional Ecological Knowledge (TEK) when applicable. Identify information gaps, common conservation objectives and Ecoregional priorities.
3. Decision Support: Use climate-smart principles and the appropriate decision-support methodologies such as vulnerability or landscape assessments to inform the development of climate-smart strategies and actions to conserve priority resources.
4. Strategies: Design climate-smart conservation strategies and actions to achieve measurable conservation objectives to conserve priority resources.
5. Action: Establish plans and mechanisms that clearly lead to implementation on the ground.



**The Strategic Plan (Objective 2, Strategy 1) calls for two place-based projects per year in different Ecoregions over the next five years.*



“Expertise from Traditional Ecological Knowledge experts will help guide identification of priority resources, information gaps and understanding of changing ecosystem processes.”

PLACE-BASED PROJECTS

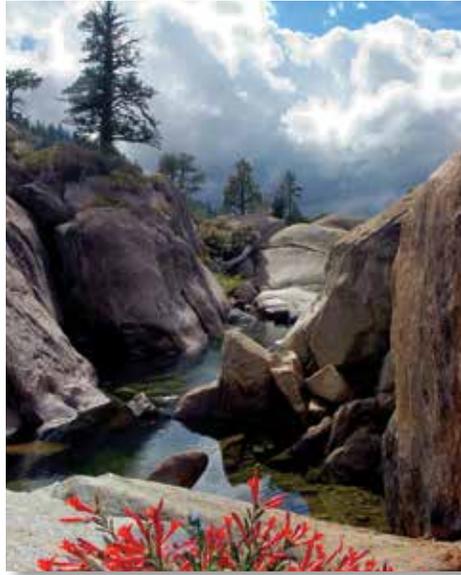
“Place-based” projects demonstrate or advance climate-smart conservation in a specific geographic location such as an Ecoregion or a landscape within an Ecoregion. Projects will meet regionally identified high priority needs and address priority resources and important management issues. Projects will highlight the unique capacities and capabilities that add value and support climate-smart strategies and actions.

TRADITIONAL ECOLOGICAL KNOWLEDGE (TEK)

TEK is a cumulative body of knowledge and beliefs handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

The CA LCC will seek increased tribal involvement, particularly from tribal resource managers and scientists interested in opportunities to integrate TEK and western science. Expertise from TEK experts will help guide identification of priority resources, information gaps and understanding of changing ecosystem processes.

Objective 1



STRATEGY 2

Support place-based projects that address Ecoregional priorities and needs.

- Place-based projects will address:
 - Priority resources in the Ecoregion including landscapes, ecosystems, or habitats (e.g., high species/community diversity, vulnerable or endemic species, vulnerable or unique habitats)
 - Top stressors
 - Critical identified management needs
- Projects will draw upon existing conservation planning documents and regionally identified priorities (e.g. Habitat Conservation Plans and state plans such as the California State Wildlife Action Plan (SWAP) that identify priority resources in each Ecoregion). See Appendix D and E for examples of major conservation planning efforts and adaptation plans.

STRATEGY 3

Ensure that place-based projects show high value-added by the CA LCC, high impact, respond to management needs, and use methodologies and practices that are transferable.

Key criteria for all projects include:

- Value-added by the CA LCC – the CA LCC will make a unique contribution to the project or greatly enhance existing efforts.
- High impact – projects will generate climate-smart conservation strategies that address critical stressors to priority resources within or across Ecoregions.
- Relevance to management – natural resource managers are able to respond with actions on the ground.
- Transferable results –project approaches or outcomes can be replicated in other locations with refinement and adaptations as needed.

Projects will require co-leads including a scientist and a natural resource manager. Additionally, proposed projects will be evaluated annually for other criteria as decided by the Science-Management Team such as capacity of the project team, amount of leveraging and feasibility. Innovative or groundbreaking projects that can advance climate-smart applications will be encouraged.



“Sometimes nature is big, and crosses our human boundaries. Climate change is such a phenomenon. In response, we need to think big, and work together across those boundaries. The LCC is a place where that can happen. If it didn’t exist, we’d have to invent it—or something very much like it.”

Mark Kramer, Director of External Affairs, California TNC

CA LCC staff pictured from left to right: Andrea Graffis, Communication Coordinator; Rebecca Fris, Science Coordinator; Debra Schlafmann, Coordinator; and Karen Thorne, USGS Science Advisor.

CA LCC STAFF ROLE

In support of Conservation Goals and Objectives, staff will engage in projects over multiple years, including facilitation, outreach and information exchange and oversight of project implementation. Assist projects in developing teams of scientists and managers. The strong engagement of managers and stakeholders in partnerships is a key element of project success.

- Help build project teams across institutions, agencies and disciplines to accelerate creative synergy and reach new audiences.
- Review, evaluate and share information on innovative projects underway or under consideration in other LCCs or elsewhere.
- Monitor progress of each project according to pre-established performance benchmarks.

Case Study 1

Place-Based Project : Case Study 1

OBJECTIVE 1: Support ten or more place-based projects distributed across all CA LCC Ecoregions that lead to climate-smart conservation actions by resource managers.

PROJECT TITLE: *From Awareness to Action: A Vulnerability Assessment and Adaptation Strategies for Focal Resources of the Sierra Nevada*

PROJECT LEAD: EcoAdapt

DESCRIPTION: The U.S. Forest Service (USFS) initiated this collaborative, multi-stakeholder effort to develop a large-scale vulnerability assessment and associated adaptation strategies for focal resources of the Sierra Nevada. This project has provided information and tools for forest planning and management (e.g., NEPA analyses, Forest Plan revisions, Climate Scorecard) and other natural resource management and conservation efforts (e.g., state fire and wildlife plans) to prepare for climate change impacts in the Sierra Nevada. Specifically, the objectives were to: (1) assess the vulnerability of focal resources to climate change, (2) use spatial analysis and expert input to prioritize conservation areas or actions, and (3) identify implementable management responses to climate change. To achieve these objectives, the team facilitated two workshops and created comparative maps. The workshops informed specific management needs and developed strategies that will result in actionable responses by conservation partners. Comparative maps that are available online identify spatially explicit recommendations on the most suitable management options for each focal resource identified.



PLACE-BASED KEY ELEMENTS MET: This project met the five key elements over the last two years, including pulling together a strong partnership, drawing upon relevant and usable science information, identifying priority focal habitats, conducting a vulnerability assessment for decision support and developing adaptation strategies for implementation by the partners engaged in the process.

PARTNERS: US Forest Service, Geos Institute, Conservation Biology Institute.

FOR MORE INFORMATION:

<http://ecoadapt.org/programs/adaptation-consultations/calcc/>

Case Study 2

Place-Based Project : Case Study 2

OBJECTIVE 1: Support ten or more place-based projects distributed across all CA LCC Ecoregions that lead to climate-smart conservation actions by resource managers.

PROJECT TITLE: *North-Central California Coast and Ocean Climate Adaptation Project*

PROJECT LEAD: Gulf of the Farrallones National Marine Sanctuary

DESCRIPTION: This effort began in October 2013 with the goal of creating a plan that enables coastal resource managers to manage and prepare for the impacts of climate change in North-central California coastal and ocean systems. It will benefit coastal communities, coastal recreation and natural resource management and conservation. The team will:

1. Conduct vulnerability assessments for focal resources for the coast and ocean region from Año Nuevo, San Mateo County to Alder Creek, Mendocino County;
2. Develop climate change profile and scenarios from climatic & non-climatic drivers;
3. Prioritize a list of adaptation actions and;
4. Complete an Adaptation Implementation Plan that will lead to specific adaptation projects within the project area. The first workshop to identify focal resources is scheduled for February 2014. It is hoped that this can serve as a model within California and along coastlines globally.

PLACE-BASED KEY ELEMENTS MET:

This project will include the five key elements of pulling together a partnership, drawing upon relevant and usable science information, identifying priority focal habitats, conducting a vulnerability assessment for decision support and developing adaptation strategies for implementation by the partners engaged in the process.

PARTNERS: Farrallones Marine Sanctuary Association, National Park Service, Golden Gate National Recreation Area, Point Reyes National Seashore, Point Blue Conservation Science, EcoAdapt, Bay Area Ecosystems Climate Change Consortium.

FOR MORE INFORMATION: Contact Kelley Higgason at Kelley.higgason@noaa.gov.

“The goal is to complete an Adaptation Implementation Plan that will lead to specific adaptation projects in the north-central California coast and ocean ecosystems.”



Objective 2

Objective 2

Implement at least two interdisciplinary projects to assess and address climate change impacts to priority ecosystem processes at a landscape scale.*

STRATEGY 1

Support the design and implementation of projects that promote cross-sectoral understanding of ecosystem processes.

Ecosystem process projects will include these components:

1. Partnerships: Build a collaborative, ongoing partnership comprised of a team of scientists and resource managers who represent different sectors (e.g. hydrologists and range managers) and the range of relevant organizations, stakeholders and tribes protecting and managing the landscape including the natural and built environments.
2. Information: Compile and synthesize existing relevant science information, TEK, and resource manager expertise to identify information gaps, identify priority issues and understand the status of changing ecosystem processes. Target any applied research to address key uncertainties to priority ecosystem processes identified by partners and the CA LCC.
3. Decision Support: Use appropriate decision-support methodologies to develop, understand and translate results to managers so that potential to increase understanding of climate-related impacts to priority ecosystem processes.



**The CALCC Strategic Plan Objective 2, Strategy 2 has identified the need to implement one integrative project within the first two years.*



“Information from ecosystem process projects can be used to inform place-based project development and to develop strategies to address priority resources and conservation concerns.”

STRATEGY 2

Ensure ecosystem process projects show value-added by the CA LCC and have the potential for high impact, respond to management needs and use methodologies and practices that are transferable.

Key criteria for all projects include:

- Value-added – project will make a unique contribution to the project or greatly enhance existing efforts.
- High impact – projects are likely to generate climate-smart conservation strategies and actions that address critical stressors to priority resources within or across Ecoregions.
- Relevance to management – natural resource managers are able to respond and adapt management actions in their planning documents and with other actions on the ground.
- Transferable results - project approaches or outcomes can be replicated in other locations or systems, and for other ecosystem processes, with refinement and adaptations as needed.
- Informs place-based projects - Information from ecosystem process projects can be used to inform place-based project development and to develop strategies to address priority resources and conservation concerns.

Case Study 3

Changing Ecosystem Processes: Case Study 3



OBJECTIVE 2: Implement at least two interdisciplinary projects to assess and address climate change impacts to priority ecosystem processes at a landscape scale.

PROJECT TITLE: *Sea-level rise modeling across the California salt marsh gradient for resource managers*

PROJECT LEADS: John Takekawa and Karen Thorne, USGS Western Ecological Research Center

DESCRIPTION: This project uses a bottom-up local modeling approach to assess the

effects of sea-level rise (SLR) on coastal tidal salt marshes. At selected tidal marshes, the project team measured several parameters (elevation, accretion rate, tidal inundation, plant communities) that were incorporated into ArcGIS models to create comparable datasets across the CA LCC coast tidal gradient (e.g. San Diego Refuges, Tijuana NOAA NERR, Seal Beach NWR, San Francisco Bay Refuges). Marsh SLR response models were developed to 2100 in 10-year increments to assist decisions making by the managers. In understanding the local processes and the site specific responses to SLR, managers are able to incorporate results into local planning documents, vulnerability assessments and decision making. Methods and results were standardized across all sites to be comparable across the entire California coast. The project leads have met personally with the managers at their study sites to explain the results and discuss how to incorporate this information into their management decisions.

PRIORITY ECOSYSTEM PROCESSES

TOPIC MET: Sea-level rise and changing ocean conditions including sea surface temperature and ocean circulation patterns both physical and chemical.

PARTNERS: San Diego and San Francisco Bay U.S. Fish & Wildlife Service Refuges, Tijuana Estuary NOAA NERR, U.S. Fish & Wildlife Inventory & Monitory Program, North Pacific Landscape Conservation Cooperative, USGS California Water Science Center.

FOR MORE INFORMATION:

<http://www.werc.usgs.gov/cercc>



CHANGING ECOSYSTEM PROCESSES - EFFECTS ON ECOSYSTEMS, COMMUNITIES AND/OR SPECIES

A CA LCC resource manager needs assessment conducted over the last three years and Moser et al., 2012, a summary report on the Third Assessment from the California Climate Change Center, identified the following priority topics. These topics have been identified as priorities by the Science-Management Team to provide support for science information, decision support, and climate-smart conservation.

- Effects of changing hydrologic regime (amount, timing) changes on processes and function.
- Effects of changing sediment regimes (amount, timing) to estuaries, rivers, streams and lakes.
- Meteorological changes that include changes in patterns of air temperatures, CO₂, humidity, wind and extreme weather events
- Effects of changing fire regimes on processes and function.
- Changes in the carbon cycle and sequestration.
- Sea-level rise and changing ocean conditions that include sea surface temperature and ocean circulation patterns, both physical and chemical.
- Changes in storm frequency and intensity including precipitation change, flooding, wind, and wave effects.
- Effects on vegetation community composition and structure.

Objective 3

Objective 3

Develop at least two landscape conservation design projects that provide spatially explicit blueprints that will support climate-smart strategies and actions development.

STRATEGY 1

Support the design of spatially explicit blueprints that incorporates climate-smart principles.



- Inventory and synthesize existing conservation planning efforts and available spatial layers for landscape conservation design focus area.
- Incorporate key elements in each landscape conservation design project, including:
 1. Clearly defined purpose(s) and stakeholder audiences.
 2. Development of a collaborative partnership.
 3. Strong science-based approach with appropriate decision support methodologies, including identification of priority resources, vulnerability or

landscape assessments, and other methods that address future climate change scenarios, other stressors, and ecosystem response on species, habitats and processes.

4. Conscientious gathering and use of information following appropriate protocols and utilizing TEK when applicable.
5. Appropriate scale for the purpose, which may be sub-Ecoregional, Ecoregional, or across multiple Ecoregions. Scale can include across adjacent LCCs when applicable.
6. Development and application of design uses advanced methods and best available technology.
7. A process to revise and update design as new partners join and new information becomes available, including information from monitoring priority resources over time and other landscape changes.
8. Designed to provide results that are used to help establish climate-smart strategies and actions for priority resources and conservation concerns.

STRATEGY 2

Ensure the landscape conservation design approaches and outcomes can be adapted or replicated in other areas.

- Methodologies are transparent, replicable, and if available online, use open access software when possible.
- Results are easy to use and available to all relevant audiences.

STRATEGY 3

CA LCC Staff coordinates landscape conservation designs across the CA LCC and with adjacent LCCs.

- Coordinate among partners to develop and connect landscape conservation designs within the CA LCC.
- Coordinate with adjacent LCCs to develop integrated landscape conservation designs to support functionally connected landscapes .
- Assist in the standardization of design methodologies, development and delivery to support landscape conservation design connectivity.

“Landscape conservation design seeks to represent spatially at a large scale a suite of conservation areas, connectivity and transition zones needed to achieve strategic conservation results.”

LANDSCAPE CONSERVATION DESIGN

Landscape conservation design seeks to represent spatially at a large scale (e.g., within an Ecoregion or other large geographic area) a suite of conservation areas, connectivity and transition zones needed to achieve strategic conservation results. While undertaken in a collaborative fashion, partners retain the flexibility to implement specific strategies that best meet their organization's needs. As identified by the Science-Management Team, some key landscape design issues to be addressed in the context of climate change include:

- Identification of important habitats with high diversity, vulnerable species or otherwise high priority populations, and endemic species for conservation actions including climate- smart strategies.
- Identification of impacts to habitats and the distribution and persistence of species within and across ecoregions.
- Identification of transitional habitats and dispersal areas to provide climate change adaptation potential for communities and species.

Case Study 4

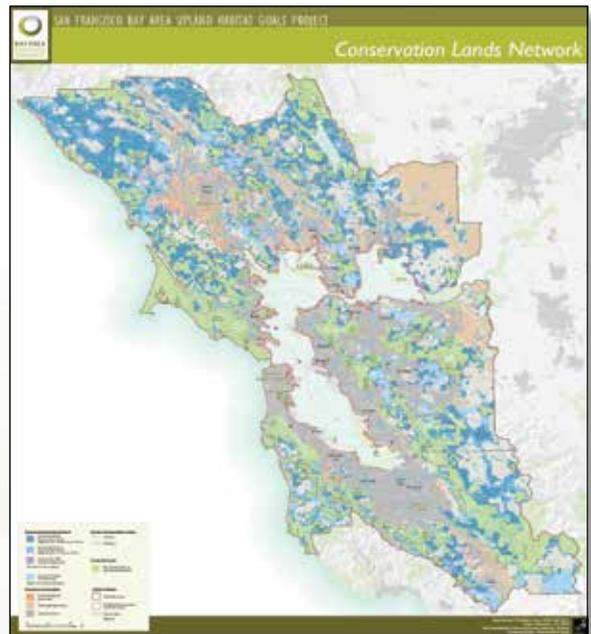
Landscape Conservation Design: Case Study 4

OBJECTIVE 3: Develop at least two landscape conservation design projects that provide spatially explicit blueprints that will support climate-smart strategies and actions development.

PROJECT TITLE: *The Conservation Lands Network*

PROJECT LEAD: Bay Area Open Space Council and San Francisco Bay Area Upland Habitat Goals Project

DESCRIPTION: The Conservation Lands Network is a collaborative, science-based vision for conserving the region's landscapes in face of development, changing climate and water availability. The project identified the types, amounts, and distribution of interconnected habitats (not a list of parcels) needed to sustain diverse and healthy ecosystems in upland habitats around the San Francisco Bay. It is intended as a guide for making conservation investments, supporting collaborative conservation planning, and helping protect biodiversity. Shared conservation goals for the region and conservation targets were identified during a two-step coarse/fine filter approach to conservation planning. A goal of this project was to make the information easy to use and readily accessible via a mapping tool on the Internet called Explorer.



LANDSCAPE CONSERVATION DESIGN ELEMENTS MET: Identification of transitional habitats and dispersal areas to provide climate change adaptation potential for communities and species; and identification of important habitats with high diversity, vulnerable species, and endemic species for conservation actions including climate-smart strategies.

PARTNERS: Over 125 experts representing 43 resource and regulatory agencies, conservation nonprofits, consulting firms, universities, and landowners have been involved in this work over the last five years.

FOR MORE INFORMATION: <http://www.bayarealands.org/>

Case Study 5

Landscape Conservation Design: Case Study 5

OBJECTIVE 3: Develop at least two landscape conservation design projects that provide spatially explicit blueprints that will support climate-smart strategies and actions development.

PROJECT TITLE: *Piloting a Strategic Approach to Landscape Conservation Design in the Columbia Plateau*

PROJECT LEAD: Region 1 US Fish and Wildlife Service, Portland, OR

DESCRIPTION: This collaborative effort occurring in the Great Northern LCC is identifying shared and spatially explicit priorities for protecting the Columbia Plateau ecoregion that is fragmented by land use conversion, invasive species, altered fire regimes, declining water tables and other stressors. Climate change impacts are expected to further alter the long term viability of habitats and species. This project will develop a spatial design that the Arid Lands Initiative partners and the National Wildlife Refuge System can use to further landscape-scale conservation. The team identified eight conservation targets, conducted a viability assessment for those targets and identified the best available landscape-scale data. They used a spatial conservation prioritization tool to identify areas that best met the team's conservation goals and are now developing maps of conservation and restoration priority areas in the Columbia Plateau Ecoregion. They will also assess their vulnerability to climate change and provide decision support regarding the vulnerability and resiliency of priority areas and targets. Project results will be available via a flexible decision support system, NatureServe Vista.



LANDSCAPE CONSERVATION DESIGN ELEMENTS MET: Identification of important habitats with high diversity, vulnerable species or otherwise high priority populations, and endemic species for conservation actions including climate-smart strategies; Identification of impacts to habitats and species distribution and persistence within and across ecoregions; and Identification of transitional habitats and dispersal areas to provide climate change adaptation potential for communities and species.

PARTNERS: US Fish and Wildlife Service, Great Northern LCC and Arid Lands Initiative

FOR MORE INFORMATION: <http://greatnorthernlcc.org/supported-science/317>

Objective 4

Objective 4

Lessons learned from place-based, ecosystem process and landscape conservation design projects are applied by partners, including implementing climate-smart strategies and actions.

STRATEGY 1

Staff annually evaluates project outcomes and identifies successful/unsuccessful approaches.

- Evaluate outcomes from each CA LCC project (place-based, ecosystem processes, and landscape design) to ascertain whether:
 - Primary objectives/defined outcomes were met
 - Final products were delivered to resource managers and other stakeholders
 - Climate-smart strategies and/or actions were developed
 - Lessons learned from other CA LCC funded projects were applied

STRATEGY 2

The Science-Management Team works with the CA LCC Communication Team to document and share lessons learned across the CA LCC and deliver useful information to decision makers.

- Communicate regularly between the Science-Management Team and the Communication Team to ensure delivery of Science-Management Framework products.

- Create webpages or newsletters of climate-smart case studies that highlight former and ongoing case studies.
- Highlight successful approaches and findings on CA LCC website, Climate Commons, CA LCC meetings, annual reports, media and workshops and publication in peer-reviewed journals to transfer knowledge more broadly and replicate results across the CA LCC and beyond.

STRATEGY 3

The Science-Management Team works with the CA LCC Communication Team to continually identify science needs of resource managers across the CA LCC.

- Document on the ground impacts and unmet needs for climate-smart information and decision support by following up with resource managers during personal communications, meetings, trainings and workshops.
- Ensure scientists understand the information needs of resource managers by creating effective scientist-manager interactions on CA LCC website, listserv, annual meeting, workshops, collaborative CA LCC projects and in-person meetings.

INTEGRATION WITH OTHER PROGRAMS AND PLANS

Southwest Climate Science Center (SWCSC) – The CA LCC falls within the U.S. Department of the Interior Southwest Climate Science Center (SWCSC) which was established in 2011 as part of eight CSCs in the United States that are managed by the US Geological Survey National Climate Change Wildlife Science Center and provides scientific support for climate-adaptation across a full range of natural and cultural resources. CSCs prioritize their delivery of fundamental science, data and decision support activities to meet the needs of a broad range of resource management partners. The SWCSC addresses the regional science needs and resource management challenges presented by climate change and variability in the southwestern United States. Their vision is to “foster effective collaboration between scientists and resource



managers in anticipating, monitoring, and adapting to climate variability and change in the Southwest U.S.” The SWCSC is developing essential scientific knowledge and tools that are provided to LCCs in their region and others for translation to more local areas. The CA LCC and SWCSC

collaborate on annual priority development and project selection to ensure the most efficient use of both programs’ resources and to identify ways to work collaboratively across the landscape.

National Fish, Wildlife, and Plants Climate Adaptation Strategy (NFWPCAS) –

The NFWPCAS is a nation-wide call to action that provides key strategies to help natural resource managers and others safeguard the national world in a changing climate. The CA LCC is implementing this strategy within our boundaries in numerous ways such as identifying key areas and priority resources that are impacted and resilient to climate change. In addition, the CA LCC is identifying, developing and providing decision support tools for managing under uncertainty, and advancing the understanding of climate change impacts to species and ecosystems identified as strategies in the NFWPCAS.



“The CA LCC and Southwest Climate Science Center collaborate on annual priority development and project selection to ensure the most efficient use of both programs’ resources and to identify ways to work collaboratively across the landscape.”

Citations

Citations

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Appendices

Appendix A. Glossary

Adaptation (Climate Change): adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Adaptation (Biological): the process or the product of natural selection that changes an organism's behavior, physiological function, or anatomical structure, so that it is better suited to its environment.

Adaptive Management: A systematic approach for improving resource management by learning from management outcomes.

Biodiversity: the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, among species, and of ecosystems.

Climate Change: a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions or the distribution of events around that average (e.g., more or fewer extreme weather events).

Climate-Smart Conservation: The intentional and deliberate consideration of climate change in natural resource management, realized through forward-looking goals and explicitly linking strategies to key climate impacts and vulnerabilities.

Conservation: Preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife.

Conservation Design: controlled-growth land use development that adopts the principle for allowing limited sustainable development while protecting the area's natural environmental features in perpetuity.

Conservation Goal: A statement detailing a desired conservation outcome, such as the desired future condition of an ecosystem. Goals are typically broader, directional, and/or longer term statements. The term "goal" and "objective" are often used synonymously. Goals and objectives are the "what," whereas strategies are the "how."

Conservation Objective: A statement detailing a desired specific, measurable conservation outcome, such as reducing a critical threat or improving a specific attribute of an ecosystem's health. A good objective meets the "SMART" criteria of being: specific, measurable, achievable, results oriented, and time based.

Cross-sectoral: CA LCC is defining this in the broadest sense as working across numerous groups, agencies, disciplines and areas.

Appendices

Ecosystem: a biological environment consisting of all the organisms living in a particular area, as well as all the nonliving (abiotic), physical components of the environment with which the organisms interact, such as air, soil, water, and sunlight.

Ecosystem Function: the physical, chemical, and biological processes or attributes that contribute to the self-maintenance of the ecosystem, such as decomposition, nutrient cycling, pollination, and seed dispersal.

Ecosystem Health: The ability of an ecosystem to maintain its structure and function over time in the face of external stress.

Habitat: an ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. It is the natural environment in which an organism lives, or the physical environment that surrounds (influences and is utilized by) a population.

Landscape (Ecology): a mosaic of ecological systems, characterized by its heterogeneity and dynamics, partly influenced by human activities, occurring at a scale that is smaller than continental or regional and larger than very local.

Landscape (CA LCC): Public, private, and workings landscapes within the boundaries of the CA LCC.

Natural Resources: materials and components that can be found within the environment. A natural resource may exist as a separate entity, such as fresh water and air, as well as a living organism, such as a fish, or it may exist in an alternate form which must be processed to obtain the resource, such as metal ores, oil, and most forms of energy.

Non-climate Stressors: in the context of climate adaptation, non-climate stressors refer to those current or future pressures and impacts threatening species and natural systems that do not stem from climate, such as habitat fragmentation, invasive species, pollution and contamination, disease, and over exploitation.

On-the-ground: In a place where real, practical work is done.

Place-based Projects (CA LCC): Projects that are relevant to a specific geographic location and can lead to an action on the ground.

Priority Resources: Biological, ecological and cultural features and processes that have been identified as priorities for conservation within an Ecoregion or other geographic area. Priority ecological resources may include landscapes, ecosystems or habitats.

Resilience: (Current ecological Usage) - the capacity of an ecosystem to return to its original state following a perturbation, including maintaining its essential characteristics of taxonomic composition, structure, ecosystem functions, and process rates. (emerging Climate Change Usage)—in the emerging context of climate change, resilience might best be thought of as the ability of an ecosystem to recover from or adjust easily to change, measured more in terms of overall ecosystem structure, function, and rates and less in terms of taxonomic composition

Restoration: (Current ecological Usage) - the process of repairing damage to the diversity and dynamics of native ecosystems, which can include promoting or mimicking natural disturbance regimes; managing issues like in-stream flows, water withdrawals, and storm water run-off; and addressing poorly sited infrastructure. (emerging Climate Change Usage) - in the emerging context of climate change, restoration might best be thought of as focusing on repairing damage to such structural or functional aspects of the ecosystem as listed above, as opposed to attempting to restore the original or historic composition of an ecosystem.

Strategy: A high-level, necessary strategic action to achieve a conservation objective (more than one strategy may be required to do so – e.g. prevent, contain and eradicate invasive weeds). Strategies typically include one or more activities or action steps. Strategies are designed to achieve specific objectives. Strategies are the “how” or the means to the end.

Traditional Ecological Knowledge (TEK): a cumulative body of knowledge and beliefs handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

Appendix B. CA LCC Science-Management Team

Name	Organization	Scientific Expertise
Christine Albano	Southwest CSC	Terrestrial and freshwater ecology
Whitney Albright	CDFW	Climate Change Coordinator
Sarah Allen	National Park Service	Marine and coastal ecology, marine birds and mammals, inter-tidal monitoring. Wildlife ecology - marine and terrestrial, wildlife modeling and spatial distribution modeling.
Grant Ballard	PRBO Conservation Science	Ecologist, marine and terrestrial systems; climate change impacts, and informatics
Giselle Block	FWS I & M	Biologist, land management, refuges, invasive species and climate change
David Boughton	NOAA NMFS	Population biology, habitat dynamics of endangered steelhead
Matt Gerhart	State CC	Coastal conservation, environmental geography, climate change, ecosystem adaptation
Dave Graber	NPS	Ecologist, conservation biologist, species-habitat relationships. Sierra Nevada ecosystems, wilderness.
John Hopkins	CA HCP Coalition	Conservation planning for at risk species, upland and wetland species
Chrissy Howell	USFS	Terrestrial ecology, wildlife modeling, and spatial distribution modeling
Javier Linares	CA Fish Passage Forum	Fisheries
Steve Lindley	NMFS	Anadromous fish
Tom Moore	NRCS	Wildlife friendly agricultural practices
Anne Morkill	USFWS	Wildlife biology, zoology, refuge management
Koren Nydick	NPS	Forest ecology
Larry Rabin	USFWS	Ecological services, endangered species
Michelle Selmon	DWR	Climate change adaptation, endangered species conservation and management

Name	Organization	Scientific Expertise
Christina Sloop	SFBJV	Ecologist, conservation geneticist; seasonal wetlands, invasive species control, endangered species conservation management, San Francisco Bay monitoring and evaluation
Wayne Spencer	CBI	Terrestrial wildlife ecology with a focus on rare mammals. Conservation planning, reserve design and connectivity conservation
Steve Swartzbach	USGS	Contaminant ecologist, ornithologist
Tom Suchanek	USGS	General ecology, with focus on aquatic ecology (marine and freshwater), contaminants, anthropogenic impacts and climate change
Michael Tansey	BOR	Climate change, hydro-meteorology, plant and earth sciences
Mike White	Tejon Ranch	Private lands, land management
Jim Wiegand	BLM	Marine and coastal ecology, endemism on rare soils
Staff		
Debra Schlafmann	CA LCC	Coordinator
Rebecca Fris	CA LCC	Science Coordinator
Karen Thorne	USGS	CA LCC Science Advisor
Andrea Graffis	CA LCC	Communication Coordinator
Greg Low	Applied Conservation Science	Advisor/Facilitator

Appendix C.

Table of Ecoregion Climate Change Impacts and Stressors

Major Climate Change Ecosystem Stressors and Impacts				
Marine	Increase in ocean temperatures will change stratification, primary productivity, and species distributions.	Changing ocean conditions and circulation patterns will result in changes in food webs and distributions of marine species.	Warming of the atmosphere and ocean will change the location and intensity of winds, affecting surface ocean circulation.	Increase in ocean acidification will reduce growth and survivorship of shell-forming organisms and early life stages, and the planktonic food base.
Coastal	Warming in coastal waters will alter productivity and community composition.	Changes in precipitation patterns will alter subsequent delivery of freshwater, nutrients, and sediment delivery.	Storms will increase beach, dune, and cliff erosion and flood vegetation and tidal habitats. Sea-level rise will flood low lying habitats.	Increased temperatures will change the fire regime of coastal vegetation.
Inland Water	Atmospheric warming will result in lakes, rivers, and streams becoming warmer and depleting O ₂ levels.	Warmer waters will stress cold water species and increase disease and parasite susceptibility.	Loss of snowpack will change the amount, duration, distribution and timing of runoff.	Increased severity of both low and high precipitation anomalies between years will change stream flow dynamics, lake levels, and distribution of riparian habitat.
Grassland	Warmer temperatures and more variable precipitation will dry wetlands and speed the invasion of non-native grasses and pests.	Hotter dryer environments will result in changing fire regimes.	Extended heat waves will create plant community stress and lower productivity.	Longer heat and dry season will impact animal movements and foraging ability.

Major Climate Change Ecosystem Stressors and Impacts, continued

Shrubland	Warmer and dryer conditions will change fire regime and spread invasive species	Decrease in winter snow pack will create dryer conditions and change hydrological regimes including timing and quantity.	Increased fire frequency may favor grasses, changing community composition.	Spread of exotic species and insect pests from plant stress.
Forest & Woodland	Warmer temperatures and droughts will decrease productivity. Higher evapotranspiration and drought stress will occur.	Insect pests will expand their ranges causing tree stress. Increased tree mortality and decrease in forest productivity.	Longer fire season. Increased fire frequency and intensity which can replace forests with shrubs, grasses and sedges.	Increased fire will increase forest disturbance with more young forest stands and changes in species composition.
Alpine	Loss of snow pack and changes in the amount of precipitation. More freeze-thaw events and changes in subnivean temperature. Longer snow-free season.	More icing/rain-on-snow events affecting animal movements and access to forage.	Changing plant communities with longer growing season.	Increased productivity of some plant species. Changes in plant community composition.

Appendix D. Summary of Conservation Plans and Affiliated Groups by Ecoregion

Major Conservation Plans by Ecosystem Type								
		Marine	Coastal	Inland Water	Grassland	Shrubland	Forest	Alpine
Federal Government	BLM				X		X	
	FWS		X	X	X	X	X	X
	NOAA	X	X					
	NPS		X	X	X	X	X	X
	NRCS		X	X			X	
	USFS			X	X	X	X	X
Non-Governmental Organizations	CVJV			X	X	X		
	CA Rangeland Conservation Coalition			X	X	X	X	
	SFBJV			X				
	SJV			X				
	TNC		X	X		X	X	X
State Government	CDFW	X	X	X	X	X	X	X
	DWR			X	X			
	SCC	X	X	X				
	UC Reserves		X	X	X	X	X	X
Total		3	12	13	8	8	9	6

Ecoregion Location of Major Conservation Plans

		Marine	North Coast	Central Coast	South Coast	Bay/ Delta	Central Valley	Sierra Nevada	Baja California
Federal Government	BLM			X			X	X	
	FWS		X	X	X	X	X	X	
	NOAA	X	X	X	X	X			
	NPS		X		X	X		X	
	NRCS		X	X	X	X	X	X	
	USFS			X	X			X	
Non-Governmental Organizations	CVJV					X	X	X	
	CA Rangeland Conservation Coalition					X	X	X	
	SFBJV					X			
	SJV				X				X
	TNC			X	X	X		X	X
State Government	CDFW	X	X	X	X	X	X	X	
	DWR		X	X	X	X	X	X	
	SCC	X	X	X	X	X			
	UC Reserves		X	X	X			X	
Total		3	7	9	10	11	7	11	2

Appendix E. Major Conservation Plans by Organizations

Federal Government			
Agency	Conservation Plan Name	URL	Description
BLM	Areas of Critical Environmental Concern	http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/planning/rmpcontents/chapt11_acecs.html	ACECs include public lands where special management attention and direction is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ACEC designation indicates BLM recognizes the significant values of the area and intends to implement management to protect and enhance the resource values.
FWS	Habitat Conservation Plans	http://www.fws.gov/endangered/what-we-do/hcp-overview.html	HCPs area planning documents required as part of an application for an incidental take permit. They describe the anticipated effects of the proposed taking; how those impacts will be minimized, or mitigated; and how the HCP is to be funded.
FWS	National Wildlife Refuge System with Comprehensive Conservation Plans	http://www.fws.gov/cno/refuges/	A Comprehensive Conservation Plan (CCP) provides management direction for a refuge for 15 years. With input for the public, the Service forms a vision of a refuge's desired conditions and the actions needed to achieve it. A refuge's vision may include improved habitat conditions and expanded public use programs that are compatible with resource conservation.
FWS	Species recovery plans	http://ecos.fws.gov/tess_public/	Listed species and populations recovery plans.
NOAA	National Marine Protected Areas	http://marineprotectedareas.noaa.gov/	Marine protected areas are special places in our oceans. Whether they've been set aside to protect endangered species, sensitive habitats, cultural heritage or all of these reasons, they belong to all of us.
NPS	General Management Plans	http://planning.nps.gov/plans.cfm?PageNumGet_PNET=4&Category=General%20Management%20Plan	Each park goes through an EA/EIS process to develop a general plan.
NRCS	Grassland Reserve Program	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/grassland/	The Grassland Reserve Program (GRP) is a voluntary conservation program that emphasizes support for working grazing operations, enhancement of plant and animal biodiversity, and protection of grassland under threat of conversion to other uses.

Federal Government, continued

Agency	Conservation Plan Name	URL	Description
NCRS	Healthy Forests Reserve Program	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests/	The purpose of the Healthy Forests Reserve Program (HFRP) is to assist landowners, on a voluntary basis, in restoring, enhancing and protecting forestland resources on private lands through easements, 30-year contracts and 10-year cost-share agreements.
NCRS	Wetlands Reserve Program	http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/wetlands/	The USDA Natural Resources Conservation Service (NRCS) provides technical and financial support to help landowners with their wetland restoration efforts.
UCFS	Region 5 Forest Plan Revision	http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5364034.pdf	A Forest Plan guides a National Forest's future activities. Similar to a county's general plan, it identifies uses that may be possible in areas of the forest. The plan provides long range vision, goals and objectives. The forest then monitors to make sure it is moving toward the vision and achieving its goals and objectives. Although the plan does not detail specific projects, it sets the stage by providing guidelines to make decisions about future projects.

Non-Governmental Organizations

Agency	Conservation Plan Name	URL	Description
CVJV	North American Waterfowl Management Plan	http://www.centralvalleyjointventure.org/science/bird-conservation-plans	The North American Waterfowl Management Plan was developed and signed in 1986 in response to declining waterfowl populations. This plan lays out a strategy among the United States, Canadian and Mexican governments to restore wetlands. Recovery of these shared resources is implemented through habitat protection, restoration, and enhancement through regionally-based joint ventures.
CVJV	California Riparian Bird Conservation Plan	http://www.centralvalleyjointventure.org/science/bird-conservation-plans	The plan is intended to provide a source of information on riparian bird conservation for managers, agencies, landowners, academic institutions and non-governmental organizations.

Appendix E, continued

Non-Governmental Organizations, continued			
Agency	Conservation Plan Name	URL	Description
CVJV	Southern Pacific Shorebird Conservation Plan	http://www.centralvalleyjointventure.org/science/bird-conservation-plans	The mission of the Southern Pacific Shorebird Conservation Plan is to guide the provision of adequate, high quality shorebird habitat to restore and maintain California's shorebird populations.
CA Rangeland Conservation Coalition	Approach & Method for Rangeland Coalition Focus Area	http://www.carangeland.org/focusarea.html	The Rangeland Coalition works with willing, private landowners to preserve ranches through conservation easement and to carry out habitat enhancement projects for common and threatened species.
SFBJV	Implementation Plan: Conservation Objectives	http://www.sfbayjv.org/strategy.php#conservation_objectives	Establishes region-wide habitat goals for the restoration of the Bay Estuary using three categories: bay habitats, seasonal wetlands, and creeks and lakes.
SJV	Bird Conservation Plan	http://sonoranjv.org/plans/conservation-plan/	The Plan summarizes the status of avian species, prioritizes these species, provides habitat discussions and conservation recommendations, and lists Focus Areas for conservation action. It will guide the SJV staff, Board, and committees in their actions and inform SJV partners of beneficial activities.
Tejon Ranch Conservancy	Ranch-wide Management Plan	http://www.tejonconservancy.org/rwmp.htm	The Plan details the existing understanding of Tejon Ranch ecosystems, the Conservancy's conservation goals, the proposed management actions to enhance and restore habitats, best management practices for the Tejon Ranch Company's Ranch uses, and a five year public access plan.
TNC	Land acquisition, conservation easements, and conservation	http://www.nature.org/ourinitiatives/regions/north_america/unitedstates/california/placesweprotect/index.htm	For more than 50 years, the Conservancy has been working throughout California to help protect nature and the precious natural resources that are essential to human life. Together with partners, local landowners and the support of members like you, we have helped to protect nearly 1.5 million acres in California.

State Government

Agency	Conservation Plan Name	URL	Description
CDFW	State Wildlife Action Plan (SWAP)	http://www.dfg.ca.gov/SWAP/	The State Wildlife Action Plan examines the health of wildlife and prescribes actions to conserve wildlife and vital habitat before they become more rare and more costly to protect. The plan also promotes wildlife conservation while furthering responsible development and addressing the needs of a growing human population.
CDFW	Natural Communities Conservation Planning (NCCP)	http://www.dfg.ca.gov/habcon/nccp/	The Natural Communities Conservation Planning program's primary objective is to conserve natural communities at the ecosystem level while accommodating compatible land use. A local agency oversees development of a conservation plan with CDFW, other agencies, landowners, and interested parties.
CDFW	Central Valley Flood Management Plan (CVFMP)	http://www.water.ca.gov/cvfmp/	The Central Valley Flood Management Plan (CVFMP) manages and implements integrated flood management actions for the Sacramento and San Joaquin valleys
SCC	Regions: North, Central, South, SF Bay, and Ocean all have different areas of focus for project types	http://scc.ca.gov/about/	State agency that uses entrepreneurial techniques to purchase, protect, restore, and enhance coastal resources, and to provide access to the shore. We work in partnership with local governments, other public agencies, nonprofit organizations, and private landowners.
UC Reserves	UC Reserve System	http://nrs.ucop.edu/index.htm	The UC Natural Reserve System is a network of protected natural areas throughout California. Its 38 sites include more than 750,000 acres, making it the largest university-administered reserve system in the world.

Climate Change Adaptation Plan Examples

FEDERAL

Executive Office of the President (2013): *The President's Climate Action Plan*

National Fish, Wildlife, and Plants Climate Adaptation Partnership (2012): *National Fish, Wildlife and Plants Climate Adaptation Strategy*

National Park Service: *Climate Change Response Strategy*

U.S. Army Corps of Engineers, US Bureau of Reclamation (2011): *Addressing Climate Change in Long-Term Water Resources Planning and Management: User Needs for Improving Tools and Information*

U.S. Department of the Interior: *Plan for a Coordinated, Science-Based Response to Climate Change Impacts on our Land, Water, and Wildlife Resources*

U.S. Fish and Wildlife Service: *Strategic Plan for Responding to Accelerating Climate Change*

U.S. Department of Agriculture (2010): *USDA Climate Change Science Plan*

U.S. Environmental Protection Agency: *Climate Change Adaptation Plan*

STATE

California Adaptation Advisory Panel, Pacific Council on International Policy (2010): *Preparing for the Effects of Climate Change – A Strategy for California*

California Emergency Management Agency, California Natural Resources Agency (2012): *California Climate Adaptation Planning Guide: Planning for Adaptive Communities*

California Department of Fish and Wildlife (2009): *California State Wildlife Action Plan*

California Department of Water Resources (2008): *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*

California Department of Water Resources (2009): *California Water Plan Update 2009 – Integrated Water Management*

California Natural Resources Agency (2013): *Safeguarding California: Reducing Climate Risk*

California State Coastal Conservancy (2012): *California State Coastal Conservancy Strategic Plan 2013-2018*

San Francisco Bay Conservation and Development Commission (2011): *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline*

San Francisco Bay Conservation and Development Commission (2011): *San Francisco Bay Plan*

LOCAL

Association of Bay Area Governments (2010): *Regional Hazard Mitigation Plan*

City of Berkeley (2009): *City of Berkeley Climate Action Plan*

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The CA LCC Leadership

Steering Committee Members



For more information,
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