



California State Wildlife Action Plan

2015 UPDATE

A Conservation Legacy for Californians

Executive Summary

September 2015



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CALIFORNIA STATE WILDLIFE ACTION PLAN

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A Conservation Legacy for Californians

Executive Summary



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With Assistance from



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Foreword

California is an amazing place. From the Sierra Nevada to the Pacific coast, from the redwood forests to the Mojave Desert, California is the most biologically diverse state in the country. Biodiversity measures richness of life and California Department of Fish and Wildlife's mission is to manage that richness of life for future generations.

The state is facing a warming climate and a fourth year of historic drought threatening many species, particularly native trout, salmon, and other inland fish. At the same time, California is the eighth largest economy in the world, and home to Silicon Valley, the birth of the aerospace industry, and Hollywood, just to name a few common references. We must have a solid plan in place to navigate the challenges ahead.

California Department of Fish and Wildlife is proud to present the first major revision to the State Wildlife Action Plan (SWAP 2015). SWAP 2015 includes conservation actions that respond to current and future challenges with objectives and goals that are specific, measurable, and time bound. The conservation strategies consider the anthropogenic pressures imposed by the legitimate need for food, housing, transportation, and recreation, taken together with the recognition of limited funding and time. The strategies focus on restoring ecological function and processes capable of withstanding the stresses imposed by a changing environment. Collaboration and partnerships will be imperative to implementing these strategies.

SWAP 2015 is a product of many individuals and organizations. More than 300 people and 40 organizations worked across 200 meetings to pull together this update. Every one of them deserves a big thank you. The document has received incredible public participation and scrutiny. We are grateful to all who helped in its development, and look forward to the continued collaboration needed to succeed in conserving California's tremendous biodiversity.

Wallace Stegner, a great native son, once remarked, "One cannot be pessimistic about the West. This is the native home of hope." California has always been a land of hope, dreams, and optimism, all of which we will need to safeguard the state's fish and wildlife for the future. Stegner also reminds us it is possible as Californians, "to create a society to match its scenery." At California Department of Fish and Wildlife, we have a duty to ensure the state's fish and wildlife and the habitats upon which they depend will be here and healthy for our children, their children, and so on. The 2015 update to the State Wildlife Action Plan will help us meet that challenge.

Charlton H. Bonham
Director

Executive Summary

Congress created the State and Tribal Wildlife Grants (SWG) program in 2000, recognizing the need to fund programs for the conservation of wildlife diversity. Congress mandated each state and territory to develop by 2005 a State Wildlife Action Plan (SWAP) that provided a comprehensive wildlife conservation strategy to continue receiving federal funds through the SWG program. California's first SWAP was completed by California Department of Fish and Game (now the California Department of Fish and Wildlife [CDFW]) and approved by the U.S. Fish and Wildlife Service (USFWS) in 2005. California's SWAP 2005 identified and targeted Species of Greatest Conservation Need (SGCN) and the vital habitats on which they depend. CDFW has received approximately \$37 million in federal support for the state's wildlife conservation activities through the SWG program from 2005 through 2014. The SWG program requires SWAP updates at least every 10 years. CDFW has now prepared SWAP 2015, which is the first comprehensive update of SWAP 2005.

Vision for Wildlife Conservation

In SWAP 2015, CDFW is focusing on conservation of the wildlife resources of the nation's most biologically diverse state using an approach that is in harmony with a growing human population and the need for resilience in the face of a changing climate. SWAP 2015 is a flexible, but scientifically grounded plan. Employing an ecosystem approach to conserve and manage diverse habitats and species, SWAP 2015 provides a blueprint for actions necessary to address the highest priorities for conserving California's aquatic, marine, and terrestrial resources. Its implementation relies on making important and helpful conservation information more accessible to resource managers and the public, and on developing lasting partnerships with a broad array of governments, agencies, organizations, businesses, and citizens.

For SWAP 2015 to be successful, it will need to be supported and adopted internally at the highest levels and by staff of CDFW, as well as externally by partners. Internally, priorities will be articulated and direction given to integrate and implement SWAP goals, strategies, and actions into programs and ongoing activities. Externally, CDFW will advocate for adoption and integration of SWAP goals, strategies, and actions into other planning efforts and coordinate and collaborate with its conservation partners to leverage human and financial capacity to achieve success.

CDFW's vision for conserving the state's wildlife is to sustain the floral and faunal biodiversity of California over the next decade, and to establish a solid conservation framework for the decades that follow. Through SWAP 2015 and together with diverse partners, CDFW seeks to:

- maintain and enhance the integrity of ecosystems by conserving key natural processes and functions, habitat qualities, and sustainable native species population levels, so that

California's ecosystems are resilient to shifting environmental conditions resulting from climate change and other causes;

- promote partnerships with federal, state, and local agencies; tribal governments; and non-governmental organizations with aligned conservation goals to leverage efficient use of funding and other public resources;
- inspire greater understanding and recognition of critical needs for conserving wildlife and their habitats by lawmakers, land use planners, private landowners, and others who have influence in developing and implementing conservation actions;
- allocate sufficient water and manage water resources to maintain healthy ecosystems and fish and wildlife populations when considering state and regional water supply needs;
- provide resources and coordinate efforts with partners to eradicate or control invasive species and prevent new introductions;
- promote hunting and fishing as a conservation tool to use when working to eradicate or control invasive or non-native game species;
- sustain the quality of California's natural resources and biodiversity in harmony with predicted economic growth and human population increases;
- continue to prioritize protection of key habitat linkages, sensitive habitats, and specialized habitats for SGCN;
- integrate wildlife conservation with working landscapes and environments, recognizing both the economic and ecological values of agriculture, rangeland, forestry, and fisheries;
- support conservation programs that benefit native species, habitats, and ecosystems through broad-based public funding from federal, state, special district, and local government sources;
- educate the public about wildlife conservation issues, including hunting and fishing as conservation tool, and inspire a conservation ethic in present and future generations through public outreach; and
- enhance conservation capacity by clearly articulating conservation purposes, applying adaptive management principles, and effectively using staff and financial resources.

Statewide Goals

Three statewide goals to enhance California ecosystems have been identified for SWAP 2015. These overarching goals, with their associated sub-goals, represent the desired ecological outcomes of SWAP 2015 implementation.

Goal 1 – Abundance and Richness: Maintain and increase ecosystem and native species distributions in California, while sustaining and enhancing species abundance and richness.

- *Goal 1.1 (Ecosystem Distribution):* Maintain and increase ecosystem distributions.

- *Goal 1.2 (Native Species Range and Distribution):* Maintain and increase native species ranges and distributions.
- *Goal 1.3 (Native Species Abundance and Richness):* Sustain and enhance native species abundance and diversity, including genetic diversity.
- *Goal 1.4 (Ecosystem Richness):* Sustain and enhance ecosystem diversity.

Goal 2 - Enhance Ecosystem Conditions: Maintain and improve ecological conditions vital for sustaining ecosystems in California.

- *Goal 2.1 (Connectivity):* Maintain and improve connectivity vital for sustaining ecosystems (including those relevant to vegetation, wildlife corridors, genetic permeability, water flow, floodplains [longitudinal and lateral], and groundwater.)
- *Goal 2.2 (Community Structure and Composition):* Maintain and improve community structure and composition vital for sustaining ecosystems (including age structure, structural heterogeneity, habitat richness, and native and key species population levels).
- *Goal 2.3 (Water Quality, Quantity, and Availability):* Maintain and improve water quality (including temperature, chemistry, and pollutant/nutrient concentrations and dynamics) and water quantity and availability vital for sustaining ecosystems and their attributes (including ocean, lakes, rivers, streams, groundwater, and snowpack).
- *Goal 2.4 (Soil and Sediment Quality):* Maintain and improve soil and sediment quality vital for sustaining ecosystems (including soil moisture, chemistry, and pollutant/nutrient concentrations and dynamics).

Goal 3 - Enhance Ecosystem Functions and Processes: Maintain and improve ecosystem functions and processes vital for sustaining ecosystems in California.

- *Goal 3.1 (Successional Dynamics):* Maintain or improve successional dynamics vital for sustaining ecosystems.
- *Goal 3.2 (Disturbance Regime):* Maintain or improve disturbance regimes vital for sustaining ecosystems (including fire, flooding and grazing regimes).
- *Goal 3.3 (Hydrological Regime):* Maintain or improve hydrological regimes vital for sustaining ecosystems (including riverine, lacustrine, and estuarine hydrodynamics).
- *Goal 3.4 (Sediment Deposition Regime):* Maintain or improve sediment deposition regimes vital for sustaining ecosystems (including hydro-geomorphic processes, wind-driven processes, and soil stability).

Ecosystem Approach

A multi-species, ecosystem approach has been used as the guiding framework for developing SWAP 2015. An ecosystem approach to conservation involves maintaining and enhancing the ecosystem processes, structure, and conditions, recognizing that all components are interrelated

in a dynamically changing system. Large-scale landscape approaches are generally the most reliable and preferred method to conserve ecological integrity, including biological diversity. The approach benefits both game and non-game (or harvested and non-harvested) wildlife species, and creates many co-benefits related to both ecological values (such as enhanced water quality, soil conservation, or resilience to the effects of climate change) and societal values (such as open space, scenic quality, or outdoor recreation opportunities).

Species of Greatest Conservation Need

A key element of updating the SWAP is identifying and compiling information on the species of wildlife that are indicative of the state's biological diversity and have the greatest need for conservation. These species are referred to as Species of Greatest Conservation Need (SGCN). For SWAP 2015, regional teams developed criteria and evaluated species, resulting in a list of over 1,000 species of invertebrates, amphibians, reptiles, fish, birds, mammals, and plants that are considered SGCN. Because of the large number of species, applying a species-based conservation approach to develop SWAP 2015 was not feasible; however, it is recognized that dividing California into habitat categories may present limitations that must be balanced with species-specific efforts when needed to effectively address conservation of species.

SWAP 2015 used three criteria to determine the list of SGCN:

- species listed as threatened, endangered, or candidate species in California under the federal Endangered Species Act or the California Endangered Species Act;
- species for which there is a conservation concern (generally equivalent to California Species of Special Concern); or
- species identified by CDFW as being highly vulnerable to climate change.

Consideration of Climate Change

Significant climate-related changes to California's environment have been documented in the last decade, including sea level rise, natural community shifts, increased prevalence of invasive species, increased number and intensity of wildfires, and prolonged drought (CNRA 2009; CNRA 2014). Climate-induced effects on wildlife, in combination with other pressures, have the potential to greatly diminish vulnerable wildlife populations and habitats and must be considered when developing management strategies. Climate change considerations have been given great weight during development of SWAP 2015 in the following ways:

- adopting climate vulnerability as a criterion for selecting SGCN;
- incorporating climate forecasts when assessing the ecological conditions of conservation targets;

- conducting climate change vulnerability analyses for native species and vegetation in California; and
- identifying how the SWAP conservation strategies align with California's Climate Change Adaptation Strategy (CNRA 2009; CNRA 2014) and the National Fish, Wildlife, and Plants Climate Adaptation Strategy (National Fish, Wildlife, and Plants Climate Adaptation Partnership 2012), thus achieving important climate adaptation co-benefits through SWAP implementation.

Prioritizing Conservation Targets

The process to provide the SWAP elements required by USFWS and develop multi-species conservation strategies began by broadly categorizing natural resources in California. The categories used in SWAP 2015 are terrestrial, freshwater aquatic, and marine habitats. SWAP 2015 recognizes that within each of these resource categories, there are strategies that apply to specific geographic regions and others that are more broadly relevant across many regions or possibly statewide. To assess conservation needs at a manageable scale, the state was subdivided for each resource category using established and accepted geographic units. These geographic units are ecoregions (adopting "sections" identified under the U.S. Forest Service Ecoregion Classification) for terrestrial resources, hydrologic units (adopting the four digit hydrologic unit codes identified by the U.S. Geologic Survey) for freshwater aquatic resources, and marine conservation units (adopting marine study regions identified under the Marine Life Protection Act [Fish and Game Code Sections 2850-2863]), collectively called conservation units. The conservation units were then grouped together into seven major geographic provinces. This approach facilitated the discussion of ecosystems, natural communities, and species at a scale appropriate for regional conservation planning. The seven provinces are:

- | | |
|------------------------------------|---------------|
| ■ North Coast and Klamath | ■ South Coast |
| ■ Cascades and Modoc Plateau | ■ Deserts |
| ■ Central Valley and Sierra Nevada | ■ Marine |
| ■ Bay Delta and Central Coast | |

An exception to developing conservation strategies within these geographic scales is the analysis for anadromous fish. Anadromous fish begin life in the fresh water of rivers and streams, migrate to the ocean to grow into adults, and then return to fresh water to spawn. Most anadromous fish spend the majority of their life in marine environments and travel great distances to reach their spawning rivers or streams. Because the geographic ranges of anadromous fish span many of the provinces developed for SWAP 2015, the organization of conservation strategies by hydrologic unit or even province does not adequately address their conservation needs. As such, the geographic organization of conservation strategies for anadromous fish has been developed separately to capture all the habitats within their ranges.

For each conservation unit in California, SWAP 2015 developed at least one conservation project, consisting of a set of conservation strategies to improve conditions of a conservation target. The focus of SWAP 2015 is on species deemed to be most rare, imperiled, and in need of conservation. Habitat types with high levels of species richness, high counts of rare and endemic species, and high counts of vulnerable species (including declining and at-risk species and SGCN), are prioritized for selection as potential terrestrial conservation targets. Expert opinion and knowledge were employed to identify the highest priority freshwater aquatic targets for each hydrologic unit. Marine ecosystem targets were based on priorities identified through work recently completed as part of the Marine Life Protection Act (MLPA). Anadromous fish conservation targets are key species, species guilds, habitat types, or ecological processes essential to the future conservation of anadromous species. They have been prioritized by CDFW to adequately encapsulate their evolutionary and ecological significance.

Development of Conservation Strategies

SWAP 2015 provides an ecosystem approach for conserving California's fish and wildlife resources by identifying strategies intended to improve conditions of SGCN and the ecosystems upon which they depend (Figure 1).

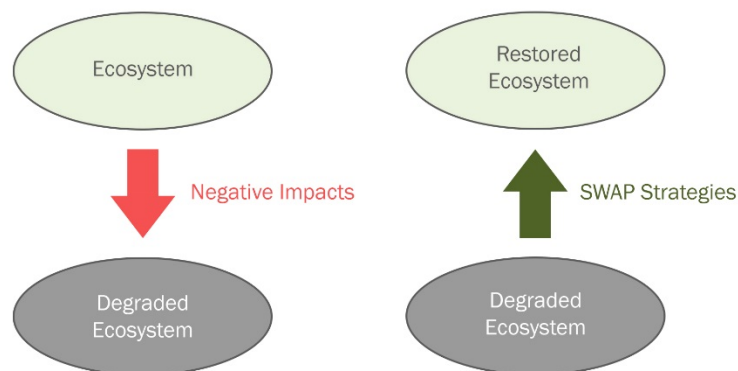


Figure 1 Ecosystem Condition Before and After SWAP 2015 Implementation

Regional conservation strategies have been developed in SWAP 2015 for terrestrial, freshwater aquatic, and marine resources in the following strategy categories:

- ▲ Data Collection and Analysis
- ▲ Partner Engagement
- ▲ Management Planning
- ▲ Direct Management
- ▲ Economic Incentives
- ▲ Environmental Review
- ▲ Land Acquisition, Easement, and Lease
- ▲ Land Use Planning
- ▲ Law and Policy
- ▲ Outreach and Education
- ▲ Training and Technical Assistance

Specific conservation strategies were developed as part of a conservation project for each conservation target using a systematic approach (Figure 2). First, for each conservation target, key ecological attributes (KEAs) were identified. These attributes are the ecological qualities on which the viability of the conservation target most depends. Stresses, the degraded conditions of the ecological attributes, were then identified followed by the identification of the sources of the degradation called pressures, which consist of anthropogenic (human-induced) or natural drivers that have strong influences on the ecological conditions of the target. If applicable, underlying socio-economic causes for the pressures were also recognized. After illustrating the interrelationship of KEAs, stresses and pressures, conservation strategies were developed that would either directly or indirectly alleviate negative impacts of pressures or stresses, or to improve or maintain the ecological viability of conservation targets by conserving KEAs. Strategies reduce pressures directly and stresses indirectly, or act directly on stresses or the target. Desired outcomes of each conservation project are articulated as the project's goals and objectives. The goals describe the desired outcomes for the condition of the KEAs and the objectives address the desired outcomes of the strategies. The conservation targets, stresses, pressures, and conservation strategies for each province are summarized in Tables 1-7.

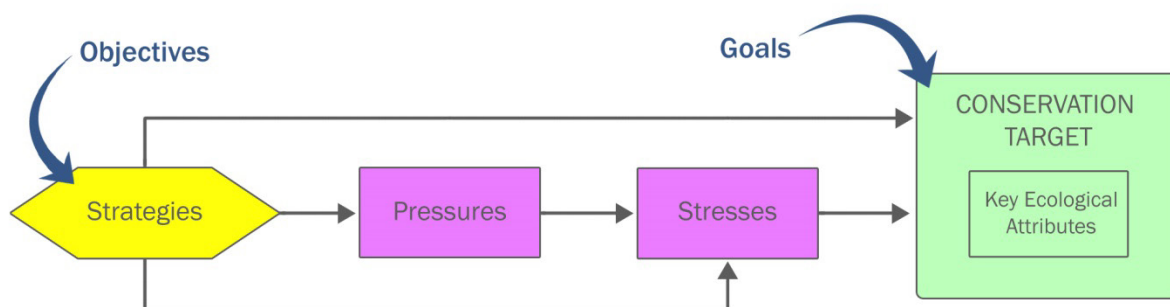


Figure 2 Conceptual Model - How Strategy Implementation Improves Conservation Target Condition

Conservation strategies for anadromous fish are summarized in Table 8 and consist of the following general strategies:

- ▲ Research, Assessment, and Monitoring;
- ▲ Securing Adequate Funding;
- ▲ Habitat Enhancement, Restoration, and Protection; and
- ▲ Developing Water Management Plans.

Definitions Important to SWAP 2015

Conservation Target: An element of biodiversity at a project site, which can be a species, habitat/ecological system, or ecological process on which a project has chosen to focus.

Goal: A formal statement detailing a desired outcome of a conservation project, such as a desired future status of a target. The scope of a goal is to improve or maintain key ecological attributes (defined below).

Key Ecological Attribute (KEA): Aspects of a target's biology or ecology that, if present, define a healthy target and, if missing or altered, would lead to the outright loss or extreme degradation of the target over time.

Objective: A formal statement detailing a desired outcome of a conservation project, such as reducing the negative impacts of a critical pressure (defined below). The scope of an objective is broader than that of a goal because it may address positive impacts not related to ecological entities (such as getting better ecological data or developing conservation plans) that would be important for the project. The set of objectives developed for a conservation project are intended, as a whole, to lead to the achievement of a goal or goals, that is, improvements of key ecological attributes.

Pressure: An anthropogenic (human-induced) or natural driver that could result in changing the ecological conditions of the target. Pressures can be positive or negative depending on intensity, timing, and duration. Negative or positive, the influence of a pressure to the target is likely to be significant.

Species of Greatest Conservation Need (SGCN): All state and federally listed and candidate species, species for which there is a conservation concern, or species identified as being vulnerable to climate change.

Strategy: A group of actions with a common focus that work together to reduce pressures, capitalize on opportunities, or restore natural systems. A set of strategies identified under a project is intended, as a whole, to achieve goals, objectives, and other key results addressed under the project.

Stress: A degraded ecological condition of a target that resulted directly or indirectly from negative impacts of pressures (e.g., habitat fragmentation).

North Coast and Klamath Province

Table 1 Conservation Targets and Strategies for the North Coast and Klamath Province				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
North Coastal and Montane Riparian Forest and Woodland	<p>Northern California Coast Ranges:</p> <ul style="list-style-type: none"> By 2025, acres of habitat are increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired channel pattern are increased by at least 5% from 2015 acres/miles. By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres. <p>Northern California Coast:</p> <ul style="list-style-type: none"> By 2025, acres of habitat (riparian) are increased at least 5% from 2015 acres. By 2025, acres with desired endemic plant diversity (ground cover, shrubs, understory) are increased at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired channel pattern (natural floodplain) are increased by at least 5% from 2015 acres/miles. By 2025, miles connected (to natural floodplain) are increased by at least 5% from 2015 miles. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, acres/miles with natural hydrologic regime (through management of water operations in the Eel, Klamath, Trinity, Mad, and Russian Rivers) are increased by at least 5% from 2015 acres/miles. 	<ul style="list-style-type: none"> Area and extent of community Connectivity among communities and ecosystems Hydrological regime Successional dynamics 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Dams and water management/use Household sewage and urban wastewater Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Roads and railroads 	<ul style="list-style-type: none"> Direct Management Land Acquisition/Easement/Lease Law and Policy Management Planning Outreach and Education Partner Engagement
Freshwater Marsh	<ul style="list-style-type: none"> By 2025, acres of freshwater emergent wetland habitat are increased by at least 5% from 2015 acres. By 2025, miles of freshwater emergent wetland where native species are dominant are increased by at least 5% from 2015 miles. By 2025, population abundance of key species (SGCN) is increased by at least 5% from 2015 population levels. By 2025, acres/miles of freshwater emergent wetland with desired inches of groundwater are increased by at least 5% from 2015. By 2025, acres of freshwater emergent wetland with suitable soil characteristics are increased by 5% from 2015 acres. By 2025, population of key species (beaver) is increased by at least 5% from 2015 population levels. By 2025, acres of freshwater emergent wetland with desired stages of succession are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired channel pattern (connected floodplains) are increased by at least 5% from 2015 acres/miles. By 2025, miles with desired level of discharge (mimicking natural flood frequency, seasonality, and magnitude) are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Connectivity among communities and ecosystems Community structure and composition Successional dynamics Surface water flow regime 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Commercial and industrial areas Dams and water management/use Household sewage and urban wastewater Housing and urban areas Industrial and military effluents Invasive plants/animals Livestock, farming, and ranching Mining and quarrying Roads and railroads 	<ul style="list-style-type: none"> Economic Incentives Land Acquisition/Easement/Lease Law and Policy Management Planning Outreach and Education
Pacific Northwest Conifer Forests	<ul style="list-style-type: none"> By 2025, acres of redwood habitat are increased by at least 5% from 2015 acres. By 2025, acres with desired structural diversity (multi-story canopy) are increased by at least 5% from 2015 acres. By 2025, acres/miles with natural hydrologic (udic) regime are increased by at least 5% from 2015 acres/miles. By 2025, acres with suitable soil characteristics (in wet meadows) are increased by at least 5% from 2015 acres. By 2025, acres with desired (late) stages of succession are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Hydrological regime Soil quality and sediment deposition regime Successional dynamics 	<ul style="list-style-type: none"> Agricultural and forestry effluents Climate change Fire and fire suppression Introduced genetic material Invasive plants/animals Livestock, farming, and ranching Logging and wood harvesting Parasites/pathogens/diseases Roads and railroads Wood and pulp plantations 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Management Planning Outreach and Education Partner Engagement Training and Technical Assistance

Table 1 Conservation Targets and Strategies for the North Coast and Klamath Province (continued)				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Pacific Northwest Subalpine Forest	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres.By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionParasites/pathogens/diseasesRecreational activities	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesEnvironmental ReviewLand Use PlanningManagement PlanningPartner EngagementTraining and Technical Assistance
California Foothill and Valley Forests and Woodlands	<ul style="list-style-type: none">By 2025, acres with desired endemic plant diversity are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity (oak recruitment) are increased by at least 5% from 2015 acres.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired inches of groundwater are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Community structure and compositionFire regimeSoil quality and sediment deposition regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionInvasive plants/animalsLivestock, farming, and, ranchingRecreational activities	<ul style="list-style-type: none">Direct ManagementEconomic IncentivesLand Acquisition/Easement/LeaseOutreach and EducationPartner Engagement
Alpine Vegetation	<ul style="list-style-type: none">By 2025, acres connected are maintained within the ecoregion from 2015 acres.By 2025, acres of macrogroup (target) are maintained within the ecoregion from 2015 acres.By 2025, acres with desired plant diversity (species richness and subgroup/alliance diversity) are maintained within the ecoregion from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystems	<ul style="list-style-type: none">Climate changeCommercial and industrial areasInvasive plants/animalsLivestock, farming, and ranchingRecreational activities	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesManagement PlanningOutreach and EducationPartner EngagementTraining and Technical Assistance
Wet Mountain Meadow Fen (Wet Meadow) Mountain Riparian Scrub and Wet Meadow Subalpine Aspen Forests and Pine Woodlands (Meadows) Western Upland Grasslands	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired channel pattern are increased by at least 5% from 2015 acres/miles.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeHydrological regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionInvasive plants/animalsLivestock, farming, and ranchingLogging and wood harvesting	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEnvironmental ReviewLaw and PolicyOutreach and EducationPartner Engagement
Subalpine Aspen Forests and Pine Woodlands (Mature Conifer Forest)	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres.By 2025, acres connected are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsFire regimeSoil quality and sediment deposition regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionLogging and wood harvestingParasites/pathogens/diseases	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEnvironmental ReviewLaw and PolicyOutreach and EducationPartner Engagement

North Coast and Klamath Province

Table 1 Conservation Targets and Strategies for the North Coast and Klamath Province (continued)				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Montane Upland Deciduous Scrub	<ul style="list-style-type: none">By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres.By 2025, connected montane shrubland and grassland acres are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres with suitable soil characteristics are increased by 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Connectivity among communities and ecosystemsCommunity structure and compositionFire regimeHydrological regime	<ul style="list-style-type: none">Climate changeFire and fire suppressionHousing and urban areasLogging and wood harvesting	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEnvironmental ReviewLaw and PolicyOutreach and EducationPartner Engagement
Coastal Dune and Bluff Scrub	<ul style="list-style-type: none">By 2025, acres with desired structural diversity are increased at least 5% from 2015 acres.By 2025, acres connected are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres with suitable soil characteristics are increased by 5% from 2015 acres.By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsFire regimeSoil quality and sediment deposition regime	<ul style="list-style-type: none">Airborne pollutantsClimate changeCommercial and industrial areasFire and fire suppressionHousing and urban areasInvasive plants/animalsRecreational activitiesRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEnvironmental ReviewLand Acquisition/Easement/LeaseLand Use PlanningLaw and PolicyManagement PlanningPartner Engagement
Native Aquatic Species Assemblages/Communities	<ul style="list-style-type: none">By 2025, miles of streams with target amphibian population are increased by at least 5% from 2015 miles.By 2025, miles of streams with target fish population are increased by at least 5% from 2015 miles.By 2025, miles of streams with key species population are increased by at least 5% from 2015 population.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, acres/miles with desired concentrations of pollutants are increased by at least 5% from 2015 acres/miles.By 2025, acres/miles with total dissolved solids are decreased by at least 5% from 2015 acres.By 2025, miles with desired stream stage (flow) are increased by at least 5% from 2015 miles.By 2025, acres/miles with desired temperature are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionPollutant concentrations and dynamics Soil quality and sediment deposition regimeSurface water flow regimeWater temperatures and chemistry	<ul style="list-style-type: none">Agricultural and forestry effluentsAnnual and perennial non-timber cropsClimate changeDams and water management/useFire and fire suppressionGarbage and solid wasteHousehold sewage and urban waste waterHousing and urban areasIndustrial and military effluentsIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingLogging and wood harvestingMarine and freshwater aquacultureMining and quarryingParasites/pathogens/diseasesRenewable energyRoads and railroads	<ul style="list-style-type: none">Direct ManagementEconomic IncentivesLand Acquisition/Easement/LeaseLaw and PolicyOutreach and Education

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.

² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Table 2 Conservation Targets and Strategies for the Cascades and Modoc Plateau Province				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
North Coastal Mixed Evergreen and Montane Forests	<ul style="list-style-type: none">By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, miles with desired level of water yield are increased by at least 5 % from 2015 miles.	<ul style="list-style-type: none">Community structure and compositionHydrological regimeFire regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionLivestock, farming, and ranchingLogging and wood harvestingRenewable energyUtility and service lines	<ul style="list-style-type: none">Data Collection and AnalysisLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and Education
Western Upland Grasslands	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity (remove in-growth trees from within grassland habitats) are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeSuccessional dynamics	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeFire and fire suppressionInvasive plants/animalsLivestock, farming, and ranchingLogging and wood harvesting	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesLand Acquisition/Easement/LeaseLand Use PlanningLaw and Policy
Big Sagebrush Scrub Great Basin Dwarf Sagebrush Scrub Great Basin Upland Scrub	<ul style="list-style-type: none">By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres with suitable soil characteristics are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeSoil quality and sediment deposition regimeSuccessional dynamics	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useFire and fire suppressionHousing and urban areasInvasive plants/animals (non-native species)Invasive plants/animals (native species)Livestock, farming, and ranchingRecreational activitiesRenewable energyUtility and service lines	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesLaw and PolicyManagement PlanningOutreach and EducationPartner Engagement
Great Basin Pinyon-Juniper Woodland	<ul style="list-style-type: none">By 2025, acres where desired native species are dominant and desired structural diversity are increased by at least 5% within the presettlement range of pinyon-juniper and juniper habitats in the ecoregion.By 2025, acres of desired successional stage are increased by at least 5% from presettlement habitat acreage.By 2025, acres with desired fire return interval are increased by at least 5% from 2015 levels.	<ul style="list-style-type: none">Community structure and compositionFire regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionInvasive plants/animalsOther ecosystem modifications	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementPartner Engagement
Eagle Lake Native Fish Assemblage	<ul style="list-style-type: none">By 2025, miles of streams with target fish population (Eagle Lake Rainbow Trout - ELRT) are increased by at least 5% from 2015 miles.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, population of key species (ELRT) is increased by at least 5% from the 2015 population size.By 2025, acres with desired genetic connectivity between lower Pine Creek and lake populations during spawning and migration period are increased by at least 5% from 2015 acres.By 2025, miles connected are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsHydrological regimeSoil quality and sediment deposition regimeSurface water flow regimeWater level fluctuations	<ul style="list-style-type: none">Climate changeDams and water management/useIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingLogging and wood harvestingRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesLaw and PolicyManagement PlanningOutreach and EducationPartner Engagement
Goose Lake Native Fish Assemblage	<ul style="list-style-type: none">By 2025, acres connected are increased by at least 5% from 2015 acres by improving access to habitat in all lake tributaries and enhancing fish passage.By 2025, populations of key species are increased by at least 5% from 2015 population size.By 2025, miles of river in Pine and Davis Creeks where native species are dominant are increased by at least 5% from 2015 miles.By 2025, miles connected between stream and lake populations during spawning and migration period are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsHydrological regimeNutrient concentration and dynamicsSoil quality and sediment deposition regimeSurface water flow regimeWater temperatures and chemistryWater level fluctuations	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingLogging and wood harvestingRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLaw and PolicyOutreach and Education

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.
² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Bay Delta and Central Coast Province

Target	Goals¹	Key Ecological Attributes (KEAs)	Pressures²	Strategy Categories
American Southwest Riparian Forest and Woodland	<ul style="list-style-type: none"> By 2025, acres of habitat are increased by at least 5% from 2015 acres of riparian habitat in the Central Coast Ecoregion. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, miles connected are increased by at least 5% from 2015 miles of riparian habitat. By 2025, miles with desired level of discharge are increased by at least 5% from 2015 miles. By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres of riparian habitat. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Water level fluctuations 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Commercial and industrial areas Dams and water management/use Household sewage and urban waste water Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Roads and railroads Utility and service lines 	<ul style="list-style-type: none"> Direct Management Land Acquisition/Easement/Lease Outreach and Education
California Grassland, Vernal Pools, and Flowerfields	<ul style="list-style-type: none"> By 2025, acres of grassland habitat restored are increased by at least 5% from 2015 acres. By 2025, acres of vernal pool habitat restored are increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres by treatment with managed grazing. By 2025, population of key species (spadefoot toad) is increased by at least 5% from 2015 population levels. By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres by reducing encroachment of coyote bush/coastal scrub into grassland. By 2025, miles with desired stream stage are increased by at least 5% from 2015 miles through length of hydroperiod. By 2025, miles with desired level water quality are increased by at least 5% from 2015 miles by meeting standards of Basin Plan. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Successional dynamics Surface water flow regime 	<ul style="list-style-type: none"> Annual and perennial non-timber crops Climate change Commercial and industrial areas Fire and fire suppression Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Renewable energy Roads and railroads 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Acquisition/ Easement/ Lease Land Use Planning Partner Engagement
Coastal Sage Scrub Northwest Coast Cliff and Outcrop Coastal Dune and Bluff Scrub North Coast Deciduous Scrub and Terrace Prairie	<ul style="list-style-type: none"> By 2025, acres with desired structural diversity are increased at least 5% from 2015 acres. By 2025, acres connected are increased by at least 5% from 2015 acres. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, acres with suitable soil characteristics are increased by 5% from 2015 acres. By 2025, acres of habitat are increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Fire regime Soil quality and sediment deposition regime 	<ul style="list-style-type: none"> Airborne pollutants Annual and perennial non-timber crops Climate change Commercial and industrial areas Fire and fire suppression Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Roads and railroads Tourism and recreation areas 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Environmental Review Land Acquisition/Easement/Lease Land Use Planning Law and Policy Management Planning Partner Engagement

Table 3 Conservation Targets and Strategies for the Bay Delta and Central Coast Province (continued)				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Coastal Lagoons	<ul style="list-style-type: none">By 2025, area (miles/acres) with desired nutrient load (TMDL) are increased by at least 5% from 2015 area (miles/acres).By 2025, acres of lagoon habitat are increased by at least 5% from 2015 acres.By 2025, acres of connected lagoon habitat are increased by at least 5% from 2015 acres.By 2025, miles with desired level of discharge (water level) are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsNutrient concentrations and dynamicsSurface water flow regime	<ul style="list-style-type: none">Agricultural and forestry effluentsAnnual and perennial non-timber cropsClimate changeCommercial and industrial areasDams and water management/useGarbage and solid wasteHousing sewage and urban waste waterHousing and urban areasLivestock, farming, and ranchingOther ecosystem modificationsRecreational activitiesRoads and railroadsTourism and recreation areasWood and pulp plantations	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseLaw and PolicyTraining and Technical Assistance
Freshwater Marsh	<ul style="list-style-type: none">By 2025, acres of freshwater emergent wetland habitat acre increased by at least 5% from 2015 acres.By 2025, miles of freshwater emergent wetland where native species are dominant are increased by at least 5% from 2015 miles.By 2025, population abundance of key species (SGCN) is increased by at least 5% from 2015 population levels.By 2025, acres/miles of freshwater emergent wetland with desired inches of groundwater are increased by at least 5% from 2015.By 2025, acres of freshwater emergent wetland with suitable soil characteristics are increased by 5% from 2015 acres.By 2025, population of key species (beaver, tricolored blackbird, giant garter snake, and western pond turtle) are increased by at least 5% from 2015 population levels.By 2025, acres of freshwater emergent wetland with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired channel pattern (connected floodplains) are increased by at least 5% from 2015 acres/miles.By 2025, miles with desired level of discharge (mimicking natural flood frequency, seasonality, and magnitude) are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsSuccessional dynamicsSurface water flow regime	<ul style="list-style-type: none">Agricultural and forestry effluentsAnnual and perennial non-timber cropsClimate changeCommercial and industrial areasDams and water management/useHousehold sewage and urban waste waterHousing and urban areasIndustrial and military effluentsInvasive plants/animalsLivestock, farming, and ranchingMining and quarryingRoads and railroads	<ul style="list-style-type: none">Economic IncentivesLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and Education
Salt Marsh	<ul style="list-style-type: none">By 2025, miles with desired level of water quality are increased by at least 5% from 2015 miles.By 2025, acres of habitat (salt-marsh habitat) are increased by at least 5% from 2015 acres.By 2025, acres with desired genetic connectivity are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased at least 5% from 2015 acres.By 2025, acres connected are increased by at least 5% from 2015 acres.By 2025, acres of habitat (salt-marsh habitat by providing high-tide refugia for native species) are increased by at least 5% from 2015 acres.By 2025, miles with desired level of water yield (consistent with the Bay-Delta Water Quality Control Plan requirements) are increased by at least 5% from 2015 miles.By 2025, improve water quality in the San Francisco Bay Delta by meeting Total Maximum Daily Load (TMDL) requirements for organic and inorganic pollutants.By 2025, miles with desired level water quality are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionPollutant concentrations and dynamicsSoil quality and sediment deposition regimeSuccessional dynamicsWater level fluctuations	<ul style="list-style-type: none">Agricultural and forestry effluentsAnnual and perennial non-timber cropsClimate changeCommercial and industrial areasDams and water management/useHousehold sewage and urban waste waterHousing and urban areasIndustrial and military effluentsInvasive plants/animalsLivestock, farming, and ranchingMining and quarryingOther ecosystem modificationsRoads and railroadsShipping lanes	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and EducationPartner Engagement

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.

² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Central Valley and Sierra Nevada Province

Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
American Southwest Riparian Forest and Woodland	<ul style="list-style-type: none"> By 2025, acres of functional riparian habitat are increased by at least 5% from 2015 acres. By 2025, acres connected riparian habitat are increased by at least 5% from 2015 acres. By 2025, acres/miles with natural hydrologic regime are increased by at least 5% from 2015 acres/miles. By 2025, acres/miles with total dissolved solids (meeting TMDL) are decreased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Connectivity among communities and ecosystems Hydrological regime Soil quality and sediment deposition regime Successional dynamics Surface water flow regime 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Commercial and industrial areas Dams and water management/use Household sewage and urban waste water Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Logging and wood harvesting Roads and railroads Utility and service lines 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Acquisition/Easement/Lease Law and Policy Management Planning Outreach and Education
Freshwater Marsh	<ul style="list-style-type: none"> By 2025, acres of freshwater emergent wetland habitat are increased by at least 5% from 2015 acres. By 2025, miles of freshwater emergent wetland where native species are dominant are increased by at least 5% from 2015 miles. By 2025, population abundance of key species (SGCN) is increased by at least 5% from 2015 population levels. By 2025, acres/miles of freshwater emergent wetland with desired inches of groundwater are increased by at least 5% from 2015. By 2025, acres of freshwater emergent wetland with suitable soil characteristics are increased by 5% from 2015 acres. By 2025, population of key species (beaver) is increased by at least 5% from 2015 population levels. By 2025, acres of freshwater emergent wetland with desired stages of succession are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired channel pattern (connected floodplains) are increased by at least 5% from 2015 acres/miles. By 2025, miles with desired level of discharge (mimicking natural flood frequency, seasonality, and magnitude) are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Successional dynamics Surface water flow regime 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Commercial and industrial areas Dams and water management/use Household sewage and urban waste water Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Mining and quarrying Roads and railroads 	<ul style="list-style-type: none"> Economic Incentives Land Acquisition/Easement/Lease Law and Policy Management Planning Outreach and Education
Chaparral Desert Transition Chaparral Montane Chaparral California Foothill and Coastal Rock Outcrop Vegetation	<ul style="list-style-type: none"> By 2025, acres of macrogroup habitat (target) are maintained or increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres. By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres. By 2025, acres with desired connectivity are increased by at least 5% from 2015 acres. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Fire regime Successional dynamics 	<ul style="list-style-type: none"> Climate change Fire and fire suppression Housing and urban areas Livestock, farming, and ranching Renewable energy 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Acquisition/Easement/Lease Management Planning Partner Engagement
California Foothill and Valley Forests and Woodlands	<ul style="list-style-type: none"> By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, populations of key species (oaks) are increased by at least 5% from 2015 population. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, miles with desired level of water yield are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Community structure and composition Fire regime Soil quality and sediment deposition regime Successional dynamics 	<ul style="list-style-type: none"> Climate change Fire and fire suppression Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Recreational activities Roads and railroads 	<ul style="list-style-type: none"> Direct Management Economic Incentives Land Acquisition/Easement/Lease Outreach and Education Partner Engagement

Table 4 Conservation Targets and Strategies for Central Valley and Sierra Nevada Province (continued)				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
North Coastal Mixed Evergreen and Montane Conifer Forests	<ul style="list-style-type: none">By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres with desired age class heterogeneity (increase rotation age) are increased by at least 5% from 2015 acres.By 2025, acres of habitat (with increased recruitment of oaks, aspen, and shrubs) are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired water yield are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Community structure and compositionHydrological regimeFire regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionLivestock, farming, and ranchingLogging and wood harvestingRenewable energyUtility and service lines	<ul style="list-style-type: none">Data Collection and AnalysisLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and Education
Alpine Vegetation	<ul style="list-style-type: none">By 2025, acres connected are maintained within the ecoregion from 2015 acres.By 2025, acres of macrogroup (target) are maintained within the ecoregion from 2015 acres.By 2025, acres with desired plant diversity (species richness and subgroup/alliance diversity) are maintained within the ecoregion from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystems	<ul style="list-style-type: none">Climate changeInvasive plants/animalsLivestock, farming, and ranchingRecreational activities	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementManagement PlanningOutreach and EducationPartner EngagementTraining and Technical Assistance
Pacific Northwest Subalpine Forest	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres.By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionParasites/pathogens/diseasesRecreational activities	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesEnvironmental ReviewLand Use PlanningManagement PlanningPartner EngagementTraining and Technical Assistance
Wet Mountain Meadow Western Upland Grasslands	<ul style="list-style-type: none">By 2025, acres of habitat (meadows) are increased by at least 5% from 2015 acres.By 2025, populations of key species (hydrophilic vegetation for SGCNs) are increased by at least 5% from 2015 population.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres/miles with a natural hydrologic regime are increased by at least 5% from acres/miles.By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres.By 2025, acres with suitable soil characteristics (reduced sediment input) are increased by at least 5% from 2015 acres.By 2025, miles with desired level of discharge are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsFire regimeSoil quality and sediment deposition regimeWater level fluctuations	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useFire and fire suppressionHousing and urban areasInvasive plants/animals (non-native)Invasive plants/animals (native species)Livestock, farming, and ranchingLogging and wood harvestingParasites/pathogens/diseasesRecreational activitiesRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseManagement PlanningOutreach and Education
Clear Lake Native Fish Assemblage	<ul style="list-style-type: none">By 2025, acres of habitat (wetland) are increased by at least 5% from 2015 acres.By 2025, acres of habitat (riparian) are increased by at least 5% from 2015 acres.By 2025, populations of key species (tule perch, prickly sculpin, and Clear Lake hitch) are increased by at least 5% from 2015 population.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, water flow of Adobe, Scotts, Middle, Kelsey, Cole creeks in Lake County is increased by at least 5% during spring and early summer season so that native fish species could better migrate in these creeks.By 2025, miles with desired stream stage (in Adobe, Scotts, Middle, Kelsey, Cole creeks in Lake Co. during spring and early summer season) are increased by at least 5% from 2015 miles.By 2025, miles with desired level water quality are increased by at least 5% from 2015 miles.By 2025, acres/miles with desired channel pattern are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsNutrient concentrations and dynamicsPollutant concentration and dynamicsSoil quality and sediment deposition regimeSurface water flow regime	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useInvasive plants/animalsMining and quarryingRecreational activities	<ul style="list-style-type: none">Direct ManagementEconomic IncentivesLand Acquisition/Easement/LeaseLaw and PolicyOutreach and EducationPartner Engagement

Central Valley and Sierra Nevada Province

Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Carson River Native Fish Assemblage	<ul style="list-style-type: none"> By 2025, miles of streams with target fish population are increased by at least 5% from 2015 miles in the Carson River basin. By 2025, miles with desired age class heterogeneity are increased by at least 5% from 2015 acres. By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired concentrations of pollutants are increased by at least 5% from 2015 acres/miles (consistent with TMDL). By 2025, acres/miles with total dissolved solids are decreased by at least 5% from 2015 acres. By 2025, miles with desired stream stage are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Fire regime Pollutant concentration and dynamics Soil quality and sediment deposition regime Surface water flow regime 	<ul style="list-style-type: none"> Agricultural and forestry effluents Annual and perennial non-timber crops Climate change Dams and water management/use Fire and fire suppression Household sewage and urban waste water Housing and urban areas Introduced genetic material Invasive plants/animals Livestock, farming, and ranching Mining and quarrying Roads and railroads 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Acquisition/Easement/Lease Law and Policy Management Planning Outreach and Education Training and Technical Assistance
Walker River Native Fish Assemblage	<ul style="list-style-type: none"> By 2025, miles of streams with target fish population (SGCNs) are increased by at least 5% from 2015 miles. By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles. By 2025, miles connected (i.e., past barriers) are increased by at least 5% from 2015 miles. By 2025, miles with desired stream stage (mimics natural hydrograph) are increased by at least 5% from 2015 miles. By 2025, miles with desired level of water quality (meeting TMDL standards) are increased by at least 5% from 2015 miles. By 2025, miles with desired age class heterogeneity are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Surface water flow regime Water quality 	<ul style="list-style-type: none"> Climate change Dams and water management/use Introduced genetic material Invasive plants/animals Livestock, farming, and ranching Roads and railroads 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Law and Policy Management Planning Outreach and Education Partner Engagement
San Joaquin Native Fish Assemblage	<ul style="list-style-type: none"> By 2025, miles connected native fish habitat are increased by at least 5% from 2015 miles. By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles. By 2025, miles with desired level of water yield (flow) are increased by at least 5% from 2015 miles. By 2025, miles of streams with target fish population are increased by at least 5% from 2015 miles. By 2025, acres/miles of native fish habitat with desired temperature are increased by at least 5% from 2015 acres/miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Hydrological regime Surface water flow regime Water level fluctuations Water quality Water temperature and chemistry 	<ul style="list-style-type: none"> Annual and perennial non-timber crops Climate change Dams and water management/use Household sewage and urban waste water Invasive plants/animals Marine and freshwater aquaculture Recreational activities 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Law and Policy Management Planning Outreach and Education
Upper Kern River Native Fish Assemblage	<ul style="list-style-type: none"> By 2025, miles of streams with target fish population are increased by at least 5% from 2015 miles. By 2025, miles with desired age class heterogeneity are increased by at least 5% from 2015 acres. By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. By 2025, acres/miles with desired concentrations of pollutants are increased by at least 5% from 2015 acres/miles (consistent with TMDL). By 2025, acres/miles with total dissolved solids are decreased by at least 5% from 2015 acres. By 2025, miles with desired stream stage are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Fire regime Soil quality and sediment deposition regime Surface water flow regime 	<ul style="list-style-type: none"> Climate change Introduced genetic material Invasive plants/animals Livestock, farming, and ranching 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Acquisition/Easement/Lease Management Planning Outreach and Education Training and Technical Assistance

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Table 5 Conservation Targets and Strategies for the South Coast Province				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
California Grassland and Flowerfields	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres connected are increased by at least 5% from 2015 acres.By 2025, acres with desired endemic plant/animal diversity are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres.By 2025, populations of key species are increased by at least 5% from 2015 population levels.By 2025, acres/miles with desired plant/animal diversity are increased by at least 5% from 2015 acres/miles.By 2025, acres with desired genetic connectivity are increased by at least 5% from 2015 acres.By 2025, acres/miles with natural hydrologic regime are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsFire regimeNutrient concentrations and dynamicsSuccessional dynamicsSoil quality and sediment deposition regime	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeFire and fire suppressionHousing and urban areasInvasive plants/animalsLivestock, farming, and ranchingRecreational activitiesRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseManagement PlanningPartner Engagement
Freshwater Marsh	<ul style="list-style-type: none">By 2025, acres of freshwater emergent wetland habitat are increased by at least 5% from 2015 acres.By 2025, miles of freshwater emergent wetland where native species are dominant are increased by at least 5% from 2015 miles.By 2025, population abundance of key species (SGCN) is increased by at least 5% from 2015 population levels.By 2025, acres/miles of freshwater emergent wetland with desired inches of groundwater are increased by at least 5% from 2015.By 2025, acres of freshwater emergent wetland with suitable soil characteristics are increased by 5% from 2015 acres.By 2025, population of key species (beaver) is increased by at least 5% from 2015 population levels.By 2025, acres of freshwater emergent wetland with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired channel pattern (connected floodplains) are increased by at least 5% from 2015 acres/miles.By 2025, miles with desired level of discharge (mimicking natural flood frequency, seasonality, and magnitude) are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsSuccessional dynamicsSurface water flow regime	<ul style="list-style-type: none">Agricultural and forestry effluentsAnnual and perennial non-timber cropsClimate changeCommercial and industrial areasDams and water management/useHousehold sewage and urban waste waterHousing and urban areasIndustrial and military effluentsInvasive plants/animalsLivestock, farming, and ranchingRoads and railroads	<ul style="list-style-type: none">Economic IncentivesLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and Education
American Southwest Riparian Forest and Woodland	<ul style="list-style-type: none">By 2025, acres of habitat are maintained or increased by at least 5% in every watershed throughout the ecoregion.By 2025, acres/miles of continuous riparian habitat are increased by at least 5% from 2015 levels.By 2025, the range of more than one riparian SGCN is maintained or increased by at least 5%.By 2025, miles of stream that display the full range of age classes and vegetation layers (herb, shrub, subtree, trees) are increased by at least 5% from 2015 levels.By 2025, miles of surface water flows, both ephemeral and permanent, are restored to mimic historic patterns (hydrographs) of flooding and low flow patterns by at least 5% from 2015 miles.By 2025, acres where native species are dominant are increased by at least 5% of riparian habitat.By 2025, miles connected are increased by at least 5% from 2015 miles of riparian habitat connected.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsHydrological regimeSurface water flow regimeWater level fluctuations	<ul style="list-style-type: none">Catastrophic geological eventsClimate changeDams and water management/useFire and fire suppressionGarbage and solid wasteHousehold sewage and urban waste waterHousing and urban areasInvasive plants/animalsLivestock, farming, and ranchingMining and quarryingRecreational activitiesRoads and railroadsTourism and recreation areas	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseLaw and PolicyManagement PlanningOutreach and Education
Native Fish Assemblage	<ul style="list-style-type: none">By 2025, miles of streams containing their historic native fish composition are increased by at least 5%.By 2025, at least two more streams than in 2015 have improved connectivity.By 2025, the ratio of native fish to non-native fish in Big Tujunga Creek, Haines Creek, and the Santa Clara River mainstem is increased by at least 5%.By 2025, all species and their life stages are present and commonly encountered during summer fish surveys within their currently known range.By 2025, suitable flows are released to maintain target populations below Big Tujunga and Cogswell dams.By 2025, the natural hydrologic regime in coastal lagoons that support target species is maintained or increased by at least 5%.	<ul style="list-style-type: none">Community structure and compositionConnectivity among communities and ecosystemsSurface water flow regimeWater level fluctuations	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useHousehold sewage and urban waste waterHousing and urban areasInvasive plants/animalsMining and quarrying	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseOutreach and Education
South Coast Native Aquatic Herp Assemblage	<ul style="list-style-type: none">By 2025, area occupied by assemblage is increased by at least 5% from 2015 levels.By 2025, all populations contain both juvenile (egg and tadpole) and adult life stages in adequate abundance to ensure population sustainability.By 2025, non-native invasive aquatic species are reduced by at least 5% within sensitive amphibian habitat, and their source populations are identified to aid recovery of native amphibians.By 2025, flow regimes to provide access to suitable habitat for native species are restored by at least 5% from 2015.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionSurface water flow regime	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useHousing and urban areasInvasive plants/animalsMining and quarryingParasites/pathogens/diseasesRecreational activitiesRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/LeaseOutreach and Education

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.

² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Big Sagebrush Scrub	<ul style="list-style-type: none"> By 2025, acres of habitat are increased by at least 5% from 2015 acres. By 2025, acres with desired age class heterogeneity are increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres with desired fire regime are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Fire regime 	<ul style="list-style-type: none"> Climate change Fire and fire suppression Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Parasites/pathogens/diseases Recreational activities 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Economic Incentives Land Acquisition/Easement/Lease Partner Engagement
Great Basin Pinyon-Juniper Woodland	<ul style="list-style-type: none"> By 2025, acres where desired native species are dominant and desired structural diversity are increased by at least 5% within the presettlement range of pinyon-juniper and juniper habitats in the ecoregion. By 2025, acres of desired successional stage are increased by at least 5% from presettlement habitat area. By 2025, acres with desired fire return level are increased by at least 5% from 2015 levels. 	<ul style="list-style-type: none"> Community structure and composition Fire regime Successional dynamics 	<ul style="list-style-type: none"> Climate change Fire and fire suppression Invasive plants/animals Livestock, farming, and ranching Other ecosystem modifications 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Partner Engagement
Shadscale-Saltbush Scrub	<ul style="list-style-type: none"> By 2025, acres of disturbed areas showing signs of successional dynamics are increased by at least 5% from 2015 acres. By 2025, acres of habitat are increased by at least 5% from 2015 acres. By 2025, acres with desired endemic plant/animal diversity are increased by at least 5% from 2015 acres. By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres with habitat connectivity are increased by at least 5% from 2015 acres. By 2025, acres/miles with natural hydrologic regime are increased by at least 5% from acres/miles. By 2025, acres with suitable soil characteristics are increased by at least 5% from 2015 acres. By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Hydrological regime Soil quality and sediment deposition regime Successional dynamics 	<ul style="list-style-type: none"> Airborne pollutants Annual and perennial non-timber crops Climate change Commercial and industrial areas Housing and urban areas Industrial and military effluents Invasive plants/animals Livestock, farming, and ranching Military activities Mining and quarrying Recreational activities Renewable energy Roads and railroads Utility and service lines 	<ul style="list-style-type: none"> Data Collection and Analysis Land Acquisition/Easement/Lease Management Planning Outreach and Education Partner Engagement Training and Technical Assistance
Desert Wash Woodland and Scrub	<ul style="list-style-type: none"> By 2025, acres of (desert wash) habitat are increased by at least 5% from 2015 acres. By 2025, acres with desired endemic plant/animal diversity are increased at least 5% from 2015 acres. By 2025, population of key species (Couch's spadefoot) is increased by at least 5% from 2015 population levels. By 2025, acres with desired structural diversity are increased by at least 5% from 2015 acres. By 2025, miles with habitat connectivity (desert wash habitat) are increased by at least 5% from 2015 miles. By 2025, miles with stable bank (desert wash) are increased by at least 5% from 2015 miles. By 2025, miles with desired stream stage (water volume and flow) are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Soil quality and sediment deposition regime Surface water flow regime 	<ul style="list-style-type: none"> Climate change Commercial and industrial areas Dams and water management/use Housing and urban areas Military activities Mining and quarrying Recreational activities Renewable energy Roads and railroads Tourism and recreation areas Utility and service lines 	<ul style="list-style-type: none"> Data Collection and Analysis Land Use Planning Outreach and Education Partner Engagement
Sparsely Vegetated Desert Dune	<ul style="list-style-type: none"> By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres of habitat are maintained or increased by at least 5% from 2015 acres. By 2025, acres of habitat with suitable soil characteristics regimes are increased by at least 5% from 2015 acres. By 2025, acres of habitat with desired ground water levels are increased by at least 5% from 2015 acres. By 2025, acres of habitat with desired connectivity are increased by at least 5% from 2015 acres. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Connectivity among communities and ecosystems Hydrological regime Soil quality and sediment deposition regime 	<ul style="list-style-type: none"> Climate change Commercial and industrial areas Housing and urban areas Invasive plants/animals Livestock, farming, and ranching Recreational activities Renewable energy Tourism and recreation activities 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Use Planning Management Planning Partner Engagement
American Southwest Riparian Forest and Woodland	<ul style="list-style-type: none"> By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres. By 2025, acres of target habitat are increased by at least 5% from 2015 acres. By 2025, miles with desired stream stage are increased by at least 5% from 2015 miles. 	<ul style="list-style-type: none"> Area and extent of community Community structure and composition Surface water flow regime 	<ul style="list-style-type: none"> Annual and perennial non-timber crops Climate change Dams and water management/use Housing and urban areas Invasive plants/animals Parasites/pathogens/diseases Recreational activities Renewable energy 	<ul style="list-style-type: none"> Data Collection and Analysis Direct Management Land Use Planning

Table 6 Conservation Targets and Strategies for the Deserts Province (continued)				
Target	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
High Desert Wash and “Rangeland” Scrub	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, acres with desired structural diversity are increased at least 5% from 2015 acres.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionSuccessional dynamics	<ul style="list-style-type: none">Climate changeFire and fire suppressionInvasive plants/animalsLivestock, farming, and ranchingMining and quarryingRenewable energy	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementManagement PlanningPartner Engagement
Great Basin Upland Scrub				
Mojave and Sonoran Desert Scrub	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, acres with habitat connectivity are increased by at least 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.By 2025, populations of key species are increased by at least 5% from 2015 population.By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsSuccessional dynamicsWeather regime	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeCommercial and industrial areasHousing and urban areasInvasive plants/animalsRenewable energyRoads and railroadsUtility and service lines	<ul style="list-style-type: none">Land Acquisition/Easement/LeaseLand Use PlanningManagement PlanningOutreach and EducationPartner EngagementTraining and Technical Assistance
Walker River Native Fish Assemblage	<ul style="list-style-type: none">By 2025, miles of streams with target fish population (SGCNs) are increased by at least 5% from 2015 miles.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, miles with habitat connectivity (i.e., past barriers) are increased by at least 5% from 2015 miles.By 2025, miles with desired stream stage (mimics natural hydrograph) are increased by at least 5% from 2015 miles.By 2025, miles with desired level of water quality (meeting TMDL standards) are increased by at least 5% from 2015 miles.By 2025, miles with desired age class heterogeneity are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsHydrological regimeSoil quality and sediment deposition regimeSurface water flow regimeWater quality	<ul style="list-style-type: none">Climate changeDams and water management/useIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLaw and PolicyManagement PlanningOutreach and EducationPartner Engagement
Cienegas	<ul style="list-style-type: none">By 2025, acres of cienegas habitat are increased by at least 5% from 2015 acres.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, acres with desired fire regime (frequent low-intensity fire) are increased by at least 5% from 2015 acres.By 2025, acres/miles with desired inches of groundwater (stable depth) are increased by at least 5% from 2015 acres/miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionFire regimeHydrological regime	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeDams and water management/useFire and fire suppressionHousing and urban areasIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingParasites/pathogens/diseasesRenewable energy	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/ Easement/ LeaseOutreach and EducationPartner Engagement
Springs and Spring Brooks	<ul style="list-style-type: none">By 2025, acres of habitat are increased by at least 5% from 2015 acres.By 2025, miles of river where native species are dominant are increased by at least 5% from 2015 miles.By 2025, miles with habitat connectivity are increased by at least 5% from 2015 miles.By 2025, acres/miles with desired inches of groundwater are increased by at least 5% from 2015 acres/miles.By 2025, acres/miles with desired water yield are increased by at least 5% from 2015 acres/miles.By 2025, acres with suitable soil characteristics are increased by 5% from 2015 acres.By 2025, acres with desired stages of succession are increased by at least 5% from 2015 acres.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsHydrological regimeSoil quality and sediment deposition regimeSuccessional dynamicsSurface water flow regimeWater quality	<ul style="list-style-type: none">Annual and perennial non-timber cropsClimate changeCommercial and industrial areasDams and water management/useIntroduced genetic materialInvasive plants/animalsLivestock, farming, and ranchingMarine and freshwater aquacultureRecreational activitiesRenewable energy	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Acquisition/Easement/ LeaseManagement PlanningOutreach and EducationPartner Engagement
Anthropogenically Created Aquatic Features	<ul style="list-style-type: none">By 2025, acres where native species are dominant are increased by at least 5% from 2015 acres.By 2025, acres with desired genetic connectivity are increased (between Salton Sea drains) by at least 5% from 2015 acres.By 2025, miles with stable bank are increased by at least 5% from 2015 miles.By 2025, miles with desired stream stage (mimic natural flow hydrograph) are increased by at least 5% from 2015 miles.	<ul style="list-style-type: none">Area and extent of communityCommunity structure and compositionConnectivity among communities and ecosystemsSoil quality and sediment deposition regimeSurface water flow regimeWater quality	<ul style="list-style-type: none">Agricultural and forestry effluentsClimate changeDams and water management/useInvasive plants/animalsMarine and freshwater aquacultureRecreational activitiesRenewable energyRoads and railroads	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementLand Use PlanningLaw and PolicyOutreach and EducationPartner Engagement

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.

² Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Marine Province

Table 7 Conservation Targets and Strategies for the Marine Province				
Target*	Goals ¹	Key Ecological Attributes (KEAs)	Pressures ²	Strategy Categories
Embayments Estuaries Lagoons	<ul style="list-style-type: none">By 2025, in coordination with partners, area of target is increased by at least 5% (with half of this new area available as buffer for sea level rise).By 2025, increase reproductive success of native shorebirds by at least 5%, increase native oyster populations by at least 5%, and reduce key invasive species populations (those that pose the greatest ecological risk) by at least 5%, as indicators of improved community structure in the embayments, estuaries, lagoons ecosystems.By 2025, protect at least 5% more shorebird habitats to secure high quality embayments, estuaries, lagoons ecosystems.By 2025, native seagrass (eelgrass) bed acreage is increased by at least 5%. (Will result in an increase in floating vegetation)By 2025, in coordination with partners, surface water flow (both ephemeral and permanent) is increased by at least 5% into embayments, estuaries, lagoons.By 2025, in coordination with State Water Boards and other partners, improve the water quality of tributaries that flow into embayments, estuaries, lagoons by meeting at least 5% of the TMDLs.By 2025, in coordination with partners, at least 5% of the embayment, estuary, and lagoon water bodies improve circulation and hydro-connectivity so that key ecological processes are restored, for example, nutrient and other chemical mixings in the water body are functioning better and improved tidal marsh evolutions are experienced throughout the target.By 2025, in coordination with State Water Boards and other partners, the water quality standards are met for at least 5% of those embayment, estuary, and lagoon water bodies not currently meeting those standards.By 2025, in coordination with State Water Boards and other partners, the sediment quality objectives are met for at least 5% of those embayment, estuary, and lagoon water bodies not currently meeting those objectives.	<ul style="list-style-type: none">Area and extent of communityBiogenic habitatCirculation and connectivity within targetCommunity structure and composition (e.g., key species population levels, age class structure, biodiversity, endemic diversity, native versus non-native diversity)Hydrologic characteristics (e.g., flow coming into and out of target)Quantity of sediment delivered into target (sediment deposition)Sediment qualityWater quality	<ul style="list-style-type: none">Agricultural and forestry effluentsAirborne pollutantsClimate changeDams and water management/useFishing, harvesting, and collecting aquatic resourcesGarbage and solid wasteHousehold sewage and urban wastewater (urban runoff)Housing and urban areas, commercial and industrial areas (shoreline development)Industrial and military effluents (hazardous spills)Industrial and military effluents, household sewage and urban wastewater (point discharges)Invasive plants/animalsLogging and wood harvestingMarine and freshwater aquacultureOther ecosystem modifications (modifications of mouth/channels, ocean/estuary water diversion/control, artificial structures)Parasites/pathogens/diseasesRecreational activitiesShipping lanes (ballast water)Stormwater (urban runoff)	<ul style="list-style-type: none">Data Collection and AnalysisDirect ManagementEconomic IncentivesEnvironmental ReviewLand Acquisition/Easement/LeaseLand Use PlanningLaw and PolicyManagement PlanningOutreach and EducationPartner EngagementTraining and Technical Assistance

* Conservation strategies were only developed for the embayments, estuaries, lagoon target. Strategies for other marine conservation targets will be developed in the future. See Appendix H for discussion of Offshore Islands.

¹ The goals are set initially at 5 percent, but will be refined over time using the adaptive management process described in Chapter 8.

²Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.

Table 8 Conservation Targets and Strategies for Anadromous Fish			
Geography	Conservation Target	Conservation Strategy (Implementation by 2025)	
Statewide	In-river spawning and rearing habitat	<ul style="list-style-type: none">Document range and distribution of spawning and rearing habitat.Enhance and protect key spawning and rearing habitat for each specific anadromous species.	<ul style="list-style-type: none">Promote restoration actions that focus on ecological processes and climate change resilience (e.g., removing barriers to migration, expanding riparian corridors).
	River flow	<ul style="list-style-type: none">Identify annual flow regimes and habitat connectivity necessary for migration, rearing, and spawning of each anadromous species.Develop water management and conservation plans necessary to conserve anadromous fishes.	<ul style="list-style-type: none">Implement water management and conservation plans.
	Wetland habitat	<ul style="list-style-type: none">Identify current condition of riparian and marsh habitat associated with anadromous species.Restore marsh and riparian habitat to improve carrying capacity of anadromous fishes.	<ul style="list-style-type: none">Protect key areas necessary to maintain viable populations.
North Coast and North Central Coast	California Anadromous Salmonid Stronghold Watersheds Conditions	<ul style="list-style-type: none">Establish collaborative working groups for each Stronghold (Smith, Mattole, and South Fork Eel rivers).Assess ecological and human conditions that are allowing for healthy fish populations.	<ul style="list-style-type: none">Establish technical, agency, and financial support to maintain and expand ecological and human conditions supporting strong salmon and steelhead populations.
	Coastal estuaries	<ul style="list-style-type: none">Evaluate current condition and estuarine needs for coho salmon, eulachon, Pacific lamprey, and longfin smelt in key estuaries (i.e., Smith, Klamath, and Eel rivers and Humboldt Bay).Restore and enhance estuary habitat, connectivity, and ecological processes essential for anadromous species.	<ul style="list-style-type: none">Establish estuary function and structure that will allow anadromous migration and be responsive to climate change.
	Russian River Watershed Conditions	<ul style="list-style-type: none">Restore and enhance estuary and river habitat necessary to support viable populations of all listed anadromous fishes (i.e., Chinook salmon, coho salmon, steelhead, green sturgeon).Develop and implement water management plan to ensure Russian River fisheries and land use are compatible.	<ul style="list-style-type: none">Expand Warm Springs Hatchery complex to function as a potential regional conservation facility for coho salmon and other listed species in the North-Central Domain.
Klamath-Trinity Rivers Basin	Pacific lamprey	<ul style="list-style-type: none">Establish standing committee of local, tribal, State, and federal partners in the Klamath-Trinity Rivers Basin to implement interstate/intertribal 2012 Pacific lamprey conservation agreement.Implement basin-wide habitat restoration and monitoring programs.	<ul style="list-style-type: none">Secure funding specific for conserving Pacific lamprey in the Klamath/Trinity Rivers Basin.
	Ecological processes	<ul style="list-style-type: none">Evaluate wood debris, gravel, and water cycling and transport mechanisms across the basins.Establish agreements and practices to ensure adequate ecological processes, habitat quality, and connectivity are maintained to support sustainable anadromous populations across the basins.	<ul style="list-style-type: none">Establish monitoring and evaluation programs to track ecological processes and functioning.
	Listed and at-risk salmonids	<ul style="list-style-type: none">Establish standing inter-organizational team to implement federal and state recovery plans, and continue to support the Trinity River Restoration Plan, and Klamath River Settlement.Integrate recovery actions with strategic hatchery management (e.g., Iron Gate and Trinity River facilities).	<ul style="list-style-type: none">Integrate sustainable river and tribal fisheries with establishing sustainable, natural populations of salmon and steelhead.
South-Central and Southern California Coasts	Steelhead trout populations	<ul style="list-style-type: none">Establish a robust monitoring program to evaluate steelhead populations, habitat, and ecological processes.Secure additional funding necessary to pursue essential habitat recovery.	<ul style="list-style-type: none">Determine role of resident populations to recovery and sustainability of anadromous populations.
	Migration barriers	<ul style="list-style-type: none">Remediate most downstream barriers to steelhead entering rivers and streams.Accelerate planning and remediation of rim dam barriers to key steelhead populations.	<ul style="list-style-type: none">Modify land use practices (e.g., water use, agriculture, recreation, urban and road development) to minimize effects on migration corridors.
	Water management	<ul style="list-style-type: none">In addition to the statewide strategy, identify key streams and locations essential for over-summering juvenile and adult steelhead.Investigate ability and options to creating water banks for steelhead habitat.	<ul style="list-style-type: none">Update CDFW management and conservation plan to integrate modern water management, including drought and climate change parameters.
Central Valley	Pacific lamprey	<ul style="list-style-type: none">Establish standing committee to implement interstate/intertribal 2012 Pacific lamprey conservation agreement.Implement habitat restoration and monitoring programs.	<ul style="list-style-type: none">Secure funding specific for conserving Pacific lamprey in the Central Valley.
	Sturgeon	<ul style="list-style-type: none">Establish fisheries management and conservation plans for white and green sturgeon.Implement habitat restoration and monitoring programs.	<ul style="list-style-type: none">Secure funding specific for conserving sturgeon populations and fisheries in the Central Valley.
	Chinook salmon and steelhead	<ul style="list-style-type: none">Establish biological production goals for each species, coupled with SMART ecological objectives, prioritized restoration actions, focused biotic and abiotic monitoring, and adaptive management planning framework that are developed and overseen by an established standing inter-organizational team to integrate activities of NMFS and CDFW recovery programs, Central Valley Program Improvement Act program, Bay Delta Conservation Plan, San Joaquin River Restoration program, and CDFW fisheries programs to establish sustained salmon and steelhead populations and fisheries.	<ul style="list-style-type: none">Revise and integrate hatchery practices of the six facilities in the Central Valley to maximize scientific standards, minimize effects of programs on natural spawning populations and river habitat, and promote healthy fisheries populations.Conduct rim dam re-introduction pilot projects on Yuba and Sacramento rivers and evaluate efficacy of expanding rearing and spawning habitats for recovery.

Statewide Summary of Most Common Key Ecological Attributes, Stresses, Pressures, and Strategies

Input provided by the regional teams was summarized using available data through June 2014 (Tables 9 through 12). This summary depicts a current statewide trend regarding the overall status of the state's ecosystem health, key conservation factors, and conservation actions needed to improve ecosystem conditions. Several strategies have been created or refined since June 2014 and these changes are not reflected in the summary below. In addition, the pressure of "climate change" has not been included in this summary. Climate change is discussed in more detail in the province sections (Chapter 5). Table 13 provides, at a state-wide level, the strategies that are most commonly applied to each pressure identified for the priority conservation targets.

Table 9 Most Commonly Identified Key Ecological Attributes		
Key Ecological Attributes	Conservation Unit Type	
	Terrestrial	Aquatic
Area and extent of community	X	X
Community structure and composition	X	X
Connectivity among communities and ecosystems	X	X
Fire regime	X	
Successional dynamics	X	
Surface water flow regime		X

Table 10 Most Commonly Identified Stresses		
Stress	Conservation Unit Type	
	Terrestrial	Aquatic
Change in annual average temperatures [climate related factor]	X	X
Change in annual average precipitation [climate related factor]	X	X
Change in natural fire regime	X	
Change in runoff and river flow		X
Change in water level and hydroperiod		X
Change in groundwater table		X
Change in spatial distribution of habitat types	X	
Change in community structure or composition	X	
Change in biotic interactions (altered community dynamics)	X	
Change in succession processes and ecosystem development	X	
Habitat fragmentation	X	

Table 11 Most Commonly Identified Pressures		
Pressures	Conservation Unit Type	
	Terrestrial	Aquatic
Agriculture and forestry effluents		X
Annual and perennial non-timber crops	X	X
Dams and water management		X
Fire and fire suppression	X	X
Housing and urban development	X	
Introduced genetic materials		X
Invasive plants and animals	X	X
Livestock, farming, and ranching	X	X
Recreational activities	X	X
Roads and railroads	X	X
Utility and service lines	X	

Table 12 Most Commonly Identified Strategies		
Strategies	Conservation Unit Type	
	Terrestrial	Aquatic
Data Collection and Analysis	X	X
Partner Engagement	X	X
Management Planning	X	X
Direct Management - Manage Invasive Species	X	X
Direct Management - Habitat Restoration	X	
Direct Management - Manage Dams and Other Barriers		X
Direct Management - Species Reintroductions		X
Land Acquisition, Easements, and Lease	X	X
Law and Policy	X	
Outreach and Education	X	X

Table 13 Number of Conservation Strategy Categories Addressing Each Pressure

Pressure	Strategy Category										
	Data collection and analysis	Partner engagement	Management planning	Direct management	Economic incentives	Environmental review	Land acquisition, easement, and lease	Land use planning	Law and policy	Outreach and education	Training and technical assistance
Agricultural and forestry effluents	○	○	○	○		○		○	○	○	○
Airborne pollutants	○	○	○			○		○	○		
Annual and perennial non-timber crops	●	○	○	●	○		●	○	○	○	○
Catastrophic geological events	○										
Climate change	●	●	○	○	○	○		○	○	○	○
Commercial and industrial areas ¹	○	○	○	○	○	○	●	○	○	○	
Dams and water management/use ²	○	●	○	○	○	○	○	○	○	○	
Fire and fire suppression	■	■	○	■				○	○	○	○
Garbage and solid waste	○	○	○			○			○	○	○
Household sewage and urban wastewater ³	○		○					○	○	○	○
Housing and urban areas ¹	●	●	○	○	○	○	■	○	○	○	
Industrial and military effluents ⁴		○	○					○	○	○	
Fishing and harvesting aquatic resources		○	○			○			○	○	
Introduced genetic material	○	○	○	○						○	○
Invasive plants/animals	■	■	■	■	○		○	○	○	■	○
Livestock, farming, and ranching	○	●	●	■	○		●		●	●	○
Logging and wood harvesting	○	○	○			○	○		○	○	
Marine and freshwater aquaculture	○	○	○	○				○	○	○	
Military activities		○									
Mining and quarrying			○	○							
Other ecosystem modifications ⁵			○	○				○	○	○	
Parasites/pathogens/diseases	○	○	○	○	○			○	○	○	
Recreational activities	○	○	○	○				○	○	○	○
Renewable energy	○	●	○	○			○	○		○	
Roads and railroads	○	●	○	○	○	○	○	○	○	○	
Shipping lanes ⁶	○	○	○					○	○	○	
Tourism and recreation areas	○	○					○	○	○		
Utility and service lines	○	○	○				○	○		○	
Wood and pulp plantations	○			○			○		○		○

Number of strategies: ○ = 1-9, ● = 10-19, ■ = 20-29, ■ = 30-39, ■ = 40-49

Pressures include the following, which are unique to the Marine Province:

¹ Shoreline development, artificial structures

² Urban runoff

³ Point discharge

⁴ Hazardous spills and point discharge

⁵ Modification of mouth/channels and ocean/estuary water diversion/control

⁶ Ballast water

Integration and Implementation

Integration and implementation are two of the most important aspects of SWAP 2015 development. Implementation of California’s SWAP 2015 will involve integrating SWAP features into other resource management programs and plans led by CDFW or partners, developing more detailed SWAP implementation plans, systematically pursuing resources necessary for implementation of conservation strategies, effectively coordinating and collaborating with CDFW partners, and adaptively responding to emerging issues.

Because of California’s tremendous biodiversity and the broad spectrum of actions needed to implement conservation strategies across a complex assemblage of resources, land uses, government activities, and resource-consumptive industries, CDFW determined that a more detailed coordination framework for SWAP 2015 implementation was needed beyond the presentation in SWAP 2015. Called “companion plans,” these sector-specific action plans will be instrumental in the implementation of SWAP 2015. CDFW, in partnership with other state and federal agencies and organizations involved in the use, management, and conservation of California’s natural resources and cultural heritage, are creating nine sector-specific plans.

Sector-Specific Companion Plans:		
▲ Agriculture	▲ Forests and Rangelands	▲ Tribal Lands
▲ Consumptive and Recreational Uses	▲ Land Use Planning	▲ Water Management
▲ Energy Development	▲ Transportation Planning	▲ Marine Resources

Companion plans will support development of well-coordinated, collaborative, multi-stakeholder efforts that leverage human and financial resources, as well as increase efficiencies for implementation of strategies, to achieve goals and objectives of SWAP 2015. These plans will identify shared priorities of SWAP 2015 and CDFW partners, and mutually strengthen the conservation capabilities of CDFW and participating organizations.

Adaptive Management and Monitoring

Natural communities, ecosystems, species population dynamics, and the effects of pressures or conservation actions on the environment are inherently complex. Resource managers often need to take action to conserve species even though scientific information may be incomplete and outcomes of the actions may be uncertain. Adaptive management is essential to implementing effective conservation programs in light of these challenges. In the implementation of a conservation plan, adaptive management is a process of continually monitoring and assessing relevant environmental conditions, as well as the effects and effectiveness of conservation strategies, and adjusting the plan when improvement is needed to

achieve the desired outcomes. SWAP 2015 has integrated the concept of adaptive management into its preparation and implementation.

For SWAP 2015, CDFW has adopted a framework of effectiveness measures that is consistent with the *Open Standards for the Practice of Conservation* (<http://www.conservationmeasures.org>) and that has been recommended by the Association of Fish and Wildlife Agencies (AFWA; 2011). This framework establishes a standardized and readily accessible monitoring and evaluation process to inform and guide SWAP design and implementation. Under the effectiveness measure framework, the information gathered through monitoring and evaluation can be used to identify successful strategies that should be continued and shared, and also to identify less effective ones that should be improved or abandoned. The effectiveness measure framework also provides a mechanism for CDFW to report on the status of SWAP implementation to USFWS, conservation partners, and the public.

SWAP 2015 employs three types of monitoring: (1) status monitoring, which tracks conditions of species, ecosystems, and other conservation factors over time; (2) effectiveness monitoring, which determines if conservation strategies are having their intended results and identifies ways to improve actions that are less effective (i.e., through adaptive management); and (3) effect monitoring, which addresses whether and how the target conditions are being influenced by the implementation of strategies. The effectiveness measure framework promoted by AFWA and adopted for SWAP 2015 brings these three types of monitoring together to (1) attribute changes in ecosystems and species status to the effectiveness of SWAP conservation strategies, and (2) roll up the results of many different strategies into statewide reports.

Conclusion

California's SWAP 2015 establishes a strategic vision of the integrated conservation efforts needed to sustain the tremendous diversity of fish and wildlife resources found in the state. Although SWAP 2015 is not a specific work plan for CDFW or any other organization, it is meant to visualize, support, complement, and unite the plans of the multiple conservation and management entities within California. More detailed, operation-level plans will be needed to complete many of the strategies identified in SWAP 2015. Such plans should be developed by the appropriate entities whose interest, authority, or responsibility encompass each action and in coordination with the SWAP and its companion plans. Support provided by the SWG program will enable coordination and implementation of many projects identified in the SWAP.

SWAP 2015 is an adaptive plan that will continually be updated, revised, and improved, based on the input and deliberations of all those involved in wildlife conservation. Working together, Californians can shape a future with abundant wildlife, outstanding biodiversity, and healthy ecosystems that define the state and provide for the inspiration, recreation, sustenance, and livelihood of its residents and visitors for current and coming generations.