4 Statewide Conservation Strategies

"The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired in value."

– Theodore Roosevelt

CDFW and its partners have developed standardized categories of conservation strategies for SWAP 2015. Conservation strategies are a set of actions intended to reduce pressures and improve the viability of targets. Conservation strategies have been designed to achieve desired outcomes for the conservation targets, called goals. In the most general sense, the overall goal of SWAP 2015 is to enhance the viability of ecosystems. Therefore, the conservation strategies are meant to work toward the ultimate goal of enhancing ecosystems. Figure 4-1 is an expanded version of Figure 1.5-6 and shows the conceptual relationship among conservation strategies, pressures, stresses, key ecological attributes (KEAs), and ecosystem targets developed for SWAP 2015. In most cases, multiple conservation strategies are needed to work together to achieve the desired outcomes for ecosystems.

Recognizing that many conservation practitioners, whether federal, state, or local agencies; tribal governments; non-governmental organizations; or private land-owners, are working toward the goal of conserving natural resources, CDFW has chosen to use standardized terms consistent with the *Open Standards for the Practice of Conservation* to assess and describe conservation strategies. The conservation strategies are also classified into broad categories to facilitate communication both among CDFW staff and with external conservation partners and the public.

This chapter presents the statewide goals for SWAP 2015 and describes each category of conservation strategy to achieve those goals. The specific strategies for each target are presented by province in Chapter 5 and for anadromous fish in Chapter 6. Chapter 8 illustrates the rationales behind choosing those strategies for SWAP 2015 by showing the chain of expected results derived through strategy implementation and how the progress of implementation and the accompanying sequence of expected interim results eventually lead to the achievement of desired outcomes.

4.1 Statewide Goals

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

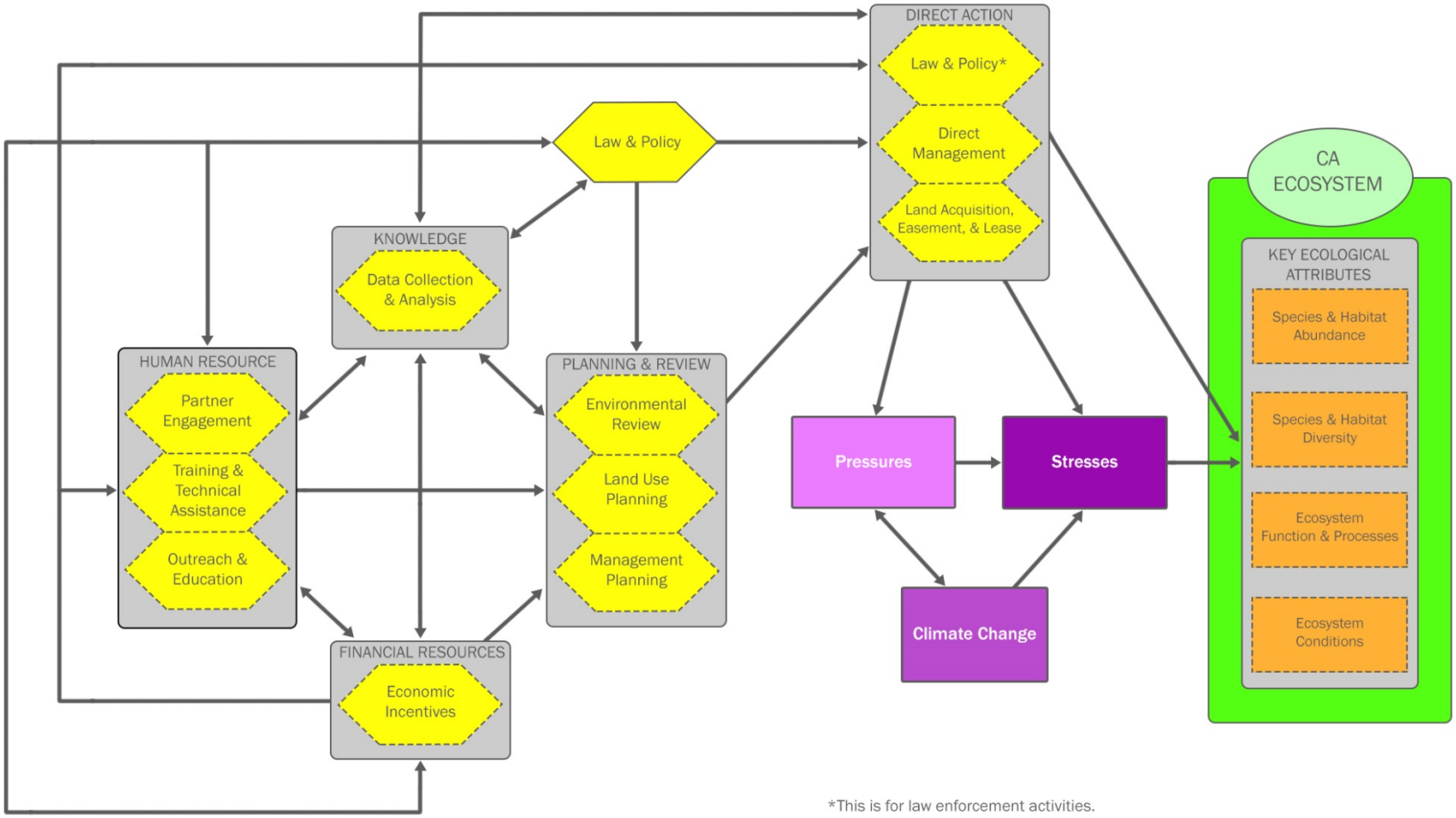


Figure 4-1 Conceptual Model for Conservation Strategies

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).

4.2 Categories of Conservation Strategies

Standardized categories of conservation strategies have been developed in SWAP 2015 to organize the specific conservation strategies developed for each of the conservation targets. The use of categories allows the SWAP program to aggregate and analyze information across scales. For example, Table 4.2-1 shows, at a state-wide level, the strategies that are most commonly applied to each pressure identified for the priority conservation targets. Implementation of these strategies are not limited to CDFW actions or confined to CDFW lands. Forming and facilitating partnerships, alliances, and networks of organizations is vital to implementation of SWAP 2015. These strategies are not limited to the targets and conservation units described in Chapter 5, but should be considered appropriate to apply to any and all habitats or SGCNs in California when relevant.

Eleven categories of conservation strategies have been identified that provide overall conservation benefits statewide and are described below. These categories contain the strategies to achieve the goals presented in Section 4.1. The overall objective of each strategy is to reduce the negative impacts of pressures and stresses resulting in maintained or improved viability of the conservation targets, or to create and enhance conditions so that those actions can occur. Strategies can be applied to pressures, stresses, or directly to the KEAs. Some categories are intended as precursors to other categories as show in Figure 4-1. They are aimed at the development and implementation of other conservation strategies. The first three categories discussed below, Data Collection and Analysis, Partner Engagement, and Management Planning, are examples of these precursors that improve the capability of direct conservation actions on the ground.

The standardized categories of conservation strategies for SWAP 2015 are based on the categories developed by the Effectiveness Measures Working Group of the Associated of Fish and Wildlife Agencies' (AFWA) Teaming with Wildlife Committee (AFWA 2011). The categories are also based on conservation actions that are most commonly funded by State Wildlife Grants (SWG). CDFW adapted the categories to meet the needs of conservation in California. Using the standardized categories of conservation strategies allows CDFW to evaluate the desired outcomes and effectiveness measures across the state. The desired results, including goals, objectives, and effectiveness measures for the categories of conservation strategies, are described in Chapter 8.

Categories of Conservation Strategies

- **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**

The specific conservation strategies developed for each conservation target are contained within these standardized categories and are described in more detail at the province level in Chapter 5. Appendix E identifies the strategies proposed for each conservation target.

Table 4.2-1 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

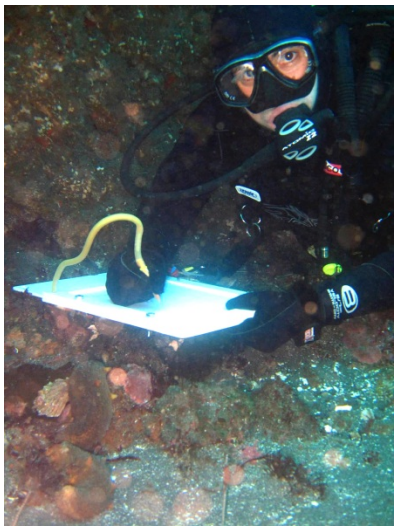
[5] Modification of mouth/channels and ocean/estuary water diversion/control

[6] Ballast water

Table 4.2-1 also shows the pressures that were most commonly identified across the state and what types of conservation strategies will be used to address those pressures. For example, invasive plants and animals was the most commonly identified pressure across all conservation targets. Direct Management and Outreach and Education are the most common strategies identified to reduce the pressure, followed by Data Collection and Analysis, Partner Engagement, and Management Planning.

SWAP 2015 helps implement national and state programs for climate adaptation and invasive species management. Appendix G identifies how SWAP 2015 conservation strategies align with the federal and state climate adaptation strategies described in Section 2.5.3, so important climate adaptation co-benefits are obtained while implementing SWAP 2015 strategies. Appendix F identifies the relationship between SWAP 2015 strategies and the National Invasive Management Plan (NISC 2008) and California's strategic framework for managing invasive species (ISCC 2011).

4.2.1 Data Collection and Analysis



Athena Maguire, CDFW

Data collection and analysis of Species of Greatest Conservation Need (SGCN), their habitats, and the pressures affecting them are needed to help identify appropriate conservation strategies. Robust data and thorough analysis facilitate more effective implementation of conservation strategies under the other categories. This category may also include data collection on performance and compliance measures. This conservation category includes data compilation, management, synthesis, analysis, and reporting of spatial and non-spatial data. It includes stand-alone research conducted to fill basic knowledge gaps and does not include research that is a minor component of implementing another action. Development and implementation of effective conservation strategies require that state natural resource managers and their partners have data available to them that answer specific resource management questions related to conservation targets and relevant pressures. As such, data collection and analysis is one of the most common conservation categories identified by the CDFW. Specific conservation strategies in this category may include:

- Collect baseline and long-term data for conservation targets and SGCN to understand their viability status and trends. This includes universally applicable information on multiple species throughout the state, such as vegetation and habitat inventory and mapping for terrestrial species, water quality and seasonality data for aquatic and amphibious species,

and basic census techniques for groups of vertebrates (e.g., breeding bird census, live mammal trapping, radio collaring large mammals, herpetological census).

- Conduct research to design more effective conservation strategies.
- Collect data on climate impacts and climate refugia.
- Analyze impacts of a particular pressure on a conservation target and explain correlations of human and abiotic effects on species distribution and demographics.
- Conduct comprehensive ecological assessment on individual species, guilds, and ecosystems.
- Conduct groundwater and surface water assessment.
- Include performance monitoring.

The steps to achieve the desired outcomes of the Data Collection and Analysis category are: (1) identify information needs in coordination with state agencies and other partners; (2) collect data to answer relevant questions; (3) convey data to the correct people in appropriate format; (4) use data to inform more effective conservation strategies (see outcomes for other strategies); (5) apply the strategies to reduce the negative impacts of pressures and stresses on the conservation target(s); and (6) achieve improved or maintained viability of conservation target(s).

4.2.2 Partner Engagement

This conservation strategy category includes engaging state and federal agencies with natural resources responsibilities, tribal entities, non-governmental organizations, private landowners, and other partners to achieve shared conservation goals and objectives encompassing broader coordination and collaboration across jurisdictions, geographies, or areas of interest. CDFW's Partner Engagement category includes strategies that create positive work environments through developing and sustaining solid partnership that lead to the development and implementation of more effective conservation strategies. CDFW recognizes the importance of Partner Engagement to successfully manage ecosystems and their associated SGCN. As a result, Partner Engagement is one of the most common categories of conservation strategies identified in SWAP 2015. Specific conservation strategies in this category may include:

- Establish partnerships with other agencies, governments, organizations, and private landowners.
- Maintain and enhance partnerships.
- Engage in decision-making process of partner entities.

The steps to achieve the desired outcomes of the Partner Engagement category are: (1) identify the outcomes that require a strategic partnership; (2) identify natural resource managers and other stakeholders for partnering; (3) engage partners; (4) develop more effective conservation strategies with partners (see outcomes for other strategies); (5) apply the strategies to reduce the negative impacts of pressures and stresses on the conservation target(s); and (6) achieve improved or maintained viability of conservation target(s).

4.2.3 Management Planning

The category of Management Planning includes development of management plans for species, habitats, and natural processes and conditions. Development of management plans for conservation targets will lead to the development and implementation of more effective conservation strategies. Therefore, it allows for more effective implementation of conservation strategies under the other categories. Management Planning will typically undergo a public process and will serve as the road map of conservation strategies and implementation for the agency adopting the plan. For example, CDFW's Marine Region has been involved in a process to revise its "Master Plan, A Guide to the Development of Fishery Management Plans." During that time, a few Fishery Management Plans have been developed, such as for lobster, and more are planned in various formats, including a potential scaled-down versions.

Specific conservation strategies in this category may include:

- Develop and implement Habitat Conservation Plans (HCPs), Natural Community Conservation Plans (NCCPs), and land, aquatic, or marine resource management plans that incorporate long term management and monitoring.
- Update existing management plans.
- Include best management practices (BMPs) to guide conservation strategies in management plans.
- Develop basin management plans to provide guidance on a watershed basis.
- Integrate resource management for multiple objectives, including developing wildlife-friendly fire management, outdoor recreation management, or watershed management.
- Provide meaningful input and engage with local and state agency planning and decision-making processes.

The steps to achieve the desired outcomes of the Management Planning category are: (1) identify the compelling need for a management plan; (2) involve key stakeholders to support the development of the plan; (3) develop a complete management plan; (4) consider and evaluate alternative strategies in the planning process; (5) secure agreement among key agencies and stakeholders a to implement the plan, implement the actions, and monitor the plan's effectiveness; (5) use the plans to implement more effective conservation strategies (see outcomes for other strategies); (6) apply the strategies to reduce the negative impact of pressures and stress on the conservation target(s); (7) achieve improved or maintained viability of conservation target(s); and (8) management plan leads to more effective conservation strategies.

4.2.4 Direct Management

The conservation category of Direct Management involves the stewardship of habitats and natural processes to maintain, increase, and/or restore species populations and ecological

functions and ecological conditions. Direct Management is one of the most common and fundamental conservation categories used by CDFW to manage ecosystems and their associated SGCN. Partner Engagement strategies in conjunction with Direct Management strategies will allow efforts to occur on non-CDFW lands. Before implementing a Direct Management strategy, a management plan may be needed (see Management Planning category). Management Planning informs the Direct Management strategies that should occur. Specific conservation strategies in this category may include:

- Protect, restore, and enhance habitat for SGCN.
- Protect and restore floodplain function.
- Manage dams and other barriers and impediments to water flow or fish movement.
- Manage water, including restoration of natural flows and flow patterns, promotion of water conservation, and development of alternative water sources.
- Manage invasive species.
- Promote hunting and fishing as a conservation tool to use when working to eradicate or control invasive or non-native game species.
- Implement BMPs.
- Promote responsible grazing as a conservation tool.
- Implement controlled burns and other fuel-reduction treatments.
- Translocate or reintroduce native species.
- Maintain roads and manage off-highway vehicle use.
- Develop protective buffers to sensitive ecosystems.

The steps to achieve the desired outcomes of the Direct Management category are: (1) implement management actions; (2) reduce the negative impact of identified pressures; (3) reduce stresses to conservation target(s). If desired pressure and/or stress reduction does not occur, then (4) adjust management actions as appropriate, based on monitoring efforts; and (5) achieve improved viability of conservation target(s).

4.2.5 Economic Incentives

The Economic Incentives category includes development and delivery of economic incentives to private landowners and other stakeholders to implement responsible stewardship of landscapes, ecological processes and conditions, and specific species. It is first expected that a project team would clearly define appropriate incentives for sound stewardship that is designed to improve the status of conservation target(s). Incentives could come in a variety of forms, such as compensation for stewardship costs or loss of income as a result of the stewardship; assistance with efficient compliance with regulatory requirements, which allows them to save money or time; added value from responsible stewardship (e.g., obtaining certifications, attracting hunters or eco-tourists); and technical assistance, which could also help them to apply for money or

other incentives programs. The incentives should provide an impetus to start or continue effective management, but the long-term goal is for stakeholders to recognize the benefit of continuing those practices for an extended duration and to work with managers to implement these practices. Specific conservation strategies in this category may include:

- Develop and provide economic incentives and assurances.
- Seek funding through grants, cooperation with other agencies, and other opportunities as a source for economic incentives.

The steps to achieve the desired outcomes of the Economic Incentive category of strategies are: (1) convey incentives to stakeholders for responsible stewardship; (2) use the incentive to motivate stakeholders to continue responsible stewardship; (3) apply responsible stewardship practices to reduce the negative impacts of pressures and stresses on conservation target(s); and (4) achieve improved viability of conservation target(s).

4.2.6 Environmental Review

The Environmental Review category is fundamentally intended to avoid, minimize, or mitigate/compensate for pressures that may adversely affect conservation targets. The Environmental Review category may be supported by strategies in the Laws and Policy category that trigger reviews. This can include review during the California Environmental Quality Act (CEQA) process of conservation and non-conservation-oriented policies, projects, and plans. Under CEQA, CDFW may provide comments to a lead agency for a project either as a "responsible agency," when it has approval authority over some aspect of a project, and/or as a "trustee agency" with the legal jurisdiction to protect fish and wildlife of the state. Where significant effects on wildlife are identified, CDFW makes recommendations to avoid, minimize, and/or mitigate those significant effects. Specific conservation strategies in this category may include:

- When acting as lead agency, prepare environmental documents that fully meet the requirements and intent of CEQA, including ensuring that project impacts on conservation targets are mitigated to below a level of significance, as possible, as defined in CEQA, as feasible.
- When acting as a responsible agency, provide input during CEQA review to lead agencies to require that project impacts on conservation targets are mitigated to below a level of significance, to the extent feasible, in the area subject to CDFW approval authority. As a responsible agency, CDFW also acts as a trustee agency with the authority to provide input on project impacts outside of its approval authority, as described below.
- When acting as a trustee agency, provide input during environmental review to lead agencies to promote mitigation of project impacts on conservation targets to below a level of significance, to the extent feasible, recognizing that CDFW has a trustee responsibility for fish and wildlife resources.

The steps to achieve the desired outcomes of the Environmental Review category are: that (1) sufficient CDFW staff capacity exists to provide input; (2) gather sufficient information for use in providing input to lead agencies; (3) provide input during environmental review to lead agencies; (4) recommend actions to help achieve conservation needs during the CEQA public comment periods; (5) require the lead agency to incorporate CDFW recommendations as conditions of project approval, if serving as a responsible agency, or promote voluntary implementation of those recommendations, if serving as a trustee agency; (6) implement the CDFW-recommended strategies intended to benefit the conservation target(s); (7) apply the strategies to reduce the negative impacts of pressures and stresses on conservation target(s); and (8) achieve improved viability of conservation target(s).

4.2.7 Land Acquisition, Easement, and Lease

Obtaining land or water rights through fee-title acquisition, conservation easement, lease, contract, or related means are included in the Land Acquisition, Easement, and Lease category. Partner Engagement strategies in conjunction with these strategies will allow actions to take place on non-CDFW lands. The success of the conservation strategies in the Land and Water Acquisition, Easement, or Lease category depends on securing sufficient funds for the initial transaction and then purchasing, leasing, or obtaining a conservation easement for the prioritized lands and water. Steps include developing a management and monitoring plan and allocating funds for implementation. The responsible party then needs to implement the management and monitoring work, which would ameliorate the negative impacts of pressures to the conservation target. If the land or water is leased, over time the responsible entity will need to renew the lease or convert to a more permanent form of protection. If the land or water is placed under conservation easement, the easement conditions must be monitored to ensure they stay in compliance. Specific conservation strategies in this category may include:

- Protect land and/or water through acquisition fee-title ownership or preferably conservation easements.
- Acquire or protect through conservation easements habitat areas important for the conservation target.
- Acquire water rights to protect aquatic habitat including use of Water Code Section 1707.
- Acquire lands or protect through conservation easements, and/or water to maintain wildlife corridors to connect parcels of protected (conserved lands and/or water).
- Create refuges/protected areas.
- Create and expand existing CDFW Wildlife Areas and Ecological Reserves.
- Authorize acquisition or protection through conservation easements of property and/or water rights.

The steps to achieve the desired outcomes in the Land Acquisition, Easement, and Lease category are: (1) obtain sufficient funds for the initial transaction; (2) priority lands or water with high conservation value are identified; (3) purchase, lease, or secure a conservation easement to protect priority lands and water; (4) develop management and monitoring plans; (5) allocate funding for management and monitoring on an annual basis; (6) implement appropriate management and monitoring; and adjust management actions to reduce the negative impacts of identified pressures and stresses, as needed, based on monitoring (see Direct Management category); (7) apply strategies to reduce the negative impacts of pressures and stresses on conservation target(s); (8) maintain compliance of the easement or lease on the land or water being protected in perpetuity; and (9) achieve improved viability of conservation target(s).

4.2.8 Land Use Planning

The Land Use Planning category includes leading or participating in planning activities for rural, urban, agricultural, or coastal lands where conservation targets are present. It involves understanding the decision-making process and identifying a mechanism to inform planning decisions. It may also involve using data collection and analysis to identify wildlife needs and habitat priorities within the involved government jurisdictions (see Data Collection and Analysis category). These results will encourage Land Use Planning actions that are consistent with conservation needs. If this happens as anticipated, Land Use Planning will need to be implemented consistent with the identified conservation needs. In these circumstances, expected negative impacts of pressures and/or stresses will be minimized to help improve the viability of the conservation target(s). Specific conservation strategies in this category may include:

- Provide input on local land use plans and participate in local decision-making processes that affect conservation targets.
- Develop regional HCPs and NCCPs that integrate conservation planning with local land use planning.
- Develop statewide strategies for siting major infrastructure projects, such as roads, water conveyance facilities, desalination plants, and renewable energy development.
- Incorporate BMPs for land use development and public infrastructure that may affect conservation targets, such as roads, transmission lines, or railroads.

The steps to achieve the desired outcomes of the Land Use Planning category are: (1) identify stakeholders and mechanisms to effectively inform decisions; (2) provide guidance for land use and development decisions identified and articulated in the plan; (3) encourage the preparation of a land use plan that is consistent with the input being provided by CDFW; (4) implement the land use plan with conservation strategies consistent with CDFW input; (5) apply the strategies to reduce the negative impacts of pressures and stresses on conservation target(s); (6) stresses are reduced; (7) adjustments are made based on monitoring; and (8) achieve improved viability of conservation target(s).

4.2.9 Law and Policy

The Law and Policy conservation category includes strategies to develop, change, influence, and implement legislation, regulations, policy, and voluntary standards that improve the practice of conservation of target species and habitats. This category also includes law enforcement to ensure legislation, regulations, policies, and voluntary standards are being effectively enforced. Specific conservation strategies in the Law and Policy category may include:

- Develop and support laws, policies, and regulations to protect natural resources.
- Support effective law enforcement.
- Develop BMPs for activities which could harm wildlife (e.g., mosquito abatement) or degrade or eliminate habitats.
- Participate in the legislative and regulatory decision-making process.
- Increase enforcement capacity to support compliance with environmental laws.

The steps to achieve the desired outcomes of the Law and Policy category, in addition to seeking substantial political and constituent support, are: (1) provide input from appropriate agencies and/or stakeholders regarding law or policy; (2) approve law or policy that is consistent with agency and/or stakeholder input; (3) effectively enforce laws or policies that are consistent with conservation objectives; (4) improve compliance with laws and policies that lead to strategies benefiting conservation targets; (5) apply strategies to reduce the negative impacts of pressures and stresses on conservation target(s); and (6) achieve improved viability of conservation target(s).

4.2.10 Outreach and Education

The Outreach and Education category involves the social sciences and reaches out to specific important groups, communities, resource users, policy makers, stakeholders and/or the public with information to improve awareness, gain knowledge, and change attitudes, and behaviors regarding protection of natural resources. It includes both formal (e.g., classroom or workshop) and informal education efforts (e.g., one-on-one or small group meetings and pamphlets). The strategies in the Outreach and Education category focus on providing information and materials to key resource users and stakeholders to inspire the adoption or

reinforcement of behaviors that support SGCN and habitat conservation. The start of any outreach initiative involves being clear about the target audience and the effective messages and communication methods. If the audience receives the message, then the expectation is that they will have the desired knowledge, attitudes, and values to be better stewards of natural habitats and resources. This will, in turn, lead them to adopt or continue a practice that is consistent with the conservation message. The practice should result in a reduction in the negative impacts of pressures and/or stresses which would help improve the viability of the conservation target(s). Specific conservation strategies in this category may include:

- Develop and implement education and outreach programs, including those for wildlife-friendly fire management, outdoor recreation management, recreational and commercial fisheries management, agricultural activities, urban runoff, and the impact of invasive species.
- Engage urban and suburban residents about stewardship of natural resources.
- Develop partnerships for joint advocacy of conservation causes.
- Conduct demonstration management.

The steps to achieve the desired outcomes of the Outreach and Education category are: (1) identify the target audience, message, and appropriate media; (2) the target audience receives the desired conservation message; (3) the target audience adjusts behavior consistent with the conservation needs of the SGCN and their habitats; (4) the target audience adopts or continues behaviors consistent with the message resulting in improved conservation; (5) secure the support of stakeholders and the public to reduce the negative impacts of pressures and stresses on conservation targets; and (6) achieve improved viability of conservation targets.

4.2.11 Training and Technical Assistance

The Training and Technical Assistance category includes providing professional scientific training to managers, scientists, key stakeholders, or others involved in resource conservation to facilitate improved or new management activities and techniques. It includes stand-alone training efforts, workshops, collaborative technical assistance, and technical information sharing. Prior to developing and conducting the training sessions, a need and goal for the training must be determined, and specific skills to be delivered and audiences to receive these must be identified. Once these are determined, the curricula can be selected from existing sources or newly developed, and suitable trainers must be identified. Once the training itself takes place, trainees must demonstrate learning of the new skills and then ultimately apply these skills to development and implementation of more effective conservation strategies.

Technical assistance follows a similar pattern to training, but focuses more on solving immediate problems and practical skills delivery “on the ground” rather than developing capacity. First, a need and goal for technical assistance must be defined and specific skills to be delivered and audiences to receive these must be identified. Once these are determined, the method and

providers of the assistance must be identified. Trainees or recipients of the assistance must demonstrate learning of the new skills and then ultimately apply these skills to development and implementation of more effective conservation strategies. Specific conservation strategies in this category may include:

- Develop training materials and information.
- Conduct training and technical assistance.
- Provide science-based application and tools that are useful for conservation activities.

The steps to achieve the desired outcomes of the Training and Technical Assistance category are: (1) identify needed skills/technical assistance and targeted audiences; (2) develop the appropriate curriculum and identify trainers or technical assistance providers; (3) assemble sufficient participants being trained or assisted; (4) educate the participants about the needed skills; (5) empower the sufficiently trained people to apply the learned skills; (6) apply the learned skills to reduce the negative impacts of pressures and stresses on conservation targets; and (7) achieve improved viability of conservation targets.

4.3 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 4.3-1 through 4.3-4). 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 the 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 4.3-1 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 4.3-2 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 4.3-3 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 4.3-4 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