Appendix A Required Report Elements and Compliance

The California State Wildlife Action Plan (SWAP) 2025 update process has been guided by several documents provided by the Association of Fish and Wildlife Agencies (AFWA). The guidance documents provide the content necessary to fulfill the eight required elements (AFWA 2025), including supporting statements of a SWAP (National Advisory Acceptance Team 2004), plan revisions strategies (AFWA 2012), and guidance on integrating climate change into management plans, including the SWAP (AFWA 2022).

Eight Required Elements of a State Comprehensive Wildlife Conservation Strategy

1. Information on the distribution and abundance of species of wildlife, including low and declining populations, that is indicative of the diversity and health of the state's wildlife

- Section 1.4 SWAP 2025 Approach
- Chapter 2 California's Natural Diversity and Conservation Challenges
- Section 2.3 Habitat and Species Diversity
- Section 2.4 Species of Greatest Conservation Need
- Section 3.1 Conservation Data and Tools
- Section 6.2 Anadromy and Anadromous Species Diversity in California
- Section 8.1.5 Monitoring and Management Plans
- Chapter 10 Bibliography
- Appendix C Species of Greatest Conservation Need
- Appendix D SWAP Conservation Targets: Terrestrial Vegetation Communities
- Appendix G Offshore Islands: Introduction

2. Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in the first element.

- Chapter 2 California's Natural Diversity and Conservation Challenges
- Section 2.3 Habitat and Species Diversity
- Section 2.5 Challenges in California Ecosystems
- Chapter 5.0 Province Specific Conservation Strategies
- Table 5.0
- Chapters 5.X
    - Section 5.X.1 Geophysical and Ecological Description of the Province

    - Section 5.X.2 Conservation Units and Targets (5.7.2-5.7.4 for Marine Province)
    - Section 5.X.3 Key Ecological Attributes (5.7.5 for Marine Province)
- Section 6.3 Salmonid Ecoregions
- Section 6.6 Anadromous Fish Conservation Targets and Strategies
- Appendix D SWAP Conservation Targets: Terrestrial Vegetation Communities
- Appendix G Offshore Islands: Introduction

3. Descriptions of problems and threats that may adversely affect species at risk or their habitats, and priority research and survey work needed for restoration and conservation of these species and habitats.

- Section 1.4 SWAP 2025 Approach
- Chapter 2 California's Natural Diversity and Conservation Challenges
- Section 2.5 Challenges in California Ecosystems
- Section 4.2.1 Data Collection and Analysis
- Table 5.0
- Sections 5.X.5 Pressures on Conservation Targets (5.7.7 for Marine Province)
- Section 6.5 Challenges to Anadromous Species and Watersheds
- Section 6.7.3 Research, Monitoring, and Resource Assessment (Anadromous Fishes)
- Section 7.7 Resources Need for Conservation Actions
- Chapter 8 Monitoring California's Species and Habitat Conservation
- Table 8.1 CDFW Monitoring and Adaptive Management Plans
- Appendix E Invasive Species in California
- Appendix G Offshore Islands
- Introduction
- Conservation Target: Offshore Islands

4. Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats, and priorities for implementing such actions.

- Section 1.4.3 Process to Prioritize Conservation Targets
- Chapter 4 Statewide Conservation Strategies
- Table 5.0
- Sections 5.X.6 Conservation Strategies (5.7.8 for Marine Province)
- Section 6.6 Anadromous Fish Conservation Targets and Strategies
- Chapter 7 Integration and Implementation
- Section 7.2 Companion Plans
- Section 7.3 Resources Need for Conservation Actions
- Section 7.4 Coordination with Partners
- Appendix G Offshore Islands
- Shared Goals for Offshore Islands

- Conservation Target: Offshore Islands

5. Descriptions of the proposed plans for monitoring species at risk and their habitats for monitoring the effectiveness of the conservation actions proposed in Element 4 and for adapting these conservation actions to respond appropriately to new information or changing conditions.

- Section 1.4.4 Open Standards for the Practice of Conservation – Planning Framework
- Section 3.1 Conservation Data and Tools
- Section 4.2.1 Data Collection and Analysis
- Chapter 6 Anadromous Fish
- Section 6.4 Companion Conservation and Recovery Plans
- Section 6.7.3 Research, Monitoring, and Resource Assessment
- Chapter 7 Implementation and Integration
- Chapter 8 Monitoring California's Species and Habitat Conservation

6. Descriptions of procedures to review the strategy at intervals not to exceed 10 years.

- Section 1.5 SWAP Review and Revision
- Appendix B California State Wildlife Action Plan 2025 Revision Summary

7. Description of the plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the strategy with federal, state, and local agencies and California Native American tribes that manage significant land and water areas within the state or administer programs that significantly affect the conservation of identified species and habitats.

- Chapter 1 Introduction and Vision
- Section 1.3.1 Vision Components
- Section 1.5 SWAP Review and Revision
- Section 1.6 Companion Plans
- Section 4.2.2 Partner Engagement
- Section 6.7.2 Partnerships, Education, and Outreach
- Chapter 7 Integration and Implementation
- Appendix E Invasive Species in California: Inter-Agency Partnerships
- Appendix G Offshore Islands: Shared Goals for Offshore Islands

8. Description of the necessary public participation in the development, revision, and implementation of the strategy.

- Chapter 1 Introduction and Vision
- Section 1.3.1 Vision Components

- Section 1.5 SWAP Review and Revision
- Section 1.5.1 SWAP 2025 Public Engagement
- Section 4.2.10 Outreach and Engagement
- Section 6.7.2 Partnerships, Education, and Outreach
- Section 7.5 Public Engagement
- Section 8.2 Citizen Science

Voluntary Guidance for States to Incorporate Climate Change into State Wildlife Action Plans and Other Management Plans

1. Species Distribution

States may want to use vulnerability assessments to support the addition/removal of species from their list of species in greatest need of conservation and examine how climate change could impact distribution and abundance of species and their status as native or exotic.

- Section 2.4 Species of Greatest Conservation Need
- Appendix C Species of Greatest Conservation Need

2. Location and Condition of Key Habitats

States may want to assess how habitats and species ranges may change as a result of current and future climate change through scenario-building; both temporally and spatially and plan for novel communities/ecosystems that appear due to these shifts.

- Section 2.5.4 Vulnerability to Climate Change
- Sections 5.X.5 Pressures on Conservation Targets: Climate Change
- Section 6.5 Challenges to Anadromous Species and Watersheds

3. Descriptions of Problems and Priority Research Survey Efforts

States may want to consider both direct and indirect impacts of climate change; identify and execute research in partnership with other states/regions to gain economy of scale and consider climate change as an additional "layer" of threats to existing threats.

- Section 2.5.4 Vulnerability to Climate Change
- Chapter 5 Province-Specific Conservation Strategies
- Chapter 7 Integration and Implementation
- Ch 8 Monitoring California's Conservation Strategies
- Appendix F Climate Adaptation Strategies Cross-Reference Guide

4. Descriptions of Conservation Actions

States should consider actions for a range of likely future climate conditions; identify/describe how conservation actions will be prioritized when considering multiple threats; identify actions that minimize, not necessarily eliminate climate change impacts; provide for wildlife adaptation; and provide for resilience and/or facilitate movement to suitable habitats and conditions.

- Chapter 5 Province-Specific Conservation Strategies

- Sections 5.X.6 Conservation Strategies (5.7.8 for Marine Province)
- Section 6.6 Anadromous Fish Conservation Targets and Strategies

5. Monitoring Plans

States should strive to implement streamlined and affordable monitoring programs that inform management decisions under a changing climate and should consider working with other states and partners to monitor species and habitats across their entire range.

- Section 6.7.3 Research, Monitoring, and Resource Assessment (Anadromous Fishes)
- Chapter 7 Implementation and Integration
- Chapter 8 Monitoring California's Species and Habitat Conservation
- Appendix F Climate Adaptation Strategies Cross-Reference Guide

6. Plans for Revision

States should contact the US Fish and Wildlife Service regional office early in the revision process and refer to the 2007 USFWS/AFWA Revision Guidance letter to determine if a "major" or "minor" revision will be required.

- Section 1.5 SWAP Review and Revision
- Appendix B California State Wildlife Action Plan 2025 Revision Summary

7. Coordinating with Partners

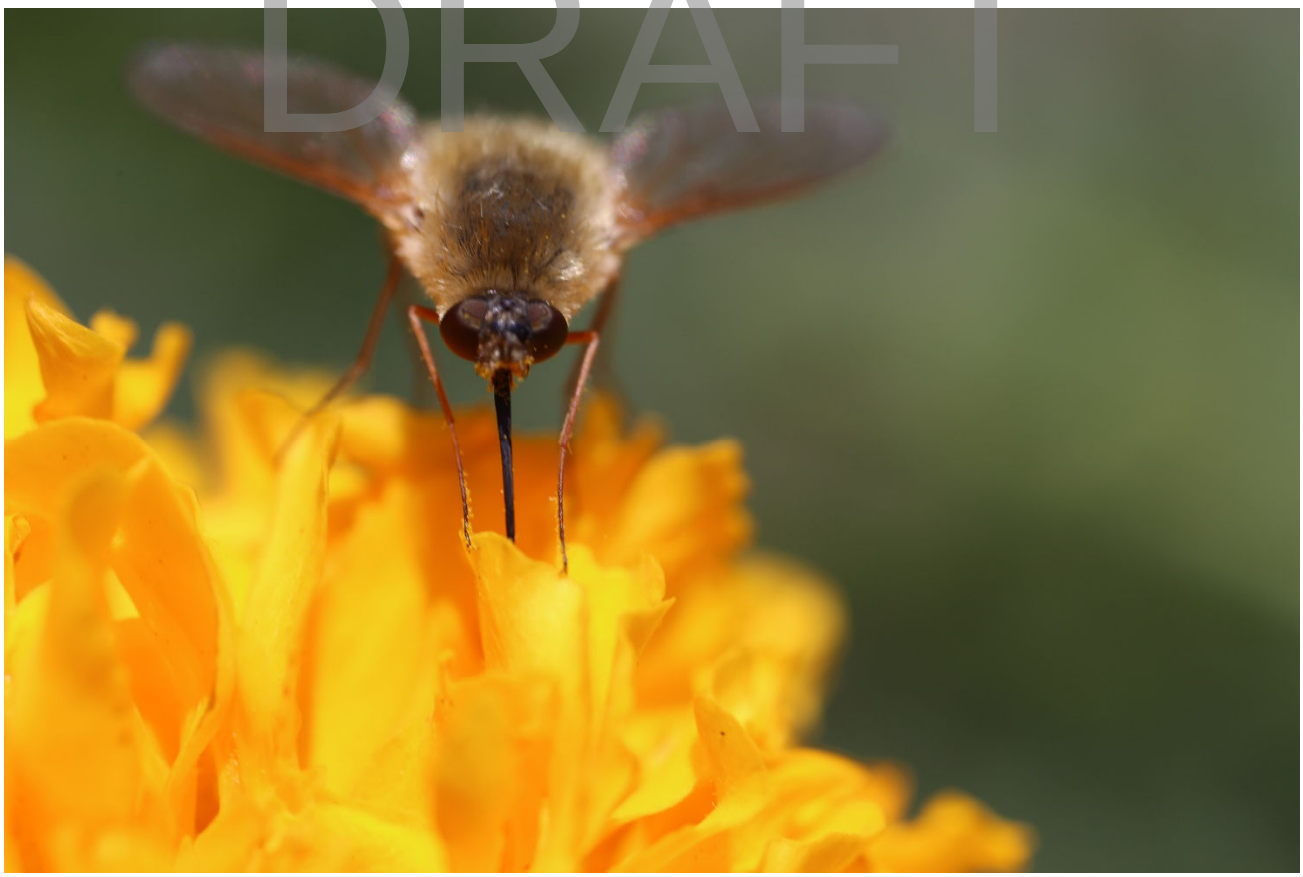
States should consider coordinating and collaborating with partners since the scope, scale and uncertainty of climate change impacts will require a high level of expertise, support and collaboration; agencies in coastal states should consider addressing marine environments and/or collaborating with sister agencies with jurisdiction over marine species.

- Chapter 1 Introduction and Vision
- Section 1.3.1 Vision Components
- Section 1.5 SWAP Review and Revision
- Section 1.6 Companion Plans
- Section 4.2.2 Partner Engagement
- Section 6.7.2 Partnerships, Education, and Outreach
- Chapter 7 Integration and Implementation
- Appendix E Invasive Species in California: Inter-Agency Partnerships
- Appendix F Climate Adaptation Strategies Cross-Reference Guide
- Appendix G Offshore Islands: Shared Goals for Offshore Islands

8. Public Participation

States should consider public participation planning since the potential for controversy associated with climate change could be high; strive to improve understanding of the impacts to wildlife and gain public support or acceptance for revising your Wildlife Action Plan; use terms that are tested with the public like "safeguarding wildlife" as opposed to "wildlife adaption" and involve conservation partners early during the public participation planning process, but recognize there may not be agreement on messages or approaches.

- Chapter 1 Introduction and Vision
- Section 1.3.1 Vision Components
- Section 1.5 SWAP Review and Revision
- Section 1.5.1 SWAP 2025 Public Engagement
- Section 4.2.10 Outreach and Engagement
- Section 6.7.2 Partnerships, Education, and Outreach
- Section 7.5 Public Engagement
- Section 8.2 Citizen Science



Appendix B California State Wildlife Action Plan 2025 Revision Summary

The California State Wildlife Action Plan (SWAP) 2025 is the second major revision of the first California SWAP, which was developed in 2005. California's approach to the SWAP is much more than meeting the requirements for federal grants eligibility. California's vision for SWAP 2025 is to be an overarching blueprint for conservation of fish and wildlife resources. The SWAP can be useful not just for California Department of Fish and Wildlife (CDFW) purposes as the state's trustee for fish and wildlife resources, but also for other natural resource agencies, tribal governments, hunters and anglers, conservation groups, landowners, and people who manage working landscapes. A summary of the revisions to SWAP 2025 is provided below.

SWAP 2025 Highlights

Revisions to the SGCN list. The SGCN list in SWAP 2025 includes over 1,395 species, representing marine, aquatic, and terrestrial habitats, and includes birds, mammals, reptiles, amphibians, fish, invertebrates, algae, and plants. It focuses not only on threatened and endangered species and species of special concern, but also other species that are rare or declining in numbers and that are vulnerable to climate change. CDFW clarified the 2025 SGCN criteria to state "species where take is expressly prohibited by CDFW or NMFS" for fish and marine plants. There were eight amphibian and reptile, 57 bird, 16 fish, 67 invertebrate, 72 mammal, and 62 algal and plant species added to SWAP 2025.

Tribal engagement is one of the keys to successful implementation of the conservation strategies in SWAP 2025. CDFW recognizes that land is a shared entity and successful conservation strategies cannot be implemented without tribal government partnerships, especially with limited budgets and staff. Through implementation of SWAP 2025, CDFW is committed to engaging in high-value, highly leveraged conservation planning efforts with California Native American tribes. The goal for these inter-governmental partnerships is to share information, expertise, and vision for building a robust natural resource conservation infrastructure that supports California's unparalleled wildlife diversity. As part of this comprehensive SWAP 2025 update, the Tribal Lands Companion Plan was one of two companion plans updated.

Updated and expanded information on pressures. CDFW focused on bolstering information regarding emerging or expanded pressures since 2015. This included new information on fire suppression and resiliency, renewable energy projects, cannabis

cultivation, and emerging invasive species. This information was expanded upon in Chapter 2, provincial chapters (Chapters 5.1–5.7), and Appendix E.

SWAP 2025 as a new and dynamic website. CDFW will transition SWAP 2025 from a PDF to a standalone website. As new information is developed, new research is completed, or a new issue emerges, it will be necessary to update the SWAP periodically to address these new issues. A web-hosted SWAP can be efficiently and frequently updated, as needed. As a website, SWAP will now be in an interactive and responsive format, making it easier for users to navigate content on various devices, including mobile phones and tablets. Furthermore, content can be connected to other online CDFW resources, applications, or databases for a more seamless user experience.

Americans with Disabilities Act (ADA)/Web Content Accessibility Guidelines (WCAG) Compliance. CDFW is committed to making publicly available information accessible to all Californias. SWAP 2025 was completely revised to be compliant with WCAG 2.2 standards. Significant changes include simplified tables, cleaner formatting and document structure, "alt text" for all maps and images, and easier text navigation. With a new SWAP website, the content is even more adaptable to assistive technologies like screen readers.

Highlighted Changes to All SWAP Chapter and Appendices

- Revised content to be more concise and allow the reader to access the most updated information via weblinks
- Removed outdated, incorrect, and redundant information based upon the latest science and reports
- Reviewed and updated or removed all images, maps, tables and figures
- Added new story highlights on SGCN species and conservation projects
- Added new list of CDFW monitoring plans, management plans and/or grant reports w/ monitoring components and expanded information on monitoring
- Reviewed and updated all existing references and added new references
- Added information on CDFW programs (Examples: Office of Cannabis, Connectivity Unit, Office of Tribal Affairs, Beaver Restoration Program, Nutria Eradication Program, and Timberland Conservation Fire Resiliency Program)

Highlighted Changes to All SWAP Province Chapters

- Removed 2015 goals
- Reviewed and updated existing pressures and added new pressures

- Reviewed and updated climate change sections with the latest projections and information
- Moved ecoregion and conservation target descriptions (Tables 5.X-1) into text and new Table 5.0
- Moved key ecological attributes (Tables 5.X-2) into new Table 5.0
- Moved key pressures on conservation targets (Tables 5.X-4) new Table 5.0
- Removed focal species tables (Tables 5.X-3) as to not be confused with SGCN lists
- Added new conservation targets and strategies to SWAP select province chapters:
    - Coastal Dune and Bluff
    - Vernal Pool
    - Coastal Lagoons
    - Chapparal
    - California Foothill and Valley Forests and Woodlands
    - California Grassland, Vernal Pool, and Flowerfields
    - Shadscale-Saltbush Scrub

Appendix C Species of Greatest Conservation Need

List of Species of Greatest Conservation Need (SGCN)

Chapter 2 'California Diversity and Conservation Challenges' describes the criteria used to update the Species of Greatest Conservation Need (SGCN) list for 2025. This Appendix contains the list of SGCN for SWAP 2025. The list includes 88 amphibians and reptiles (Table C-1), 171 bird species (Table C-2), 102 fish species (Table C-3), 323 invertebrate species (Table C-4), 174 mammal species (Table C-5), and 475 plant and algae species (Table C-6). SGCN species are identified as they occur within macrogroups (Table C-7). Common stresses and pressures affecting SGCN habitats (conservation targets) and conservation strategies intended to relieve conservation targets from negative impacts and/or enhance habitat conditions are identified in Chapter 5.

While plants and algae are included in the list of SGCN, the presence of SGCN plants and algae was not included as a separate criterion used to prioritize or select targets when developing regional SWAP strategies. USFWS accepts plants and algae as SGCN, but they are not currently eligible for SWG funding. However, plants and algae will benefit from implementation of SWAP 2025 strategies incidentally when occurring in habitats conserved for animal SGCN. CDFW has chosen to include plants and algae on the SGCN list, so SWAP 2025 would be a comprehensive conservation planning document.

SGCN Table Legend

Legal Status

- FE = Federally endangered
- FT = Federally threatened
- FPL = Federally proposed for listing
- FCL = Federal candidate for listing
- SE = State endangered
- SFP= State fully protected
- ST = State threatened
- SCL = State candidate for listing

Conservation Concern

- BCC = USFWS Birds of Conservation Concern

- CDF-S = California Department of Forestry & Fire Protection (CDF) Forest Practice Rules & Forest Practice Act protected Sensitive Species
- E = Expert opinion and/or documented in published literature or reports
- S1 = NatureServe State Conservation Rank of S1 (Invertebrates)
- S1S2= NatureServe State Conservation Rank of S1S2 (Invertebrates)
- SSC = CDFW Species of Special Concern
- NT = No take allowed by state and/or federal harvesting/fishing regulations
- R = Under federal rebuilding plan
- O = Overfished

Rare Plant Rank

- 1A = Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
- 1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
- 2B = Plants Rare or Endangered in California, but more common elsewhere
- 3 = Plants for which we need more information - Review List
- 4 = Plants of limited distribution - Watch list

Table C-1 Amphibian and Reptile SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Ambystoma macrodactylum croceum	Santa Cruz long-toed salamander	FE, SE, SFP		
Ambystoma macrodactylum sigillatum	southern long-toed salamander		SSC	X
Ambystoma californiense pop. 1	California tiger salamander - central California DPS	FT, ST		X
Ambystoma californiense pop. 2	California tiger salamander - Santa Barbara County DPS	FE, ST		X
Ambystoma californiense pop. 3	California tiger salamander - Sonoma County DPS	FE, ST		X
Aneides niger	Santa Cruz black salamander		SSC	
Batrachoseps campi	Inyo Mountains slender salamander		SSC	X
Batrachoseps major aridus	desert slender salamander	FE, SE		
Batrachoseps relictus	relictual slender salamander	FPL	SSC	X
Batrachoseps simatus	Kern Canyon slender salamander	FPL, ST		
Batrachoseps stebbinsi	Tehachapi slender salamander	STL, ST		X
Batrachoseps luciae	Santa Lucia slender salamander			X
Batrachoseps minor	lesser slender salamander		SSC	X
Batrachoseps incognitus	San Simeon slender salamander			X
Batrachoseps wakei	Arguello slender salamander			
Hydromantes brunus	limestone salamander	ST, SFP		
Hydromantes platycephalus	Mount Lyell salamander			X
Hydromantes shastae	Shasta salamander	ST		
Plethodon dunni	Dunn's salamander			X
Plethodon stormi	Siskiyou Mountains salamander	ST		
Plethodon asupak	Scott Bar salamander	ST		
Taricha rivularis	red-bellied newt		SSC	
Taricha torosa	Coast Range newt		SSC	
Dicamptodon ensatus	California giant salamander		SSC	
Rhyacotriton variegatus	southern torrent salamander		SSC	X
Ascaphus truei	Pacific tailed frog		SSC	X
Incilius alvarius	Sonoran Desert toad		SSC	
Anaxyrus canorus	Yosemite toad	FT	SSC	X
Anaxyrus exsul	black toad	ST, SFP		X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Anaxyrus californicus	arroyo toad	FE	SSC	X
Scaphiopus couchii	Couch's spadefoot		SSC	X
Spea hammondii	western spadefoot	FPL	SSC	
Rana aurora	northern red-legged frog		SSC	X
Rana draytonii	California red-legged frog	FT	SSC	
Rana boylii pop. 1	foothill yellow-legged frog - north coast DPS		SSC	X
Rana boylii pop. 2	foothill yellow-legged frog - Feather River DPS	FT, ST		X
Rana boylii pop. 3	foothill yellow-legged frog - north Sierra DPS	ST		X
Rana boylii pop. 4	foothill yellow-legged frog - central coast DPS	FT, SE		X
Rana boylii pop. 5	foothill yellow-legged frog - south Sierra DPS	FE, SE		X
Rana boylii pop. 6	foothill yellow-legged frog - south coast DPS	FE, SE		X
Rana cascadae	Cascades frog	SCL	SSC	X
Lithobates pipiens	northern leopard frog		SSC	X
Rana pretiosa	Oregon spotted frog	FT	SSC	
Lithobates yavapaiensis	lowland leopard frog		SSC	X
Rana muscosa	southern mountain yellow-legged frog	FE, SE		X
Rana sierrae	Sierra Nevada yellow-legged frog	FE, ST		X
Caretta caretta	loggerhead sea turtle (North Pacific)	FE		X
Chelonia mydas	green turtle	FT		X
Lepidochelys olivacea	olive ridley sea turtle	FT		X
Dermochelys coriacea	leatherback sea turtle	FE		X
Actinemys marmorata	northwestern pond turtle	FPL	SSC	
Actinemys pallida	southwestern pond turtle	FPL	SSC	
Kinosternon sonoriense	Sonoran mud turtle		SSC	
Gopherus agassizii	desert tortoise	FT, ST		
Elgaria panamintina	Panamint alligator lizard		SSC	X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Anniella pulchra	Northern California legless lizard		SSC	X
Anniella alexanderae	Temblor legless lizard	SCL	SSC	X
Anniella campi	Southern Sierra legless lizard		SSC	X
Anniella grinnelli	Bakersfield legless lizard		SSC	X
Anniella stebbinsi	Southern California legless lizard		SSC	X
Coleonyx variegatus abbotti	San Diego banded gecko		SSC	
Coleonyx switaki	barefoot banded gecko	ST		
Heloderma suspectum	Gila monster		SSC	X
Gambelia sila	blunt-nosed leopard lizard	FE, SE, SFP		
Gambelia copeii	Cope's leopard lizard		SSC	
Phrynosoma mcallii	flat-tailed horned lizard		SSC	
Phrynosoma blainvillii	coast horned lizard		SSC	X
Uma inornata	Coachella Valley fringe-toed lizard	FT, SE		
Uma notata	Colorado Desert fringe-toed lizard		SSC	
Uma scoparia	Mojave fringe-toed lizard		SSC	X
Aspidoscelis hyperythra	orange-throated whiptail			X
Aspidoscelis tigris stejnegeri	coastal whiptail		SSC	
Xantusia riversiana	island night lizard			X
Xantusia sierrae	Sierra night lizard		SSC	X
Xantusia gracilis	sandstone night lizard		SSC	
Charina umbratica	southern rubber boa	ST		
Arizona elegans occidentalis	California glossy snake		SSC	
Contia longicauda	forest sharp-tailed snake			X
Diadophis punctatus regalis	regal ringneck snake		SSC	
Masticophis [= Coluber] flagellum ruddocki	San Joaquin coachwhip		SSC	
Masticophis [= Coluber] fuliginosus	Baja California coachwhip		SSC	
Masticophis [= Coluber] lateralis euryxanthus	Alameda whipsnake	FT, ST		
Salvadora hexalepis virgultea	coast patch-nosed snake		SSC	X
Thamnophis sirtalis tetrataenia	San Francisco gartersnake	FE, SE, SFP		
Thamnophis sirtalis pop. 1	south coast gartersnake		SSC	
Thamnophis gigas	giant gartersnake	FT, ST		
Thamnophis hammondii	two-striped gartersnake		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Crotalus ruber	red-diamond rattlesnake		SSC	

Table C-2 Bird SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Gavia immer	common loon		SSC	
Aechmophorus occidentalis	Western Grebe		BCC	
Aechmophorus clarkii	Clark's Grebe		BCC	
Phoebastria albatrus	short-tailed albatross	FE	SSC	
Phoebastria nigripes	Black-footed Albatross		BCC	
Phoebastria immutabilis	Laysan Albatross		BCC	
Pterodroma ultima	Murphy's Petrel		BCC	
Pterodroma cookii	Cook's Petrel		BCC	
Ardenna creatopus	Pink-footed Shearwater		BCC	
Ardenna bulleri	Buller's Shearwater		BCC	
Puffinus opisthomelas	Black-vented Shearwater		BCC	
Hydrobates furcatus	fork-tailed storm-petrel		SSC	
Hydrobates homochroa	ashy storm-petrel		SSC, BCC	X
Hydrobates melania	black storm-petrel		SSC, BCC	
Pelecanus erythrorhynchos	American white pelican		SSC, BCC	X
Pelecanus occidentalis californicus	California brown pelican			X
Urile penicillatus	Brandt's cormorant		BCC	X
Urile pelagicus	pelagic cormorant			X
Ixobrychus exilis	least bittern		SSC	
Ardea herodias	great blue heron		CDF-S	
Ardea alba	great egret		CDF-S	
Mycteria americana	wood stork		SSC	
Dendrocygna bicolor	fulvous whistling-duck		SSC	
Cygnus buccinator	Trumpeter Swan	SFP		
Anser albifrons elgasi	tule greater white-fronted goose		SSC	
Branta bernicla	brant		SSC	
Aythya americana	redhead		SSC	
Histrionicus histrionicus	harlequin duck		SSC	
Bucephala islandica	Barrow's goldeneye		SSC	
Gymnogyps californianus	California condor	FE, SE, SFP	CDF-S	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Pandion haliaetus	osprey		CDF-S	
Elanus leucurus	white-tailed kite	SFP		
Haliaeetus leucocephalus	bald eagle	SE, SFP	CDF-S	
Circus hudsonius	northern harrier		SSC, BCC	
Accipiter atricapillus	American goshawk		SSC, CDF-S	
Buteo swainsoni	Swainson's hawk	ST		X
Aquila chrysaetos	golden eagle	SFP	CDF-S	
Falco peregrinus anatum	American peregrine falcon		CDF-S	
Dendragapus fuliginosus howardi	Mount Pinos sooty grouse		SSC	
Centrocercus urophasianus	greater sage-grouse	FPL, SC	SSC	X
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse		SSC	
Callipepla californica catalinensis	Catalina California quail		SSC	
Coturnicops noveboracensis	yellow rail		SSC, BCC	X
Laterallus jamaicensis coturniculus	California black rail	ST, SFP		X
Rallus obsoletus obsoletus	California Ridgway's rail	FE, SE, SFP		X
Rallus obsoletus levipes	light-footed Ridgway's rail	FE, SE, SFP		X
Rallus obsoletus yumanensis	Yuma Ridgway's rail	FE, ST, SFP		X
Antigone canadensis canadensis	lesser sandhill crane		SSC	
Antigone canadensis tabida	greater sandhill crane	ST, SFP		
Anarhynchus nivosus nivosus	northern snowy plover - interior population		SSC, BCC	X
Anarhynchus nivosus nivosus	northern snowy plover - west coast DPS	FT		X
Charadrius montanus	mountain plover		SSC, BCC	
Haematopus bachmani	black oystercatcher		BCC	X
Recurvirostra americana	American Avocet		BCC	
Tringa flavipes	Lesser Yellowlegs		BCC	
Tringa semipalmata	Willet		BCC	
Tringa incana	wandering tattler			X
Limosa fedoa	Marbled Godwit		BCC	
Arenaria interpres	ruddy turnstone			X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Arenaria melanocephala	black turnstone			X
Calidris virgata	surfbird			X
Calidris canutus	red knot		BCC	X
Calidris alba	sanderling			X
Calidris melanotos	Pectoral Sandpiper		BCC	
Limnodromus griseus	Short-billed Dowitcher		BCC	
Leucophaeus pipixcan	Franklin's Gull		BCC	
Larus heermanni	Heermann's Gull		BCC	
Larus californicus	California gull		BCC	
Larus livens	Yellow-footed Gull		BCC	
Larus occidentalis	Western Gull		BCC	
Gelochelidon nilotica	gull-billed tern		SSC, BCC	X
Thalasseus elegans	elegant tern		BCC	X
Sterna forsteri	Forster's Tern		BCC	
Sternula antillarum browni	California least tern	FE, SE, SFP		X
Thalasseus maximus	royal tern			X
Chlidonias niger	black tern		SSC, BCC	X
Rynchops niger	black skimmer		SSC, BCC	X
Uria aalge	common murre			X
Cepphus columba	pigeon guillemot			X
Brachyramphus marmoratus	marbled murrelet	FT, SE	CDF-S	X
Synthliboramphus hypoleucus	Guadalupe murrelet		BCC	X
Synthliboramphus scrippsi	Scripps's murrelet	ST	BCC	X
Synthliboramphus craveri	Craveri's murrelet		BCC	X
Ptychoramphus aleuticus	Cassin's auklet		SSC, BCC	X
Cerorhinca monocerata	rhinoceros auklet			X
Fratercula cirrhata	tufted puffin		SSC, BCC	X
Coccyzus americanus occidentalis	western yellow-billed cuckoo	FT, SE		X
Psiloscops flammeolus	flammulated owl		BCC	
Micrathene whitneyi	elf owl	SE		X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Athene cunicularia	burrowing owl		SSC, BCC	
Strix occidentalis caurina	northern spotted owl	FT, ST	CDF-S	
Strix occidentalis occidentalis	California spotted owl		SSC, BCC	
Strix nebulosa	great gray owl	SE	CDF-S	X
Asio otus	long-eared owl		SSC, BCC	
Asio flammeus	short-eared owl		SSC, BCC	
Cypseloides niger	black swift		SSC, BCC	
Chaetura vauxi	Vaux's swift		SSC, BCC	
Calypte costae	Costa's hummingbird		BCC	
Selasphorus calliope	Calliope Hummingbird		BCC	
Selasphorus platycercus	Broad-tailed Hummingbird		BCC	
Selasphorus rufus	rufous hummingbird		BCC	
Selasphorus sasin	Allen's Hummingbird		BCC	
Melanerpes lewis	Lewis' woodpecker		BCC	
Melanerpes uropygialis	Gila woodpecker	SE	BCC	
Dryobates nuttallii	Nuttall's Woodpecker		BCC	
Dryobates albolarvatus	White-headed Woodpecker		BCC	
Colaptes chrysoides	gilded flicker	SE	BCC	
Contopus cooperi	olive-sided flycatcher		SSC, BCC	
Empidonax traillii	willow flycatcher	SE		
Empidonax traillii brewsteri	little willow flycatcher	SE		
Empidonax traillii extimus	southwestern willow flycatcher	FE, SE		
Pyrocephalus rubinus	vermilion flycatcher		SSC	
Myiarchus tyrannulus	brown-crested flycatcher			X
Progne subis	purple martin		SSC	
Riparia riparia	bank swallow	ST		
Aphelocoma insularis	Island scrub-jay		BCC	
Gymnorhinus cyanocephalus	Pinyon Jay		BCC	
Pica nuttalli	yellow-billed magpie		BCC	
Poecile rufescens rufescens	Northern Chestnut-backed Chickadee		BCC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Baeolophus inornatus	Oak Titmouse		BCC	
Auriparus flaviceps	Verdin		BCC	
Sitta carolinensis	White-breasted Nuthatch		BCC	
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren		SSC	
Thryomanes bewickii leucophrys	San Clemente Bewick's wren		SSC	
Cistothorus palustris clarkae	Clark's marsh wren		SSC	
Cinclus mexicanus	American Dipper		BCC	
Polioptila californica californica	coastal California gnatcatcher	FT	SSC	
Chamaea fasciata	Wrentit		BCC	
Oreoscoptes montanus	Sage Thrasher		BCC	
Toxostoma bendirei	Bendire's thrasher		SSC, BCC	X
Toxostoma redivivum	California Thrasher		BCC	
Toxostoma crissale	Crissal thrasher		SSC	
Toxostoma lecontei	Le Conte's thrasher		SSC, BCC	
Lanius ludovicianus	loggerhead shrike		SSC	
Lanius ludovicianus anthonyi	Island loggerhead shrike		SSC	
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike	FE	SSC	
Vireo bellii arizonae	Arizona Bell's vireo	SE		X
Vireo bellii pusillus	least Bell's vireo	FE, SE		X
Vireo vicinior	gray vireo		SSC	
Vireo huttoni unitti	Catalina Hutton's vireo		SSC	
Leiothlypis virginiae	Virginia's warbler		BCC	
Leiothlypis luciae	Lucy's warbler		SSC	
Setophaga petechia	yellow warbler		SSC	
Setophaga nigrescens	Black-throated Gray Warbler		BCC	
Setophaga occidentalis	Hermit Warbler		BCC	
Geothlypis trichas sinuosa	saltmarsh common yellowthroat		SSC, BCC	X
Icteria virens	yellow-breasted chat		SSC	
Piranga rubra	summer tanager		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Melozone crissalis eremophilus	Inyo California towhee	FT, SE		X
Pipilo maculatus clementae	San Clemente spotted towhee		SSC	
Aimophila ruficeps obscura	Santa Cruz Island rufous-crowned sparrow		SSC	
Spizella atrogularis	Black-chinned Sparrow		BCC	
Pooecetes gramineus affinis	Oregon vesper sparrow		SSC	
Artemisiospiza belli clementeae	San Clemente Bell's sparrow		SSC	
Passerculus sandwichensis alaudinus	Bryant's savannah sparrow		SSC	
Passerculus sandwichensis beldingi	Belding's savannah sparrow	SE	BCC	
Passerculus sandwichensis rostratus	large-billed savannah sparrow		SSC	
Ammodramus savannarum	grasshopper sparrow		SSC	
Melospiza melodia pop. 1	song sparrow ("Modesto" population)		SSC	X
Melospiza melodia graminea	Channel Island song sparrow		SSC, BCC	
Melospiza melodia maxillaris	Suisun song sparrow		SSC	X
Melospiza melodia pusillula	Alameda song sparrow		SSC, BCC	X
Melospiza melodia samuelis	San Pablo song sparrow		SSC, BCC	X
Agelaius phoeniceus aciculatus	Kern red-winged blackbird		SSC	
Agelaius tricolor	tricolored blackbird	ST	SSC, BCC	
Xanthocephalus xanthocephalus	yellow-headed blackbird		SSC	
Icterus parisorum	Scott's Oriole		BCC	X
Leucosticte tephrocotis	Gray-crowned Rosy-Finch			X
Haemorhous cassinii	Cassin's Finch		BCC	
Spinus lawrencei	Lawrence's goldfinch		BCC	
Coccothraustes vespertinus	Evening Grosbeak		BCC	

Table C-3 Fish SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Lampetra hubbsi	Kern brook lamprey		SSC	X
Entosphenus similis	Klamath River lamprey		SSC	
Entosphenus tridentatus	Pacific lamprey		SSC	X
Entosphenus tridentatus ssp. 1	Goose Lake lamprey		SSC	X
Lampetra ayresii	western river lamprey		SSC	X
Entosphenus lethophagus	Pit-Klamath brook lamprey		SSC	
Lampetra richardsoni	western brook lamprey		SSC	X
Entosphenus folletti	northern California brook lamprey		SSC	
Carcharodon carcharias	white shark		NT	
Acipenser medirostris pop. 1	green sturgeon - southern DPS	FT	SSC	X
Acipenser medirostris pop. 2	green sturgeon - northern DPS		SSC	
Acipenser transmontanus	white sturgeon	SCL	SSC	X
Oncorhynchus clarkii clarkii	coast cutthroat trout		SSC	X
Oncorhynchus clarkii henshawi	Lahontan cutthroat trout	FT	SSC	X
Oncorhynchus clarkii seleniris	Paiute cutthroat trout	FT	SSC	X
Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon / northern California ESU	FT, ST	NT	X
Oncorhynchus kisutch pop. 4	coho salmon - central California coast ESU	FE, SE	NT	X
Oncorhynchus mykiss aguabonita	California golden trout		SSC	X
Oncorhynchus mykiss aquilarum	Eagle Lake rainbow trout		SSC	X
Oncorhynchus mykiss gilberti	Kern River rainbow trout		SSC	X
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	FE, SCL		X
Oncorhynchus mykiss irideus pop. 1	steelhead - Klamath Mountains Province DPS		SSC	X
Oncorhynchus mykiss irideus pop. 48	steelhead - northern California DPS summer-run	FT, SE	NT	X
Oncorhynchus mykiss irideus pop. 49	steelhead - northern California DPS winter-run	FT	SSC	
Oncorhynchus mykiss irideus pop. 9	steelhead - south-central California coast DPS	FT	SSC, NT	X
Oncorhynchus mykiss irideus pop. 8	steelhead - central California coast DPS	FT	SSC, NT	X
Oncorhynchus mykiss irideus pop. 11	steelhead - Central Valley DPS	FT	SSC, NT	X
Oncorhynchus mykiss ssp. 1	Goose Lake redband trout		SSC	X
Oncorhynchus mykiss ssp. 2	McCloud River redband trout		SSC	X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Oncorhynchus mykiss whitei	Little Kern golden trout	FT	SSC	X
Oncorhynchus tshawytscha pop. 13	chinook salmon - Central Valley fall / late fall-run ESU		SSC	X
Oncorhynchus tshawytscha pop. 30	chinook salmon - upper Klamath and Trinity Rivers ESU	FCL	SSC	X
Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers spring-run	FCL, ST	SSC	X
Oncorhynchus tshawytscha	chinook salmon - upper Klamath and Trinity Rivers fall-run	FCL	SSC, O	X
Oncorhynchus tshawytscha pop. 17	chinook salmon - California coastal ESU	FT	SSC	X
Oncorhynchus tshawytscha pop. 11	chinook salmon - Central Valley spring-run ESU	FT, ST	NT	X
Oncorhynchus tshawytscha pop. 7	chinook salmon - Sacramento River winter-run ESU	FE, SE	NT	X
Oncorhynchus tshawytscha pop. 14	chinook salmon - southern Oregon/northern California coastal		SSC	
Prosopium williamsoni	mountain whitefish		SSC	
Hypomesus transpacificus	Delta smelt	FT, SE		X
Spirinchus thaleichthys	longfin smelt	ST		X
Spirinchus thaleichthys pop. 2	longfin smelt - San Francisco Bay-Delta DPS	FE, ST		
Thaleichthys pacificus	eulachon	FT	SSC, NT	X
Gila coerulea	blue chub		SSC	
Gila orcuttii	arroyo chub		SSC	
Lavinia exilicauda chi	Clear Lake hitch	FPL, ST		X
Lavinia exilicauda exilicauda	Sacramento hitch		SSC	
Lavinia exilicauda harengus	Monterey hitch		SSC	
Hesperoleucus mitrulus	northern roach		SSC	
Hesperoleucus venustus navarroensis	northern coastal roach		SSC	
Hesperoleucus parvipinnis	Gualala roach		SSC	
Hesperoleucus symmetricus symmetricus	central California roach		SSC	X
Hesperoleucus symmetricus serpentinus	Red Hills roach		SSC	X
Hesperoleucus venustus subditus	southern coastal roach		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Hesperoleucus venustus x H. symmetricus	Clear Lake roach		SSC	
Mylopharodon conocephalus	hardhead		SSC	
Pogonichthys macrolepidotus	Sacramento splittail		SSC	
Ptychocheilus lucius	Colorado pikeminnow	FE, SE, SFP		
Rhinichthys nevadensis nevadensis	Amargosa speckled dace		SSC	
Rhinichthys gabrielino	Santa Ana speckled dace	FPL	SSC	X
Rhinichthys nevadensis caldera	Long Valley speckled dace	FPL	SSC	
Siphateles bicolor mohavensis	Mohave tui chub	FE, SE, SFP		X
Siphateles bicolor pectinifer	Lahontan Lake tui chub		SSC	
Siphateles bicolor snyderi	Owens tui chub	FE, SE		X
Siphateles bicolor ssp. 12	Eagle Lake tui chub		SSC	X
Siphateles bicolor thalassinus	Goose Lake tui chub		SSC	X
Siphateles bicolor vaccaceps	Cow Head tui chub		SSC	X
Catostomus fumeiventris	Owens sucker		SSC	
Catostomus microps	Modoc sucker	SE, SFP		
Catostomus occidentalis lacusanserinus	Goose Lake sucker		SSC	X
Catostomus lahontan	Lahontan mountain sucker		SSC	
Catostomus santaanae	Santa Ana sucker	FT	SSC	X
Catostomus snyderi	Klamath largescale sucker		SSC	
Chasmistes brevirostris	shortnose sucker	FE, SE, SFP		
Deltistes luxatus	Lost River sucker	FE, SE, SFP		
Xyrauchen texanus	razorback sucker	FE, SE, SFP		
Cyprinodon macularius	desert pupfish	FE, SE		X
Cyprinodon nevadensis amargosae	Amargosa pupfish		SSC	X
Cyprinodon nevadensis nevadensis	Saratoga Springs pupfish		SSC	X
Cyprinodon nevadensis shoshone	Shoshone pupfish		SSC	X
Cyprinodon radiosus	Owens pupfish	FE, SE, SFP		X
Cyprinodon salinus milleri	Cottonball Marsh pupfish	ST		X
Cyprinodon salinus salinus	Salt Creek pupfish		SSC	X
Gasterosteus aculeatus williamsoni	unarmored threespine stickleback	FE, SE, SFP		X
Sebastes maliger	quillback rockfish		O	
Sebastes pinniger	canary rockfish		NT, R	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Stereolepis gigas	giant sea bass		NT	
Mycteroperca jordani	gulf grouper		NT	
Mycteroperca xenarcha	broomtail grouper		NT	
Archoplites interruptus	Sacramento perch		SSC	
Eucyclogobius newberryi	tidewater goby	FE	SSC	X
Thunnus orientalis	bluefin tuna		O	
Eopsetta jordani	Petrale sole		R	
Cottus asper ssp.	Clear Lake prickly sculpin		SSC	
Cottus asperrimus	rough sculpin	ST, SFP		
Cottus gulosus	riffle sculpin		SSC	
Cottus klamathensis macrops	bigeye marbled sculpin		SSC	
Cottus klamathensis klamathensis	upper Klamath marbled sculpin		SSC	
Cottus klamathensis polyporus	lower Klamath marbled sculpin		SSC	
Hysterocarpus traskii pomo	Russian River tule perch		SSC	
Hysterocarpus traskii lagunae	Clear Lake tule perch		SSC	
Hypsypops rubicundus	Garibaldi		NT	

Table C-4 Invertebrate SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Branchinecta conservatio	Conservancy fairy shrimp	FE		
Branchinecta longiantenna	longhorn fairy shrimp	FE		
Branchinecta lynchi	vernal pool fairy shrimp	FT		
Branchinecta campestris	pocket pouch fairy shrimp		S1	
Branchinecta sandiegonensis	San Diego fairy shrimp	FE	S1	
Linderiella santarosae	Santa Rosa Plateau fairy shrimp		S1	
Streptocephalus woottoni	Riverside fairy shrimp	FE		
Lepidurus packardi	vernal pool tadpole shrimp	FE		
Dumontia oregonensis	hairy water flea		S1	
Stygobromus gradyi	Grady's Cave amphipod		S1	
Stygobromus harai	Hara's Cave amphipod		S1	
Stygobromus mackenziei	Mackenzie's Cave amphipod		S1	
Stygobromus wengerorum	Wengerors' Cave amphipod		S1	
Stygobromus lacicolus	Lake Tahoe amphipod		S1	
Stygobromus mysticus	Secret Cave amphipod		S1	
Stygobromus sheldoni	Sheldon's amphipod		S1	
Stygobromus sierrensis	Sierra amphipod		S1	
Stygobromus tahoensis	Lake Tahoe stygobromid		S1	
Stygobromus trinus	Trinity County amphipod		S1	
Stygobromus cherylae	Barr's amphipod		S1	
Stygobromus cowani	Cowan's amphipod		S1	
Stygobromus gallawayae	Gallaway's amphipod		S1	
Stygobromus rudolphi	Rudolph's amphipod		S1	
Stygobromus imperialis	Empire Cave amphipod		S1	
Syncaris pacifica	California freshwater shrimp	FE, SE		
Hyalella muerta	Texas Spring amphipod		S1	
Hyalella sandra	Death Valley amphipod		S1	
Pacifastacus fortis	Shasta crayfish	FE, SE	S1	
Calasellus longus	An isopod		S1	
Pycnopodia helianthoides	sunflower sea star	FPL		
Habroscelimorpha gabbii	western tidal-flat tiger beetle		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Cicindela latesignata	western beach tiger beetle		S1	
Cicindela senilis frosti	senile tiger beetle		S1	
Cicindela tranquebarica viridissima	greenest tiger beetle		S1	
Cicindela tranquebarica joaquinensis	San Joaquin tiger beetle		S1	
Cicindela ohlone	Ohlone tiger beetle	FE	S1	
Anomala carlsoni	Carlson's dune beetle		S1	
Anomala hardyorum	Hardy's dune beetle		S1	
Cyclocephala wandae	Wandae dune beetle		S1	
Elaphrus viridis	Delta green ground beetle	FT	S1	
Pseudocotalpa andrewsi	Andrew's dune scarab beetle		S1	
Hygrotus fontinalis	travertine band-thigh diving beetle		S1	
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	FT		
Coelus globosus	Globose Dune Beetle		S1S2	
Coelus gracilis	San Joaquin dune beetle		S1	
Lytta insperata	Mojave Desert Blister Beetle		S1S2	
Coenonycha clementina	San Clemente Beetle		S1S2	
Onychobaris langei	Lange's El Segundo Dune weevil		S1	
Trigonoscuta brunnotesselata	brown tassel trigonoscuta weevil		S1	
Trigonoscuta dorothea dorothea	Dorothy's El Segundo Dune weevil		S1	
Trigonoscuta sp.	Doyen's trigonoscuta dune weevil		S1	
Trigonoscuta stantoni	Santa Cruz Island shore weevil		S1	
Trigonoscuta rothi rothi	Roth's dune weevil		S1	
Trigonoscuta rothi algodones	Algodones dune weevil		S1	
Trigonoscuta rothi imperialis	Imperial dune weevil		S1	
Trigonoscuta rothi punctata	Punctate dune weevil		S1	
Agabus rumppi	Death Valley agabus diving beetle		S1S2	
Atractelmis wawona	Wawona Riffle Beetle		S1S2	
Dubiraphia brunnescens	brownish dubiraphian riffle beetle		S1	
Microcylloepus formicoideus	Furnace Creek riffle beetle		S1	
Optioservus canus	Pinnacles optioservus riffle beetle		S1	
Palaeoxenus dohrni	Dohrn's Elegant Eucnemid Beetle		S1S2	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Ochthebius recticulus	Wilbur Springs minute moss beetle		S1	
Chaetarthria leechi	Leech's chaetarthrian water scavenger beetle		S1	
Aegialia concinna	Ciervo aegilian scarab beetle		S1	
Lichnanthe albipilosa	white sand bear scarab beetle		S1	
Polyphylla barbata	Mount Hermon (=barbate) June beetle	FE		
Polyphylla nubila	Atascadero June beetle		S1	
Polyphylla erratica	Death Valley June beetle		S1S2	
Polyphylla morroensis	Morro Bay June beetle		S1	
Nebria sahlbergii triad	Trinity Alps ground beetle		S1	
Nebria gebleri siskiyouensis	Siskiyou Ground Beetle		S1S2	
Nebria darlingtoni	South Forks ground beetle		S1	
Agrilus harenus	Harenus jewel beetle		S1	
Trichinorhipis knulli	Knull's metallic wood-boring beetle		S1	
Lepismadora algodones	Algodones sand jewel beetle		S1S2	
Dinacoma caseyi	Casey's June beetle	FE	S1	
Trachykele hartmani	serpentine cypress wood-boring beetle		S1	
Deltaspis ivae	marsh-elder long-horned beetle		S1	
Juniperella mirabilis	juniper metallic wood-boring beetle		S1	
Rhaphiomidas trochilus	San Joaquin Valley giant flower-loving fly		S1	
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	FE	S1	
Rhaphiomidas terminatus terminatus	El Segundo flower-loving fly		S1	
Efferia antiochi	Antioch Efferian Robberfly		S1S2	
Metapogon hurdi	Hurd's Metapogon Robberfly		S1S2	
Paracoenia calida	Wilbur Springs shore fly		S1	
Brennania belkini	Belkin's Dune Tabanid Fly		S1S2	
Apiocera warneri	Glamis sand fly		S1	
Ambrysus funebris	Nevares Spring naucorid bug		S1	
Belostoma saratogae	Saratoga Springs belostoman bug		S1	
Oravelia pege	Dry Creek cliff strider bug		S1	
Pelocoris biimpressus	Amargosa Naucorid Bug		S1S2	
Perdita algodones	Algodones perdita		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Perdita frontalis	Imperial Perdita		S1S2	
Perdita stephanomeriae	a miner bee		S1S2	
Dufourea stagei	Stage's dufourine bee		S1	
Bombus franklini	Franklin's bumble bee	FE, SCL		
Bombus occidentalis	western bumble bee	SCL	S1	
Bombus suckleyi	Suckley's cuckoo bumble bee	FPL, SCL	S1	
Bombus caliginosus	obscure bumble bee		S1S2	
Bombus morrisoni	Morrison bumble bee		S1S2	
Bombus crotchii	Crotch's bumble bee	SCL		
Andrena blennospermatis	Blennosperma vernal pool andrenid bee		S1	
Andrena subapasta	an andrenid bee		S1S2	
Cleptes humboldti	Humboldt Cuckoo Wasp		S1S2	
Hedychridium argenteum	Riverside Cuckoo Wasp		S1S2	
Hedychridium milleri	Borax Lake cuckoo wasp		S1	
Ceratochrysis bradleyi	Bradley's cuckoo wasp		S1	
Ceratochrysis gracilis	Piute Mountains cuckoo wasp		S1	
Ceratochrysis longimala	Desert cuckoo wasp		S1	
Parnopes borregoensis	Borrego Parnopes Chrysidid Wasp		S1S2	
Protodufourea wasbaueri	Wasbauer's protodufourea bee		S1	
Protodufourea zavortinki	Zavortink's protodufourea bee		S1	
Sphecodogastra antiochensis	Antioch Dunes halcitid bee		S1	
Trachusa gummifera	San Francisco Bay Area leaf-cutter bee		S1	
Paranomada californica	California cuckoo bee		S1	
Rhopalolemma robertsi	Roberts' rhopalolemma bee		S1	
Sphaeropthalma ecarinata	Glamis night mutillid		S1	
Microbembex elegans	Algodones elegant sand wasp		S1	
Stictiella villegasi	Algodones sand wasp		S1	
Sedomaya glamisensis	Glamis night tiphiid		S1	
Euparagia unidentata	a wasp		S1S2	
Pelochrista hennei	Henne's eucosman moth		S1	
Pyrgus ruralis lagunae	Laguna Mountains skipper	FE	S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Pseudocopaeodes eunus obscurus	Carson wandering skipper	FE		
Hesperia miriamae longaevicola	White Mountains skipper		S1	
Polites sabuleti albamontana	White Mountain Skipper		S1S2	
Polites mardon	mardon skipper		S1	
Euphyes vestris harbisoni	Dun Skipper		S1S2	
Lycaena rubidus incana	White Mountains copper		S1	
Lycaena hermes	Hermes copper butterfly	FT	S1	
Callophrys sheridanii comstocki	Desert Green Hairstreak		S1S2	
Callophrys mossii bayensis	San Bruno elfin butterfly	FE		
Callophrys mossii hidakupa	San Gabriel Mountains Elfin Butterfly		S1S2	
Euphilotes allyni	El Segundo blue butterfly	FE	S1	
Euphilotes enoptes smithi	Smith's blue butterfly	FE		
Euphilotes baueri	Bauer's Blue		S1S2	
Philotiella speciosa bohartorum	Boharts' blue butterfly		S1	
Glaucopsyche lygdamus palosverdesensis	Palos Verdes blue butterfly	FE	S1	
Plebejus anna lotis	lotis blue butterfly	FE		
Icaricia saepiolus aureolus	San Gabriel Mountains blue butterfly		S1	
Icaricia saepiolus albomontanus	White Mountains saepiolus blue butterfly		S1	
Plebulina emigdionis	San Emigdio Blue		S1S2	
Icaricia icarioides missionensis	Mission blue butterfly	FE		
Icaricia icarioides parapheres	Point Reyes blue butterfly		S1	
Icaricia icarioides albihalos	White Mountains icarioides blue butterfly		S1	
Apodemia mormo langei	Lange's metalmark butterfly	FE	S1	
Speyeria nokomis carsonensis	Carson Valley silverspot		S1	
Speyeria zerene sonomensis	Sonoma zerene fritillary		S1	
Speyeria zerene hippolyta	Oregon silverspot butterfly	FE	S1	
Speyeria zerene behrensii	Behren's silverspot butterfly	FE	S1	
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	FE	S1	
Speyeria callippe callippe	callippe silverspot butterfly	FE	S1	
Speyeria adiaste adiaste	unsilvered fritillary		S1S2	
Chlosyne leanira elegans	Oso Flaco Patch Checkerspot		S1S2	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Euphydryas editha bayensis	Bay checkerspot butterfly	FT		
Euphydryas editha monoensis	Mono Lake Checkerspot		S1S2	
Euphydryas editha quino	quino checkerspot butterfly	FE	S1S2	
Coenonympha tullia yontockett	Yontocket satyr		S1S2	
Cercyonis pegala carsonensis	Carson Valley Wood-Nymph		S1S2	
Danaus plexippus	Monarch	FPL		
Hesperopsis gracielae	Mcneill's Saltbush Sootywing		S1S2	
Euproserpinus euterpe	Kern primrose sphinx moth	FT	S1	
Orobittacus obscurus	gold rush hanging scorpionfly		S1	
Psychomastax deserticola	desert monkey grasshopper		S1	
Pristoceuthophilus sp. 1	Samwell Cave cricket		S1	
Ammopelmatus kelsoensis	Kelso Jerusalem Cricket		S1S2	
Ammopelmatus muwu	Point Conception jerusalem cricket		S1	
Tetrix sierrana	Sierra pygmy grasshopper		S1	
Idiostatus middlekauffi	Middlekauff's shieldback katydid		S1	
Idiostatus kathleenae	Pinnacles Shield Back Katydid		S1S2	
Aglaothorax longipennis	Santa Monica Shieldback Katydid		S1S2	
Trimerotropis infantilis	Zayante band-winged grasshopper	FE	S1	
Trimerotropis occulens	Lompoc Grasshopper		S1S2	
Capnia lacustra	Lake Tahoe benthic stonefly		S1	
Lepidostoma ermanae	Cold Spring caddisfly		S1	
Cryptochia shasta	confusion caddisfly		S1	
Limnephilus atercus	Fort Dick limnephilus caddisfly		S1S2	
Neothremma siskiyou	Siskiyou caddisfly		S1	
Rhyacophila lineata	Castle Crags rhyacophilan caddisfly		S1	
Rhyacophila mosana	bilobed rhyacophilan caddisfly		S1	
Diplectrona californica	California diplectronan caddisfly		S1	
Parapsyche extensa	King's Creek parapsyche caddisfly		S1	
Calicina minor	Edgewood blind harvestman		S1	
Banksula melones	Melones Cave harvestman		S1	
Banksula galilei	Galile's cave harvestman		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Banksula grubbsi	Grubbs' cave harvestman		S1	
Banksula martinorum	Martins' cave harvestman		S1	
Banksula rudolphi	Rudolph's cave harvestman		S1	
Banksula tuolumne	Tuolumne cave harvestman		S1	
Banksula incredula	incredible harvestman		S1	
Banksula tutankhamen	King Tut Cave harvestman		S1	
Texella kokoweef	Kokoweef Crystal Cave harvestman		S1	
Texella shoshone	Shoshone Cave harvestman		S1	
Texella deserticola	Whitewater Canyon harvestman		S1	
Aphrastochthonius grubbsi	Grubbs' Cave pseudoscorpion		S1	
Aphrastochthonius similis	Carlow's Cave pseudoscorpion		S1	
Archeolarca aalbui	Aalbu's Cave pseudoscorpion		S1	
Larca laceyi	Lacey's Cave pseudoscorpion		S1	
Pseudogarypus orpheus	Music Hall Cave pseudoscorpion		S1	
Microcina edgewoodensis	Edgewood Park micro-blind harvestman		S1	
Microcina jungi	Jung's micro-blind harvestman		S1	
Microcina leei	Lee's micro-blind harvestman		S1	
Microcina lumi	Lum's micro-blind harvestman		S1	
Talanites ubicki	Ubick's gnaphosid spider		S1	
Neochthonius imperialis	Empire Cave pseudoscorpion		S1	
Hubbardia shoshonensis	Shoshone Cave whip-scorpion		S1	
Hubbardia idria	Idria short-tailed whipscorpion		S1	
Hubbardia secoensis	Arroyo Seco short-tailed whipscorpion		S1	
Fissilicreagris imperialis	Empire Cave pseudoscorpion		S1	
Calileptoneta briggsi	Briggs' leptonetid spider		S1	
Calileptoneta oasa	Andreas Canyon leptonetid spider		S1	
Calileptoneta ubicki	Ubick's leptonetid spider		S1	
Calileptoneta wapiti	Mendocino leptonetid spider		S1	
Socalchemmis gertschi	Gertsch's socalchemmis spider		S1	
Socalchemmis icenoglei	Icenogle's socalchemmis spider		S1	
Socalchemmis monterey	Monterey socalchemmis spider		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Calicina arida	San Benito harvestman		S1	
Calicina breva	Stanislaus harvestman		S1	
Calicina conifera	Crane Flat harvestman		S1	
Calicina diminua	Marin blind harvestman		S1	
Calicina dimorphica	Watts Valley harvestman		S1	
Calicina macula	marbled harvestman		S1	
Calicina mesaensis	Table Mountain harvestman		S1	
Calicina piedra	Piedra harvestman		S1	
Calicina cloughensis	Clough Cave harvestman		S1	
Anodonta kennerlyi	Western Floater			X
Anodonta nuttalliana	Winged Floater			X
Anodonta oregonensis	Oregon floater			X
Anodonta californiensis	California floater			X
Gonidea angulata	western ridged mussel			X
Margaritifera falcata	western pearlshell		S1S2	X
Pisidium ultramontanum	montane peaclam		S1	
Argopecten ventricosus	speckled scallop		NT	X
Sterkia clementina	San Clemente Island blunt-top snail		S1S2	
Haplotrema catalinense	Santa Catalina lancetooth		S1	
Binneya notabilis	Santa Barbara shelled slug		S1	
Pristiloma shepardae	Shepard's snail		S1	
Trilobopsis roperi	Shasta chaparral		S1	
Trilobopsis tehamana	Tehama chaparral		S1	
Vespericola pressleyi	Big Bar hesperian		S1	
Vespericola scotti	Benson Gulch hesperian		S1	
Ammonitella yatesii	tight coin (=Yates' snail)		S1	
Radiocentrum avalonense	Catalina mountainsnail		S1	
Eremarionta immaculata	white desertsnail		S1	
Eremarionta millepalmarum	Thousand Palms desertsnail		S1	
Eremarionta morongoana	Morongo (=Colorado) desertsnail		S1	
Eremarionta rowelli bakerensis	Baker's desertsnail		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Eremarionta rowelli mccoiana	California McCoy snail		S1	
Helminthoglypta allynsmithi	Merced Canyon shoulderband		S1	
Helminthoglypta arrosa pomoensis	Pomo bronze shoulderband		S1	
Helminthoglypta stiversiana williamsi	Williams' bronze shoulderband		S1	
Helminthoglypta arrosa monticola	mountain shoulderband		S1	
Helminthoglypta callistoderma	Kern shoulderband		S1	
Helminthoglypta fontiphila	Soledad shoulderband		S1	
Helminthoglypta hertleini	Oregon shoulderband		S1S2	
Helminthoglypta mohaveana	Victorville shoulderband		S1	
Helminthoglypta nickliniana awania	Peninsula coast range shoulderband		S1	
Helminthoglypta nickliniana bridgesi	Bridges' coast range shoulderband		S1S2	
Helminthoglypta sequoicola consors	redwood shoulderband		S1	
Helminthoglypta traskii pacoimensis	Pacoima shoulderband		S1	
Helminthoglypta walkeriana	Morro shoulderband	FT		
Helminthoglypta coelata	mesa shoulderband		S1	
Helminthoglypta milleri	peak shoulderband		S1	
Helminthoglypta taylori	westfork shoulderband		S1	
Helminthoglypta uvasana	Grapevine shoulderband		S1	
Helminthoglypta vasquezi	Vasquez shoulderband		S1	
Micrarionta feralis	San Nicolas islandsnail		S1	
Micrarionta gabbii	San Clemente islandsnail		S1	
Micrarionta opuntia	pricklypear islandsnail		S1	
Rothelix warnerfontis	Warner Springs shoulderband		S1	
Monadenia fidelis pronotis	rocky coast Pacific sideband		S1	
Monadenia infumata ochromphalus	yellow-based sideband		S1S2	
Monadenia marmarotis	marble sideband		S1	
Monadenia mormonum buttoni	Button's Sierra sideband		S1S2	
Monadenia mormonum hirsuta	hirsute Sierra sideband		S1	
Monadenia infumata setosa	Trinity bristle snail	ST		
Monadenia tuolumneana	Tuolumne sideband		S1	
Herpeteros angelus	Soledad desertsnail		S1	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Xerarionta intercisa	horseshoe snail		S1	
Xerarionta redimita	wreathed cactussnail		S1	
Xerarionta tryoni	Bicolor cactussnail		S1	
Pyrgulopsis aardahli	Benton Valley (=Aahrdahl's) springsnail		S1	
Pyrgulopsis perturbata	Fish Slough springsnail		S1	
Pyrgulopsis falciglans	Likely pyrg		S1	
Pyrgulopsis rupinicola	Sucker Springs pyrg		S1	
Pyrgulopsis diablensis	Diablo Range pyrg		S1	
Pyrgulopsis greggi	Kern River pyrg		S1	
Pyrgulopsis longae	Long Valley pyrg		S1	
Pyrgulopsis taylori	San Luis Obispo pyrg		S1	
Pyrgulopsis ventricosa	Clear Lake pyrg		S1	
Tryonia margae	Grapevine Springs elongate tryonia		S1	
Tryonia rowlandsi	Grapevine Springs squat tryonia		S1	
Ipnobius robustus	robust tryonia		S1	
Pomatiopsis binneyi	robust walker		S1	
Pomatiopsis californica	Pacific walker		S1	
Juga occata	scalloped juga		S1	
Juga chacei	Chace juga		S1	
Helisoma newberryi	Great Basin rams-horn		S1S2	
Assiminea infima	Badwater snail		S1	
Haliotis sorenseni	white abalone	FE		X
Haliotis cracherodii	black abalone	FE		X
Haliotis kamtschatkana	pinto abalone		NT	X
Haliotis fulgens	green abalone		NT	X
Haliotis corrugata	pink abalone		NT	X
Haliotis walallensis	flat abalone		NT	X
Pristinicola hemphilli	pristine pyrg		S1	
Monadenia yosemitensis	Yosemite sideband		S1S2	
Cicindela hirticollis siuslawensis	Siuslaw Hairy-necked Tiger Beetle	FPL		
Omus audouini	Audouin's Night-stalking Tiger Beetle	E		

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Anthicus sacramento	Sacramento anthicid beetle	E		
Perdita meconis	Mojave poppy bee	FPL		
Bombus pensylvanicus	American Bumble Bee	FPL		
Bombus kirbiellus	golden-belted bumble bee	E		
Proceratium californicum	Valley Oak Ant	E		
Osmia neocyanopoda	a mason bee	E		
Osmia sequoiae	a mason bee	E		
Megachile bradleyi	a leafcutter bee	E		
Satyrium behrii	Behr's Hairstreak	E		
Callophrys johnsoni	Johnson's Hairstreak	E		
Autoplusia olivacea	a noctuid moth	E		
Papaipema angelica	Angelica Borer Moth	E		
Banksula californica	Alabaster Cave harvestman	E		

Table C-5 Mammal SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Sorex lyelli	Mount Lyell shrew		SSC	
Sorex vagrans halicoetes	salt-marsh wandering shrew		SSC	
Sorex vagrans paludivagus	Monterey vagrant shrew		SSC	
Sorex ornatus willetti	Santa Catalina shrew		SSC	
Sorex ornatus relictus	Buena Vista Lake ornate shrew	FE	SSC	
Sorex ornatus sinuosus	Suisun shrew		SSC	
Sorex ornatus salicornicus	southern California saltmarsh shrew		SSC	
Sorex ornatus salarius	Monterey shrew		SSC	
Scapanus latimanus parvus	Alameda Island mole		SSC	
Macrotus californicus	California leaf-nosed bat		SSC	
Choeronycteris mexicana	Mexican long-tongued bat		SSC	
Leptonycteris yerbabuenae	lesser long-nosed bat		SSC	
Myotis velifer	cave myotis		SSC	
Myotis velifer velifer	Arizona cave myotis		SSC	
Myotis evotis	long-eared myotis		SSC	
Myotis evotis evotis			SSC	
Myotis evotis pacificus			SSC	
Myotis thysanodes	fringed myotis		SSC	
Myotis thysanodes thysanodes			SSC	
Myotis thysanodes vespertinus	Pacific Fringe-tailed Bat		SSC	
Myotis volans	long-legged myotis		SSC	
Myotis volans interior			SSC	
Myotis volans longicrus			SSC	
Myotis occultus	Arizona Myotis		SSC	
Myotis ciliolabrum	western small-footed myotis		SSC	
Lasionycteris noctivagans	silver-haired bat		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Lasiurus cinereus	hoary bat		SSC	
Lasiurus cinereus cinereus			SSC	
Lasiurus xanthinus	western yellow bat		SSC	
Lasiurus frantzii	western red bat		SSC	
Euderma maculatum	spotted bat		SSC	
Corynorhinus townsendii	Townsend's big-eared bat		SSC	
Corynorhinus townsendii pallescens	Pale Lump-nosed Bat		SSC	
Corynorhinus townsendii townsendii	Townsend's Western Big-eared Bat		SSC	
Antrozous pallidus	pallid bat		SSC	
Antrozous pallidus pacificus	Pacific Pallid Bat		SSC	
Antrozous pallidus pallidus			SSC	
Eumops perotis californicus	western mastiff bat		SSC	
Nyctinomops femorosaccus	pocketed free-tailed bat		SSC	
Nyctinomops macrotis	big free-tailed bat		SSC	
Ochotona princeps schisticeps	gray-headed pika			X
Sylvilagus bachmani riparius	riparian brush rabbit	FE, SE		
Lepus americanus klamathensis	Oregon snowshoe hare		SSC	
Lepus americanus tahoensis	Sierra Nevada snowshoe hare		SSC	
Lepus townsendii townsendii	western white-tailed jackrabbit		SSC	
Brachylagus idahoensis	pygmy rabbit		SSC	
Aplodontia rufa nigra	Point Arena mountain beaver	FE	SSC	
Aplodontia rufa phaea	Point Reyes mountain beaver		SSC	
Aplodontia rufa californica	Sierra Nevada mountain beaver		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Aplodontia rufa humboldtiana	Humboldt mountain beaver		SSC	
Neotamias alpinus	Alpine chipmunk		SSC	X
Neotamias speciosus callipeplus	Mount Pinos chipmunk		SSC	
Neotamias speciosus speciosus	lodgepole chipmunk		SSC	
Ammospermophilus nelsoni	Nelson's (=San Joaquin) antelope squirrel	ST		
Xerospermophilus mohavensis	Mohave ground squirrel	ST		
Xerospermophilus tereticaudus chlorus	Palm Springs round-tailed ground squirrel		SSC	
Callospermophilus lateralis bernardinus	San Bernardino golden-mantled ground squirrel		SSC	
Urocitellus mollis	Piute ground squirrel		SSC	
Urocitellus mollis mollis			SSC	
Glaucomys oregonensis californicus	San Bernardino flying squirrel		SSC	X
Perognathus longimembris brevinasus	Los Angeles pocket mouse		SSC	
Perognathus longimembris pacificus	Pacific pocket mouse	FE	SSC	
Perognathus longimembris bangsi	Palm Springs pocket mouse		SSC	
Perognathus longimembris internationalis	Jacumba pocket mouse		SSC	
Perognathus inornatus	San Joaquin pocket mouse		SSC	
Perognathus inornatus inornatus	Fresno pocket mouse		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Perognathus inornatus neglectus	McKittrick pocket mouse		SSC	
Perognathus inornatus psammophilus	Salinas pocket mouse		SSC	
Perognathus mollipilosus xanthonotus	yellow-eared pocket mouse		SSC	
Perognathus alticola	white-eared pocket mouse		SSC	
Perognathus alticola alticola	white-eared pocket mouse		SSC	
Perognathus alticola inexpectatus	Tehachapi pocket mouse		SSC	
Dipodomys venustus	Narrow-faced Kangaroo Rat		SSC	
Dipodomys venustus elephantinus	big-eared kangaroo rat		SSC	
Dipodomys venustus venustus	Santa Cruz kangaroo rat		SSC	
Dipodomys agilis	Agile Kangaroo Rat		SSC	
Dipodomys agilis agilis	Gambel Kangaroo Rat		SSC	
Dipodomys heermanni berkeleyensis	Berkeley kangaroo rat		SSC	
Dipodomys heermanni dixoni	Merced kangaroo rat		SSC	
Dipodomys heermanni morroensis	Morro Bay kangaroo rat	FE, SE, SFP		
Dipodomys heermanni arenae	Lompoc kangaroo rat		SSC	
Dipodomys heermanni goldmani	Salinas kangaroo rat		SSC	
Dipodomys heermanni heermanni	Heermann's kangaroo rat		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Dipodomys californicus eximius	Marysville California kangaroo rat		SSC	
Dipodomys ingens	giant kangaroo rat	FE, SE		
Dipodomys stephensi	Stephens' kangaroo rat	FT, ST		
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE, SE	SSC	
Dipodomys merriami collinus	Earthquake Merriam's kangaroo rat		SSC	
Dipodomys merriami trinidadensis	Valle de la Trinidad kangaroo rat		SSC	
Dipodomys nitratoides	San Joaquin Valley Kangaroo Rat		SSC	
Dipodomys nitratoides exilis	Fresno kangaroo rat	FE, SE		
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	FE, SE		
Dipodomys nitratoides brevinasus	short-nosed kangaroo rat		SSC	
Dipodomys simulans	Dulzura kangaroo rat		SSC	
Dipodomys simulans simulans			SSC	
Chaetodipus californicus femoralis	Dulzura pocket mouse		SSC	
Chaetodipus fallax fallax	northwestern San Diego pocket mouse		SSC	
Chaetodipus fallax pallidus	pallid San Diego pocket mouse		SSC	
Castor canadensis frondator	Sonora Beaver		SSC	
Reithrodontomys megalotis santacruzae	Santa Cruz harvest mouse		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Reithrodontomys megalotis distichlis	Salinas harvest mouse		SSC	
Reithrodontomys megalotis limicola	Southern Marsh Harvest Mouse		SSC	
Reithrodontomys raviventris	salt-marsh harvest mouse	FE, SE, SFP	SSC	
Peromyscus maniculatus anacapae	Anacapa Island deer mouse		SSC	
Peromyscus maniculatus clementis	San Clemente deer mouse		SSC	
Onychomys torridus tularensis	Tulare grasshopper mouse		SSC	
Onychomys torridus ramona	southern grasshopper mouse		SSC	
Sigmodon hispidus eremicus	Yuma hispid cotton rat		SSC	
Sigmodon arizonae plenus	Colorado River cotton rat		SSC	
Neotoma albigula venusta	Colorado Valley woodrat		SSC	
Neotoma lepida intermedia	San Diego desert woodrat		SSC	
Neotoma fuscipes riparia	riparian (=San Joaquin Valley) woodrat	FE	SSC	
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat		SSC	
Neotoma macrotis luciana	Monterey dusky-footed woodrat		SSC	
Microtus californicus mohavensis	Mohave river vole		SSC	
Microtus californicus scirpensis	Amargosa vole	FE, SE		
Microtus californicus vallicola	Owens Valley vole		SSC	
Microtus californicus sanpabloensis	San Pablo vole		SSC	X

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Microtus californicus stephensi	south coast marsh vole		SSC	
Microtus californicus halophilus	Monterey vole		SSC	X
Microtus californicus paludicola	Marsh Vole		SSC	X
Microtus longicaudus bernardinus	San Bernardino Mountains Long-tailed Vole		SSC	
Arborimus albipes	white-footed vole		SSC	
Arborimus pomo	Sonoma tree vole		SSC	X
Zapus trinotatus orarius	Point Reyes jumping mouse		SSC	
Erethizon dorsatum couesi			SSC	
Physeter macrocephalus	sperm whale	FE		
Orcinus orca	killer whale (southern resident DPS)	FE		
Balaenoptera physalus	fin whale	FE		
Balaenoptera borealis	sei whale	FE		
Balaenoptera musculus	blue whale	FE		
Megaptera novaeangliae	humpback whale	FE		
Eubalaena japonica	North Pacific right whale	FE, SFP		
Canis lupus	gray wolf	FE, SE		
Vulpes vulpes patwin	Sacramento Valley red fox		SSC	
Vulpes vulpes necator pop. 1	Sierra Nevada red fox - southern Cascades DPS	ST		X
Vulpes vulpes necator pop. 2	Sierra Nevada red fox - Sierra Nevada DPS	FE, ST		
Vulpes macrotis mutica	San Joaquin kit fox	FE, ST		
Urocyon littoralis santacruzae	Santa Cruz Island fox	ST		
Urocyon littoralis catalinae	Santa Catalina Island fox	FT, ST		

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Urocyon littoralis clementae	San Clemente Island fox	ST		
Urocyon littoralis dickeyi	San Nicolas Island fox	ST		
Urocyon littoralis littoralis	San Miguel Island fox	ST		
Urocyon littoralis santarosae	Santa Rosa Island fox	ST		
Arctocephalus townsendi	Guadalupe fur-seal	FT, ST, SFP		
Eumetopias jubatus	Steller sea lion		SSC	
Bassariscus astutus octavus	southern California ringtail	SFP	SSC	
Bassariscus astutus willetti	Palo Verde Mountains ringtail	SFP	SSC	
Bassariscus astutus yumanensis	Yuma ringtail	SFP	SSC	
Bassariscus astutus raptor	northern California ringtail	SFP		
Bassariscus astutus nevadensis	Nevada ringtail	SFP		
Martes caurina humboldtensis	Humboldt marten	FT, SE	SSC	
Pekania pennanti	Fisher		SSC	
Pekania pennanti pop. 2	Fisher - southern Sierra Nevada ESU	FE, ST	SSC	
Pekania pennanti pacifica	Pacific fisher		SSC	
Martes caurina	Pacific marten		SSC	X
Mustela frenata inyoensis	Inyo long-tailed weasel		SSC	
Mustela frenata xanthogenys	San Joaquin long-tailed weasel		SSC	
Gulo gulo	wolverine	FT, ST, SFP		X
Taxidea taxus	American badger		SSC	
Taxidea taxus berlandieri			SSC	
Taxidea taxus jeffersonii			SSC	
Spilogale gracilis amphiala	Channel Islands spotted skunk		SSC	
Enhydra lutris nereis	southern sea otter	FT, SFP	SSC	
Lontra canadensis sonora	southwestern river otter		SSC	

Scientific Name	Common Name	Legal Status	Conservation Concern	Climate Vulnerable
Mirounga angustirostris	northern elephant seal	SFP		
Puma concolor browni	Yuma mountain lion		SSC	
Cervus canadensis nannodes	tule elk		SSC	
Antilocapra americana	pronghorn		SSC	
Antilocapra americana americana			SSC	
Ovis canadensis	Bighorn Sheep	SFP	SSC	
Ovis canadensis nelsoni pop. 2	Peninsular bighorn sheep DPS	FE, ST, SFP		
Ovis canadensis nelsoni	desert bighorn sheep	SFP	SSC	
Ovis canadensis sierrae	Sierra Nevada bighorn sheep	FE, SE, SFP		

Table C-6 Plant and Algae SGCN

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Geothallus tuberosus	Campbell's liverwort		BLM-S,	1B.1
Sphaerocarpos drewiae	bottle liverwort			1B.1
Grimmia vaginulata	vaginulate grimmia			1B.1
Scytinium siskiyouense	Siskiyou jellyskin lichen			1B.1
Sulcaria isidiifera	splitting yarn lichen			1B.1
Eryngium aristulatum var. parishii	San Diego button-celery	FE, SE		1B.1
Eryngium aristulatum var. hooveri	Hoover's button-celery			1B.1
Eryngium racemosum	Delta button-celery	SE		1B.1
Eryngium constancei	Loch Lomond button-celery	FE, SE		1B.1
Eryngium pendletonense	Pendleton button-celery			1B.1
Eryngium montereyense	Fort Ord button-celery			1B.1
Lilaeopsis masonii	Mason's lilaeopsis	Rare		1B.1
Lomatium stebbinsii	Stebbins' lomatium			1B.1
Sanicula maritima	adobe sanicle	Rare		1B.1
Ambrosia pumila	San Diego ambrosia	FE		1B.1
Baccharis vanessae	Encinitas baccharis	FT, SE		1B.1
Baccharis malibuensis	Malibu baccharis			1B.1
Blennosperma bakeri	Sonoma sunshine	FE, SE		1B.1
Blepharizonia plumosa	big tarplant			1B.1
Calycadenia villosa	dwarf calycadenia			1B.1
Chaenactis glabriuscula var. orcuttiana	Orcutt's pincushion			1B.1
Cirsium crassicaule	slough thistle			1B.1
Cirsium fontinale var. fontinale	fountain thistle	FE, SE		1B.1
Cirsium hydrophilum var. hydrophilum	Suisun thistle	FE		1B.1
Cirsium scariosum var. loncholepis	La Graciosa thistle	FE, ST		1B.1
Cirsium praeteriens	lost thistle			1A
Corethrogyne filaginifolia var. incana	San Diego sand aster			1B.1
Corethrogyne filaginifolia var. linifolia	Del Mar Mesa sand aster			1B.1
Ericameria fasciculata	Eastwood's goldenbush			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Ericameria palmeri var. palmeri	Palmer's goldenbush			1B.1
Erigeron parishii	Parish's daisy	FT		1B.1
Erigeron mariposanus	Mariposa daisy			1A
Erigeron calvus	bald daisy			1B.1
Eriophyllum lanatum var. hallii	Fort Tejon woolly sunflower			1B.1
Eriophyllum latilobum	San Mateo woolly sunflower	FE, SE		1B.1
Hazardia orcuttii	Orcutt's hazardia	ST		1B.1
Helianthus nuttallii ssp. parishii	Los Angeles sunflower			1A
Helianthus inexpectatus	Newhall sunflower			1B.1
Deinandra conjugens	Otay tarplant	FT, SE		1B.1
Centromadia parryi ssp. congdonii	Congdon's tarplant			1B.1
Centromadia parryi ssp. australis	southern tarplant			1B.1
Centromadia pungens ssp. laevis	smooth tarplant			1B.1
Deinandra increscens ssp. villosa	Gaviota tarplant	FE, SE		1B.1
Deinandra bacigalupii	Livermore tarplant	SE		1B.1
Heterotheca sessiliflora ssp. sessiliflora	beach goldenaster			1B.1
Heterotheca monarchensis	Monarch golden-aster			1B.1
Holocarpha macradenia	Santa Cruz tarplant	FT, SE		1B.1
Isocoma arguta	Carquinez goldenbush			1B.1
Lagophylla dichotoma	forked hare-leaf			1B.1
Lasthenia burkei	Burke's goldfields	FE, SE		1B.1
Lasthenia chrysantha	alkali-sink goldfields			1B.1
Lasthenia conjugens	Contra Costa goldfields	FE		1B.1
Lasthenia glabrata ssp. coulteri	Coulter's goldfields			1B.1
Layia carnosa	beach layia	FT, SE		1B.1
Layia discoidea	rayless layia			1B.1
Layia heterotricha	pale-yellow layia			1B.1
Layia leucopappa	Comanche Point layia			1B.1
Lessingia germanorum	San Francisco lessingia	FE, SE		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Lessingia glandulifera var. tomentosa	Warner Springs lessingia			1B.1
Madia radiata	showy golden madia			1B.1
Harmonia doris-nilesiae	Niles' harmonia			1B.1
Harmonia guggolziorum	Guggolz's harmonia			1B.1
Malacothrix indecora	Santa Cruz Island malacothrix	FE		1B.1
Malacothrix squalida	island malacothrix	FE		1B.1
Malacothrix junakii	Junak's malcothrix			1B.1
Pentachaeta aurea ssp. allenii	Allen's pentachaeta			1B.1
Pentachaeta bellidiflora	white-rayed pentachaeta	FE, SE		1B.1
Pentachaeta lyonii	Lyon's pentachaeta	FE, SE		1B.1
Pseudobahia bahiifolia	Hartweg's golden sunburst	FE, SE		1B.1
Pseudobahia peirsonii	San Joaquin adobe sunburst	FT, SE		1B.1
Stylocline citroleum	oil neststraw			1B.1
Stylocline masonii	Mason's neststraw			1B.1
Taraxacum californicum	California dandelion	FE		1B.1
Verbesina dissita	big-leaved crownbeard	FT, ST		1B.1
Ancistrocarphus keilii	Santa Ynez groundstar			1B.1
Erigeron conditii	Condit's fleabane daisy			1B.1
Berberis nevinii	Nevin's barberry	FE, SE		1B.1
Amsinckia grandiflora	large-flowered fiddleneck	FE, SE		1B.1
Cryptantha excavata	deep-scarred cryptantha			1B.1
Cryptantha ganderi	Gander's cryptantha			1B.1
Cryptantha hooveri	Hoover's cryptantha			1A
Cryptantha traskiae	Trask's cryptantha			1B.1
Plagiobothrys diffusus	San Francisco popcornflower	SE		1B.1
Plagiobothrys glaber	hairless popcornflower			1A
Plagiobothrys hystriculus	bearded popcornflower			1B.1
Plagiobothrys lithocaryus	Mayacamas popcornflower			1A
Plagiobothrys mollis var. vestitus	Petaluma popcornflower			1A

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Plagiobothrys parishii	Parish's popcornflower			1B.1
Plagiobothrys strictus	Calistoga popcornflower	FE, ST		1B.1
Boechera constancei	Constance's rockcress			1B.1
Boechera hoffmannii	Hoffmann's rockcress	FE		1B.1
Arabis mcdonaldiana	McDonald's rockcress	FE, SE		1B.1
Boechera rollei	Rolle's rockcress			1B.1
Caulanthus amplexicaulis var. barbarae	Santa Barbara jewelflower			1B.1
Dithyrea maritima	beach spectaclepod	ST		1B.1
Draba asterophora var. macrocarpa	Cup Lake draba			1B.1
Erysimum capitatum var. angustatum	Contra Costa wallflower	FE, SE		1B.1
Erysimum teretifolium	Santa Cruz wallflower	FE, SE		1B.1
Erysimum menziesii	Menzies' wallflower	FE, SE		1B.1
Physaria kingii ssp. bernardina	San Bernardino Mountains bladderpod	FE		1B.1
Rorippa subumbellata	Tahoe yellow cress	SE		1B.1
Nasturtium gambelii	Gambel's water cress	FE, ST		1B.1
Sibara filifolia	Santa Cruz Island winged-rockcress	FE		1B.1
Streptanthus albidus ssp. albidus	Metcalf Canyon jewelflower	FE		1B.1
Streptanthus fenestratus	Tehipite Valley jewelflower			1B.1
Streptanthus glandulosus ssp. niger	Tiburon jewelflower	FE, SE		1B.1
Streptanthus tortuosus ssp. truei	True's mountain jewelflower			1B.1
Streptanthus anomalus	Mount Burdell jewelflower			1B.1
Streptanthus medeirosii	Tejon jewelflower			1B.1
Thelypodium stenopetalum	slender-petaled thelypodium	FE, SE		1B.1
Noccaea fendleri ssp. californica	Kneeland Prairie pennycress	FE		1B.1
Tropidocarpum capparideum	caper-fruited tropidocarpum			1B.1
Caulanthus californicus	California jewelflower	FE, SE		1B.1
Tropidocarpum californicum	Kings gold			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Boechera rubicundula	Mt. Day rockcress			1B.1
Boechera shevockii	Shevock's rockcress			1B.1
Boechera ultraalsa	Snow Mountain rockcress			1B.1
Echinocereus engelmannii var. howei	Howe's hedgehog cactus			1B.1
Opuntia basilaris var. treleasei	Bakersfield cactus	FE, SE		1B.1
Cylindropuntia californica var. californica	snake cholla			1B.1
Downingia concolor var. brevior	Cuyamaca Lake downingia	SE		1B.1
Legenere limosa	legenere			1B.1
Nemacladus twisselmannii var. botanywomaniae	Botany Woman's threadplant			1B.1
Arenaria paludicola	marsh sandwort	FE, SE		1B.1
Paronychia ahartii	Ahart's paronychia			1B.1
Atriplex argentea var. longitrichoma	Pahrump orache			1B.1
Atriplex coronata var. notatior	San Jacinto Valley crownscale	FE		1B.1
Atriplex parishii	Parish's brittlescale			1B.1
Atriplex tularensis	Bakersfield smallscale	SE		1A
Atriplex minuscula	lesser saltscale			1B.1
Nitrophila mohavensis	Amargosa nitrophila	FE, SE		1B.1
Suaeda californica	California seablite	FE		1B.1
Calystegia sepium ssp. binghamiae	Santa Barbara morning-glory			1A
Calystegia stebbinsii	Stebbins' morning-glory	FE, SE		1B.1
Calystegia felix	lucky morning-glory			1B.1
Dudleya abramsii ssp. murina	mouse-gray dudleya			1B.1
Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya			1B.1
Dudleya blochmaniae ssp. insularis	Santa Rosa Island dudleya			1B.1
Dudleya brevifolia	short-leaved dudleya	SE		1B.1
Dudleya cymosa ssp. ovatifolia	Santa Monica dudleya	FT		1B.1
Dudleya densiflora	San Gabriel Mountains dudleya			1B.1
Dudleya nesiotica	Santa Cruz Island dudleya	Rare		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Dudleya stolonifera	Laguna Beach dudleya	FT, ST		1B.1
Dudleya verityi	Verity's dudleya	FT		1B.1
Dudleya gnoma	munchkin dudleya			1B.1
Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	FE		1B.1
Sedum oblanceolatum	Applegate stonecrop			1B.1
Sedella leiocarpa	Lake County stonecrop	FE, SE		1B.1
Arctostaphylos densiflora	Vine Hill manzanita	SE		1B.1
Arctostaphylos glandulosa ssp. crassifolia	Del Mar manzanita	FE		1B.1
Arctostaphylos montana ssp. ravenii	Presidio manzanita	FE,SE		1B.1
Arctostaphylos franciscana	Franciscan manzanita	FE		1B.1
Arctostaphylos imbricata	San Bruno Mountain manzanita	SE		1B.1
Arctostaphylos morroensis	Morro manzanita	FT		1B.1
Arctostaphylos pacifica	Pacific manzanita	SE		1B.1
Arctostaphylos pajaroensis	Pajaro manzanita			1B.1
Arctostaphylos pallida	pallid manzanita	FT, SE		1B.1
Arctostaphylos purissima	La Purisima manzanita			1B.1
Arctostaphylos stanfordiana ssp. raichei	Raiche's manzanita			1B.1
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita			1B.1
Arctostaphylos crustacea ssp. eastwoodiana	Eastwood's brittle-leaf manzanita			1B.1
Arctostaphylos tomentosa ssp. daciticola	dacite manzanita			1B.1
Arctostaphylos bakeri ssp. bakeri	Baker's manzanita	Rare		1B.1
Arctostaphylos rainbowensis	Rainbow manzanita			1B.1
Arctostaphylos ohloneana	Ohlone manzanita			1B.1
Euphorbia jaegeri	Orocopia Mountains spurge			1B.1
Astragalus agnicidus	Humboldt County milk-vetch	SE		1B.1
Astragalus albens	Cushenbury milk-vetch	FE		1B.1
Astragalus atratus var. mensanus	Darwin Mesa milk-vetch			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Astragalus brauntonii	Braunton's milk-vetch	FE		1B.1
Astragalus claranus	Clara Hunt's milk-vetch	FE, SE		1B.1
Astragalus deanei	Dean's milk-vetch			1B.1
Astragalus hornii var. hornii	Horn's milk-vetch			1B.1
Astragalus jaegerianus	Lane Mountain milk-vetch	FE		1B.1
Astragalus mohavensis var. hemigyrus	curved-pod milk-vetch			1B.1
Astragalus nyensis	Nye milk-vetch			1B.1
Astragalus pachypus var. jaegeri	Jaeger's milk-vetch			1B.1
Astragalus preussii var. laxiflorus	Lancaster milk-vetch			1B.1
Astragalus pycnostachyus var. lanosissimus	Ventura Marsh milk-vetch	FE, SE		1B.1
Astragalus tener var. titi	coastal dunes milk-vetch	FE, SE		1B.1
Astragalus tener var. ferrisiae	Ferris' milk-vetch			1B.1
Astragalus lentiginosus var. piscinensis	Fish Slough milk-vetch	FT		1B.1
Astragalus lentiginosus var. sesquimetralis	Sodaville milk-vetch	SE		1B.1
Hoffmannseggia peninsularis	Baja peninsula rushpea			1B.1
Lathyrus biflorus	two-flowered pea			1B.1
Acmispon argophyllus var. adsurgens	San Clemente Island bird's-foot trefoil	SE		1B.1
Hosackia crassifolia var. otayensis	Otay Mountain lotus			1B.1
Acmispon prostratus	Nuttall's acmispon			1B.1
Acmispon rubriflorus	red-flowered bird's-foot trefoil			1B.1
Lupinus tidestromii	Tidestrom's lupine	FE, SE		1B.1
Lupinus constancei	Lassics lupine	FE, SE		1B.1
Lupinus milobakeri	Milo Baker's lupine	SE		1B.1
Lupinus nipomensis	Nipomo Mesa lupine	FE, SE		1B.1
Lupinus paynei	Payne's bush lupine			1B.1
Trifolium amoenum	two-fork clover	FE		1B.1
Trifolium polyodon	Pacific Grove clover	Rare		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Trifolium trichocalyx	Monterey clover	FE, SE		1B.1
Trifolium siskiyouense	Siskiyou clover			1B.1
Trifolium buckwestiorum	Santa Cruz clover			1B.1
Hoita strobilina	Loma Prieta hoita			1B.1
Quercus dumosa	Nuttall's scrub oak			1B.1
Zeltnera namophila	spring-loving centaury	FT		1B.1
Ribes divaricatum var. parishii	Parish's gooseberry			1A
Eriodictyon altissimum	Indian Knob mountainbalm	FE, SE		1B.1
Phacelia argentea	sand dune phacelia	FT		1B.1
Phacelia cookei	Cooke's phacelia			1B.1
Phacelia parishii	Parish's phacelia			1B.1
Phacelia monoensis	Mono County phacelia			1B.1
Phacelia stellaris	Brand's star phacelia			1B.1
Acanthomintha ilicifolia	San Diego thorn-mint	FT, SE		1B.1
Acanthomintha duttonii	San Mateo thorn-mint	FE, SE		1B.1
Monardella venosa	veiny monardella			1B.1
Monardella leucocephala	Merced monardella			1A
Monardella pringlei	Pringle's monardella			1A
Monardella australis ssp. jokerstii	Jokerst's monardella			1B.1
Monardella australis ssp. occidentalis	southwestern mountain monardella			1B.1
Monardella viminea	willowy monardella	FE, SE		1B.1
Monardella undulata ssp. arguelloensis	Point Arguello monardella			1B.1
Monardella sinuata ssp. gerryi	Gerry's curly-leaved monardella			1B.1
Pogogyne abramsii	San Diego mesa mint	FE, SE		1B.1
Pogogyne nudiuscula	Otay Mesa mint	FE, SE		1B.1
Trichostema austromontanum ssp. compactum	Hidden Lake bluecurls			1B.1
Limnanthes bakeri	Baker's meadowfoam	Rare		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Limnanthes douglasii ssp. ornduffii	Ornduff's meadowfoam			1B.1
Limnanthes floccosa ssp. californica	Butte County meadowfoam	FE, SE		1B.1
Limnanthes vinculans	Sebastopol meadowfoam	FE, SE		1B.1
Hesperolinon congestum	Marin western flax	FT, ST		1B.1
Lavatera assurgentiflora ssp. assurgentiflora	island mallow			1B.1
Lavatera assurgentiflora ssp. glabra	southern island mallow			1B.1
Malacothamnus abbottii	Abbott's bushmallow			1B.1
Malacothamnus clementinus	San Clemente Island bushmallow	SE		1B.1
Malacothamnus fasciculatus var. nesioticus	Santa Cruz Island bushmallow	FE, SE		1B.1
Malacothamnus parishii	Parish's bushmallow			1A
Malacothamnus mendocinensis	Mendocino bushmallow			1B.1
Malacothamnus jonesii var. gracilis	slender bushmallow			1B.1
Malacothamnus eastwoodiae	Alice's lovely bushmallow			1B.1
Sidalcea covillei	Owens Valley checkerbloom	SE		1B.1
Sidalcea hickmanii ssp. viridis	Marin checkerbloom			1B.1
Sidalcea hickmanii ssp. napensis	Napa checkerbloom			1B.1
Sidalcea keckii	Keck's checkerbloom	FE		1B.1
Sidalcea oregana ssp. valida	Kenwood Marsh checkerbloom	FE, SE		1B.1
Sidalcea pedata	bird-foot checkerbloom	FE, SE		1B.1
Sidalcea stipularis	Scadden Flat checkerbloom	SE		1B.1
Abronia alpina	Ramshaw Meadows abronia			1B.1
Abronia umbellata var. breviflora	pink sand-verbena			1B.1
Abronia villosa var. aurita	chaparral sand-verbena			1B.1
Camissonia benitensis	San Benito evening-primrose			1B.1
Clarkia amoena ssp. whitneyi	Whitney's farewell-to-spring			1B.1
Clarkia borealis ssp. arida	Shasta clarkia			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Clarkia concinna ssp. raichei	Raiche's red ribbons			1B.1
Clarkia franciscana	Presidio clarkia	FE, SE		1B.1
Clarkia imbricata	Vine Hill clarkia	FE, SE		1B.1
Clarkia lingulata	Merced clarkia	SE		1B.1
Clarkia mosquinii	Mosquin's clarkia			1B.1
Clarkia speciosa ssp. immaculata	Pismo clarkia	FE, Rare		1B.1
Clarkia tembloriensis ssp. calientensis	Vasek's clarkia			1B.1
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	FE, SE		1B.1
Oenothera wolfii	Wolf's evening-primrose			1B.1
Aphyllon robbinsii	Robbins' broomrape			1B.1
Eschscholzia lemmonii ssp. kernensis	Tejon poppy			1B.1
Eschscholzia rhombipetala	diamond-petaled California poppy			1B.1
Meconella oregana	Oregon meconella			1B.1
Chorizanthe orcuttiana	Orcutt's spineflower	FE, SE		1B.1
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	SE		1B.1
Chorizanthe parryi var. parryi	Parry's spineflower			1B.1
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE		1B.1
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	FE		1B.1
Chorizanthe robusta var. robusta	robust spineflower	FE		1B.1
Chorizanthe valida	Sonoma spineflower	FE, SE		1B.1
Chorizanthe aphanantha	Irish Hills spineflower			1B.1
Eriogonum apricum var. apricum	Ione buckwheat	FE, SE		1B.1
Eriogonum apricum var. prostratum	Irish Hill buckwheat	FE, SE		1B.1
Eriogonum grande var. timorum	San Nicolas Island buckwheat	SE		1B.1
Eriogonum kennedyi var. pinicola	Kern buckwheat			1B.1
Eriogonum microthecum var. lacus-ursi	Bear Lake buckwheat	FPL		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Eriogonum nudum var. decurrens	Ben Lomond buckwheat			1B.1
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat			1B.1
Eriogonum alexanderae	Alexander's buckwheat			1B.1
Eriogonum ovalifolium var. vineum	Cushenbury buckwheat	FE		1B.1
Eriogonum ovalifolium var. monarchense	Monarch buckwheat			1B.1
Eriogonum truncatum	Mt. Diablo buckwheat			1B.1
Eriogonum umbellatum var. lautum	Scott Valley buckwheat			1B.1
Eriogonum evanidum	vanishing wild buckwheat			1B.1
Eriogonum callistum	Tehachapi buckwheat			1B.1
Acanthoscyphus parishii var. goodmaniana	Cushenbury oxytheca	FE		1B.1
Polygonum hickmanii	Scotts Valley polygonum	FE, SE		1B.1
Dodecahema leptoceras	slender-horned spineflower	FE, SE		1B.1
Erythranthe carsonensis	Carson Valley monkeyflower			1B.1
Erythranthe hardhamiae	Santa Lucia monkeyflower			1B.1
Erythranthe rhodopetra	Red Rock Canyon monkeyflower			1B.1
Erythranthe taylorii	Shasta limestone monkeyflower			1B.1
Erythranthe marmorata	Stanislaus monkeyflower			1B.1
Erythranthe percaulis	Serpentine Canyon monkeyflower			1B.1
Erythranthe serpentinicola	Irish Hills monkeyflower			1B.1
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	FE, SE		1B.1
Eriastrum ertterae	Lime Ridge eriastrum	SE		1B.1
Eriastrum rosamondense	Rosamond eriastrum			1B.1
Eriastrum brandegeeae	Brandegee's eriastrum			1B.1
Gilia capitata ssp. chamissonis	blue coast gilia			1B.1
Gilia capitata ssp. tomentosa	woolly-headed gilia			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Gilia tenuiflora ssp. hoffmannii	Hoffmann's slender-flowered gilia	FE		1B.1
Linanthus maculatus ssp. emaculatus	Jacumba Mountains linanthus			1B.1
Gilia yorkii	Monarch gilia			1B.1
Leptosiphon croceus	coast yellow leptosiphon	SE		1B.1
Leptosiphon rosaceus	rose leptosiphon			1B.1
Navarretia fossalis	spreading navarretia	FT		1B.1
Navarretia leucocephala ssp. bakeri	Baker's navarretia			1B.1
Navarretia leucocephala ssp. pauciflora	few-flowered navarretia	FE, ST		1B.1
Navarretia setiloba	Piute Mountains navarretia			1B.1
Navarretia myersii ssp. myersii	pincushion navarretia			1B.1
Navarretia myersii ssp. deminuta	small pincushion navarretia			1B.1
Navarretia gowenii	Lime Ridge navarretia			1B.1
Navarretia ojaiensis	Ojai navarretia			1B.1
Claytonia peirsonii ssp. bernardinus	San Bernardino spring beauty			1B.1
Claytonia peirsonii ssp. californacis	Furnace spring beauty			1B.1
Claytonia peirsonii ssp. yorkii	York's spring beauty			1B.1
Claytonia panamintensis	Panamint spring beauty			1B.1
Lewisia serrata	saw-toothed lewisia			1B.1
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws			1B.1
Calyptridium pulchellum	Mariposa pussypaws	FT		1B.1
Delphinium bakeri	Baker's larkspur	FE SE		1B.1
Delphinium luteum	golden larkspur	FE, Rare		1B.1
Delphinium variegatum ssp. thornei	Thorne's royal larkspur			1B.1
Delphinium variegatum ssp. kinkiense	San Clemente Island larkspur	SE		1B.1
Ceanothus foliosus var. vineatus	Vine Hill ceanothus			1B.1
Ceanothus roderickii	Pine Hill ceanothus	FE, Rare		1B.1
Ceanothus ophiochilus	Vail Lake ceanothus	FT, SE		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Ceanothus ferrisiae	Coyote ceanothus	FE		1B.1
Ceanothus confusus	Rincon Ridge ceanothus			1B.1
Ceanothus thyrsiflorus var. obispoensis	San Luis Obispo ceanothus			1B.1
Cercocarpus traskiae	Catalina Island mountain-mahogany	FE, SE		1B.1
Horkelia cuneata var. sericea	Kellogg's horkelia			1B.1
Horkelia cuneata var. puberula	mesa horkelia			1B.1
Horkelia daucifolia var. indicta	Jepson's horkelia			1B.1
Horkelia hendersonii	Henderson's horkelia			1B.1
Horkelia wilderae	Barton Flats horkelia			1B.1
Ivesia aperta var. canina	Dog Valley ivesia			1B.1
Ivesia webberi	Webber's ivesia	FT		1B.1
Potentilla multijuga	Ballona cinquefoil			1A
Potentilla hickmanii	Hickman's cinquefoil	FE, SE		1B.1
Potentilla uliginosa	Cunningham Marsh cinquefoil			1A
Rosa woodsii var. glabrata	Cushenbury rose			1B.1
Drymocallis cuneifolia var. cuneifolia	wedgeleaf woodbeauty			1B.1
Bensoniella oregona	bensoniella	Rare		1B.1
Lithophragma maximum	San Clemente Island woodland star	FE, SE		1B.1
Castilleja leschkeana	Point Reyes paintbrush			1A
Castilleja mollis	soft-leaved paintbrush	FE		1B.1
Castilleja uliginosa	Pitkin Marsh paintbrush	SE		1A
Castilleja ambigua var. insalutata	pink Johnny-nip			1B.1
Castilleja ambigua var. meadii	Mead's owls-clover			1B.1
Castilleja ambigua var. heckardii	Heckard's owl's-clover			1B.1
Chloropyron molle ssp. hispidum	hispid salty bird's-beak			1B.1
Cordylanthus nidularius	Mt. Diablo bird's-beak	Rare		1B.1
Chloropyron palmatum	palmate-bracted bird's-beak	FE, SE		1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Cordylanthus rigidus ssp. littoralis	seaside bird's-beak	SE		1B.1
Diplacus traskiae	Santa Catalina Island monkeyflower			1A
Erythranthe shevockii	Kelso Creek monkeyflower			1B.1
Diplacus vandenbergensis	Vandenberg monkeyflower	FE		1B.1
Orthocarpus pachystachyus	Shasta orthocarpus			1B.1
Pedicularis rigginsiae	Arroyo de la Cruz lousewort			1B.1
Penstemon albomarginatus	white-margined beardtongue			1B.1
Penstemon bicolor ssp. roseus	rosy two-toned beardtongue			1B.1
Diplacus brandegeei	Santa Cruz Island monkeyflower			1A
Lycium verrucosum	San Nicolas Island desert-thorn			1A
Solanum wallacei	Wallace's nightshade			1B.1
Fremontodendron mexicanum	Mexican flannelbush	FE, Rare		1B.1
Verbena californica	Red Hills vervain	FT, ST		1B.1
Hesperocyparis stephensonii	Cuyamaca cypress			1B.1
Hesperocyparis forbesii	Tecate cypress			1B.1
Pinus radiata	Monterey pine			1B.1
Nolina interrata	Dehesa nolina	SE		1B.1
Rhynchospora californica	California beaked-rush			1B.1
Sisyrinchium hitchcockii	Hitchcock's blue-eyed grass			1B.1
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush			1B.1
Juncus digitatus	finger rush			1B.1
Allium munzii	Munz's onion	FE, ST		1B.1
Brodiaea filifolia	thread-leaved brodiaea	FT, SE		1B.1
Brodiaea orcuttii	Orcutt's brodiaea			1B.1
Brodiaea pallida	Chinese Camp brodiaea	FT, SE		1B.1
Brodiaea matsonii	Sulphur Creek brodiaea			1B.1
Calochortus excavatus	Inyo County star-tulip			1B.1
Calochortus monanthus	single-flowered mariposa-lily			1A

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Calochortus tiburonensis	Tiburon mariposa-lily	FT, ST		1B.1
Calochortus syntrophus	Callahan's mariposa-lily			1B.1
Hooveria purpurea var. purpurea	Santa Lucia purple amole	FT		1B.1
Hooveria purpurea var. reducta	Camatta Canyon amole	FT, Rare		1B.1
Fritillaria gentneri	Gentner's fritillary	FE		1B.1
Fritillaria striata	striped adobe-lily	ST		1B.1
Fritillaria roderickii	Roderick's fritillary	SE		1B.1
Fritillaria biflora var. ineziana	Hillsborough chocolate lily			1B.1
Fritillaria lanceolata var. tristulis	Marin checker lily			1B.1
Lilium maritimum	coast lily			1B.1
Lilium occidentale	western lily	FE, SE		1B.1
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	FE, SE		1B.1
Bloomeria clevelandii	San Diego goldenstar			1B.1
Triteleia piutensis	Piute Mountains triteleia			1B.1
Piperia elegans ssp. decurtata	Point Reyes rein orchid			1B.1
Piperia yadonii	Yadon's rein orchid	FE		1B.1
Agrostis lacuna-vernalis	vernal pool bent grass			1B.1
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	FE		1B.1
Neostapfia colusana	Colusa grass	FT, SE		1B.1
Orcuttia californica	California Orcutt grass	FE, SE		1B.1
Orcuttia pilosa	hairy Orcutt grass	FE, SE		1B.1
Orcuttia tenuis	slender Orcutt grass	FT, SE		1B.1
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	FT, SE		1B.1
Orcuttia viscida	Sacramento Orcutt grass	FE, SE		1B.1
Pleuropogon hooverianus	North Coast semaphore grass	ST		1B.1
Poa napensis	Napa blue grass	FE, SE		1B.1
Puccinellia parishii	Parish's alkali grass			1B.1
Puccinellia howellii	Howell's alkali grass			1B.1
Sphenopholis interrupta ssp. californica	prairie false oat			1B.1

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Tuctoria greenei	Greene's tuctoria	FE, Rare		1B.1
Tuctoria mucronata	Crampton's tuctoria or Solano grass	FE, SE		1B.1
Isoetes minima	Columbia quillwort			1B.1
Botrychium lineare	slender moonwort			1B.1
Cirsium fontinale var. obispoense	Chorro Creek bog thistle	FE, SE		1B.2
Enceliopsis nudicaulis var. corrugata	Ash Meadows daisy	FT		3.3
Grindelia fraxinipratensis	Ash Meadows gumplant	FT		1B.2
Packera layneae	Layne's ragwort	FT, Rare		1B.2
Monolopia congdonii	San Joaquin woollythreads	FE		1B.2
Berberis pinnata ssp. insularis	island barberry	FE, SE		1B.2
Thysanocarpus conchuliferus	Santa Cruz Island fringepod	FE		1B.2
Eremogone ursina	Big Bear Valley sandwort	FT		1B.2
Crocanthemum greenei	island rush-rose	FT		1B.2
Dudleya parva	Conejo dudleya	FT		1B.2
Dudleya cymosa ssp. marcescens	marcescent dudleya	FT, Rare		1B.2
Dudleya cymosa ssp. agourensis	Agoura Hills dudleya	FT		1B.2
Dudleya traskiae	Santa Barbara Island dudleya	FE, SE		1B.2
Arctostaphylos confertiflora	Santa Rosa Island manzanita	FE		1B.2
Arctostaphylos myrtifolia	Ione manzanita	FT		1B.2
Euphorbia hooveri	Hoover's spurge	FT		1B.2
Astragalus magdalenae var. peirsonii	Peirson's milk-vetch	FT, SE		1B.2
Astragalus tricarinatus	triple-ribbed milk-vetch	FE		1B.2
Astragalus lentiginosus var. coachellae	Coachella Valley milk-vetch	FE		1B.2
Eriodictyon capitatum	Lompoc yerba santa	FE, Rare		1B.2
Phacelia insularis var. insularis	northern Channel Islands phacelia	FE		1B.2
Eremalche parryi ssp. kernensis	Kern mallow	FE		1B.2
Clarkia springvillensis	Springville clarkia	FT, SE		1B.2

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Chorizanthe howellii	Howell's spineflower	FE, ST		1B.2
Chorizanthe pungens var. pungens	Monterey spineflower	FT		1B.2
Eriogonum kennedyi var. austromontanum	southern mountain buckwheat	FT		1B.2
Gilia tenuiflora ssp. arenaria	Monterey gilia	FE, ST		1B.2
Navarretia leucocephala ssp. plieantha	many-flowered navarretia	FE, SE		1B.2
Phlox hirsuta	Yreka phlox	FE, SE		1B.2
Galium californicum ssp. sierrae	El Dorado bedstraw	FE, Rare		1B.2
Castilleja affinis var. neglecta	Tiburon paintbrush	FE, ST		1B.2
Castilleja cinerea	ash-gray paintbrush	FT		1B.2
Castilleja campestris var. succulenta	succulent owl's-clover	FT, SE		1B.2
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	FE, SE		1B.2
Chloropyron molle ssp. molle	soft salty bird's-beak	FE, Rare		1B.2
Cordylanthus tenuis ssp. capillaris	Pennell's bird's-beak	FE, Rare		1B.2
Fremontodendron decumbens	Pine Hill flannelbush	FE, Rare		1B.2
Hesperocyparis goveniana	Gowen cypress	FT		1B.2
Hesperocyparis abramsiana var. abramsiana	Santa Cruz cypress	FT, SE		1B.2
Hesperocyparis abramsiana var. butanoensis	Butano Ridge cypress	FT, SE		1B.2
Poa atropurpurea	San Bernardino blue grass	FE		1B.2
Swallenia alexandrae	Eureka Valley dune grass	FT, Rare		1B.2
Sanicula saxatilis	rock sanicle	Rare		1B.2
Blennosperma nanum var. robustum	Point Reyes blennosperma	Rare		1B.2
Cirsium rhothophilum	surf thistle	ST		1B.2
Eriophyllum congdonii	Congdon's woolly sunflower	Rare		1B.2
Helianthus niveus ssp. tephrodes	Algodones Dunes sunflower	SE		1B.2
Deinandra arida	Red Rock tarplant	Rare		1B.2
Deinandra minthornii	Santa Susana tarplant	Rare		1B.2

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Laphamia inyoensis	Inyo rock daisy	ST		1B.2
Packera ganderi	Gander's ragwort	Rare		1B.2
Oreocarya roosiorum	bristlecone oreocarya	Rare		1B.2
Nemacladus twisselmannii var. twisselmannii	Twisselmann's nemacladus	Rare		1B.2
Silene greenei ssp. angustifolia	Red Mountain catchfly	SE		1B.2
Arctostaphylos hookeri ssp. hearstiorum	Hearsts' manzanita	SE		1B.2
Arctostaphylos bakeri ssp. sublaevis	Cedars manzanita	Rare		1B.2
Astragalus johannis-howellii	Long Valley milk-vetch	Rare		1B.2
Astragalus monoensis	Mono milk-vetch	Rare		1B.2
Astragalus traskiae	Trask's milk-vetch	Rare		1B.2
Lupinus citrinus var. deflexus	Mariposa lupine	ST		1B.2
Lupinus padrecrowleyi	Father Crowley's lupine	Rare		1B.2
Carpenteria californica	tree-anemone	ST		1B.2
Pogogyne clareana	Santa Lucia mint	SE		1B.2
Limnanthes douglasii ssp. sulphurea	Point Reyes meadowfoam	SE		1B.2
Limnanthes alba ssp. parishii	Parish's meadowfoam	SE		1B.2
Hesperolinon didymocarpum	Lake County western flax	SE		1B.2
Sidalcea hickmanii ssp. anomala	Cuesta Pass checkerbloom	Rare		1B.2
Sidalcea hickmanii ssp. parishii	Parish's checkerbloom	Rare		1B.2
Oenothera avita ssp. eurekensis	Eureka Dunes evening-primrose	Rare		1B.2
Eriogonum alpinum	Trinity buckwheat	SE		1B.2
Eriogonum crocatum	Conejo buckwheat	Rare		1B.2
Eriogonum thornei	Thorne's buckwheat	SE		1B.2
Eriogonum kelloggii	Kellogg's buckwheat	SE		1B.2
Eriogonum twisselmannii	Twisselmann's buckwheat	Rare		1B.2
Delphinium hesperium ssp. cuyamacae	Cuyamaca larkspur	Rare		1B.2
Ceanothus hearstiorum	Hearsts' ceanothus	Rare		1B.2
Ceanothus maritimus	maritime ceanothus	Rare		1B.2

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Ceanothus masonii	Mason's ceanothus	Rare		1B.2
Neviusia cliftonii	Shasta snow-wreath	ST		1B.2
Galium buxifolium	box bedstraw	Rare		1B.2
Castilleja gleasoni	Mt. Gleason paintbrush	Rare		1B.2
Gratiola heterosepala	Boggs Lake hedge-hyssop	SE		1B.2
Pedicularis dudleyi	Dudley's lousewort	Rare		1B.2
Holmgrenanthe petrophila	rock lady	Rare		1B.2
Bloomeria humilis	dwarf goldenstar	Rare		1B.2
Brodiaea insignis	Kaweah brodiaea	SE		1B.2
Calochortus dunnii	Dunn's mariposa-lily	Rare		1B.2
Calochortus persistens	Siskiyou mariposa-lily	Rare		1B.2
Panicum acuminatum var. thermale	Geysers panicum	SE		1B.2
Acmispon argophyllus var. niveus	Santa Cruz Island bird's-foot trefoil	SE		4.3
Acmispon dendroideus var. traskiae	San Clemente Island lotus	SE		1B.3
Allium yosemitense	Yosemite onion	Rare		1B.3
Brodiaea rosea	Indian Valley brodiaea	SE		3.1
Calamagrostis foliosa	leafy reed grass	Rare		4.2
Carex tompkinsii	Tompkins' sedge	Rare		4.3
Castilleja grisea	San Clemente Island paintbrush	SE		1B.3
Cirsium ciliolatum	Ashland thistle	SE		2B.1
Croton wigginsii	Wiggins' croton	Rare		2B.2
Dedeckera eurekensis	July gold	Rare		1B.3
Deinandra mohavensis	Mojave tarplant	SE		1B.3
Dieteria asteroides var. lagunensis	Mt. Laguna aster	Rare		2B.1
Eriastrum tracyi	Tracy's eriastrum	Rare		3.2
Eriogonum butterworthianum	Butterworth's buckwheat	Rare		1B.3
Eriogonum giganteum var. compactum	Santa Barbara Island buckwheat	Rare		1B.3
Galium angustifolium ssp. borregoense	Borrego bedstraw	Rare		1B.3

Scientific Name	Common Name	Legal Status	Conservation Concern	Rare Plant Rank
Galium catalinense ssp. acrispum	San Clemente Island bedstraw	SE		1B.3
Ivesia callida	Tahquitz ivesia	Rare		1B.3
Lewisia congdonii	Congdon's lewisia	Rare		1B.3
Ornithostaphylos oppositifolia	Baja California birdbush	SE		2B.1
Rosa minutifolia	small-leaved rose	SE		2B.1
Thermopsis macrophylla	Santa Ynez false lupine	Rare		1B.3
Arctostaphylos rudis	sand mesa manzanita			1B.1
Dudleya chasmophyta	Santiago Canyon dudleya			1B.1
Eisenia arborea	southern sea palm		E	
Macrocystis pyrifera	giant kelp		E	
Nereocystis luetkeana	bull kelp		E	
Phyllospadix spp.	surfgrass		NT	
Postelsia palmaeformis	sea palm		NT	
Zostera spp.	eelgrass		NT	
Carex albida	white sedge	FE, SE		
Yucca brevifolia	western Joshua tree	SCL		
Pinus albicaulis	whitebark pine	FT		

Table C-7 Species Habitat Associations by Macrogroup

Species-habitat associations are derived from the California Wildlife Habitat Relationships program (CWHR; See Chapter 3), which rates habitat suitability as high, moderate, low, or none for three life requisites per species: reproduction, cover, and feeding. Species with high habitat suitability in any life requisite are included here. Note that terrestrial vertebrate SGCN, or with one or more SGCN subspecies, are included here. Habitat associations apply at the species level, but may not apply to every subspecies. See https://wildlife.ca.gov/Data/CWHR to access CWHR and create a query using the most recent information and for a full suite of available information. CWHR habitat types were crosswalked to macrogroups based on information provided in Table D-23.

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
California Forest and Woodland	Amphibians	California red-legged frog (*Rana draytonii*) California tiger salamander (*Ambystoma californiense*) Coast Range newt (*Taricha torosa*) lesser slender salamander (*Batrachoseps minor*) northern red-legged frog (*Rana aurora*) red-bellied newt (*Taricha rivularis*) relictual slender salamander (*Batrachoseps relictus*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Cruz black salamander (*Aneides niger*) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) Santa Lucia slender salamander (*Batrachoseps luciae*) Shasta salamander (*Hydromantes shastae*)
	Birds	Allen's Hummingbird (*Selasphorus sasin*) Bewick's wren (*Thryomanes bewickii*) Black-throated Gray Warbler (*Setophaga nigrescens*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) California towhee (*Melozone crissalis*) Calliope Hummingbird (*Selasphorus calliope*) flammulated owl (*Psiloscops flammeolus*) golden eagle (*Aquila chrysaetos*) gray vireo (*Vireo vicinior*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) Hermit Warbler (*Setophaga occidentalis*) Island scrub-jay (*Aphelocoma insularis*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*) loggerhead shrike (*Lanius ludovicianus*) long-eared owl (*Asio otus*) Nuttall's Woodpecker (*Dryobates nuttallii*) Oak Titmouse (*Baeolophus inornatus*) peregrine falcon (*Falco peregrinus*) Pinyon Jay (*Gymnorhinus cyanocephalus*) purple martin (*Progne subis*) rufous hummingbird (*Selasphorus rufus*) savannah sparrow (*Passerculus sandwichensis*) spotted owl (*Strix occidentalis*) spotted towhee (*Pipilo maculatus*) Swainson's hawk (*Buteo swainsoni*) White-breasted Nuthatch (*Sitta carolinensis*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*) yellow warbler (*Setophaga petechia*) yellow-billed magpie (*Pica nuttalli*)
	Mammals	American badger (Taxidea taxus) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) dusky-footed woodrat (*Neotoma fuscipes*) fringed myotis (*Myotis thysanodes*) golden-mantled ground squirrel (*Callospermophilus lateralis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
California Forest and Woodland	Mammals	hoary bat (*Lasiurus cinereus*) long-eared myotis (*Myotis evotis*) long-legged myotis (*Myotis volans*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) pallid bat (*Antrozous pallidus*) ringtail (*Bassariscus astutus*) San Diego pocket mouse (*Chaetodipus fallax*) San Joaquin pocket mouse (*Perognathus inornatus*) western spotted skunk (Spilogale gracilis) western yellow bat (*Lasiurus xanthinus*)
	Reptiles	northwestern pond turtle (*Actinemys marmorata*) ring-necked snake (*Diadophis punctatus*) southwestern pond turtle (*Actinemys pallida*) two-striped gartersnake (*Thamnophis hammondii*)
Californian-Vancouverian Montane and Foothill Forest	Amphibians	California giant salamander (*Dicamptodon ensatus*) lesser slender salamander (*Batrachoseps minor*) Pacific tailed frog (*Ascaphus truei*) red-bellied newt (*Taricha rivularis*) relictual slender salamander (*Batrachoseps relictus*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Cruz black salamander (*Aneides niger*) Santa Lucia slender salamander (*Batrachoseps luciae*) Scott Bar salamander (*Plethodon asupak*) Siskiyou Mountains salamander (*Plethodon stormi*) southern long-toed salamander (*Ambystoma macrodactylum sigillatum*) southern torrent salamander (*Rhyacotriton variegatus*)
	Birds	bald eagle (*Haliaeetus leucocephalus*) black swift (*Cypseloides niger*) Black-throated Gray Warbler (*Setophaga nigrescens*) California condor (*Gymnogyps californianus*) Calliope Hummingbird (*Selasphorus calliope*) Cassin's Finch (*Haemorhous cassinii*) Evening Grosbeak (*Coccothraustes vespertinus*) flammulated owl (*Psiloscops flammeolus*) golden eagle (*Aquila chrysaetos*) great blue heron (*Ardea herodias*) great gray owl (*Strix nebulosa*) Hermit Warbler (*Setophaga occidentalis*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*) marbled murrelet (*Brachyramphus marmoratus*) Nuttall's Woodpecker (*Dryobates nuttallii*) Oak Titmouse (*Baeolophus inornatus*) olive-sided flycatcher (*Contopus cooperi*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) rufous hummingbird (*Selasphorus rufus*) sooty grouse (*Dendragapus fuliginosus*) spotted owl (*Strix occidentalis*) Vaux's swift (*Chaetura vauxi*) White-breasted Nuthatch (*Sitta carolinensis*) White-headed Woodpecker (*Dryobates albolarvatus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Californian-Vancouverian Montane and Foothill Forest	Birds	Wrentit (*Chamaea fasciata*) yellow warbler (*Setophaga petechia*)
	Mammals	American badger (*Taxidea taxus*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) common porcupine (*Erethizon dorsatum*) deer mouse (*Peromyscus maniculatus*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Cervus canadensis*) Fisher (*Pekania pennanti*) golden-mantled ground squirrel (*Callospermophilus lateralis*) hoary bat (*Lasiurus cinereus*) long-eared myotis (*Myotis evotis*) long-legged myotis (*Myotis volans*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) ornate shrew (*Sorex ornatus*) Pacific jumping mouse (*Zapus trinotatus*) Pacific marten (*Martes caurina*) ringtail (*Bassariscus astutus*) silver-haired bat (*Lasionycteris noctivagans*) snowshoe hare (*Lepus americanus*) Sonoma tree vole (*Arborimus pomo*) western spotted skunk (*Spilogale gracilis*)
Rocky Mountain Subalpine and High Montane Conifer Forest	Amphibians	Pacific tailed frog (*Ascaphus truei*)
	Birds	black swift (*Cypseloides niger*) Calliope Hummingbird (*Selasphorus calliope*) Cassin's Finch (*Haemorhous cassinii*) golden eagle (*Aquila chrysaetos*) great gray owl (*Strix nebulosa*) olive-sided flycatcher (*Contopus cooperi*) peregrine falcon (*Falco peregrinus*) rufous hummingbird (*Selasphorus rufus*) sooty grouse (*Dendragapus fuliginosus*) White-breasted Nuthatch (*Sitta carolinensis*)
	Mammals	American badger (*Taxidea taxus*) American beaver (*Castor canadensis*) broad-footed mole (*Scapanus latimanus*) common porcupine (*Erethizon dorsatum*) deer mouse (*Peromyscus maniculatus*) elk (*Cervus canadensis*) Fisher (*Pekania pennanti*) golden-mantled ground squirrel (*Callospermophilus lateralis*) hoary bat (*Lasiurus cinereus*) lodgepole chipmunk (*Neotamias speciosus speciosus*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) Pacific marten (*Martes caurina*) ringtail (*Bassariscus astutus*) silver-haired bat (*Lasionycteris noctivagans*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Rocky Mountain Subalpine and High Montane Conifer Forest	Mammals	vagrant shrew (*Sorex vagrans*) western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*) wolverine (*Gulo gulo*)
Vancouverian Rainforest	Amphibians	California giant salamander (*Dicamptodon ensatus*) lesser slender salamander (*Batrachoseps minor*) Pacific tailed frog (*Ascaphus truei*) red-bellied newt (*Taricha rivularis*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Cruz black salamander (*Aneides niger*) Santa Lucia slender salamander (*Batrachoseps luciae*) southern torrent salamander (*Rhyacotriton variegatus*)
	Birds	golden eagle (*Aquila chrysaetos*) Hermit Warbler (*Setophaga occidentalis*) marbled murrelet (*Brachyramphus marmoratus*) olive-sided flycatcher (*Contopus cooperi*) osprey (*Pandion haliaetus*) rufous hummingbird (*Selasphorus rufus*) spotted owl (*Strix occidentalis*) Vaux's swift (*Chaetura vauxi*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*)
	Mammals	brush rabbit (*Sylvilagus bachmani*) deer mouse (*Peromyscus maniculatus*) elk (*Cervus canadensis*) Fisher (*Pekania pennanti*) long-tailed weasel (*Mustela frenata*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) Pacific jumping mouse (*Zapus trinotatus*) western spotted skunk (*Spilogale gracilis*)
Vancouverian Subalpine Forest	Amphibians	Pacific tailed frog (*Ascaphus truei*)
	Birds	black swift (*Cypseloides niger*) California condor (*Gymnogyps californianus*) Cassin's Finch (*Haemorhous cassinii*) golden eagle (*Aquila chrysaetos*) great gray owl (*Strix nebulosa*) Hermit Warbler (*Setophaga occidentalis*) olive-sided flycatcher (*Contopus cooperi*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) rufous hummingbird (*Selasphorus rufus*) sooty grouse (*Dendragapus fuliginosus*) spotted owl (*Strix occidentalis*) White-headed Woodpecker (*Dryobates albolarvatus*)
	Mammals	common porcupine (*Erethizon dorsatum*) deer mouse (*Peromyscus maniculatus*) Fisher (*Pekania pennanti*) golden-mantled ground squirrel (*Callospermophilus lateralis*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) Pacific marten (*Martes caurina*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Vancouverian Subalpine Forest	Mammals	silver-haired bat (*Lasionycteris noctivagans*) wolverine (*Gulo gulo*)
Intermountain Basins Pinyon-Juniper Woodland	Birds	Bewick's wren (*Thryomanes bewickii*) Black-chinned Sparrow (*Spizella atrogularis*) burrowing owl (*Athene cunicularia*) golden eagle (*Aquila chrysaetos*) gray vireo (*Vireo vicinior*) Lewis' woodpecker (*Melanerpes lewis*) loggerhead shrike (*Lanius ludovicianus*) peregrine falcon (*Falco peregrinus*) Pinyon Jay (*Gymnorhinus cyanocephalus*) rufous hummingbird (*Selasphorus rufus*) Scott's Oriole (*Icterus parisorum*) Swainson's hawk (*Buteo swainsoni*) White-breasted Nuthatch (*Sitta carolinensis*)
	Mammals	American badger (*Taxidea taxus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) fringed myotis (*Myotis thysanodes*) long-eared myotis (*Myotis evotis*) long-legged myotis (*Myotis volans*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) San Diego pocket mouse (*Chaetodipus fallax*) western spotted skunk (*Spilogale gracilis*)
Vancouverian Flooded and Swamp Forest (formerly Western Cordilleran Montane-Boreal Riparian Scrub and Forest)	Amphibians	California giant salamander (*Dicamptodon ensatus*) lesser slender salamander (*Batrachoseps minor*) Pacific tailed frog (*Ascaphus truei*) red-bellied newt (*Taricha rivularis*) relictual slender salamander (*Batrachoseps relictus*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Lucia slender salamander (*Batrachoseps luciae*) Sierra Nevada yellow-legged frog (*Rana sierrae*) southern mountain yellow-legged frog (*Rana muscosa*) southern torrent salamander (*Rhyacotriton variegatus*)
	Birds	American Dipper (*Cinclus mexicanus*) bank swallow (*Riparia riparia*) Bewick's wren (*Thryomanes bewickii*) black swift (*Cypseloides niger*) black-capped chickadee (*Poecile atricapillus*) Broad-tailed Hummingbird (*Selasphorus platycercus*) Calliope Hummingbird (*Selasphorus calliope*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) great blue heron (*Ardea herodias*) Lewis' woodpecker (*Melanerpes lewis*) long-eared owl (*Asio otus*) Nuttall's Woodpecker (*Dryobates nuttallii*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) rufous hummingbird (*Selasphorus rufus*) song sparrow (*Melospiza melodia*) spotted owl (*Strix occidentalis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Vancouverian Flooded and Swamp Forest (formerly Western Cordilleran Montane-Boreal Riparian Scrub and Forest)	Birds	White-breasted Nuthatch (*Sitta carolinensis*) willow flycatcher (*Empidonax traillii*) yellow warbler (*Setophaga petechia*)
	Mammals	American beaver (*Castor canadensis*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California vole (*Microtus californicus*) deer mouse (*Peromyscus maniculatus*) elk (*Cervus canadensis*) Fisher (*Pekania pennanti*) hoary bat (*Lasiurus cinereus*) long-eared myotis (*Myotis evotis*) long-legged myotis (*Myotis volans*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) Mount Lyell shrew (*Sorex lyelli*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) ornate shrew (*Sorex ornatus*) Pacific marten (*Martes caurina*) ringtail (*Bassariscus astutus*) silver-haired bat (*Lasionycteris noctivagans*) snowshoe hare (*Lepus americanus*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*) white-footed vole (*Arborimus albipes*)
	Reptiles	ring-necked snake (*Diadophis punctatus*) two-striped gartersnake (*Thamnophis hammondii*)
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow (formerly Western Cordilleran Montane-Boreal Wet Meadow)	Amphibians	California giant salamander (*Dicamptodon ensatus*) Cascades frog (*Rana cascadae*) Coast Range newt (*Taricha torosa*) lesser slender salamander (*Batrachoseps minor*) Pacific tailed frog (*Ascaphus truei*) red-bellied newt (*Taricha rivularis*) relictual slender salamander (*Batrachoseps relictus*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Cruz black salamander (*Aneides niger*) Santa Lucia slender salamander (*Batrachoseps luciae*) Sierra Nevada yellow-legged frog (*Rana sierrae*) southern mountain yellow-legged frog (*Rana muscosa*) southern torrent salamander (*Rhyacotriton variegatus*)
	Birds	American Dipper (*Cinclus mexicanus*) bank swallow (*Riparia* riparia) Bewick's wren (Thryomanes *bewickii*) black swift (*Cypseloides niger*) black-capped chickadee (*Poecile atricapillus*) Broad-tailed Hummingbird (*Selasphorus platycercus*) California gull (*Larus californicus*) California quail (*Callipepla californica*) Calliope Hummingbird (*Selasphorus calliope*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow (formerly Western Cordilleran Montane-Boreal Wet Meadow)	Birds	Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) great blue heron (*Ardea herodias*) great gray owl (*Strix nebulosa*) greater sage-grouse (*Centrocercus urophasianus*) greater white-fronted goose (*Anser albifrons*) Lesser Yellowlegs (*Tringa flavipes*) Lewis' woodpecker (*Melanerpes lewis*) long-eared owl (*Asio otus*) northern harrier (*Circus hudsonius*) Nuttall's Woodpecker (*Dryobates nuttallii*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) red-winged blackbird (*Agelaius phoeniceus*) rufous hummingbird (*Selasphorus rufus*) sandhill crane (*Antigone canadensis*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) spotted owl (*Strix occidentalis*) White-breasted Nuthatch (*Sitta carolinensis*) white-tailed kite (*Elanus leucurus*) Willet (*Tringa semipalmata*) willow flycatcher (*Empidonax traillii*) yellow warbler (*Setophaga petechia*) yellow-billed magpie (*Pica nuttalli*) yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
	Mammals	American beaver (*Castor canadensis*) American pika (*Ochotona princeps*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California vole (*Microtus californicus*) common porcupine (*Erethizon dorsatum*) deer mouse (*Peromyscus maniculatus*) elk (*Cervus canadensis*) Fisher (*Pekania pennanti*) Heermann's kangaroo rat (*Dipodomys heermanni heermanni*) hoary bat (*Lasiurus cinereus*) long-eared myotis (*Myotis evotis*) long-legged myotis (*Myotis volans*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela* frenata) Mount Lyell shrew (Sorex *lyelli*) mountain beaver (*Aplodontia rufa*) mountain lion (*Puma concolor*) ornate shrew (*Sorex ornatus*) Pacific jumping mouse (*Zapus trinotatus*) Pacific marten (*Martes caurina*) red fox (*Vulpes vulpes*) ringtail (*Bassariscus astutus*) silver-haired bat (*Lasionycteris noctivagans*) snowshoe hare (*Lepus americanus*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow (formerly Western Cordilleran Montane-Boreal Wet Meadow)	Mammals	western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*) white-footed vole (*Arborimus albipes*)
	Reptiles	common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis gigas*) ring-necked snake (*Diadophis punctatus*) two-striped gartersnake (*Thamnophis hammondii*)
Warm Southwest Riparian Forest	Amphibians	California giant salamander (*Dicamptodon ensatus*) foothill yellow-legged frog (*Rana boylii*) lesser slender salamander (*Batrachoseps minor*) red-bellied newt (*Taricha rivularis*) relictual slender salamander (*Batrachoseps relictus*) San Simeon slender salamander (*Batrachoseps incognitus*) Santa Cruz black salamander (*Aneides niger*) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) Santa Lucia slender salamander (*Batrachoseps luciae*)
	Birds	Allen's Hummingbird (*Selasphorus sasin*) bank swallow (*Riparia riparia*) Bell's vireo (*Vireo bellii*) Bewick's wren (*Thryomanes bewickii*) Black-throated Gray Warbler (*Setophaga nigrescens*) California quail (*Callipepla californica*) California towhee (*Melozone crissalis*) common yellowthroat (*Geothlypis trichas*) Costa's hummingbird (*Calypte costae*) gilded flicker (*Colaptes chrysoides*) golden eagle (*Aquila chrysaetos*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) Hermit Warbler (*Setophaga occidentalis*) Island scrub-jay (*Aphelocoma insularis*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*) long-eared owl (*Asio otus*) Nuttall's Woodpecker (*Dryobates nuttallii*) Oak Titmouse (*Baeolophus inornatus*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) song sparrow (*Melospiza melodia*) spotted towhee (*Pipilo maculatus*) summer tanager (*Piranga rubra*) Swainson's hawk (*Buteo swainsoni*) tricolored blackbird (*Agelaius tricolor*) White-breasted Nuthatch (*Sitta carolinensis*) willow flycatcher (*Empidonax traillii*) yellow warbler (*Setophaga petechia*) yellow-billed cuckoo (*Coccyzus americanus*) yellow-billed magpie (*Pica nuttalli*) yellow-breasted chat (*Icteria virens*)
	Mammals	American badger (*Taxidea taxus*) American beaver (*Castor canadensis*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) deer mouse (*Peromyscus* maniculatus)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Warm Southwest Riparian Forest	Mammals	elk (*Cervus canadensis*) fringed myotis (*Myotis thysanodes*) hoary bat (*Lasiurus cinereus*) long-eared myotis (*Myotis evotis*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) North American river otter (*Lontra canadensis*) ornate shrew (*Sorex ornatus*) Pacific jumping mouse (*Zapus trinotatus*) ringtail (*Bassariscus astutus*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*) western small-footed myotis (*Myotis ciliolabrum*) western spotted skunk (*Spilogale gracilis*) western yellow bat (*Lasiurus xanthinus*)
	Reptiles	common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis gigas*) northwestern pond turtle (*Actinemys marmorata*) ring-necked snake (*Diadophis punctatus*) two-striped gartersnake (*Thamnophis hammondii*)
California Chaparral	Amphibians	Coast Range newt (*Taricha torosa*)
	Birds	Bell's sparrow (*Artemisiospiza belli*) Bewick's wren (*Thryomanes bewickii*) Black-chinned Sparrow (*Spizella atrogularis*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) California Thrasher (*Toxostoma redivivum*) California towhee (*Melozone crissalis*) golden eagle (*Aquila chrysaetos*) gray vireo (*Vireo vicinior*) Island scrub-jay (*Aphelocoma insularis*) long-eared owl (*Asio otus*) rufous-crowned sparrow (*Aimophila ruficeps*) spotted towhee (*Pipilo maculatus*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) California kangaroo rat (*Dipodomys californicus*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Cervus canadensis*) golden-mantled ground squirrel (*Callospermophilus lateralis*) Heermann's kangaroo rat (*Dipodomys heermanni heermanni*) island fox (*Urocyon littoralis*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) ringtail (*Bassariscus astutus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
California Chaparral	Mammals	western spotted skunk (*Spilogale gracilis*)
	Reptiles	coast horned lizard (*Phrynosoma blainvillii*) common gartersnake (*Thamnophis sirtalis*) island night lizard (*Xantusia riversiana*) red-diamond rattlesnake (*Crotalus ruber*) ring-necked snake (*Diadophis* punctatus) sandstone night lizard (*Xantusia gracilis*)
California Coastal Scrub	Amphibians	California red-legged frog (*Rana draytonii*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*)
	Birds	Allen's Hummingbird (*Selasphorus sasin*) bank swallow (*Riparia riparia*) Bell's sparrow (*Artemisiospiza belli*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gnatcatcher (*Polioptila californica*) California quail (*Callipepla californica*) California Thrasher (*Toxostoma redivivum*) California towhee (*Melozone crissalis*) golden eagle (*Aquila chrysaetos*) Island scrub-jay (*Aphelocoma insularis*) peregrine falcon (*Falco peregrinus*) rhinoceros auklet (*Cerorhinca* monocerata) rufous hummingbird (*Selasphorus rufus*) rufous-crowned sparrow (*Aimophila ruficeps*) savannah sparrow (*Passerculus sandwichensis*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Cervus canadensis*) island fox (*Urocyon littoralis*) little pocket mouse (*Perognathus longimembris*) long-tailed weasel (Mustela *frenata*) mountain lion (*Puma concolor*) ringtail (*Bassariscus astutus*) San Diego pocket mouse (*Chaetodipus fallax*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	coast horned lizard (*Phrynosoma blainvillii*) island night lizard (*Xantusia riversiana*) orange-throated whiptail (*Aspidoscelis hyperythra*) western patch-nosed snake (*Salvadora hexalepis*)
California Annual and Perennial Grassland	Amphibians	California tiger salamander (*Ambystoma californiense*) western spadefoot (*Spea hammondii*)
	Birds	bank swallow (*Riparia riparia*) brant (*Branta bernicla*) brown pelican (*Pelecanus occidentalis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
California Annual and Perennial Grassland	Birds	burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) grasshopper sparrow (*Ammodramus savannarum*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*) loggerhead shrike (*Lanius ludovicianus*) long-eared owl (*Asio otus*) mountain plover (*Charadrius montanus*) northern harrier (*Circus hudsonius*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) red-winged blackbird (*Agelaius phoeniceus*) rufous-crowned sparrow (*Aimophila ruficeps*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) Swainson's hawk (*Buteo swainsoni*) tricolored blackbird (*Agelaius tricolor*) tufted puffin (*Fratercula cirrhata*) vesper sparrow (*Pooecetes gramineus*) white-tailed kite (*Elanus leucurus*) yellow-billed magpie (*Pica nuttalli*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) Arizona cotton rat (*Sigmodon arizonae*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California kangaroo rat (*Dipodomys californicus*) California pocket mouse (*Chaetodipus californicus*) California vole (*Microtus californicus*) elk (*Cervus canadensis*) Fresno kangaroo rat (*Dipodomys nitratoides exilis*) giant kangaroo rat (*Dipodomys ingens*) hispid cotton rat (*Sigmodon hispidus*) kit fox (*Vulpes macrotis*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela* frenata) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) Nelson's (=San Joaquin) antelope squirrel (*Ammospermophilus nelsoni*) pallid bat (*Antrozous pallidus*) pronghorn (*Antilocapra americana*) San Diego pocket mouse (*Chaetodipus fallax*) San Joaquin pocket mouse (*Perognathus inornatus*) San Joaquin Valley Kangaroo Rat (*Dipodomys nitratoides*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) common gartersnake (*Thamnophis sirtalis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Temperate Grassland and Meadow	Amphibians	California tiger salamander (*Ambystoma californiense*) western spadefoot (*Spea hammondii*)
	Birds	bank swallow (*Riparia riparia*) brant (*Branta bernicla*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) grasshopper sparrow (*Ammodramus savannarum*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*) loggerhead shrike (*Lanius ludovicianus*) long-eared owl (*Asio otus*) mountain plover (*Charadrius montanus*) northern harrier (*Circus hudsonius*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) red-winged blackbird (*Agelaius phoeniceus*) rufous-crowned sparrow (*Aimophila ruficeps*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) Swainson's hawk (*Buteo swainsoni*) tricolored blackbird (*Agelaius tricolor*) tufted puffin (*Fratercula cirrhata*) vesper sparrow (*Pooecetes gramineus*) white-tailed kite (*Elanus leucurus*) yellow-billed magpie (*Pica nuttalli*) Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California kangaroo rat (*Dipodomys californicus*)
	Mammals	California pocket mouse (*Chaetodipus californicus*) California vole (*Microtus californicus*) elk (*Cervus canadensis*) Fresno kangaroo rat (*Dipodomys nitratoides exilis*) giant kangaroo rat (*Dipodomys ingens*) kit fox (*Vulpes macrotis*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) Nelson's (=San Joaquin) antelope squirrel (*Ammospermophilus nelsoni*) pallid bat (*Antrozous pallidus*) pronghorn (*Antilocapra americana*) San Diego pocket mouse (*Chaetodipus fallax*) San Joaquin pocket mouse (*Perognathus inornatus*) San Joaquin Valley Kangaroo Rat (*Dipodomys nitratoides*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Temperate Grassland and Meadow	Mammals	western mastiff bat (*Eumops perotis californicus*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) common gartersnake (*Thamnophis sirtalis*)
Western Cordilleran Montane Shrubland and Grassland	Birds	Bell's sparrow (*Artemisiospiza belli*) Bewick's wren (*Thryomanes bewickii*) black swift (*Cypseloides niger*) Black-chinned Sparrow (*Spizella atrogularis*) Broad-tailed Hummingbird (*Selasphorus platycercus*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) Calliope Hummingbird (*Selasphorus calliope*) golden eagle (*Aquila chrysaetos*) long-eared owl (*Asio otus*) peregrine falcon (*Falco peregrinus*) spotted towhee (*Pipilo maculatus*) Virginia's warbler (*Leiothlypis virginiae*) yellow warbler (*Setophaga petechia*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) dusky-footed woodrat (*Neotoma fuscipes*) golden-mantled ground squirrel (*Callospermophilus lateralis*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) ringtail (*Bassariscus astutus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	ring-necked snake (*Diadophis punctatus*)
Vancouverian Lowland Grassland and Shrubland	Amphibians	California red-legged frog (*Rana draytonii*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*)
	Birds	Allen's Hummingbird (*Selasphorus sasin*) bank swallow (*Riparia riparia*) Bell's sparrow (*Artemisiospiza belli*) brant (*Branta bernicla*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gnatcatcher (*Polioptila californica*) California quail (*Callipepla californica*) California Thrasher (*Toxostoma redivivum*) California towhee (*Melozone crissalis*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) grasshopper sparrow (*Ammodramus savannarum*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) Island scrub-jay (*Aphelocoma insularis*) Lawrence's goldfinch (*Spinus lawrencei*) Lewis' woodpecker (*Melanerpes lewis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Vancouverian Lowland Grassland and Shrubland	Birds	loggerhead shrike (*Lanius ludovicianus*) long-eared owl (*Asio otus*) mountain plover (*Charadrius montanus*) northern harrier (*Circus hudsonius*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) red-winged blackbird (*Agelaius phoeniceus*) rhinoceros auklet (*Cerorhinca monocerata*) rufous hummingbird (*Selasphorus rufus*) rufous-crowned sparrow (*Aimophila ruficeps*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) tufted puffin (*Fratercula* cirrhata) vesper sparrow (*Pooecetes gramineus*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*) yellow-billed magpie (*Pica nuttalli*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) big-eared woodrat (*Neotoma macrotis*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California pocket mouse (*Chaetodipus californicus*) California vole (*Microtus californicus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Antigone canadensis*) island fox (*Urocyon littoralis*) kit fox (*Vulpes macrotis*) little pocket mouse (*Perognathus longimembris*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) Nelson's (=San Joaquin) antelope squirrel (*Ammospermophilus nelsoni*) ringtail (*Bassariscus astutus*) San Diego pocket mouse (*Chaetodipus fallax*) San Joaquin pocket mouse (*Perognathus inornatus*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	coast horned lizard (*Phrynosoma blainvillii*) island night lizard (*Xantusia riversiana*) orange-throated whiptail (*Aspidoscelis hyperythra*) western patch-nosed snake (*Salvadora hexalepis*)
Warm Interior Chaparral	Amphibians	Coast Range newt (*Taricha torosa*)
	Birds	Bell's sparrow (*Artemisiospiza belli*) Bewick's wren (*Thryomanes bewickii*) Black-chinned Sparrow (*Spizella atrogularis*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) California Thrasher (*Toxostoma redivivum*) California towhee (*Melozone crissalis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Warm Interior Chaparral	Birds	golden eagle (*Aquila chrysaetos*) gray vireo (*Vireo vicinior*) Island scrub-jay (*Aphelocoma insularis*) long-eared owl (*Asio otus*) rufous-crowned sparrow (*Aimophila ruficeps*) spotted towhee (*Pipilo maculatus*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) big-eared woodrat (Neotoma *macrotis*) brush rabbit (*Sylvilagus bachmani*) California kangaroo rat (*Dipodomys californicus*) California pocket mouse (Chaetodipus *californicus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Cervus canadensis*) golden-mantled ground squirrel (*Callospermophilus lateralis*) Heermann's kangaroo rat (*Dipodomys heermanni heermanni*) island fox (*Urocyon littoralis*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) ringtail (*Bassariscus astutus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	coast horned lizard (*Phrynosoma blainvillii*) common gartersnake (*Thamnophis sirtalis*) island night lizard (*Xantusia riversiana*) red-diamond rattlesnake (*Crotalus ruber*) ring-necked snake (*Diadophis punctatus*) sandstone night lizard (*Xantusia gracilis*)
Cool Interior Chaparral (formerly Western North American Cool/Montane Sclerophyllous Evergreen Shrub)	Birds	Bell's sparrow (*Artemisiospiza belli*) Bewick's wren (*Thryomanes bewickii*) black swift (*Cypseloides niger*) Black-chinned Sparrow (*Spizella atrogularis*) Broad-tailed Hummingbird (*Selasphorus platycercus*) California condor (*Gymnogyps californianus*) California quail (*Callipepla californica*) Calliope Hummingbird (*Selasphorus calliope*) golden eagle (*Aquila chrysaetos*) long-eared owl (*Asio otus*) peregrine falcon (*Falco peregrinus*) spotted towhee (*Pipilo maculatus*) Virginia's warbler (*Leiothlypis virginiae*) yellow warbler (*Setophaga petechia*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (*Sylvilagus bachmani*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) dusky-footed woodrat (*Neotoma fuscipes*) golden-mantled ground squirrel (*Callospermophilus lateralis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Cool Interior Chaparral (formerly Western North American Cool/Montane Sclerophyllous Evergreen Shrub)	Mammals	long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) ringtail (*Bassariscus astutus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	ring-necked snake (*Diadophis punctatus*)
Vancouverian Coastal Dune and Bluff	Amphibians	California red-legged frog (*Rana draytonii*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*)
	Birds	Allen's Hummingbird (*Selasphorus sasin*) bank swallow (*Riparia riparia*) Bell's sparrow (*Artemisiospiza belli*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gnatcatcher (*Polioptila californica*) California quail (*Callipepla californica*) California Thrasher (*Toxostoma redivivum*) California towhee (*Melozone crissalis*) golden eagle (*Aquila chrysaetos*) Island scrub-jay (*Aphelocoma insularis*) peregrine falcon (*Falco peregrinus*) rhinoceros auklet (*Cerorhinca monocerata*) rufous hummingbird (*Selasphorus rufus*) rufous-crowned sparrow (*Aimophila ruficeps*) savannah sparrow (*Passerculus sandwichensis*) white-tailed kite (*Elanus leucurus*) Wrentit (*Chamaea fasciata*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) big-eared woodrat (*Neotoma macrotis*) brush rabbit (Sylvilagus *bachmani*) California pocket mouse (*Chaetodipus californicus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) dusky-footed woodrat (*Neotoma fuscipes*) elk (*Cervus canadensis*) island fox (*Urocyon littoralis*) little pocket mouse (*Perognathus longimembris*) long-tailed weasel (*Mustela frenata*) mountain lion (*Puma concolor*) ringtail (*Bassariscus astutus*) San Diego pocket mouse (*Chaetodipus fallax*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*) western spotted skunk (*Spilogale gracilis*)
	Reptiles	coast horned lizard (*Phrynosoma blainvillii*) island night lizard (*Xantusia riversiana*) orange-throated whiptail (*Aspidoscelis hyperythra*) western patch-nosed snake (*Salvadora hexalepis*)
Western North American Montane/Boreal Peatland	Amphibians	California red-legged frog (*Rana draytonii*) Cascades frog (*Rana cascadae*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*) Sierra Nevada yellow-legged frog (*Rana sierrae*) southern mountain yellow-legged frog (*Rana muscosa*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Montane/Boreal Peatland	Amphibians	western spadefoot (*Spea hammondii*) Yosemite toad (*Anaxyrus canorus*)
	Birds	bank swallow (*Riparia riparia*) black rail (*Laterallus jamaicensis*) black tern (*Chlidonias niger*) California gull (*Larus californicus*) California quail (*Callipepla californica*) Calliope Hummingbird (*Selasphorus calliope*) Clark's Grebe (*Aechmophorus clarkii*) common yellowthroat (*Geothlypis trichas*) fulvous whistling-duck (*Dendrocygna bicolor*) golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) great gray owl (*Strix nebulosa*) greater sage-grouse (*Centrocercus urophasianus*) greater white-fronted goose (*Anser albifrons*) least bittern (*Ixobrychus exilis*) Lesser Yellowlegs (*Tringa flavipes*) Lewis' woodpecker (*Melanerpes lewis*) long-eared owl (*Asio otus*) marsh wren (*Cistothorus palustris*) northern harrier (*Circus hudsonius*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) redhead (*Aythya americana*) red-winged blackbird (*Agelaius phoeniceus*) Ridgway's rail (*Rallus obsoletus*) rufous hummingbird (*Selasphorus rufus*) sandhill crane (*Antigone canadensis*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) tricolored blackbird (*Agelaius tricolor*) Western Grebe (*Aechmophorus occidentalis*) white-tailed kite (*Elanus leucurus*) Willet (*Tringa semipalmata*) willow flycatcher (*Empidonax traillii*) yellow-billed magpie (*Pica nuttalli*) yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
	Mammals	American beaver (*Castor canadensis*) American pika (*Ochotona princeps*) California vole (*Microtus californicus*) common porcupine (*Erethizon dorsatum*) elk (*Cervus canadensis*) Heermann's kangaroo rat (*Dipodomys heermanni heermanni*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) Mount Lyell shrew (*Sorex lyelli*) mountain beaver (*Aplodontia* rufa) North American river otter (*Lontra canadensis*) Pacific jumping mouse (*Zapus trinotatus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Montane/Boreal Peatland	Mammals	Pacific marten (*Martes caurina*) red fox (*Vulpes vulpes*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys* megalotis) western mastiff bat (*Eumops perotis californicus*)
	Reptiles	common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis gigas*) northwestern pond turtle (*Actinemys marmorata*) southwestern pond turtle (*Actinemys* pallida) two-striped gartersnake (*Thamnophis hammondii*)
Western North American Freshwater Marsh	Amphibians	California red-legged frog (*Rana draytonii*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*)
	Birds	western spadefoot (*Spea hammondii*) bank swallow (*Riparia riparia*) black rail (*Laterallus jamaicensis*) black tern (*Chlidonias niger*) California gull (*Larus californicus*) Clark's Grebe (*Aechmophorus clarkii*) common yellowthroat (*Geothlypis trichas*) fulvous whistling-duck (*Dendrocygna bicolor*) golden eagle (*Aquila chrysaetos*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) gull-billed tern (*Gelochelidon nilotica*) least bittern (*Ixobrychus exilis*) Lesser Yellowlegs (*Tringa flavipes*) marsh wren (*Cistothorus palustris*) northern harrier (*Circus hudsonius*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) redhead (*Aythya americana*) red-winged blackbird (*Agelaius phoeniceus*) Ridgway's rail (*Rallus obsoletus*) sandhill crane (*Antigone canadensis*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) tricolored blackbird (*Agelaius tricolor*) Western Grebe (*Aechmophorus occidentalis*) white-tailed kite (*Elanus leucurus*) Willet (*Tringa semipalmata*) yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
	Mammals	American beaver (*Castor canadensis*) common porcupine (*Erethizon dorsatum*) elk (*Cervus canadensis*) North American river otter (*Lontra canadensis*) vagrant shrew (*Sorex vagrans*) western mastiff bat (*Eumops perotis californicus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Freshwater Marsh	Reptiles	common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis gigas*) northwestern pond turtle (*Actinemys marmorata*) southwestern pond turtle (*Actinemys pallida*) two-striped gartersnake (*Thamnophis hammondii*)
Western North America Vernal Pool	Amphibians	California red-legged frog (*Rana draytonii*) California tiger salamander (*Ambystoma californiense*) Coast Range newt (*Taricha torosa*) northern red-legged frog (*Rana aurora*) western spadefoot (*Spea hammondii*)
	Birds	bank swallow (*Riparia riparia*) black rail (*Laterallus jamaicensis*) black tern (*Chlidonias niger*) brant (*Branta bernicla*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gull (*Larus californicus*) California quail (*Callipepla californica*) Clark's Grebe (*Aechmophorus clarkii*) common yellowthroat (*Geothlypis trichas*) fulvous whistling-duck (*Dendrocygna bicolor*) golden eagle (*Aquila chrysaetos*) grasshopper sparrow (*Ammodramus savannarum*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) gull-billed tern (*Gelochelidon nilotica*) Lawrence's goldfinch (*Spinus lawrencei*) least bittern (*Ixobrychus exilis*) Lesser Yellowlegs (*Tringa flavipes*) Lewis' woodpecker (*Melanerpes lewis*) loggerhead shrike (*Lanius ludovicianus*) long-eared owl (Asio otus) marsh wren (*Cistothorus palustris*) mountain plover (*Charadrius montanus*) northern harrier (*Circus hudsonius*) snowy plover (*Anarhynchus nivosus*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) redhead (*Aythya americana*) red-winged blackbird (*Agelaius phoeniceus*) Ridgway's rail (*Rallus obsoletus*) rufous-crowned sparrow (*Aimophila ruficeps*) sandhill crane (*Antigone canadensis*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) Swainson's hawk (*Buteo swainsoni*) tricolored blackbird (*Agelaius tricolor*) vesper sparrow (*Pooecetes gramineus*) Western Grebe (*Aechmophorus occidentalis*) white-tailed kite (*Elanus leucurus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North America Vernal Pool	Birds	Willet (*Tringa semipalmata*) yellow-billed magpie (*Pica nuttalli*) yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
	Mammals	Agile Kangaroo Rat (*Dipodomys agilis*) American badger (*Taxidea taxus*) American beaver (*Castor canadensis*) Arizona cotton rat (*Sigmodon arizonae*) broad-footed mole (*Scapanus latimanus*) brush rabbit (*Sylvilagus bachmani*) California kangaroo rat (*Dipodomys californicus*) California pocket mouse (*Chaetodipus californicus*) California vole (Microtus *californicus*) common porcupine (*Erethizon dorsatum*) elk (*Cervus canadensis*) Fresno kangaroo rat (*Dipodomys nitratoides exilis*) giant kangaroo rat (*Dipodomys ingens*) hispid cotton rat (*Sigmodon hispidus*) kit fox (*Vulpes macrotis*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) Narrow-faced Kangaroo Rat (*Dipodomys venustus*) Nelson's (=San Joaquin) antelope squirrel (*Ammospermophilus nelsoni*) North American river otter (*Lontra canadensis*) pallid bat (*Antrozous pallidus*) pronghorn (*Antilocapra americana*) San Diego pocket mouse (*Chaetodipus fallax*) San Joaquin pocket mouse (*Perognathus inornatus*) San Joaquin Valley Kangaroo Rat (*Dipodomys nitratoides*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis gigas*) northwestern pond turtle (*Actinemys marmorata*) southwestern pond turtle (*Actinemys pallida*) two-striped gartersnake (*Thamnophis hammondii*)
Western North America Wet Meadow and Low Shrub Carr	Amphibians	Cascades frog (*Rana cascadae*) Coast Range newt (*Taricha torosa*) Sierra Nevada yellow-legged frog (*Rana sierrae*) southern mountain yellow-legged frog (*Rana muscosa*) Yosemite toad (*Anaxyrus canorus*)
	Birds	California gull (*Larus californicus*) California quail (*Callipepla californica*) Calliope Hummingbird (*Selasphorus calliope*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) great blue heron (*Ardea herodias*) great gray owl (*Strix nebulosa*) greater sage-grouse (*Centrocercus urophasianus*) greater white-fronted goose (*Anser albifrons*) Lesser Yellowlegs (*Tringa flavipes*) Lewis' woodpecker (*Melanerpes lewis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North America Wet Meadow and Low Shrub Carr	Birds	long-eared owl (*Asio otus*) northern harrier (*Circus hudsonius*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) red-winged blackbird (*Agelaius phoeniceus*) rufous hummingbird (*Selasphorus rufus*) sandhill crane (*Antigone canadensis*) savannah sparrow (*Passerculus sandwichensis*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) white-tailed kite (*Elanus leucurus*) Willet (*Tringa semipalmata*) willow flycatcher (*Empidonax traillii*) yellow-billed magpie (*Pica nuttalli*) yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
	Mammals	American beaver (*Castor canadensis*) American pika (*Ochotona princeps*) California vole (*Microtus californicus*) common porcupine (*Erethizon dorsatum*) elk (*Cervus canadensis*) Heermann's kangaroo rat (*Dipodomys heermanni heermanni*) long-tailed vole (*Microtus longicaudus*) long-tailed weasel (*Mustela frenata*) Mount Lyell shrew (*Sorex lyelli*) mountain beaver (*Aplodontia rufa*) Pacific jumping mouse (*Zapus trinotatus*) Pacific marten (*Martes caurina*) red fox (*Vulpes vulpes*) vagrant shrew (*Sorex vagrans*) western harvest mouse (*Reithrodontomys megalotis*) western mastiff bat (*Eumops perotis californicus*)
	Reptiles	common gartersnake (*Thamnophis sirtalis*) giant gartersnake (*Thamnophis* gigas) two-striped gartersnake (Thamnophis *hammondii*)
North American Pacific Coastal Salt Marsh	Birds	black rail (*Laterallus jamaicensis*) brant (*Branta bernicla*) California gull (*Larus californicus*) common yellowthroat (*Geothlypis trichas*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) least bittern (*Ixobrychus exilis*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) marsh wren (*Cistothorus palustris*) northern harrier (*Circus hudsonius*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) red-winged blackbird (*Agelaius phoeniceus*) Ridgway's rail (*Rallus obsoletus*) savannah sparrow (*Passerculus* sandwichensis) Short-billed Dowitcher (*Limnodromus griseus*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) white-tailed kite (*Elanus leucurus*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
North American Pacific Coastal Salt Marsh	Birds	Willet (*Tringa semipalmata*)
	Mammals	salt-marsh harvest mouse (*Reithrodontomys raviventris*) vagrant shrew (*Sorex vagrans*)
Warm Semi-Desert/Mediterranean Alkali-Saline Wetland	Birds	Bell's sparrow (*Artemisiospiza belli*) black rail (*Laterallus jamaicensis*) brant (*Branta bernicla*) burrowing owl (*Athene cunicularia*) California gull (*Larus californicus*) common yellowthroat (*Geothlypis trichas*) golden eagle (*Aquila chrysaetos*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) Le Conte's thrasher (*Toxostoma lecontei*) least bittern (*Ixobrychus exilis*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) marsh wren (*Cistothorus palustris*) northern harrier (*Circus hudsonius*) osprey (*Pandion haliaetus*) peregrine falcon (*Falco peregrinus*) red-winged blackbird (*Agelaius phoeniceus*) Ridgway's rail (*Rallus obsoletus*) savannah sparrow (*Passerculus sandwichensis*) Short-billed Dowitcher (*Limnodromus griseus*) short-eared owl (*Asio flammeus*) song sparrow (*Melospiza melodia*) Verdin (*Auriparus flaviceps*) white-tailed kite (*Elanus leucurus*) Willet (*Tringa semipalmata*)
	Mammals	American badger (*Taxidea taxus*) desert woodrat (*Neotoma lepida*) kit fox (*Vulpes macrotis*) little pocket mouse (*Perognathus longimembris*) Merriam's kangaroo rat (*Dipodomys merriami*) Piute ground squirrel (*Urocitellus mollis*) salt-marsh harvest mouse (*Reithrodontomys raviventris*) southern grasshopper mouse (*Onychomys torridus ramona*) vagrant shrew (*Sorex vagrans*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) western whiptail (*Aspidoscelis tigris*)
Mojavean-Sonoran Desert Scrub	Amphibians	Couch's spadefoot (*Scaphiopus couchii*)
	Birds	Bell's sparrow (*Artemisiospiza belli*) Bendire's thrasher (*Toxostoma bendirei*) brown-crested flycatcher (*Myiarchus tyrannulus*) burrowing owl (*Athene cunicularia*) cactus wren (*Campylorhynchus brunneicapillus*) Costa's hummingbird (*Calypte costae*) gilded flicker (*Colaptes chrysoides*) golden eagle (*Aquila chrysaetos*) Le Conte's thrasher (*Toxostoma lecontei*) loggerhead shrike (*Lanius ludovicianus*) Scott's Oriole (*Icterus parisorum*) Verdin (*Auriparus flaviceps*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Mojavean-Sonoran Desert Scrub	Mammals	American badger (*Taxidea taxus*) Bighorn Sheep (*Ovis canadensis*) desert woodrat (*Neotoma lepida*) fringed myotis (*Myotis thysanodes*) kit fox (Vulpes *macrotis*) little pocket mouse (*Perognathus longimembris*) Merriam's kangaroo rat (*Dipodomys merriami*) round-tailed ground squirrel (*Xerospermophilus tereticaudus*) San Diego pocket mouse (*Chaetodipus fallax*) southern grasshopper mouse (*Onychomys torridus ramona*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) Colorado Desert fringe-toed lizard (*Uma notata*) desert tortoise (*Gopherus agassizii*) flat-tailed horned lizard (*Phrynosoma mcallii*) glossy snake (*Arizona elegans*) island night lizard (*Xantusia* riversiana) Mojave fringe-toed lizard (*Uma scoparia*) western banded gecko (*Coleonyx variegatus*) western whiptail (*Aspidoscelis tigris*)
North American Warm-Desert Xero-Riparian Macrogroup (formerly Madrean Warm Semi-Desert Wash Woodland/Scrub)	Amphibians	Couch's spadefoot (*Scaphiopus couchii*)
	Birds	Bell's sparrow (*Artemisiospiza belli*) brown-crested flycatcher (*Myiarchus tyrannulus*) burrowing owl (*Athene cunicularia*) Costa's hummingbird (*Calypte costae*) Crissal thrasher (*Toxostoma crissale*) Gila woodpecker (*Melanerpes uropygialis*) golden eagle (*Aquila chrysaetos*) Le Conte's thrasher (*Toxostoma lecontei*) Lucy's warbler (*Leiothlypis luciae*) Scott's Oriole (*Icterus parisorum*) Verdin (*Auriparus flaviceps*)
	Mammals	American badger (*Taxidea taxus*) Arizona Myotis (*Myotis occultus*) Bighorn Sheep (*Ovis canadensis*) California leaf-nosed bat (*Macrotus californicus*) cave myotis (*Myotis velifer*) desert woodrat (*Neotoma lepida*) kit fox (*Vulpes macrotis*) little pocket mouse (*Perognathus longimembris*) Merriam's kangaroo rat (*Dipodomys merriami*) round-tailed ground squirrel (*Xerospermophilus tereticaudus*) southern grasshopper mouse (*Onychomys torridus ramona*) white-throated woodrat (*Neotoma albigula*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) Colorado Desert fringe-toed lizard (*Uma notata*) desert tortoise (*Gopherus agassizii*) flat-tailed horned lizard (*Phrynosoma mcallii*) glossy snake (*Arizona elegans*) Mojave fringe-toed lizard (*Uma scoparia*) western banded gecko (*Coleonyx variegatus*) western whiptail (*Aspidoscelis tigris*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Great Basin Saltbush Scrub Macrogroup (formerly Western North American Cool Semi-Desert Shrubland, Shrub-Steppe)	Amphibians	Couch's spadefoot (*Scaphiopus couchii*)
	Birds	Bell's sparrow (*Artemisiospiza belli*) brown-crested flycatcher (*Myiarchus tyrannulus*) burrowing owl (*Athene cunicularia*) Costa's hummingbird (*Calypte costae*) Crissal thrasher (*Toxostoma crissale*) Gila woodpecker (*Melanerpes uropygialis*) golden eagle (*Aquila chrysaetos*) Le Conte's thrasher (*Toxostoma lecontei*) Lucy's warbler (*Leiothlypis luciae*) Scott's Oriole (*Icterus parisorum*) Verdin (*Auriparus flaviceps*)
	Mammals	American badger (*Taxidea taxus*) Arizona Myotis (*Myotis occultus*) Bighorn Sheep (*Ovis canadensis*) California leaf-nosed bat (*Macrotus californicus*) cave myotis (*Myotis velifer*) desert woodrat (*Neotoma lepida*) kit fox (*Vulpes macrotis*) little pocket mouse (*Perognathus longimembris*) Merriam's kangaroo rat (*Dipodomys merriami*) Piute ground squirrel (*Urocitellus mollis*) round-tailed ground squirrel (*Xerospermophilus tereticaudus*) southern grasshopper mouse (*Onychomys torridus ramona*) white-throated woodrat (*Neotoma albigula*)
	Reptiles	blunt-nosed leopard lizard (*Gambelia sila*) Colorado Desert fringe-toed lizard (*Uma notata*) desert tortoise (*Gopherus agassizii*) flat-tailed horned lizard (*Phrynosoma mcallii*) glossy snake (*Arizona elegans*) Mojave fringe-toed lizard (*Uma scoparia*) western banded gecko (*Coleonyx variegatus*) western whiptail (*Aspidoscelis tigris*)
Cool Semi-Desert Wash and Disturbance Scrub	Birds	Bell's sparrow (*Artemisiospiza belli*) Black-chinned Sparrow (*Spizella atrogularis*) burrowing owl (*Athene cunicularia*) California quail (*Callipepla californica*) golden eagle (*Aquila chrysaetos*) greater sage-grouse (*Centrocercus urophasianus*) long-eared owl (*Asio otus*) peregrine falcon (*Falco peregrinus*) Sage Thrasher (*Oreoscoptes montanus*) vesper sparrow (*Pooecetes gramineus*)
	Mammals	American badger (*Taxidea taxus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) elk (*Cervus canadensis*) little pocket mouse (*Perognathus longimembris*) long-tailed weasel (*Mustela frenata*) Piute ground squirrel (*Urocitellus mollis*) pronghorn (*Antilocapra americana*) pygmy rabbit (*Brachylagus idahoensis*) white-tailed jackrabbit (*Lepus townsendii*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North America Tall Sage Shrubland and Steppe	Birds	Bell's sparrow (*Artemisiospiza belli*) Black-chinned Sparrow (*Spizella atrogularis*) burrowing owl (*Athene cunicularia*) California quail (*Callipepla californica*) golden eagle (*Aquila chrysaetos*) greater sage-grouse (*Centrocercus urophasianus*) long-eared owl (*Asio otus*) peregrine falcon (*Falco peregrinus*) Sage Thrasher (*Oreoscoptes montanus*) vesper sparrow (*Pooecetes gramineus*)
	Mammals	American badger (*Taxidea taxus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) elk (*Cervus canadensis*) little pocket mouse (*Perognathus longimembris*) long-tailed weasel (*Mustela frenata*) Piute ground squirrel (*Urocitellus mollis*) pronghorn (*Antilocapra americana*) pygmy rabbit (*Brachylagus idahoensis*) white-tailed jackrabbit (*Lepus townsendii*)
Western North America Dwarf Sage Shrubland and Steppe	Birds	Bell's sparrow (*Artemisiospiza belli*) burrowing owl (*Athene cunicularia*) golden eagle (*Aquila chrysaetos*) peregrine falcon (*Falco peregrinus*) Sage Thrasher (*Oreoscoptes montanus*) vesper sparrow (*Pooecetes gramineus*)
	Mammals	American badger (*Taxidea taxus*) Piute ground squirrel (*Urocitellus mollis*) pronghorn (*Antilocapra americana*)
Inter-Mountain Dry Shrubland and Grassland	Birds	Bell's sparrow (*Artemisiospiza belli*) Black-chinned Sparrow (*Spizella atrogularis*) burrowing owl (*Athene cunicularia*) California quail (*Callipepla californica*) golden eagle (*Aquila chrysaetos*) greater sage-grouse (*Centrocercus urophasianus*) long-eared owl (*Asio otus*) peregrine falcon (*Falco peregrinus*) Sage Thrasher (*Oreoscoptes montanus*) vesper sparrow (*Pooecetes gramineus*)
	Mammals	American badger (*Taxidea taxus*) deer mouse (*Peromyscus maniculatus*) desert woodrat (*Neotoma lepida*) elk (*Cervus canadensis*) little pocket mouse (*Perognathus longimembris*) long-tailed weasel (*Mustela frenata*) Piute ground squirrel (*Urocitellus mollis*) pronghorn (*Antilocapra americana*) pygmy rabbit (*Brachylagus idahoensis*) white-tailed jackrabbit (*Lepus townsendii*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Vancouverian Alpine Scrub, Forb Meadow, and Grassland meadow *And* Rocky Mountain Alpine Scrub, Forb Meadow, and Grassland	Birds	golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) rufous hummingbird (*Selasphorus rufus*)
	Mammals	Alpine chipmunk (*Neotamias alpinus*) common porcupine (*Erethizon dorsatum*) red fox (*Vulpes vulpes*) wolverine (*Gulo gulo*)
Temperate Pacific Intertidal Shore	Birds	American Avocet (*Recurvirostra americana*) American white pelican (*Pelecanus erythrorhynchos*) Barrow's goldeneye (*Bucephala islandica*) black rail (*Laterallus jamaicensis*) black skimmer (*Rynchops niger*) black turnstone (*Arenaria melanocephala*) Brandt's cormorant (*Urile penicillatus*) brant (*Branta bernicla*) brown pelican (*Pelecanus occidentalis*) California gull (*Larus californicus*) Clark's Grebe (*Aechmophorus clarkii*) common loon (*Gavia immer*) elegant tern (*Thalasseus elegans*) Forster's Tern (*Sterna forsteri*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) Heermann's Gull (*Larus heermanni*) least tern (*Sternula antillarum*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) snowy plover (*Anarhynchus nivosus*) Pectoral Sandpiper (*Calidris melanotos*) pelagic cormorant (*Urile pelagicus*) peregrine falcon (*Falco peregrinus*) red knot (*Calidris canutus*) redhead (*Aythya americana*) Ridgway's rail (*Rallus obsoletus*) royal tern (*Thalasseus maximus*) ruddy turnstone (*Arenaria interpres*) Short-billed Dowitcher (*Limnodromus griseus*) surfbird (*Calidris virgata*) wandering tattler (*Tringa incana*) Western Grebe (*Aechmophorus occidentalis*) Western Gull (*Larus occidentalis*) Willet (*Tringa semipalmata*) wood stork (*Mycteria americana*)
	Mammals	North American river otter (*Lontra canadensis*)
Western North American Freshwater Aquatic Vegetation	Amphibians	California giant salamander (*Dicamptodon ensatus*) California red-legged frog (*Rana draytonii*) Cascades frog (*Rana cascadae*) Coast Range newt (*Taricha torosa*) foothill yellow-legged frog (*Rana boylii*) northern red-legged frog (*Rana aurora*) red-bellied newt (*Taricha rivularis*) Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) Sierra Nevada yellow-legged frog (*Rana sierrae*) southern long-toed salamander (*Ambystoma macrodactylum sigillatum*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Western North American Freshwater Aquatic Vegetation	Amphibians	southern mountain yellow-legged frog (*Rana muscosa*) southern torrent salamander (*Rhyacotriton variegatus*) western spadefoot (*Spea hammondii*)
	Birds	American Avocet (*Recurvirostra americana*) American Dipper (*Cinclus mexicanus*) American white pelican (*Pelecanus erythrorhynchos*) bald eagle (*Haliaeetus leucocephalus*) bank swallow (*Riparia riparia*) black skimmer (*Rynchops niger*) black swift (*Cypseloides niger*) California gull (*Larus californicus*) Clark's Grebe (*Aechmophorus clarkii*) Forster's Tern (*Sterna forsteri*) fulvous whistling-duck (*Dendrocygna bicolor*) great blue heron (*Ardea herodias*) great egret (*Ardea alba*) greater white-fronted goose (*Anser albifrons*) gull-billed tern (*Gelochelidon nilotica*) harlequin duck (*Histrionicus histrionicus*) Lesser Yellowlegs (*Tringa flavipes*) snowy plover (*Anarhynchus nivosus*) osprey (*Pandion haliaetus*) Pectoral Sandpiper (*Calidris melanotos*) peregrine falcon (*Falco peregrinus*) purple martin (*Progne subis*) redhead (*Aythya americana*) Ridgway's rail (*Rallus obsoletus*) sandhill crane (*Antigone canadensis*) Western Grebe (*Aechmophorus occidentalis*) Willet (*Tringa semipalmata*) wood stork (*Mycteria americana*) Yellow-footed Gull (*Larus livens*)
	Mammals	American beaver (*Castor canadensis*) cave myotis (Myotis *velifer*) North American river otter (*Lontra canadensis*)
	Reptiles	giant gartersnake (*Thamnophis gigas*) northwestern pond turtle (*Actinemys marmorata*) Southwestern pond turtle (*Actinemys pallida*) two-striped gartersnake (*Thamnophis hammondii*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
California Cliff, Scree, and Other Rock Vegetation	Birds	American Avocet (*Recurvirostra americana*) American Dipper (*Cinclus mexicanus*) American white pelican (*Pelecanus erythrorhynchos*) ashy storm-petrel (*Hydrobates homochroa*) bank swallow (*Riparia riparia*) black oystercatcher (*Haematopus bachmani*) black skimmer (*Rynchops niger*) black storm-petrel (*Hydrobates melania*) black swift (*Cypseloides niger*) black turnstone (*Arenaria melanocephala*) Brandt's cormorant (*Urile penicillatus*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gull (*Larus californicus*) common murre (*Uria aalge*) elegant tern (*Thalasseus elegans*) fork-tailed storm-petrel (*Hydrobates furcatus*) Forster's Tern (*Sterna forsteri*) golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) greater sage-grouse (*Centrocercus urophasianus*) Guadalupe murrelet (*Synthliboramphus hypoleucus*) gull-billed tern (*Gelochelidon nilotica*) least tern (*Sternula antillarum*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) mountain plover (*Charadrius montanus*) snowy plover (*Anarhynchus nivosus*) Pectoral Sandpiper (*Calidris melanotos*) pelagic cormorant (*Urile pelagicus*) peregrine falcon (*Falco peregrinus*) pigeon guillemot (*Cepphus columba*) royal tern (*Thalasseus maximus*) ruddy turnstone (*Arenaria interpres*) Short-billed Dowitcher (*Limnodromus griseus*) surfbird (*Calidris virgata*) Swainson's hawk (*Buteo swainsoni*) Western Gull (*Larus occidentalis*) Yellow-footed Gull (*Larus livens*)
	Mammals	American pika (*Ochotona princeps*) Arizona Myotis (*Myotis occultus*) fringed myotis (*Myotis thysanodes*) long-legged myotis (*Myotis volans*) northern elephant seal (*Mirounga angustirostris*)
	Reptiles	pallid bat (*Antrozous pallidus*) Steller sea lion (*Eumetopias jubatus*) western small-footed myotis (*Myotis ciliolabrum*) Coachella Valley fringe-toed lizard (*Uma inornata*) Colorado Desert fringe-toed lizard (*Uma notata*) flat-tailed horned lizard (*Phrynosoma mcallii*) Mojave fringe-toed lizard (*Uma scoparia*) sandstone night lizard (*Xantusia gracilis*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
Vancouverian Cliff, Scree, and Other Rock Vegetation	Birds	American Avocet (*Recurvirostra americana*) American Dipper (*Cinclus mexicanus*) American white pelican (*Pelecanus erythrorhynchos*) ashy storm-petrel (*Hydrobates homochroa*) bank swallow (*Riparia riparia*) black oystercatcher (*Haematopus bachmani*) black skimmer (*Rynchops niger*) black storm-petrel (*Hydrobates melania*) black swift (*Cypseloides niger*) black turnstone (*Arenaria melanocephala*) Brandt's cormorant (*Urile penicillatus*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gull (*Larus californicus*) common murre (*Uria aalge*) elegant tern (*Thalasseus elegans*) fork-tailed storm-petrel (*Hydrobates furcatus*) Forster's Tern (*Sterna forsteri*) golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) greater sage-grouse (*Centrocercus urophasianus*) Guadalupe murrelet (*Synthliboramphus hypoleucus*) least tern (*Sternula antillarum*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) mountain plover (*Charadrius montanus*) snowy plover (*Anarhynchus nivosus*) Pectoral Sandpiper (*Calidris melanotos*) pelagic cormorant (*Urile pelagicus*) peregrine falcon (*Falco peregrinus*) pigeon guillemot (*Cepphus columba*) royal tern (*Thalasseus maximus*) ruddy turnstone (*Arenaria interpres*) Short-billed Dowitcher (*Limnodromus griseus*) surfbird (*Calidris virgata*) Swainson's hawk (*Buteo swainsoni*) Western Gull (*Larus occidentalis*)
	Mammals	American pika (*Ochotona princeps*) fringed myotis (*Myotis thysanodes*) long-legged myotis (*Myotis volans*) northern elephant seal (*Mirounga angustirostris*) pallid bat (*Antrozous pallidus*) Steller sea lion (*Eumetopias jubatus*) western small-footed myotis (*Myotis ciliolabrum*)
	Reptiles	Mojave fringe-toed lizard (*Uma scoparia*)

Conservation Targets (Macrogroups)	Taxonomic Group	Species of Greatest Conservation Need
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation	Birds	American Avocet (*Recurvirostra americana*) American Dipper (*Cinclus mexicanus*) American white pelican (*Pelecanus erythrorhynchos*) ashy storm-petrel (*Hydrobates homochroa*) bank swallow (*Riparia riparia*) black oystercatcher (*Haematopus bachmani*) black skimmer (*Rynchops niger*) black storm-petrel (*Hydrobates melania*) black swift (*Cypseloides niger*) black turnstone (*Arenaria melanocephala*) Brandt's cormorant (*Urile penicillatus*) brown pelican (*Pelecanus occidentalis*) burrowing owl (*Athene cunicularia*) California condor (*Gymnogyps californianus*) California gull (*Larus californicus*) common murre (*Uria aalge*) elegant tern (*Thalasseus elegans*) fork-tailed storm-petrel (*Hydrobates furcatus*) Forster's Tern (*Sterna forsteri*) golden eagle (*Aquila chrysaetos*) Gray-crowned Rosy-Finch (*Leucosticte tephrocotis*) greater sage-grouse (*Centrocercus urophasianus*) Guadalupe murrelet (*Synthliboramphus hypoleucus*) gull-billed tern (*Gelochelidon nilotica*) least tern (*Sternula antillarum*) Lesser Yellowlegs (*Tringa flavipes*) Marbled Godwit (*Limosa fedoa*) mountain plover (*Charadrius montanus*) snowy plover (Anarhynchus nivosus) Pectoral Sandpiper (*Calidris melanotos*) pelagic cormorant (*Urile pelagicus*) peregrine falcon (*Falco peregrinus*) pigeon guillemot (*Cepphus columba*) royal tern (*Thalasseus maximus*) ruddy turnstone (*Arenaria interpres*) Short-billed Dowitcher (*Limnodromus griseus*) surfbird (*Calidris virgata*) Swainson's hawk (*Buteo swainsoni*) Western Gull (*Larus occidentalis*) Yellow-footed Gull (*Larus livens*)
	Mammals	American pika (*Ochotona princeps*) Arizona Myotis (*Myotis occultus*) fringed myotis (*Myotis thysanodes*) long-legged myotis (*Myotis volans*) northern elephant seal (*Mirounga angustirostris*) pallid bat (*Antrozous pallidus*) Steller sea lion (*Eumetopias jubatus*) western small-footed myotis (*Myotis ciliolabrum*)
	Reptiles	Coachella Valley fringe-toed lizard (*Uma inornata*) Colorado Desert fringe-toed lizard (*Uma notata*) flat-tailed horned lizard (*Phrynosoma mcallii*) Mojave fringe-toed lizard (*Uma scoparia*) sandstone night lizard (*Xantusia gracilis*)

Appendix D SWAP Conservation Targets: Terrestrial Vegetation Communities

California Department of Fish and Wildlife (CDFW) scientists used a systematic method to rank vegetation communities (macrogroups) as priority conservation targets for SWAP 2025 (Figure 1.5-2 Spatial Scales of SWAP Analysis). Scientists reviewed the terrestrial conservation targets in SWAP 2015, which were selected out of all macrogroups based on three criteria: endemism, total biodiversity, and vulnerability (rarity). Scientists then looked for exceptions to the 2015 ranking to add conservation targets, including vegetation under new pressures such as renewable energy. If outstanding pressures that could be reduced by a specific conservation strategy were impacting a lower ranked macrogroup, it was considered for inclusion as a conservation target. No conservation targets identified in SWAP 2015 were removed in SWAP 2025. Seven macrogroups were added as conservation targets for SWAP 2025.

CDFW Appendix D contains:

Table D-4 through **Table D-22**: Priority conservation targets (in **bold**) and macrogroup ranking based on analysis of total biodiversity, vulnerability (rarity), and endemism

Table D-23: US National Vegetation Classification (USNCV) macrogroup vegetation information, including:

- a cross-reference to the California Wildlife Habitat Relationship (CWHR) classification (see Chapter 3.1.2)
- location (SWAP Province)
- location as a conservation target (SWAP Province)

Ranking Method Used in SWAP 2025

- The target rank is the sum of biodiversity, vulnerability, and endemism ranks (Tables D-1 through D-3). The smaller number is a "better" rank (i.e., the target contains more biodiversity, vulnerability, and endemism), indicating a higher consideration as priority conservation target.
- Biodiversity, vulnerability and endemism were ranked from 1–5 in quantiles, representing the top 1/5 (rank 1), the second fifth (rank 2), and the bottom 1/5 (rank 5).
- Biodiversity and endemism ranks were derived from CWHR queries that listed the total number of native species (i.e., biodiversity) and the number of endemic species by CWHR type, which was then cross-walked to the macrogroups. Vulnerability ranks were derived from calculating the inverse of the area each macrogroup occupies within each ecoregion times total biodiversity. This identified

those macrogroups supporting the most species but least available in the ecoregion.

Endemism Rules

Mammals

Percentage of Entire Range within California (EN): This criterion measures what proportion of the entire geographic range of a taxon occurs within California. Taxa mostly or entirely restricted to California are considered of greater concern in California than are taxa with only a small proportion of their range in the state. The teams relied on range maps in (Hall and Kelson 1981) to approximate a taxon's geographic range unless better alternatives were available.

Table D-1 Endemism Rule for Mammals

Proportion of North American range or population within California	Score
100% (endemic)	10
80%–100%	7.5
50%–80%	5
20%–50%	2.5
< 20%	0

Birds

Percentage of Entire Range within California (EN): This criterion measures what proportion of a taxon's North American range or population occurs within California. Taxa with a high proportion of their range or population within California are considered of greater concern than taxa with only a small proportion of their range or population in the state.

Table D-2 Endemism Rule for Birds

Proportion of North American range or population within California	Score
100% (endemic)	10
>80% but <100% (near-endemic)	7.5
>50%–80%	5
>20%–50%	2.5
<20%	0

Amphibians and Reptiles

Percentage of a species' entire range that occurs in California (EN): Endemism determines the extent to which conservation actions in California are likely to impact the taxon's persistence range wide. From another perspective, this is a way of measuring California's responsibility to conserve individual species. Taxa whose range is completely, or nearly completely, contained within California's borders are in need of greater conservation consideration from our state than taxa whose range only extends peripherally into California. We recognize that this presumes appropriate conservation measures are also being implemented in other areas of North America (including Mexico and Canada), and that such conservation may be more completely, or less completely, implemented in California. We again made this measure discrete in recognition of the inherent uncertainty in our knowledge of range limits.

Table D-3 Endemism Rules for Amphibians and Reptiles

Proportion of North American range or population within California	Score
100% (endemic)	10
>66–99%	7
33–66%	3
<33%	0

North Coast and Klamath Province

Table D-4 Northern California Coast Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Vancouverian Flooded and Swamp Forest*	**North Coastal and Montane Riparian Forest and Woodland**	**3**
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	3
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	3
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	6
Vancouverian Rainforest*	**Pacific Northwest Conifer Forests**	**7**
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	8
Western North American Freshwater Marsh*	**Freshwater Marsh**	**8**
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	9
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	9
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	10
North American Pacific Coastal Salt Marsh	Salt Marsh	13

USNVC Macrogroup	Common Name	Target Rank
California Annual and Perennial Grassland	California Grassland and Flowerfields	13
California Coastal Scrub	Coastal Sage Scrub	13
Vancouverian Coastal Dune and Bluff*	**Coastal Dune and Bluff Scrub**	**13**
California Chaparral	Chaparral	14
Introduced North American Mediterranean woodland and forest	Non-Native Forest and Woodlands	15

Table D-5 Northern California Coast Ranges Ecoregions

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	3
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	4
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	4
California Annual and Perennial Grassland	California Grassland and Flowerfields	4
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	7
Temperate Pacific Intertidal Shore	Brackish (Estuarine) Submerged Aquatic Vegetation	7
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	7

USNVC Macrogroup	Common Name	Target Rank
Western North American Freshwater Marsh	Freshwater Marsh	7
Vancouverian Flooded and Swamp Forest*	**North Coastal and Montane Riparian Forest and Woodland**	**8**
Vancouverian Rainforest	Pacific Northwest Conifer Forests	8
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	8
California Chaparral	Chaparral	9
California Coastal Scrub	Coastal Sage Scrub	10
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	11
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	11
Cool Interior Chaparral	Montane Chaparral	13
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	13
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	15
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	15
Vancouverian Subalpine Forest*	**Pacific Northwest Subalpine Forest**	**15**

Table D-6 Northern California Interior Coast Ranges Ecoregions

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland*	**California Foothill and Valley Forests and Woodlands**	**4**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	5
Western North American Freshwater Marsh	Freshwater Marsh	6
California Annual and Perennial Grassland	California Grassland and Flowerfields	6
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	6
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	9
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	10
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	12
California Coastal Scrub	Coastal Sage Scrub	13
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	15
California Chaparral	Chaparral	15

Table D-7 Klamath Mountains Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Vancouverian Rainforest	Pacific Northwest Conifer Forests	3
Western North American Temperate Grassland and Meadow*	**Western Upland Grasslands**	**3**
Western North American Montane/Boreal Peatland*	**Fen (Wet Meadow)**	**3**
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	4
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	4
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow*	**Mountain Riparian Scrub and Wet Meadow**	**5**
Western North America Wet Meadow and Low Shrub Carr*	**Wet Mountain Meadow**	**5**
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	6
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	7

USNVC Macrogroup	Common Name	Target Rank
Western North American Freshwater Marsh	Freshwater Marsh	7
California Annual and Perennial Grassland	California Grassland and Flowerfields	8
Rocky Mountain Subalpine and High Montane Conifer Forest*	**Subalpine Aspen Forests and Pine Woodlands**	**10**
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	10
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	10
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	11
California Coastal Scrub	Coastal Sage Scrub	11
Vancouverian Alpine Scrub, Forb Meadow, and Grassland*	**Alpine Vegetation**	**13**
Cool Interior Chaparral	Montane Chaparral	13
Western Cordilleran Montane Shrubland and Grassland*	**Montane Upland Deciduous Scrub**	**13**
North American Pacific Coastal Salt Marsh	Salt Marsh	14
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15

USNVC Macrogroup	Common Name	Target Rank
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	15

Cascades and Modoc Plateau Province

Table D-8 Southern Cascades Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Western North American Montane/Boreal Peatland	Fen (Wet Meadow)	3
Western North American Temperate Grassland and Meadow*	**Western Upland Grasslands**	**3**
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	3
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	5
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	5
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	5
Californian–Vancouverian	**North Coastal Mixed Evergreen and**	**6**

USNVC Macrogroup	Common Name	Target Rank
Montane and Foothill Forest*	**Montane Conifer Forests**	
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	7
Western North American Freshwater Marsh	Freshwater Marsh	7
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	7
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	9
California Coastal Scrub	Coastal Sage Scrub	10
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	10
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	12
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	12
California Chaparral	Chaparral	12
Vancouverian Alpine Scrub, Forb Meadow, and Grassland	Alpine Vegetation	13

USNVC Macrogroup	Common Name	Target Rank
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	13
Intermountain Singleleaf Pinyon–Western Juniper Woodland	Intermountain Pinyon – Juniper Woodland	13
Cool Interior Chaparral	Montane Chaparral	14
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	14
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15

Table D-9 Modoc Plateau Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	3
Western North America Vernal Pool	Vernal Pools	4
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	5
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	5

USNVC Macrogroup	Common Name	Target Rank
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	5
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	5
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	7
Western North American Freshwater Marsh	Freshwater Marsh	7
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	8
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	8
California Annual and Perennial Grassland	California Grassland and Flowerfields	9
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	12
Western North America Tall Sage Shrubland and Steppe*	**Big Sagebrush Scrub**	**12**
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	13

USNVC Macrogroup	Common Name	Target Rank
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	13
Inter-Mountain Dry Shrubland and Grassland*	**Great Basin Upland Scrub**	**14**
Cool Interior Chaparral	Montane Chaparral	14
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	14
Western North America Dwarf Sage Shrubland and Steppe*	**Great Basin Dwarf Sagebrush Scrub**	**15**

Table D-10 Northwest Basin Range Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	3
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	4
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	6
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	6
Western North American Temperate	Western Upland Grasslands	6

USNVC Macrogroup	Common Name	Target Rank
Grassland and Meadow		
Western North American Freshwater Marsh	Freshwater Marsh	7
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	9
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	11
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	11
Intermountain Basins Pinyon–Juniper Woodland*	**Great Basin Pinyon-Juniper Woodland**	**11**
North American Pacific Coastal Salt Marsh	Salt Marsh	11
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	12
Cool Interior Chaparral	Montane Chaparral	14
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	14
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	15

USNVC Macrogroup	Common Name	Target Rank
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	15

Bay Delta and Central Coast Province

Table D-11 Central California Coast Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Western North America Vernal Pool*	**Vernal Pools**	**4**
California Annual and Perennial Grassland*	**California Grassland and Flowerfields**	**4**
California Forest and Woodland	**California Foothill and Valley Forests and Woodlands**	4
Western North American Freshwater Marsh	**Freshwater Marsh**	**5**
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**5**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	7
California Chaparral	**Chaparral**	**8**
Vancouverian Cliff, Scree, and Other Rock Vegetation*	**Northwest Coast Cliff and Outcrop**	**8**
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	8
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	8

USNVC Macrogroup	Common Name	Target Rank
California Coastal Scrub*	**Coastal Sage Scrub**	**11**
Vancouverian Coastal Dune and Bluff*	**Coastal Dune and Bluff Scrub**	**11**
Vancouverian Lowland Grassland and Shrubland*	**North Coast Deciduous Scrub and Terrace Prairie**	**11**
Vancouverian Rainforest	Pacific Northwest Conifer Forests	12
North American Pacific Coastal Salt Marsh	Salt Marsh	13
Introduced North American Mediterranean Woodland and Forest	Non-Native Forest and Woodlands	15
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	15

Table D-12 Central California Coast Ranges Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland	**California Foothill and Valley Forests and Woodlands**	**3**
Western North America Vernal Pool*	**Vernal Pools**	**4**
California Annual and Perennial Grassland*	**California Grassland and Flowerfields**	**4**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	5

USNVC Macrogroup	Common Name	Target Rank
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**6**
California Chaparral	**Chaparral**	7
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	7
Warm Interior Chaparral	Desert Transition Chaparral	8
California Coastal Scrub*	Coastal Sage Scrub	8
Vancouverian Coastal Dune and Bluff	Coastal Dune and Bluff Scrub	8
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	9
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	11
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	12
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	13
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	14
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	15
Western North America Tall Sage	Big Sagebrush Scrub	15

USNVC Macrogroup	Common Name	Target Rank
Shrubland and Steppe		

Central Valley and Sierra Nevada Province

Table D-13 Great Valley Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Western North America Vernal Pool	**Vernal Pools**	**4**
California Annual and Perennial Grassland	**California Grassland and Flowerfields**	**4**
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**4**
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	4
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	4
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	6
Western North American Freshwater Marsh*	**Freshwater Marsh**	**6**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	8
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	8

USNVC Macrogroup	Common Name	Target Rank
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	9
California Coastal Scrub	Coastal Sage Scrub	11
Vancouverian Coastal Dune and Bluff	Coastal Dune and Bluff Scrub	11
Mojavean–Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	13
North American Pacific Coastal Salt Marsh	Salt Marsh	13
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	14
Introduced North American Mediterranean Woodland and Forest	Non-Native Forest and Woodlands	15
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	15

Table D-14 Sierra Nevada Foothills Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland*	**California Foothill and Valley Forests and Woodlands**	**4**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	4

USNVC Macrogroup	Common Name	Target Rank
Western North America Vernal Pool	Vernal Pools	5
California Annual and Perennial Grassland	California Grassland and Flowerfields	5
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	8
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	8
Western North American Freshwater Marsh	Freshwater Marsh	8
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	9
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	9
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	10
Warm Interior Chaparral*	**Desert Transition Chaparral**	**12**
California Chaparral*	**Chaparral**	**12**
California Coastal Scrub	Coastal Sage Scrub	13
Cool Interior Chaparral*	**Montane Chaparral**	**15**
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	15

USNVC Macrogroup	Common Name	Target Rank
California Cliff, Scree, and Other Rock Vegetation*	**California Foothill and Coastal Rock Outcrop Vegetation**	**15**

Table D-15 Sierra Nevada Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Californian–Vancouverian Montane and Foothill Forest*	**North Coastal Mixed Evergreen and Montane Conifer Forests**	
California Forest and Woodland*	California Foothill and Valley Forests and Woodlands	3
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	3
Western North American Montane/Boreal Peatland	Fen (Wet Meadow)	3
Western North American Temperate Grassland and Meadow*	**Western Upland Grasslands**	**3**
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	4
Western North America Wet Meadow and Low Shrub Carr*	**Wet Mountain Meadow**	**4**

USNVC Macrogroup	Common Name	Target Rank
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	6
Western North American Freshwater Marsh	Freshwater Marsh	6
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	6
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	6
Warm Interior Chaparral	Desert Transition Chaparral	8
Vancouverian Subalpine Forest*	**Pacific Northwest Subalpine Forest**	**9**
California Coastal Scrub	Coastal Sage Scrub	9
Cool Interior Chaparral*	Montane Chaparral	11
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	11
Intermountain Singleleaf Pinyon–Western Juniper Woodland	Intermountain Pinyon - Juniper Woodland	11
Great Basin Saltbush Scrub	**Shadscale-Saltbush Scrub**	**12**
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	12

USNVC Macrogroup	Common Name	Target Rank
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	12
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	12
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	13
Rocky Mountain Alpine Scrub, Forb Meadow, and Grassland*	**Alpine Vegetation**	**14**
Vancouverian Alpine Scrub, Forb Meadow, and Grassland*	**Alpine Vegetation**	**14**

South Coast Province

Table D-16 Southern California Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**3**
Western North American Freshwater Marsh*	**Freshwater Marsh**	**3**
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	4
California Annual and Perennial Grassland*	**California Grassland and Flowerfields**	**5**

USNVC Macrogroup	Common Name	Target Rank
Western North America Vernal Pool	**Vernal Pools**	**6**
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	6
California Coastal Scrub	Coastal Sage Scrub	7
Vancouverian Coastal Dune and Bluff	**Coastal Dune and Bluff Scrub**	**7**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	8
California Chaparral	Chaparral	9
Warm Interior Chaparral	Desert Transition Chaparral	9
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation	10
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	10
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	11
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	11
Introduced North American	Non-Native Forest and Woodlands	15

USNVC Macrogroup	Common Name	Target Rank
Mediterranean Woodland and Forest		
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	15
North American Pacific Coastal Salt Marsh	Salt Marsh	15
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	15

Table D-17 South Coast Mountains and Valleys Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	3
Western North America Vernal Pool	**Vernal Pools**	**3**
California Annual and Perennial Grassland*	**California Grassland and Flowerfields**	**3**
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	3
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**4**
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	4

USNVC Macrogroup	Common Name	Target Rank
Vancouverian Flooded and Swamp Forest	Vancouverian Flooded and Swamp Forest	6
Western North American Freshwater Marsh	Freshwater Marsh	6
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	7
California Coastal Scrub	Coastal Sage Scrub	7
Vancouverian Coastal Dune and Bluff	**Coastal Dune and Bluff Scrub**	**7**
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	8
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	8
California Chaparral	Chaparral	8
Warm Interior Chaparral	Desert Transition Chaparral	8
Mojavean-Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	9
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	10
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	10

USNVC Macrogroup	Common Name	Target Rank
Cool Interior Chaparral	Montane Chaparral	10
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	10
North American Pacific Coastal Salt Marsh	Salt Marsh	13
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	13
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	13
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	14
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	14
Introduced North American Mediterranean Woodland and Forest	Non-Native Forest and Woodlands	15
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	15
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	15
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	15

Deserts Province

Table D-18 Mono Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	3
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	3
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow	Mountain Riparian Scrub and Wet Meadow	4
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	4
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	4
Vancouverian Flooded and Swamp Forest	North Coastal and Montane Riparian Forest and Woodland	5
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	6
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	8

USNVC Macrogroup	Common Name	Target Rank
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	8
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation	Sparsely Vegetated Desert Dune	9
Western North American Freshwater Marsh	Freshwater Marsh	9
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	10
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	10
Western North America Tall Sage Shrubland and Steppe*	**Big Sagebrush Scrub**	**11**
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	11
Mojavean–Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	12
Intermountain Basins Pinyon–Juniper Woodland*	**Great Basin Pinyon-Juniper Woodland**	**12**
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	13
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	13
Cool Interior Chaparral	Montane Chaparral	13

USNVC Macrogroup	Common Name	Target Rank
North American Pacific Coastal Salt Marsh	Salt Marsh	14
Temperate Pacific Intertidal Shore	Brackish (Estuarine) Submerged Aquatic Vegetation	14
Vancouverian Alpine Scrub, Forb Meadow, and Grassland	Alpine Vegetation	15
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15

Table D-19 Mojave Desert Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Annual and Perennial Grassland	California Grassland and Flowerfields	3
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation	Sparsely Vegetated Desert Dune	5
Western North American Freshwater Marsh	Freshwater Marsh	5
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	5
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	6

USNVC Macrogroup	Common Name	Target Rank
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	7
California Coastal Scrub	Coastal Sage Scrub	8
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	8
Mojavean–Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	10
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	10
Warm Interior Chaparral	Desert Transition Chaparral	11
Great Basin Saltbush Scrub*	**Shadscale-Saltbush Scrub**	**14**
North American Pacific Coastal Salt Marsh	Salt Marsh	14
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	14
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	14

USNVC Macrogroup	Common Name	Target Rank
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	15

Table D-20 Sonoran Desert Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Annual and Perennial Grassland	California Grassland and Flowerfields	5
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	6
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	7
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation	Sparsely Vegetated Desert Dune	8
Western North American Freshwater Marsh	Freshwater Marsh	8
Mojavean–Sonoran Desert Scrub*	**Mojave and Sonoran Desert Scrub**	**10**
North American Warm-Desert Xero-Riparian	Desert Wash Woodland and Scrub	10
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	12
North American Pacific Coastal Salt Marsh	Salt Marsh	15

Table D-21 Colorado Desert Ecoregion

USNVC Macrogroup	Common Name	Target Rank
California Annual and Perennial Grassland	California Grassland and Flowerfields	4
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation*	**Sparsely Vegetated Desert Dune**	**5**
Western North American Freshwater Marsh	Freshwater Marsh	6
Warm Southwest Riparian Forest	American Southwest Riparian Forest and Woodland	6
Mojavean–Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	8
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	8
Warm Interior Chaparral	Desert Transition Chaparral	10
North American Warm-Desert Xero-Riparian*	**Desert Wash Woodland and Scrub**	**11**
California Coastal Scrub	Coastal Sage Scrub	11
Warm Semi-Desert/ Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	11
North American Pacific Coastal Salt Marsh	Salt Marsh	15

Table D-22 Southeastern Great Basin Ecoregion

USNVC Macrogroup	Common Name	Target Rank
Warm Southwest Riparian Forest*	**American Southwest Riparian Forest and Woodland**	**3**
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	4
Inter-Mountain Dry Shrubland and Grassland*	**Great Basin Upland Scrub**	**6**
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	6
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	6
Western North American Freshwater Marsh	Freshwater Marsh	7
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	9
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	11
Cool Semi-Desert Wash and Disturbance Scrub*	**High Desert Wash and "Rangeland" Scrub**	**11**
North American Pacific Coastal Salt Marsh	Salt Marsh	11

USNVC Macrogroup	Common Name	Target Rank
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	12
Cool Interior Chaparral	Montane Chaparral	14
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	14
Great Basin Saltbush Scrub	Shadscale-Saltbush Scrub	15
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows	15

Terrestrial Vegetation Communities Cross-reference

Table D-23 provides table of USNVC macrogroups and their common names (used for the SWAP conservation targets), and includes the following:

- Ecological description
- CWHR classification(s)
- Geographic occurrences (SWAP provinces)
- SWAP province(s) selected as priority conservation target

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
California Forest and Woodland	California Foothill and Valley Forests and Woodlands	Includes all Mediterranean climate woodlands and forests in California from sea level to the point where snow and frost in combination with high winter precipitation enables cool temperate species of trees to dominate the overstory layer. This macrogroup ranges throughout the state west of the deserts and below the higher mountains where snow is the main form of precipitation. This includes the Central and South Coast Ranges, the Northern California Interior Coast Ranges, the Sierra Foothills, Central Valley, and lower elevations of the west slope of the Sierra, the Southern Cascades, the Southern Klamath Mountains, and the Transverse and Peninsular Ranges.	Blue Oak Woodland, Blue-Oak-Foothill Pine, Closed-Cone Pine-Cypress, Coastal Oak Woodland, Juniper, Montane Hardwood, Montane Hardwood, Valley Oak Woodland	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath, Central Valley and Sierra Nevada, Bay Delta & Central Coast
Californian–Vancouverian Montane and Foothill Forest	North Coastal Mixed Evergreen and Montane Conifer Forests	This broad macrogroup is representative of the cool-temperate forests which occur in the Pacific states from the Puget Sound area south into the higher mountains of southern California and adjacent Baja, Mexico. In California these range inland from the immediate coast and experience warm, relatively dry summers and cool rainy to cool snowy winters. All of these forests average cooler and wetter than the previous macrogroup (California Foothill and Valley Forests and Woodlands).	Douglas-Fir, Eastside Pine, Jeffrey Pine, Klamath Mixed Conifer, Montane Hardwood, Montane Hardwood-Conifer, Ponderosa Pine, Sierran Mixed Conifer, White Fir	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Central Valley and Sierra Nevada
Rocky Mountain Subalpine and High Montane Conifer Forest	Subalpine Aspen Forests and Pine Woodlands	This macrogroup represents the cold but less snowy subalpine to high montane forests of the Sierra, Cascades, Klamath, Transverse, and Peninsular Ranges of California. It is a wide ranging macrogroup, including similar forests and woodlands in the Rocky Mountains, and the high mountains of the Great Basin.	Aspen, Lodgepole Pine, Subalpine Conifer	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath
Vancouverian Rainforest	Pacific Northwest Conifer Forests	This is the Pacific Northwest temperate rainforest, which includes the giant conifer forests ranging from central California coast, all the way up to southeast Alaska. Mild winters with massive amounts of rain (and some snow north of California) and a maritime climate, with cool summers with either fog (in California) or some summer rain (north of California) are typical.	Redwood	North Coast and Klamath, Bay Delta and Central Coast	North Coast and Klamath

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Vancouverian Subalpine Forest	Pacific Northwest Subalpine Forest	Includes montane conifer forests and woodlands adapted to very high winter snowfall, from montane to subalpine altitudes. Snow loads are the greatest anywhere in North America, and persist well into the summer. Tree germination is also limited in some cases by the short period the ground is not covered by snow.	Red Fir, Subalpine Conifer	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada	North Coast and Klamath, Central Valley and Sierra Nevada
Intermountain Basins Pinyon–Juniper Woodland	Great Basin Pinyon-Juniper Woodland	Includes all mixed and pure pinyon and juniper stands in trans-montane California. These are largely found in the Mojave Desert mountains, and in the mountains of the Modoc Plateau, and Great Basin. They also occur on the eastern slopes of the Sierra Nevada and the Peninsular Ranges and the northern slopes of the Transverse Ranges. Outliers occur west of the Sierra Crest in Kings Canyon, and in the mountains of Ventura and Santa Barbara Counties.	Juniper, Pinyon-Juniper	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Cascades and Modoc Plateau, Deserts
Vancouverian Flooded and Swamp Forest (formerly Western Cordilleran montane–Boreal Riparian Scrub and Forest)	North Coastal and Montane Riparian Forest and Woodland	This is a new synthesis of parts of the older concept treated under Western Cordilleran montane–boreal riparian scrub and forest. Revisions of the NVC have split the tree-dominated forest and woodlands of the cool temperate parts of the state from the riparian scrubs. These riparian forests occur along the major rivers and streams in the outer and middle North Coast Ranges, and along the foothill and lower montane reaches of rivers and streams in the Klamath, Cascades, Sierra Nevada, Modoc Plateau, Transverse, and Peninsular ranges. Unlike the Warm Southwest Riparian Forest Macrogroup, surrounding upland vegetation is mainly conifer dominated and not broadleaf evergreen or deciduous woodland/forest.	Montane Riparian	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada	North Coast and Klamath

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Western North American Montane-Subalpine Wet Shrubland and Wet Meadow (formerly Western Cordilleran Montane-Boreal Wet Meadow)	Mountain Riparian Scrub and Wet Meadow	This macrogroup contains montane meadow grasses, graminoids, and forbs and shrublands associated with meadows, riparian terraces, and seeps in the higher mountains of the state from the Peninsular and Transverse Ranges through the Sierra-Cascade Ranges and including the higher mountains of the Modoc Plateau, the Klamath Mountains and the high Inner North Coast Ranges. The vegetation tends to make small stands sorting ecologically based on moisture availability and on tolerance of disturbance. This concept joins both low riparian shrublands and associated wet meadows based on their overlap in ecologies and floristic composition.	Montane Riparian, Wet Meadow	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath
Warm Southwest Riparian Forest (formerly Southwestern North American Riparian, Flooded and Swamp Forest)	American Southwest Riparian Forest and Woodland	The Great Valley, South Coast, and warm desert riparian forests and thickets are included in this macrogroup. The range of the main indicator trees and shrubs are the southwestern United States and northern Mexico. Most stands of this macrogroup occur below 4,000-feet elevation and are replaced by the cool-temperate version of riparian (Montane and North Coast Riparian Forest and Scrub) in the mountains and on the north coast	Palm Oasis, Valley-Foothill Riparian	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts
California Chaparral	Chaparral	This includes all chaparral (evergreen sclerophyll-leaved shrublands) below the zone of regular snow accumulation in the mountains. The chaparral occurs throughout Mediterranean climate parts of California from the Klamath Mountains to the Mexican Border. It is represented by a wide variety of floristic alliances, but in general can be grouped into coastal (maritime), xeric (dry, sunny slopes), mesic (cooler, shady slopes), and lower montane (somewhat frost sensitive) types. All these groupings have different characteristic species and fire regimes.	Chamise-Redshank, Mixed Chaparral	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast, Central Valley and Sierra Nevada

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
California Coastal Scrub	Coastal Sage Scrub	This is the other main macrogroup of California shrublands. It differs from chaparral by being composed of drought-deciduous shrubs, which typically are smaller with less extensive root systems and shorter life spans. Many of the members of this macrogroup are also found in the warm deserts and show similar adaptations to hot-dry summer conditions.	Coastal Scrub	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	¼ Bay Delta and Central Coast
California Annual and Perennial Grassland	California Grassland and Flowerfields	This macrogroup includes all annual forb/grass vegetation native and non-native, as well as native perennial grasslands growing within the California Mediterranean climate. This does not include the cool-moist north coastal terrace prairies, the montane meadow/upland grasslands, and non-native perennial pasture grasses. Stands of this macrogroup include everything from wildflower fields in the San Joaquin Valley and adjacent South and Central Coast Ranges, poppy fields of the western Mojave Desert, needlegrass grasslands of the foothills, valleys and coast ranges, and the largely non-native annual grasslands and weed patches in the dry, warm summer regions of California.	Annual Grassland, Perennial Grassland	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast
Western North American Temperate Grassland and Meadow	Western Upland Grasslands	This macrogroup applies to vegetation dominated by grasses, which are typically not restricted to moisture conditions that are higher than the surrounding landscape (not seeps, riparian, or wet meadows). In general, these grasslands are also widespread outside of California in surrounding states with cool-temperate climatic conditions. This vegetation occurs in the hills and mountains of the north Coast Ranges, Klamath Mountains, lower montane Sierra Nevada, Modoc Plateau, Great Basin, and southward to the Transverse and Peninsular Ranges.	Annual Grassland, Perennial Grassland	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Western Cordilleran Montane Shrubland and Grassland	Montane Upland Deciduous Scrub	This macrogroup includes several widespread western alliances that occur in rocky settings at mid to higher elevations. Stands occur in Klamath, Cascade, Sierra, higher inner North Coast Ranges and the Transverse and Peninsular Ranges. Stands are often adjacent to montane chaparral (which is largely evergreen) but often shows greater affinity to more mesic sites such as rocky canyons, north-facing slopes, or areas of greater snow accumulation. Some vegetation types are successional to forest, others persist due to avalanche disturbance, or poor soils, which preclude productive tree growth.	Montane Chaparral	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath
Vancouverian Lowland Grassland and Shrubland	North Coast Deciduous Scrub and Terrace Prairie	This macrogroup includes a combination of grasses and shrubs, which tend to intermix in stands along the immediate coastal strip from central California to north of the Oregon border. Cool foggy summers and rainy winters, coupled with salty winds tend to preclude forest development along the immediate coast, but inland these stands only persist through regular disturbance such as clearing, grazing/browsing. Stands also commonly occur adjacent to upland Coastal Dune and Bluff scrub. However, that macrogroup is characterized by more evergreen shrubs, which occur in well-drained exposed settings (exposed bluffs and dunes).	Coastal Scrub, Perennial Grassland	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast
Warm Interior Chaparral	Desert Transition Chaparral	These chaparral stands occur in the "rain-shadow" of the Mountains including the inland sides of the inner South Coast Ranges, the southern Sierra, Tehachapi, Transverse, and Peninsular Ranges. Compared to California chaparral the stands are less dense, contain a mix of other non-chaparral shrubs with desert affinities, and tend to have less frequent and less intense fires. Several of the characteristic species are also found in Arizona, New Mexico, and adjacent northern Mexico in similar "desert-margin" settings, and are thus, different floristically and ecologically from typical California Chaparral, although the two macrogroups may intermingle in some areas.	Chamise-Redshanks Chaparral, Mixed Chaparral	Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Central Valley and Sierra Nevada

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Cool Interior Chaparral (formerly Western North American Cool/Montane Sclerophyllous Evergreen Scrub)	Montane Chaparral	This macrogroup is characterized by sclerophyllous leaved shrubs with wider geographic range than California. Many occur throughout the western mountains to the Rockies. These are cold-adapted and occupy successional relationships to various coniferous forests on productive sites, or persist in rocky or other poor soil sites.	Montane Chaparral	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Central Valley and Sierra Nevada
Vancouverian Coastal Dune and Bluff	Coastal Dune and Bluff Scrub	Stands of coastal dune and bluff vegetation are limited to salty, rocky or sandy settings immediately adjacent to the open coast. Adaptations to salt spray, wind and shifting sands, result in several lifeforms including succulent or hairy leaves, long underground roots and stolons (adaptation to shifting sands), and good colonization of relatively unstable and sterile substrates.	Coastal Scrub	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast	North Coast and Klamath, Bay Delta and Central Coast, South Coast
Western North American Montane/Boreal Peatland	Fen (Wet Meadow)	Fens (often mistakenly called "bogs") are hydrologically and chemically unique wetlands, which are typically nutrient-poor and support many endemic vascular and non-vascular plants. (mostly mosses) Fens are typically small in size in California, and in California have only been well described from the Sierra, Klamath, and Cascade ranges. They also occur along the cool north coast.	Fresh Emergent Wetland, Wet Meadow	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada	North Coast and Klamath
Western North American Freshwater Marsh	Freshwater Marsh	Freshwater is present throughout all or most of the growing season, species are widespread and tend to be tall emergent forms at lower elevations, but when water depth is > 1 m most vegetation is either anchored or floating hydrophytes (water lilies, duckweed, pondweed, etc.)	Fresh Emergent Wetland	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath, Bay Delta and Central Coast, South Coast, Central Valley and Sierra Nevada, South Coast

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Western North America Vernal Pool	Vernal Pools, California Grasslands and Flowerfields	Vernal pools are widespread in 17 different regions in the state from the Mediterranean climate pools of south-coastal through the Great Valley up to the cool temperate Modoc Plateau and Sierra Valley areas of the Northeastern part of the state. Pools generally fill and dry several times per winter, but generally are completely dry in the summer months. Vegetation is seasonally varied and also varies yearly due to fluctuating and unpredictable water levels. Most pools are small, but can be many acres in size in some areas such as the Modoc Plateau.	Annual Grassland, Fresh Emergent Wetland	Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast	Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast
Western North America Wet Meadow and Low Shrub Carr	Wet Mountain Meadow	Wet meadows are typical of low-lying sites in the mountains and in some lower elevation valleys and depressions. Saturated soil or standing water through the growing season are key characteristics. Long-persisting standing water tends to convert sites to Freshwater Marsh macrogroup. Many wet meadow vegetation types occur in the mountainous areas of the state where cool snowy winters and short growing seasons prevail. However, there is a warmer winter lower elevation analog, and also one with invasive exotic species. This macrogroup is widespread throughout the state wherever freshwater meadows and seeps occur.	Wet Meadow	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Central Valley and Sierra Nevada, North Coast and Klamath
North American Pacific Coastal Salt Marsh	Salt Marsh	Salt marshes are generally tied to coastal tidally influenced wetlands in California. They have salinities similar to ocean water and do not develop the higher concentrations of salts characteristic of the Salt marsh meadow macrogroup. Many salt marsh species are widespread, and species diversity is relatively low. Individual alliances within the macrogroup tend to sort out based on inundation frequencies and maximum water depths.	Saline Emergent Wetland	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Warm Semi-Desert/Mediterranean Alkali–Saline Wetland	Salt Marsh Meadows (strategies developed for Salt Marsh apply to this macrogroup)	This macrogroup includes herbaceous and shrubby perennial vegetation associated with saline or alkaline wetlands in the desert or along the upper edges of coastal salt marshes. The overlap between salty desert basins and coastal "high" salt marsh becomes more pronounced as one proceeds southward. In coastal southern California precipitation is only 10 inches per year and solar insulation and evaporation concentrate surface salts to similar levels found on or at the edges of many desert playas. Seeps of fresh or brackish water in either setting account for denser herbaceous growth indicative of one group of alliances in this macrogroup, while the evaporative flat pannes and playas of the coast and the desert are the home of the phreatophitic shrubby indicators of the other group in this category.	Alkali Desert Scrub, Saline Emergent Wetland	Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Bay Delta and Central Coast
Mojavean–Sonoran Desert Scrub	Mojave and Sonoran Desert Scrub	This is an upland desert scrub found on hill slopes and alluvial fans throughout the arid Southwest where winter temperatures are not as cold as in the Great Basin Desert and summer temperatures are very hot. The Mojave has frost and occasional winter snows, the Sonoran rarely has any frost. The warmer Sonoran desert tends to have more summer rain, and more distinctive emergent arborescent species, such as saguaro, ocotillo, and the Mojave is cooler with fewer large cacti and large thorny trees, but has Joshua trees and other Yucca species.	Desert Scrub, Desert Succulent Scrub, Joshua Tree	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Deserts
North American Warm-Desert Xero-Riparian Macrogroup (formerly Madrean Warm Semi-Desert Wash Woodland/Scrub)	Desert Wash Woodland and Scrub	This macrogroup includes the warm desert washes of the Sonoran and Colorado Desert. These have trees and large shrubs associated with them while the cooler Mojave desert has fewer trees but several shrub species. Stands vary depending upon subsurface water availability, minimum winter temperature, and intensity and frequency of flooding.	Desert Scrub, Desert Wash	North Coast and Klamath, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Deserts

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Great Basin Saltbush Scrub Macrogroup (formerly Western North American Cool Semi-Desert Shrubland, Shrub-Steppe)	Shadscale-Saltbush Scrub	The shrubby cool desert saltbush species often form distinct bands above closed basins and below extensive sagebrush belts in the Great Basin Desert. This macrogroup addresses those saltbush scrubs, which typically are not growing in strongly saline or alkaline soils, but do tolerate higher pH (alkalinity) and often finer soil texture than Artemisia tridentata and related taxa of sagebrush.	Alkali Desert Scrub, Desert Scrub, Desert Wash	Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Deserts, Central Valley and Sierra Nevada
Cool Semi-Desert Wash and Disturbance Scrub	High Desert Wash and "Rangeland" Scrub	This is a cool desert macrogroup which is most common in the eastern portions of the state from Modoc Plateau, southward and east of the Cascades and Sierra into the mountains of the Mojave Desert. Stands form when fire or other clearing and disturbance remove stands of Artemisia, (in the big sagebrush scrub) or other shrubs characteristic of the Great Basin Upland Scrub macrogroup	Bitterbrush, Low Sage, Sagebrush	Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Deserts
Western North America Tall Sage Shrubland and Steppe	Big Sagebrush Scrub	This macrogroup is emblematic of the valleys and lower slopes of the Great Basin Desert and enters California in the Modoc Plateau, south and east of the Cascades and Sierra, into the higher mountains of the Mojave Desert. It also occurs in isolated patches in the Transverse and Peninsular ranges, the south and the inner north Coast Ranges sporadically northward to the eastern Klamath Mountains.	Sagebrush	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Cascades and Modoc Plateau, Deserts
Western North America Dwarf Sage Shrubland and Steppe	Great Basin Dwarf Sagebrush Scrub	This macrogroup occurs in cool desert or even high mountain settings from the Eastern Sierra, Cascades, Modoc Plateau, southward into the southern Great Basin Mountains, and the desert side of the Transverse Ranges. It is characterized by low subshrub species in the genus Artemisia (sagebrush). These species form stands on poor soils, or exposed slopes and ridges where larger sagebrush species are unable to grow.	Low Sage	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada, Deserts	Cascades and Modoc Plateau

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Inter-Mountain Dry Shrubland and Grassland	Great Basin Upland Scrub	This macrogroup occurs in the cooler Mojave Desert mountains, the uplands of the Great Basin and Modoc Plateau, and in isolated pockets of the inner South Coast Ranges such as Temblor Range and Carrizo Plains. It is composed of shrublands with cool desert affinities but has been segregated from the short and tall species of sagebrush (Artemisia spp.). Most of the vegetation in this macrogroup occurs well beyond the eastern borders of CA into the Great Basin Province. Successional relationships exist between the several groups of alliances in this macrogroup, some are disturbance followers and may also occur in episodic washes. Some are persistent resprouting shrubs, which recover well after fire, and some are fire and browsing-sensitive with longer recovery times. Some perennial desert grasslands are also part of this macrogroup and increase with short fire intervals.	Bitterbrush, Low Sage, Sagebrush	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	Cascades and Modoc Plateau, Deserts
Vancouverian Alpine Scrub, Forb Meadow, and Grassland, *and* Rocky Mountain Alpine Scrub, Forb Meadow, and Grassland	Alpine Vegetation	This macrogroup is representative of the state's alpine zone in the Sierra, Cascades, White, Sweetwater, and Klamath Mountains. It either occurs above timberline or is found localized within subalpine areas in cold air drainages (e.g. N-facing slopes, often near long persisting snowbanks). The characteristic species are either herbaceous (many are cushion plants, some tufted or rhizomatous graminoids) or low prostrate or dwarf shrubs. Different groups segregate based on substrate type (scree, talus, felfield) and moisture regime (snowbank, felfield, etc.).	Alpine Dwarf-Shrub	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath
Temperate Pacific Intertidal Shore	Brackish (Estuarine) Submerged Aquatic Vegetation *(strategies from Marine target "Embayments, Estuaries, and Lagoons" apply to this macrogroup)*	This macrogroup is poorly defined currently in California, but should include both hard and soft bottom intertidal settings.	Estuarine	North Coast and Klamath, Bay Delta and Central Coast, South Coast	Marine

USNVC Macrogroup	Common Name (SWAP Conservation Targets)	Ecological Description	CWHR Classification	Geographic Occurrences (Provinces)	SWAP Province Selected as Priority Conservation Target
Western North American Freshwater Aquatic Vegetation	Freshwater Aquatic Vegetation (strategies from Freshwater Marsh apply to this macrogroup)	This macrogroup is poorly defined in the state, many wetland vegetation stands are best kept in the Freshwater marsh macrogroup. However, deeper water species which do not cover large areas of water surface would fall into this macrogroup.	Lacustrine, Riverine	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast, Deserts	North Coast and Klamath, Bay Delta and Central Coast, South Coast
California Cliff, Scree, and Other Rock Vegetation	California Foothill and Coastal Rock Outcrop Vegetation	Vegetative cover is generally < 2% cliffs and outcrops west of the deserts and inland from the immediate coast, south of central California. Rock surfaces or rapidly eroding unstable slopes are characteristic. Stands do not include alpine or subalpine sparse, rocky vegetation, and also do not include the sparsely vegetated portions of the warm and cold deserts.	Barren	North Coast and Klamath, Cascades and Modoc Plateau, Bay Delta and Central Coast, Central Valley and Sierra Nevada, South Coast	Bay Delta and Central Coast, Central Valley and Sierra Nevada
Vancouverian Cliff, Scree, and Other Rock Vegetation	Northwest Coast Cliff and Outcrop	Taken to describe coastal cliffs on headlands and islands of the north coast.	Barren	Cascades and Modoc Plateau, Bay Delta and Central Coast	Bay Delta and Central Coast
North American Warm Semi-Desert Cliff, Scree, and Other Rock Vegetation	Sparsely Vegetated Desert Dune	This macrogroup is characteristic of the desert dunes and contains both annual and perennial species with special strategies to deal with the shifting sands and the dry and unpredictable climate. Vegetation cover is variable depending upon unpredictable rainfall patterns.	Barren	North Coast and Klamath, Cascades and Modoc Plateau, Central Valley and Sierra Nevada, South Coast	Deserts

Appendix E Invasive Species in California

Impacts of Invasive Species

Invasive species are nonnative organisms that cause, or are likely to cause economic, ecological, or environmental harm (Food and Ag. Code § 7700(g)(2)). Invasive species do not include humans, domestic livestock, domestic or domesticated species exempted pursuant to Section 2118 of the Fish and Game Code, or nonharmful nonnative organisms. Nonnative are all organisms presumed to have been absent from California, or from a specific location with California, prior to European colonization.

Some of these organisms were introduced inadvertently while others were introduced intentionally, without consideration of the harm they might cause. Although many species brought into our state cause little or no apparent harm, a small percentage can thrive in California to the detriment of native biological diversity, recreation, agriculture, infrastructure, and public health. Though it is difficult to compute harm from invasive species in financial terms, in Environmental and Economic Costs Associated with Non-Indigenous Species in the United States (2005), Pimental et al. place the cost to the United States at over $100 billion each year. Scientific literature on invasive species and their impacts is extensive, as evidenced by the USDA National Invasive Species Information Center.

Invasive species in California range from a tiny fungal-like pathogen causing sudden oak death to 200-pound feral pigs. They include freshwater or brackish water mussels that clog infrastructure (e.g., pipes, pumps, equipment, etc.) and exert impacts on waterways, insects that damage and destroy crops and forests, amphibians that are vectors of diseases and parasites for which native species have little or no immunity (e.g. bullfrogs), and plants that drastically alter native plant communities. Some introduced species are voracious predators, others out-compete native species for resources, and some are capable of re-engineering the environment to suit their preferences, changing hydrology, soil chemistry, and fire regimes. Collectively, invasive species are recognized as a major threat to biodiversity; they significantly impact over half of all federally listed threatened and endangered species and are second only to habitat loss as a threat to these species (Wilcove et al. 1998). As the United Nation's Convention on Biological Diversity states, "[a]lien species that become invasive are considered to be a main direct driver of biodiversity loss across the globe.

In addition, alien species have been estimated to cost our economies hundreds of billions of dollars each year" (Convention on Biological Diversity 2025)."

Federal and state governments have developed and implemented plans and programs that promote interdisciplinary, interagency, and multi-stakeholder efforts to combat the threats posed by invasive species. The "Policy Background" and "Agency Programs" sections below provide a description of policies and plans that provide the framework and guidance for federal and state agency actions and programs. The "Invasive Species Leadership by Taxonomic Group" section describes the agency and non-governmental organization (NGOs) efforts targeting specific taxonomic groups of species, which is organized by plants, insects and terrestrial invertebrates, aquatic and marine invertebrates, and vertebrates.

The species highlighted in this section are only a few of the hundreds of invasive plant and animal species in California. The California Invasive Species Advisory Committee (CISAC) compiled an all-taxa list of invasive species found in the state, as well as known invasive species with potential for being introduced into the state in the future.

Agency Programs

Several agencies at the federal and state government levels, as well as NGOs, manage invasive species as part of meeting their mission. Invasive species are a landscape-level problem, thus solutions must also be landscape-level and not limited by jurisdictional boundaries. Interagency collaborative bodies and their efforts to tackle invasive species are also described below.

State Agencies

Numerous California state agencies and departments have developed programs to address aspects of the invasive species challenge relevant to their mission. In some states, a single agency has been created to coordinate the state's overall response to invasive species, but that does not exist in California at this time. For more detailed information on invasive species programs in California, refer to the state's *Aquatic Invasive Species Management Plan* (CDFG 2008) and the *Invasive and Noxious Weed Action Plan* (CDFA 2005).

California Department of Fish and Wildlife

CDFW is the trustee agency for wildlife and habitat protection. CDFW supports coordination and policy direction on invasive species prevention and management, as well as implements high priority invasive species management actions across the state on properties managed by CDFW, as well as properties not explicitly managed

by CDFW. CDFW's Invasives Species Program Manager represents California in the state seat on the Western Regional Panel on Aquatic Nuisance Species.

The Invasive Species Program (ISP) leads coordination internally and externally on policy and oversees the state's quagga mussel (*Dreissena bugensis*) and zebra mussel (*Dreissena polymorpha*) prevention and control activities. ISP initiated a golden mussel reporting system to respond to detections of golden mussels (*Limnoperna fortunei*) in 2024. Additionally, the program has increased golden mussel monitoring in high-risk waterbodies and revised outreach materials to be inclusive of all invasive mussels. ISP's mission is to reduce the negative effects of invasive animals and plants, both terrestrial and aquatic, on the wildlands and waterways of California. The program puts an emphasis on identifying and addressing the ways by which species are introduced and moved, typically inadvertently, by human activities. In 2014, CDFW held the first Invasive Species Action Week, seeking to engage the public and many volunteers across the state who help control invasive species. ISP continues to grow but does not yet have full capacity to take a comprehensive approach to addressing the impact of invasive species on wildlife statewide (CDFW 2025a).

The Nutria Eradication Program (NEP), formally created in 2019, evolved out of CDFW's emergency response to the 2017 discovery of nutria in California. NEP seeks to eradicate nutria to prevent degradation of aquatic ecosystems, particularly loss of wetland and riparian habitat, and prevent damage to flood protection and water conveyance infrastructure. NEP conducts outreach and education to landowners and local stakeholders and implements nutria surveys and trapping throughout the area of infestation. NEP operates in close partnership with the U.S. Fish and Wildlife Service, which contributes to survey and trapping operations on their refuges. NEP maintains close coordination with the Departments of Water Resources and Food and Agriculture given the potential for impacts to the resources under their purview. Additionally, NEP collaborates with the Department of Parks and Recreation's Division of Boating and Waterways in an effort to control aquatic invasive plant infestations that both harbor and are exacerbated by nutria populations.

Marine Invasive Species Program (MISP) within CDFW's Office of Spill Prevention and Response (OSPR) coordinates with the California State Lands Commission (SLC) to control the introduction of Non-Indigenous Species (NIS) from the ballast of ocean-going vessels. MISP is responsible for conducting biological surveys to assess the amount and types of marine invasive species present in state coastal and estuarine waters, and the degree of success of ballast water management activities. The California Non-Native Estuarine and Marine Organisms (CalNEMO) database has replaced CANOD, OSPR's inventory of non-native species in California. Improvements include images and descriptions for identification, maps of global distributions, and

information about species ecology and impacts. It is a long-term, dynamic database that we will continue to update as new species are discovered and new research becomes available.

CDFW is also responsible for controlling invasive species on land CDFW owns or manages. Over 1.1 million acres of land are owned and operated by CDFW, spanning over 700 properties statewide. The Lands Program (Wildlife Branch) manages invasive vegetation on CDFW-managed properties to protect beneficial uses, such as habitat for native species and recreational uses by the public. Methods used for vegetation control fall within an Integrated Pest Management (IPM) approach which include the use of measures to prevent new introductions of invasive species, track infestations that exist, monitor for new introductions, and manage or control species that are having negative effects on the native environment. CDFW prioritizes invasive species infestations that have the highest likelihood to cause negative impacts and, when eradication or control is needed, relies on the best available science to determine which is the most effective and least impactful method (or combination of methods) available.

CDFW maintains a regulatory list of live restricted animals (Cal. Code Regs., tit. 14, § 671; FGC § 2118), through which several invasive animals, among other species, are prohibited from importation, possession, and transportation unless under a permit issued by CDFW. FGC also prohibits the sale, possession, import, transport, transfer, or live release of all Caulerpa spp., and live or dead mussels of the family Dreissenidae (e.g., quagga, zebra, dark false) unless under CDFW permit. CDFW regulates the aquaculture industry, including the import, sale, and placement of aquatic plants and animals into state waters.

California Department of Parks and Recreation

California Department of Parks and Recreation's (State Parks) resource management policies call for preservation and restoration of native plants and animals and systematic removal of invasive species in wildland settings. Of all State Park expenditures on natural resource management, control of invasive species is the single largest expense. State Parks has taken aggressive action to control or eliminate the most serious invasive plants, with the Early Detection and Rapid Response (EDRR) program initiated to detect new invasive plant introductions when populations are small. State Parks partners with the non-profit California Invasive Plant Council (Cal-IPC) and other agencies and organizations in planning and implementing strategic regional invasive plant management projects. State Parks also implements quagga/zebra mussel prevention programs in water bodies that State Parks manages that are deemed vulnerable to mussel infestation (CDPR 2025).

State Parks Division of Boating and Waterways (DBW) manages the state's largest and oldest aquatic weed control program, working with other public agencies to control water hyacinth (*Eichhornia crassipes*), and more recently Brazilian elodea (*Egeria densa*) and South American spongeplant (*Limnobium laevigatum*), in the Sacramento-San Joaquin Delta, its tributaries, and the Suisun Marsh. DBW also leads the California Clean Boating Network, a collaboration of government, business, boating, and academic organizations working to increase and improve clean boating education efforts, including invasive species education, across the state. DBW also manages the "Mussel Fee" sticker which provides grant funding to eligible agencies for quagga and zebra mussel prevention programs at uninfested reservoirs that allow boating and fishing recreation (DBW 2016).

California Department of Water Resources

The California Department of Water Resources (DWR) addresses invasive species that impact water supply, water delivery, and flood control. Activities related to invasive species are diverse. DWR conducts monthly monitoring of benthic (bottom-dwelling) invertebrates, zooplankton, and phytoplankton throughout the upper San Francisco Estuary and reports trends in invertebrate abundance and community composition, including newly introduced species, to the State Water Resources Control Board (SWRCB). DWR contributes to programs aimed at controlling invasive plants along the eroding banks of the Sacramento River, within flood control and water conveyance structures, and along urban streams. DWR also conducts research on invasive species with the potential to impact the State's water resources including the invasive algal species Microcystis spp. in the upper San Francisco Estuary, the impacts of the Chinese mitten crab (*Eriocher sinensis*) on the benthic invertebrate community in the Sacramento-San Joaquin Delta, quagga and zebra mussel impacts on State Water Project infrastructure, and northern pike (*Esox lucius*) control at Lake Davis with downstream protection, including the installation of a structure to prevent pike escape over the dam (CDFW 2025b).

California Coastal Conservancy

For over 20 years, the California Coastal Conservancy (Coastal Conservancy) has been involved in the control and eradication of aquatic invasive species (Pub. Resources Code, div. 21). The Coastal Conservancy developed, funded, and operates the Invasive Spartina Project in San Francisco Bay that shows great promise in eradicating invasive Spartina cordgrass species and their associated hybrids. The Coastal Conservancy is also involved in efforts to control giant reed (*Arundo donax*) in many coastal watersheds. The Coastal Conservancy directly develops projects and

provides grant funds related to resources enhancement and restoration, including control and elimination of invasive species (CA SCC 2025).

State Water Resources Control Board

The SWRCB and regional boards have been working in support of, and in an advisory capacity to, other state agencies on various aquatic invasive species activities, such as hull fouling and ballast water management. Invasive species come under SWRCB purview as part of the state's efforts to implement and enforce the Clean Water Act since a 2005 federal court ruling defined non-indigenous species as "pollutants" present in discharges and found that such discharges are not exempt from permitting. The SWRCB supported extensive mapping of invasive giant reed in coastal watersheds from the Bay Area to Mexico.

California State Lands Commission

SLC manages the mandatory, statewide, multi-agency MISP. This program works to implement regulations governing ballast water management for vessels operating on the west coast of North America. In addition to its regulatory activities, SLC facilitates scientific research and technology development to enhance management efforts of the program and to inform policymakers. Limited funding is provided for research that targets priority information gaps and to technologies that show exceptional promise for the treatment of ballast water. In recent years, the SLC has prepared a number of reports for the state legislature documenting commercial vessel fouling in California, proposing performance standards for ballast water discharges, and summarizing vessel ballast water activities and compliance. SLC also coordinates interagency efforts to manage invasive aquatic plants such as Eurasian watermilfoil (*Myriophyllum spicatum*) in Lake Tahoe (CA State Lands Commission 2025).

California Department of Food and Agriculture

As prescribed by its mission statement, one of the primary mandates of CDFA is to "[p]rotect against invasion of exotic pests and diseases." This mandate focuses primarily on protecting agriculture. A limited amount of CDFA's activities overlap with efforts to protect wildlife; CDFA's regulatory authority includes quarantine, exterior pest exclusion (border protection stations and inspections), interior pest exclusion (survey of pet/aquaria stores, aquatic plant dealers, and nurseries), and detection and control/eradication programs. The CDFA Plant Pest Diagnostic Center identifies plant species, assigns plant pest ratings, and supports the listing of noxious weed species. CDFA has a long-standing partnership with County Agricultural Commissioners (CACs) to address invasive plants across the state.

CDFA administers grants through the Noxious Weed Management Account to fund projects through the state's Weed Management Area (WMA) network. WMAs are local stakeholder collaborations focusing on invasive plant control efforts. This collaborative network has eradicated several thousand high-priority invasive plant populations across the state. CDFA's Biological Control Program helps to minimize the economic and environmental impact of noxious weeds and exotic pests by facilitating the importation and establishment of co-evolved natural species. With funding from the U.S. Forest Service (USFS), CDFA supported the development of CalWeedMapper, the statewide mapping and decision-support tool, by the nonprofit California Invasive Plant Council (Cal-IPC), and the development of the Weed Heuristics: Invasive Population Prioritization for Eradication Tool (WHIPPET), another decision-support prioritization tool, at UC Davis. The one wildland program remaining at CDFA is its partnership with CDFW and State Parks' DBW on aquatic weed control, with a still-active hydrilla (*Hydrilla verticillata*) program (CDFA 2025).

County Agricultural Commissioners

California Agricultural Commissioners (CACs) have long been at the forefront of addressing invasive species throughout the state. They work collaboratively with CDFA and other agencies to exclude, detect, and eradicate or manage a wide range of pest species. CACs perform numerous inspections of incoming plant materials, checking for compliance with quarantine requirements and for noxious weeds and other pests. Nurseries and pet stores are also inspected. The CACs have worked with CDFA to obtain additional resources to fund more effective programs. Once plant materials enter the state, it is generally the CACs who perform inspections and carry out most of the weed eradication and management activities. While the CACs are not a "state" agency, they form a statewide system, represented at the state level by California Agricultural Commissioners and Sealers Association (CACASA) and have specific authorities granted by state law to carry out pest prevention programs. From 2000 to 2010, CACs received seed grants from the state through the WMA program, resulting in significant progress on the ground and substantial in-kind contributions from a wide array of partners (CA Agricultural Commissioners and Sealers Association 2025). CACs also coordinate with state and federal agencies on the new Weed Free Forage program. Weed Free Forage is hay, feed, straw, or straw mulch that has been inspected and certified to not contain propagative plant parts or seeds from species on the California Noxious Weed List.

California Department of Transportation

California Department of Transportation (Caltrans) manages invasive plants along rights-of-way for state highways. These management activities are critical because

roadways are a significant pathway of spread for invasive plants. Caltrans has worked on best management practices (BMPs) for preventing the spread of invasive plants during construction and maintenance, and reviews roadside landscaping palettes for plant species that could be invasive (Caltrans 2025).

Federal Agencies

More than 40 percent of lands in California are federally managed; consequently, federal land and natural resource agencies have an important role in addressing invasive species issues. The roles and efforts of some of the major federal agencies to manage invasive species or conduct research on invasive species control are described below.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is the only agency of the U.S. Government whose primary responsibility is the conservation of the nation's fish, wildlife, and plants. Because of these responsibilities, USFWS is very concerned about the impacts that invasive species are having on wildlife across the nation. National Wildlife Refuges in California control invasive species as part of their mission to protect wildlife habitat. Invasive species are often part of the reason that species are listed under the Endangered Species Act, which is administered by USFWS.

Also, under the purview of USFWS is the listing and regulation of injurious wildlife under the Lacey Act. Injurious wildlife are mammals, birds, amphibians, reptiles, fish, crustaceans, mollusks and their offspring or gametes that are injurious to the interests of human beings, agriculture, horticulture, forestry, wildlife, or wildlife resources of the United States. Listing of species as injurious wildlife prohibits their importation into the U.S. and interstate transport among the states and U.S. territories, unless under a permit from USFWS. The Service's Office of Law Enforcement, using wildlife inspectors at major airports, ocean ports, and border crossings, seeks to prevent the introduction of injurious wildlife through its wildlife inspection program. However, possession and intrastate transport of injurious wildlife is not prohibited under the Lacey Act and is the discretionary responsibility of each state. Find more information at USFWS-Invasive Species.

National Park Service

The National Park Service (NPS) works to manage invasive species on park lands through a suite of national and local programs, each based upon the following strategies: cooperation and collaboration, inventory and monitoring, prevention, early detection and rapid response, treatment and control, and restoration. At the national

level, NPS has fostered a successful invasive plant management program with the creation of Exotic Plant Management Teams. These 16 teams provide highly trained mobile assistance in invasive plant management to parks throughout the National Park System. Almost all parks have incorporated invasive species management into long range planning goals for natural and cultural landscapes, as well as in day-to-day operations. Nationally, 70 percent of the invasive species in National Parks are invasive plants (NPS 2025).

U.S. Forest Service

The U.S. Forest Service (USFS) manages 20 million acres in California and implements several programs that manage invasive species to protect resources. The USFS implements an Invasive Species Program to reduce, minimize, or eliminate the potential for introduction, establishment, spread, and impact of invasive species across all landscapes and ownerships. The Invasive Species Program integrates many divisions of the agency. The State and Private Forestry program of the USFS is one that connects a variety of stakeholders across different forests, states, communities, and includes private landowners. This program provides funds to the state for implementing weed management projects on non-federal lands (USFS 2025).

Bureau of Land Management

Although the Bureau of Land Management (BLM) participates in the control of large invasive plant infestations, the agency's primary focus is providing adequate capability to detect and treat smaller weed infestations in high-risk areas before they have a chance to spread. The BLM Weed Management and Invasive Species Program receives support from several BLM programs that are affected by invasive species. These include the BLM Rangeland Management, Forestry, Fire Fuels Reduction, Soil, Water, Air, and Riparian programs. In most cases, BLM works with county governments, local community governments, and private landowners to detect and treat weed infestations. To leverage funding and share expertise, BLM partners with more than 50 Coordinated Weed Management Areas (CWMAs) in the Western United States. CWMA partners include state, federal, county, and private land managers (US BLM 2025).

National Oceanic and Atmospheric Administration

To help prevent and control invasive species in our coastal waters and along our coasts, the National Oceanic and Atmospheric Administration (NOAA) provides funding for restoration and oversees the National Marine Fisheries Service (NMFS). NOAA provides BMPs for activities such as cleaning watercraft and equipment, decontamination of shells, decontamination of crane bags used in unloading ships,

and replanting restoration project sites. It also hosts an online database of Aquatic Nuisance Species experts. NOAA also supports the West Coast Ballast Outreach Project to educate the maritime industry. NOAA has a leadership role as the co-chair of both the NISC and the Aquatic Nuisance Species Task Force (NOAA 2025).

U.S. Geological Survey

Supporting science to inform management of invasive species, the U.S. Geological Survey (USGS) invasive species research encompasses all significant groups of invasive organisms in terrestrial and aquatic ecosystems throughout the United States, directly supporting risk assessment, prevention, early detection, rapid response, monitoring, and control efforts. In addition, the USGS manages the Nonindigenous Aquatic Species (NAS) information resource, an online central repository for spatially referenced biogeographic accounts of introduced aquatic species. The program provides scientific reports, online/real-time queries, spatial data sets, distribution maps, and general information. The data are made available for use by biologists, interagency groups, and the public.

Inter-Agency Partnerships

Invasive Species Council of California

The Invasive Species Council of California (ISCC) represents the highest level of leadership and authority in state government regarding invasive species. The ISCC is an inter-agency council created to help coordinate and ensure complementary, cost-efficient, environmentally sound, and effective state activities regarding invasive species.

In California, Assembly Bill 2763 (Laird), signed by the governor in 2008, directed state agencies under the leadership of the California Department of Food and Agriculture (CDFA) to strengthen planning to anticipate the potential responses needed for future invasive species. This resulted in the formation of the ISCC (comprising secretaries of six state agencies) and CISAC (comprising 24 stakeholder representatives and expert advisors). In 2011, CISAC completed (and ISCC approved) *Stopping the Spread: A Strategic Framework for Protecting California from Invasive Species* (ISCC 2011). This plan built on two previously existing plans, the *California Noxious and Invasive Weed Action Plan* (CDFA 2005) and the *California Aquatic Invasive Species Management Plan* (CDFG 2008). The plan includes 40 recommendations for strengthening the state's response to invasive species.

In 2018, AB 2470 reestablished the California Invasive Species Council, co-chaired by the Secretary of Agriculture and Secretary of Natural Resources, and Advisory Committee, and newly created an Invasive Species Account managed by the

Department of Food and Agriculture. The Council and Advisory Committee continue to support the state Strategic Framework and tools to support invasive species management efforts across the state.

California Invasive Species Advisory Committee

The purpose of the CISAC is to advise the ISCC on a broad array of issues related to preventing the introduction of invasive species and providing for their control and/or eradication, as well as minimizing the economic, ecological and human health impacts that invasive species cause. The CISAC will maintain an intensive and regular dialogue with other stakeholders to explore these issues and develop recommendations. The California Agency Aquatic Invasive Species Team (CAAIST), defined in the California Aquatic Invasive Species Management Plan, is comprised of members from each state agency and/or department that has identified a lead representative for Aquatic Invasive Species (AIS) work. This team meets as needed to revise and coordinate implementation of the state AIS plan. This team also reports to executive level managers to implement actions in the plan and is led by CDFW's State Invasive Species Coordinator.

Interagency Quagga/Zebra Mussel Team

The Interagency Quagga/Zebra Mussel Team, comprised of federal and state agencies and private partners, has been working together to contain and control quagga and zebra mussels in California since the discovery of quagga mussels in Lake Mead in January 2007 and subsequently in water bodies in southern California.

California Interagency Noxious and Invasive Plant Committee

The California Interagency Noxious and Invasive Plant Committee (CINIPC) is an ad hoc group formed in 2000 to provide coordination between state and federal agencies involved in invasive plant management. The group meets regularly to share updates and has produced a Strategic Blueprint identifying agreed-upon approaches to landscape-level management of invasive plants.

Southern California Caulerpa Action Team

The Southern California Caulerpa Action Team (SCCAT) is an ad hoc group focused on coordination to characterize, respond, and eradicate *Caulerpa spp.* infestations. The SCCAT is made up of federal, state, and local governmental agencies, scientists, consultants, and affected stakeholders. The SCCAT developed the *Caulerpa* Control Protocol to guide the detection of existing infestations and avoidance of the spread of *Caulerpa spp.* to other systems. NOAA Fisheries and CDFW serve as the lead Federal and State agencies for administering the *Caulerpa* Control Protocol.

Non-Governmental Organizations

California Invasive Plant Council

California Invasive Plant Council (Cal-IPC) is an NGO that serves as a hub for invasive plant management in the state. Cal-IPC brings together partnerships to plan and execute high-priority projects, while providing informational resources and decision-support tools to support the state's land managers (CA Invasive Plant Council 2025).

California Native Plant Society (CNPS)

CNPS works to protect California's native plants and their natural habitats, today and into the future, through science, education, stewardship, gardening, and advocacy.

University of California: Statewide Integrated Pest Management (IPM) Program

The University of California Statewide IPM Program (UC IPM) helps residents, growers, land managers, community leaders, and other professional pest managers prevent and solve pest problems with the least unintended impacts on people and their surroundings. The program draws on expertise from the University of California scientists to develop and distribute UC's best information on managing pests using safe and effective techniques and strategies that protect people and the environment. These techniques and strategies are the basis of integrated pest management, or IPM.

Invasive Species by Taxonomic Group

Invasive species in California can be categorized into taxonomic groups for plants, insects and terrestrial invertebrates, aquatic and marine invertebrates, and vertebrates (mammals, birds, fish, amphibians, and reptiles). The approaches that various agencies and organizations use to manage invasive species are organized by taxonomic group below.

Plants

Invasive plant species are pervasive across every ecoregion of California. Virtually all land management agencies, from the USFS with 21 million acres across California to small local regional parks, must manage invasive plants in one form or another. The ISCC was established to coordinate statewide efforts to keep new invasive species from entering California and to eliminate, reduce, or mitigate the impacts of invasive species already established within the state (ISCC 2022). The ISCC is advised by the California Invasive Species Advisory Committee (CISAC), which is staffed and supported by CDFW and/or the CNRA until the time at which funds can be directly allocated to the CISAC.

State Parks and CDFW control invasive plants, such as iceplant, on their properties to protect habitat value. Caltrans manages invasive plants along roadways to minimize spread along those corridors. State Parks' DBW apply treatments to control aquatic invasive plants in the Delta, including water hyacinth and curlyleaf pondweed. CDFA is the lead agency for detecting and eradicating hydrilla (*Hydrilla verticillate*) across the state. At the local level, CACs lead invasive plant management efforts. They are typically the lead agency for the local WMA. They have a mandate to control noxious weeds in partnership with CDFA (CDFA 2021).

From the NGO sector, Cal-IPC provides substantial coordination for invasive plant management at the statewide level. CDFA has statutory authority to regulate noxious weeds. Cal-IPC evaluates and lists invasive plant species based on environmental harm.

Insects and Terrestrial Invertebrates

The Pest Exclusion Branch of CDFA works to keep exotic agricultural and environmental pests out of the state of California and to prevent or limit the spread of newly discovered pests within the state. CACs work closely with CDFA on monitoring and eradication efforts. Forest pests are handled by a partnership between the USFS, California Department of Forestry and Fire Protection (CAL FIRE), and CDFA.

Aquatic and Marine Invertebrates

Several agencies oversee different aspects of invasive invertebrates in the freshwater aquatic and marine environments. CDFW's invasive species program works to control and prevent the spread of aquatic invasive species, such as quagga mussels, zebra mussels, golden mussels (*Limnoperna fortunei*), and New Zealand mudsnails (*Potamopygrus antipodarum*). DWR tracks invertebrates such as Asian clams as part of their surveys in the Sacramento-San Joaquin Delta. As described above under the discussion of CDFW and SLC, MISP is an interagency program based out of SLC that enforces regulations on ballast water discharge by cargo ships.

Vertebrates

CDFW oversees regulation and management of vertebrate species (mammals, birds, fish, amphibians, reptiles) in California, including invasive species. CDFW removes invasive vertebrate species to improve the survival of native species, especially those that are listed as threatened or endangered. State Parks and other land-owning agencies conduct feral pig removal on their lands.

Selected Species Accounts

Nutria

Nutria (*Myocastor coypus*) are large, dark to golden brown, fur-bearing, semi-aquatic rodents. Adults can weigh 15 to 25 pounds and have a body length up to two feet. They are found in a wide variety of permanent and seasonal aquatic habitats, including both fresh- and brackish water sources and thrive in warmer climates. Nutria breed year-round, producing up to three litters in 13 months, with one to thirteen young per litter, and they can disperse up to 50 miles, making them capable of rapidly expanding both their population and geographic distribution. Nutria cause severe environmental damage through burrowing and intense herbivory, which can result in damage to water conveyance infrastructure, flood protection levee failures, roadbed collapses, and bank erosion. Their destructive feeding habits cause extensive damage to native plant communities, resulting in habitat loss and degradation of wetland habitats that rare, threatened, or endangered species also rely on. Additionally, they are hosts for several pathogens and parasites that are transmissible to humans, livestock, pets, and native species. Nutria were originally introduced to the U.S. for the fur-trade but were also promoted and released to control aquatic vegetation. Records indicate they were present in California in the 1940s and 50s but were eradicated from the state by the 1970s. In 2017, a reproducing population of Nutria was discovered in California which initiated the launching of a full Incident Command System to implement eradication, followed by the creation of a dedicated Nutria Eradication Program in 2019. As of November 2024, a total of 5,333 nutria have been taken from 9 counties: Solano, Sacramento, Contra Costa, San Joaquin, Stanislaus, Merced, Mariposa, Madera, Fresno (and detected in Tuolumne). These counties are located within the following SWAP Bay Delta & Central Coast and Central Valley & Sierra Nevada provinces, and likely to advance in North Coast & Klamath province. An interactive map showing the densities and locations of nutria taken, by year, is available on CDFW's nutria eradication webpage.

Caulerpa

Caulerpa (*Caulerpa* spp.) is a species of green algae that consists of multiple blades linked by underground runners which attach to substrates with small root-like structures. It is a popular alga in the aquarium trade, but it is devastating if it is introduced to wild areas. Caulerpa forms dense mats that displace native marine habitats and the animals that depend on those habitats. It grows extremely quickly, out-competes native species including seagrass communities, and causes expensive damage to coastal waters in California. There have been several introductions of different

Caulerpa species (*Caulerpa prolifera; Caulerpa taxifolia*) in California since 2000. Eradication and control efforts have been successful due to rapid response and collaboration between agencies, but the success requires hard work and coordination. Caulerpa can reproduce asexually from fragments so even tiny pieces that break off can grow into full adults. Caulerpa threatens the biodiversity of the marine ecosystems that make California unique.

Giant Reed

Giant reed (*Arundo donax*) is a grass that lives up to its name by growing as much as 8 meters tall. Giant reed arrived in California in the 1700s, initially planted for erosion control; however, it is now a serious problem along many waterways. Giant reed reduces habitat value along riparian areas for some wildlife species because it greatly changes the structure of the vegetation along waterways. Among these changes, it provides less food for aquatic insects and arthropods than other vegetation types, affecting animals higher up the food web that depend on these insects. Along the Santa Ana River in Ventura County, populations of the endangered least Bell's vireo (*Vireo bellii pusillus*) rebounded after giant reed was removed and replaced with native species. A study examining potential effects of arundo on threatened and endangered wildlife species identified several species on which arundo has moderate to severe negative impacts. Many of these impacts result from the changes to water flow and channel structure. Threatened or endangered species for which giant reed has been identified as a specific negative impact include arroyo toad (*Anaxyrus (= Bufo) californicus*), least Bell's vireo, southwestern willow flycatcher (*Empidonax traillii extimus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), western snowy plover (*Charadrius alexandrinus nivosus*), tidewater goby (*Eucyclogobius newberryi*), unarmored three spine stickleback (*Gasterosteus aculeatus williamsoni*), southern steelhead (*Oncorhynchus mykiss*), Santa Ana sucker (*Catostomus santaanae*).

American Bullfrog

American bullfrogs (*Lithobates catesbeianus*) have become widespread throughout California. Bullfrogs are native to the central and eastern United States. American bullfrogs occupy a wide range of both natural and manmade aquatic habitats. American bullfrogs were intentionally introduced into the western United States as a food source and for biological control of insects and may have been accidentally introduced into some areas during fish stocking. Adult American bullfrogs have voracious appetites and will eat anything they can fit into their mouths, including invertebrates, birds, bats, rodents, frogs, newts, lizards, snakes, and turtles. Bullfrog

tadpoles mainly eat algae, aquatic plant material, and invertebrates, but they will also eat the tadpoles of other frog species. As a result of these feeding behaviors, all life stages of bullfrogs prey upon and are able to out-compete native frogs and other aquatic species. Additionally, bullfrogs are a known carrier of chytrid fungus, which causes the potentially fatal skin disease in frogs called chytridiomycosis. Chytridiomycosis is believed to be a leading cause of the decline of native amphibian populations all over the world and is responsible for the extinction of over 100 species since the 1970s.

Dreissenid Mussels

Quagga and zebra (*Dreissenid;* QZ) mussels are typically the same size as a fingernail but can grow up to about 2 inches long. They attach to aquatic plants, boats, motors, trailers, and recreation equipment or can be present in water (in addition to substrates, docks, piers, anchors, etc.). QZ mussels arrived to the Great Lakes in ballast water discharge from ships from Europe in the late 1980s. They have spread throughout the U.S. primarily through human-related activities, such as on trailered boats, transported in bilges, live wells, motors, or on any fishing, boating, other equipment or wet surfaces, and pet fur. In California, quagga mussels have been found in Orange, Riverside, San Diego, San Bernardino, and Ventura counties while zebra mussels have been found in San Benito County, according to CDFW data. The spread of invasive mussels threatens water delivery systems, hydroelectric facilities, agriculture, recreational boating and fishing, and freshwater ecosystems. They ruin beaches with razor-sharp, foul-smelling shells. California could spend hundreds of millions of dollars protecting the state's water system from infestations.

Golden Mussel

Golden mussel (*Limnoperna fortunei*), an invasive freshwater bivalve, was discovered for the first time in October 2024 in the Delta and O'Neill Forebay. This detection was not only the first detection in California but the first detection of golden mussel in North America. Golden mussels are native to rivers and creeks of China and Southeast Asia. Golden mussels in California pose a significant, immediate threat to the ecological health of all waters, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Because they require less calcium to survive and tolerate warmer water temperatures than dreissenid mussels, golden mussels can establish in environments where dreissenid mussels are unable to invade. They can tolerate higher salinity than dreissenid mussels, making the brackish parts of estuaries, such as Suisun Bay, suitable for golden mussel establishment. Like dreissenid mussels, golden mussels pose an environmental threat to

California as ecosystem engineers that can profoundly change the food web of an invaded ecosystem. They can impact native species and sport fish by competing for food sources. They can also increase water clarity due to intense filter feeding, resulting in degraded water quality, algal blooms, and increased aquatic vegetation growth that requires control to maintain navigation.

Mute Swan

Mute swans (*Cygnus olor*) are very large, aquatic birds weighing up to 30 pounds with a wingspan of nearly eight feet. Adult swans are solid white with an orange bill and black face patch and bulb. They prefer freshwater habitats that contain an abundance of submerged aquatic vegetation (SAV), their primary food source. Mute swans were introduced to the U.S. in the late 1800s for aesthetic purposes and have spread throughout the country since their introduction. In California, their population has been steadily increasing since 2003. Mute swans are territorial, voracious feeders of SAV and destroy surrounding habitat in the process. Their heavy consumption alters aquatic habitats that native species depend upon. They are aggressive towards native waterfowl and will chase birds from their nests. Mute swans have been reported to physically inure, or even kill, other birds and harass people and pets. Their destructive and aggressive impacts not only affect sensitive habitats for native species, but also impact recreational opportunities like hunting and fishing for the public.

Invasive Carp

Invasive carp include multiple species including bighead carp (*Hypophthalmichthys nobilis*), black carp (*Mylopharyngodon piceus*), grass carp (*Ctenopharyngodon idella*), and silver carp (*Hypophthalmichthys molitrix*). Carp are not native to the U.S. and were introduced in the mid-1800s for biological control. Grass carp is found in California , but all species can cause devastating impacts on aquatic habitats and fisheries. Their ravenous appetite for plants can quickly reduce or eliminate large quantities of aquatic vegetation that native species depend on for food and shelter. Black carp have teeth that can crush native mollusks, snails, and other macroinvertebrates. Invasive carp carry diseases that are transmittable to other fish which can negatively affect recreational opportunities if they are introduced to California. Their negative impacts have been documented in other states where they have been introduced, therefore, one of the best tools available for invasive carp management is prevention. By preventing their introduction, California can protect its sensitive habitats and unique fisheries.

Perennial pepperweed

Perennial pepperweed (*Lepidium latifolium*) is an invasive weed introduced to California in the 1930s. It is alternatively referred to as tall whitetop. Native to southern Europe and Western Asia, it is suspected to have been introduced by means of contaminated sugar beet seeds. It's now found across much of the state and is also common in other western states. Perennial pepperweed plants grow between 2 feet and greater than 6 feet high and have deep and widely spreading roots. Infestations of perennial pepperweed often spread quickly and aggressively to form a thick monospecific stand, crowding out native species. This weed also increases soil salinity, which can affect the germination of neighboring plants, enhancing the weed's competitive advantage. It reproduces both by seed and vegetatively from its roots and small root fragments. Each mature plant can produce thousands of seeds each year and its perennial roots can float downstream in waterways to establish new infestations. It thrives in both seasonally wet areas like ditches and stream edges or dry road edges and hillsides. Dense stands of perennial pepperweed have the potential to affect a wide range of habitats and species in California. In tidal wetlands, perennial pepperweed can displace endangered plant species like Soft bird's-beak (*Cordylanthus mollis ssp. mollis*) and Suisun thistle (*Cirsium hydrophilum var. hydrophilum*), and reduce nesting frequency of waterfowl. Vernal pool communities of species are also vulnerable to perennial pepperweed, including endangered plant species like San Diego buttoncelery (*Eryngium aristulatum var. parishii*), Spreading navarretia (*Navarretia fossalis*), California Orcutt grass (*Orcuttia californica*), Goldfields (*Lasthenia fremontii*), and Downingia (e.g. *Downingia concolor* var. *brevior*, *Downingia bella*), among others. Riparian and upland habitats are also at risk of impacts from perennial pepperweed, including bird species that rely on riparian habitats for nesting and foraging as well as aquatic insects and other invertebrates, including several pollinator species, that depend on healthy native ecosystems. Specialist species that depend specifically on native vegetation for nesting, forage or habitat are especially at risk, however a wide range of species – too many to list – have the potential to be negatively impacted by perennial pepperweed and its competitive exclusion of native plants across multiple habitats.

Management Horizon

Invasive species present a real threat to the unique wildlands, waterways, and biodiversity of California. Once invasive species are established, they can spread and displace native species, eventually dominating ecosystems. Efforts by numerous federal and state government agencies and departments, along with partner entities, have contributed to statewide successes to date. Ultimately, it takes diligence and

perseverance by all involved to prevent, eradicate, contain, and control invasive species in order to protect the ecosystems and species that make California special.

Acknowledgements

This appendix was originally written by Elizabeth Brusati and Doug Johnson, California Invasive Plant Council, and adapted from the introduction to the state's Strategic Framework on Invasive Species (ISCC 2011) for SWAP 2015. CDFW updated this appendix for SWAP 2025.

Appendix F Climate Adaptation Strategies Cross-Reference Guide

This appendix illustrates how the conservation strategies in the SWAP (Chapter 4), correspond with state and federal climate adaptation goals and strategies. The California Climate Adaption Strategy (state goals; citation), described in Section 2.5, align with the national strategy, which is detailed in the National Fish, Wildlife, and Plants Climate Adaptation Strategy (national strategy; National Fish, Wildlife, and Plants Climate Adaptation Network 2021). The cross-reference below was generated by identifying overlaps between the broad categories of SWAP conservation strategies and the state (forthcoming; once final plan is released) and national climate goals and strategies. This cross-reference highlights how implementing specific SWAP conservation strategies may contribute to implementing a state of national climate change goal or strategy, thereby helping to achieve climate adaptation co-benefits.

- State climate goals that correspond with SWAP are denoted with "(S)".
- National climate strategies that correspond with SWAP are denoted with "(N)".

SWAP 2025 Conservation Strategy Categories

Land Acquisition/ Easement/Lease

- Target conservation actions at both landscape and watershed scales and at more local scales, based on identified desired features and attributes (N)
- Act to facilitate species' and systems' ability to persist in place as appropriate (N)
- Act to facilitate species' and systems' ability to shift in space, tracking suitable climate conditions across the landscape, as appropriate (N)

Partner Engagement

- Partner to increase effectiveness and efficiency of adaptation (N)
- Embed shared values, expectations, and consistent practices regarding engagement in the culture of the organization (N)
- Dedicate the necessary resources to support the staff's short-, mid-, and long-term community engagement efforts (N)

Data Collection and Analysis

- Identify the target systems, species, and habitats and their spatial extent and desired features and attributes (N)

- Target conservation actions at both landscape and watershed scales and at more local scales, based on identified desired features and attributes (N)
- Research and monitor the effects of climate change on fish, wildlife, and plants (N)

Management Planning

- Target conservation actions at both landscape and watershed scales and at more local scales, based on identified desired features and attributes (N)
- Account for variability and uncertainty in social and ecological conditions (N)
- Rethink goals in existing plans and write new plans that incorporate the possibility of ecological and social change (N)
- Mainstream climate adaptation throughout organizational culture and operations (N)
- Target operational adaptations to specific climate vulnerabilities (N)

Direct Management

- Target conservation actions at both landscape and watershed scales and at more local scales, based on identified desired features and attributes (N)
- Act to facilitate species' and systems' ability to persist in place as appropriate (N)
- Act to facilitate species' and systems' ability to shift in space, tracking suitable climate conditions across the landscape, as appropriate (N)
- Mainstream climate adaptation throughout organizational culture and operations (N)

Economic Incentives

- Fund climate adaptation (N)

Land Use Planning

- Identify the target systems, species, and habitats and their spatial extent and desired features and attributes (N)
- Target conservation actions at both landscape and watershed scales and at more local scales, based on identified desired features and attributes (N)

Outreach and Education

- Partner to increase effectiveness and efficiency of adaptation (N)
- Embed shared values, expectations, and consistent practices regarding engagement in the culture of the organization (N)

- Dedicate the necessary resources to support the staff's short-, mid-, and long-term community engagement efforts (N)

Training and Technical Assistance

- Mainstream climate adaptation throughout organizational culture and operations (N)

Appendix G Offshore Islands

Introduction

Islands represent just 5% of the world's land area, yet they contribute a disproportionately high amount to global biodiversity. Island biogeography creates high species endemism, due to isolated evolution and distinct habitats; islands are important epicenters of biodiversity, invasive species vulnerability, and extinction (Spatz et al. 2017). California's islands are no exception. California's islands are recognized as biodiversity hotspots; they account for another layer of species diversity within the context of the state's incredible biodiversity (Figure H-1). Many of California's islands also have a rich human history, and California's Channel Islands have been inhabited for thousands of years. For example, the Chumash maritime culture coevolved and continues to be shaped by their connection with the northern Channel Islands and surrounding waters.

California's spectacular biodiverse offshore islands are recognized globally, including the famous Channel Islands and Farallon Islands, renowned for high rates of endemism, biologically diverse flora and fauna, and significant nesting sites for sea birds and pinnipeds. The Channel Islands (and often the Farallon Islands) are appropriately referred to as "*California's Galapagos*." Given their small area, they are home to more endemic taxa than anywhere else in California, with 110 Species of Greatest Conservation Need (SGCN; Appendix C) found on the islands. The California coastline is also dotted with thousands of rocks and islets, many of which house important wildlife populations. California's island wildlife ranges from small aquatic invertebrates and algae to large, dense colonies of marine birds and mammals, including rare state-listed species such as the ashy storm petrel (*Hydrobates homochroa*).

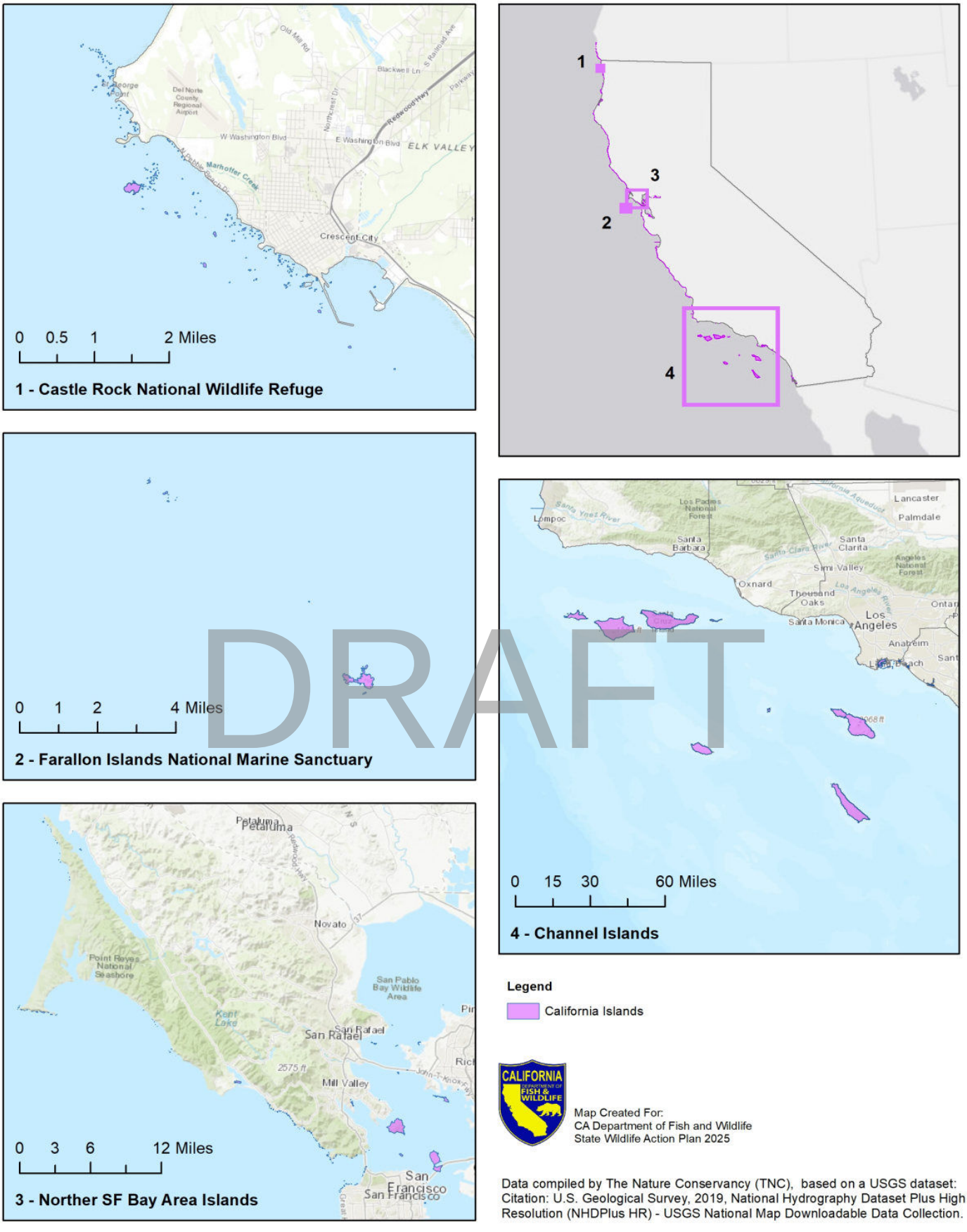


Figure G-1 California's Offshore Islands

The global significance of California's islands is underscored by multiple formal recognitions, including:

- Designations as National Marine Sanctuaries
- Recognition of the connectivity of the islands and surrounding waters to traditional cultures and people, including establishment of Chumash Community Working Groups to the Channel Islands Marine Sanctuary Advisory Council
- Designation as part of the United Nations' Man and the Biosphere program (Channel Islands Biosphere Reserve and Golden Gate Biosphere Reserve)
- Designation as a State of California Area of Special Biological Significance
- Designation of five of the eight Channel Islands as Channel Islands National Park (National Park Service (NPS), with NPS having both acquired and now continuing to manage Santa Barbara Island, Anacapa Island, Santa Rosa Island, 24% of Santa Cruz Island, and San Miguel Island (owned by the US Navy)
- Acquisition and continued management of 76% of Santa Cruz Island by The Nature Conservancy
- Acquisition and continued management of 88% of Santa Catalina Island by the Catalina Island Conservancy
- Designation of the Farallon Islands as a National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service
- Portions designated as Wilderness
- Inclusion in the Channel Islands National Marine Sanctuary, Greater Farallon's National Marine Sanctuary, and in the University of California's Natural Reserve System
- Designation as a California State Channel Islands Reserve
- Designation as a University of Southern California Reserve
- Strategic location for US Navy, with the majority of the land managed for conservation (San Clemente and San Nicolas Islands)

The Channel Islands encompass two island groups, the Southern and Northern Channel Islands. The Southern Channel Islands are located due west of the mainland coast from San Diego to Huntington Beach; the Northern Channel Islands lie due south of the coast from Oxnard to Goleta. The Channel Islands are comprised of eight large islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa, San Nicolas, Santa Barbara, Santa Catalina, and San Clemente) and numerous offshore rocks and islets, totaling 906 km^2 (350 mi^2) in area and 753 m (2470 ft) in elevation. Vegetation communities on large islands include island woodland, island chaparral, oak woodland, coastal scrub, bluff scrub, grassland (perennial and non-native annual), riparian woodland, riparian scrub, wetlands, badlands, beach and dune.

More than 10% of the Channel Islands' flora, approximately 100 taxa, are endemic. The Channel Islands are also home to a myriad of endemic wildlife that include: eight subspecies of island deer mouse, six subspecies of island fox, island spotted skunk,

island scrub-jay, island loggerhead shrike, Santa Catalina Island shrew, Catalina California ground squirrel, island harvest mouse, island gopher snake, and Channel Islands salamander. San Miguel and San Nicolas islands boast the largest and second largest breeding populations of northern elephant seal; San Nicolas has the largest (by far) breeding colony of California Sea Lion.

Relatively unstudied compared to other wildlife, the islands are home to numerous endemic invertebrates such as: San Nicolas and San Clemente Island snails, and Channel Islands sweat bee. Several of the islands provide critical nesting sites for sea birds, rookeries and haul-out areas for pinnipeds, and foraging areas and migratory stopover sites for bats species such as Townsend big-eared bat, hoary bat, Mexican free-tail bat, Yuma myotis, and western red bats. The islands serve as home to the only breeding populations in California of Brown Pelicans and Scripps's Murrelets. The islands also have refugia for migrating species such as the subtropical Brown Booby (*Sula leucogaster brewsteri*), which has consistently nested there since 2017, and Guadalupe Murrelet, with single nests found on multiple islands since 2021 (NPS 2025). Likely other rare seabirds and other taxa call these islands home (American Bird Conservancy 2025). Scaled up monitoring of biodiversity on these islands is critical for tracking island species fluctuations over time.

The Farallon Islands lie approximately 27 miles due west of San Francisco and consist of the South, Middle, and North Farallon islands, totaling 211 acres (83 ha). Smaller in size, the Farallones have a more limited flora and fauna compared to the larger Channel Islands but are still globally significant for several species. They are the largest US seabird rookery south of Alaska, with over 300,000 breeding birds of thirteen species. The world's largest colonies of Ashy Storm-Petrels, Brandt's Cormorants and Western gulls occur there. Five species of marine mammals breed and haul out there, including Northern Elephant Seal, Northern Fur Seal, Harbor Seal, Northern Sea Lion, and California Sea Lion. While plant diversity is low, the Farallones support a unique plant community with Southeast Farallon Island supporting the majority of plant habitats.

All the islands may be considered part of a single archipelago because they share the following attributes:

- Mediterranean-type/maritime climate characterized by a long summer period without rain and the presence of a "marine layer," which moderates temperatures and humidity relative to inland sites at the same latitude
- High levels of endemism
- Similar animal and plant communities found within the California Floristic Province
- Many species that are common to islands, but absent from the mainland
- Managed mostly for conservation
- Similar legacies of introduced species, and more recently, eradication

- Common pressures (e.g., biological invasions, oil spills, climate change, increased fire frequency, limited species distribution, and soil erosion)
- Similarities in marine conditions
- A history of inter-island collaboration and information sharing

Introduced species have caused substantial impacts to island ecosystems. Historical over-grazing and browsing by a variety of introduced vertebrates, including rabbits, feral sheep, feral pigs, deer, and elk, has caused considerable soil and habitat disturbance and led to severe habitat degradation and adverse effects on native species. These impacts include conversion of shrublands to grasslands, proliferation of non-native invasive species island-wide, and reductions of endemic plant populations.

Eagles in Channel Islands National Park

Breeding bald eagles were eliminated by the mid-1950's, in Channel Islands National Park, due to the persecution by humans and the effects of organochlorine chemicals such as DDT. Golden eagles were able to colonize the northern Channel Islands in the mid-1990s due to the presence of an alien prey base (wild pigs and mule deer fawns) and the absence of the native bald eagle. Golden eagles also preyed on the vulnerable island fox, nearly driving foxes to extinction. Subsequent conservation efforts successfully relocated golden eagles to the mainland, and restored bald eagles to the Channel Islands, helping to bring back the island fox from the brink of extinction.

Coordination among island managers and mainland partners has led to successful eradications of invasive species from islands globally and associated biodiversity gains (Spatz et al. 2022). Most of the introduced vertebrates were successfully removed from the Farallon and Channel Islands over the past four decades, and island fox populations, as well as populations of other native animals and plants, have made remarkable comebacks as a result. For example, on Anacapa Island the eradication of invasive black rats (*Rattus rattus*) in 2001 quickly led to a positive response by Scripps's murrelets, a rare seabird that nests on the island. Ten years later, Ashy storm-petrels were nesting on the island for the first time, Cassin's auklets colonies expanded, and the number of Scripps's murrelets nests quadrupled.

Eradication of invasive species on islands requires substantial commitment, collaboration, and the investment of tens of millions of dollars from federal, state, and local agencies, private foundations, and individuals. Eradication of invasive species also requires public support. For example, mule deer are not native to Catalina Island and were introduced as a game species in the 1930s. Since that time, mule deer have reduced native and endemic vegetation due to their browsing preference for these plants that evolved without defense mechanisms. Mule deer populations on Catalina Island have increased due in part to the lack of natural predation pressures, and have

encountered suboptimal body conditions due to overpopulation (Spatz et al. 2022). Mule deer eradication efforts face contentious public responses, which has stymied efforts to control their populations.

Invasive species pose a significant and increasing threat to native biota and unique ecosystems of islands worldwide. The breaching of biogeographic boundaries by the widespread, recent human transport of species has caused rapid and radical change in biological communities, including multiple extinctions. The priority focus for preventing further extinctions and ecological impacts on California islands is to reduce the risks of new invasions (prevention). After prevention, the next priority is to eradicate existing harmful invasive species where possible. The United Nations Convention on Biological Diversity embodied these priorities in their objective to "prevent the introduction of, control or eradicate those alien [invasive] species which threaten ecosystems, habitats or species."

Land managers of California's offshore islands have an enviable and undisputable record of success eradicating invasive species from the islands. This work has demonstrated that with planning, informed technique, and sustained effort, it is possible to eradicate many types of invasive species. Eradication of invasive species on islands is most successful if done in the early stages of an invasion, or where a population is confined to an island or limited habitat (Clout and Veitch 2002). These successes include:

- Eradication of feral sheep from Santa Cruz, Santa Rosa, San Miguel, and San Nicolas islands
- Eradication of introduced feral pigs from Santa Catalina, Santa Cruz, and Santa Rosa islands
- Removal of feral goats from San Clemente and Santa Catalina islands
- Eradication of introduced mule deer from Santa Rosa Island
- Eradication of introduced elk from Santa Rosa Island
- Eradication of introduced donkeys from San Miguel Island
- Removal of cattle and horses from Santa Catalina, Santa Cruz, and Santa Rosa islands
- Removal of feral cats from Farallon, Santa Barbara, San Nicolas, and Santa Rosa islands
- Removal of feral hares from Farallon Islands
- Removal of feral rabbits from Santa Barbara Island
- Eradication of black rats from Anacapa Island
- Eradication of feral turkeys from Santa Catalina and Santa Cruz islands
- Eradication of the European honeybee from Santa Cruz Island

More importantly, these eradications have resulted in resurgences in populations of native species on all the islands, many of which had become rare, and others which

were widespread elsewhere but increasingly uncommon on the islands. Notable conservation outcomes on California islands include:

- Golden eagles were successfully captured and relocated from the islands.
- There was significant increase in seabird populations and breeding success on Anacapa Island 10 years after rat eradication, plus the appearance of the rare Ashy Storm Petrel.
- Three island fox populations were delisted from the Endangered Species Act (ESA), and delisting monitoring is nearly complete.
- Five species were delisted from their ESA status on San Clemente.
- Two plant species were delisted from their ESA status (one on Santa Cruz Island and another on Santa Cruz Island and San Miguel).

Despite these successes, many native species, natural communities, and ecological processes are still recovering from the negative effects of the roughly 150 years of intensive ranching on the Channel Islands. In some cases, recovery is stalled and will require active intervention and restoration to resume. For example, many areas that were stripped of vegetation by grazers subsequently suffered massive erosion of soils and even of bedrock. Some of these areas, particularly in major watersheds, need to be restored to help reduce massive flows of smothering sediments into nearshore waters following heavy rainfall events. Climate change and other threats exacerbate this situation and add to the complexity of managing these unique and special islands.

The islands are ideal platforms for developing and testing scientific approaches to advance and the practice of island conservation and restoration. The legislation that established Channel Islands National Park specifically mentioned the scientific value of California islands. Island managers have fostered highly productive conservation partnerships, resulting in the application and advancement of science-based approaches to pressing conservation challenges across California islands, and islands worldwide. Stakeholders have made many important contributions to these projects. Some accomplishments resulting from these collective efforts include: the eradication of feral avian and invertebrate species, the reintroduction of bald eagles to the islands, the first aerial eradication of black rats in North America, and progress toward the eradication of Argentine ants, house mice, mule deer, and approximately 50 species of non-native, invasive plants.

Much of the conservation work conducted on the California Islands over the past four decades was reactive and addressed severe and urgent threats, most of which required the removal of non-native, invasive species. Fortunately, the successes of those efforts and the lessons learned along the way have positioned island managers to develop new *proactive* management strategies for the conservation of the islands for the decade ahead. Lessons learned through these successful cooperative efforts

described above have been published in scientific journals, textbooks, and popular media to disseminate information on conservation techniques to consider in other island conservation projects. Sharing successful techniques used on California islands helps maximize the outcomes of other island conservation and restoration investments.

Shared Goals for Offshore Islands

Offshore islands managers have identified many similar conservation priorities, including the prevention of invasive species introductions through biosecurity strategies. The public has many opportunities to visit the islands, due to their proximity to the mainland, which increases the risk of invasive species introductions. As discussed above, introduced non-native organisms threaten the survival of many endemic island species and have led to the extinction of species, such as the San Clemente Island Bewick's Wren, and the Santa Barbara Island Song Sparrow.

Managers of California Islands' properties have designed a new collaborative Biosecurity Program (Boser et al. 2014) aimed at reducing the likelihood of non-native species entering and establishing populations on the islands. Representatives from twelve organizations and agencies formed the California Islands Biosecurity Group, the first collaborative group in California devoted solely to biosecurity. Through this collaboration, island managers and mainland partners share resources and expertise with the objective of preventing the introduction and establishment of invasive species on the California Islands. This proactive approach to conservation could spare the islands and mainland conservation areas significant ecological stress and economic cost.

With the Biosecurity Program in place, conservation management is moving to a more proactive phase. This phase is designed to bolster the biota's resilience and adaptation in anticipation of climate change and to restore native species, vegetation cover, and ecological processes whose recovery has stalled.

The shared goals of island managers of the California Islands include the following:

- Identify and prioritize likely impacts to island resources due to climate change and develop management and adaptation strategies
- Assess vulnerability of coastal resources to sea-level rise and prioritize management actions for archeological sites, seabird nesting areas/colonies, and rare plants
- Identify any plant community dominants at high risk to climate change and scope possible actions to increase their resilience
- Create a database and data management system to document occurrences of any new species, including migratory birds, bats, and other transients, on the islands
- Develop criteria for management responses to any new colonizations or extinctions on the islands

- Develop, curate, and archive important baseline datasets that are informative for present day management, and for longer-term responses to change
- Support monitoring of the nearshore environment for effects of linkages between terrestrial and marine environments (e.g. effects of runoff following major storms on nearshore areas) and for effects of climate change
- Assess and foster the adaptation of conservation and management policies that apply to the islands to ensure that they remain relevant and supportive of conservation decision-making in the context of climate change
- Survey, or re-survey, and map each island's vegetation communities
- Determine whether the areal coverage of any community should be significantly increased or decreased
- Map areas of islands cleared for agriculture or grazing during the ranching era which are now dominated by bare ground or invasive annual grasses and apparently not succeeding to woody plant communities dominated by native species
- Use paleo-botanical data to help determine the extent of vegetation communities during the Chumash and Tongva era on the islands, and to understand how intensive their management of the islands was
- Develop inventories for species or species groups that still lack information
- Develop catastrophic wildfire risk reduction strategies
- map and assess effects of non-native snails on native snails and plants; then develop an eradication feasibility plan on San Nicolas Island
- assess denuded areas for revegetation and begin revegetation of the highest priority sites
- Restore/rehabilitate native vegetation in select areas now dominated by non-native annual grasses and to areas in an apparently arrested state of succession to shrubland or woodland
- Monitor and manage the Island fox populations to ensure those currently listed as endangered are delisted, provide with ongoing monitoring and management to ensure that these conservation-reliant populations remain viable for the long-term following de-listing, and develop and implement a "conservation-reliant species" management and monitoring plan as part of the ESA de-listing or down-listing process
- Monitor and manage bald eagle populations across the Channel Islands archipelago to ensure that they remain viable
- Monitor and manage the island scrub-jay population on Santa Cruz Island to ensure it remains viable. Assess and implement, as appropriate, management strategies to reduce extinction risk, including vaccination, and other efforts to prevent the establishment of West Nile Virus and other diseases present on the mainland from reaching and decimating the population

- Increase understanding of ecological relationships between the islands' terrestrial vertebrates and plant species
- Increase understanding of ecological relationships between the islands' terrestrial and marine ecosystems
- Update rare and listed plant species maps and plant taxa checklist
- Ascertain the role of each of the populations of island endemic plant taxa have in each taxa's overall distribution (e.g. Estimated percentage of the total population found on each island)
- Increase the resilience of listed plant species by identifying and reducing, or eliminating threats where possible, and by augmenting populations, increasing genetic diversity within populations, or establishing new populations as appropriate and permitted
- Monitor and manage nesting seabird species
- Support efforts to monitor and restore pinniped species
- Foster seed banking of priority endemic and rare plant species
- Strengthen and maintain a comprehensive biosecurity program to prevent, detect, and manage new invasions to the island, and to minimize other adverse impacts of visitation (e.g., disturbance, fire risk) to the island
- Identify risks of invasion by diseases and pests by organisms known to cause great harm to native species and natural communities on the mainland (e.g., West Nile virus, sudden oak death, goldspotted oak borer); include actions in the biosecurity program to reduce the likelihood that diseases and pests will invade and establish; increase the likelihood that new invasions will be detected
- Eradicate harmful introduced non-native vertebrate, such as feral cats and non-native rodents, and invertebrate species where possible and practical, such as Argentine ants
- Eradicate or control targeted invasive plant species
- Prevent the expansion of widespread invasive plant species on the islands
- Update island-specific management plans
- Develop and use a decision framework to determine whether and how to manage each of the taxa which are present on an island and native to other parts of California but not to the island itself. Management options include eradication, containment, and no management
- Systematically search suitable habitats for possible surviving individuals or populations of taxa presumed to have been extirpated from the islands since the European settlement of California
- Develop a re-introduction decision framework and implementation protocol for extirpated taxa on California's offshore islands, which also can be applied generally to re-introductions of a wide variety of taxa and island systems
- Foster and facilitate research on priority conservation planning and management questions

- Develop and maintain a useful and spatially referenced (where applicable) online repository for island datasets, literature, photographs, and maps
- Maintain a research priority list and disseminate it to the California Islands Research Forum and our academic partners

Conservation Target: Offshore Islands

Conservation Strategy 1 (Direct Management): Stewardship of habitats and/or natural processes to maintain species populations or restore ecological functions

Objective(s):

- Restore disturbed sites (eroded, past farming, heavily invaded) to 1) reestablish vegetative cover to decrease soil erosion, 2) manage invasive plant species that alter ecosystem processes, impact rare plant populations, or are eradicable, 3) provide habitat for wildlife such as sea birds, island fox, invertebrates, 4) restore habitat types that are preferred by rare and endemic plant species, especially Federally and State-listed species
- Remove or reduce introduced mainland vertebrates and/or feral livestock that impact native species, specifically endemic species, and ecosystem function
- Restore decommissioned roads, improve ecological maintenance of roadways, and decrease soil erosion
- Reduce risk of anthropogenic fire ignition; Allow for natural fire frequency
- Implement biosecurity measures to prevent, detect, and rapidly respond, to harmful invasive species introductions including activities at mainland egress points to the islands; Manage recreational activities to decrease the risk of new invasions, impact to vegetation, wildlife, and soil structure
- Consider active restoration methods for population enhancement or species reintroduction for island species that have *not* yet recovered from historic threats and consider climate adaptation opportunities for species naturally expanding their ranges into the California Current Ecosystem
- Prohibit quarrying and dams

Target pressure(s): All pressures.

Conservation Strategy 2 (Partner Engagement): Engaging state, federal, and local agencies, NGOs, Mexican island entities, and other partners to achieve shared objectives and broader coordination across overlapping areas such as: invasive plant management, biosecurity, sea bird and pinniped management, botanical management issues within the California Floristic Providence.

Objective(s):

- Strengthen relationships, partnerships, and collaboratives between island managers and mainland partners across the California Islands including those within the California Floristic Providence in Mexico
- Hire an island botanist to meet annually to address management issues of rare plant, endemic, and invasive plant species, vegetation, extirpated plant reintroductions, and joint database
- Collaborate among island managers and mainland partners to monitor and manage sea bird and pinniped issues, and other island flora and fauna needs, including invasive species management
- Consider collaborative monitoring opportunities to share resources, data and knowledge of island species

Target pressure(s): All pressures

Conservation Strategy 3 (Training and Technical Assistance): Share professional expertise, technical assistance, and training to island managers, key stakeholders or others to facilitate improved or new management activities and techniques, including stand-alone training or demonstration projects

Objective(s):

Share expertise and technical assistance regarding endemic plant propagation, native plant nursery development, island restoration, invasive plant treatment, biosecurity, road maintenance, island fox management, invertebrate treatment, and biological monitoring through professional trainings, demonstration projects, workshare, volunteer opportunities, and handbook development

Target pressure(s): All pressures

Conservation Strategy 4 (Outreach and Education): Outreach and education efforts targeted at specific groups, communities, resource users, policy makers, stakeholders and/or the public to improve awareness and change knowledge, attitudes, and behaviors; Includes both formal (classroom) and non-formal education efforts

- Objective(s):
- Share methods, techniques, and strategies developed on the islands to tackle conservation issues with resource managers on the California Islands, islands elsewhere, and the mainland
- Develop biosecurity outreach materials and education programs to address the threat that non-native species pose to the islands
- Publish and/or present the lessons learned and outcomes of conservation initiatives that will benefit the resource management community in professional journals, conferences, and/or symposia

Target pressure(s): All pressures

Conservation Strategy 5 (Data Collection and Analysis): Collecting data about species, habitats, ecosystems, threats, processes, and interactions to fill information needs; includes compilation, management, synthesis, analysis, and reporting of spatial and non-spatial data. Stand-alone research conducted to fill basic knowledge gaps

Objective(s):

- Develop an island all taxa database to house, track, and share information regarding the taxa of the California Islands
- Conduct extirpated taxa specific surveys, evaluate taxa for reintroduction.
- Collect and analyze data on development of soil crusts
- Analyze vegetation community data across all islands, prioritize invasive plants on each island and across the archipelago for eradication. Conduct island wide invasive plant surveys of San Miguel, San Clemente, San Nicolas, and Santa Catalina
- Collect data on island skunk populations decline due to suspected competition with island foxes and reduced food availability (island deer mouse) due to drought conditions
- Collect distribution, abundance, and demographic data on endemic and listed taxa
- Collect data on sea bird populations to better understand their distribution, abundance, and reproductive success

Target pressure(s): All pressures.

Conservation Strategy 6 (Management Planning): Development of management plans for species, habitats and natural processes

Objective(s):

- Develop or update management plans to integrate the effects of climate change
- Develop a decision tree, species specific survey protocols, and guidelines to evaluate extirpated taxa candidates for reintroduction back to the California Islands
- Develop a California Islands Flora for the offshore islands within the California Floristic Province
- Develop a California Islands Weed Management Plan
- Develop a Santa Barbara Island Restoration Strategy
- Develop a Santa Cruz Island Central Valley Restoration Plan
- Develop a rare plant taxa management work plan

Target pressure(s): All pressures

Related Conservation Plans and Strategies

California Islands Biosecurity Program. 2013.

Catalina Island Fox Epidemic Response Plan. 2014

Channel Islands National Park Fox Epidemic Response Plan. 2015

Channel Islands National Park Final General Management Plan Wilderness Study Environmental Impact Statement. 2015.

Farallon National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment. U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex. 2009.

Feasibility Study for Re-establishment of Bald Eagles on the Northern Channel Islands, California. Final Environmental Assessment, Montrose Settlements Restoration Program. National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, National Park Service, California Dept. of Fish and Game, California State Lands Commission, and California Dept. of Parks and Recreation. 2002.

Integrated Natural Resources Management Plan. Naval Base Coronado, San Clemente Island California.

Integrated Natural Resources Management Plan. Naval Base Ventura County, San Nicolas Island, California. December 2010.

Recovery Plan for Four Subspecies of Island Fox (*Urocyon littoralis*). U.S. Fish and Wildlife Service. 2015.

Recovery Strategy for Island Foxes (*Urocyon littoralis*) on the Northern Channel Islands. Channel Islands Nation Park. 2003.

San Clemente Island Fox Epidemic Response Plan. 2014

San Clemente Island Integrated Natural Resources Management Plan (INRMP)

Santa Cruz Island Primary Restoration Plan. Final Environmental Impact Statement. Channel Islands National Park. 2002.

Santa Cruz Island Weed Management Strategy. 2007.

Santa Rosa Island Resource Management Plan for Improving Water Quality and Conserving Rare Species and their Habitats. Final Environmental Impact Statement. 1997.

Santa Rosa Vegetation Classification (in progress).

Thirteen Plant Taxa from the Northern Channel Islands Recovery Plan. U.S. Fish and Wildlife Service. 2000.

Appendix H Wildlife Connectivity

Background

California is home to extraordinary biodiversity, 40 million people, and a large economy, which has led to numerous anthropogenic barriers that inhibit aquatic and terrestrial wildlife movement, including migration. Improving habitat connectivity and wildlife corridors through a mosaic of natural and developed areas is critical to conserving California's biodiversity and ecosystem resiliency now and into the future. To successfully maintain biodiversity and ecosystem resilience, wildlife will need to be able to move through the existing and developing system of built infrastructure.

The ability of California's wildlife to move and migrate has been diminished due to habitat loss, fragmentation, and degradation, and made worse by pressures such as climate change and invasive species. Development and infrastructure such as railroads, highways, aqueducts, and canals have blocked, or limited, movement for many species. Additionally, infrastructure and development impede wildlife and can be significant sources of mortality, affecting population demographics, gene flow, pollination, resilience, and, potentially, the persistence of California's rich biodiversity. Additionally, climate change, which is shifting habitat ranges for many species and exposing others to new threats (e.g., drought, catastrophic wildfires), compounds the need for connectivity as species migrate to different latitudes or elevations to locate suitable habitat to survive.

Well-placed, designed, and maintained wildlife connectivity projects, including underpasses, overpasses, and associated habitat protection and enhancement can help facilitate the safe movement of wildlife across the landscape. In addition to species benefits, habitat connectivity across roadways may improve public safety by reducing wildlife-vehicle collisions. Although connectivity projects provide wildlife and human benefits, connectivity projects can be a challenge to coordinate, costly to construct, and require extensive planning to develop, build, and maintain.

Connectivity Work at CDFW

CDFW has a long history of integrating habitat connectivity into projects statewide due to the well-established benefits to wildlife populations. Connectivity goals are integrated into various CDFW projects that address environmental laws and regulations, including the California Environmental Quality Act (CEQA), the California

Endangered Species Act (CESA), and Lake and Streambed Alteration Agreements (FGC § 1957, subdivision (e)).

In 2023, CDFW established the Wildlife Connectivity Unit to prioritize and support connectivity. CDFW efforts include identifying areas where wildlife connectivity is impacted, as defined by subdivision (a) of section 158 of the Streets and Highways Code (last updated by Assem. Bill No. 2344 (2021-2022, Reg. Sess.)) and assisting Caltrans with the remediation of these areas. CDFW integrates connectivity goals throughout CDFW's programs. CDFW connectivity goals are achieved by obtaining funding and preparing scientific studies that identify different connectivity areas within California. This work is done in collaboration with Caltrans, other State and local public entities, California Native American tribes, and NGOs. Connectivity areas include:

- Areas identified by any federal or state agency that meet the needs for a special status species pursuant to the federal Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) or the California Endangered Species Act (Chapter 1.5 (commencing with Section 2050) of Division 3 of the Fish and Game Code [FGC])
- Areas identified by CDFW that are important for ecological connectivity for fish or wildlife between natural landscape areas based on consideration of the following factors:
    - Important landscape linkages identified in regional connectivity studies or habitat protection plans
    - Known ungulate migration routes, including those identified in response to the federal Secretarial Order 3362, issued on February 9, 2018, by the federal Secretary of the Interior, and any subsequent updates to the order
    - Important movement corridors for sensitive species according to species-specific studies, genetic studies, or published recovery plans
    - Known areas of high wildlife mortality due to transportation infrastructure
    - Areas where wildlife is known to cross more frequently than other nearby areas, including riparian corridors, canyon bottoms, ridges, or open-space corridors
    - Areas where wildlife approach and refuse to cross highways, as identified by wildlife behavior data
    - Areas where habitat of adjacent lands is currently in good condition
    - Highways with identified barriers where lands adjacent to all approaches to the highway have conservation protections
    - Linkages that could facilitate range shifts due to climate change, including areas that connect lower to higher elevations or connect to northern habitats

- An area identified by Caltrans with known or potential transportation barriers to wildlife connectivity, as determined by the CDFW

In addition to this, the WCU will work to improve wildlife connectivity by supporting, preparing, and obtaining funding to enhance wildlife migration routes. This includes improving different wildlife habitats to facilitate wildlife connectivity. Another goal is to ensure that important wildlife linkage habitats are preserved in perpetuity and that land adjacent to future wildlife connectivity projects is protected to ensure appropriate functionality of wildlife projects.

The WCU will also work on securing internal and external funding to construct wildlife connectivity projects and monitor these projects effectiveness to improve future wildlife connectivity projects.

All this work will also require outreach and collaboration with members of the public, stakeholders and NGOs, state, local, and federal agencies, private entities and California Native American tribes to improve wildlife connectivity in California.

Connectivity Advance Mitigation (CAM) Program

The goals of Connectivity Advance Mitigation (CAM) Program include:

- Actively performing outreach to interested parties and working with external partners to develop initial CAM projects
- Providing presentations as appropriate and keeping the CAM website updated with most current information regarding how the subprogram is developing
- Working with internal CDFW staff to cross-train on how to implement the CAM Guidelines and procedures for when potential sponsors have banking or MCA projects for review
- Developing credit factor formula to determine amounts of credit allocation for connectivity projects
- Collecting feedback and input on the Guidelines for areas of improvement in the future
- Coordinating and collaboration within CDFW on all areas of work related to connectivity

Wildlife Connectivity Projects

Transportation Projects (AB 2344)

The California Legislature enacted Assembly Bill 2344 in 2022, adding article 3.8 (commencing with Section 158) to Chapter 1 of Division 1 of the Streets and Highways

Code. This bill establishes connectivity areas identified by CDFW and other agencies where wildlife connectivity is impaired by the highway system. In addition to this, the bill requires the Department of Transportation (Caltrans) to establish an inventory of connectivity needs on the state highway system where improvements could be made to increase connectivity and reduce wildlife-vehicle collisions. This bill requires consultation with CDFW for that purpose and whenever a project on a state highway system has the potential to impact wildlife connectivity. The bill also established a transportation wildlife connectivity remediation program with Caltrans if the legislature provides funding for the program.

Connectivity Advance Mitigation

The California Legislature enacted Senate Bill 790, codified as FGC section 1955 et seq., titled "Wildlife Connectivity Actions", to promote wildlife connectivity improvements through the California Department of Fish and Wildlife's (CDFW) Conservation and Mitigation Banking (Banking) Program and Mitigation Credit Agreements (MCAs), a part of CDFW's Regional Conservation Investment Strategy (RCIS) Program.

If a sponsor of a conservation or mitigation bank (bank) or MCA includes a wildlife connectivity action within a proposal, CDFW can issue species or habitat mitigation credits for the wildlife connectivity action. The sponsor can then sell the mitigation credits to third parties needing compensatory mitigation, required by regulatory agencies, or they can retain the credits for themselves to fulfill expected future mitigation needs. Bank or MCA sponsors can, therefore, offset their costs from developing and constructing a wildlife connectivity action or earn a return on their investment by selling credits.

The CAM program increases mitigation options by incentivizing connectivity projects and provides a tool to help meet the diverse needs of California's biodiversity and economic development. CDFW has the authority to create mitigation credits for actions that improve habitat connectivity inhibited by built infrastructure or habitat fragmentation. The credits created can be sold and purchased to fulfill compensatory mitigation requirements established under state or federal environmental laws, including but not limited to the CEQA, the CESA, and Lake and Streambed Alteration Agreements.

Additional information about fish and wildlife connectivity can be found on CDFW's Connectivity and Planning for Fish and Wildlife webpage.

Modeling and Mapping

Wildlife connectivity models help us to better understand potential species movement patterns and how barriers may impact wildlife movement. The Conservation Analysis Unit (CAU) develops and maintains spatial data and models of wildlife movement, corridors, and habitat connectivity across California. These maps and models are used by scientists and decision-makers to determine how to best conserve habitat connectivity, or the ability of species and ecological processes to move through the landscape.

Major projects undertaken by the CAU include the following:

- Compilation of existing habitat linkage data from multiple sources across the state into a single Statewide Terrestrial Habitat Connectivity map
- Facilitating the development of regional, fine-scale connectivity models to identify focal species-based habitat linkages in each region of the state
- Development of wildlife movement corridor models based on GPS collar data
- Identification of major barriers to wildlife movement across the state

These resources can be accessed through the Biogeographic Information and Observation System (BIOS), a geographic information system designed to enable the management, visualization, and analysis of biogeographic data collected by CDFW and its partner organizations.

Terrestrial Habitat Connectivity Map

CDFW is compiling linkage data to create a statewide connectivity map. The Statewide Terrestrial Connectivity map, part of the CDFW Areas of Conservation Emphasis (ACE) project, presents a high-level view of connectivity across the state using the ACE grid of 2.5-mi^2 hexagons. Each hexagon contains attributes identified across multiple studies, including the presence of mapped corridors or linkages; the presence of large, contiguous, natural areas; climate resilient corridors and refugia; the relative landscape intactness score; and The Nature Conservancy's Omniscape. Hexagons are then assigned to one of five ACE connectivity classes and accompanying ranks, indicating the relative importance of each area to providing opportunities for the movement and dispersal of organisms critical to maintaining healthy populations and species survival. In 2024, CDFW updated the layer to include modeled ungulate migration corridors and additional regional linkages. As with all ACE model products, the Terrestrial Connectivity Map represents a snapshot in time and will be updated over time as new data become available. The most current version of this dataset is included in both the ACE Viewer and the Habitat Connectivity Viewer.

History of the Terrestrial Habitat Connectivity Map:

In 2008, CDFW and Caltrans commissioned the California Essential Habitat Connectivity Project (CEHC; Spencer et al. 2010), a statewide assessment of essential habitat connectivity. Following the guidance of a multidisciplinary team including representatives of numerous state, federal, tribal, regional, and local agencies, the project was completed in 2010. The CEHC identified large remaining blocks of intact, contiguous natural habitat (natural landscape blocks) and modeled linkages (essential connectivity areas) between them to best maintain habitat connectivity across the landscape. These connections provide a broad-scale view of habitat connectivity needs at the statewide scale.

In 2018, the California Biodiversity Initiative Roadmap directed CDFW to develop an updated statewide habitat connectivity map. To accomplish this, CDFW compiled available regional linkage models along with California Essential Habitat Connectivity output, Terrestrial Landscape Intactness (Degagne et al. 2016), which provides an index of multiple anthropogenic disturbances, and Omniscape, an ecological flow model (Landau et al. 2021). These datasets were brought together into the Statewide Terrestrial Connectivity Map in 2019, which continues to be updated over time (last update as of this printing 2024).

Fine-scale Connectivity Models

CDFW is developing regional, fine-scale connectivity models to identify focal species-based habitat linkages in each region of the state. CDFW, along with partners including Science and Collaboration for Connected Wildlands and the Conservation Biology Institute, have completed several fine-scale connectivity analyses to identify important regional core areas and linkages, as well as corridors for focal species. As an example, CDFW completed a project in to map wildlife connectivity areas in the northern Sierra Nevada foothills (NSNF). The project analyzed connectivity within the NSNF and between the NSNF and adjacent lands in the Central Valley and Sierra Nevada using the fine-scale vegetation map completed by the Vegetation Classification and Mapping Program (VegCAMP) and following recommendations from the statewide CEHC. The NSNF project identified important core habitat areas for focal species and used species-specific data to model corridors between blocks of protected lands, identified land facets (areas of land with uniform topographic and geologic features that will interact with future climate to support species and species movement under future climate conditions), and developed guidance on minimum standards for fine-scale connectivity modeling needed to meet the CDFW mission and mandates.

As of 2024, these regional analyses cover approximately 60% of the state, including regions such as the San Francisco Bay area, California desert, Central Valley, Modoc Plateau, south coast, and the previously mentioned northern Sierra Nevada foothills. Both regional and statewide connectivity analyses can be accessed via CDFW's Habitat Connectivity Viewer, a specially curated version of the BIOS viewer.

CDFW is currently working to fill remaining data gaps with additional fine-scale linkage studies across the state as fine-scale vegetation data become available in regions such as the southern Sierra Nevada foothills and North Coast.

Wildlife Corridor Models

CDFW is developing wildlife corridor models based on GPS collar data and an ungulate migration analysis. California is home to several species of ungulates, including mule deer, elk, pronghorn, and bighorn sheep. Many of the ungulate herds in California are migratory and require large landscapes to persist, making them particularly vulnerable to habitat loss and fragmentation. Connectivity between seasonal ranges is therefore crucial to conserve these charismatic species and to facilitate their movement across the landscape. In addition to migration corridors, mapping and conserving high-use winter range habitat is also essential to maintain ungulate herd population viability.

In February 2018, the U.S. Secretary of the Interior issued Secretarial Order No. 3362 (SO3362) directing BLM, USFWS, and NPS to work with western state wildlife agencies to improve the quality and condition of priority big-game winter and migration corridor habitat on and adjacent to federal lands. To achieve the objectives of SO3362, the Department of Interior asked states to identify between three and five priority migration corridors or winter range habitats for big game species in each of their respective states. In response to SO3362, CDFW prepared the California Action Plan in 2020 that was updated in 2022 and 2024 (CDFW 2024). In this report, CDFW identified 5 priority areas considering population stressors, including fire, habitat quality, and geography. The action plan provides a brief overview of the different priority areas and current efforts, followed by a list of risks/threats and potential collaborative actions between local, state, federal, tribal, and non-governmental organizations to address these risks.

Additionally, in 2020, efforts began to analyze GPS collar datasets that provide accurate location information for ungulate individuals over time. Using this collar data from historical and ongoing projects across the state, ungulate population-level corridors, stopovers, and winter range habitats are being mapped and prioritized for conservation. This interactive story map explores some of CDFW's ungulate migration products, describing the data and analytical processes. A complete list of ungulate

migration products available to the public can be viewed in the Ungulate Migration Corridor Viewer. Detailed results of these analyses, and comparable analyses from other western states, can also be found in a series of reports (Ungulate Migrations of the Western United States) published by the U.S. Geological Survey (USGS). Links to these reports can be found on the CAU connectivity webpage.

These analyses have proven useful to CDFW staff across numerous programs as well as external partners working on wildlife connectivity projects throughout the state. Potential future efforts to collar and model movements of non-game species, including SGCN would help inform future conservation, enhancement, and/or restoration of key movement pathways and other important connectivity areas.

Wildlife Movement Barriers

CDFW is identifying major barriers to wildlife movement across the state. Wildlife must navigate thousands of miles of linear infrastructure that crisscross California's landscape as they go about their daily and seasonal movements to secure the resources they need, such as food, mates, and shelter. The State Highway System alone consists of over 16,600 miles of paved roads of varying widths. Historically, identifying important wildlife movement locations has been piecemeal and based on local information and interest. However, increasing attention is being directed toward wildlife habitat connectivity as a mechanism of maintaining biodiversity in the face of population growth and climate change. Identifying and prioritizing wildlife barrier locations is an essential step in focusing limited resources to restore, maintain, and enhance connectivity.

In 2020, CDFW conducted an initial assessment of priority barriers to wildlife movement throughout the state. In 2022, CDFW revised and expanded upon the dataset to introduce a tiered ranking system and move toward establishing a comprehensive inventory of areas where connectivity is impaired by linear infrastructure. Reports can be found on the CAU connectivity webpage under the Wildlife Barriers menu; the dataset can be accessed via the Habitat Connectivity Viewer. Work to update the dataset and re-evaluate priorities is ongoing as new problem segments are identified, and remediation actions occur.

Aquatic Specific Resources

Additional resources that can be used to help identify wildlife connectivity action locations for aquatic species include the following datasets, which are also available on BIOS:

- CDFW Fish Passage Priorities: A map-based representation of an ongoing inventory of known and potential barriers to anadromous fish in California. It compiles currently available fish passage information from more than two hundred data sources and allows past and future barrier assessments to be standardized and stored in one place. The inventory is to be used to identify barriers suitable for removal or modification to restore spawning and riparian habitat for salmon and steelhead, and to enhance aquatic and riparian habitat.
- Fish Passage Assessment Database (PAD):This CDFW database is an ongoing map-based inventory of known and potential barriers to anadromous fish migration in California. This database may be helpful to identify and remediate man-made barriers to anadromous fish migration.

Appendix I Regulations, CDFW Programs and Grants

This chapter outlines the federal, state, and local laws and regulations that govern conservation in California and describes the CDFW programs used to implement them. CDFW works in partnership with numerous agencies to implement environmental laws and regulations (described in Chapter 7). CDFW grant programs are also listed, as grants are an additional tool to implement SWAP conservation strategies.

Regulatory Framework

Federal and state laws and regulations, as well as local ordinances, protect many of California's natural resources and regulate the activities affecting them. Federal, state, and local governments have also adopted plans and policies to protect and manage natural resources. Many of these are designed to provide for the conservation and management of wildlife habitats and sensitive species. SWAP 2025 is not itself a regulatory document, but operates within and assists in achieving compliance with applicable federal, state, and local laws and regulations. This section describes the key laws, regulations, plans, and policies that create the framework for wildlife conservation in California.

Federal Laws and Regulations

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) regulate the take and incidental take of species listed as threatened or endangered under the federal Endangered Species Act (ESA; 16 U.S.C. section 1531 et seq.). USFWS has jurisdiction over terrestrial and inland aquatic species and NMFS has jurisdiction over anadromous fish and marine species, including marine mammals.

Marine Mammal Protection Act

The Marine Mammal Protection Act (16 U.S.C. section 1361 et seq.) prohibits, with certain exceptions, the "take" of marine mammals in U.S. territorial waters. NMFS administers the Marine Mammal Protection Act and is charged with protecting whales, dolphins, porpoises, seals, sea lions, manatees, and other species of marine mammals. Sea otters are protected by the USFWS.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 U.S.C. section 703 et seq.) provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the take of migratory birds. The MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, hunt, take, capture or kill, possess, offer for sale, sell, offer to purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, or any part, nest, or egg of any such bird.

Clean Water Act

The Clean Water Act (CWA; 33 U.S.C. section 1251 et seq.) establishes structure for regulating discharges of pollutants into waters of the Unites States (WOTUS) and regulating quality standards for surface waters. The WOTUS definition, last revised in 2023 and published in 40 Code of Federal Regulations (CFR) 120, accounts for the Sackett v. Environmental Protection Agency (2023) Supreme Court ruling for the State of California. This ruling limited the definition of WOTUS for wetlands to those that have a continuous surface connection to another body of water that is already considered WOTUS, such as a river, lake, or ocean. It excludes wetlands separated by natural or man-made barriers, which were formerly included as jurisdictional. Under Section 404 of CWA, the US Army Corps of Engineers (USACE) regulates, and issues permits for activities that involve the discharge of dredged or fill materials into waters of the United States. Under Section 401 of the CWA, the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards have authority to regulate water quality standards to WOTUS.

National Invasive Species Council

Executive Order 13112 established the National Invasive Species Council (NISC). The federal government defined invasive species as "a species that is non-native to the ecosystem and whose introduction causes, or is likely to cause, economic or environmental harm, or harm to human health." Federal agencies were directed to prepare an invasive species management plan. In 2016, the National Invasive Species Council revised the federal management plan, laying out a blueprint for action (NISC 2016).

California Eelgrass Mitigation Policy

Eelgrass (*Zostera marina* & *Z. pacifica*) provides primary production and nutrients to the ecosystem along with spawning, foraging, and nursery habitat for fish and other

species. Pursuant to the federal Magnuson-Stevens Fishery Conservation and Management Act, eelgrass is designated as Essential Fish Habitat for various federally managed fish species within the Pacific Coast Groundfish and Pacific Coast Salmon Fisheries Management Plans. Eelgrass is also considered a Habitat Area of Particular Concern for various species within the Pacific Coast Groundfish Fisheries Management Plans. Eelgrass habitats are further protected under state and federal "no-net-loss" policies for wetland habitats. Additionally, the importance of eelgrass protection and restoration, as well as the ecological benefits of eelgrass, is identified in the Public Resources Code section 35630. CDFW refers to the National Marine Fisheries Service California Eelgrass Mitigation Policy (CEMP) for guidance on identifying eelgrass impacts, developing eelgrass mitigation measures and compensation, and for identifying appropriate eelgrass mitigation and donor sites. CDFW's Marine BIOS mapping tool (see Section 3.2.2) includes state-wide eelgrass distribution data from a variety of eelgrass surveys, although it is important to note that spatial data is not comprehensive.

State Laws and Regulations

Below are descriptions of select state laws and regulations that CDFW directly and indirectly coordinates with. Additional information on CDFW's state agency partners can be found on the California Natural Resources Agency and California Environmental Protection Agency websites.

California Endangered Species Act

Under Fish and Game Code (hereafter, "FGC") section 2050 et seq., the California Endangered Species Act (CESA) prohibits the import, export, take, possession, purchase, or sale within California of any CESA-listed or candidate species. The California Fish and Game Commission is responsible for listing or delisting a species under CESA, and CDFW acts as the Commission's scientific advisor during that process. CDFW is also responsible for regulating the take of listed and candidate species through various provisions of the FGC (see § 2081 subd. [a] for scientific, educational, or management purposes; § 2081 subd. [b] incidental take; Voluntary Local Program [§ 2086 et seq.]; California State Safe Harbor Agreement Program Act [§ 2089.2 et seq.]; and Natural Community Conservation Planning Act [§ 2800 et seq.]).

30x30 California

In 2020, the governor signed Executive Order N-82-20, which committed California to permanently conserve 30% of California lands and coastal waters by 2030 (Pub. Resources Code § 71450). The 30x30 goal is intended to help accelerate conservation

of California's lands and coastal waters through voluntary, collaborative action with partners across the state to meet three objectives: conserve and restore biodiversity, expand access to nature, and mitigate and build resilience to climate change. California's 30x30 commitment is part of a global effort to increase biodiversity conservation,. California's 30x30 Order parallels federal Executive Order 14008 (America the Beautiful), issued in January 2021, which calls for the U.S. to conserve at least 30 percent of its lands and waters by 2030.

California Native Plant Protection Act

The Native Plant Protection Act (NPPA; FGC§1900 et seq.) allows the Fish and Game Commission to designate native plants as rare or endangered. There are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, unless authorized by CDFW via a permit or other agreement pursuant to the applicable regulations, or under certain other limited circumstances.

California Desert Native Plants Act

The purpose of the California Desert Native Plants Act (CDNPA; Food and Ag. Code § 80001 et seq.) is to protect certain species of California desert native plants from unlawful harvesting on both public and privately owned lands. The CDNPA only applies within the boundaries of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. Within these counties, the CDNPA prohibits the harvest, transport, sale, or possession of specific native desert plants unless a person has a valid permit or wood receipt, and the required tags and seals. The appropriate permits, tags, and seals must be obtained from the sheriff or commissioner of the county where collecting will occur.

Western Joshua Tree Conservation Act

The Western Joshua Tree Conservation Act (WJTCA; FGC § 1927 et seq.) was enacted in 2023, and prohibits the importation, export, take, possession, purchase, or sale of any western Joshua tree in California unless authorized by CDFW. The WJTCA authorizes CDFW to issue permits for the incidental take of western Joshua trees and for the removal of dead western Joshua trees and the trimming of live western Joshua trees under certain circumstances. Under the WJTCA, all in-lieu fees collected are deposited into the Western Joshua Tree Conservation Fund for appropriation to CDFW solely for the purposes of acquiring, conserving, and managing western Joshua tree conservation lands and completing other activities to conserve the western Joshua tree. CDFW is committed to collaboration with California Native American tribes to ensure that co-management principles and traditional ecological knowledge are included in the plan.

California State Safe Harbor Agreement Program Act

The California State Safe Harbor Agreement Program Act (FGC § 2089.2 et seq.) allows CDFW to enter into safe harbor agreements (SHAs) with landowners as an incentive for them to manage their lands for the benefit of state-listed endangered, threatened, candidate, declining, or vulnerable species. SHAs provide landowners with a safe harbor assurance that the landowners will not be subject to additional regulatory restrictions in the future because of their conservation efforts. An SHA must result in a net conservation benefit to the covered species and cannot result in the reduction of an existing population of covered species present at the time the baseline is established. Additionally, if a declining or vulnerable species covered by an SHA subsequently becomes listed under CESA or a candidate for listing, the species remains covered by the SHA regardless of the change in status of the species.

Landowners that have a federal SHA, a federal Candidate Conservation Agreement with Assurances, or a federal Conservation Benefit Agreement with the USFWS or NMFS can request for CDFW to determine that the federal agreement is consistent with the California State Safe Harbor Agreement Program Act. Once CDFW determines that a federal agreement is consistent, no further authorization or approval from CDFW is required for the landowner to implement the federal agreement.

Fully Protected Species

The designation and protection of fully protected species is established by FGC sections 3511, 4700, 5050, and 5515, and as amended through Senate Bill 147 (2023). Fully protected species may not be taken or possessed except with authorization from CDFW for necessary scientific research, including efforts to recover fully protected or CESA-listed species, relocation of a fully protected bird species for the protection of livestock, or if the fully protected species is listed as a covered species whose conservation and management is provided for in a Natural Community Conservation Plan (NCCP). Senate Bill 147 streamlined take permitting of fully protected species by authorizing CDFW to issue a permit under CESA that would authorize the take of a fully protected species. The bill also required CDFW to develop a plan to assess the population status of each fully protected species, and for annual reports to the Legislature regarding the implementation of the bill to issue permits for the take of fully protected species.

Protection for Bird Nests and Raptors

FGC section 3503 states that, except as otherwise provided by the FGC or any of its implementing regulations, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Subject to the same exception, FGC section 3503.5 states that it is unlawful to take, possess, or destroy any raptors (e.g., hawks, owls, eagles, and falcons), including their nests or eggs. FGC section 3513 provides that it is unlawful to take or possess any migratory nongame bird as designated by the MBTA or any part of such bird except as provided by rules and regulations adopted pursuant to the MBTA.

Lake and Streambed Alteration Program

For the protection and conservation of California's fish and wildlife resources, FGC section 1602 requires an entity to notify CDFW prior to commencing any activity that may: substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other materials that could pass into any river, stream, or lake. "Any river, stream, or lake" includes perennial, intermittent, and ephemeral waterbodies including desert washes and playas (i.e., seasonally dry lakes). FGC section 1602 may also apply to work undertaken within the flood plain of a body of water. Pursuant to FGC section 1602, CDFW requires a Lake or Streambed Alteration (LSA) Agreement when it determines that an activity substantially adversely affect existing fish or wildlife resources (FGC § 1602, subd. (a)(4)(B)).

CDFW Implements Program for Simpler and Faster Approval of Small Habitat Restoration Projects

Many voluntary habitat restoration and water quality improvement projects are relatively small but can have important environmental benefits for fish and wildlife, sensitive species, and water quality. Even for this type of beneficial work, however, obtaining the proper permits and regulatory approvals can sometimes be a complex and lengthy process, which can discourage some landowners from acting.

CDFW has implemented a special program based upon the efforts of a nonprofit organization, Sustainable Conservation, which sponsored the Habitat Restoration and Enhancement Act (Assembly Bill 2193, Statutes of 2014). The Habitat Restoration and Enhancement Act was signed into law by Governor Jerry Brown in 2014. CDFW offers any person, public agency, or nonprofit organization a simpler and faster permitting approval process for small restoration projects. The new approval process is an alternative to the existing FGC Section 1600 Lake or Streambed Alteration Agreement (LSAA) and FGC Section 2081 California Endangered Species Act permit processes.

The Habitat Restoration and Enhancement Act applies to voluntary restoration projects with a primary purpose of improving fish and wildlife habitat, and is coordinated with similar general permits from other agencies, particularly the State Water Resources Control Board. Qualifying projects can receive CDFW approval within 30-60 days. The approval can be used for many common types of habitat improvements such as replacing undersized culverts, removing concrete crossings and sills that block fish passage, removing invasive plants and planting native vegetation along stream corridors, erosion control along waterways, and more. Qualifying projects must be voluntary and should follow techniques and priorities specified in restoration guidelines, manuals, recovery plans or other accepted guidance documents. All appropriate environmental protection measures should be incorporated into the project design.

CDFW encourages landowners with habitat restoration or water quality improvement projects to take advantage of this new, efficient approval process. For more information, visit CDFW's Habitat Restoration and Enhancement Act Program website.

California Environmental Quality Act

The California Environmental Quality Act (CEQA; Pub. Resources Code §§ 21000–21189) serves to: inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities; identify ways that environmental damage can be avoided or significantly reduced; prevent significant, avoidable damage to the environment by requiring feasible project alternatives and mitigation measures; and disclose to the public the reasons for a governmental approval despite the project causing significant environmental effects. State and local public agencies must comply with CEQA before making a discretionary approval of a project. Such compliance can be met by determining a project is exempt from CEQA or preparing an environmental analysis, typically a mitigated negative declaration (MND) or environmental impact report (EIR).

Assembly Bill 52 (Chapter 532, Statutes 2014) required public agencies to consult with tribes during the CEQA process and updated the Initial Study Checklist of the CEQA Guidelines to include questions related to impacts to tribal cultural resources.

Natural Community Conservation Planning Act

The Natural Community Conservation Planning Act (NCCP; FGC section 2800 et seq.) provides for the development of effective, broad-based conservation plans that focus on the needs of natural communities and the range of species that inhabit them while allowing compatible and appropriate economic activity. The NCCP program provides a platform for successful collaborations between state and federal agencies, local governments, community groups, and private interests that have resulted in long-term, habitat-based protections for regional biodiversity. It has also proved to be an effective tool in achieving these protections while reducing conflicts between achieving conservation goals and allowing the reasonable use of natural resources and lands for economic development.

Marine Life Protection Act

The Marine Life Protection Act (MLPA; FGC §2850 et seq.) of 1999 directed CDFW to redesign California's existing system of marine protected areas (MPAs) to increase its coherence and effectiveness for protecting the state's marine life, habitats, and ecosystems (CDFG 2008b). A master plan was also required to guide modification of existing and designation of new marine protected areas (MPAs) into an ecologically connected network. MPA networks function to: increase coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational and study opportunities provided by marine ecosystems subject to minimal human disturbance.

Marine Life Management Act

Passed in 1998 by the California Legislature under Assembly Bill 1241, the Marine Life Management Act (MLMA, FGC §§90-99.5, 105, 7050-7090, 8585-8589.7, 8842, and 9001.7) significantly changed the way California's marine fisheries are managed and regulated. It expanded responsibilities of the CDFW and California Fish and Game Commission, and increased stakeholder involvement in the development of Fishery Management Plans (FMPs). Along with the MLPA and Marine Managed Areas Improvement Act (MMAIA, Pub. Resources Code §§36600-36900), these foundational legislative changes have charted the course for ocean management, specifically regarding sustainable fisheries management and ecosystem conservation and protection (CDFW 2016, 2018).

Invasive Species Council of California

Assembly Bill 2470 (2018) directed state agencies to coordinate a comprehensive effort to prevent the introduction of invasive species in the state and facilitate coordinated, complementary, and cost-effective control or eradication efforts for species already established in the state. The bill created the Invasive Species Council of California (ISCC; comprising secretaries of six state agencies) and the California Invasive Species Advisory Committee (CISAC; comprising 19 members). In 2011, a prior iteration of CISAC completed (and ISCC approved) *Stopping the Spread: A Strategic Framework for Protecting California from Invasive Species* (ISCC 2011). The plan includes 40 recommendations for strengthening the state's response to invasive species.

Sustainable Groundwater Management Act

Composed of a three-bill package (Assem. Bill 1739, and Sen. Bills 13191168) passed in 2014, the Sustainable Groundwater Management Act (SGMA) defines a process and timeline for forming locally-controlled groundwater sustainability agencies (GSAs) in designated groundwater basins. GSAs are responsible for developing and realizing groundwater sustainability plans (GSPs) to achieve basin sustainability within a 20-year implementation horizon. The Department of Water Resources developed GSP Regulations to guide plan content and will be responsible for plan review and approval. The State Water Resources Control Board serves as the regulatory backstop for groundwater basins found to be out of compliance with SGMA.

Administrative Procedures Act

The Administrative Procedure Act (APA; Gov. Code § 11340 et seq., implementing regulations in Cal. Code Regs., tit. 1, § 1-280) establishes rulemaking procedures and standards for state agencies in California. The requirements set forth in the APA are

designed to provide the public with a meaningful opportunity to participate in the adoption of state regulations and to ensure that regulations are clear, necessary and legally valid. The Office of Administrative Law (OAL) is responsible for reviewing regulations proposed by over 200 state agencies for compliance with the APA. Both CDFW and the California Fish and Game Commission have rulemaking authority granted by the FGC.

Local Ordinances, Plans, and Policies

Cities and counties establish policies to direct and manage community issues (such as growth, housing, and environmental protection) and adopt ordinances to protect important local resources. Local governments use a variety of planning tools, such as the general plan, specific plans, zoning, CEQA review, conditions of approval for approved projects, and ordinances. Natural resource protection can occur on a local level in plans, policies, or ordinances, including to protect riparian buffers, native and heritage trees, lakes and ponds, and locally important plants and animals (e.g., rare plant preserves, bird nesting areas, monarch butterfly migration roosts).

Wildlife Conservation Board

The Wildlife Conservation Board (WCB) is an independent Board with authority and funding to carry out an acquisition and development program for wildlife conservation (FGC §1300 et seq.). WCB and CDFW work cooperatively to implement mutual conservation efforts. About one-half of WCB funding is derived from California bonds authorized by public vote with the remainder coming from other state funds, local matching funds, partner donations, and federal money (Wildlife Conservation Board 2023). The primary responsibilities of WCB are to select, authorize, and allocate funds for the purchase of land and waters suitable for recreation purposes combined with the preservation, protection, and restoration of fish and wildlife habitat. WCB can also authorize the construction of facilities for fish and wildlife-related recreational purposes.

CDFW Offices and Programs

CDFW offices and programs that tie into species conservation and management and/or implementation of SWAP conservation strategies (Chapter 4) are listed below. Additional CDFW programs are described in Chapter 3.

Wildlife Diversity Program

CDFW's Wildlife Diversity Program (WDP) works to conserve and manage native amphibian, bird, mammal, reptile, and terrestrial invertebrate populations and their

habitats throughout California, with a focus on the state's most vulnerable wildlife - Threatened and Endangered species and Species of Special Concern. The program uses a variety of strategies to maintain California's rich biodiversity, including monitoring and assessment, conservation and recovery planning, scientific research permitting, species and habitat management, research, and outreach.

WDP staff evaluate petitions to list terrestrial wildlife species under the California Endangered Species Act (CESA), develop comprehensive status reviews for candidate species, and develop recovery plans for species already listed. Through research and consultation with external experts, the program identifies amphibian and reptile, bird, and mammal Species of Special Concern (SSCs) and works to implement conservation actions to preclude the need to list SSCs under CESA. The program's subject matter experts accomplish recovery and conservation actions through engagement with tribal governments, state and federal agencies, land managers, non-governmental organizations, academic partners, and the public to secure the future for California's wildlife. The WDP also issues Scientific Collecting Permits to researchers, managers, and educators working with non-listed native wildlife, and issues research and management authorizations to individuals and organizations working with CESA-listed and Fully Protected Species to coordinate efforts statewide. Program staff also conduct scientific monitoring and research to promote understanding of certain high-profile species, including their population sizes, distributions, and their responses to climate change, wildfire, drought, and land use. This data is used to inform biodiversity conservation and wildlife management decisions, and to inform biodiversity conservation. Additional duties of the WDP include, but are not limited to:

- Coordinating statewide conservation efforts
- Evaluating petitions and conducting status reviews for listing under CESA
- Evaluating and prioritizing traditional and non-traditional section 6 grants
- Evaluating and prioritizing state wildlife grant applications
- Prioritizing statewide drought response
- Partnering with USFWS on developing conservation strategies and assisting with development of recovery plans

Game Conservation Program

CDFW Game Conservation Program manages the following programs for the benefit of wildlife: Bear Management Program, Deer Management Program, Elk Management Program, Wild Pig Management Program, Pronghorn Antelope Management Program, Bighorn Sheep Management Program, the Shared Habitat Alliance for Recreational Enhancement Program, Private Lands Management, and the Waterfowl Unit.

The Game Conservation Program manages the Private Lands Management (PLM) program, which offers landowners incentives to manage their lands for the benefit of wildlife. This increases benefits to a landowner while preventing the conversion of private lands to land uses that are not compatible with wildlife, such as urban development, grazing, and logging. Landowners who enroll in this "ranching for wildlife" program consult with biologists to identify biologically sound habitat improvements that benefit wildlife, like providing water sources, planting native plants for food, and making brush piles for cover. In return for these habitat improvements, landowners can charge fees for wildlife viewing, hunting, and fishing. This partnership between wildlife managers and private landowners helps conserve and maintain wildlife habitat in California.

Wildlife Connectivity Unit

Wildlife Connectivity Unit (WCU) was officially established in 2023, although CDFW has long been involved in habitat connectivity efforts before that time. The WCU consists of CDFW staff across various regions and programs across the state. Habitat Conservation Planning, Fisheries, and Biogeographic Data branches along with other CDFW programs collaborate as part of the WCU. One of the main goals of the Wildlife Connectivity Unit (WCU) is to identify areas where wildlife connectivity is impacted, as defined by subdivision (a) of section 158 of the Streets and Highways Code (last updated by Assem. Bill No. 2344 (2021-2022, Reg. Sess.)). The WCU works with Caltrans to comply with AB 2344 and any other entities that have wildlife connectivity inquiries. In addition to this, the WCU provides assistance related to wildlife connectivity to other CDFW programs, such as Environmental Review and Permitting (FGC § 1957, subdivision (e)).

Lands Program

CDFW Lands Program CDFW is responsible for management of over 1.1 million acres of fish and wildlife habitat spanning over 700 properties statewide. Lands Program within CDFW develops land management plans for these properties. It also manages the Wetland Conservation Program (WCP), which was established in 1990 in response to the nationwide groundswell of interest in wetland preservation, restoration, and enhancement. The WCP provides coordination, direction, and funding for many of CDFW's wetland habitat programs and activities. Although the responsibilities of the WCP extend statewide, the program is focused primarily on the Central Valley. The following programs are implemented by the WCP on an annual basis:

- Public Lands Programs
- Private Lands Programs
- Wetland Water Resources

The CDFW Wildfire Resiliency Initiative has increased the pace and scale of vegetation management and fire-adapted native plant restoration activities to promote resiliency on CDFW lands. Projects are aligned with the implementation framework known as Maintenance, Adaptive management, Restoration, Capacity or MARC. Actions include new and ongoing fuel reduction projects, native species revegetation, facility protection and preparedness, increased collaborations with tribes and partners, and advancing workforce development. Monitoring efforts have begun to ensure the best practices are being applied within an adaptive management process.

Planning and Permitting Programs

Environmental Review and Permitting

In CDFW headquarters, the mission of the Habitat Conservation Planning Branch (HCPB) is to provide for the conservation, protection, restoration, and management of fish, wildlife, and native plants and to preserve and restore the ecosystems (including ecological processes) on which they depend for use and enjoyment by the public.

The HCPB Environmental Review and Permitting Program implements CESA and CEQA. The Environmental Review and Permitting Program administers the incidental take provisions of CESA to ensure regulatory compliance and statewide consistency. CDFW consults with lead and responsible agencies and provides the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities under the CEQA. HCPB Environmental Review and Permitting Program is an important part of implementing conservation laws and regulations carried out by CDFW.

The Lake and Streambed Alteration (LSA) Program reviews activities that may alter the bed, bank, or channel of any river, stream, or lake. If project activities may substantially adversely affect fish and wildlife resources, an LSA agreement may be issued containing reasonable measures necessary to protect the resources. Common activities that are permitted by LSA agreements include installation, repair, or maintenance of water diversions, culverts, or stream crossings (e.g., bridges).

The LSA Program also manages an interagency contract with the California Department of Transportation (Caltrans) to fund dedicated CDFW liaisons for LSA and CESA permitting, CEQA review, advance mitigation, and fish and wildlife passage projects. CDFW's partnership with Caltrans supports public infrastructure projects and the conservation of fish and wildlife and their habitats.

The Cannabis Permitting Program (CPP) coordinates with the Department of Cannabis Control (DCC) to implement the Medicinal and Adult-Use Cannabis Regulation and Safety Act. Specifically, the CPP works with DCC on the issuance of cannabis cultivation

licenses to ensure activities related to cultivation are included in, and licenses are in compliance with LSA agreements. Additionally, CPP collaborates with HCPB's Environmental Review and Permitting Program on the implementation of CESA and CEQA for cannabis cultivation projects to ensure regulatory compliance and statewide consistency.

The LSA, Cannabis Permitting, and Caltrans Programs (Programs) work closely with regional staff to provide support and ensure statewide consistency within each program. The Programs are also responsible for managing CDFW's Environmental Permit Information Management System (EPIMS) used by all staff to review and issue LSA agreements.

Cutting the Green Tape Program

"Cutting Green Tape" is a priority initiative throughout the State of California to increase the pace and scale of ecological restoration, conservation, climate adaptation, and stewardship. Within the California Natural Resources Agency (CNRA), Cutting Green Tape (CGT) is focused on improving regulatory processes and policies so that ecological restoration and stewardship can occur more quickly, simply, and cost-effectively.

With the support of the Newsom Administration, CDFW established its own CGT initiative with several new approaches to support improved and enhanced restoration activities within its granting and environmental review programs. First supported with one-time funding in the Budget Act of 2020, CDFW's pilot CGT initiative created several new improvements to CDFW's granting and restoration permitting procedures.

Following the success of the pilot CGT initiative during the 2020–2021 fiscal year, CDFW received permanent funding to create a new statewide CGT Program beginning in the 2021–22 fiscal year. This program consists of a headquarters team (an Environmental Program Manager, two Senior Environmental Scientists, one Administrative Governmental Program Analyst, and a dedicated attorney) and 10 regional staff who focus exclusively on restoration permitting and grant administration. With added assistance from general counsel and CDFW executive leadership, as part of the Watershed Restoration Grants Branch (WRGB), the CGT Program administers the Statutory Exemption for Restoration Projects, the Restoration Management Permit, the Restoration Consistency Determination, and assists in grant program improvements and integration.

Cutting the Green Tape: Saving Time and Money to Accelerate Restoration
Recognizing that combatting the impacts of biodiversity loss and climate change requires swift and bold action, the Cutting Green Tape (CGT) Initiative accelerates the pace and scale of habitat restoration by streamlining and improving CDFW processes. To date, CDFW's CGT Program has saved nearly $7 million dollars that would have been consumed by permit application fees or environmental review expenses. In addition, permit processing times have been substantially reduced over the past three years. Saving both time and money means that more grant dollars can be directed to restoring habitat and recovering imperiled species.

Statutory Exemption for Restoration Projects (SERP)
Shortly after the CGT program was created, Governor Newsom signed Senate Bill 155 (2021) adding Section 21080.56 to the California Public Resources Code. This section provides a CEQA statutory exemption for fish and wildlife restoration projects that: 1) are exclusively restoration; 2) may also have incidental public benefits; result in long-term net benefits to climate resiliency, biodiversity and sensitivity species recovery; and include procedures and ongoing management for the protection of the environment. CDFW's CGT program supports the implementation of the statute and is responsible for coordination efforts with CEQA lead agencies who are requesting SERP concurrence from the CFW Director.

Restoration Management Permits (RMPs)
The original Restoration Management Permit, developed in 2019, consolidated two CDFW "take" authorizations into a single streamlined permit designed for beneficial restoration projects. The original RMP was able to authorize take of 1) endangered, threatened, and candidate species pursuant to the California Endangered Species Act (CESA) and 2) fully protected species.

On September 27, 2024, Governor Newsom signed AB 1581, adding Chapter 6.7 to the FGC while also updating the California Safe Harbor Program Act. AB 1581 created a more comprehensive RMP that can consolidate up to five CDFW authorizations into a single permit designed for beneficial management and restoration activities resulting in a substantial net benefit to native species or habitats. These authorizations for qualifying restoration projects include take of CESA listed or candidate species, Fully Protected Species, plants protected by the

Native Plant Protection Act, and other protected species. Additionally, the new MP an authorize impacts to rivers, streams, and lakes when those impacts are associated with a qualifying restoration project.

Restoration Consistency Determinations (CDs)

FGC section 2080.1 allows an applicant who has obtained a federal incidental take statement (federal Section 7 consultation) or a federal incidental take permit (federal Section 10(a)(1)(B)) to request that the Director of CDFW find the federal documents consistent with CESA. If the federal documents are found to be consistent with CESA, a consistency determination (CD) is issued, and no further authorization or approval is necessary under CESA. In 2021, CDFW created new procedures to issue CDs using federal Programmatic Biological Opinions (PBOs) for restoration in response to strong interest from the restoration community to develop programmatic permitting options. CDFW worked closely with federal agencies to develop a new process for CDFW's "pre-approval" of PBOs to ensure general consistency with CESA, coupled with an expedited review of project-specific applications. Under this process, potential conflicts between CESA and the restoration PBO are resolved at the front end, resulting in an expedited CD process that focuses solely on project-specific review of an application for consistency with the PBO. The Restoration CD may also be used for projects obtaining project-specific biological opinions.

Landscape Conservation Planning Program

Landscape conservation planning proactively identifies priority mitigation and conservation areas before impacts occur, with the goal of preserving larger areas of higher habitat quality and increasing wildlife connectivity. This type of advance planning also results in more efficient and streamlined permitting for development projects. The program includes Natural Community Conservation Planning, Regional Conservation Investment Strategies, Conservation and Mitigation Banking, Wildlife Connectivity Advance Mitigation, and Entity Due Diligence for Mitigation Lands. These programs are described in Chapter 3.

Native Plant Program

The Native Plant Program coordinates CDFW's statewide plant conservation efforts, issues scientific, educational and management permits for state-listed plants, manages grants for plant research and conservation through the Cooperative Endangered Species Conservation Fund (section 6) of FESA, evaluates CESA, and provides education and outreach regarding California's native plants.

Timberland Conservation and Fire Resiliency Program

The Timberland Conservation and Fire Resiliency Program is the lead for coordination of wildfire-prevention focused vegetation management projects with CAL FIRE and the California Natural Resources Agency. CDFW staff in the six regions (all but Marine) are available to coordinate with CAL FIRE and other resources agency departments on

timber harvesting plans, emergencies, exemptions, and monitoring. These staff also consult with local CAL FIRE Districts and electrical utilities on fuel reduction projects as required by Senate Bill 901 (2018) and other forestry and fire-related legislation, and coordinate on catastrophic wildfire response.

Invasive Species Program

The mission of the Invasive Species Program is to reduce the negative effects of non-native invasive species on the wildlands and waterways of California. CDFW is involved in efforts to proactively prevent the introduction of these species into the state, detect and respond to introductions when they occur, and prevent the spread of invasive species that have become established. CDFW projects address problems with introduced animals and plants, both terrestrial and aquatic. More fundamentally, CDFW tries to identify and address the ways by which the species are introduced, typically inadvertently, by human activities. Studies show that preventing introductions is the most efficient and cost-effective way to manage invasive species. CDFW conducts work in coordination with other government agencies and non-governmental organizations.

CDFW maintains a regulatory list of live restricted animals (FGC §§ 2118 and 2120; Cal. Code Regs., tit. 14, § 671), through which several invasive animals, among other species, are prohibited from importation, possession, and transportation unless under a permit issued by CDFW. The FGC prohibits the sale, possession, import, transport, transfer, or live release of all Caulerpa spp. of saltwater algae (FGC § 2300), as well as live or dead mussels of the family Dreissenidae (e.g., quagga, zebra, dark false), unless under CDFW permit (FGC §§2301-23. CDFW also regulates the aquaculture industry, including the import, sale, and placement of aquatic plants and animals into state waters through other programmatic functions outside the Invasive Species Program.

Beaver Restoration Program

In 2023, as part of the Governor's Nature-Based Solutions Initiative, CDFW established a Beaver Restoration Program. Through collaboration with private and public landowners, tribes, non-governmental organizations, and other resource management agencies, the Program seeks to implement beaver restoration projects for the purposes of restoring ecosystem processes, advancing habitat restoration and species conservation efforts, and increasing climate change, drought, and wildfire resilience.

Due to resource exploitation by the fur trade and later due to its management as a nuisance on the landscape, the North American beaver (*Castor canadensis*) was nearly extirpated from much of its native range, including most watersheds in California. However, in recent years there has been a paradigm shift, particularly among the western states, with a changed perspective that now recognizes and values beavers as

the ecosystem engineers and keystone species they are as opposed to viewing beavers primarily as a nuisance species.

Where their dam-building and wetland-engineering occurs, beavers increase carbon sequestration, reduce downstream sediment transport and deposition, repair channel incision, reconnect streams to their floodplains, increase riparian vegetation, and create critical habitat for both wetland- and riparian-obligate species, as well as increase habitat complexity to provide suitable habitat necessary for multiple taxa, species, and life stages within. This retention of water on the landscape increases groundwater recharge, improves summer baseflows, extends seasonal flows, and increases fuel moisture during wildfire season, effectively creating "green belts" that can serve as wildfire buffers or breaks and provide refugia for wildlife.

Due to their relatively limited distribution on the landscape, beavers represent a virtually untapped resource in California's fight against our greatest ecological pressures. As such, to effectively utilize beavers as a nature-based solution, implementation of the Beaver Restoration Program includes:

- Conducting beaver restoration projects (via beaver translocations) on private, public, and tribal lands for a suite of ecological objectives
- Facilitating re-establishment of beaver populations on tribal lands
- Supporting non-lethal management of human-beaver conflicts through non-lethal deterrents or translocation, where feasible options exist
- Developing a Beaver Management and Restoration Plan, which provides a comprehensive understanding of where, when, and how beavers can be utilized as a tool in restoring and conserving habitats for the species under CDFW purview
- Developing a prioritization tool that incorporates biodiversity indices, special status species, and related stressors and pressures to identify watersheds and project sites with greatest beaver restoration value

Nutria Eradication Program

The Nutria Eradication Program consists of planning, support, and field staff dedicated to the eradication from the state of nutria (*Myocastor coypus*), a highly invasive, semi-aquatic rodent. Field staff operate on both public and private lands, currently covering a roughly two-million-acre project area that spans from San Pablo Bay, throughout the Sacramento-San Joaquin Delta, down the Central Valley to Kings County, and up the river corridors into the Sierra Nevada foothills.

Nutria are aquatic habitat generalists, capable of thriving in most aquatic habitats where adequate food resources (vegetation) and cover exist. They establish dense colonies, whose destructive feeding and burrowing behaviors have quickly

compounded impacts on the ecosystem. In emergent wetlands, nutria feeding results in loss of emergent vegetation and associated habitat structure; loss of soil organic matter, which reduces carbon sequestration, and erosion of wetland soils, which can result in conversion of emergent wetland/marsh habitat to open water; and their burrowing activities cause further erosion, compromising habitat management and water conveyance infrastructure. In riverine systems and off-channel habitat, nutria burrowing exacerbates erosion and sedimentation, potentially impacting both riparian and fish-spawning habitats; their feeding on aquatic invasive plants (e.g., water hyacinth, parrotfeather, water primrose) create fragments that exacerbate infestations and further choke waterways, impeding flow, increasing water temperatures, and reducing dissolved oxygen for fish.

Throughout the project area, staff assess habitat suitability, and where suitable habitat exists staff conduct visual and ongoing camera surveys. Where nutria are detected, staff conduct live-trapping for dispatch or release of non-target species. The Program coordinates with nearly 5,000 private landowners that have granted access to their properties, as well as several dozen local, state, and federal agencies. Though CDFW is the lead agency for nutria eradication in California, the Program maintains close coordination with the California Departments of Water Resources and Food and Agriculture, as well as operates in close partnership with the U.S. Fish and Wildlife Service, which contributes to survey and trapping operations on infested refuges within the project area.

Law Enforcement

CDFW's Law Enforcement Program employs wildlife officers/wardens to protect California's wildlife and natural resources. Wildlife officers are armed law enforcement officers with statewide arrest authority. They enforce California state laws related to hunting, fishing, pollution, endangered species, and wildlife habitat destruction. Wildlife officers are also expected to promote and coordinate hunter education programs, collect and report information on the conditions of fish and wildlife and their habitat, and represent the CDFW at local schools and meetings of special interest groups, e.g., hunting and fishing clubs, Lions Club, Rotary, Audubon.

Wildlife officers have assignments in both rural and urban areas of the state. They are typically assigned to and responsible for enforcing the law in a specific geographical area of the state. They enforce all fish and wildlife laws related to hunting, recreational and commercial fishing, trapping, pollution, falconry, and exotic animal laws.

The Cannabis Cultivation Enforcement Program a critical component of California's transition into a regulated cannabis industry. CDFW's Law Enforcement Division (LED):

- works with growers to bring their facilities into compliance
- provides assistance in remediating criminal environmental violations
- works with other agencies to remove illegal grows, growers, illegal water impoundments, and extremely toxic chemicals frequently associated with illegal grows

The Law Enforcement Division maintains a confidential witness program, CalTIP (Californians Turn in Poachers and Polluters) that encourages the public to provide CDFW with factual information leading to the arrest of poachers and polluters.

The Law Enforcement Division also has a K-9 Program to assist wildlife wardens. The warden/dog teams are trained and certified to locate people, protect officers, and apprehend suspects, as well as detect certain odors and evidence.

Office of Cannabis

Background

CDFW's Office of Cannabis exists to mitigate and remedy the environmental impacts of cannabis cultivation on California's fish and wildlife and the habitats upon which they depend. Since the 1980s, CDFW has been steadfast in their enforcement of FGC violations and prosecution of illegal cultivators operating on public lands. Historically, illegal cannabis cultivation has occurred on public lands throughout the state, resulting in significant damage to critical fish and wildlife habitat through diversions of water from streams, removal of native riparian and upland vegetation, depletion of fish and wildlife, harmful disposal of garbage and human waste, and chemical contamination and alteration of sensitive watersheds. Much of this activity has occurred in the heavily forested and sparsely developed counties of Humboldt, Mendocino, and Trinity.

The breadth and depth of CDFW's Cannabis Program has evolved dramatically, coinciding with changes in cannabis laws, economy, and science. In 1996, California voters passed Proposition 215, the Compassionate Use Act, which legalized consumption and cultivation of cannabis for medicinal purposes. In 2014, CDFW received staff and resources to create a Watershed Enforcement Team composed of seven staff. In 2016, the Adult Use of Marijuana Act (AUMA; Proposition 64) legalized adult use of cannabis for non-medical purposes. The following year, the state legislature passed the Medical and Adult Use of Cannabis Regulation and Safety Act (MAUCRSA) to establish the state regulatory framework for licensing commercial cannabis activity. Between 2019 and 2024, CDFW's Cannabis Program has experienced dramatic expansion across its core functions which include enforcement, permitting and compliance, grants, environmental monitoring, and land stewardship. As of 2024, there are nearly 250 staff, approximately 65 percent of whom are scientific/technical, 30

percent law enforcement, two percent attorneys, and the remainder administrative. The impacts of cannabis cultivation on wildlife are detailed in Chapter 2.

Cannabis Cultivation Regulatory Framework

CDFW's commitment to protecting fish and wildlife, and the habitats upon which they depend, is central to California's commercial cannabis licensing requirements. For example, cannabis cultivators must demonstrate compliance with FGC section 1602 to receive a state cultivation license from the Department of Cannabis Control (DCC) (FGC § 1602 requires an entity to notify CDFW prior to commencing any activity that may adversely impact any river, stream, or lake.) To satisfy this licensing requirement, cultivators may submit a CDFW LSA Agreement or written verification that an LSA Agreement is not needed. This is a novel requirement, non-existent in any other regulatory framework for agricultural commodities or otherwise. Additionally, the legislation prohibits DCC from issuing new cultivation licenses or increasing the total number of plant identifiers within a watershed or other geographic, pursuant to CDFW finding that cannabis cultivation is causing significant adverse impacts on the environment in that watershed or area. The legislation also requires DCC to include cultivation licensing conditions requested by CDFW to protect fish, wildlife, habitat, fish and wildlife habitat, and water quality (Bus. & Prof. Code §26060.1, subd.(b)). Cultivators must also demonstrate compliance with the California Environmental Quality Act which commonly includes biological expertise provided by CDFW during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

Cannabis Cultivation Policy and Enforcement

The State of California responds to environmental pressures caused by cannabis cultivation by both cracking down on illegal cannabis operations and by improving legal production regulation and oversight. The State funds the Eradication and Prevention of Illicit Cannabis (EPIC) program along with local and federal partner agencies. Run by the California Attorney General and financed in part by the federal government, the EPIC program funds sheriffs and park law enforcement officers to find and remove illegal cannabis in California. The EPIC program focuses on the investigation and prosecution of civil and criminal cases relating to illicit cannabis cultivation with a focus on environmental and economic harms and labor exploitation. EPIC is a multi-agency collaboration led by DOJ in partnership with the U.S. Department of Agriculture's U.S. Forest Service; the U.S. Department of the Interior's Bureau of Land Management and National Park Service; the California Department of Fish and Wildlife; the U.S. Department of Justice's Drug Enforcement Administration; the California National Guard, Counter Drug Task Force; the Central Valley High Intensity Drug

Trafficking Areas program; California State Parks; and other local law enforcement departments.

EPIC marks an evolution in DOJ's cannabis enforcement work, which has responded to issues and concerns that arise from operations each summer. EPIC works in close coordination with DOJ's Cannabis Control Section, Special Prosecutions Section, and Tax Recovery and Underground Economy (TRUE) Task Force to build investigations and prosecute civil and criminal cases. In 2024, EPIC operations serviced 36 counties in California, eradicating over 775,000 plants from 665 sites.

To reduce environmental damage caused by state-legal cannabis cultivation on public and private lands, the CDFW and the State Water Resources Control Board (SWRCB) work collaboratively to investigate environmental impacts associated with cannabis cultivation. This collaboration includes the Department of Cannabis Control to support the multiagency task force in addressing environmental impacts of cannabis cultivation. CDFW's goal is to be proactive with enforcement in highly impacted watersheds, hold those responsible for existing environmental damage accountable, and provide a pathway toward compliance for those operators who want to cultivate in an environmentally sound manner. These efforts have included outreach to educate and hear from cultivators, consultants, and local agencies about their challenges and successes, in addition to a focused effort to check compliance with existing licenses and permits.

Law enforcement is a critical component of California's transition into a regulated cannabis industry. CDFW's wildlife officers are fully fledged peace officers authorized to enforce all laws of the State of California. CDFW's Law Enforcement Division (LED) fills the following roles:

- Works with growers to bring their facilities into compliance
- Provides assistance in remediating criminal environmental violations
- Works with other agencies to remove illegal grows, growers, illegal water impoundments, and extremely toxic chemicals frequently associated with illegal grows
- Protects California's unique, beautiful, and diverse natural resources

Marine Region and Programs

The mission of CDFW's Marine Region is "to protect, maintain, enhance, and restore California's marine ecosystems for their ecological values and their use and enjoyment by the public through good science and effective communication." The Marine Region oversees regulations for commercial and recreational fishing; administers the Marine

Protection Act; conducts research and provides information on marine species; and provides data, management and research on marine fisheries.

Office of Spill Prevention and Response

The Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 established the Office of Spill Prevention and Response (OSPR). OSPR, as a division of CDFW, is the lead state agency charged with the mission:

"…to provide the best achievable protection to California's natural resources by preventing, preparing for, and responding to spills of oil and other deleterious materials, and through restoring and enhancing affected resources"

OSPR, and its mission, a unique in that it is one of the only state agencies in the United States with combined regulatory, law enforcement, pollution response, and public trust authority for waters of the state. Thus, OSPR's dual regulatory / trustee authority assures that oil spill prevention and response to spills will safeguard wildlife and the ecosystems in which they live and restore these resources when injured by pollution incidents. OSPR jurisdictions covers the marine environment and all statewide surface waters at risk of oil spills from any source, including pipelines and the increasing shipments of oil transported by railroads. OSPR regulates many of the modalities of producing, transporting, and storing fuels and will respond if spilled product threatens surface waters of the state. After a spill, OSPR works to restore resources injured by oil spills. In the case of oil spills, a natural resource damage assessment determines how the public is compensated for the lost ecological benefits and uses of resources injured by the spill.

In 2021, California lawmakers enacted Assembly Bill 148 to update sections of the Lempert-Keene-Seastrand Oil Spill Prevention & Response Act and addressing renewable fuels. Facilities and vessels that handle renewable fuels are now within the jurisdiction of OSPR, including two new categories: renewable fuel production and renewable fuel receiving facilities.

The Marine Invasive Species Program within OSPR coordinates with the California State Lands Commission (SLC) to control the introduction of Non-Indigenous Species (NIS) from the ballast of ocean-going vessels. The Marine Invasive Species Program is responsible for conducting biological surveys to assess the amount and types of marine invasive species present in state coastal and estuarine waters, and the degree of success of ballast water management activities. OSPR manages the California Aquatic Non-Native Organism Database and is working to establish consistency among the various major databases being used to analyze similar types of aquatic invasive species-related information (CDFW 2025).

Office of Tribal Affairs

The Office of Tribal Affairs (OTA) is in CDFW's Executive Office and within the Office of Justice, Equity, Diversity and Inclusion. With CDFW's commitment to conserve, protect and manage the state's natural resources in consultation with California Native American tribes, the OTA and a designated Department Tribal Liaison, lead CDFW and support staff statewide to more effectively engage tribes early, often, and throughout the conservation process to ensure meaningful involvement.

CDFW recognizes that many of its proposed activities may significantly impact the interests of California Native American tribes. It is committed to consulting and engaging with tribes about fish, wildlife, and plant issues, assessing and avoiding to the extent practicable any potential impact of CDFW activities on tribal interests, and providing tribes with meaningful opportunities to participate in decision-making processes that affect tribal interests. This includes, but not limited to, collaboration of education across the various programs under CDFW, tribal input, participation, co-management, inclusion of Traditional Ecological Knowledge (TEK) and practices, and tribal perspectives into the conservation, protection and management of fish, wildlife and the plant habitats.

Supporting Legislation and Executive Orders

Various legislation and policy documents support State agencies to engage in consultation with California Native American tribes regarding policies, processes, programs, and projects that have the potential to affect tribal interests. These reinforce CDFWs responsibility to incorporate and engage tribes when policies, projects, and activities may affect tribal communities.

Executive Order (EO) B-10-11 was issued by Governor Edmond G. Brown, Jr. and states it is the policy of the administration that every State agency and department subject to executive control shall encourage communication and consultation with California Native American tribes. EO B-10-11 reaffirms the right for California Native American tribes to exercise sovereign authority over their members and territory, recognizes that the State and Tribes are better able to adopt and implement mutually beneficial policies when they cooperate and engage in meaningful consultation, and identifies the State's commitment to strengthening and sustaining effective government-to-government relationships between the State and the California Native American tribes. EO B-10-11 also created the Office of the Tribal Advisor, which, among other things, is directed to facilitate communication and consultations between California Native American tribes and state agencies.

Pursuant to EO B-10-11, CNRA and CDFW developed the following Tribal Consultation policies:

- CNRA adopted its Tribal Consultation Policy on November 20, 2012. The Tribal Consultation Policy directs CNRA departments to conduct outreach to California Native American tribes and designate a tribal liaison to serve as the central point of contact for California Native American tribes.
- CDFW adopted its Tribal Communication and Consultation Policy on October 2, 2014. The policy establishes guiding principles and directs CDFW to appoint a tribal liaison. CDFW is committed to consulting with tribes about issues surrounding the State's fish, wildlife, and plant resources, assessing the potential effects of CDFW activities on tribal interests, and providing tribes with meaningful opportunities to participate in decision-making processes that have the potential to affect tribal interests.

Assembly Bill 52 (2014) Established a consultation process in CEQA with all California Natie American tribes on the Native American Heritage Commission list. Through AB52, it added a class of resources Tribal Cultural Resources (TCR) where consideration of Tribal Cultural Values in determination of project impacts and mitigation. It requires tribal notice and meaningful consultation prior to determining whether a negative declaration, mitigated negative declaration, or environmental impact report is required consultation must occur with tribes.

EO N-15-19 Issued by Governor Gavin Newsom on June 18, 2019, acknowledges and apologizes on behalf of the State for the prejudicial policies and maltreatment of California Native American tribes and commends California Native Americans for stewarding and protecting lands within California. The EO also reaffirms and incorporates by reference the principles of government-to-government engagement established by EO B-10-11.

Statement of Administration Policy: Native American Ancestral Lands Issued by Governor Gavin Newsom on September 25, 2020, and in the spirit of righting the historical wrongs, encourages state entities to see opportunities to support California tribes for the co-management and access to natural lands that are within a California tribe's ancestral land and under the ownership or control of the State of California. It also encourages partnerships with tribes on land management and stewardship utilizing Traditional Ecological Knowledges.

EO N-82-20 Signed by Governor Gavin Newsom on October 7, 2020, creates a California Biodiversity Collaborative and sets a goal of conserving at least 30 percent of the State's land and coastal waters by 2030 to combat the biodiversity and climate crises. The EO acknowledges that California Native Americans have stewarded and

managed the lands within California and that addressing the biodiversity and climate crises requires partnerships and collaboration with California Native American tribes.

Office of Tribal Affairs Framework

Under the leadership of the Department Tribal Liaison, the OTA provides resources and support to both CDFW staff and California Native American tribes. Serving as a bridge between tribes and CDFW, The Department Liaison may include assisting in discussions, communication of tribal interests and priorities, and ensuring CDFW is doing everything we can to be good partners.

To assist the Department Tribal Laison, a network of identified staff serve as Tribal Coordinators in the seven CDFW Regions and some Statewide Programs. The Tribal Coordinators, in close coordination with the Department Liaison, engage and collaborate with tribes using OTA policies and direction. They provide support and tribal issues, concerns, requests from both staff and tribes. For the Regional Tribal Coordinators, the role includes being the local program experts, serving as the primary point of contact for tribes in that area, working with the day-to-day operations and projects. A list of OTA contacts can be found on the CDFW Tribal Affairs website.

Office of Communications, Education, and Outreach

The Office of Communications, Education, and Outreach was formed in October 2005 with the intention of CDFW to more effectively engage with constituents. Communications, education, and outreach activities are valuable means to reach the people served by CDFW. It is evident the state's ongoing population growth, especially in urban areas, continues to put pressure on fish and wildlife resources, thus increasing the need for public outreach and education.

CDFW continues to identify, connect with, and provide education to targeted audiences who are traditionally not reached as potential partners in conservation without excluding traditional constituencies (e.g. hunters, commercial and recreational anglers, conservation groups). Marketing specialists have been targeting non-traditional groups with like interests for partnerships. An example is the "Be Bear Aware" program which partners with sanitation officials in the Lake Tahoe Basin to reduce bear/human conflicts.

Laboratories and Research Centers

Wildlife Forensics Laboratory (WFL)

The Wildlife Forensic Laboratory (WFL) has been operating since the early 1950's and supports CDFW Wildlife Officers by conducting forensic analyses on physical evidence

for casework and public safety investigations. To protect wildlife from abuse by poaching, The WFL serves as the wildlife "crime lab" for the CDFW Law Enforcement Division (LED) by providing scientific analyses to assist in the determination of whether wildlife laws have been broken. Over the years, the WFL has assisted Wildlife Officers with thousands of investigations into wildlife crimes such as poaching, trafficking, and illegally marketed products.

The term "forensic" is most simply defined as the application of science to the purposes of the law. "Crime labs" are laboratories which, as their primary function, conduct forensic analyses on physical evidence exclusively in criminal cases and provide legally acceptable reports and expert testimony regarding their findings. WFL is the sole molecular biology laboratory for CDFW and fulfills a crucial and ever-expanding role in protecting California's wild resources. Maintained since the early 1950s, WFL's sole purpose and mission is to use accepted forensic science procedures to examine, analyze, report and testify at criminal trials on physical evidence seized by CDFW officers in criminal cases. During the past sixty plus years, thousands of poachers have been convicted of crimes perpetrated on wildlife partially because of results provided by WFL on evidence submitted by CDFW Officers.

Wildlife Health Laboratory (WHL)

The Wildlife Health Laboratory (WHL), formerly the Wildlife Investigations Laboratory (WIL), was established in 1941 as mandated by FGC Section 1008 to conduct wildlife disease investigations. The mission of WHL is to investigate, monitor, and manage wildlife population health issues in California. WHL staff provides expertise, coordination, training, resources, and technical assistance to agency staff and partners in a variety of wildlife health issues and animal welfare, including disease surveillance, biological sampling, legislative review, regulation changes, genetics research, wildlife rehabilitation, and human-wildlife conflict.

Shellfish Health Laboratory

Located at the Bodega Marine Laboratory in Bodega Bay, the CDFW Shellfish Health Laboratory (SHL) monitors and diagnoses known and emerging diseases in wild and farmed shellfish throughout California. Staff conduct inspections at, and work closely with shellfish farms, marine aquaria, and research laboratories to prevent the introduction and transfer of disease agents and non-native species, including freshwater (quagga and zebra) mussels. In collaboration with academic institutions and aquaria, the SHL contributes to the recovery of endangered native abalone populations.

Other Laboratories and Research Centers

CDFW manages numerous other laboratories (labs) and research centers. More information can be found on the following websites:

- Aquatic Bioassessment Lab
- Interagency Ecological Program
- Marine Invertebrate Survey and Assessment Project
- Marine Pollution Studies Laboratory Group
- Marine Wildlife Veterinary Care and Research Center
- Petroleum Chemistry Lab
- Water Pollution Control Lab

CDFW Grant Programs

CDFW's grant programs operate to support projects that work toward CDFW initiatives and the mission, and implementing SWAP. Funding opportunities change over time. Current information on grant opportunities are best viewed on the CDFW grant opportunities website. Below is a non-exhaustive list of CDFW grant programs.

Watershed Restoration Grants Branch

The Watershed Restoration Grants Branch (WRGB) administers grant funding and oversees the CGT Program to deliver science-informed grants for restoration of ecological function and conservation, and assesses the success of those efforts at a large-scale. Grant programs administered by WRGB include:

- Watershed Restoration Grant Program
- Drought – Protecting Salmon
- Nature-based Solutions, including Wetlands and Mountain Meadows Restoration and Wildlife Corridors
- Addressing Climate Impacts
- Fisheries Restoration Grant Program
- Proposition 1 Restoration Grant Program
- Watershed Restoration Grant
- Delta Water Quality and Ecosystem Restoration Grant
- Proposition 68 Restoration Grant Program
- Rivers and Streams Grants
- Southern Steelhead Grants
- Fish and Wildlife Improvement Grants
- Wetland Restoration for Greenhouse Gas Reduction Program

Cannabis Restoration Grant Program

CDFW's Cannabis Program offers grant funding through the Cannabis Restoration Grant Program (CRGP). Grants are provided through the Environmental Restoration and Protection Account pursuant to Revenue and Taxation Code section 34019, subdivision (f)(2). CRGP is committed to promoting ecosystem restoration and ecological health throughout California. CRGP offers multiple funding opportunities in support of partnerships that clean-up, remediate, and restore watersheds affected by cannabis cultivation; assist qualified cannabis cultivators apply for permits and implement water conservation and sustainable cultivation practices; support research for the benefit of ecosystem health; and reduce impacts on the environment. CRGP also facilitates environmental stewardship by supporting local partnerships and licensed cannabis cultivation statewide.

CRGP continually seeks to diversify the type of projects funded while improving processes for eligible applicants. The CRGP solicits project concepts and applications using an open and continuous process under three funding opportunities:

- Cleanup, Remediation, and Watershed Enhancement (CRWE)
- Qualified Cultivator Funding Opportunity (QCFO)
- Cannabis Research and Innovation Funding Opportunity (RIFO)

Fish and Wildlife Management Grants

CDFW provides grant funds to proponents carrying out wildlife conservation, management, and monitoring through these funding mechanisms:

- Native Wildlife Rehabilitation Voluntary Tax Contribution Fund Grant Program
- State Wildlife Grants
- Steelhead Report Card
- Big Game Management
- Upland Game Management
- California Duck Stamp
- Cooperative Endangered Species Conservation Fund Grants: Traditional Conservation Grants
- Conservation Planning Assistance Grants
- Habitat Conservation Plan (HCP) Land Acquisition Grants
- Recovery Land Acquisition Grants
- Endangered Species Conservation and Recovery Grant Program (Traditional Section 6)
- Endangered Species Conservation and Recovery Land Acquisition (Nontraditional Section 6)

- Wolf Livestock Compensation Grant Pilot Program
- George H.W. Bush Vamos A Pescar Education Fund

Conservation Planning and Protection Grants

- California Winter Rice Habitat Incentive Program
- Natural Community Conservation Planning Local Assistance Grants
- Endangered Species Conservation and Recovery Land Acquisition
- Habitat Conservation Planning Assistance Grant
- Habitat Conservation Plan Land Acquisition Grant

Oil Spill Prevention and Response Grants

The Office of Spill Prevention and Response partners with leaders from California's numerous organizations to provide grants, including:

- Environmental Enhancement Fund
- Native American Preparedness Grant Program
- Natural Resource Damage Assessment
- Response Equipment Grant Program
- Small Spills Restoration Fund