

# Appendix H Offshore Islands

## Prelude

Offshore Islands strategies have been created as a response to the public comments received during the SWAP 2015 public commenting period (May - July 2015). California Department of Fish and Wildlife (CDFW) will continue to develop new strategies as the need arises and if the additions are consistent with SWAP 2015 priorities. Any additional strategies will be shared through the SWAP public website.

## Introduction

California's Offshore Islands, which include the Channel Islands and Farallon Islands and exclude coastal rocks within the Marine Province, are renowned for their high rates of endemism, biologically diverse flora and fauna, and significant nesting sites for sea birds and pinnipeds. The Channel Islands (and often the Farallones as well) 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. California is a hotspot of biodiversity, and within the state, the offshore islands are a hotspot within a hotspot.

The global significance of these islands is underscored by their:

- 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 (which is 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;
- inclusion in the Greater Farallones National Marine Sanctuary;
- inclusion 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; and

- ▲ strategic location for US Navy weapon testing operations, 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 stretch of the mainland coast from San Diego to Huntington Beach, and the Northern Channel Islands lie due south of the coast from Oxnard to Goleta. The Channel Islands are comprised of eight islands (Santa Cruz, Santa Rosa, Santa Catalina, San Clemente, San Nicolas, San Miguel, Anacapa, and Santa Barbara), totaling 906 km<sup>2</sup> (350 mi<sup>2</sup>), and range from 193 to 753 m (635- 2470 ft.) in highest elevation. Vegetation communities 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. Over 10% of the islands' flora, approximately 100 taxa, are endemic to the islands. The islands are 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. 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 and rookeries and haul-out areas for pinnipeds.

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 U.S. 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 habitat.

All of 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, eradications

- ▲ Common threats and impacts (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

Historical over-grazing and browsing by a variety of introduced vertebrates, ranging from rabbits to feral sheep, feral pigs deer and elk, and considerable soil and habitat disturbance by these animals led to severe habitat degradation and adverse effects on native species. These impacts included the conversion of shrublands to grasslands, proliferation of non-native invasive species island-wide, and reductions of endemic plant populations. These affects combined with the loss of bald eagles from the area due to pesticide contamination of Southern California's waters, allowed a new top predator to move in, the golden eagle. Golden eagles feed more on terrestrial prey than bald eagles, and were subsidized with large populations of introduced vertebrates, but incidentally fed on island foxes which led to collapses of the fox populations across the Northern Channel Islands.

Most of the introduced vertebrates were successfully removed from the Farallons 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. The success of island managers and mainland partners in these endeavors is the product of substantial commitment, collaboration, and the investment of tens of millions of dollars from Federal, State, and local agencies, private foundations, and individuals.

Non-native 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. To minimize further extinctions and other ecological changes, the most important priority for the California islands is to reduce the risks of new invasions. After biosecurity (prevention), the next priority is to eradicate existing harmful invasive species, where this is possible. These aims are embodied in the United Nations Convention on Biological Diversity, which includes an 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, especially in the early stages of an invasion, or where a population is confined to an island or limited habitat (Clout et. al 2001). These successes include:

- ▲ the eradication of feral sheep from Santa Cruz, Santa Rosa, San Miguel, and San Nicolas islands;
- ▲ the eradication of introduced feral pigs from Santa Catalina, Santa Cruz, and Santa Rosa islands;
- ▲ the removal of feral goats from San Clemente and Santa Catalina islands;
- ▲ the eradication of introduced mule deer from Santa Rosa Island;

- ▲ the eradication of introduced elk from Santa Rosa Island;
- ▲ the eradication of introduced donkeys from San Miguel Island;
- ▲ the removal of cattle and horses from Santa Catalina, Santa Cruz, and Santa Rosa islands;
- ▲ the removal of feral cats from Farallon, Santa Barbara, San Nicolas, and Santa Rosa islands;
- ▲ the removal of feral hares from Farallon Islands;
- ▲ the removal of feral rabbits from Santa Barbara Island;
- ▲ the eradication of black rats from Anacapa Island;
- ▲ the eradication of feral turkeys from Santa Catalina and Santa Cruz islands;
- ▲ the eradication of the European honey bee from Santa Cruz Island; and
- ▲ the capture and successful relocation of golden eagles from the islands (which has brought about a reduction in predation-related mortality of the endemic, and federally endangered, island fox).

More importantly, these eradications have resulted in resurgences in populations of native species on all of the islands, many of which had become rare, and others which were widespread elsewhere but increasingly uncommon on the islands.

Despite these successes, many native species, natural communities and ecological processes are still in the process of recovering from other 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 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 also exemplary platforms for developing and testing innovative approaches needed to advance the science and practice of conservation and restoration. Indeed, the extraordinary scientific values of the California Islands were explicitly noted in the legislation that established Channel Islands National Park. The island managing entities have fostered highly productive conservation partnerships across the islands, resulting in the application and advancement of science-based approaches to pressing conservation challenges that face, not only the California Islands, but islands around the world. Many stakeholders have made important contributions to these projects. Other 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. Lessons learned through these efforts have been published in scientific journals, textbooks, and popular media in order to disseminate techniques that can be used in other conservation projects and increase the impact of conservation and restoration investments.

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 a new *proactive* management strategy for the conservation of the islands for the decade ahead.

## Goals for Offshore Islands

The offshore islands share many similar goals and preventing the introduction of non-native invasive species through biosecurity strategies impacts all islands. The islands proximity to the mainland allows for increased visitation opportunities, but also increases the risk of invasive species introductions. Over time, a number of non-native organisms have been introduced to the islands, some of which have threatened the survival of the endemic island species, and even led to the extinction of others, such as the San Clemente Island Bewick's Wren and Santa Barbara Island Song Sparrow.

Moving forward, Island managers and transportation concessionaires agreed to strengthen biosecurity protocols to reduce the likelihood of non-native species entering and establishing populations on the Islands. The California Islands' managers have designed a new collaborative Biosecurity Program (Boser et al. 2012) and have hired a Biosecurity Manager to enact top priorities. Some of the most significant parts of the plan have yet to be fully developed and funded. Representatives from twelve organizations and agencies formed the California Islands Biosecurity Group, the first collaborative group in California devoted solely to biosecurity. Through this collaborative, 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.

Now that most (but not quite all) of the urgent problems caused by invasive vertebrates on California's offshore islands have been addressed, conservation management is moving to a more pro-active phase. This phase is designed to anticipate climate change and bolster the biota's resilience and adaptation, and to restore native species, vegetation cover, and ecological processes whose recovery has stalled.

The list of shared goals among the island managers of the California Offshore Islands are:

- 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 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 how intensive was their management of the islands.
- 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) and include actions in the biosecurity program to reduce the likelihood that they will invade and establish, and to increase the likelihood that they will be quickly detected if they do.
- ▲ Eradicate harmful introduced non-native vertebrate and invertebrate species where possible and practical.
- ▲ 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 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.

Table H-1 Stresses and Pressures for Offshore Islands												
Priority Pressures	Stresses											
	Climate Related Factors			Changes in Geophysical and Disturbance Regime		Changes in Hydrology and Water Characteristics			Ecosystem Changes			
	Change in temperature extremes	Change in annual average precipitation	Sea level rise and ocean acidification	Change in sediment erosion-deposition regime	Change in natural fire regime	Change in runoff and river flow	Change in water levels and hydroperiod	Change in flood occurrence, frequency, intensity, and area flooded	Change in spatial distribution of habitat types	Habitat fragmentation	Change in community structure or composition	Change in biotic interactions
Airborne pollutants											X	
Climate change	X	X	X		X				X		X	X
Dams and water management/use						X	X	X	X		X	X
Fire and fire suppression					X				X		X	X
Housing and urban areas											X	X
Introduced genetic material											X	
Invasive plants/animals									X	X	X	X
Livestock, farming, and ranching				X					X		X	X
Military activities									X			X
Mining and quarrying										X	X	X
Parasites/pathogens/diseases											X	X
Recreational activities									X		X	X
Roads and railroads										X	X	X
Tourism and recreation areas									X			X
Utility and service lines										X	X	X



Table H-2 Focal Species of Conservation Strategies Developed for Offshore Islands

Common Name	Scientific Name
<b>Invertebrates</b>	
Santa Barbara shelled slug*	<i>Binneya notabilis</i>
Santa Catalina lancetooth*	<i>Haplotrema catalinense</i>
San Nicolas island snail*	<i>Micrarionta feralis</i>
San Clemente island snail*	<i>Micrarionta gabbi</i>
Pricklypear island snail*	<i>Micrarionta opuntia</i>
Shepard's snail*	<i>Pristiloma shepardae</i>
San Clemente Island blunt-top snail*	<i>Sterkia clementina</i>
Bicolor cactus snail*	<i>Xerarionta tryoni</i>
Channel Island sweat bee*	<i>Lasioglossum channelense</i>
<b>Reptiles</b>	
Loggerhead sea turtle (North Pacific)*	<i>Caretta caretta</i> *
Green sea turtle*	<i>Chelonia mydas</i> *
Leatherback sea turtle*	<i>Dermochelys coriacea</i> *
Olive ridley sea turtle*	<i>Lepidochelys olivacea</i> *
Island night lizard*	<i>Xantusia riversiana</i> *
Two-striped gartersnake*	<i>Thamnophis hammondi</i> *
<b>Birds</b>	
Black storm-petrel*	<i>Oceanodroma melania</i> *
Ashy storm-petrel*	<i>Oceanodroma homochroa</i> *
Catalina California quail*	<i>Callipepla californica catalinensis</i> *
California brown pelican*	<i>Pelecanus occidentalis californicus</i> *
Pelagic cormorant*	<i>Phalacrocorax pelagicus</i>
Brandt's cormorant*	<i>Phalacrocorax penicillatus</i>
Northern harrier*	<i>Circus cyaneus</i>
Bald eagle*	<i>Haliaeetus leucocephalus</i>
Snowy plover (coastal population)*	<i>Charadrius nivosus</i>
Black oystercatcher*	<i>Haematopus bachmani</i>
Short-eared owl*	<i>Asio flammeus</i>
Burrowing owl*	<i>Athene cunicularia</i>
Island scrub-jay*	<i>Aphelocoma insularis</i> *
Vaux's swift*	<i>Chaetura vauxi</i>
Olive-sided flycatcher*	<i>Contopus cooperi</i>
Island loggerhead shrike*	<i>Lanius ludovicianus anthonyi</i> *
San Clemente loggerhead shrike*	<i>Lanius ludovicianus mearnsi</i>
Least Bell's vireo*	<i>Vireo bellii pusillus</i>
Catalina Hutton's vireo*	<i>Vireo huttoni unitti</i>
San Clemente Island Bewick's wren*	<i>Thryomanes bewickii leucophrys</i>

Table H-2 Focal Species of Conservation Strategies Developed for Offshore Islands	
Common Name	Scientific Name
Santa Cruz Island rufous-crowned sparrow*	<i>Aimophila ruficeps obscura</i>
Grasshopper sparrow*	<i>Ammodramus savannarum</i>
Channel Island song sparrow*	<i>Melospiza melodia graminea</i>
San Clemente spotted towhee*	<i>Pipilo maculatus clementae</i>
Tricolored blackbird*	<i>Agelaius tricolor</i>
Pigeon guillemot*	<i>Cephus columba</i>
Tufted puffin*	<i>Fratercula cirrhata</i>
Cassin's auklet*	<i>Ptychoramphus aleuticus</i>
Guadalupe murrelet*	<i>Synthliboramphus hypoleucus</i>
Scripps's murrelet*	<i>Synthliboramphus scrippsi</i>
Common murre*	<i>Uria aalge</i>
<b>Mammals</b>	
Guadalupe fur seal*	<i>Arctocephalus townsendi*</i>
Southern sea otter*	<i>Enhydra lutris nereis*</i>
Steller (=northern) sea-lion*	<i>Eumetopias jubatus*</i>
Channel Islands spotted skunk*	<i>Spilogale gracilis amphialus*</i>
Anacapa deer mouse	<i>Peromyscus maniculatus anacapae</i>
Santa Catalina Island shrew*	<i>Sorex ornatus willeti*</i>
Pallid bat*	<i>Antrozous pallidus*</i>
Townsend's big-eared bat*	<i>Corynorhinus townsendii*</i>
Fringed myotis*	<i>Myotis thysanodes*</i>
Santa Catalina Island fox*	<i>Urocyon littoralis catalinae*</i>
San Clemente Island fox*	<i>Urocyon littoralis clementae*</i>
San Nicolas Island fox*	<i>Urocyon littoralis dickey*</i>
San Miguel Island fox*	<i>Urocyon littoralis littoralis*</i>
Santa Cruz Island fox*	<i>Urocyon littoralis santacruzae*</i>
Santa Rosa Island fox*	<i>Urocyon littoralis santarosae*</i>
<b>Plants</b>	
San Clemente Island bird's-foot trefoil*	<i>Acmispon argophyllus var. adsurgens*</i>
Santa Cruz Island bird's-foot trefoil*	<i>Acmispon argophyllus var. niveus*</i>
San Clemente Island lotus*	<i>Acmispon dendroideus var. traskiae*</i>
Santa Rosa Island manzanita*	<i>Arctostaphylos confertiflora*</i>
Trask's milk-vetch*	<i>Astragalus traskiae*</i>
Island barberry*	<i>Berberis pinnata ssp. insularis*</i>
Hoffmann's rockcress*	<i>Boechera hoffmannii*</i>
Round-leaved filaree*	<i>California macrophylla*</i>
San Clemente Island paintbrush*	<i>Castilleja grisea*</i>
Soft-leaved paintbrush*	<i>Castilleja mollis*</i>
Catalina Island mountain-mahogany*	<i>Cercocarpus traskiae*</i>

Table H-2 Focal Species of Conservation Strategies Developed for Offshore Islands	
Common Name	Scientific Name
Island rush-rose*	<i>Crocanthemum greenei</i> *
Trask's cryptantha*	<i>Cryptantha traskiae</i> *
San Clemente Island larkspur*	<i>Delphinium variegatum</i> ssp. <i>Kinkiense</i> *
Thorne's royal larkspur*	<i>Delphinium variegatum</i> ssp. <i>Thornei</i> *
Catalina grass	<i>Dissanthelium californicum</i>
Beach spectaclepod*	<i>Dithyrea maritime</i> *
Blochman's dudleya*	<i>Dudleya blochmaniae</i> ssp. <i>Blochmaniae</i> *
Santa Rosa Island dudleya*	<i>Dudleya blochmaniae</i> ssp. <i>Insularis</i> *
Munchkin dudleya*	<i>Dudleya gnoma</i> *
Santa Cruz Island dudleya*	<i>Dudleya nesiotica</i> *
Santa Barbara Island dudleya*	<i>Dudleya traskiae</i> *
Catalina Island dudleya	<i>Dudleya virens</i> ssp. <i>Hassei</i>
Island green dudleya	<i>Dudleya virens</i> ssp. <i>Insularis</i>
Bright green dudleya	<i>Dudleya virens</i> ssp. <i>Virens</i>
Santa Barbara Island buckwheat*	<i>Eriogonum giganteum</i> var. <i>compactum</i> *
San Nicolas Island buckwheat*	<i>Eriogonum grande</i> var. <i>timorum</i> *
Box bedstraw*	<i>Galium buxifolium</i> *
San Clemente Island bedstraw*	<i>Galium catalinense</i> ssp. <i>Acrispum</i> *
Hoffmann's slender-flowered gilia*	<i>Gilia tenuiflora</i> ssp. <i>Hoffmannii</i> *
Island mallow*	<i>Lavatera assurgentiflora</i> ssp. <i>Assurgentiflora</i> *
Southern island mallow*	<i>Lavatera assurgentiflora</i> ssp. <i>Glabra</i> *
San Clemente Island woodland star*	<i>Lithophragma maximum</i> *
Island lomatium	<i>Lomatium insular</i>
Santa Catalina Island desert-thorn*	<i>Lycium brevipes</i> var. <i>hassei</i> *
San Clemente Island bush-mallow*	<i>Malacothamnus clementinus</i> *
Santa Cruz Island bush-mallow*	<i>Malacothamnus fasciculatus</i> var. <i>nesioticus</i> *
San Nicolas Island malacothrix	<i>Malacothrix foliosa</i> ssp. <i>Polycephala</i>
Santa Cruz Island malacothrix*	<i>Malacothrix indecora</i> *
Junak's malcothrix*	<i>Malacothrix junakii</i> *
Island malacothrix*	<i>Malacothrix squalida</i> *
Lyon's pentachaeta*	<i>Pentachaeta lyonii</i> *
Northern Channel Islands phacelia*	<i>Phacelia insularis</i> var. <i>insularis</i> *
Nuttall's scrub oak*	<i>Quercus dumosa</i> *
Santa Cruz Island winged-rockcress*	<i>Sibara filifolia</i> *
Wallace's nightshade*	<i>Solanum wallacei</i> *
Santa Cruz Island fringe-pod*	<i>Thysanocarpus conchuliferus</i> *

\*Denotes a species on the SGCN list. Non-asterisked species are not SGCN but are identified as important species by island managers.

## 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 Statement for Management. 1991.

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 National 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.

## TARGET: OFFSHORE ISLANDS

### Goals:

- ▲ By 2025, acres of Offshore Islands are maintained from 2015 acres.
- ▲ By 2025, acres where native species are dominant are increased by at least 10% from 2015 acres.
- ▲ By 2025, population or acres of key and endemic Offshore Islands plant species is increased by at least 10% from 2015 population
- ▲ By 2025, acres connected are maintained from 2015 acres.
- ▲ By 2025, acres with fragmented habitat are more connected by 10% from 2015 acres.
- ▲ By 2025, fire regime frequency or enabling conditions are decreased from 2015 levels by 25%.
- ▲ By 2025, acres with desired soil sediment deposition are increased by 10% from 2015 acres.

**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.
- ▲ Remove or reduced 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.
- ▲ Manage recreational activities to decrease the risk of new invasions, impact to vegetation, wildlife, and soil structure.
- ▲ 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.
- ▲ Develop a California Islands Invasive Plant Management Network by the end of 2016 developing an MOU to share expertise, resources, and joint funding sourcing.

- ▲ 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.

*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 to 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.

Table H-3 Conservation Goals and Strategies for the Offshore Islands				
Target	Goals	Key Ecological Attributes (KEAs)	Pressures <sup>1</sup>	Strategy Categories
Offshore Islands	<ul style="list-style-type: none"> <li>▲ By 2025, acres of Offshore Islands are maintained from 2015 acres.</li> <li>▲ By 2025, acres where native species are dominant are increased by at least 10% from 2015 acres.</li> <li>▲ By 2025, population or acres of key and endemic Offshore Islands plant species is increased by at least 10% from 2015 population</li> <li>▲ By 2025, acres connected are maintained from 2015 acres.</li> <li>▲ By 2025, acres where fragmented are more connected from 2015 acres by 10%.</li> <li>▲ By 2025, fire regime frequency or enabling conditions are decreased from 2015 levels by 25% from 2015 acres.</li> <li>▲ By 2025, acres where desired soil sediment deposition is occurring is increased by 10% from 2015 acres.</li> </ul>	<ul style="list-style-type: none"> <li>▲ Area and extent of community</li> <li>▲ Fire regime</li> <li>▲ Connectivity among communities and ecosystems</li> <li>▲ Community structure and composition</li> <li>▲ Key species population levels</li> <li>▲ Endemic diversity</li> <li>▲ Native versus non-native diversity</li> <li>▲ Soil and sediment deposition regimes</li> </ul>	<ul style="list-style-type: none"> <li>▲ Climate change</li> <li>▲ Fire and fire suppression</li> <li>▲ Mining and quarrying</li> <li>▲ Invasive plants/animals</li> <li>▲ Roads and railroads</li> </ul>	<ul style="list-style-type: none"> <li>▲ Data Collection and Analysis</li> <li>▲ Partner Engagement</li> <li>▲ Direct Management</li> <li>▲ Management Planning</li> <li>▲ Training and technical assistance</li> <li>▲ Outreach and education</li> </ul>

<sup>1</sup> Pressures can be positive or negative depending on the intensity, timing, and duration of the action on the target habitat.



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