Appendix A: Acronyms and Abbreviations

Table A-1. Acronyms and abbreviations for the San Clemente Island Integrated Natural Resources Management Plan .

Acronym or Abbreviation	Definition
°C	Celsius
°F	Fahrenheit
AFP	Artillery Firing Point
AMP	Artillery Maneuvering Points
ASBS	Area of Special Biological Significance
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
AVMA	Assault Vehicle Maneuver Area
AVMC	Assault Vehicle Maneuver Corridor
AVMR	Assault Vehicle Maneuver Road
BASH	Bird Aircraft Strike Hazard
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
BUD/S	Basic Underwater Demolition/SEAL
CA	Conservation Agreement
cal	caliber
CCA	California Coastal Act
CCC	California Coastal Commission
CCNM	California Coastal National Monument
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CINP	Channel Islands National Park
cm	centimeter(s)
CNIC	Commander, Navy Installations Command
CNO	Chief of Naval Operations
CNPS	California Native Plant Society
CNRSW	Commander, Navy Region Southwest
CO	Commanding Officer
COMPACFLT	Commander, Pacific Fleet
COMPTUEX	Composite Training Unit Exercise
CSG	Carrier Strike Group
CSUN	California State University Northridge
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DDT	dichloro-diphenyl-trichloroethane
DoD	U.S. Department of Defense
DoDDIR	U.S. Department of Defense Directive
DoDINST	U.S. Department of Defense Instruction
DUSD[I&E]	Deputy Under Secretary of Defense (Installations and Environment)

Table A-1. Acronyms and abbreviations for the San Clemente Island Integrated Natural Resources Management Plan (Continued).

Acronym or Abbreviation	Definition
DZ	Drop Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPR	Environmental Program Requirements
ERL	Environmental Readiness Level
ER-L	Effects Range Low
ER-M	Effects Range Medium
ESA	Endangered Species Act
ESG	Expeditionary Strike Group
FACSFAC	Fleet Area Control and Surveillance
FR	Federal Regulations
gal	gallon(s)
GIS	Geographic Information System
ha	hectare(s)
INLMA	Island Night Lizard Management Area
INRMP	Integrated Natural Resources Management Plan
IOA	Infantry Operations Area
IPMP	Integrated Pest Management Plans
IWS	Institute for Wildlife Studies
JTFEX	Joint Task Force Exercise
kg	kilogram(s)
km	kilometer(s)
km2	square kilometer(s)
kph	kilometer(s) per hour
KTR	Kingfisher Mine Countermeasures Range
kW	kilowatt(s)
L	liter(s)
LARWQCB	Los Angeles Regional Water Quality Control Board
lbs	pounds
LCTA	Long-Term Condition and Trend Analysis
LOA	Letter of Authorization
LRMP	Legacy Resource Management Program
LTR	Laser Training Range
m	meter(s)
MARINe	Multi-agency Rocky Intertidal Network
MBTA	Migratory Bird Treaty Act
MEU	Marine Expeditionary Unit
MILCON	Military Construction
MIR	Missile Impact Range
MITT	Maritime Integrated Tailored Training

Table A-1. Acronyms and abbreviations for the San Clemente Island Integrated Natural Resources Management Plan (Continued).

Acronym or Abbreviation	Definition
MLPA	Marine Life Protection Act
mm	millimeter(s)
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MPA	Marine Protected Area
mph	mile(s) per hour
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
MTR	Mine Training Range
NALF	Naval Auxiliary Landing Field
NAVFAC	Naval Facilities Engineering Command Southwest
Navy	U.S. Department of the Navy
NBC	Naval Base Coronado
NEPA	National Environmental Policy Act
NEW	net explosive weight
nm	nautical mile(s)
nm^2	square nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	Nonpoint Source Discharge Elimination System
NRO	Natural Resources Office
NSG	Naval Strike Group
NSZ	Naval Safety Zone
NUWC	Naval Undersea Warfare Center
O&MN	Operations and Maintenance
OPAREA	Operational Area
OPNAVINST	Naval Operations Instruction
OSD	Office of the Secretary of Defense
PCBs	polychlorinated biphenyls
PDO	Pacific Decadal Oscillation
PIF	Partners in Flight
PL	Public Law
PMARs	Primary Mission Areas
PMSR	Point Mugu Sea Range
POM	Program Objectives Memorandum
RCMP	Range Complex Management Plan
RDT&E	Research, Development, Test and Evaluation
RSIP	Regional Shore Infrastructure Plan
SCB	Southern California Bight
SCI	San Clemente Island
SCIUR	San Clemente Island Underwater Range
SCORE	Southern California Offshore Range
SCS	Soil Conservation Service

Table A-1. Acronyms and abbreviations for the San Clemente Island Integrated Natural Resources Management Plan (Continued).

Acronym or Abbreviation	Definition
SERDP	Strategic Environmental Research and Development Program
SERG	Soil Ecology and Restoration Group
SHOBA	Shore Bombardment Area
SNI	San Nicolas Island
SOAR	Southern California Anti-Submarine Warfare Range
SOCAL	Southern California Range Complex
SOW	Statement of Work
SPAWAR	Space and Naval Warfare Systems Center
SURGEX	Surge Exercise
SWAP	State Wildlife Action Plans
SWATs	Special Warfare Training Areas
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWTR	Shallow Water Training Range
TAR	Training Area and Range
TDI	Tierra Data Inc.
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USW	Undersea Warfare
UXO	Unexploded Ordnance
VC-3	Old Airfield
VDS	Variable Depth Sonar Area
VHF	Very High Frequency
W-291	Warning Area 291
WAP	Wildlife Action Plan
WFMP	Wildland Fire Management Plan

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Appendix B: Implementation Summary Table for the SCI INRMP

The purpose of the implementation table is to summarize all projects or activities that San Clemente Island (SCI) is seeking to implement under the Integrated Natural Resources Management Plan (INRMP). The implementation table is organized according to INRMP management topic. Management strategies presented in Chapters 3 and 4 identify the means by which SCI intends to achieve desired future conditions. Management actions, such as Environmental Program Requirement (EPR) projects, are specific projects or activities designed to achieve desired future conditions. Individual EPR projects may address multiple management strategies encompassing various EPR numbers.

The implementation table includes the EPR funding code, project name, metrics focus areas, legal drivers, and potential funding source for each project. Scopes of work are developed by the Natural Resources Managers in partnership with Naval Facilities Engineering Command Southwest, as appropriate, and generally detailed in kick-off meetings, meeting minutes, and written work plans that document the common understanding of work methods and schedule.

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466AAA44	3.3.4 Wildland Fire	O&MN	San Clemente Island Fire Management Plan Update. Project funds updates to the SCI Wildland Fire Management Plan (WFMP) for SCI and associated National Environmental Policy Act (NEPA) documents and biological assessments. Implementing the WFMP is required under the Biological Opinion (BO) FWS-LA-09B0027-09F0040 November 2008. Updates are required every five years under the BO referenced above. This project also funds the annual review and reporting of the WFMP implementation, which includes the following data on each fire that occurs during the reporting period: map; size; ignition source; severity; effects; weather conditions at time of ignition; suppression assets used; duration. Annual reviews will be done every year, even in years in which the WFMP is being updated. Annual reviews also are required under the BO referenced above.	4	NEPA, DoDI 6055.06, ESA, NEPA	Recurring		6. Ecosystem Integrity
31466BIOSC	3.6.7 Invasive Species		Bio-Security Plan. The introduction of additional invasive species to SCI could result in additional species listings or the inability to delist currently listed species. This project should develop and implement a bio-security plan for SCI with SCI-specific measures (e.g, inspection of barge shipments, inspection of vehicles and cargo flown to SCI, and remote camera monitoring at likely entry points). This action should identify and reduce the threats to these listed species at SCI by reducing arrivals of non-native species and promoting early detection of new arrivals.	4	ESA, MBTA, SAIA, EO 13112, EO 13186	Recurring		6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466CBRPE	3.6.5.8 California Brown Pelican	O&MN	California Brown Pelican Monitoring. Monitoring of nesting colony occupancy, number of nesting pairs, and nest success is recommended to meet the post-delisting monitoring requirements of the California brown pelican. Aerial surveys are planned as the most cost-effective method for assessing colony occupancy and number of nesting pairs, but some level of ground truthing is necessary to verify aerial data, assess nest success, and document disturbance. Monitoring is recommended annually through 2019 (unless the colony is consistently unoccupied), in keeping with the recommended Endangered Species Act (ESA) post-delisting ten-year monitoring period for this species. To support conservation of this species throughout its range, banding of a limited portion of the pelican nestlings/juveniles is recommended to determine movement between colonies within the region.	4	ESA, NEPA, MBTA, SAIA	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity
31466EM001	Ecosystem Approach	O&MN	Stable Isotope Analysis of Trophic Ecology. Projects that use nested hierarchical relationships to evaluate functions, patterns, and identify related mechanisms from the top down or bottom up within the ecosystems support effective ecosystem management. Lack of data across trophic levels and spatial scales and lack of data on key biological processes limits the INRMP and the Installation Biologist's ability to successfully manage on both an ecosystem and species level. This project is designed to identify prey base components on multiple scales and evaluate trophic level relationships in support of ecosystem and species-specific management. Stable isotope analysis has been used in ecological studies of diet composition and preference and can assess trophic interactions (Lewis et al. 2006; Newsome et al. 2009; Newsome et al. 2010). Stable isotope analyses would be undertaken at SCI from samples collected in the field (plant samples, prey base samples, fox whiskers, bird feathers, etc.) to determine diet components of various species by habitat.	3	SAIA, ESA, DoDI 4715.3, OPNAVINST 5090.1C	Non-recurring		6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466EMWHA	3.6.2.7 Mammals	O&MN	Wildlife Habitat Assessment. This project would use a modified Wildlife Habitat Assessment methodology (original methods designed or modified by the U.S. Fish and Wildlife Service (USFWS), Audubon Society, U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, and state wildlife agencies) to numerically rate and qualitatively describe sites across SCI relative to their value as wildlife habitat. The assessment includes mapping, photo documentation, assessment of food, cover, water, unique/important features, human disturbance, etc. This project has particular value for SCI, where on-going vegetative recovery (following removal of feral grazers) may change habitat suitability over time and where little has been recorded in terms of baseline habitat data.	3	SAIA, EO 13186,OPNAVINST 5090.1C	Non-recurring		6. Ecosystem Integrity
31466MAR21	Ecosystem Approach, 3.3.3 Water and Sediment Quality	MIS	Amphibious Landing Area Surveys. This project is in support of the Southern California (SOCAL) Range Complex Environmental Impact Statement (EIS) to allow for continued amphibious training and operations. Currently, the environmental impacts of amphibious landings are unknown. This project is designed to establish an environmental baseline of the amphibious landing areas within the SOCAL Range, including SCI. Baseline surveys will include: vertical profiles (bathymetry), sediment corings, and band transects of all amphibious landing areas. Additional surveys will be necessary three years after the initial surveys to determine the impacts, if any, of amphibious landings at these locations.	2	NEPA, MSA, SAIA, EO 12962, OPNAVINST 5090.1C	Non-recurring		6. Ecosystem Integrity
31466MAR22	Ecosystem Approach, 3.5.2.1 Subtidal Habitats - Soft Bottom, 3.5.2 Rocky Habitat and Kelp Forests	MIS	Eelgrass Surveys. Subtidal areas on SCI will be surveyed for abundance, distribution, and health of eelgrass. The surveys will be conducted using a combination of side-scan and single beam sonar technologies and SCUBA diving. The data gathered from this project will provide Natural Resources (NR) managers valuable information needed to minimize adverse impacts to this sensitive ecological area due to military training, operations, and facilities. These surveys will be conducted every five years to monitor any changes in the health, distribution, abundance, and any military impacts of existing eelgrass beds and kelp forests.	4	MSA, EO 12962, OPNAVINST 5090.1C, Fish and Wildlife Conservation Act	Non-recurring		6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466MAR23	3.3.3 Water and Sediment Quality, 3.6.3.12 Black Abalone	MIS	Black Abalone Surveys. This project is in support of the ESA for avoidance of critical habitat and restrictions to operations and training. This project will assess the general condition and availability of black abalone habitat on SCI, including a detailed habitat characterization, estimates of the distribution of black abalone habitat on SCI, monitoring of a suite of variables designed to examine oceanographic and water quality indices (water column temperatures, sea level rise, etc.) to detect changes in the environment over time.	4	ESA, SAIA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat
31466MAR24	Ecosystem Approach, 3.5.1.2 Rocky Intertidal and Surfgrass, 3.6.2.2 Marine Invertebrates, 3.6.2.3 Marine Fishes, 3.6.3.12 Black Abalone, 5.1.4 Safety and Other Restricted Access Zones	MIS	SCI Safety Zone Fish Study. Two no take safety zones have been designated around SCI. The objective of this study is to establish baseline surveys in order to determine site usage of black abalone and other rocky intertidal assemblages within the SCI safety zones. These surveys will be similar to the framework developed by the Monitoring Enterprise to be consistent with monitoring of the South Coast regional network of marine protected areas. This study will be developed at a scale useful for project planning so that these locations can be managed and support the Marine Life Protection Act monitoring requirements. All data collected in the safety zones on SCI will be shared with the State of California.	4	ESA, MSA, SAIA, OPNAVINST 5090.1C, MPRSA	Recurring	2012, 2014-2018	2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
31466MAR30	3.5.1.2 Rocky Intertidal and Surfgrass, 3.5.2 Rocky Habitat and Kelp Forests, 3.6.2.2 Marine Invertebrates 3.6.2.3 Marine Fishes, 3.6.3.11 White Abalone, 3.6.3.12 Black Abalone	MIS	Black Abalone Monitoring Database. This project is in support of the ESA for avoidance of critical habitat and restrictions to operations and training. A database will be created and used for management considerations, which will integrate any historical monitoring data sets of black and white abalone as well as other marine species and habitat monitoring, such as rocky intertidal, safety zone surveys, kelp forest surveys, eelgrass surveys, etc. Additionally, these data will be shared with the Multi-agency Rocky Intertidal Network (MARINe) database. This database will serve as a clearinghouse for all data collected in the safety zones on SCI so that those data can be shared with the State of California to avoid being designated and regulated as a State Marine Protected Area.	4	ESA, SAIA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466MR100	3.3.3 Water and Sediment Quality, 3.6.7.2 Marine Invasive Species	O&MN	Marine Invasive Species Plan. The proposed project seeks to detect marine invasive species that could be colonizing the Area of Responsibility for SCI. This project will complete an initial study of non-native species at SCI that reviews the relevant scientific literature, collections records, and unpublished biological data, re-examines collected specimens, and conducts some limited field work. These data will be assembled into a regional database for non-native species of SCI. A sampling program will conduct a five-day rapid assessment survey surrounding SCI. The rapid assessment survey will be conducted every five years. Hotspot monitoring will be conducted annually between the rapid assessment years. This monitoring will consist of small diving surveys to monitor hotspots.	3	Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, Noxious Plant Control Act of 1968, EO 13112	Recurring		6. Ecosystem Integrity
31466MR103	3.6.2.2 Marine Invertebrates, 3.6.2.3 Marine Fishes, 3.6.2.8 Marine Mammals, 3.6.3.11 White Abalone, 3.6.3.12 Black Abalone, 5.1.4 Safety and Other Restricted Access Zones	O&MN	Marine Resources Compliance Signs. This project will promote listed species and species at risk protection and awareness. Develop and install signs at SCI to protect federally listed marine species (black abalone, white abalone), species at risk (green and pink abalone, basking sharks, and Pacific-Southern distinct population segment of boccacio), Marine Mammal Protection Act (MMPA) protected cetaceans and pinnipeds, Essential Fish Habitat and federally managed fish species (eelgrass, giant kelp, coastal pelagic species, and groundfish species) and educate regarding the two No Fishing safety zones.	4	ESA, MMPA, MPRSA	Non-recurring		2. Listed Species and Critical Habitat 4. Fish and Wildlife Management and Public Use 6. Ecosystem Integrity
31466NR005	3.3.3 Water and Sediment Quality, 3.5.2.1 Subtidal Habitats - Soft Bottom, 3.5.2.2 Rocky Habitat and Kelp Forests, 3.6.2.2 Marine Invertebrates, 3.6.2.3 Marine Fishes, 3.6.3.11 White Abalone, 5.1.4 Safety and Other Restricted Access Zones	MIS	Marine Habitat Monitoring Assessment. This project is in support of the ESA for avoidance of critical habitat, restrictions to operations and training, and designation as a State Marine Protected Area. In conjunction with the Marine Life Protection Act initiative, two no take safety zones have been designated around SCI. The objective of this study is to establish baseline surveys in order to determine site usage of white abalone and other subtidal assemblages within the SCI safety zones. All data collected in the safety zones on SCI will be shared with the state of California. This project will also support Navy activities that require an Essential Fish Habitat consultation with NMFS and the requirements for Area of Special Biological Significance (ASBS).	4	ESA, MSA, SAIA, OPNAVINST 5090.1C, MPRSA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466NR012	Ecosystem Approach, 3.3.4 Wildland Fire, 3.6.3 Federally Threatened and Endangered Species	MIS	SCI/SOCAL EIS Mitigation. This project will support the mitigation requirements for SCI EIS and is not duplicative of other ongoing projects or requirements. Mitigation requirements resulted from both the Section 7 consultation under the ESA and as outlined in the USFWS BO FWS- LA-09B0027-09F0040 on San Clemente Island Military Operations and Fire Management Plan 2008 and the SOCAL EIS final Record of Decision. Additionally, due to unexploded ordnance concerns, the Navy is not in compliance with several major requirements of the BO and WFMP. This project includes research, monitoring, reporting or other tasks mandated by the above ESA and NEPA documentation.	4	ESA, MBTA, SAIA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466NR100	3.3.3 Water and Sediment Quality, 3.3.2 Soil and Soil Condition, 3.6.3 Federally Threatened and Endangered Species	MIS	SCI Erosion Control. Project support continued training and operations on SCI. Project controls soil erosion that could adversely affect habitat for federally listed species and/or species at risk. Project entails the installation of erosion control materials (such as geotextile, coir logs, and straw wattles), seeding and/or installation of native plants, supplemental watering, and maintenance and monitoring. This project is included in the INRMP to address erosional concerns that may affect endangered or threatened species on SCI.	4	ESA, SAIA, SCI WFMP	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466NR101	3.4.2.6 California Perennial Grassland, 3.6.3 Federally Threatened and Endangered Species, 3.6.7.1 Invasive Terrestrial Plants	O&MN	SCI Grassland Restoration to Benefit Listed Species. This project restores native grassland that has become invaded by exotic annual grasses to promote the recovery of federally listed species and improve the status of sensitive but non-listed species to prevent their future federal listing. Project will involve a combination of the following: weed control, native species outplanting, and possibly prescribed fire.	4	ESA, EO 13112, SAIA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466NR102	3.3.4 Wildland Fire, 3.6.3 Federally Threatened and Endangered Species	O&MN	Prescribed Burns to Enhance Habitat for Listed Species. This project is an element of the SCI WFMP. The project entails newly burned areas of up to one mile per year of strip burns to enhance fuelbreaks and up to 300 acres per year of additional strip or patch burns. The additional burns will help prevent the spread of fire, which will conserve habitat for six listed plant species and help protect habitat for the SCI loggerhead shrike. Reseeding or planting may follow burning.	4	WFMP, Federal Wildland Fire Policy, DoDI 6055.06, ESA, SAIA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466NR666	3.3.4 Wildland Fire, 3.6.3 Federally Threatened and Endangered Species	O&MN	Fuel Moisture Monitoring for WFMP Implementation. This project entails monitoring fuel moisture levels of shrubs in different plant communities at representative sites across SCI. The project implements one element of the SCI WFMP as required by the BO. Data collected under this project are used to declare the beginning and end of fire season on SCI.	4	Federal Wildland Fire Policy, DoDI 6055.06, ESA, SAIA, NEPA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466NR900	Ecosystem Approach	O&MN	Ecosystem and Adaptive Management. The goal is to maintain and improve the sustainability and native biological diversity of ecosystems (as opposed to one species), while supporting human needs, including the military mission. The development and implementation of a plan would seek to improve the understanding of natural process on SCI, including understanding pre-disturbance habitat conditions on SCI, understanding the natural fire regime of SCI, and helping to understand the climatic and habitat changes to be expected on SCI as a result of climate change.	4	SAIA, ESA, EO 13112	Recurring		6. Ecosystem Integrity
31466NR901	3.6.5.1 California dissanthelium	O&MN	*Dissanthelium californicum* Management, Outplanting, and Habitat Restoration. This project will fund seed collection, propagation, and growing to maximize seed harvesting of California dissanthelium. Additionally, it will fund habitat enhancement, invasive species removal, and monitoring and maintenance. Both of these tasks have the ultimate goal of creating more areas with the species and increasing population numbers at the (only) two populations on SCI.	4	ESA, SAIA, EO 13112, OPNAVNIST 5090.1C	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity
31466NR902	3.6.3.8 San Clemente loggerhead shrike	MIS	San Clemente Loggerhead Shrike Releases. San Clemente loggerhead shrike population augmentation by releasing birds from captivity into the wild and supplemental feeding of birds at release sites began to measurably increase the "wild" shrike population between 1999 and 2001. The success of this program has led to relaxation of regulatory restrictions on training activities in the Shore Bombardment Area and an allowance for incidental take from a variety of activities. Growth of the loggerhead shrike population has relied on the continuation and success of this project. Continuation of this program will be guided by shrike population status relative to recovery objectives (in development in 2012).	4	ESA, NEPA, SAIA	Recurring		2. Listed Species and Critical Habitat

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466NR907	3.6.3 Federally Threatened and Endangered Species 3.3.4 Wildland Fire	MIS	Aerial Fire Suppression. This project provides for an on-site aerial suppression asset at SCI for the wildland fire season. On-island response capability will significantly aid in the protection of loggerhead shrike and other endangered species habitat and is necessary to ensure compliance with the WFMP and 2008 BO.	4	ESA, SAIA, MBTA, NEPA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466NR910	3.6.3.9 San Clemente sage sparrow	MIS	San Clemente Sage Sparrow Management Plan. The 2006 San Clemente Sage Sparrow Management Plan (& population viability analysis) outlined a basis for species status concern. In response, this project initiated radio-telemetry and additional surveys to assess juvenile survival. In addition, re-analysis of existing data indicates potential flaws or gaps in previous analyses under the 2006 plan. This project will update the plan based on new data and revised analyses of the existing data. The management plan should be revisited periodically as new monitoring data indicates a need for management shifts or as population and/or demography data shift.	4	NEPA, ESA, SAIA, MBTA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat
31466NR911	3.6.2.6 Resident and Migratory Birds	O&MN	Avian Community Monitoring. This project would implement commonly accepted sampling methodologies to identify bird species presence within breeding and wintering seasons across the landscape of SCI. Data would be used to inform future NEPA documents for facilities and operational expansion and, in particular, anticipated increases in the use of wind energy at SCI. The information from SCI will also contribute to the understanding of continental migration patterns of birds; specifically, the importance of SCI in the Pacific Flyway and will support the DoD Partners In Flight program. To be statistically rigorous, the program should be conducted for a minimum of three years or whatever duration is necessary to sample a drought cycle and a normal to high rainfall cycle.	4	MBTA, EO 13186, NEPA, SAIA	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity

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EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
31466POL01	3.6.2.1 Terrestrial Invertebrates 3.6.3 Federally Threatened and Endangered Species	O&MN	Pollinators Study. Project was developed from a growing need to understand pollination mechanisms for listed plants on SCI. Lack of sufficient/suitable pollinators for a few SCI listed plant species has been identified as a possible reason for existing low populations numbers. This project will develop a protocol and conduct pollinator surveys to determine which species are pollinating listed plants, in particular *Sibara filifolia* and *Malacothamnus clementinus*. It will determine whether pollinators are present in the habitat with enough frequency to produce viable and sufficient seeds. Surveys to be done every three years to monitor population levels to help ensure that sufficient numbers of pollinators remain to produce sufficient number of seed.	4	ESA, SAIA, DoDI 4715.03, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
31466PPAVE	3.6.5.4 Peregrine Falcon 3.6.5.5 Bald Eagle 5.2.5 Communication Towers, Wind Farms, and Power Lines	O&MN	Avian Power Pole Protection. This project surveys SCI power poles to identify any poles with evidence of electrocution hazard based on pole configuration and/or the presence of bird remains at the pole base. The project would result in comprehensive recommendations for avian protection on power poles at SCI.	4	MBTA, EO 1316, Bald and Golden Eagle Protection Act	Non-recurring	2012	4. Fish and Wildlife Management and Public Use 6. Ecosystem Integrity
31466SNAIL	3.6.2.1 Terrestrial Invertebrates	O&MN	Land Snail Survey. Field surveys should determine the distribution and population status of native snails and non-native snails at SCI. Surveys should document presence/absence and habitat associations as well as densities. Out years will focus on implementation of report recommendations in support of the military mission sustainment, including, as appropriate, control of non-native species.	3	SAIA, NEPA, National Invasive Species Act	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600001	Ecosystem Approach 3.3.4 Wildland Fire 3.6.3 Federally Threatened and Endangered Species	MIS	Vegetation Plots: Endangered Species Habitat Recovery Monitoring. This is a status survey that detects changes in the plant communities of SCI, which support federally listed plant and wildlife species. Periodic assessments (roughly once every two years) are required to document the recovery of the habitat upon which these species depend and provide data essential in supporting downlisting or delisting of federally listed species. Data also provide information vital to making management decisions to promote the recovery of federally listed species and other species at risk. These surveys are required under BO FWS-LA-09B0027-09F0040 on the Navy's San Clemente Island Military Training Program and Fire Management Plan.	4	ESA, NEPA, SAIA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity

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						Frequency	Year	
3146600002	3.6.3 Federally Threatened and Endangered Species	O&MN	Listed and Sensitive Plant Species Monitoring. This project is a status survey to determine the abundance and distribution of federally listed and other sensitive and special status plant taxa on SCI. Updates in status are needed every three years to maintain current data. Surveys will focus on areas most heavily used for training, construction, and where listed species are expected to occur. Surveys will also support delisting/ downlisting of certain species.	4	ESA, SAIA, NEPA	Recurring		2. Listed Species and Critical Habitat
3146600003	3.6.3.10 Western snowy plover	MIS	Western Snowy Plover Surveys. This project is a status survey to determine the abundance, distribution, and reproductive status of the western snowy plover on the northern beaches of SCI. Surveys of southern beaches would occur if effective, non-ground access survey methods are developed. Surveys are anticipated monthly for all months.	4	NEPA, ESA, SAIA, MBTA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat
3146600004	3.6.3.9 San Clemente sage sparrow	MIS	San Clemente Sage Sparrow Monitoring & Management. This project includes surveys and monitoring to determine the abundance, distribution, and reproductive success of the San Clemente sage sparrow, investigations into juvenile survival, and monitoring to address operational effects on/incidental take for this sub-species.	4	NEPA, ESA, SAIA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat
3146600005	3.6.3.7 Island night lizard	MIS	Island Night Lizard Monitoring. This project determines the abundance, distribution, and reproductive success of island night lizards at SCI in support of management and delisting efforts.	4	ESA, NEPA, SAIA,	Recurring		2. Listed Species and Critical Habitat
3146600006	3.6.3 Federally Threatened and Endangered Species	MIS	Genetic Diversity of Endangered and Sensitive Plants. This project assesses reproductive mechanisms and genetic variation within and between plant populations and uses the data obtained to develop appropriate recovery strategies. Genetic studies will be needed to support delisting or downlisting efforts. This project will focus on the following species: *Delphinium variegatum*, *Castilleja grisea*, and *Malacothamnus clementinus*. Newly discovered populations of SCI woodland star and Santa Cruz rockcress will also be analyzed to determine their genetic variability within and between populations. Additional focus species may be included as necessary.	4	ESA, SAIA	Non-recurring		2. Listed Species and Critical Habitat

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3146600008	3.6.3 Federally Threatened and Endangered Species	MIS	SCI Seed Collection and Propagation. This project provides for the seed collection and propagation of SCI native plants to promote recovery of federally listed species and species at risk. Project entails collection of seed and vegetative plant material, plant propagation in the SCI greenhouse, and maintenance of propagated plants. Project includes experimentation to determine effective means of propagating species for which established propagation protocols do not exist. This project also supports EPR 3146600009 (Site Selection, Outplanting and Maintenance) by supplying plant material to be used in outplantings. This project is required as a condition of BO FWS-LA-09B0027-09F0040 on military operations and the SCI WFMP.	4	ESA, SAIA	Recurring		2. Listed Species and Critical Habitat
3146600009	Ecosystem Approach 3.3.3 Water and Sediment Quality 3.6.3 Federally Threatened and Endangered Species 4.8.1 Terrestrial Invasive Flora	MIS	Site Selection, Outplanting, and Maintenance. This project revegetates areas on SCI to enhance habitat for federally listed species and species at risk, to minimize the proliferation of invasive non-native plant species, and to control erosion or endance degraded areas. Project entails selection of appropriate sites, outplanting of appropriate SCI native plant species, and maintenance of restoration sites.	4	ESA, SAIA	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600010	Ecosystem Approach 3.6.3 Federally Threatened and Endangered Species 3.6.7.1 Invasive Terrestrial Plants	MIS	Exotic Plant Management and Control for Endangered Species Protection. This project: 1) determines the distribution and abundance of introduced plants at SCI; 2) establishes the priority for their elimination based on their level of invasiveness, their ease of treatment, and their potential to adversely affect habitat for sensitive and listed species; 3) establishes the most suitable strategies for target species removal; and 4) implements those strategies.	4	ESA, SAIA, Federal Noxious Weed Act, EO 13112	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600011	3.6.3.8 San Clemente loggerhead shrike	MIS	San Clemente Loggerhead Shrike Captive Breeding. This project provides for the care, maintenance, and breeding of San Clemente loggerhead shrikes to produce birds for release to augment the wild population. The project also addresses genetic management of the shrike population. Continuation of this program will be guided by shrike population status relative to recovery objectives (in development in 2012).	4	NEPA, ESA, SAIA, OPNAVINST 5090.1C	Recurring		2. Listed Species and Critical Habitat

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3146600012	3.6.3.8 San Clemente loggerhead shrike	MIS	San Clemente Loggerhead Shrike Monitoring. Monitoring of the shrike population is necessary to document shrike population status in support of recovery and for coordination and consultation with USFWS regarding operations. Monitoring currently entails census of all accessible birds and nest monitoring at all accessible sites. Sampling is planned for outyears (in design 2012). Monitoring will be required even if this species is delisted.	4	NEPA, ESA, SAIA, MBTA	Recurring		2. Listed Species and Critical Habitat
3146600012	3.6.3.8 San Clemente loggerhead shrike 3.6.3.9 San Clemente sage sparrow 3.6.7.3 Non-Native Terrestrial Wildlife	MIS	Rodent Abundance. This project aims to quantifying rodent populations (through grid trapping and marking) in several different habitats to estimate species-specific rodent densities. This would provide us with estimates of mammalian prey available for shrikes and with more information on potential avian nest predators. Lastly, the project will provide data on the endemic San Clemente deer mouse presence/absence and abundance.	4	ESA, SAIA, EO 13112	Non-recurring	2011-2012	2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600014	3.6.3.8 San Clemente loggerhead shrike 3.6.3.9 San Clemente sage sparrow 3.6.7.3 Non-Native Terrestrial Wildlife	MIS	Predator Research and Ecosystem Management. This project provides predator control in support of listed species recovery, delisting, and avoidance of future ESA listings. Predator control is focused on non-native predators, although permits are in place for the removal of a small number of common ravens. Non-native predator control is critical at SCI; absent this project, no T&E wildlife species could be delisted due to the presence of an unmanaged threat.	4	NEPA, ESA, SAIA, EO 13112	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600014	3.6.3.8 San Clemente loggerhead shrike 3.6.3.9 San Clemente sage sparrow 3.6.7.3 Non-Native Terrestrial Wildlife	MIS	Feral Cat Ecology Study. Feral cats are known predators of shrikes and sage sparrows. Understanding the ecology of feral cats, particularly their habitat use, movements, and home range size, assists managers in controlling them through targeting control efforts. This project involves radio telemetry of a small portion of the SCI feral cat population that is removed at the completion of the study.	4	NEPA, ESA, SAIA, EO 13112	Non-recurring	2011-2012	2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146600014	3.6.3.8 San Clemente loggerhead shrike 3.6.3.9 San Clemente sage sparrow 3.6.7.3 Non-Native Terrestrial Wildlife	MIS	Black Rat Habitat, Movements, and Home Range. Rats are documented predators of shrikes and sage sparrows. To more effectively manage rats, this project examines rat spatial ecology through telemetry. Understanding home-range size of rats will allow for better placement of poison bait stations for protection of listed species.	4	NEPA, ESA, SAIA, EO 13112	Non-recurring	2011-2012	2. Listed Species and Critical Habitat 6. Ecosystem Integrit

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3146600016	3.4 Terrestrial Habitats and Communities 3.5 Marine Habitats 3.6.3 Federally Threatened and Endangered Species	MIS	Habitat Mapping. This project will provide current comprehensive vegetation maps of all terrestrial areas of SCI. Vegetation maps created using these methods will be scientifically valid and will be critical in enhancing recovery strategies for federally listed species and managing species at risk so they do not become listed. Maps and data collected as part of this project will play a vital role in demonstrating recovery of listed species habitat on SCI and will be used to assist with delisting and downlisting of species.	4	ESA, SAIA	Recurring		2. Listed Species and Critical Habitat
3146600030	3.6.3 Federally Threatened and Endangered Species 5.3.4 Outdoor Recreation and Environmental Education for on-island personnel	MIS	T&E Outreach Materials. This project provides operational training groups and island users with pertinent information regarding protected natural resources and necessary actions to ensure NR regulatory compliance while using SCI.	4	ESA, SAIA, MBTA, NEPA, OPNAINST 5090.1C	Recurring		2. Listed Species and Critical Habitat 4. Fish and Wildlife Management and Public Use 6. Ecosystem Integrity 7. INRMP Impact on the Installation Mission
3146600034	3.6.3 Federally Threatened and Endangered Species	MIS	Natural Resources Equipment and Supplies Support. Provides for equipment purchase, repair, and maintenance for the continuation of the NR/Cultural Resources (CR) programs and facilities on SCI.	4	ESA, SAIA, MBTA, OPNAINST 5090.1C	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 5. Team Adequacy 6. Ecosystem Integrity
3146600035	3.6.3 Federally Threatened and Endangered Species	MIS	Barge and Bulk Food. Provides bulk food for contractors and cooperative research personnel while engaged in field work associated with protected biological or cultural resources at SCI. Provides for transportation of supplies and equipment to SCI via weekly barge service.	4	ESA, NEPA, SAIA, National Historic Preservation Act	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 5. Team Adequacy 6. Ecosystem Integrity
3146600037	3.6.3 Federally Threatened and Endangered Species	MIS	GSA Vehicles and Fuel Support. Provides government services administration vehicles, fuel, and maintenance of vehicles for NR staff and selected contractors and cooperative research personnel while engaged in field work associated with protected biological resources at SCI.	4	ESA, SAIA	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 3. Ecosystem Integrity
3146600043	Ecosystem Approach	O&MN	SCI INRMP Update and Revision. This project addresses updates and revisions of the SCI INRMP in support of the military mission at SCI and compliance with regulatory requirements.	4	SAIA, ESA, DoDI 4715.3, OPNAINST 5090.1C, MBTA, MMPA, MSA, CWA, National Invasive Species Act, NEPA	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 3. Ecosystem Integrity

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3146600046	3.6.4.1 San Clemente island fox	MIS	Island Fox Road Kill Avoidance Mowing. This effort consists of roadside mowing on the primary roads of SCI outside of the Shore Bombardment Area. It is a primary conservation effort to reduce the threat of road kills to the San Clemente island fox.	4	ESA, SAIA, OPNAVINST 5090.1C	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity
3146612002	3.3.4 Wildland Fire 3.6.3 Federally Threatened and Endangered Species	MIS	Creation and Maintenance of Fuelbreaks. This project provides for fuel breaks consistent with the SCI WFMP. Fuel breaks are located around target areas associated with ship-to-shore bombardment and are essential for the protection of federally listed species and their habitats. Such fuel breaks prevent the spread of wildfire outside target areas. This project is required as a condition of BO FWS-LA-09B0027-09F0040 issued by the USFWS in 2008 on military operations and the SCI WFMP. Project includes fuel breaks established using fire retardant, herbicide, and/or strip burns.	4	ESA, SAIA,	Recurring		2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146612025	3.6.4.1 San Clemente island fox	MIS	Island Fox Monitoring, Management & Conservation. This broad project covers several sub-projects for the San Clemente island fox: population monitoring, sentinel monitoring, biostatistical analysis, and veterinary care and pathology services for the island fox.	4	ESA, SAIA, CCA, CA, OPNAVINST 5090	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity
3146612991	3.6.3 Federally Threatened and Endangered Species	MIS	Operation and Maintenance of Weather Stations. Project establishes and maintains approximately six weather stations at different locations on SCI. The weather data currently aren't available in real-time, but funds in 2012 will support implementation of software to complete this action and comply with the BO. Weather data are needed to determine daily fire danger rating during fire season and to support fire suppression activities. This project also is essential for the management and recovery of federally listed species by providing microclimatic data for the enhancement of recovery programs.	4	ESA, SAIA	Recurring		2. Listed Species and Critical Habitat
3146612198	3.6.2.6 Resident and Migratory Birds 3.6.5.6 Xantus's Murrelet 3.6.5.7 Ashy Storm-petrel 3.6.5.8 California Brown Pelican	MIS	Seabird Monitoring. This project provides for monitoring of relevant seabird species to form the basis for future management decisions, inform future NEPA documentation, and address candidate species under ESA. This project includes a two-pronged approach to monitoring: annual aerial photographic surveys for ground nesting seabirds (primarily cormorant and gull colonies) and surveys for Xantus's murrelet and ashy storm-petrel. This project also addresses non-native predator control (rats) for seabird colonies.	4	NEPA, SAIA, MBTA, ESA	Recurring		3. Partnership Effectiveness 6. Ecosystem Integrity

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3146612999	3.3.4 Wildland Fire Management 3.6.3.8 San Clemente loggerhead shrike	MIS	Helicopter Field Support. This project provides helicopter lift support for the NR programs on SCI and is utilized primarily for the movement of personnel and equipment into remote areas on SCI difficult to access via ground transportation or on foot. The project is also necessary for mapping fires, a requirement for annual reporting to USFWS under the SCI WFMP.	3	ESA, SAIA, MBTA, NEPA	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 6. Ecosystem Integrity
3146617224	5.5 Beneficial Partnerships and Collaborative Resources Planning	O&MN	SCA Support for Natural Resources Programs. This project would support the establishment of two Student Conservation Association (SCA) "billets" for SCI to accomplish/support a variety of existing and emerging NR needs. Specifically, SCA interns would provide research and NR compliance support.	4	SAIA, NEPA	Recurring		1. INRMP Project Implementation 2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
3146642687	3.6.7.3 Non-Native Terrestrial Wildlife	O&MN	Invasive Ant Management. This project entails efforts to eradicate Argentine ants at SCI (~2014) followed by monitoring surveys in out-years to determine re-infestation and recommend target management and likely additional applications of eradication agents for two follow-on years.	4	EO 13112, ESA, MBTA	Recurring		6. Ecosystem Integrity
31466NR915	3.5.1.2 Rocky Intertidal and Surfgrass 3.6.3.12 Black Abalone 3.6.2.2 Marine Invertebrates 3.6.1.4 Macroalgae 3.6.7.2 Marine Invasive Species	O&MN	Rocky Intertidal Surveys. This project will evaluate the health of the rocky intertidal community at SCI with the following specific goals: 1) detection of significant changes in intertidal communities and species to identify threats before new species become listed; 2) evaluate the presence/absence of black abalone by supporting the MARINe surveys. Independent monitoring on SCI will be conducted biannually, and will tie in with the larger MARINe monitoring program. This monitoring will support requirements from SCI's ASBS exception process.	4	ESA, CWA, SAIA	Recurring	2009	2. Listed Species and Critical Habitat 6. Ecosystem Integrity
N/A	3.6.2.1 Terrestrial Invertebrates 3.6.7.3 Non-Native Terrestrial Wildlife	CRA	Argentine Ant and Endemic Ant Delineation. SCI has never had a proper survey for native ant species. This agreement supports documentation of the distribution of the invasive Argentine ant at SCI and surveys for native ant species.	N/A	SAIA, EO 13112, OPNAINST 5090.1C			6. Ecosystem Integrity
N/A	3.6.2.1 Terrestrial Invertebrates	CRA	Beetle Survey and Research. Study the genetic diversity (phylogeography) of seven beetle species on the California Channel Islands and to update the inventory of beetle species on the California Channel Islands.	N/A	SAIA, OPNAINST 5090.1C		2009-2010	6. Ecosystem Integrity

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N/A	3.6.7.3 Non-Native Terrestrial Wildlife	CRA	Applications For Emerging Technologies For Predator Research And Management. Research, Development, Testing and Evaluation of feral cat management and fox protection methods, including but not limited to testing the use of automated camera systems, and testing of Forward Looking Infrared technology for the removal of feral cats.	N/A	ESA, SAIA, EO 13112, OPNAINST 5090.1C			2. Listed Species and Critical Habitat 6. Ecosystem Integrity
N/A	3.6.4.1 San Clemente island fox	CRA	Using Stable Isotopes to Assess Temporal Patterns of Resource Use by Island Foxes. Compare fox food item use and diversity among the three Channel Islands - San Clemente, Santa Rosa, and San Miguel islands; examine seasonal variation in diet, diversity, and overlap across these islands via 13C and 15N analysis of vibrissae segments; determine the extent to which island foxes are exploiting marine resources, especially marine sources of food that may be contaminated with organochlorides (e.g., DDT) and heavy metals; and determine the extent to which island foxes and cats are exploiting CAM plants such as cactus (prickly pear) or succulents (sea fig).	N/A	ESA, SAIA, CCA, CA, OPNAVINST 5090			3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.4.1 San Clemente island fox	CRA	Temporal and Spatial Patterns of Resource Exploitation by Island Foxes - Implications for Conservation. Project compared food item use and diversity among the six Channel Islands with foxes; examined seasonal variation in item use and diversity across all islands; and assessed island foxes use of non-native resources.	N/A	ESA, SAIA, CCA, CA, OPNAVINST 5090		2009-2011	3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.4.1 San Clemente island fox	CRA	Transfer of San Clemente Island Foxes into Mainland Zoo Population. Project supports transfer of a limited number of SCI foxes to Santa Barbara Zoo for species conservation through education, research, and as a genetic reservoir.	N/A	ESA, SAIA, CCA, CA, OPNAVINST 5090			3. Partnership Effectiveness 4. Fish and Wildlife Management and Public Use
N/A	3.6.3.8 San Clemente loggerhead shrike	CRA	Kinesiology Research Of Captive San Clemente Loggerhead Shrike. Study the feeding performance of captive San Clemente Loggerhead Shrikes to obtain valuable insight regarding the specifics of shrike feeding mechanics and prey-processing behavior.	N/A	ESA, SAIA,			2. Listed Species and Critical Habitat
N/A	Ecosystem Approach	CRA	Compositional and species diversity changes in the vegetation of SCI following the release from feral grazing pressure. Quantify plant species richness and compositional changes that have taken place over the seventeen years since data were last collected, and to determine the spatial correlation between human altered landscapes on the island and densities of exotic species.	N/A				6. Ecosystem Integrity

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N/A	3.6.4.1 San Clemente island fox	DoD Legacy Program, project 08-308	Spatial Ecology of the Island Fox. Use fox home range and contact data in conjunction with data on disease transmission rates for canine rabies and distemper to develop a spatially explicit model for disease spread in San Clemente island foxes and use a model to explore the efficacy of preventative measures, such as preemptive vaccination of a portion of the population.	N/A				3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.2.2 Marine Invertebrates	CRA	Abalone Monitoring. Achieving recovery goals for pink abalone and green abalone at the California Channel Islands through monitoring and enhancement tools	N/A	ESA, SAIA	Non-recurring	2009	2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.2.3 Marine Fishes 3.6.2.2 Marine Invertebrates 3.6.7.2 Marine Invasive Species 3.6.1.4 Macroalgae	CRA	Nearshore Water Monitoring. Document the distribution and abundance of nearshore marine plants, invertebrates, and fishes at the Channel Islands, with special emphasis on bio-geographic trends associated with oceanographic climate changes.	N/A	ESA, SAIA, Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, Noxious Plant Control Act of 1968, EO 13112	Non-recurring	2011	2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.2.8 Marine Mammals	CRA	California Sea Lion Study. Obtain counts of California sea lions, northern elephant seals, and Pacific harbor seals at SCI for the following: assess status of U.S. population; monitor seasonal occurrence of California sea lions and northern elephant seals; monitor long term trends of pinnipeds inhabiting SCI. Obtain seasonal scat samples of California sea lions for diet analysis at SCI for the following: examine seasonal, annual, and multi-year variability in the diet of California sea lions; derive methodology for using diet information to assess status of the California sea lion population in the U.S.; estimate consumption of fishes by California sea lions.	N/A	MMPA, SAIA	Non-recurring	1981	3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.2.3 Marine Fishes 3.6.2.2 Marine Invertebrates 3.6.1.4 Macroalgae 3.3.3 Water and Sediment Quality	CRA	Area of Special Biological Significance (ASBS) Biological Monitoring. The goal of this study is to characterize the rocky reef biological communities at sites inside ASBS and compare them to biological communities at sites outside of ASBS.	N/A	ESA, MSA, SAIA, OPNAVINST 5090.1C, MPRSA	Non-recurring	2008	2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
N/A	3.6.2.2 Marine Invertebrates 3.3.3 Water and Sediment Quality	CRA	Water Quality Study. The goal of this project is to quantify and assess spatial and temporal trends in coastal contamination, and to provide a baseline to assess impacts of anthropogenic and natural events.	N/A	CWA, ESA, MSA, SAIA	Non-recurring	2009	2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity

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3146Research	3.5.2.2 Rocky Intertidal and Surfgrass		Effects of Climate Change on Rocky Intertidal Habitat. Evaluate the occurrence and potential implications of climate change and sea level rise on rocky intertidal habitats at SCI.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.5.2.1 Soft Bottom		Eelgrass Ecosystem Function. Conduct surveys of eelgrass habitat around the island. Evaluate the usage of eelgrass beds on SCI by fishes and invertebrates.		MSA, CWA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.5.2.2 Rocky Habitat and Kelp Forests		Kelp Forest Species. Investigate recruitment, disturbance, and species diversity of kelp forests that help to assess regional trends.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.5.2.2 Rocky Habitat and Kelp Forests		Kelp Forest Mapping. Map kelp around the island to examine trends in surface coverage and primary production.		SAIA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.5.2.2 Rocky Habitat and Kelp Forests		Rocky Reef and Kelp Forest Ecosystem Function. Evaluate the ecosystem function and health of SCI rocky reefs and kelp forests.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.2.2 Marine Invertebrates		Abalone Surveys. Investigate current SCI invertebrate populations of concern, including pink and green abalone.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.5.3.1 Rocky Habitat		Deep Coral Surveys. Locate and map populations of deep corals and related species, such as soft corals, sea fans, and black corals.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.2.3 Marine Fishes		Marine Fish Surveys. Investigate the following to gain a better understanding of fish abundance and trends at SCI: 1. Contribution of productivity at SCI from federally managed fish species. 2. The shift of fish productivity from nearshore areas of SCI. 3. Range expansion of fishes at SCI. 4. Population and abundance of federally managed coastal pelagic, groundfish, and highly migratory species. 5. Track the use of habitats surrounding SCI by species of concern, such as the basking shark, bocaccio, and cowcod.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity

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						Frequency	Year	
3146Research	3.6.2.8 Marine Mammals 3.6.3.14 Threatened and Endangered Marine Mammals		Marine Mammal Studies. Investigate the following to increase protection of cetaceans and understanding of cetacean behavior in the SOCAL Range Complex: 1. Effects of naval training activities on Cuvier's beaked whales at the individual and population level. 2. Behavioral reactions of cetaceans to sound. 3. Movement patterns and residence time of blue, fin, and Cuvier's beaked whales. 4. Density of Cuvier's beaked whales in the Northern SOCAL Range Complex. 5. Behavioral activities of cetaceans within the SOCAL range complex. 6. Annual occurrence of blue and fin whales northern SOCAL Range Complex. 7. Winter densities of cetaceans within the nearshore and offshore waters.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.3.11 White Abalone		White Abalone Studies. Investigate the following in order to support the recovery of the white abalone: 1. Factors affecting larval dispersal distances, survival, and recruitment dynamics. 2. Field outplantings for a range of sizes, densities, and spatial scales in both nearshore and island locations. 3. Long-term effects on white abalone from climate change.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.3.12 Black Abalone		Black Abalone Studies. Investigate the following in order to support the recovery of the black abalone: 1. Factors affecting larval dispersal distances, survival, and recruitment dynamics. 2. Field outplantings for a range of sizes, densities, and spatial scales in both nearshore and island locations. 3. Population structure of black abalone at SCI. 4. Movement patterns of post-metamorphic juvenile black abalone.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.4 Terrestrial Habitats and Communities		Terrestrial Habitat Restoration. Projects that promote natural habitat restoration and protection, thereby preventing the listing of additional plant and animal species.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	Chapter 3		Monitoring of Natural Resources. Investigate new techniques, methodologies, and management practices for natural resources, including predictive modeling, emerging forms of distance sampling, and genetic-based population assessment techniques.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
3146Research	Chapter 3		Special Status Species Monitoring. Monitor any special status species declines that could adversely affect operations and the ability to train on the island.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.7 Invasive Species		Invasive Species Detection/BioSecurity. Develop efforts to implement Early Detection (developed under BioSecurity Plan) and Rapid Response methods.		SAIA, EO 13112			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.4.1 San Clemente Island Fox		Captive San Clemente Island Fox Diet Study. Conduct stable isotope research using the captive island fox population at the Santa Barbara Zoo to establish reference standards that would support further stable isotope analysis work for this species on SCI and throughout its range.		SAIA			3. Partnership Effectiveness
3146Research	3.6.3.8 San Clemente loggerhead shrike 3.6.2.6 Resident and Migratory Birds		Corvid Predation Pressure And Ecology. Work with USFWS to design and conduct research to assess the level of predation pressure from common ravens on San Clemente loggerhead shrikes and San Clemente sage sparrows in order to inform management of listed avian species at SCI.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.5.1 Dissanthelium californicum		Propagation. Develop methods to propagate California dissanthelium.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.5.1 Dissanthelium californicum		Restoration. Develop methods to successfully establish Dissanthelium californicum at SCI restoration sites.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.3.2 San Clemente Island Larkspur		Taxonomy Research. Research the taxonomy of the San Clemente Island larkspur.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.5.3 Santa Cruz Ironwood		Ironwood Propagation. Research effective and applicable methods to establish ironwood groves.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.5.3 Santa Cruz Ironwood		Ironwood Reproductive Study. Research effective methods to expand ironwood groves through successful sexual reproduction.		SAIA			3. Partnership Effectiveness 6. Ecosystem Integrity
3146Research	3.6.2.9 Pollinators 3.6.3.5 San Clemente Island Bush-Mallow		Pollinators. Research the pollination and seed set of the San Clemente Island bush-mallow.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.3.2 San Clemente Island Larkspur		Larkspur Study. Grow both the Thorne's larkspur and San Clemente Island larkspur) in the exact same setting in the common garden investigate floral characteristics and potential variation.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.6.3.2 San Clemente Island Larkspur		Larkspur Study. Translocate the San Clemente Island larkspur and the Thorne's larkspur to the other species' habitat to investigate floral characteristics and potential variation.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness

Table B-1. Naval Auxiliary Landing Field, San Clement Island's Integrated Natural Resources Management Plan Implementation Summary, including the assignment of priorities based on the legal driver behind each project (January 2013).

EPR Number	INRMP Section	Funding Source	Project Description	ERL	Legal Driver	Implementation		Natural Resources Metrics Builder
						Frequency	Year	
3146Research	3.6.3.6 Santa Cruz Island Rockcress		Santa Cruz Island Rockcress Study. Research the optimal conditions for Santa Cruz Island rockcress.		SAIA, ESA			2. Listed Species and Critical Habitat 3. Partnership Effectiveness
3146Research	3.4 Terrestrial Habitats and Communities		Paleobotany Study. Complete soil cores and study the seeds at different depths to understand habitats previously on the island and when they occurred based on the presence and prevalence of certain species.		SAIA			3. Partnership Effectiveness

Definitions:

Funding Source: **CRA** = Cooperative Research Agreement; **MIS** = Mission Funding; **O&MN** = Operations & Maintenance, Navy

Legal Driver: **CA** = Conservation Agreement; **CCA** = Candidate Conservation Agreement; **CWA** = Clean Water Act; **DoDI** = Department of Defense Instruction; **EO** = Executive Order; **ESA** = Endangered Species Act; **MBTA** = Migratory Bird Treaty Act; **MMPA** = Marine Mammal Protection Act; **MPRSA** = Marine Protection, Research and Sanctuaries Act; **MSA** = Magnuson-Stevens Fisheries Conservation and Management Act; **NEPA** = National Environmental Policy Act; **NISA** = National Invasive Species Act; **OPNAVINST** = Chief of Naval Operations Instruction; **WFMP** = Wildland Fire Management Plan

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Appendix C: Species List

C.1 Plants

C.1.1 Vascular Plants

Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
DICOTS				
Family Adoxaceae				
Sambucus nigra subsp. *caerulea*	blue elderberry	N		Ross 1992
Family Aizoaceae				
Carpobrotus chilensis	sea fig	E		Ross 1992
Carpobrotus edulis	hottentot fig	E		Junak 2006
Malephora crocea	coppery mesemb	E		Ross 1992
Mesembryanthemum crystallinum	crystalline iceplant	E		Ross 1992
Mesembryanthemum nodiflorum	slender-leaved iceplant	E		Ross 1992
Sesuvium verrucosum	western seapurslane	N		TDI 2011a
Family Anacardiaceae				
Malosma laurina	laurel sumac	N		Ross 1992
Rhus integrifolia	lemonade berry	N		Ross 1992
Rhus ovata	sugar bush	N		TDI 2011a
Schinus molle	Peruvian pepper tree	N		TDI 2011a
Schinus terebinthifolius	Brazilian pepper tree	E		TDI 2011a
Toxicodendron diversilobum	western poison oak	N		Ross 1992
Family Apiaceae				
Apiastrum angustifolium	wild celery	N		Ross 1992
Apium graveolens	celery	E		Ross 1992
Bowlesia incana	hoary bowlesia	N		TDI 1994
Daucus pusillus	American wild carrot	N		Ross 1992
Foeniculum vulgare	fennel	E		Ross 1992
Lomatium insulare	San Nicolas Island lomatium	N	FC2, CNPS 1B	Ross 1992
Sanicula arguta	sharptooth black snakeroot	N		Ross 1992
Sanicula crassicaulis var. *crassicaulis*	gamble weed	N		Ross 1992
Yabea microcarpa	California hedge parsley	N		Ross 1992
Family Asteraceae				
Achillea millefolium	yarrow	N		Ross 1992
Achyrachaena mollis	blow-wives	N		Ross 1992
Amblyopappus pusillus	dwarf coastweed	N		Ross 1992
Ambrosia chamissonis	silver beach-burr	N		Ross 1992
Artemisia californica	California sagebrush	N		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Artemisia nesiotica	island sagebrush	N	CI-E, CNPS 4	Ross 1992
Baccharis pilularis	coyote brush	N		Ross 1992
Baccharis salicifolia	mulefat	N		Ross 1992
Baccharis viminea	mulefat	N		TDI 2011a
Bahiopsis lacinata	San Diego county viguiera	N		TDI 2011a
Brickellia californica	brickellbush	N		Junak 2006
Centaurea melitensis	tocalote	E		Ross 1992
Cirsium occidentale	cobwebby thistle	N		Ross 1992
Constancea nevinii	Nevin's woolly sunflower	N	CI-E, FC2, CNPS 1B	Ross 1992
Cotula australis	Australian waterbuttons	N		TDI 2011a
Deinandra clementina	island tarplant	N	CI-E, CNPS 4	Ross 1992
Deinandra fasciculata	clustered tarweed	N		Ross 1992
Encelia californica	California brittlebush	N		Ross 1992
Erigeron bonariensis	asthmaweed	E		Ross 1992
Erigeron canadensis	Canadian horseweed	E		Ross 1992
Eriophyllum confertiflorum var. *confertiflorum*	yellow yarrow	N		Ross 1992
Gamochaeta purpureum	purple cudweed	N		TDI 2011a
Glebionis coronaria	crown daisy	E		Junak 2006
Gnaphalium bicolor	two color cudweed	N		Ross 1992
Gnaphalium palustre	western marsh cudweed	N		Ross 1992
Grindelia camporum	common gumplant	N		SCI 2010
Hazardia cana	southern Island hazardia	N	FC2, CNPS 1B	Ross 1992
Hedypnois cretica	crete weed	E		Junak 2006
Helianthus annuus	hairy leaved sunflower	N		TDI 2011a
Hesperevax sparsiflora	erect dwarf cudweed	N		Ross 1992
Heterotheca grandiflora	telegraph weed	N		Ross 1992
Hypochaeris glabra	smooth cat's ear	E		Ross 1992
Hypochaeris radicata	rough cat's ear	E		Ross 1992
Isocoma menziesii var. *decumbens*	decumbent goldenbush	N		Ross 1992
Isocoma menziesii var. *menziesii*	white flowered goldenbush	N		Ross 1992
Isocoma menziesii var. *vernoniodes*	coastal goldenbush	N		Ross 1992
Lactuca serriola	prickly lettuce	N		Ross 1992
Laennecia coulteri	Coulter's horseweed	N		Ross 1992
Lasthenia californica	goldfields	N		Ross 1992
Layia platyglossa subsp. *campestris*	tidytips	N		Ross 1992
Leptosyne gigantea	giant coreopsis	N		Ross 1992
Logfia arizonica	Arizona cottonrose	N		Ross 1992
Logfia filaginoides	California cottonrose	N		Ross 1992
Logfia gallica	narrowleaf cottonrose	E		Ross 1992
Madia sativa	coast tarweed	N		Ross 1992
Malacothrix foliosa var. *foliosa*	leafy malacothrix	N	CI-E, CNPS 4	Ross 1992
Malacothrix incana	dunedelion	N		Ross 1992
Malacothrix saxatilis var. *tenuifolia*	cliff aster	E		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Microseris douglasii subsp. *douglasii*	Douglas' silverpuffs	N		Ross 1992
Microseris douglasii subsp. *platycarpha*	small flowered microseris	N	CNPS 4	Ross 1992
Microseris elegans	elegant silverpuffs	N		Ross 1992
Microseris lindleyi	Lindley's silverpuffs	N		Ross 1992
Munzothamnus blairii	Blair's wirelettuce	N	SCI-E, FC2, CNPS 1B	Ross 1992
Perityle emoryi	Emory's rock daisy	N		Ross 1992
Pseudognaphalium californicum	ladies' tobacco	N		Ross 1992
Pseudognaphalium beneolens	everlasting cudweed	N		Ross 1992
Pseudognaphalium microcephalum	white everlasting	N		Ross 1992
Pseudognaphalium luteoalbum	fragrant everlasting	E		Ross 1992
Pseudognaphalium stramineum	Chilean cudweed	N		TDI 2011a
Psilocarphus brevissimus var. *brevissimus*	dwarf woolly-heads	N		Ross 1992
Psilocarphus tenellus	slender woolly heads	N		Ross 1992
Rafinesquia californica	California chicory	N		Ross 1992
Senecio flaccidus var. *douglasii*	Douglas' groundsel	N		Ross 1992
Senecio lyonii	island ragweed	N		Ross 1992
Senecio vulgaris	common groundsel	E		Ross 1992
Silybum marianum	blessed milkthistle	N		TDI 2011a
Sonchus asper	prickly sowthistle	E		Ross 1992
Sonchus oleraceus	common sowthistle	E		Ross 1992
Sonchus tenerrimus	slender sowthistle	E		Ross 1992
Stebbinsoseris heterocarpa	grassland stebbinsoseris	N		Ross 1992
Stephanomeria diegensis	wreathplant	N		Ross 1992
Stephanomeria virgata subsp. *virgata*	rod wirelettuce	N		Ross 1992
Stylocline gnaphaloides	everlasting nest straw	N		Ross 1992
Tragopogon porrifolius	salsify	E		Junak 2006
Uropappus lindleyi	silver puffs	N		TDI 2011a
Family Bataceae				
Batis maritima	saltwort	N		Ross 1992
Family Boraginaceae				
Amsinckia intermedia	rancher's fireweed	N		Ross 1992
Amsinckia spectabilis var. *nicolai*	seaside fiddleneck	N	CI-E	Ross 1992
Amsinckia spectabilis var. *spectabilis*	fiddleneck	N		Ross 1992
Cryptantha clevelandii var. *clevelandii*	Cleveland's catseye	N		Ross 1992
Cryptantha intermedia	common cryptantha	N		Ross 1992
Cryptantha maritima	Guadalupe catseye	N		Ross 1992
Cryptantha traskiae	Trask's cryptantha	N	CI-E, FC2, CNPS 1B	Ross 1992
Heliotropium curassavicum subsp. *oculatum*	heliotrope	N		Ross 1992
Nama stenocarpum	mud fiddleleaf	N		TDI 2011a
Pectocarya linearis subsp. *ferocula*	sagebrush combseed	N		Ross 1992
Plagiobothrys canescens	valley popcorn flower	N		Ross 1992
Plagiobothrys collinus var. *gracilis*	Cooper's popcorn flower	N		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Plagiobothrys nothofulvus	rusty popcorn flower	N		
Family Brassicaceae				
Athysanus pusillus	common sandweed	N		TDI 1994
Brassica nigra	black mustard	N		Ross 1992
Brassica rapa	turnip	E		Ross 1992
Brassica rapa var. *rapa*	field mustard	N		TDI 2011a
Brassica tournefortii	Saharan mustard	E		SERG
Cakile maritima subsp. *maritima*	sea rocket	E		Ross 1992
Capsella brusa-pastoris	Shepard's purse	E		Ross 1992
Descurainia pinnata subsp. *menziesii*	tansy mustard	N		Ross 1992
Draba cuneifolia var. *integrifolia*	wedgeleaf whitlowgrass	N		Ross 1992
Caulanthus lasiophyllus	California mustard	N		TDI 1994
Hirschfeldia incana	Mediterranean mustard	E		Ross 1992
Hornungia procumbens	prostrate hutchinsia	N		TDI 2011a
Lepidium lasiocarpum subsp. *lasiocarpum*	shaggyfruit pepperweed	N		Ross 1992
Lepidium latipes	San Diego pepperweed	N		Ross 1992
Lepidium nitidum	shining pepperweed	N		Ross 1992
Lepidium oblongum	veiny pepper grass	N		TDI 2011a
Lepidium virginicum subsp. *menziesii*	hairy pepperweed	N		Ross 1992
Lepidium virginicum var. *robinsonii**	Robinson's pepper-grass	N	CNPS 1B	Junak 2006
Lobularia maritima	sweet alyssum	E		Ross 1992
Raphanus raphanistrum	jointed charlock	E		Ross 1992
Raphanus sativus	raddish	E		Ross 1992
Sibara filifolia	Santa Cruz Island rockcress	N	CI-E, FE, CNPS 1B	Ross 1992
Sisymbrium irio	London rocket	E		Ross 1992
Sisymbrium orientale	indian hedge mustard	N		TDI 2011a
Thysanocarpus laciniatus	lacepod	N		Ross 1992
Tropidocarpum gracile	slender keel fruit	N		Ross 1992
Family Cactaceae				
Bergerocactus emoryi	golden spined cereus	N		Ross 1992
Cylindropuntia prolifera	coastal cholla	N		Ross 1992
Opuntia ficus-indica	indian fig	E	CITES	Ross 1992
Opuntia littoralis	prickley pear	N	CITES	Ross 1992
Opuntia oricola	chaparral prickley pear	N	CITES	Ross 1992
Family Caprifoliaceae				
Lonicera hispidula	hairy honeysuckle	N		Ross 1992
Family Caryophyllaceae				
Cerastium glomeratum	mouse-eared chickweed	E		Ross 1992
Herniaria hirsuta subsp. *cinerea*	hairy rupturewort	E		Ross 1992
Minuartia douglasii	sandwort	N		Ross 1992
Polycarpon depressum	California allseed	N		TDI 2011a
Silene antirrhina	sleepy silene	N		Ross 1992
Silene gallica	common catchfly	E		Ross 1992

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Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Silene laciniata subsp. *major*	cardinal catchfly	N		Ross 1992
Spergularia bocconii	Boccone's Sand Spurry	E		Ross 1992
Spergularia macrotheca var. *macrotheca*	large flowered sand spurry	N		Ross 1992
Spergularia marina	salt marsh sand-spurrey	N		Ross 1992
Spergularia villosa	sand spurry	E		Ross 1992
Stellaria media	common chickweed	E		Ross 1992
Stellaria nitens	smooth chickweed	N		Junak 2000
Family Chenopodiaceae				
Aphanisma blitoides	aphanisma	N	CNPS 1B	Ross 1992
Arthrocnemum subterminale	pickleweed	N		Ross 1992
Atriplex argentea subsp. *expansa*	silverscale saltbrush	N		Ross 1992
Atriplex argentea subsp. *mohavensis*	silverscale	N		TDI 2011a
Atriplex californica	California saltbush	N		Ross 1992
Atriplex coulteri	Coulter's saltbrush	N		Ross 1992
Atriplex lentiformis subsp. *breweri*	big saltbrush	N		Ross 1992
Atriplex leucophylla	beach saltbush	N		Ross 1992
Atriplex pacifica	south coast saltscale	N		Ross 1992
Atriplex semibaccata	Australian saltbush	E		Ross 1992
Atriplex watsonii	Watson's saltbrush	N		Ross 1992
Bassia hyssopifolia	five horn bassia	E		Ross 1992
Beta vulgaris subsp. *maritima*	beet	E		Ross 1992
Chenopodium californicum	California pigweed	N		Ross 1992
Chenopodium multifidum	cut-leaf goose foot	E		TDI 2011a
Chenopodium murale	nettleleaf goose foot	E		Ross 1992
Monolepis nuttalliana	poverty weed	N		Ross 1992
Salicornia pacifica	Virginia glasswort	N		Ross 1992
Salsola australis	Russian thistle	N		TDI 2011a
Suaeda taxifolia	wooly seablite	N		Ross 1992
Family Cleomaceae				
Isomeris arborea	bladderpod	N		Ross 1992
Family Convolvulaceae				
Calystegia macrostegia subsp. *amplissima*	island morning-glory	N	CI-E, FC2, CNPS 4	Ross 1992
Calystegia soldanella	seashore false bindweed	N		Ross 1992
Convolvulus simulans	small-flowered morning-glory	N		Ross 1992
Cressa truxillensis var. *vallicola*	spreading alkaliweed	N		Ross 1992
Cuscuta californica	chapparral dodder	N		Ross 1992
Cuscuta occidentalis	chapparral dodder	N		Ross 1992
Family Crassulaceae				
Crassula connata	pygmyweed	E		Ross 1992
Dudleya virens subsp. *virens*	bright green dudleya	N	FC2, CNPS 1B	TDI 2011a
Family Crossosomataceae				
Crossosoma californicum	island apple-blossom	N	CNPS 1B	Ross 1992
Family Cucurbitaceae				

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Marah fabacea	California man-root	N		TDI 2011a
Marah macrocarpa	wild cucumber	N		Ross 1992
Family Euphorbiaceae				
Chamaesyce maculata	spotted spurge	N		TDI 2011a
Chamaesyce serpens	creeping spurge	N		TDI 2011a
Croton setigerus	turkey mullein	N		Ross 1992
Euphorbia misera	cliff spurge	N		Ross 1992
Euphorbia peplus	pretty spurge	E		Ross 1992
Euphorbia spathulata	warty spurge	E		Ross 1992
Ricinus communis	castor bean	E		Ross 1992
Family Fabaceae				
Acacia sp.	acacia	N		TDI 2011a
Acmispon argophyllus var. *adsurgens*	San Clemente Island silver hosackia	N	SCI-E, FC2, SE, CNPS 1B	Ross 1992
Acmispon argophyllus var. *argenteus*	silver birdsfoot trefoil	N		Ross 1992
Acmispon dendroideus var. *traskiae*	San Clemente Island lotus	N	SCI-E, FE, SE, CNPS 1B	Ross 1992
Acmispon parviflorus	San Diego bird's foot trefoil	N		Ross 1992
Acmispon strigosus	strigose bird's foot trefoil	N		Ross 1992
Astragalus didymocarpus var. *didymocarpus*	two-seeded milkvetch	N		Ross 1992
Astragalus miguelensis	San Miguel Island milk vetch	N	CI-E, CNPS 4	Ross 1992
Astragalus nevinii	San Clemente Island milk vetch	N	SCI-E, FC2, CNPS 1B	Ross 1992
Lathyrus odoratus	sweetpea	N		TDI 2011a
Lathyrus vestitus var. *vestitus*	hillside pea	N		TDI 2011a
Lupinus bicolor subsp. *microphyllus*	minature lupine	N		TDI 2011a
Lupinus bicolor subsp. *umbellatus*	annual lupine	N		Ross 1992
Lupinus concinnus	bajada lupine	N		TDI 2011a
Lupinus guadalupensis	Guadalupe Island lupine	N	FC2, CNPS 1B	Ross 1992
Lupinus hirsutissimus	stinging lupine	N		Ross 1992
Lupinus succulentus	arroyo lupine	N		Ross 1992
Lupinus truncatus	collared annual lupine	N		Ross 1992
Medicago polymorpha	California burclover	E		Ross 1992
Medicago sativa	alfalfa	E		Ross 1992
Melilotus albus	white sweetclover	E		Ross 1992
Melilotus indicus	sour clover	E		Ross 1992
Trifolium depauperatum var. *amplectans*	dwarf sack clover	N		TDI 2011a
Trifolium depauperatum var. *truncatum*	dwarf sack clover	N		TDI 2011a
Trifolium fucatum	bull clover	N		Ross 1992
Trifolium gracilentum	pinpoint clover	N		TDI 2011a
Trifolium palmeri	Palmer's clover	N	CNPS 4	TDI 2011a
Trifolium microcephalum	smallhead clover	N		TDI 2011a
Trifolium willdenovii	tomcat clover	N		TDI 2011a
Vicia hassei	Hasse's vetch	N		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Vicia ludoviciana var. *ludoviciana*	slender vetch	N		TDI 2011a
Family Fagaceae				
Quercus chrysolepis	canyon live oak	N		Ross 1992
Quercus tomentella	island oak	N	CNPS 4	Ross 1992
Family Frankeniaceae				
Frankenia salina	alkali heath	N		Ross 1992
Family Gentianaceae				
Zeltnera davyi	centaury	N		Ross 1992
Family Geraniaceae				
Erodium botrys	pinclover	E		Ross 1992
Erodium brachycarpum	shortfruit stork's bill	E		Ross 1992
Erodium cicutarium	red-stem filaree	E		Ross 1992
Erodium moschatum	green-stem filaree	E		Ross 1992
Pelargonium x hortorum	garden geranium	E		Ross 1992
Family Grossulariacea				
Ribes malvaceum var. *malvaceum*	chaparral current	N		Ross 1992
Family Hydrophyllacea				
Emmenanthe penduliflora	whispering bells	N		Ross 1992
Eucrypta chrysanthemifolia var. *chrysanthemifolia*	spotted eucrypta	N		Ross 1992
Phacelia cicutaria subsp. *hispida*	catepillar scorpionweed	N		Ross 1992
Phacelia distans	distant phacelia	N		Ross 1992
Phacelia floribunda	San Clemente Island phacelia	N	FC2, CNPS 1B	Ross 1992
Phacelia lyonii	Lyon's Phacelia	N		Ross 1992
Pholistoma auritum	fiesta flower	N		Ross 1992
Pholistoma racemosum	racemed fiesta flower	N		Ross 1992
Family Lamiaceae				
Marrubium vulgare	horehound	E		Ross 1992
Salvia columbariae var. *columbariae*	chia	N		Ross 1992
Salvia mellifera	black sage	N		SCI 2010
Family Loasaceae				
Mentzelia affinis	yellowcomet	E		Ross 1992
Mentzelia micrantha	San Luis blazingstar	N		Ross 1992
Eremalche exilis	white mallow	N		Ross 1992
Family Lythraceae				
Lythrum hyssopifolia		N		TDI 2011a
Family Malvaceae				
Lavatera assurgentiflora subsp. *glabra**	Southern Island tree mallow	N	CI-E, FC2, CNPS 1B	Ross 1992
Malacothamnus clementinus	San Clemente Island bush mallow	N	SCI-E, FE, SE, CNPS 1B	Ross 1992
Malva pseudolavatera	cornish mallow	E		Ross 1992
Malva parviflora	cheeseweed	E		Ross 1992
Malvella leprosa	alkali mallow	N		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Family Montiaceae				
Calandrinia ciliata	fringed redmaids	N		TDI 2011a
Calandrinia maritima	seaside pussypaws	N		Ross 1992
Claytonia perfoliata subsp. *mexicana*	Miner's lettuce	N		Ross 1992
Claytonia perfoliata	Miner's lettuce	N		Ross 1992
Family Moraceae				
Ficus carica	edible fig	N		TDI 2011a
Family Myoporaceae				
Myoporum laetum	ngaio tree	E		TDI 2011a
Family Myrtaceae				
Eucalyptus globulus	blue gum	E		Ross 1992
Family Nyctaginaceae				
Abronia maritima	red sand verbena	N		Ross 1992
Abronia maritima X Abronia umbellata	sand verbena	N		TDI 2011a
Abronia umbellata	sand verbena	N		Ross 1992
Mirabilis laevis var. *crassifolia*	wishbone bush	N		Ross 1992
Family Onagraceae				
Camissoniopsis cheiranthifolia subsp. *cheiranthifolia*	beach evening primrose	N		Ross 1992
Camissoniopsis guadalupensis subsp. *clementina*	San Clemente Island evening primrose	N	SCI-E, FC2, CNPS 1B	Ross 1992
Camissoniopsis micrantha	miniature suncup	N		Ross 1992
Camissoniopsis robusta	robust suncup	N		Ross 1992
Clarkia epilobioides	canyon fairyfan	N		Ross 1992
Epilobium brachycarpum	annual fireweed	N		SCI 2010
Epilobium canum subsp. *canum*	California fuchsia	N		TDI 2011a
Family Orobanchaceae				
Castilleja grisea	San Clemente Island indian paintbrush	N	SCI-E, FE, SE, CNPS 1B	Ross 1992
Orobanche fasciculata	fascicled broom ape	N		Ross et al. 1997
Orobanche uniflora	naked broom rape	N		TDI 2011a
Family Oxalidaceae				
Oxalis corniculata	creeping woodsorrel	N		TDI 2011a
Oxalis pes-caprae	Bermuda buttercup	E		Ross 1992
Family Papaveraceae				
Dendromecon harfordii subsp. *rhamnoides*	Channel Island tree poppy	N	Extirpated, FC2, CNPS 4	TDI 2011a
Eschscholzia californica	California poppy	E		Ross 1992
Eschscholzia ramosa	island poppy	N	CNPS 4	Ross 1992
Papaver heterophyllum	wind poppy	N		Ross 1992
Family Phrymaceae				
Mimulus aurantiacus var. parviflorus	monkeyflower	N	CNPS 4	CNPS 2013
Mimulus floribundus	manyflowered monkeyflower	N		Ross 1992
Mimulus guttatus subsp. *guttatus*	seep monkeyflower	N		Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Family Pinaceae				
Pinus halepensis	Aleppo pine	E		TDI 2011a
Family Plantaginaceae				
Antirrhinum nuttallianum subsp. *subsessile*	Nuttal's snapdragon	N		Ross 1992
Callitriche longipedunculata	longstock water-starwort	N		Junak 2000
Callitriche marginata	water star-wort	N		Ross 1992
Collinsia heterophylla	Chinese houses	N		Ross 1992
Gambelia speciosa	showy island snapdragon	N	FC2, CNPS 1B	TDI 2011a
Keckiella cordifolia	heartleaf penstemon	N		Ross 1992
Nuttallanthus texanus	Texas toadflax	N		Ross 1992
Plantago erecta	California plantain	N		Ross 1992
Plantago lanceolata	English plantain	E		Ross 1992
Plantago ovata	desert Indianwheat	N		Ross 1992
Family Plumbaginaceae				
Limonium sp.	sea lavender	E		TDI 2011a
Family Polemoniaceae				
Allophyllum glutinosum	sticky false gillyflower	N		Ross 1992
Eriastrum filifolium	lavender woolstar	N		Ross 1992
Gilia angelensis	chaparral gilia	N		Ross 1992
Gilia nevinii	Nevin's gilia	N	CNPS 4	Ross 1992
Leptosiphon bicolor subsp. *bicolor*	bicolor linanthus	N		TDI 2011a
Leptosiphon pygmaeus subsp. *pygmaeus*	pygmy linanthus	N	CNPS 1B	Ross 1992
Navarretia atractyloides	hollyleaf pincushion plant	N		Ross 1992
Navarretia hamata subsp. *leptantha*	skunkweed	N		Ross 1992
Family Polygonaceae				
Eriogonum giganteum var. *formosum*	San Clemente Island buckwheat	N	SCI-E, FC2, CNPS 1B	Ross 1992
Eriogonum grande subsp. *grande*	island buckwheat	N	CI-E, CNPS 4	Ross 1992
Polygonum argyrocoleon	sliversheath knotweed	E		Ross 1992
Polygonum aviculare subsp. *depressum*	common knotweed	E		Ross 1992
Polygonum aviculare	prostrate knotweed	E		TDI 2011a
Pterostegia drymarioides	woodland pterostegia	N		Ross 1992
Rumex conglomeratus	clustered dock	N		TDI 2011a
Rumex crispus	culry dock	E		Ross 1992
Rumex salicifolius	willow dock	N		Ross 1992
Family Potamogetonaceae				
Stuckenia pectinata	fennel leaved pondweed	N		TDI 2011a
Family Primulaceae				
Anagallis arvensis	scarlet pimpernel	E		TDI 2011a
Dodecatheon clevelandii subsp. *insulare*	Cleveland's shooting star	N		Ross 1992
Family Ranunculaceae				
Delphinium variegatum subsp. *kinkiense*	San Clemente Island larkspur	N	SCI-E, FE, SE, CNPS 1B	Ross 1992

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Table C-1. Vascular plant species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Delphinium variegatum subsp. *thornei*	Thorne's royal larkspur	N	SCI-E, FC2, CNPS 1B	Ross 1992
Family Resedaceae				
Oligomeris linifolia	lineleaf whitepuff	N		Ross 1992
Family Rhamnaceae				
Ceanothus megacarpus subsp. *insularis*	island big-pod ceanothus	N	CI-E, CNPS 4	Ross 1992
Ceanothus megacarpus subsp. *megacarpus*	bigpod	N		Ross 1992
Rhamnus pirifolia	island redberry	N	CNPS 4	Ross 1992
Family Rosaceae				
Adenostoma fasciculatum	chamise	N		Ross 1992
Aphanes occidentalis	lady's mantle	N		Junak 2006
Heteromeles arbutifolia subsp. *macrocarpa*	Christmas berry or toyon	N		Ross 1992
Lyonothamnus floribundus spp. *asplenifolius*	Santa Cruz Island ironwood	N	CI-E, FC2, CNPS 1B	Ross 1992
Prunus ilicifolia subsp. *lyonii*	Catalina cherry	N		Ross 1992
Family Rubiaceae				
Galium aparine	goose grass	E		Ross 1992
Galium catalinense subsp. *acrispum*	San Clemente Island bedstraw	N	SCI-E, FC2, SE, CNPS 1B	Ross 1992
Family Salicaceae				
Salix gooddingii	red willow	N		TDI 2011a
Family Saururaceae				
Anemopsis californica	yerba mansa	N		Ross 1992
Family Saxifragaceae				
Jepsonia malvifolia	island jepsonia	N	FC2, CNPS 4	Ross 1992
Lithophragma maximum	San Clemente Island woodland star	N	SCI-E, FE, SE, CNPS 1B	Ross 1992
Micranthes californica	California saxifrage	N		Ross 1992
Family Scrophulariaceae				
Scrophularia villosa	Santa Catalina figwort	N	CI-E, FC2, CNPS 1B	Ross 1992
Family Solanaceae				
Lycium brevipes var. *brevipes*	boxthorn	N		Ross 1992
Lycium brevipes var. *hassei*	Santa Catalina Island desert-thorn	N	Extirpated, CNPS 1B	Ross 1992
Lycium californicum	California box-thorn	N		Ross 1992
Lycopersicon esculentum	tomato	E		TDI 2011a
Nicotiana glauca	tree tobacco	N		TDI 2011a
Solanum americanum	nightshade	E		Ross 1992
Solanum douglasii	greenspot nightshade	N		Ross 1992
Family Tamaricaceae				
Tamarix sp.		E		TDI 2011a
Tamarix ramosissima	salt cedar	N		Junak 2006
Family Tropaeolaceae				
Tropaeolum majus	garden nasturium	E		Ross 1992

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Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Family Ulmaceae				
Ulmus parviflora	Chinese elm	N		TDI 2011a
Family Urticaceae				
Hesperocnide tenella	western nettle	N		Ross 1992
Parietaria hespera var. *californica*	California pellitory	N		Ross 1992
Parietaria hespera var. *hespera*	rillita pellitory	N		Ross 1992
Family Verbenaceae				
Phylla nodiflora	common lippia	N		TDI 2011a
Verbena bracteata	bigbract verbena	N		TDI 1994
Verbena lasiostachys	western vervain	N		Ross 1992
Family Violaceae				
Viola pedunculata	Johnny jump up	N		Ross 1992
MONOCOTS				
Family Alliaceae				
Allium praecox	early onion	N		TDI 2011a
Family Asphodelaceae				
Asphodelus fistulosus	asphodel	E		TDI 1994
Family Cyperaceae				
Carex tumulicola	splitawn sedge	N		Ross 1992
Eleocharis macrostachya	pale spikerush	N		Ross 1992
Family Juncaceae				
Juncus bufonius	toad rush	N		Ross 1992
Juncus patens	common rush	N		Ross 1992
Family Poaceae				
Agrostis pallens	thingrass	N		Ross 1992
Aristida adscensionis	six-weeks three awn	N		Ross 1992
Avena barbata	slender wild oat	E		Ross 1992
Avena fatua	wild oat	N		Ross 1992
Avena sativa	cultivated oat	E		Ross 1992
Bromus arizonicus	Arizona brome	N		Ross 1992
Bromus carinatus	California brome	N		Ross 1992
Bromus catharticus	rescue grass	E		Ross 1992
Bromus diandrus	ripgut grass	E		Ross 1992
Bromus hordeaceus	soft chess	E		Ross 1992
Bromus madritensis subsp. *rubens*	foxtail chess	E		Ross 1992
Cenchrus echinatus	southern sandspur	E		TDI 2011a
Chloris virgata	feather fingergrass	E		Junak 2006
Cynodon dactylon	Bermuda grass	E		Ross 1992
Dactylis glomerata	orchard grass	E		Ross 1992
Deschampsia danthonioides	annual hairgrass	N		Ross 1992
Dissanthelium californicum	California dissanthelium	N	CNPS 1A	Ross 1992
Distichlis spicata	saltgrass	N		Ross 1992
Echinochloa crus-galli	barnyardgrass	E		TDI 2011a

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Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Ehrharta calycina	veldt grass	E		Ross 1992
Elymus condensatus	giant wild-rye	N		TDI 2011a
Festuca arundinacea	tall fescue	E		TDI 2011a
Festuca bromoides	European foxtail fescue	E		TDI 2011a
Festuca microstachys	few flowered fescue	N		TDI 2011a
Festuca myuros	foxtail fescue	E		TDI 2011a
Festuca octoflora		N		TDI 2011a
Festuca perennis	perennial rye grass	E		TDI 2011a
Festuca temulentum	darnel	E		TDI 2011a
Gastridium phleoides	nit grass	E		Ross 1992
Hainardia cylindrica	barbgrass	E		TDI 2011a
Hordeum geniculatum	Mediterranean barley	N		Ross 1992
Hordeum intercedens	bobtail barley	N		Ross 1992
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley	N		TDI 2011a
Hordeum murinum subsp. *glaucum*	blue foxtail	E		Ross 1992
Hordeum murinum subsp. *leporinum*	foxtail barley	E		TDI 2011a
Hordeum vulgare	common barley	E		TDI 2011a
Lamarckia aurea	golden top	E		TDI 2011a
Melica imperfecta	California melic	N		TDI 2011a
Muhlenbergia appressa	muhly	N		TDI 2011a
Muhlenbergia microsperma	littleseed muhly	N		TDI 2011a
Parapholis incurva	sickle grass	E		TDI 2011a
Paspalum dilatatum	dallisgrass	E		TDI 2011a
Pennisetum setaceum	crimson fountaingrass	E		Junak 2006
Phalaris caroliniana	Carolina canary grass	E		TDI 2011a
Phalaris lemmonii	Lemon's canarygrass	N		TDI 2011a
Phalaris minor	littleseed canary grass	E		TDI 2011a
Phalaris paradoxa	hood canary grass	E		Junak 2006
Poa annua	annual bluegrass	E		TDI 2011a
Poa secunda	sandberg bluegrass	N		TDI 2011a
Polypogon interruptus	ditch beard grass	E		TDI 2011a
Polypogon monspeliensis	annual beard grass	E		TDI 2011a
Schismus arabicus	Arabian schismus	E		Junak 2006
Schismus barbatus	common Mediterranean grass	E		TDI 2011a
Stipa cernua	nodding needlegrass	N		TDI 2011a
Stipa lepida	foothill needlegrass	N		TDI 2011a
Stipa miliacea var. *miliacea*	smilo grass	E		Junak 2006
Stipa pulchra	purple needlegrass	N		TDI 2011a
Triticum aestivum	common wheat	E		TDI 2011a
Family Potamogetonaceae				
Ruppia maritima	ditchgrass	N		TDI 2011a
Family Themidaceae				
Brodiaea kinkiensi	San Clemente Island brodiaea	N	SCI-E, FC2, CNPS 1B	Junak 2006

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Species Name	Common Name	Native (N)/ Exotic (E)	Sensitivity	Reference
Dichelostemma capitatum	blue dicks	N		TDI 2011a
Triteleia clementina	San Clemente Island triteleia	N	SCI-E, FC2, CNPS 1B	Junak 2006
Family Typhaceae				
Typha domingensis	narrowleaf cattail	N		TDI 2011a
Typha latifolia	broadleaf cattail	N		TDI 2011a
Family Zosteraceae				
Phyllospadix scouleri	Scouler's surfgrass	N		NPS 2004
Phyllospadix torreyi	Torrey's surfgrass	N		NPS 2004
Zostera marina	Eelgrass	N		Merkel & Associates 2007

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C.1.2 Ferns and Mosses

Table C-2. Fern and moss species recorded on San Clemente Island.

Species Name	Common Name	Native (N)/ Exotic (E)	Reference
FERNS			
Family Blechnaceae			
Woodwardia fimbriata	chain fern	N	SCI 2010
Family Dryopteridaceae			
Cyrtomium falcatum	holly fern	E	Ross 1992
Dryopteris arguta	coastal woodfern	N	Ross 1992
Family Polypodiaceae			
Polypodium californicum	California polypody	N	Ross 1992
Family Pteridaceae			
Adiantum jordani	California maidenhair	N	Ross 1992
Cheilanthes newberryi	Newberry's lipfern	N	Ross 1992
Pellaea andromedefolia	coffee fern	N	Ross 1992
Pellaea mucronata var. *mucronata*	bird's foot fern	N	Ross 1992
Pentagramma triangularis subsp. *triangularis*	goldback fern	N	Ross 1992
Pentagramma triangularis subsp. *viscosa*	sticky goldback fern	N	Ross 1992
LYCOPODS			
Family Selaginellacea			
Selaginella bigelovii	spike moss	N	Ross 1992

C.2 Marine Algae

Table C-3. Marine algae found around San Clemente Island.

Classification	Species Name	Reference
Chlorophyta (green algae)		
	Bryopsis corticulans	Engle unpubl.
	Chaetomorpha linum	Engle unpubl.
	Chaetomorpha spiralis	NPS 2004
	Cladophora sp.	NPS 2004
	Cladophora graminea	Merkel & Associates 2007
	Cladophora microcladioides	Engle unpubl.
	Cladophoropsis fasciculatus	Engle unpubl.
	Codium sp.	NPS 2004
	Codium cuneatum	NPS 2004
	Codium fragile	CRM 1998
	Codium hubbsii	Engle unpubl.
	Codium setchellii	CRM 1998
	Derbesia marina	NPS 2004
	Enteromorpha sp.	Engle unpubl.
	Ulva californica	Merkel & Associates 2007
	Ulva lobata	Engle unpubl.
	Urospora penicilliformis	Engle unpubl.
Phaeophyta (brown algae)		
	Acinetospora nicholsoniae	Engle unpubl.
	Agarum fimbriatum	NPS 2004
	Coilodesme corrugata	Engle unpubl.
	Coilodesme rigida	Engle unpubl.
	Colpomenia sp.	NPS 2004
	Colpomenia peregrina	Engle pers. comm
	Colpomenia sinuosa	Murray and Littler 1974
	Colpomenia tuberculata	Engle unpubl.
	Cylindrocarpus rugosa	Engle unpubl.
	Cystoseira sp.	TDI 2010
	Cystoseira neglecta	Engle unpubl.
	Cystoseira osmundacea	Engle unpubl.
	Cystoseira setchellii	Engle unpubl.
	Desmarestia sp.	TDI 2010
	Desmarestia ligulata	Engle unpubl.
	Desmarestia ligulata ver. *firma*	Engle unpubl.
	Desmarestia viridis	Engle unpubl.
	*Dictyopteris n.*sp.	Engle unpubl.
	Dictyopteris undulata	NPS 2004
	Dictyota sp.	Engle unpubl.
	Dictyota binghamiae	NPS 2004
	Dictyota flabellata	NPS 2004
	Ectocarpus sp.	CRM 1998
	Egregia menziesii	Merkel & Associates 2007
	Eisenia arborea	TDI 2010

Table C-3. Marine algae found around San Clemente Island.

Classification	Species Name	Reference
	Endarachne binghamiae	CRM 1998
	Halidrys dioica	Murray and Littler 1974
	Hesperophycus harveyanus	Engle unpubl.
	Hincksia sp.	Engle unpubl.
	Hincksia mitchelliae	Engle unpubl.
	Hydroclathrus clathratus	CRM 1998
	Laminaria farlowii	NPS 2004
	Leathesia difformis	CRM 1998
	Macrocystis pyrifera	NPS 2004
	Pachydictyon coriaceum	CRM 1998
	Pelagophycus porra	NPS 2004
	Pelvetia fastigiata	CRM 1998
	Petalonia fascia	Murray and Littler 1974
	Petrospongium rugosum	CRM 1998
	Pseudolithoderma nigra	Murray and Littler 1974
	Pterygophora californica	TDI 2010
	Ralfsia sp.	CRM 1998
	Sargassum spp.	NPS 2004
	Sargassum agardhianum	CRM 1998
	Sargassum muticum	Engle unpubl.
	Sargassum palmeri	CRM 1998
	Scytosiphon dotyi	CRM 1998
	Scytosiphon lomentaria	CRM 1998
	Silvetia compressa	TDI 2011a
	Sphacelaria californica	Engle unpubl.
	Sporochnus pedunculatus	Engle unpubl.
	Taonia lennebackeriae	Engle unpubl.
	Tinocladia crassa	Engle unpubl.
	Zonaria farlowii	NPS 2004
Rhodophyta (red algae)		
	Acrochaetium barbadense	Engle unpubl.
	Acrosorium uncinatum	NPS 2004
	Acrosorium venulosum	CRM 1998
	Amphiroa beavoisii	CRM 1998
	Amplisiphonia pacifica	Engle unpubl.
	Anisocladella pacifica	Murray and Littler 1974
	Asparagopsis taxiformis	Merkel & Associates 2007
	Binghamia forkii	Engle unpubl.
	Bangia vermicularis	Engle unpubl.
	Bonnemaisonia hamifera	NPS 2004
	Bossiella sp.	Engle unpubl.
	Bossiella californica	Engle unpubl.
	Bossiella orbigniana	Engle unpubl.
	Bossiella plumosa	Engle unpubl.
	Botryocladia pseudodichotoma	NPS 2004
	Branchioglossum woodii	Engle unpubl.
	Calliarthron sp.	Merkel & Associates 2007

Table C-3. Marine algae found around San Clemente Island.

Classification	Species Name	Reference
	Calliarthron cheilosporioides	Engle unpubl.
	Calliarthron tuberculosum	Engle unpubl.
	Callithamnion rupicolum	Engle unpubl.
	Callophyllis rhynchocarpa	NPS 2004
	Callophyllis violacea	NPS 2004
	Carpopeltis sp.	NPS 2004
	Carpopeltis bushiae	NPS 2004
	Centroceras clavulatum	Murray and Littler 1974
	Ceramiaceae sp.	NPS 2004
	Ceramium codicola	Engle unpubl.
	Ceramium pacificum	Engle unpubl.
	Ceramium procumbens	Engle unpubl.
	Chondracanthus corymbiferus	Engle unpubl.
	Chondracanthus exasperatus	Engle unpubl.
	Chondracanthus harveyanus	Engle unpubl.
	Chondria sp.	Engle unpubl.
	Chondria arcuata	Engle unpubl.
	Chondria californica	Engle unpubl.
	Chondria oppositiclada	Engle unpubl.
	Coeloseira compressa	NPS 2004
	Corallina chilensis	CRM 1998
	Corallina officinalis	NPS 2004
	Corallina pinnatifolia	NPS 2004
	Corallina vancouveriensis	Murray and Littler 1974
	Corallophila eatoniana	Engle unpubl.
	Cryptonemia sp.	Engle unpubl.
	Cryptonemia obovata	Engle unpubl.
	Cryptopleura sp.	Engle unpubl.
	Cryptopleura corallinara	Engle unpubl.
	Dasya sinicola	Engle unpubl.
	Dasya sinicola var. *californica*	Engle unpubl.
	Endocladia muricata	Engle unpubl.
	Erythrothrichis sp.	Engle unpubl.
	Erythrocystis saccata	Murray and Littler 1974
	Farlowia conferta	Engle unpubl.
	Fauchea sp.	Engle unpubl.
	Fryeella gardneri	Engle unpubl.
	Gastroclonium coulteri	Engle unpubl.
	Gelidium sp.	TDI 2010
	Gelidium coulteri	Murray and Littler 1974
	Gelidium nudifrons	NPS 2004
	Gelidium purpurascens	Engle unpubl.
	Gelidium pusillum	Murray and Littler 1974
	Gelidium robustum	NPS 2004
	Gigartina sp.	NPS 2004
	Gigartina canaliculata	CRM 1998
	Gigartina spinosa	Murray and Littler 1974

Table C-3. Marine algae found around San Clemente Island.

Classification	Species Name	Reference
	Gloiocladia laciniata	Engle unpubl.
	Gloiopeltis furcata	Engle unpubl.
	Gracilaria robusta	Engle unpubl.
	Gracilariopsis andersonii	Engle unpubl.
	Grateloupia doryphora	Engle unpubl.
	Griffithsia pacifica	Engle unpubl.
	Gymnogongrus leptophyllus	NPS 2004
	Haliptylon gracile	NPS 2004
	Halymenia sp.	Engle unpubl.
	Helminthocladia australis	Engle unpubl.
	Helminthora sp.	Engle unpubl.
	Herposiphonia sp.	Engle unpubl.
	Herposiphonia littoralis	Engle unpubl.
	Hildenbrandia sp.	Engle unpubl.
	Hypnea cervicornis	Engle unpubl.
	Hypnea spinella	Engle unpubl.
	Hypnea valentiae var. valentiae	CRM 1998
	Jania sp.	Engle unpubl.
	Kallymenia pacifica	Engle unpubl.
	Laurencia sp.	NPS 2004
	Laurencia decidua	Engle unpubl.
	Laurencia pacifica	CRM 1998
	Laurencia snyderae	Murray and Littler 1974
	Laurencia spectabilis	Engle unpubl.
	Laurencia subdisticha	Engle unpubl.
	Laurencia subopposita	Engle unpubl.
	Leptocladia binghamiae	Engle unpubl.
	Liagora californica	CRM 1998
	Lithothrix aspergillum	Engle unpubl.
	Lithophyllum decipiens	Murray and Littler 1974
	Lithothamnion australe	Engle unpubl.
	Lithothrix aspergillum	Murray and Littler 1974
	Lithophyllum sp.	Merkel & Associates 2007
	Lithophyllum dispar	Engle unpubl.
	Mazzaella leptorhynchos	Engle unpubl.
	Melobesia mediocris	Murray and Littler 1974
	Mesophyllum lamellatum	Engle unpubl.
	Microcladia coulteri	Merkel & Associates 2007
	Nemalion helminthoides	Engle unpubl.
	Neogoniolithon setchellii	Engle unpubl.
	Neoptilota densa	Engle unpubl.
	Nienburgia andersoniana	Engle unpubl.
	Odonthalia sp.	CRM 1998
	Osmundea crispa	Engle unpubl.
	Osmundea sinicola	Engle unpubl.
	Osmundea splendens	Engle unpubl.
	Opuntiella californica	Engle unpubl.

Table C-3. Marine algae found around San Clemente Island.

Classification	Species Name	Reference
	Peyssonellia sp.	Murray and Littler 1974
	Plocamium cartilagineum	Merkel & Associates 2007
	Phycodrys setchellii	Engle unpubl.
	Plocamium coccineum var. *pacificum*	Murray and Littler 1974
	Plocamium violaceum	Engle unpubl.
	Polysiphonia sp.	Engle unpubl.
	Polysiphonia pacifica var. *delicatula*	Engle unpubl.
	Porphyra perforata	Engle unpubl.
	Predaea masonii	Engle unpubl.
	Prionitis sp.	NPS 2004
	Prionitis linearis	CRM 1998
	Pterochondria woodii	Engle unpubl.
	Pterocladia capillacea	CRM 1998
	Pterosiphonia baileyi	Engle unpubl.
	Pterosiphonia dendroidea	Engle unpubl.
	Pugetia firma	Engle unpubl.
	Pugetia fragilissima	Engle unpubl.
	Rhodoglossum affine	CRM 1998
	Rhodemia sp.	Engle unpubl.
	Rhodymenia sp.	Engle unpubl.
	Rhodymenia arborescens	NPS 2004
	Rhodymenia californica	NPS 2004
	Rhodymenia callophylloides	Engle unpubl.
	Rhodymenia pacifica	Murray and Littler 1974
	Sarcodiotheca gaudchaudii	Engle unpubl.
	Schizymenia pacifica	Engle unpubl.
	Sciadophycus stellatus	NPS 2004
	Scinaia sp.	NPS 2004
	Scinaia confusa	Engle unpubl.
	Scinaia johnstoniae	Engle unpubl.
	Smithora naiadum	Engle unpubl.
	Sorella deliculata	Engle unpubl.
	Tiffaniella snyderae	Engle unpubl.

C.3 Lichens

Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
Family Lecanoraceae	*Lecidella asema*		Bowler et al. 1996
Family Opegraphaceae	*Opegrapha* sp.		Bowler et al. 1996
Family Acarosporaceae	*Acarospora carnegiei*	Carnegie's cracked lichen	Bratt 1999
	Acarospora fuscata	cracked lichen	Bowler et al. 1996
	Acarospora schleicheri	Schleicher's cracked lichen	Bowler et al. 1996
	Acarospora smaragdula	cracked lichen	Bowler et al. 1996

* Species recorded on San Clemente Island by Hasse 1903 but have not been verified to still exist on the island.

Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
	Pleopsidium chlorophanum		Bratt 1999
Family Bacidiaceae	*Lecania brunonis*	lecania lichen	Bowler et al. 1996
	Lecania dudleyi	Dudley's lecania lichen	Bowler et al. 1996
	Lecania naegelii		Bratt 1999
	Tephromela atra	tephromela lichen	Bowler et al. 1996
	Tephromela nashii		Bratt 1999
Family Caliciaceae	*Texosporium sancti-jacobi*		Bratt 1999
	Thelomma mammosum	thelomma lichen	Bowler et al. 1996
	Thelomma santessonii	Santesson's thelomma lichen	Bratt 1999
Family Candelariaceae	*Candelariella coralliza*		Bratt 1999
	Candelariella rosulans	eggyolk lichen	Bratt 1999
	Candelariella vitellina	eggyolk lichen	Bratt 1999
Family Catillariaceae	*Toninia ruginosa*	bruised lichen	Bowler et al. 1996
	Toninia tristis	bruised lichen	Bowler et al. 1996
Family Chrysotrichaceae	*Chrysothrix candelaris*	dust lichen	Bowler et al. 1996
Family Cladoniaceae	*Cladonia pyxidata*	cup lichen	Bratt 1999
	Cladonia scabriuscula	cup lichen	Bowler et al. 1996
Family Collemataceae	*Collema cf. tenax*	jelly lichen	Bowler et al. 1996
	Leptogium californicum	California skin lichen	Bowler et al. 1996
	Leptogium lichenoides	skin lichen	Bowler et al. 1996
Family Heppiaceae	*Heppia lutosa*	heppia lichen	Bowler et al. 1996
Family Hymeneliaceae	*Aspicilia caesiocinerea*	rimmed lichen	Bratt 1999
	Aspicilia calcarea	calcareous rimmed lichen	Bratt 1999
	Aspicilia cinerea	rimmed lichen	Bratt 1999
	Aspicilia contorta	contorted rimmed lichen	Bowler et al. 1996
Family Lecanoraceae	*Catillaria columbiana*		Bowler et al. 1996
	Lecanora caesiorubella subsp. *merrillii*	Merrill's rim lichen	Bowler et al. 1996
	Lecanora demissa	rim lichen	Bowler et al. 1996
	Lecanora gangaleoides Nyl. sensu	rim lichen	Bowler et al. 1996
	Lecanora horiza	rim lichen	Bowler et al. 1996
	Lecanora meridionalis	rim lichen	Bratt 1999
	Lecanora muralis	rim lichen	Bowler et al. 1996
	*Lecanora pallida**		Hasse 1903
	Lecanora rupicola	rim lichen	Bowler et al. 1996
	Lecanora subcarnea	rim lichen	Bowler et al. 1996
	*Lecanora subfusca**	rim lichen	Hasse 1903
	*Lecanora varia**	rim lichen	Hasse 1903
	Lecanora xanthosora	rim lichen	Bowler et al. 1996
	Protoparmelia badia	protoparmelia lichen	Bratt 1999
	Psorula scotopholis	rim lichen	Bowler et al. 1996
	Pyrrhospora quernea	pyrrhospora lichen	Bowler et al. 1996
Family Lecideaceae	*Lecidea enteroleuca**		Hasse 1903
	Lecidea mannii	Mann's lecidea lichen	Bowler et al. 1996
	Lecidea (?) sp.		Hasse 1903
Family Lichenotheliaceae	*Lichenothelia tenuissima*	lichenothelia lichen	Bowler et al. 1996
Family Lichinaceae	*Lichinella nigritella*		Bratt 1999

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Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
	Lichinella stipatula	stipitate lichinella lichen	Bratt 1999
	Zahlbrucknerella sp.		Bowler et al. 1996
Family Lobariaceae	*Sticta fuliginosa*	spotted felt lichen	Bowler et al. 1996
Family Nephromataceae	*Nephroma parile*	kidney lichen	Bowler et al. 1996
Family Opegraphaceae	*Sclerophyton californicum*	California sclerophyton lichen	Bratt 1999
	Sclerophyton cerebriforme		Bowler et al. 1996
Family Pannariaceae	*Fuscopannaria leucophaea*		Bratt 1999
	Fuscopannaria praetermissa		Bowler et al. 1996
	Leproloma sp.		Bowler et al. 1996
Family Parmeliaceae	*Evernia prunastri*	ring lichen	Bowler et al. 1996
	Flavoparmelia caperata	flavoparmelia lichen	Bowler et al. 1996
	Flavopunctelia flaventior	flavopunctelia lichen	Bowler et al. 1996
	Flavopunctelia soredica	flavopunctelia lichen	Bratt 1999
	Melanelia fuliginosa	melanelia lichen	Bratt 1999
	Neofuscelia verruculifera	neofuscelia lichen	Bowler et al. 1996
	Parmelia sulcata	shield lichen	Bowler et al. 1996
	Parmotrema chinense	Chinese parmotrema lichen	Bowler et al. 1996
	Parmotrema hypoleucinum	parmotrema lichen	Bowler et al. 1996
	Parmotrema stuppeum	parmotrema lichen	Bratt 1999
	Punctelia borreri	punctelia	Bowler et al. 1996
	Punctelia stictica	punctelia	Bowler et al. 1996
	Punctelia subrudecta	punctelia	Bowler et al. 1996
	Rimelia reticulata	netted rimelia lichen	Bowler et al. 1996
	Usnea esperantiana		Bratt 1999
	*Usnea hirta**	beard lichen	Hasse 1903
	Usnea rubicunda	beard lichen	Bowler et al. 1996
	Usnea sp.		Bowler et al. 1996
	Xanthoparmelia coloradoensis	Colorado xanthoparmelia lichen	Bratt 1999
	Xanthoparmelia conspersa	xanthoparmelia lichen	Bratt 1999
	Xanthoparmelia cumberlandia	Cumberland xanthoparmelia lichen	Bratt 1999
	Xanthoparmelia mexicana	Mexican xanthoparmelia lichen	Bowler et al. 1996
	Xanthoparmelia plittii	Plitt's xanthoparmelia lichen	Bratt 1999
	Xanthoparmelia somloensis	xanthoparmelia lichen	Bowler et al. 1996
	Xanthoparmelia sp.		Bowler et al. 1996
Family Peltulaceae	*Peltula euploca*	peltula lichen	Bowler et al. 1996
	Peltula omphaliza	peltula lichen	Bratt 1999
	Peltula patellata		Bratt 1999
Family Pertusariaceae	*Pertusaria amara*	pore lichen	Bowler et al. 1996
	Pertusaria cf. bispora		Bowler et al. 1996
	Pertusaria flavicunda		Bowler et al. 1996
	Pertusaria sp.	pore lichen	Bowler et al. 1996
Family Phlyctidaceae	*Phlyctis argena*	blemished lichen	Bratt 1999
Family Physciaceae	*Amandinea punctata*		Bowler et al. 1996
	Buellia sp.	lichen	Bowler et al. 1996
	Buellia cerussata	disc lichen	Bowler et al. 1996
	Buellia halonia	disc lichen	Bowler et al. 1996

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Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
	Buellia oidalea	disc lichen	Bowler et al. 1996
	*Buellia parasema**	disc lichen	Hasse 1903
	Buellia retrovertens	disc lichen	Bratt 1999
	Buellia turgescens	disc lichen	Bratt 1999
	Dimelaena radiata	mountain lichen	Bowler et al. 1996
	Dimelaena thysanota	mountain lichen	Bowler et al. 1996
	Diploicia canescens	diploicia lichen	Bowler et al. 1996
	Heterodermia erinacea	shield lichen	Bowler et al. 1996
	Heterodermia leucomelos	shield lichen	Bowler et al. 1996
	*Lecanora roboris (Rinodina confragosa)**	rinodina lichen	Hasse 1903
	Mobergia angelica		Bowler et al. 1996
	Physcia adscendens	rosette lichen	Bowler et al. 1996
	Physcia callosa	rosette lichen	Bowler et al. 1996
	Physcia clementei	rosette lichen	Bowler et al. 1996
	Physcia phaea	rosette lichen	Bowler et al. 1996
	Physcia stellaris	starry rosette lichen	Bowler et al. 1996
	Physcia tenella var. *tenella*	rosette lichen	Bowler et al. 1996
	Physcia tribacia	rosette lichen	Bratt 1999
	Physconia enteroxantha	frosted lichen	Bowler et al. 1996
	Physconia isidiigera		Bowler et al. 1996
	Rinodina bolanderi	Bolander's rinodina lichen	Bowler et al. 1996
	Rinodina conradii	Conrad's rinodina lichen	Bowler et al. 1996
	Rinodina hallii	Hall's rinodina lichen	Bowler et al. 1996
	Rinodina luridata	rinodina lichen	Bowler et al. 1996
	Rinodina sp.		Bowler et al. 1996
	Phaeophyscia cernohorskyi	Cernohorsky's wreath lichen	Bowler et al. 1996
Family Placynthiaceae	*Leptochidium albociliatum*	leptochidium lichen	Bowler et al. 1996
Family Poccellaceae	*Dirina catalinariae catalinariae*	dirina lichen	Bowler et al. 1996
	Dirina catalinariae sorediata	dirina lichen	Bowler et al. 1996
Family Psoraceae	*Psora decipiens*	fishscale lichen	Bowler et al. 1996
	Psora pacifica	Pacific fishscale lichen	Bratt 1999
	Psora tuckermanii	Tuckerman's fishscale lichen	Bratt 1999
Family Ramalinaceae	*Niebla cephalota*		Bowler et al. 1996
	Niebla ceruchis		Bowler et al. 1996
	Niebla ceruchoides		Bowler et al. 1996
	Niebla dissecta		Bratt 1999
	Niebla homalea	niebla lichen	Bowler et al. 1996
	Niebla isidiascens		Bowler et al. 1996
	Niebla laevigata		Bowler et al. 1996
	Niebla laminaria		Bratt 1999
	Niebla procera		Bowler et al. 1996
	Niebla robusta		Bowler et al. 1996
	Niebla sorediata		Bratt 1999
	Niebla sorocarpia		Bratt 1999
	Niebla testudinaria		Bratt 1999
	Ramalina canariensis		Bowler et al. 1996

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Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
	*Ramalina combeoides**		Hasse 1903
	Ramalina farinacea	farinose cartilage lichen	Bowler et al. 1996
	Ramalina fastigiata	cartilage lichen	Bowler et al. 1996
	Ramalina lacera	cartilage lichen	Bowler et al. 1996
	Ramalina leptocarpha	cartilage lichen	Bowler et al. 1996
	Ramalina menziesii	Mencies' cartilage lichen	Bowler et al. 1996
	Ramalina pollinaria	cartilage lichen	Bowler et al. 1996
	Vermilacinia acicularis		Bratt 1999
	Vermilacinia cerebra		Bratt 1999
	Vermilacinia nylanderi		Bratt 1999
	Vermilacinia pumila		Bratt 1999
Family Rimulariaceae	*Rimularia insularis*	rimularia lichen	Bowler et al. 1996
Family Roccellaceae	*Dendrographa alectoroides*		Bowler et al. 1996
	Dendrographa leucophaea	dendrographa	Bowler et al. 1996, Bratt 1999
	Lecanactis dimelaenoides		Bowler et al. 1996
	Lecanographa hypothallina		Bowler et al. 1996
	Opegrapha sp.		Bowler et al. 1996
	Opegrapha brattiae		Bratt 1999
	Reinkella parishii	Parish's reinkella lichen	Bowler et al. 1996
	Roccella babingtonii	Babington's roccella lichen	Bowler et al. 1996
	Roccella fimbriata	roccella lichen	Bowler et al. 1996
	Schizopelte californica		Bowler et al. 1996
	Sigridea californica		Bowler et al. 1996
Family Syzygosporaceae	*Syzygospora physciacearum*		Bratt 1999
Family Teloschistaceae	*Caloplaca* sp.		Bowler et al. 1996
	Caloplaca bolacina	orange lichen	Bowler et al. 1996
	Caloplaca brattiae	Bratt's orange lichen	Bratt 1999
	Caloplaca californica	California orange lichen	Bowler et al. 1996
	Caloplaca catalinae	Catalina orange lichen	Bowler et al. 1996
	Caloplaca cerina	orange lichen	Bratt 1999
	Caloplaca cf. sipeana	orange lichen	Bowler et al. 1996
	Caloplaca coralloides	coral orange lichen	Bowler et al. 1996
	Caloplaca epithaillina	orange lichen	Bratt 1999
	Caloplaca ferruginea	orange lichen	Bratt 1999
	Caloplaca ignea		Bratt 1999
	Caloplaca luteominia	orange lichen	Bowler et al. 1996
	Caloplaca oregona	Oregon orange lichen	Bowler et al. 1996
	Caloplaca rosei	Rose's orange lichen	Bowler et al. 1996
	Caloplaca saxicola	orange lichen	Bowler et al. 1996
	Caloplaca stanfordensis	Stanford orange lichen	Bowler et al. 1996
	Caloplaca stantonii		Bowler et al. 1996
	Polycauliona coralloides		Bowler et al. 1996
	Teloschistes californicus		Bowler et al. 1996
	Teloschistes chrysophthalmus	teloschistes lichen	Bowler et al. 1996
	Teloschistes exilis	teloschistes lichen	Bratt 1999
	Teloschistes flavicans	teloschistes lichen	Bowler et al. 1996

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Table C-4. Lichens found on San Clemente Island.

Classification	Species Name	Common Name	Reference
	Xanthoria candelaria	orange wall lichen	Bratt 1999
	Xanthoria fallax	orange wall lichen	Bowler et al. 1996
	Xanthoria sp.		Bowler et al. 1996
Family Thelotremataceae	*Diploschistes actinostomus*	crater lichen	Bratt 1999
	Diploschistes scruposus	crater lichen	Bowler et al. 1996
	*Placodium ferrugineum**		Hasse 1903
	Placodium sp.*		Hasse 1903
Family Umbilicariaceae	*Umbilicaria phaea*	navel lichen	Bowler et al. 1996
Family Verrucariaceae	*Dermatocarpon miniatum*	silverskin lichen	Bowler et al. 1996
	Endocarpon pusillum	chalice lichen	Bowler et al. 1996
	Placidium chilense		Bratt 1999
	Placidium lacinulatum		Bratt 1999
	Verrucaria sp. *1*	wart lichen	Bowler et al. 1996
	Verrucaria sp. *2*	wart lichen	Bowler et al. 1996
uncertain	*Leprocaulon microscopicum*	mealy lichen	Bowler et al. 1996

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C.4 Terrestrial Invertebrates

Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Phylum ARTHROPODA: Subphylum CRUSTACEA				
Class Branchiopoda (fairy shrimp)				
Family Branchinectidae	*Branchinecta lindahli*	versatile fairy shrimp		Bitterroot 2002
Class Malacostraca (pill bugs, wood lice)				
Family Armadillidiidae	*Armadillidiidae* sp.	pill bug		TDI 2011b
Unknown Family	*Unknown* sp.	woodlouse/sow bug		TDI 2011b
Phylum ARTHROPODA: Subphylum CHELICERATA				
Class Arachnida (mites, ticks, spiders and scorpions)				
Order ARANEAE (spiders)				
Family Agelenidae	*Agelenidae* sp.	funnel web spider		TDI 2011b
Family Araneidae	*Araneus**	orb weaver		TDI 2011b
	Argiope argentata	silver argiope spider		TDI 2011b
	Araneidae sp.	orb weaver B		TDI 2011b
Family Clubionidae	*Clubionidae* sp. *1*	clubiona sp. 1		TDI 2011b
	Clubionidae sp. *2*	clubiona sp. 2		TDI 2011b
	Clubionidae sp. *3*	clubiona sp. 3		TDI 2011b
Family Oxyopidae	*Oxyopidae* sp.	lynx spider		TDI 2011b
Family Philodromidae	*Ebo* sp.	running crab spider		TDI 2011b
	Tibellus chamberlini	slender crab spider		TDI 2011b
Family Salticidae	*Salticidae* sp. *1*	jumping spider		TDI 2011b
	Salticidae sp. *2*	jumping spider B		TDI 2011b
	Salticidae sp. *3*	jumping spider C		TDI 2011b

SCI-E: San Clemente Island endemic, CI-E: Channel Islands endemic, U: Possible endemic staus-requires more taxanomic work, * : not confirmed.

Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Family Theridiidae	*Latrodectus hesperus*	black widow spider		TDI 2011b
Family Zodaraiidae	*Lutica clementea*	ground spider	SCI-E	Miller 1984a
Order OPILIONES (harvestmen)				
Family Protolophidae	*Protolophus cockerelli*	harvestman	SCI-E	Miller 1984a
Order IXODIDA (ticks and mites)				
Family Ixodidae	*Ixodes peromysci*	shield tick	CI-E	Miller 1984a
Unk	*Galumna* sp.*	mite B		TDI 2011b
Unk	*Ixodida* sp. *1*	mite A		TDI 2011b
Unk	*Ixodida* sp. *2*	mite C		TDI 2011b
Unk	*Ixodida* sp. *3*	mite D		TDI 2011b
Order PSEUDOSCORPIONIDA (false scorpions)				
Unk	*Unk* sp.	pseudoscorpion		TDI 2011b
Order SCORPIONES (scorpions)				
Family Vaejovidae	*Pseudouroctonus (=Vaejovis) minimus minimus*	scorpion		Navy 1992
Phylum ARTHROPODA: Subphylum MYRIAPODA				
Class DIPLOPODA (millipedes)				
Order SPIROSTREPTIDA (millipedes)				
Family Cambalidae	*Tigolene clementinus*	millipede	SCI-E	Miller 1984a
Class CHILOPODA (centipedes)				
Order GEOPHILOMORPHA (soil centipedes)				
unk	*unk sp.*	centipede		TDI 2011b
Phylum ARTHROPODA: Subphylum HEXAPODA				
Class ENTOGNATHA (springtails)				
Family Entomobryidae	*Entomobryidae* sp.	elongate-bodied springtail		TDI 2011b
Family Poduridae	*Poduridae* sp.	podurid springtail		TDI 2011b
Family Sminthuridae	*Sminthuridae* sp.	globular springtail		TDI 2011b
Class Insecta (beetles, flies, bees, etc.)				
Order BLATTODEA (cockroaches and termites)				
Family Termitidae	*Termitidae* sp. *1*	termite		SCI 2010
Order COLEOPTERA (beetles)				
Family Anobiidae	*Xarifa insularis*	death-watch beetle	CI-E	SBMNH 2009
Family Anthicidae	*Ischyropalpus nitidulus*	ant-like flower beetle		SBMNH 2009
Family Attelabidae	*Temnocerus aureus*	leaf rolling weevil		SBMNH 2009
	Temnocerus insularis	leaf rolling weevil		SBMNH 2009
Family Bruchidae	*Bruchidae* sp. *1*	seed beetle A		TDI 2011b
	Bruchidae sp. *2*	seed beetle B		TDI 2011b
Family Carabidae	*Akephorus marinus*	ground beetle		SBMNH 2009
	Amara aurata	ground beetle		SBMNH 2009
	Amara californica	ground beetle		SBMNH 2009
	Amara clementina	ground beetle	SCI-E	Miller 1984a
	Amara insularis	ground beetle	SCI-E	SBMNH 2009
	Anchomenus funebris	ground beetle		SBMNH 2009
	Bembidion insulatum	ground beetle		SBMNH 2009
	Bembidion striola	ground beetle		SBMNH 2009

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
	Bembidion versicolor	ground beetle		SBMNH 2009
	Calathus ruficollis	ground beetle		SBMNH 2009
	Calosoma eremicola	ground beetle		SBMNH 2009
	Celia clementina	ground beetle		Navy 1992
	Cicindela oregona	ground beetle		SBMNH 2009
	Cicindela senilis	ground beetle		SBMNH 2009
	Dicheirus dilatatus dilatatus	ground beetle		SBMNH 2009
	Dicheirus piceus	ground beetle		SBMNH 2009
	Platynus brunneomarginatus	ground beetle		SBMNH 2009
	Pterostichus gliscans	ground beetle	SCI-E	SBMNH 2009
	Pterostichus isabellae	ground beetle		SBMNH 2009
	Pterostichus laetulus	ground beetle		SBMNH 2009
	Pterostichus menetriesii	ground beetle		SBMNH 2009
	Tachys corax	ground beetle		SBMNH 2009
	Tanystoma maculicolle	ground beetle		SBMNH 2009
	Pterostichus sp.*1*	ground beetle		SCI 2010
	Carabidae sp. *1**	ground beetle	U	SCI 2010
Family Cerambycidae	*Cerambycidae* sp. *1*	longhorn beetle		SCI 2010
Family Chrysomelidae	*Phyllotreta pusilla*	leaf beetle		SBMNH 2009
	Phyllotreta sp.*	flea beetle		TDI 2011b
	Acanthoscelides pullus	leaf beetle		SBMNH 2009
	Diachus auratus	leaf beetle		SBMNH 2009
	Chrysomelidae sp.	cylindrical leaf beetle B		TDI 2011b
	Colaspidea smaragdula	leaf beetle	CI-E	SBMNH 2009
	Erynephala puncticollis	leaf beetle		SBMNH 2009
	Monoxia sordida	leaf beetle		SBMNH 2009
Family Cleridae	*Necrobia ruficollis*	checkered beetle		SBMNH 2009
Family Cleridae	*Necrobia rufipes*	checkered beetle		SBMNH 2009
Family Coccinellidae	*Coccinella californica*	California lady beetle		SBMNH 2009
	Coccinella johnsoni	Johnson's lady beetle		SBMNH 2009
	Coccinella septempunctata	seven-spotted Lady Beetle		TDI 2011b
	Coccinella undecimpunctata	eleven-spotted lady Beetle		TDI 2011b
	Coccinellidae sp. *1**	lady beetle	U	SCI 2010
	Delphastus catalinae	lady beetle		SBMNH 2009
	Hippodamia convergens	convergent lady beetle		SBMNH 2009
	Hippodamia quinquesignata	five-spotted lady beetle		SBMNH 2009
	Hyperaspus sp.	lady beetle		TDI 2011b
	Rhyzobius lophanthae	lady beetle		SBMNH 2009
		'ten-spot' lady beetle		TDI 2011b
Family Corylophidae	*Corylophidae* sp. *1*	minute hooded beetle		SCI 2010
Family Cryptophagidae	*Cryptophagidae* sp. *1*	silken fungus beetle		SCI 2010
Family Curculionidae	*Trigonoscuta clemente*	snout beetle		SBMNH 2009
	Trigonoscuta clemente excavata	snout beetle		SBMNH 2009
	Trigonoscuta clemente isola	snout beetle		SBMNH 2009

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Classification	Species Name	Common Name	Endemic Status	Reference
	Trigonoscuta clemente latesecula	snout beetle		SBMNH 2009
	Trigonoscuta clemente traskiae	snout beetle		SBMNH 2009
	Cleonus americanus	snout beetle		SBMNH 2009
	Cleonus basalis	snout beetle		Navy 1992
	Emphyastes fucicola	snout beetle		SBMNH 2009
	Notiodes aeratus	snout beetle		SBMNH 2009
	Sciopithes insularis	root weevil	SCI-E	SBMNH 2009
	Sciopithes setosus	snout beetle		SBMNH 2009
Family Dascillidae	*Anorus piceus*	soft-bodied plant beetle		SBMNH 2009
Family Dermestidae	*Dermestes caninus*	carpet beetle		SBMNH 2009
	Dermestes caninus mannerheimi	carpet beetle		SBMNH 2009
	Dermestes frischi	carpet beetle		SBMNH 2009
	Dermestes marmoratus	carpet beetle		SBMNH 2009
Family Dytiscidae	*Rhantus gutticollis*	predaceous diving beetle		SBMNH 2009
	Dytiscidae sp. *1**	predaceous diving beetle	U	SCI 2010
Family Elateridae	*Limonius canus*	click beetle		SBMNH 2009
Family Histeridae	*Neopachylopus sulcifrons*	hister beetle		SBMNH 2009
	Saprinus lugens	hister beetle		SBMNH 2009
	Xerosaprinus lubricus	hister beetle		SBMNH 2009
Family Hydrophilidae	*Cercyon fimbriatus*	water scavenger beetle		SBMNH 2009
	Cercyon luniger	water scavenger beetle		SBMNH 2009
Family Kateretidae	*Amartus tinctus*	short-winged flower beetles		SBMNH 2009
Family Latridiidae	*Melanophthalma americana*	minute brown scavenger beetle		SBMNH 2009
	Melanophthalma insularis	minute brown scavenger beetle	CI-E	SBMNH 2009
Family Melandryidae	*Melandryidae* sp.	false darkling beetle		TDI 2011b
Family Meloidae	*Meloe barbarus*	blister beetle		SBMNH 2009
Family Melyridae	*Attalus transmarinus*	soft-wing flower beetle	SCI-E	SBMNH 2009
	Dasytes clementae	soft-wing flower beetle	SCI-E	SBMNH 2009
	Trichochrous pedalis	soft-wing flower beetle	CI-E	SBMNH 2009
Family Mordellidae	*Mordellidae* sp.	tumbling flower beetle		TDI 2011b
Family Nitidulidae	*Carpophilus pallipennis*	sap beetle		SBMNH 2009
	Nitidulidae sp. *1**	sap beetle	U	SCI 2010
Family Scarabaeidae	*Aegialia convexa*	scarab beetle		SBMNH 2009
	Aphodius lividus	scarab beetle		SBMNH 2009
	Bolbocerastes regalis	scarab beetle		SBMNH 2009
	Canthon simplex	scarab beetle		SBMNH 2009
	Coenonycha clementina	San Clemente Island coenonycha beetle	SCI-E	SBMNH 2009
	Cyclocephala longula	scarab beetle		SBMNH 2009
	Diplotaxis anxius	scarab beetle		SBMNH 2009
	Diplotaxis fimbriata	scarab beetle		SBMNH 2009
	Diplotaxis subangulata	scarab beetle		SBMNH 2009
	Parathyce palpalis	scarab beetle		SBMNH 2009

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Classification	Species Name	Common Name	Endemic Status	Reference
	Phobetus comatus	scarab beetle		SBMNH 2009
	Phyllophaga mucorea	scarab beetle		SBMNH 2009
	Scarabaeidae sp. *3**	scarab beetle	U	SCI 2010
	Serica alternata	scarab beetle		SBMNH 2009
	Serica mixta	scarab beetle		SBMNH 2009
	Tomarus gibbosus obsoletus	scarab beetle		SBMNH 2009
Family Scolytidae	*Scolytidae* sp.	ambrosia beetle		TDI 2011b
Family Silphidae	*Nicrophorus* sp.*1*	carrion beetle		SCI 2010
	Nicrophorus guttula	carrion beetle		SBMNH 2009
	Nicrophorus nigrita	carrion beetle		SBMNH 2009
	Nicrophorus sp.*1*	carrion beetle		SCI 2010
Family Staphylinidae	*Aleochara bimaculata*	rove beetle		SBMNH 2009
	Bledius ruficornis	rove beetle		SBMNH 2009
	Cafius canescens	rove beetle		SBMNH 2009
	Cafius lithocharinus	rove beetle		SBMNH 2009
	Cafius luteipennis	rove beetle		SBMNH 2009
	Cafius seminitens	rove beetle		SBMNH 2009
	Creophilus maxillosus	rove beetle		SBMNH 2009
	Diglotta pacifica	rove beetle		SBMNH 2009
	Hadrotes crassus	rove beetle		SBMNH 2009
	Neobisnius occidentoides	rove beetle		SBMNH 2009
	Staphylinidae sp. *1**	rove beetle	U	SCI 2010
	Tarphiota fucicola	rove beetle		SBMNH 2009
	Tarphiota geniculata	rove beetle		SBMNH 2009
	Thinopinus pictus	rove beetle		SBMNH 2009
	Thinusa maritima	rove beetle		SBMNH 2009
Family Tenebrionidae	*Blapstinus* sp. *1*	darkling beetle		SCI 2010
	Apsena grossa	darkling beetle	CI-E	SBMNH 2009
	Apsena pubescens	darkling beetle		SBMNH 2009
	Blapstinus histricus	darkling beetle		SBMNH 2009
	Cibdelis bachei	darkling beetle		SBMNH 2009
	Coelus pacificus	dune beetle	CI-E	SBMNH 2009
	Coniontis lata	darkling beetle	CI-E	SBMNH 2009
	Coniontis subpubescens	darkling beetle		SBMNH 2009
	Coniontis vandykei	darkling beetle		SBMNH 2009
	Cryptadius inflatus	darkling beetle		SBMNH 2009
	Eleodes dentipes	darkling beetle		SBMNH 2009
	Eleodes laticollis apprimus	darkling beetle	CI-E	Miller 1984a
	Epantius obscurus	darkling beetle		SBMNH 2009
	Eusattus difficilis	darkling beetle		SBMNH 2009
	Eusattus robustus	darkling beetle	SCI-E	SBMNH 2009
	Helops bachei	darkling beetle		SBMNH 2009
	Isomira comstocki	darkling beetle		SBMNH 2009
	Phaleria rotundata	darkling beetle		SBMNH 2009
	Pterostichus gliscans	darkling beetle		Navy 1992

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Classification	Species Name	Common Name	Endemic Status	Reference
	Tenebrionidae sp. *1**	darkling beetle	U	SCI 2010
	Tonibius sulcatus	darkling beetle		SBMNH 2009
Family Trogidae	*Trox atrox*	hide beetle		SBMNH 2009
	Trox gemmulatus	hide beetle		SBMNH 2009
Family Zopheridae	*Rhagodera tuberculata*	ironclad beetle		SBMNH 2009
Order DERMAPTERA (earwigs)				
Forficulidae	*Euborellia annulipes*	earwig		Miller 1984a
Forficulidae	*Forficula auricularia*	earwig		Miller 1984a; SCI 2010
Order DIPTERA (flies)				
Family Acroceridae	*Acroceridae* sp.	small-headed fly		TDI 2011b
Family Agromyzidae	*Agromyzidae* sp.	leaf miner fly		TDI 2011b
Family Anthomyiidae	*Anthomyiidae* sp.*1*	anthomyiid fly		SCI 2010
	Anthomyzidae sp.	anthomyzid fly B		TDI 2011b
Family Asilidae	*Efferia clementi*	robber fly	SCI-E	Miller 1984a
Family Bibionidae	*Bibionidae* sp.*1*	march fly		SCI 2010
Family Bombyliidae	*Bombylias lucifer*	long-nose bee fly		Navy 1992
	Bombyliidae sp. *1**	bee fly	U	SCI 2010
	Bombyliidae sp. *2**	bee fly	U	SCI 2010
	Bombyliidae sp. *3**	bee fly	U	SCI 2010
	Hemipenthes sp.*	bee fly B		TDI 2011b
Family Calliphoridae	*Calliphoridae* sp. *1**	blow fly	U	SCI 2010
	Calliphoridae sp.	blow fly C		TDI 2011b
	Calliphoridae sp. *2**	blow fly	U	SCI 2010
Family Cecidomyiidae	*Rhopalomyia* sp.*	sagebrush leaf gall midge*		TDI 2011b
	Cecidomyiidae sp.	gall gnat		TDI 2011b
Family Ceratopogonidae	*Ceratopogonidae* sp.	punkies		TDI 2011b
Family Chironomidae	*Chironomidae* sp.	midge		TDI 2011b
Family Chloropidae	*Chloropidae* sp. *1*	frit fly A		TDI 2011b
	Chloropidae sp. *2*	frit fly B		TDI 2011b
Family Coelopidae	*Coelopidae* sp.	seaweed fly		TDI 2011b
Family Dolichopodidae	*Dolichopodidae* sp.	long-legged fly B		TDI 2011b
	Dolichopodidae sp.*1*	long-legged fly		SCI 2010
Family Drosophilidae	*Drosophilidae* sp. *1*	pomace fly A		TDI 2011b
	Drosophilidae sp. *2*	pomace fly B		TDI 2011b
	Drosophilidae sp. *3*	pomace fly C		TDI 2011b
Family Empididae	*Empididae* sp.*1*	dance fly		SCI 2010
	Empididae sp.*2*	dance fly B		TDI 2011b
Family Ephydridae	*Scatella* sp.*	shore fly A		TDI 2011b
	Ephydridae sp.	shore fly B		TDI 2011b
Family Heleomyzidae	*Heleomyzidae* sp.*1*	heleomyzid fly		SCI 2010
Family Lonchaeidae	*Lonchaeidae* sp. *1*	lonchaeid fly		SCI 2010
Family Milichiidae	*Milichiidae* sp.	milichiid fly		TDI 2011b
Family Muscidae	*Muscidae* sp. *1*	muscid fly		SCI 2010
	Muscidae sp. *2*	muscid B		TDI 2011b

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
	Muscidae sp. *3*	muscid D		TDI 2011b
	Muscidae sp. *4*	muscid E		TDI 2011b
Family Mythicomyiidae	*Mythicomyia discreta*	fly		Navy 1992
Family Pallopteridae	*Pallopteridae* sp.	pallopterid fly		TDI 2011b
Family Phoridae	*Phoridae* sp. *1*	hump-backed fly A		TDI 2011b
	Phoridae sp. *2*	hump-backed fly B		TDI 2011b
Family Piophilidae	*Piophilidae* sp. *1*	skipper fly A		TDI 2011b
	Piophilidae sp. *2*	skipper fly B		TDI 2011b
Family Pipunculidae	*Pipunculidae* sp. *1*	big-headed fly		SCI 2010
	Pipunculidae sp. *2*	big-headed fly		SCI 2010
	Pipunculidae sp. *2*	big-headed fly		SCI 2010
Family Psilidae	*Psilidae* sp. *1*	rust fly A		TDI 2011b
	Psilidae sp. *2*	rust fly B		TDI 2011b
Family Sarcophagidae	*Sarcophagidae* sp. *1*	flesh fly		SCI 2010
	Sarcophagidae sp. *2*	flesh fly		SCI 2010
Family Sciaridae	*Sciaridae* sp. *1*	dark-winged fungus gnat		SCI 2010
Family Sciomyzidae	*Sciomyzidae* sp.	marsh fly A		TDI 2011b
Family Sphaeroceridae*	*Sphaeroceridae** sp.	small dung fly*		TDI 2011b
Family Syrphidae	*Copestylum mexicanum*	syrphid fly		SCI 2010
	Syrphidae sp. *1**	syrphid fly	U	SCI 2010
	Syrphidae sp. *2**	syrphid fly	U	SCI 2010
	Syrphidae sp. *3**	syrphid fly	U	SCI 2010
Family Tachinidae	*Tachinidae* sp. *3*	tachinid fly		SCI 2010
	Tachinidae sp. *4*	tachinid fly		SCI 2010
	Tachinidae sp.*1*	tachinid fly		SCI 2010
	Tachinidae sp.*2*	tachinid fly		SCI 2010
	Tachinidae sp.*5*	tachinid fly		SCI 2010
Family Tephritidae	*Euaresta stelligera*			Essig 2012
	Paroxyna genalis			Essig 2012
	Tephiritidae sp. *1**	fruit fly	U	SCI 2010
	Trupanea maculigera			Essig 2012
	Trupanea wheeleri			Essig 2012
Family Therevidae	*Therevidae* sp. *1*	stiletto fly		SCI 2010
Family Tipulidae	*Tipulidae* sp.*1*	crane fly		SCI 2010
	Tipulidae sp.*2*	crane fly		SCI 2010
Family Trixoscelididae	*Trixoscelididae* sp.	trixoscelidid fy		TDI 2011b
Order HEMIPTERA (true bugs)				
Family Alydidae	*Alydidae* sp. *1*	broad-headed bug A		TDI 2011b
	Alydidae sp. *2*	broad-headed bug B		TDI 2011b
	Alydidae sp. *3*	broad-headed bug C		TDI 2011b
	Alydidae sp. *4*	broad-headed bug D		TDI 2011b
	Alydidae sp. *5*	broad-headed bug E		TDI 2011b
	Alydidae sp. *6*	broad-headed bug F		TDI 2011b
	Alydidae sp. *7*	broad-headed bug G		TDI 2011b
	Alydidae sp. *8*	broad-headed bug H		TDI 2011b

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Classification	Species Name	Common Name	Endemic Status	Reference
	Alydidae sp. *9*	broad-headed bug I		TDI 2011b
	Alydidae sp. *10*	broad-headed bug J		TDI 2011b
Family Anthocoridae	*Anthocoridae* sp.	minute pirate bug		TDI 2011b
Family Berytidae	*Acanthophysa echinata**	stilt bug		TDI 2011b
Family Geocoridae	*Geocoridae* sp.	big-eyed bug		TDI 2011b
Family Gerridae	*Gerris remigis*	water strider		SCI 2010
Family Lygaeidae	*Lygaeidae* sp. *1*	seed bug A		TDI 2011b
	Lygaeidae sp. *2*	seed bug B		TDI 2011b
Family Miridae	*Miridae* sp. *1*	leaf bug A		TDI 2011b
	Miridae sp. *2*	leaf bug B		TDI 2011b
	Miridae sp. *3*	leaf bug C		TDI 2011b
	Miridae sp. *4*	leaf bug D		TDI 2011b
	Miridae sp. *5*	leaf bug E		TDI 2011b
	Miridae sp. *6*	leaf bug F		TDI 2011b
	Miridae sp. *7*	leaf bug G		TDI 2011b
	Miridae sp. *8*	leaf bug H		TDI 2011b
	Miridae sp. *1*	plant bug		SCI 2010
Family Nabidae	*Nabidae* sp. *1*	damsel bug A		TDI 2011b
	Nabidae sp. *2*	damsel bug B		TDI 2011b
Family Naucoridae*	*Naucoridae* sp. *	creeping water bug (spider cache)		TDI 2011b
Family Notonectidae	*Notonecta undulata*	backswimmer		SCI 2010
Family Pentatomidae	*Pentatomidae* sp.	stink bug		TDI 2011b
Family Reduviidae	*Reduviidae* sp.	thread-legged bug		TDI 2011b
	Emesinae sp. *1*	assassin bug		SCI 2010
	Emesinae sp. *2*	assassin bug		SCI 2010
	Emesinae sp.*1*	assassin bug		SCI 2010
	Reduviidae sp. *2*	assassin bug		SCI 2010
	Reduviidae sp.*1*	assassin bug		SCI 2010
Family Scutelliridae	*Scutelliridae* sp.*1*	shield-backed bug		SCI 2010
Family Tingidae	*Tingidae* sp.*1*	lace bug		SCI 2010
Order HOMOPTERA (roof-winged insects)				
Family Aleyrodidae	*Aleyrodidae* sp.	white fly		TDI 2011b
Family Aphididae	*Aphididae* sp. *1**	aphid	U	SCI 2010
	Aphididae sp. *2**	aphid	U	SCI 2010
	Aphis rumicis			Essig 2012
Family Cicadellidae	*Cicadellidae* sp. *1*	leaf hopper A		TDI 2011b
	Cicadellidae sp. *2*	leaf hopper AA		TDI 2011b
	Cicadellidae sp. *3*	leaf hopper AB		TDI 2011b
	Cicadellidae sp. *4*	leaf hopper AC		TDI 2011b
	Cicadellidae sp. *5*	leaf hopper B		TDI 2011b
	Cicadellidae sp. *6*	leaf hopper C		TDI 2011b
	Cicadellidae sp. *7*	leaf hopper D		TDI 2011b
	Cicadellidae sp. *8*	leaf hopper E		TDI 2011b
	Cicadellidae sp. *9*	leaf hopper F		TDI 2011b
	Cicadellidae sp. *10*	leaf hopper G		TDI 2011b

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Classification	Species Name	Common Name	Endemic Status	Reference
	Cicadellidae sp. *11*	leaf hopper H		TDI 2011b
	Cicadellidae sp. *12*	leaf hopper I		TDI 2011b
	Cicadellidae sp. *13*	leaf hopper J		TDI 2011b
	Cicadellidae sp. *14*	leaf hopper K		TDI 2011b
	Cicadellidae sp. *15*	leaf hopper L		TDI 2011b
	Cicadellidae sp. *16*	leaf hopper M		TDI 2011b
	Cicadellidae sp. *17*	leaf hopper N		TDI 2011b
	Cicadellidae sp. *18*	leaf hopper O		TDI 2011b
	Cicadellidae sp. *19*	leaf hopper P		TDI 2011b
	Cicadellidae sp. *20*	leaf hopper Q		TDI 2011b
	Cicadellidae sp. *21*	leaf hopper R		TDI 2011b
	Cicadellidae sp. *22*	leaf hopper S		TDI 2011b
	Cicadellidae sp. *23*	leaf hopper T		TDI 2011b
	Cicadellidae sp. *24*	leaf hopper U		TDI 2011b
	Cicadellidae sp. *25*	leaf hopper V		TDI 2011b
	Cicadellidae sp. *26*	leaf hopper W		TDI 2011b
	Cicadellidae sp. *27*	leaf hopper X		TDI 2011b
	Cicadellidae sp. *28*	leaf hopper Y		TDI 2011b
	Cicadellidae sp. *29*	leaf hopper Z		TDI 2011b
Family Cicadidae	*Cicadidae* sp.	cicada		TDI 2011b
Family Cixiidae	*Cixiidae* sp. *1*	cixiid planthopper		SCI 2010
	Cixiidae sp. *2*	cixiid planthopper		SCI 2010
Superfamily Coccoidea	*Coccoidea* sp. *1*	scale insect A		TDI 2011b
	Coccoidea sp. *2*	scale insect B		TDI 2011b
Family Issidae	*Issidae* sp. *1*	issid plant hopper A		TDI 2011b
	Issidae sp. *2*	issid plant hopper B		TDI 2011b
	Issidae sp. *3*	issid plant hopper C		TDI 2011b
	Issidae sp. *4*	issid plant hopper D		TDI 2011b
	Issidae sp. *5*	issid plant hopper E		TDI 2011b
	Issidae sp. *6*	issid plant hopper F		TDI 2011b
	Issidae sp. *7*	issid plant hopper G		TDI 2011b
	Issidae sp. *8*	issid plant hopper H		TDI 2011b
Family Pseudococcidae	*Chorizococcus abroniae*	mealybug		Rust et al. 1985
	Discococcus simplex	mealybug		Rust et al. 1985
	Distichlicoccus salinus	mealybug		Rust et al. 1985
	Ferrisia virgata	mealybug		Rust et al. 1985
	Heliococcus clemente	mealybug	SCI-E	Rust et al. 1985
	Miserococcus arenarius	mealybug		Rust et al. 1985
	Paludicoccus distichlium	mealybug		Rust et al. 1985
	Phenacoccus eschscholtziae	mealybug		Rust et al. 1985
	Phenacoccus solani	mealybug		Rust et al. 1985
	Pseudococcus maritimus	mealybug		Rust et al. 1985
	Pseudococcus obscurus	mealybug		Rust et al. 1985
	Puto yuccae	mealybug		Rust et al. 1985
	Radicoccus kelloggi	mealybug		Rust et al. 1985

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
	Rhizoecus bicirculus	mealybug		Rust et al. 1985
	Rhizoecus subcyperalis	mealybug		Rust et al. 1985
	Spilococcus corticosus	mealybug		Rust et al. 1985
	Spilococcus keiferi	mealybug		Rust et al. 1985
	Trionymus smithii	mealybug		Rust et al. 1985
Family Psyllidae	*Psyllidae* sp. *1*	psyllid A		TDI 2011b
	Psyllidae sp. *2*	psyllid B		TDI 2011b
	Psyllidae sp. *3*	psyllid C		TDI 2011b
	Psyllidae sp. *4*	psyllid D		TDI 2011b
	Psyllidae sp. *5*	psyllid E		TDI 2011b
	Psyllidae sp. *6*	psyllid F		TDI 2011b
Order HYMENOPTERA (membrane-winges insects)				
Family Andrenidae	*Andrena* sp. *3*	mining bee		SCI 2010
	Andrena chlorura	mining bee		Rust et al. 1985
	Andrena sp. *1*	mining bee		SCI 2010
	Andrena sp. *2*	mining bee		SCI 2010
	Andrena submoesta	mining bee		Rust et al. 1985
	Perdita sp.*1*	mining bee		SCI 2010
	Pterosarus californicus	mining bee		Rust et al. 1985
	Andrenidae sp.*1**	mining bee	U	SCI 2010
	Andrenidae sp. *2**	mining bee	U	SCI 2010
Family Anthophoridae	*Anthophora urbana clementina*	common solitary bee	SCI-E	Rust et al. 1985
	Diadasia bituberculata	bee		Rust et al. 1985
	Diadasia opuntiae	bee		Miller 1984a
	Diadasia rinconis	bee		Rust et al. 1985
	Emphropsis sp.	bee		Rust et al. 1985
	Melecta separata	bee		Rust et al. 1985
	Melissodes scotti	bee		Rust et al. 1985
	Nomada formula	bee		Rust et al. 1985
	Synhalonia actuosa	bee		Rust et al. 1985
	Synhalonia lunata	bee		Rust et al. 1985
	Synhalonia tricinctella	bee		Rust et al. 1985
	Xeromelecta californica	bee		Rust et al. 1985
Family Apidae	*Hypochrotaenia formula*	cuckoo bee		Navy 1992
	Anthophora edwardsii	bee		Rust et al. 1985
	Anthophora sp.*3*	bee		SCI 2010
	Anthophora sp.*4*	bee		SCI 2010
	Apis melifera	honeybee		TDI 2011b
	Melecta separata callura	bee		Navy 1992
	Synhalonia (=Eucera) actuosa	solitary bee		Navy 1992
	Apidae sp.*1**	bee	U	SCI 2010
	Apidae sp.*2**	bee	U	SCI 2010
	Apidae sp.*3**	bee	U	SCI 2010
Family Aulacidae	*Aulacidae* sp.*1*	wasp		SCI 2010
Family Bethylidae	*Bethylidae* sp.	bethylid wasp		TDI 2011b

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Family Braconidae	*Braconidae* sp. *1*	braconid wasp A		TDI 2011b
	Braconidae sp. *2*	braconid wasp B		TDI 2011b
	Braconidae sp. *3*	braconid wasp C		TDI 2011b
	Braconidae sp. *4*	braconid wasp D		TDI 2011b
	Braconidae sp. *5*	braconid wasp E		TDI 2011b
Family Ceraphronidae	*Ceraphronidae* sp. *1*	ceraphronid wasp A		TDI 2011b
	Ceraphronidae sp. *2*	ceraphronid wasp B		TDI 2011b
Family Chrysididae	*Chrysididae* sp.*1*	cuckoo wasp		SCI 2010
Family Cynipidae	*Neuroterus saltatorius*	California jumping gall wasp		TDI 2011b
	Cynipidae sp. *1*	gall wasp		TDI 2011b
	Cynipidae sp. *2*	gall wasp		TDI 2011b
Family Diapriidae	*Diariidae* sp. *1*	diapriid wasp		SCI 2010
	Diapriidae sp.	diapriid wasp		TDI 2011b
Family Encyrtidae	*Encyrtidae* sp. *1*	encyrtid wasp A		TDI 2011b
	Encyrtidae sp. *2*	encyrtid wasp B		TDI 2011b
	Encyrtidae sp. *3*	encyrtid wasp C		TDI 2011b
	Encyrtidae sp. *4*	encyrtid wasp D		TDI 2011b
	Encyrtidae sp. *5*	encyrtid wasp E		TDI 2011b
	Encyrtidae sp. *6*	encyrtid wasp F		TDI 2011b
Family Eulophidae	*Eulophidae* sp. *1*	eulophid wasp A		TDI 2011b
	Eulophidae sp. *2*	eulophid wasp B		TDI 2011b
	Eulophidae sp. *3*	eulophid wasp C		TDI 2011b
	Eulophidae sp. *4*	eulophid wasp D		TDI 2011b
	Eulophidae sp. *5*	eulophid wasp E		TDI 2011b
	Eulophidae sp. *6*	eulophid wasp F		TDI 2011b
Family Eupelmidae	*Eupelmidae* sp. *1*	eupelmid wasp		TDI 2011b
	Eupelmidae sp. *2*	eupelmid wasp B		TDI 2011b
Family Eurytomidae	*Eurytomidae* sp.	eurytomid wasp*		TDI 2011b
Family Evaniidae	*Evaniidae* sp.*1*	ensign wasp		SCI 2010
Family Formicidae	*Aphaenogaster patruelis*	spine-waisted ant	CI-E	Miller 1984a; Holway and Ward 2011
	Camponotus bakeri	carpenter Ant	CI-E	Miller 1984a; Holway and Ward 2011
	Camponotus sp. *nr. clarithorax*	carpenter Ant	SCI-E*	Holway and Ward 2011
	Camponotus sp. *nr. semitestaceus*	carpenter Ant	SCI-E*	Holway and Ward 2011
	Dorymyrmex bicolor	bicolor pyramid ant		M. Medina, pers. com. 2009
	Dorymyrmex insanus	pyramid ant		M. Medina, pers. com. 2009
	Formica francoueri	field ant		M. Medina, pers. com. 2009
	Hypoponera CA01			Holway and Ward 2011

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
	Lasius sp.	field ant		TDI 2011b
	Leptothorax sp.*			M. Medina, pers. com. 2009
	Linepithema humile	Argentine ant		M. Medina, pers. com. 2009
	Monomorium ergatogyna			TDI 2011b, Holway and Ward 2011
	Pheidole clementensis	harvester Ant		Holway and Ward 2011
	Pogonomyrmex subnitidus	harvester Ant		M. Medina, pers. com. 2009
	Prenolepis imparis			TDI 2011b
	Solenopsis molesta	thief ant		M. Medina, pers. com. 2009, Holway and Ward 2011
	Solenopsis xyloni	southern fire ant		M. Medina, pers. com. 2009
	Stenamma diecki			Holway and Ward 2011
	Tapinoma sessile	odorous house ant		M. Medina, pers. com. 2009, Holway and Ward 2011
	Temnothorax andrei			TDI 2011b, Holway and Ward 2011
Family Halictidae	*Agapostamon femoratus*	sweat bee		Navy 1992
	Agapostemon texanus	sweat bee		Rust et al. 1985
	Dialictus nevadensis	sweat bee		Rust et al. 1985
	Dialictus sp.*3*	sweat bee		Rust et al. 1985
	Evylaeus avalonensis	sweat bee	CI-E	Rust et al. 1985, Miller 1984a
	Evylaeus nigrescens	sweat bee		Rust et al. 1985
	Halictidae sp. *2**	sweat bee	U	SCI 2010
	Halictidae sp.*3**	sweat bee	U	SCI 2010
Family Ichneumonidae	*Ichneumonidae* sp. *1*	ichneumonid wasp		SCI 2010
	Ichneumonidae sp. *2*	ichneumonid wasp		SCI 2010
	Ichneumonidae sp. *3*	ichneumonid wasp		SCI 2010
	Ichneumonidae sp. *4*	ichneumonid wasp		SCI 2010
	Ichneumonidae sp. *5*	ichneumonid wasp		SCI 2010
Family Megachilidae	*Anthidium collectum*	resin bee		Rust et al. 1985
	Diadasia rinconis	resin bee		Navy 1992
	Osmia clarescens	resin bee		Rust et al. 1985
Family Mutillidae	*Mutillidae* sp.	velvet ant		TDI 2011b
Family Mymaridae	*Mymaridae* sp.	fairy fly		TDI 2011b
Family Platygasteridae	*Platygasteridae* sp.	platygasterid wasp A		TDI 2011b

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Family Pompilidae	*Pompilidae* sp.*1*	spider wasp		SCI 2010
	Pompilidae sp. *2*	spider wasp B		TDI 2011b
	Pompilidae sp. *3*	spider wasp C		TDI 2011b
Family Pteromalidae	*Pteromalidae* sp. *1*	pteromalid wasp A		TDI 2011b
	Pteromalidae sp. *2*	pteromalid wasp B		TDI 2011b
	Pteromalidae sp. *3*	pteromalid wasp C		TDI 2011b
	Pteromalidae sp. *4*	pteromalid wasp D		TDI 2011b
Family Sphecidae	*Ammophila azteca clemente*	thread-waisted wasp	SCI-E	Rust et al. 1985
	Ammophila mcclayi	sphecid wasp		Rust et al. 1985
	Astata bechteli	astatine wasp		Rust et al. 1985
	Bembix americana dugi	sphecid wasp	SCI-E	Rust et al. 1985
	Chlorion aerarium	thread-waisted wasp		SCI 2010
	Chlorion sp.*1*	thread-waisted wasp		SCI 2010
	Diploplectron peglowi	astatine wasp		Rust et al. 1985
	Dryudella rhimpa	astatine wasp		Rust et al. 1985
	Liris argentatus	sphecid wasp		Rust et al. 1985
	Liris beatus	sphecid wasp		Rust et al. 1985
	Microbembex californica	sphecid wasp		Rust et al. 1985
	Miscophus californicus	sphecid wasp		Rust et al. 1985
	Palmodes insularis	thread-waisted wasp	CI-E	Rust et al. 1985
	Podalonia mexicana	sphecid wasp		Rust et al. 1985
	Podalonia valida	sphecid wasp		Rust et al. 1985
	Prionyx thomae	sphecid wasp		Rust et al. 1985
	Sceliphron caementarium	sphecid wasp		Rust et al. 1985
	Solierella sayi	sphecid wasp		Rust et al. 1985
	Sphecidae sp.*1**	sphecid wasp	U	SCI 2010
	Tachysphex texanus	sphecid wasp		Rust et al. 1985
Family Trichogrammatidae	*Trichogrammatidae* sp.	trichogrammatid wasp		TDI 2011b
Unk	*Unk* sp.	unidentified chalcid		TDI 2011b
Family Vespidae	*Vespidae* sp. *1*	vespid wasp		SCI 2010
Order LEPIDOPTERA (moths and butterflies)				
Family Arctiidae	*Grammia nevadensis*	Nevada tiger moth		Essig 2012
	Grammia ornata	ornate tiger moth		Essig 2012
	Grammia virgo	tiger moth		SCI 2010
Family Crambidae	*Noctueliopsis grandis*	snout moth		Navy 1992
Family Depressariidae	*Exaeretia gracilis*			Essig 2012
Family Elachistidae	*Agonopterix toega*	grass miner moth	SCI-E	Miller 1984b
Family Gelechiidae	*Coleotechnites n.* sp.	twirler moth	CI-E	Powell 1994
	Filatima sp.			Essig 2012
	Formosella kincaidella			Essig 2012
	Formosella sistrella			Essig 2012
	Scrobipalpopsis lycii			Essig 2012
	Scrobipalpula n. sp.	twirler moth	CI-E	Powell 1994
	Scrobipalpula n. sp. *nr. chiq-uitella*	twirler moth	CI-E	Powell 1994

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
	Scrobipalpulopsis lycii			Essig 2012
	Tuta chiquitelloides			Essig 2012
Family Gelechioidea	*Vladimiria* n.* sp.	twirler moth	CI-E	Powell 1994
Family Gelichiidae	*Gnorimoschema baccharisella*	baccharis stem gall moth		TDI 2011b
Family Geometridae	*Dichorda**	emerald moth		TDI 2011b
	Pero nr. giganteus	moth	CIe	Powell 1994
	Pterotaea crinigera	moth	SCI-E	Miller 1984b
Family Hesperiidae	*Erynnis funeralis*	funereal dusky-wing butterfly		Navy 1992
Family Lycaenidae	*Brephidium exilis*	pygmy blue butterfly		Navy 1992
	Celastrina echo	echo azure		Navy 1992
	Plebejus acmon acmon	acmon blue		Navy 1992
	Strymon melinus	gray hairstreak		Navy 1992
Family Nepticulidae	*Stigmella n.* sp.	moth	CI-E	Powell 1994
Family Noctuidae	*Sympistis augustus*			Essig 2012
	Agrotis venerabilis arida	cutworm moth		Navy 1992
	Noctua pronuba	European yellow underwing		TDI 2011b
	Noctuidae sp. *2**	moth	U	SCI 2010
	Noctuidae sp. *3**	moth	U	SCI 2010
	Oncocnemis augusta	moth		Navy 1992
	Oncocnemis nita	moth		Navy 1992
	Zosteropoda clementei	moth	CI-E	Miller 1984b
Family Nolidae	*Characoma nilotica*	moth		Navy 1992
Family Nymphalidae	*Vanessa annabella*	west coast lady		Navy 1992
	Vanessa cardui	painted lady		Navy 1992
	Vanessa virginiensis	thistle butterfly		Navy 1992
Family Papilionidae	*Papilio zelicaon*	anise swallowtail		Navy 1992
Family Pieridae	*Colias eurytheme*	alfalfa butterfly		Navy 1992
	Pieris rapae	cabbage butterfly		Navy 1992
	Pontia protodice	checkered white		Navy 1992
Family Pterophoridae	*Pterophoridae* sp.	plume moth		TDI 2011b
Family Scythrididae	*Arotrura longissima*	moth		Essig 2012
Family Sphingidae	*Hyles lineata*	moth		SCI 2010
Family Tortricidae	*Argyrotaenia fraciscana insulana*	moth		Essig 2012
	Phaneta clementeana			Essig 2012
	Phaneta straminiana			Essig 2012
Family Uraniidae	*Uraniidae* sp. *1*	moth		SCI 2010
	Uraniidae sp. *2*	moth		SCI 2010
Family Ypsolophidae	*Cerostoma lyonothamnae*	moth		Navy 1992
	Ypsolopha lyonothamnae	moth	CI-E	Miller 1984b
Order NEUROPTERA (nerve-winged insects)				
Family Chrysopidae	*Chrysopidae* sp.	green lacewing		TDI 2011b
Family Coniopterygidae	*Coniopterygidae* sp.	dusty-wing		TDI 2011b
Family Hemerobiidae	*Hemerobiidae* sp.	brown lacewing		SCI 2010
Family Mantisipid	*Mantisipid* sp.*1*	mantis fly		SCI 2010

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Family Myrmeleontidae	*Myrmeleontidae* sp. *1*	moth		SCI 2010
	Myrmeleontidae sp. *2*	moth		SCI 2010
Family Raphidiidae	*Alena* sp. *1*	snakefly		SCI 2010
	Raphidiidae sp. *1**	snakefly	U	SCI 2010
Family Sisridae	*Sisridae* sp.*1*	spongefly		SCI 2010
Order ODONATA (dragonflies and damselflies)				
Family Calopterygidae	*Calopterygidae* sp. *1*	damsel fly		SCI 2010
	Hetaerina americana	American rubyspot		TDI 2011b
Family Coenagrionidae	*Enallagma civile*			Essig 2012
Order ORTHOPTERA (straight-winged insects)				
Family Acrididae	*Shistocerca nitens nitens*	gray bird grasshopper		Rentz and Weissman 1981
	Leprus intermedius	Saussure's blue-winged grass-hopper		Rentz and Weissman 1981
	Scirtetica clementina	San Clemente grasshopper	SCI-E	Rentz and Weissman 1981
	Trimerotropis fontana	Fontana grasshopper		Rentz and Weissman 1981
	Trimerotropis pallidipennis pal-lidipennis	pallid-winged grasshopper		Rentz and Weissman 1981
	Trimerotropis pseudofasciata	caerulean-winged grasshopper		Rentz and Weissman 1981
Family Blatellidae	*Blatella germanica*	German cockroach		Rentz and Weissman 1981
Family Gryllidae	*Gryllus* sp.	field cricket		Rentz and Weissman 1981
	Hoplosphyrum boreale	long-winged scaly cricket		Rentz and Weissman 1981
	Myrmecophilus oregonensis	Oregon ant cricket		Rentz and Weissman 1981
	Oecanthus argentinus	prairie tree cricket		Rentz and Weissman 1981
Family Raphidophoridae	*Pristoceuthophilus marmoratus*	camel cricket		Rentz and Weissman 1981
Family Stenopelmatidae	*Cnemotettix pulvillifer*	silk-spinning cricket	SCI-E	Rentz and Weissman 1981
Family Tettigoniidae	*Scudderia* sp.*1*	fork-tailed bush katydid		SCI 2010
Order PSOCOPTERA (booklice)				
Family Pseudocaeciliidae	*Pseudocaeciliidae* sp.	pseudocaeciliid bark louse		TDI 2011b
Family Psocidae	*Psocidae* sp. *1*	common bark louse A		TDI 2011b
	Psocidae sp. *2*	common bark louse B		TDI 2011b
Family Trogiidae	*Trogiidae* sp.	trogiid booklouse		TDI 2011b
Order THYSANOPTERA (fringed-winged insects)				
Family Phlaeothripidae	*Phlaeothripidae* sp. *1*	tube-tailed thrips A		TDI 2011b
	Phlaeothripidae sp. *2*	tube-tailed thrips B		TDI 2011b
	Phlaeothripidae sp. *3*	tube-tailed thrips C		TDI 2011b
	Phlaeothripidae sp. *4*	tube-tailed thrips D		TDI 2011b
	Phlaeothripidae sp. *5*	tube-tailed thrips E		TDI 2011b

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Table C-5. Terrestrial Invertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Endemic Status	Reference
Order THYSANURA (silverfish and firebrats)				
Family Lepismatidae	*Lepisma* sp.	silverfish		TDI 2011b
	Lepismatidae sp.	firebrat		TDI 2011b
Family Machilidae	*Machilidae* sp.	jumping bristletail		TDI 2011b
Order TRICHOPTERA (sedge-flies)				
Family Hydroptilidae	*Hydroptilidae* sp. *1*	caddisfly		SCI 2010
Phylum MOLLUSCA: Class GASTROPODA (snails and slugs)				
Family Helminthoplyptidae	*Micrarionta gabbii*	San Clemente Island land snail	SCI-E	Cohen 1979
	Micrarionta intercisa	horseshoe snail	SCI-E	Cohen 1979
	Micrarionta redimita	San Clemente Island land snail	SCI-E	Cohen 1979
Family Pupillidae	*Sterkia clementina*	San Clemente Island blunt-top snail	CI-E	USFWS 1984
	Vertigo californica longa	ribbed california vertigo	CI-E	Cohen 1979
	Vertigo californica cataliniaria	ribbed california vertigo	CI-E	Cohen 1979
Family Physidae	*Catinella rehderi*	chrome ambersnail		Cohen 1979
Family Succineidae	*Catinella oregonensis*			USFWS 1984

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C.5 Terrestrial Vertebrates

Table C-6. Terrestrial vertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Sensitivity	Reference
CARNIVORA (placental mammals)				
Family Canidae	*Urocyon littoralis clementae*	San Clemente Island fox	ST	M. Booker, pers. com. 2011
Family Felidae	**Felis domesticus*	house cat		M. Booker, pers. com. 2011
CHIROPTERA (bats)				
Family Vespertilionidae	*Myotis californicus*	California bat		Brown 1980
	Myotis thysanodes	fringed bat		last observed by von Bloeker 1967
	Plecotus townsendii	Townsend's big-eared bat		last observed by von Bloeker 1967
	Tadarida brasiliensis	Brazilian free-tailed bat		last observed by von Bloeker 1967
RODENTIA (rodents)				
Family Muridae	**Mus musculus*	house mouse		M. Booker, pers. com. 2011
	Peromyscus maniculatus clementis	San Clemente Island deer mouse		M. Booker, pers. com. 2011

FT = Federally Threatened, CSC = California Species of Concern, ST = State Threatened, * = non-native

Table C-6. Terrestrial vertebrates found on San Clemente Island.

Classification	Species Name	Common Name	Sensitivity	Reference
	**Rattus rattus*	black rat		M. Booker, pers. com. 2011
	**Reithrodontomys megalotis*	harvest mouse		M. Booker, pers. com. 2011
SQUAMATA (lizards)				
Family Phrynosomatidae	*Uta stansburiana*	side-blotched lizard		M. Booker, pers. com. 2011
Family Xantusiidae	*Xantusia riversiana*	island night lizard	FT, CSC	M. Booker, pers. com. 2011
FT = Federally Threatened, CSC = California Species of Concern, ST = State Threatened, * = non-native				

C.6 Birds

Table C-7. Bird species on San Clemente Island.

Species Name	Common Name	Sensitivity/Status	Reference
ANSERIFORMES			
Anas acuta	northern pintail	Tr	Sullivan et al. 2005
Anas americana	American wigeon	R/Tr	Sullivan et al. 2005
Anas clypeata	northern shoveler	Tr	Sullivan et al. 2005
Anas crecca	green-winged teal	Tr	Sullivan et al. 2005
Anas cyanoptera	cinnamon teal	Tr	Sullivan et al. 2005
Anas discors	blue-winged teal	Tr	Sullivan et al. 2005
Anas platyrhynchos	mallard	Tr	Sullivan et al. 2005
Anas strepera	gadwall	Tr	Sullivan et al. 2005
Anser albifrons	greater white-fronted goose	(CSC) R/Tr, R/Wr	Sullivan et al. 2005
Aythya affinis	lesser scaup	Tr	Sullivan et al. 2005
Aythya americana	redhead[1]	R	Sullivan et al. 2005
Aythya collaris	ring-necked duck	Tr	Sullivan et al. 2005
Aythya marila	greater scaup	R	Bradley et al. 2011
Aythya valisineria	canvasback[1]	R	J. Stahl, pers. com.
Branta bernicla	black brant	(CSC) R/Tr	Sullivan et al. 2005
Branta canadensis	Canada goose	Tr	Sullivan et al. 2005
Branta hutchinsii	cackling goose	Tr, Wr	Sullivan et al. 2005
Bucephala albeola	bufflehead		J. Stahl, pers. com.
Bucephala clangula	common goldeneye	Wr	Sullivan et al. 2005
Bucephala islandica	Barrow's goldeneye[1]	R	Sullivan et al. 2005
Chen rossii	Ross's goose	R	Sullivan et al. 2005
Melanitta fusca	white-winged scoter[1]	R	Sullivan et al. 2005
Melanitta nigra	black scoter	R	Bradley et al. 2011
Melanitta perspicillata	surf scoter	Wr, Tr	Sullivan et al. 2005
Mergus merganser	common merganser[1]	R	Sullivan et al. 2005
Mergus serrator	red-breasted merganser	Wr, Tr	Sullivan et al. 2005

* non-native species; [1]: unconfirmed sighting without documentation; CSC: California species of concern; BCC: USFWS Birds of Conservation Concern; FE: Federally Endangered; FT: Federally Threatened; SE: State listed, endangered; ST: State Threatened; FP: fully protected (California Department of Fish and Game); CI-E: Channel Islands - endemic; SCI-E: San Clemente Island - endemic; PIF-Partners-in-Flight Species of Concern; Wr: wintering resident; Tr: transient, found during migration; Br: breeds on island; Yr: year-round resident; R: rare; CITES: Convention on International Trade in Endangered Species Wild Fauna and Flora

Table C-7. Bird species on San Clemente Island.

Species Name	Common Name	Sensitivity/Status	Reference
Oxyura jamaicensis	ruddy duck	R/Wr, R/Tr	Sullivan et al. 2005
APODIFORMES			
Aeronautes saxatalis	white-throated swift	Br	Sullivan et al. 2005
Archilochus alexandri	black-chinned hummingbird	Tr	Sullivan et al. 2005
Archilochus colubris	ruby-throated hummingbird[1]	R	Sullivan et al. 2005
Calypte anna	Anna's hummingbird	Wr, Tr, CITES	Sullivan et al. 2005
Calypte costae	Costa's hummingbird	(BCC) Tr, CITES	Sullivan et al. 2005
Chaetura vauxi	Vaux's Swift	Tr	Sullivan et al. 2005
Selasphorus rufus	rufous hummingbird	Tr, CITES, R	Sullivan et al. 2005
Selasphorus sasin sedentarius	Allen's hummingbird	(BCC, CI-E) Br, CITES	Sullivan et al. 2005
Stellula calliope	calliope hummingbird	(BCC) R, CITES	Sullivan et al. 2005
CAPRIMULGIFORMES			
Chordeiles acutipennis	lesser nighthawk	R	J. Stahl, pers. com.
Chordeiles minor	common nighthawk[1]	(PIF) R	Sullivan et al. 2005
Phalaenoptilus nuttallii	common poorwill	Wr, Tr	Sullivan et al. 2005
CHARADRIIFORMES			
Actitis macularius	spotted sandpiper	Wr, Tr	Sullivan et al. 2005
Aphriza virgata	surfbird	Tr	Sullivan et al. 2005
Arenaria interpres	ruddy turnstone	Wr, Tr	Sullivan et al. 2005
Arenaria melanocephala	black turnstone	Wr, Tr	Sullivan et al. 2005
Brachyramphus marmoratus	marbled murrelet		J. Stahl, pers. com.
Calidris alba	sanderling	Wr, Tr	Sullivan et al. 2005
Calidris alpina	dunlin	Tr, Wr	Sullivan et al. 2005
Calidris bairdii	Baird's sandpiper	R/Tr	Sullivan et al. 2005
Calidris canutus	red knot	Tr	Sullivan et al. 2005
Calidris mauri	western sandpiper	Tr	Sullivan et al. 2005
Calidris melanotos	pectoral sandpiper	R/Tr	Sullivan et al. 2005
Calidris minutilla	least sandpiper	Tr	Sullivan et al. 2005
Calidris pusilla	semipalmated sandpiper[1]	R	Bradley et al. 2011
Cepphus columba	pigeon guillemot	Tr	Sullivan et al. 2005
Cerorhinca monocerata	rhinoceros auklet	R/Tr, R/Wr	Sullivan et al. 2005
Charadrius montanus	mountain plover	(BCC, PIF) former Wr	Sullivan et al. 2005
Charadrius nivosus	western snowy plover	(BCC, CSC, FT) Br, Tr, Wr	Sullivan et al. 2005
Charadrius semipalmatus	semipalmated plover	Tr	Sullivan et al. 2005
Charadrius vociferus	killdeer	Tr, Wr	Sullivan et al. 2005
Chlidonias niger	black tern	R	Sullivan et al. 2005
Chroicocephalus Philadelphia	Bonaparte's gull	R/Tr, R/Wr	Sullivan et al. 2005
Fratercula cirrhata	tufted puffin	R	Sullivan et al. 2005
Gallinago delicata	Wilson's snipe	Tr	Sullivan et al. 2005
Haematopus bachmani	black oystercatcher	(BCC, PIF), R/Br, R/Yr	Sullivan et al. 2005
Haematopus palliatus	American oystercatcher[1]	(PIF) R	Sullivan et al. 2005
Himantopus mexicanus	black-necked stilt	Tr, R/Wr	Sullivan et al. 2005
Hydroprogne caspia	Caspian tern	Tr	Sullivan et al. 2005

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Species Name	Common Name	Sensitivity/Status	Reference
Larus argentatus	herring gull	Wr, Tr	Sullivan et al. 2005
Larus belcheri	Belcher's gull		Sullivan and Kershner 2005
Larus californicus	California gull	Wr, Tr	Sullivan et al. 2005
Larus canus	mew gull	R	J. Stahl, pers. com.
Larus delawarensis	ring-billed gull	Tr, Wr	Sullivan et al. 2005
Larus glaucescens	glaucous-winged gull	Tr, Wr	Sullivan et al. 2005
Larus glaucoides	Iceland gull[1]	R	Sullivan et al. 2005
Larus heermanni	Heermann's gull	Yr	Sullivan et al. 2005
Larus hyperboreus	glaucous gull	R	Bradley et al. 2011
Larus occidentalis	western gull	Br, Yr	Sullivan et al. 2005
Larus thayeri	Thayer's gull	Tr, Wr	Sullivan et al. 2005
Leucophaeus atricilla	laughing gull	R	Sullivan et al. 2005
Limnodromus griseus	short-billed dowitcher	(BCC), Tr	Sullivan et al. 2005
Limnodromus scolopaceus	long-billed dowitcher	Tr	Sullivan et al. 2005
Limosa fedoa	marbled godwit	(BCC), Tr	Sullivan et al. 2005
Numenius americanus	long-billed curlew	(BCC, PIF) Tr, Wr	Sullivan et al. 2005
Numenius phaeopus	whimbrel	(BCC), Wr, Tr	Sullivan et al. 2005
Phalaropus fulicarius	red phalarope	R/Tr, R/Wr	Sullivan et al. 2005
Phalaropus lobatus	red-necked phalarope	R/Tr	Sullivan et al. 2005
Phalaropus tricolor	Wilson's phalarope	Tr	Sullivan et al. 2005
Pluvialis fulva	Pacific golden-plover	R/Wr, R/Tr	Sullivan et al. 2005
Pluvialis squatarola	black-bellied plover	Wr, Tr	Sullivan et al. 2005
Ptychoramphus aleuticus	Cassin's auklet	R, Tr	Sullivan et al. 2005
Recurvirostra americana	American avocet	Tr	Sullivan et al. 2005
Rissa tridactyla	black-legged kittiwake	R/Tr, R/Wr	Sullivan et al. 2005
Rynchops niger	black skimmer	(BCC) Tr	Sullivan et al. 2005
Stercorarius longicaudus	long-tailed jaeger	Tr, R	Sullivan et al. 2005
Stercorarius maccormicki	south polar skua	Tr	Sullivan et al. 2005
Stercorarius parasiticus	parasitic jaeger	Tr, Wr	Sullivan et al. 2005
Stercorarius pomarinus	pomarine jaeger	Tr, Wr	Sullivan et al. 2005
Sterna forsteri	Forster's tern	Tr	Sullivan et al. 2005
Sterna hirundo	common tern	Tr	Sullivan et al. 2005
Sterna paradisaea	arctic tern	Tr	Sullivan et al. 2005
Synthliboramphus antiquus	ancient murrelet	Tr, Wr	Sullivan et al. 2005
Synthliboramphus craveri	Craveri's murrelet	Tr	Sullivan et al. 2005
Synthliboramphus hypoleucus	Guadalupe murrelet	(BCC) R/Tr, Br	Sullivan et al. 2005
Synthliboramphus scrippsi	Scripps's murrelet	(BCC, ST) R/Tr, Br	Sullivan et al. 2005
Thalasseus elegans	elegant tern	(PIF) Tr	Sullivan et al. 2005
Thalasseus maximus	royal tern	Tr, Yr	Sullivan et al. 2005
Tringa flavipes	lesser yellowlegs	Tr	Sullivan et al. 2005
Tringa melanoleuca	greater yellowlegs	R/Tr	Sullivan et al. 2005
Tringa incana	wandering tattler	Wr, Tr	Sullivan et al. 2005
Tringa semipalmata	willet	Tr	Sullivan et al. 2005

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Tringa solitaria	solitary sandpiper	R/Tr	Sullivan et al. 2005
Tryngites subruficollis	buff-breasted sandpiper	Tr	Sullivan et al. 2005
Uria aalge	common murre	Tr	Sullivan et al. 2005
Xema sabini	Sabine's gull	R/Tr	Sullivan et al. 2005
CICONIIFORMES			
Ardea alba	great egret	R/Tr	Sullivan et al. 2005
Ardea herodias	great blue heron	R/Yr	Sullivan et al. 2005
Botaurus lentiginosus	America bittern	R/Wr	Bradley et al. 2011
Bubulcus ibis	cattle egret	R/Tr	Sullivan et al. 2005
Butorides virescens	green heron	Tr	Sullivan et al. 2005
Cathartes aura	turkey vulture	R	Sullivan et al. 2005
Egretta thula	snowy egret	Tr	Sullivan et al. 2005
Nycticorax nycticorax	black-crowned night-heron	Tr	Sullivan et al. 2005
Plegadis chihi	white-faced ibis	R	Sullivan et al. 2005
COLUMBIFORMES			
**Columba livia*	rock pigeon	Br, Yr	Sullivan et al. 2005
Columba fasciata	band-tailed pigeon	Tr	Sullivan et al. 2005
**Geopelia cuneata*	diamond dove	R	Sullivan et al. 2005
**Streptopelia chinensis*	spotted dove[1]	R	Sullivan et al. 2005
**Streptopelia decaocto*	Eurasian collared-dove	Tr	Sullivan et al. 2005
Zenaida asiatica	white-winged dove	Tr	Sullivan et al. 2005
Zenaida macroura	mourning dove	Br, Yr	Sullivan et al. 2005
CORACIIFORMES			
Ceryle alcyon	belted kingfisher	Tr, Wr	Sullivan et al. 2005
CUCULIFORMES			
Coccyzus americanus	yellow-billed cuckoo	(BCC, PIF) Tr	Sullivan et al. 2005
FALCONIFORMES			
Accipiter cooperii	Cooper's hawk[1]	CITES, R	Sullivan et al. 2005
Accipiter striatus	sharp-shinned hawk	CITES, R/Wr, R/Tr	Sullivan et al. 2005
Aquila chrysaetos	golden eagle[1]	(FP, PIF), CITES, R	Sullivan et al. 2005
Buteo jamaicensis	red-tailed hawk	Br, Yr, CITES	Sullivan et al. 2005
Buteo lineatus	red-shoulder hawk		J. Stahl, pers. com.
Buteo platypterus	broad-winged hawk	R, CITES	Sullivan et al. 2005
Buteo regalis	ferruginous hawk[1]	R, CITES	Sullivan et al. 2005
Buteo swainsoni	Swainson's hawk[1]	R, CITES	Sullivan et al. 2005
Circus cyaneus	northern harrier	Wr, Tr, CITES	Sullivan et al. 2005
Elanus leucurus	white-tailed kite	(FP) Br, R/Wr,R/Tr, CITES	Sullivan et al. 2005
Falco columbarius	merlin	CITES, Wr, Tr, R	Sullivan et al. 2005
Falco mexicanus	prairie falcon	(PIF) R, CITES	Sullivan et al. 2005
Falco peregrinus	peregrine falcon	(BCC, FP), Br, R/Wr, R/Tr, CITES	Sullivan et al. 2005
Falco sparverius	American kestrel	Br, Yr, CITES	Sullivan et al. 2005
Haliaeetus leucocephalus	bald eagle	(FP, BCC, PIF), CITES, Extirpated as Br, FT, SE, Yr	Sullivan et al. 2005

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Pandion haliaetus	osprey	CITES, Extirpated as Br, R/Tr	Sullivan et al. 2005
GALLIFORMES			
**Alectoris chukar*	chukar	Br, Yr	Sullivan et al. 2005
**Callipepla californica*	California quail	extirpated	Sullivan et al. 2005
**Callipepla gambelii*	Gambel's quail	Br, Yr	Sullivan et al. 2005
GAVIFORMES			
Gavia immer	common loon	R/Tr, R/Wr	Sullivan et al. 2005
Gavia pacifica	Pacific loon	Wr, Tr	Sullivan et al. 2005
Gavia stellata	red-throated loon	Tr, Wr	Sullivan et al. 2005
GRUIFORMES			
Fulica americana	American coot	R/Tr	Sullivan et al. 2005
Porzana carolina	sora	Tr	Sullivan et al. 2005
Rallus limicola	Virginia rail	Tr	Sullivan et al. 2005
PASSERIFORMES			
Agelaius phoeniceus	red-winged blackbird	(CSC) Tr, Wr	Sullivan et al. 2005
Agelaius tricolor	tricolored blackbird	(PIF) Tr	Sullivan et al. 2005
Ammodramus savannarum	grasshopper sparrow	(CSC, PIF) R/Br	Sullivan et al. 2005
Amphispiza bilineata	black-throated sparrow	Tr, Wr	Sullivan et al. 2005
Anthus cervinus	red-throated pipit	R/Tr	Sullivan et al. 2005
Anthus rubescens	American pipit	Wr, Tr	Sullivan et al. 2005
Artemisiospiza belli clementae	San Clemente sage sparrow	(CSC, SCI-E, FT, PIF) Br, Yr	Sullivan et al. 2005
Bombycilla cedrorum	cedar waxwing	Tr, R/Wr	Sullivan et al. 2005
Calamospiza melanocorys	lark bunting	Tr	Sullivan et al. 2005
Calcarius lapponicus	lapland longspur	R/Tr	Sullivan et al. 2005
Calcarius mccownii	McCown's longspur	Tr	Sullivan et al. 2005
Calcarius ornatus	chestnut-collared longspur	Tr, Wr	Sullivan et al. 2005
Campylorhynchus brunneicapillus	cactus wren[1]	(BCC) R	Sullivan et al. 2005
Cardellina canadensis	Canada warbler	Tr	Sullivan et al. 2005
Cardellina pusilla	Wilson's warbler	Tr	Sullivan et al. 2005
**Carduelis carduelis*	European goldfinch	R	Sullivan et al. 2005
Catharus fuscescens	veery		J. Stahl, pers. com.
Catharus guttatus	hermit thrush	Wr, Tr	Sullivan et al. 2005
Catharus ustulatus	Swainson's thrush	Tr	Sullivan et al. 2005
Catherpes mexicanus	canyon wren[1]	R	Sullivan et al. 2005
Certhia americana	brown creeper	R	Bradley et al. 2011
Chondestes grammacus	lark sparrow	Tr	Sullivan et al. 2005
Cistothorus palustris	marsh wren	R/Tr, Wr	Sullivan et al. 2005
Contopus cooperi	olive-sided flycatcher	(BCC, PIF) Tr, R	Sullivan et al. 2005
Contopus sordidulus	western wood-pewee	Tr	Sullivan et al. 2005
Corvus brachyrhynchos	American crow	R	Bradley et al. 2011
Corvus corax	common raven	Br, Yr	Sullivan et al. 2005
Dendorica caerulescens	black-throated blue warbler	Tr	Sullivan et al. 2005
Dolichonyx oryzivorus	bobolink	Tr	Sullivan et al. 2005

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Dumetella carolinensis	gray catbird	Tr	Sullivan et al. 2005
Empidonax difficilis insulicola	Pacific-slope flycatcher	(CI-E) Br, Tr	Sullivan et al. 2005
Empidonax hammondii	Hammond's flycatcher	Tr	Sullivan et al. 2005
Empidonax minimus	least flycatcher	R	Sullivan et al. 2005
Empidonax oberholseri	dusky flycatcher	R/Tr	Sullivan et al. 2005
Empidonax traillii	willow flycatcher	(BCC, SE) R/Tr	Sullivan et al. 2005
Empidonax wrightii	gray flycatcher	R/Tr	Sullivan et al. 2005
Eremophila alpestris insularis	horned lark	(CI-E) Br, Yr	Sullivan et al. 2005
Euphagus carolinus	rusty blackbird	(PIF) Tr, Wr	Sullivan et al. 2005
Euphagus cyanocephalus	Brewer's blackbird	Wr, Tr	Sullivan et al. 2005
Geothlypis philadelphia	mourning warbler[1]	R	Sullivan et al. 2005
Geothlypis tolmiei	Macgillivray's warbler	R/Tr	Sullivan et al. 2005
Geothlypis trichas	common yellowthroat	(BCC, CSC) Tr	Sullivan et al. 2005
Haemorhous cassinii	Cassin's finch	R	Bradley et al. 2011
Haemorhous mexicanus clementis	San Clemente house finch	(CI-E) Br, Yr	Sullivan et al. 2005
Haemorhous purpureus	purple finch	Tr	Sullivan et al. 2005
Hirundo rustica	barn swallow	Br, Tr	Sullivan et al. 2005
Icteria virens	yellow-breasted chat	Tr	Sullivan et al. 2005
Icterus bullockii	Bullock's oriole	Tr	Sullivan et al. 2005
Icterus cucullatus	hooded oriole	Tr	Sullivan et al. 2005
Icterus galbula	Baltimore oriole	Tr	Sullivan et al. 2005
Icterus parisorum	Scott's oriole	Tr, Wr	Sullivan et al. 2005
Icterus spurius	orchard oriole	Tr	Sullivan et al. 2005
Ixoreus naevius	varied thrush	Tr, Wr	Sullivan et al. 2005
Junco hyemalis	dark-eyed junco	Wr, Tr	Sullivan et al. 2005
Lanius ludovicianus mearnsi	San Clemente loggerhead shrike	(CSC, FE, SCI-E, PIF) Br, Yr	Sullivan et al. 2005
Luscinia svecica	bluethroat	R/Wr	Bradley and Stahl 2010
Melospiza georgiana	swamp sparrow	R/Wr	Bradley and Stahl 2010
Melospiza lincolnii	Lincoln's sparrow	R/Wr, Tr	Sullivan et al. 2005
Melospiza melodia	song sparrow	(CSC) R	Sullivan et al. 2005
Melospiza melodia clementae	San Clemente song sparrow	(CI-E) extirpated on SCI	Sullivan et al. 2005
Mimus polyglottos	northern mockingbird	Br, Yr	Sullivan et al. 2005
Mniotilta varia	black-and-white warbler	Tr	Sullivan et al. 2005
Molothrus aeneus	bronzed cowbird	R	Sullivan et al. 2005
Molothrus ater	brown-headed cowbird	Tr	Sullivan et al. 2005
Myadestes townsendi	Townsend's solitaire	R/Tr, Wr	Sullivan et al. 2005
Myiarchus cinerascens	ash-throated flycatcher	R/Tr	Sullivan et al. 2005
Myiodynastes luteiventris	sulphur-bellied flycatcher[1]	R	Sullivan et al. 2005
Oreothlypis celata	orange-crowned warbler	Tr, Br	Sullivan et al. 2005
Oreothlypis celata sordida	dusky orange-crowned warbler	(CI-E) Br	Sullivan et al. 2005
Oreothlypis luciae	Lucy's warbler	(PIF) Tr	Sullivan et al. 2005
Oreoscoptes montanus	sage thrasher	(BCC, PIF) R/Wr, Tr	Sullivan et al. 2005
Oreothlypis peregrina	Tennessee warbler	Tr	Sullivan et al. 2005

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Oreothlypis ruficapilla	Nashville warbler	Tr	Sullivan et al. 2005
Parkesia noveboracensis	northern waterthrush	Tr	Sullivan et al. 2005
**Passer domesticus*	house sparrow	Br, Yr	Sullivan et al. 2005
Passerculus sandwichensis	Savannah sparrow	(CSC) Wr, Tr	Sullivan et al. 2005
Passerella iliaca	fox sparrow	Wr, Tr	Sullivan et al. 2005
Passerina amoena	lazuli bunting	R/Br, Tr	Sullivan et al. 2005
Passerina caerulea	blue grosbeak	R/Tr	Sullivan et al. 2005
Passerina ciris	painted bunting	(PIF) Tr	Sullivan et al. 2005
Passerina cyanea	indigo bunting	R/Tr	Sullivan et al. 2005
Petrochelidon pyrrhonota	cliff swallow	R/Tr	Sullivan et al. 2005
Peucaea cassinii	Cassin's sparrow	R	Sullivan et al. 2005
Phainopepla nitens	phainopepla	R/Tr	Sullivan et al. 2005
Pheucticus ludovicianus	rose-breasted grosbeak	R/Tr	Sullivan et al. 2005
Pheucticus melanocephalus	black-headed grosbeak	Tr	Sullivan et al. 2005
Pipilo chlorurus	green-tailed towhee	(BCC) Tr	Sullivan et al. 2005
Pipilo maculatus	spotted towhee	(BCC, CSC) Wr, Tr	Sullivan et al. 2005
Pipilo maculatus clementae	San Clemente (spotted) towhee	(CI-E) extirpated on SCI, R/Wr, R/Tr	Sullivan et al. 2005
Piranga flava	hepatic tanager[1]	R	Bradley et al. 2011
Piranga ludoviciana	Western tanager	Tr	Sullivan et al. 2005
Piranga olivacea	scarlet tanager	Tr	Sullivan et al. 2005
Piranga rubra	summer tanager	Tr	Sullivan et al. 2005
Plectrophenax nivalis	snow bunting	R	Sullivan et al. 2005
Polioptila caerulea	blue-gray gnatcatcher	Wr, Tr	Sullivan et al. 2005
Pooecetes gramineus	vesper sparrow	(CSC) Wr, Tr	Sullivan et al. 2005
Progne subis	purple martin	Tr	Sullivan et al. 2005
Protonotaria citrea	prothonotary warbler	R	Sullivan et al. 2005
Pyrocephalus rubinus	vermilion flycatcher	R/Tr	Sullivan et al. 2005
Regulus calendula	ruby-crowned kinglet	R/Wr, Tr	Sullivan et al. 2005
Regulus satrapa	golden-crowned kinglet	Tr	Sullivan et al. 2005
Riparia riparia	bank swallow	(ST) Tr	Sullivan et al. 2005
Salpinctes obsoletus	rock wren	Br, Yr	Sullivan et al. 2005
Saxicola torquatus	stonechat	R	Sullivan et al. 2005
Sayornis nigricans	black phoebe	R/Wr, R/Tr, Br	Sullivan et al. 2005
Sayornis phoebe	eastern phoebe	R	Bradley et al. 2011
Sayornis saya	Say's phoebe	Wr, Tr	Sullivan et al. 2005
Seiurus aurocapillus	ovenbird	Tr	Sullivan et al. 2005
Setophaga americana	northern parula	Tr	Sullivan et al. 2005
Setophaga castanea	bay-breasted warbler	Tr	Sullivan et al. 2005
Setophaga citrina	hooded warbler	R/Tr	Bradley and Stahl 2010
Setophaga coronata	yellow-rumped warbler	R/Wr, Tr	Sullivan et al. 2005
Setophaga discolor	prairie warbler	(PIF) Tr	Sullivan et al. 2005
Setophaga dominica	yellow-throated warbler	R	Sullivan et al. 2005

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Setophaga fusca	Blackburnian warbler	Tr	Sullivan et al. 2005
Setophaga magnolia	magnolia warbler	Tr	Sullivan et al. 2005
Setophaga nigrescens	black-throated gray warbler	Tr	Sullivan et al. 2005
Setophaga occidentalis	hermit warbler	Tr	Sullivan et al. 2005
Setophaga palmarum	palm warbler	Tr, Wr	Sullivan et al. 2005
Setophaga pensylvanica	chestnut-sided warbler	Tr	Sullivan et al. 2005
Setophaga petechia	yellow warbler	(BCC) Tr	Sullivan et al. 2005
Setophaga ruticilla	American redstart	Tr	Sullivan et al. 2005
Setophaga striata	blackpoll warbler	R/Tr	Sullivan et al. 2005
Setophaga tigrina	Cape May warbler	R	Sullivan et al. 2005
Setophaga townsendi	Townsend's warbler	R/Wr, Tr	Sullivan et al. 2005
Setophaga virens	black-throated green warbler	Tr	Sullivan et al. 2005
Sialia currucoides	mountain bluebird	R/Wr, R/Tr	Sullivan et al. 2005
Sialia mexicana	western bluebird	R	Bradley et al. 2011
Sitta canadensis	red-breasted nuthatch	Tr	Sullivan et al. 2005
Spinus lawrencei	Lawrence's goldfinch	(BCC) Tr	Sullivan et al. 2005
Spinus pinus	pine siskin	R/Tr	Sullivan et al. 2005
Spinus psaltria	lesser goldfinch	Tr, R/Wr	Sullivan et al. 2005
Spinus tristis	American goldfinch	Tr	Sullivan et al. 2005
Spiza americana	dickcissel	(PIF) Tr	Sullivan et al. 2005
Spizella arborea	American tree sparrow	Tr	Sullivan et al. 2005
Spizella atrogularis	black-chinned sparrow	(BCC) R/Tr, R/Br	Sullivan et al. 2005
Spizella breweri	Brewer's sparrow	(BCC) Tr	Sullivan et al. 2005
Spizella pallida	clay-colored sparrow	Tr	Sullivan et al. 2005
Spizella passerina	chipping sparrow	R/Br, Wr, Tr	Sullivan et al. 2005
Stelgidopteryx serripennis	northern rough-winged swallow	R/Tr	Sullivan et al. 2005
Sturnella neglecta	western meadowlark	Br, Yr	Sullivan et al. 2005
**Sturnus vulgaris*	European starling	Br, Yr	Sullivan et al. 2005
Tachycineta bicolor	tree swallow	Tr	Sullivan et al. 2005
Tachycineta thalassina	violet-green swallow	Tr	Sullivan et al. 2005
Tarsiger cyanurus	red-flanked bluetail		J. Stahl, pers. com.
Thryomanes bewickii	Bewick's wren	extinct Br, R	Sullivan et al. 2005
Thryomanes bewickii leucophrys	San Clemente Bewick's wren	Extinct	Sullivan et al. 2005
Toxostoma bendirei	Bendire's thrasher	(PIF) Tr	Sullivan et al. 2005
Toxostoma rufum	brown thrasher	R	Sullivan et al. 2005
Troglodytes aedon	house wren	R/Wr, Tr	Sullivan et al. 2005
Turdus migratorius	American robin	Wr, Tr	Sullivan et al. 2005
Tyrannus forficatus	scissor-tailed flycatcher	Tr	Sullivan et al. 2005
Tyrannus melancholicus	tropical kingbird	Tr	Sullivan et al. 2005
Tyrannus tyrannus	eastern kingbird	Tr	Sullivan et al. 2005
Tyrannus verticalis	western kingbird	Tr	Sullivan et al. 2005
Tyrannus vociferans	Cassin's kingbird	R/Tr, Wr	Sullivan et al. 2005
Vermivora pinus	blue-winged warbler[1]	(PIF) R	Sullivan et al. 2005

* non-native species; [1]: unconfirmed sighting without documentation; CSC: California species of concern; BCC: USFWS Birds of Conservation Concern; FE: Federally Endangered; FT: Federally Threatened; SE: State listed, endangered; ST: State Threatened; FP: fully protected (California Department of Fish and Game); CI-E: Channel Islands - endemic; SCI-E: San Clemente Island - endemic; PIF-Partners-in-Flight Species of Concern; Wr: wintering resident; Tr: transient, found during migration; Br: breeds on island; Yr: year-round resident; R: rare; CITES: Convention on International Trade in Endangered Species Wild Fauna and Flora

Table C-7. Bird species on San Clemente Island.

Species Name	Common Name	Sensitivity/Status	Reference
Vermivora virginiae	Virginia's warbler	(BCC) R/Tr	Sullivan et al. 2005
Vireo bellii	Bell's vireo	(BCC) R	Sullivan et al. 2005
Vireo cassinii	Cassin's vireo	Tr/R	Sullivan et al. 2005
Vireo flavifrons	yellow-throated vireo	Tr	Sullivan et al. 2005
Vireo flavoviridis	yellow-green vireo	Tr	Sullivan et al. 2005
Vireo gilvus	warbling vireo	Tr	Sullivan et al. 2005
Vireo huttoni	Hutton's vireo	(CSC) Tr	Sullivan et al. 2005
Vireo olivacens	red-eyed vireo	Tr	Sullivan et al. 2005
Vireo philadelphicus	Philadelphia vireo	Tr	Sullivan et al. 2005
Vireo vicinior	gray vireo[1]	(BCC, PIF) R	Sullivan et al. 2005
Xanthocephalus xanthocephalus	yellow-headed blackbird	Tr	Sullivan et al. 2005
Zonotrichia albicollis	white-throated sparrow	Tr	Sullivan et al. 2005
Zonotrichia atricapilla	golden-crowned sparrow	Wr, Tr	Sullivan et al. 2005
Zonotrichia leucophrys	white-crowned sparrow	Wr, Tr	Sullivan et al. 2005
Zonotrichia querula	Harris's sparrow	(PIF) Tr, Wr	Sullivan et al. 2005
PELECANIFORMES			
Pelecanus erythrorhynchos	American white pelican[1]	R	Sullivan et al. 2005
Pelecanus occidentalis californicus	California brown pelican	(FP) Yr, Br	Sullivan et al. 2005
Phaethon aethereus	red-billed tropicbird	R/Tr	Sullivan et al. 2005
Phalacrocorax auritus	double-crested cormorant	Br, Yr	Sullivan et al. 2005
Phalacrocorax pelagicus	pelagic comorant	Wr, Tr	Sullivan et al. 2005
Phalacrocorax penicillatus	Brandt's cormorant	Br, Yr	Sullivan et al. 2005
Sula dactylatra	masked booby	Tr	Sullivan et al. 2005
Sula leucogaster	brown booby	R	Sullivan et al. 2005
Sula nebouxii	blue-footed booby	R	Sullivan et al. 2005
PHOENICIFORMES			
**Phoenicopterus* sp.	flamingo sp.[1]	R	Sullivan et al. 2005
PICIFORMES			
Colaptes auratus	northern flicker	Wr, Tr	Sullivan et al. 2005
Melanerpes formicivorus	acorn woodpecker	Tr, R	Sullivan et al. 2005
Melanerpes lewis	Lewis's woodpecker	(PIF) Tr	Sullivan et al. 2005
Sphyrapicus ruber	red-breasted sapsucker	Tr	Sullivan et al. 2005
Sphyrapicus nuchalis	red-naped sapsucker	Tr	Sullivan et al. 2005
PODICIPEDIIFORMES			
Aechmophorus clarkii	Clark's grebe	Tr	Sullivan et al. 2005
Aechmophorus occidentalis	western grebe	Tr, Wr	Sullivan et al. 2005
Podiceps auritus	horned grebe	Tr, R	Sullivan et al. 2005
Podiceps grisegena	red-necked grebe[1]	R	Sullivan et al. 2005
Podiceps nigricollis	eared grebe	Wr, Tr	Sullivan et al. 2005
Podilymbus podiceps	pied-billed grebe	R	Sullivan et al. 2005
PROCELLARIIFORMES			
Calonectris leucomelas	streaked shearwater[1]	R	Sullivan et al. 2005
Fulmarus glacialis	northern fulmar	Tr, Wr	Sullivan et al. 2005

* non-native species; [1]: unconfirmed sighting without documentation; CSC: California species of concern; BCC: USFWS Birds of Conservation Concern; FE: Federally Endangered; FT: Federally Threatened; SE: State listed, endangered; ST: State Threatened; FP: fully protected (California Department of Fish and Game); CI-E: Channel Islands - endemic; SCI-E: San Clemente Island - endemic; PIF-Partners-in-Flight Species of Concern; Wr: wintering resident; Tr: transient, found during migration; Br: breeds on island; Yr: year-round resident; R: rare; CITES: Convention on International Trade in Endangered Species Wild Fauna and Flora

Table C-7. Bird species on San Clemente Island.

Species Name	Common Name	Sensitivity/Status	Reference
Oceanites oceanicus	Wilson's storm-petrel	R	Sullivan et al. 2005
Oceanodroma homochroa	ashy storm-petrel	(BCC, PIF) Tr	Sullivan et al. 2005
Oceanodroma leucorhoa	Leach's storm-petrel	Tr	Sullivan et al. 2005
Oceanodroma melania	black storm-petrel	Tr	Sullivan et al. 2005
Oceanodroma microsoma	least storm-petrel	Tr	Sullivan et al. 2005
Phoebastria immutabilis	laysan albatross	Tr	Sullivan et al. 2005
Phoebastria nigripes	black-footed albatross	(BCC) Tr	Sullivan et al. 2005
Pterodroma ultima	Murphy's petrel	R	Sullivan et al. 2005
Puffinus bulleri	Buller's shearwater	Tr	Sullivan et al. 2005
Puffinus carneipes	flesh-footed shearwater	Tr	Sullivan et al. 2005
Puffinus creatopus	pink-footed shearwater	(BCC) Tr, Wr	Sullivan et al. 2005
Puffinus griseus	sooty shearwater	Tr, Wr	Sullivan et al. 2005
Puffinus opisthomelas	black-vented shearwater	Tr, Wr	Sullivan et al. 2005
Puffinus puffinus	Manx shearwater	Tr, R	Sullivan et al. 2005
Puffinus tenuirostris	short-tailed shearwater	Tr	Sullivan et al. 2005
STRIGIFORMES			
Asio flammeus	short-eared owl	R/Wr, R/Tr, CITES	Sullivan et al. 2005
Asio otus	long-eared owl	Tr, CITES	Sullivan et al. 2005
Athene cunicularia	burrowing owl	(BCC) Wr, Tr, CITES	Sullivan et al. 2005
Tyto alba	barn owl	Br, Yr, CITES	Sullivan et al. 2005

* non-native species; [1]: unconfirmed sighting without documentation; CSC: California species of concern; BCC: USFWS Birds of Conservation Concern; FE: Federally Endangered; FT: Federally Threatened; SE: State listed, endangered; ST: State Threatened; FP: fully protected (California Department of Fish and Game); CI-E: Channel Islands - endemic; SCI-E: San Clemente Island - endemic; PIF-Partners-in-Flight Species of Concern; Wr: wintering resident; Tr: transient, found during migration; Br: breeds on island; Yr: year-round resident; R: rare; CITES: Convention on International Trade in Endangered Species Wild Fauna and Flora

C.7 Marine Vertebrates and Relatives

Table C-8. Marine vertebrates around San Clemente Island.

Classification	Scientific Name	Common Name	Sensitivity	Reference
ACTINOPTERYGII (ray-finned fishes)				
Family Apogonidae	*Apogon guadalupensis*	Guadalupe cardinalfish		Engle and Richards 2001
	Apogon pacificus	pink cardinalfish		Engle and Richards 2001
Family Atherinidae	*Atherinidae* sp.	silversides		Engle 1993
Family Atherinopsidae	*Atherinops affinis*	topsmelt		CRM 1998
Family Aulorhynchidae	*Aulorhynchus flavidus*	tubesnout		Engle 1993
Family Balistidae	*Balistes polylepis*	finescale triggerfish		Engle unpubl.
Family Bathymasteridae	*Rathbunella hypoplecta*	stripedfin ronquil		Engle unpubl.
Family Blenniidae	*Hypsoblennius* sp.	combtooth blenny		Engle unpubl.
Family Bythitidae	*Grammonus diagrammus*	purple brotula		Engle unpubl.
Family Carangidae	*Decapterus scombrinus*	Mexican scad		Engle unpubl.
	Seriola lalandi	yellowtail		CRM 1998
	Trachurus symmetricus	jack mackerel		Engle 1993
Family Chaenopsidae	*Chaenopsis alepidota*	orangethroat pikeblenny		Engle unpubl.

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Table C-8. Marine vertebrates around San Clemente Island.

Classification	Scientific Name	Common Name	Sensitivity	Reference
	Neoclinus blanchardi	sarcastic fringehead		Engle unpubl.
	Neoclinus stephensae	yellowfin fringehead		Engle unpubl.
Family Chaetodontidae	*Prognathodes falcifer*	scythe butterfly		Engle and Richards 2001
Family Clinidae	*Alloclinus holderi*	island kelpfish		NPS 2004
	Gibbonsia sp.	kelpfish		NPS 2004
	Gibbonsia elegans	spotted kelpfish		Engle unpubl.
	Heterostichus rostratus	giant kelpfish		NPS 2004
Family Clupeidae	*Clupea pallasii*	Pacific herring		FishBase
	Sardinops sagax	Pacific sardine		Engle unpubl.
Family Cottidae	*Artedius* sp.	sculpin		Engle unpubl.
	Artedius corallinus	coralline sculpin		Engle 1993
	Artedius harringtoni	scalyhead sculpin		Engle unpubl.
	Clinocottus analis	woolly sculpin		Engle unpubl.
	Clinocottus recalvus	bald sculpin		Engle unpubl.
	Leiocottus hirundo	lavender sculpin		Engle 1993
	Orthonopias triacis	snubnose sculpin		NPS 2004
	Ruscarius creaseri	roughcheek sculpin		Engle unpubl.
	Scorpaenichthys marmoratus	cabezon		NPS 2004
Family Embiotocidae	*Brachyistius frenatus*	kelp surfperch		NPS 2004
	Cymatogaster aggregata	shiner perch		Engle 1993
	Embiotoca jacksoni	black surfperch		NPS 2004
	Embiotoca lateralis	striped surfperch		NPS 2004
	Hyperprosopon argenteum	walleye surfperch		Engle unpubl.
	Hypsurus caryi	rainbow surfperch		NPS 2004
	Micrometrus minimus	dwarf perch		Engle unpubl.
	Phanerodon sp.	surfperch		Engle 1993
	Phanerodon atripes	sharpnose surfperch		Engle unpubl.
	Phanerodon furcatus	white surfperch		Engle unpubl.
	Rhacochilus toxotes	rubberlip surfperch		Engle 1993
	Rhacochilus vacca	pile perch		NPS 2004
Family Engraulidae	*Engraulis mordax*	northern anchovy		Engle unpubl.
Family Exocoetidae	*Cheilopogon pinnatibarbatus californicus*	California flyingfish		Engle unpubl.
Family Gobiesocidae	*Gobiesox* sp.	clingfish		Engle unpubl.
Family Gobiidae	*Lythrypnus dalli*	blue-banded goby		NPS 2004
	Lythrypnus zebra	zebra goby		NPS 2004
	Rhinogobiops nicholsii	blackeyed goby		NPS 2004
Family Haemulidae	*Anisotremus davidsonii*	sargo		Engle 1993
	Xenistius californiensis	salema		Engle 1993
Family Hexagrammidae	*Ophiodon elongatus*	lingcod		Engle unpubl.
	Oxylebius pictus	painted greenling		NPS 2004
Family Kyphosidae	*Girella nigricans*	opaleye		NPS 2004
	Hermosilla azurea	zebra perch		Engle 1993
	Medialuna californiensis	halfmoon		NPS 2004
Family Labridae	*Halichoeres semicinctus*	rock wrasse		NPS 2004
	Oxyjulis californica	señorita		NPS 2004

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Table C-8. Marine vertebrates around San Clemente Island.

Classification	Scientific Name	Common Name	Sensitivity	Reference
	Semicossyphus pulcher	California sheephead		NPS 2004
Family Labrisomidae	*Paraclinus integripinnis*	reef finspot		Engle unpubl.
Family Malacanthidae	*Caulolatilus princeps*	ocean whitefish		NPS 2004
Family Merlucciidae	*Merluccius productus*	north Pacific hake		Lowry et al. 1990
Family Molidae	*Mola mola*	ocean sunfish		Engle unpubl.
Family Muraenidae	*Gymnothorax mordax*	California moray eel		NPS 2004
Family Ophidiidae	*Chilara taylori*	spotted cusk-eel		Engle unpubl.
Family Paralichthyidae	*Citharichthys* sp.	sanddab		Engle unpubl.
	Paralichthys californicus	California halibut		CRM 1998
Family Pleuronectidae	*Eopsetta jordani*	petrale sole		FishBase
	Glyptocephalus zachirus	rex sole		Lowry et al. 1990
	Lyopsetta exilis	slender sole		Lowry et al. 1990
	Microstomas pacificus	dover sole		Lowry et al. 1990
	Pleuronichthys sp.	flatfish		Engle unpubl.
	Pleuronichthys coenosus	c-o sole		Engle 1993
Family Pomacentridae	*Azurina hirundo*	swallow damselfish		Engle and Richards 2001
	Chromis punctipinnis	blacksmith		NPS 2004
	Hypsypops rubincundus	garibaldi		NPS 2004
Family Sciaenidae	*Atractoscion nobilis*	white sea bass		Engle unpubl.
	Cheilotrema saturnum	black croaker		CRM 1998
Family Scombridae	*Sarda chiliensis*	Pacific bonito		Engle unpubl.
	Scomber japonicus	Pacific mackerel		Engle unpubl.
	Thunnus alalunga	albacore		Childers et al. 2011
	Thunnus thynnus	bluefin tuna		Kitagawa et al. 2007
Family Scorpaenidae	*Scorpaena guttata*	California scorpionfish		NPS 2004
	Scorpaena xyris	rainbow scorpionfish		Engle and Richards 2001
Family Sebastidae	*Sebastes atrovirens*	kelp rockfish		NPS 2004
	Sebastes auriculatus	brown rockfish		Engle unpubl.
	Sebastes carnatus	gopher rockfish		NPS 2004
	Sebastes caurinus	copper rockfish		Engle 1993
	Sebastes chrysomelas	black and yellow rockfish		Engle 1993
	Sebastes constellatus	starry rockfish		Engle unpubl.
	Sebastes entomelas	widow rockfish		FishBase
	Sebastes jordani	shortbelly rockfish		Field et al. 2007
	Sebastes miniatus	vermilion rockfish		FishBase
	Sebastes mystinus	blue rockfish		TDI 2010
	Sebastes paucispinis	bocaccio		Engle unpubl.
	Sebastes rastrelliger	grass rockfish		Engle 1993
	Sebastes rosaceus	rosy rockfish		Engle unpubl.
	Sebastes serranoides	olive rockfish		NPS 2004
	Sebastes serriceps	treefish		NPS 2004
Family Serranidae	*Paralabrax clathratus*	kelp bass		NPS 2004
	Paralabrax maculatofasciatus	spotted sandbass		Engle unpubl.
	Paralabrax nebulifer	barred sandbass		CRM 1998
	Stereolepis gigas	giant black sea bass		NPS 2004

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Table C-8. Marine vertebrates around San Clemente Island.

Classification	Scientific Name	Common Name	Sensitivity	Reference
Family Sphraenidae	*Sphyraena argentea*	Pacific barracuda		CRM 1998
Family Syngnathidae	*Syngnathus* sp.	pipefish		Engle unpubl.
Family Xiphiidae	*Xiphias gladius*	swordfish		Dewar et al. 2011
Family Zoarcidae	*Lycodes cortezianus*	bigfin eelpout		Lowry et al. 1990
ELASMOBRANCHII (sharks, rays, and skates)				
Family Alopiidae	*Alopias vulpinus*	thresher shark		Preti et al. 2004
Family Carcharhinidae	*Carcharodon carcharias*	great white shark	CITES	Weng et al. 2007
Family Cetorhinidae	*Cetorhinus maximus*	basking shark	CITES	J. Bredvik pers. com.
Family Heterodontiformes	*Galeorhinus galeus*	soupfin shark		NPS 2004
Family Lamnidae	*Heterodontus francisci*	horned shark		Engle 1993
	Lamna ditropis	salmon shark		Weng et al. 2008
Family Myliobatidae	*Myliobatis californica*	bat ray		NPS 2004
Family Rhinocodontidae	*Rhincodon typus*	whale shark		J. Bredvik pers. com.
Family Scyliorhinidae	*Cephaloscyllium ventriosum*	swell shark		NPS 2004
Family Squalidae	*Squalus acanthias*	spiny dogfish		FishBase
Family Squatinidae	*Squatina californica*	Pacific angelshark		Engle 1993
Family Torpedinidae	*Torpedo californica*	Pacific electric ray		Engle unpubl.
Family Triakidae	*Prionace glauca*	blue shark		Preti et al. 2012
	Triakis semifasciata	leopard shark		NPS 2004
FISSIPEDIA				
Family Mustelidae	*Enhydra lutris nereis*	southern sea otter	FT, FP, CITES	Carretta et al. 2000
MYSTICETI (baleen whales)				
Family Balaenidae	*Balaenoptera acutorostrata*	Minke whale		Carretta et al. 2000
	Balaenoptera borealis	Sei whale	FE	DoN 2009
	Balaenoptera edeni	Bryde's whale		DoN 2009
	Balaenoptera musculus	blue whale	FE	Carretta et al. 2000
	Balaenoptera physalus	fin whale	FE	Carretta et al. 2000
	Eschrichtius robustus	gray whale		Carretta et al. 2000
	Eubalaena glacialis	north Pacific right whale	FE, FP	Carretta et al. 1994
	Megaptera novaengiliae	humpback whale	FE	Carretta et al. 2000
ODONTOCETI (toothed whales)				
Family Delphinidae	*Delphinus capensis*	long-beaked common dolphin	CITES	DoN 2009
	Delphinus delphis	short-beaked common dolphin	CITES	Carretta et al. 2000
	Globicephala macrorhynchus	short-finned pilot whale	CITES	Hall et al. 1971
	Grampus griseus	Risso's dolphin	CITES	Carretta et al. 2000
	Lagenorhynchus obliquidens	Pacific white-sided dolphin	CITES	Carretta et al. 2000
	Lissodelphis borealis	northern right whale dolphin	CITES	Carretta et al. 2000
	Orcinus orca	killer whale	CITES	IWS 2005
	Pseudorca crassidens	false killer whale	CITES	DoN 2009
	Stenella attenuata	pantropical spotted dolphin	CITES	DoN 2009
	Stenella coeruleoalba	striped dolphin	CITES	DoN 2009
	Stenella longirostris	spinner dolphin	CITES	DoN 2009
	Steno bredanensis	rough-toothed dolphin	CITES	DoN 2009
	Tursiops truncatus	Pacific bottlenose dolphin	CITES	Carretta et al. 2000
Family Phocoenidae	*Phocoenoides dalli*	Dall's porpoise	CITES	Carretta et al. 2000

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Table C-8. Marine vertebrates around San Clemente Island.

Classification	Scientific Name	Common Name	Sensitivity	Reference
Family Physeteridae	*Kogia breviceps*	pygmy sperm whale	CITES	DoN 2009
	Kogia sima	dwarf sperm whale	CITES	DoN 2009
	Physeter macrocephalus	sperm whale	FE, CITES	DoN 2009
Family Zipiidae	*Berardius bairdii*	Baird's beaked whale	CITES	DoN 2009
	Mesoplodon spp.	Mesoplodont beaked whales	CITES	DoN 2009
	Ziphius cavirostris	Cuvier's beaked whale	CITES	Falcone et al. 2009
PINNIPEDIA (fin-footed mammals)				
Family Otariidae	*Arctocephalus townsendi*	Guadalupe fur seal	FT, CITES	M. Lowry pers. com.
	Callorhinus ursinus	northern fur seal		DoN 2009
	Eumetopias jubatus	Steller sea lion	FE	M. Lowry pers. com.
	Zalophus californianus	California sea lion		Carretta et al. 2000
Family Phocidae	*Mirounga angustirostris*	northern elephant seal	FP	Carretta et al. 2000
	Phoca vitulina richardsi	Pacific harbor seal		Carretta et al. 2000
TESTUDINES (turtles)				
Family Cheloniidae	*Caretta caretta*	loggerhead sea turtle	FT/FE, CITES	J. Bredvik pers. com.
	Chelonia mydas	green sea turtle	FT/FE, CITES	D. Lerma, pers. com. 2011
	Lepidochelys olivacea	olive ridley sea turtle	FT/FE, CITES	J. Bredvik pers. com.
Family Dermochelyidae	*Dermochelys coriacea*	leatherback sea turtle	FE, CITES	Bailey et al. 2012

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C.8 Marine Invertebrates

Table C-9. Marine invertebrates found around San Clemente Island.

Classification	Species name	Common name	Reference
Anopla (marine worms)			
Family Valenciniidae	*Baseodiscus punnetti*		Engle unpubl.
Anthozoa (anemones and corals)			
Family Actiniidae	*Anthopleura artemisia*	burrowing anemone	NPS 2004
	Anthopleura elegantissima	aggreagate anemone	CRM 1998
	Anthopleura sola	aggregating anemone	NPS 2004
	Anthopleura xanthogrammica	giant green anemone	Murray and Littler 1974
	Epiactis prolifera	brooding anemone	NPS 2004
	Phyllactis sp.		Engle unpubl.
	Tealia sp.		Engle unpubl.
	Urticina coriacea	leathery anemone	NPS 2004
	Urticina lofotensis	white-spotted rose anemone	NPS 2004
	Urticina piscivora	fish-eating anemone	Engle unpubl.
Family Boloceroididae	*Bunodeopsis* sp.		Engle and Richards 2001
Family Caryophylliidae	*Coenocyathus bowersi*	colonial cup coral	Engle unpubl.
	Paracyathus stearnsii	brown cup coral	NPS 2004
Family Clavulariidae	*Clavularia* sp.	octocoral	Engle unpubl.
Family Corallimorphidae	*Corynactis californica*	strawberry anemone	TDI 2010

* = Federally Endangered; ^ = Listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Table C-9. Marine invertebrates found around San Clemente Island.

Classification	Species name	Common name	Reference
Family Dendrophylliidae	*Balanophyllia elegans*	orange cup coral	NPS 2004
Family Epizoanthidae	*Epizoanthus* sp.		Engle unpubl.
Family Gorgoniidae	*Eugorgia rubens*	purple gorgonian	NPS 2004
	Lophogorgia chilensis	red gorgonian	NPS 2004
Family Halcampidae	*Cactosoma* sp.	prickly anemone	NPS 2004
	Cactosoma arenarium	prickly anemone	Engle unpubl.
	Halcampa decemtentaculata	ten-tenacle burrowing anemone	NPS 2004
Family Haloclavidae	*Harenactis attenuata*	giant burrowing anemone	Engle unpubl.
Family Isanthidae	*Isanthus* sp.		Engle unpubl.
	Zaolutus actius	wormy anemone	NPS 2004
Family Metridiidae	*Metridium exile*		Engle unpubl.
Family Plexauridae	*Muricea californica*	brown gorgonian	NPS 2004
	Muricea fruticosa	octocoral	NPS 2004
Family Parazoanthidae	*Parazoanthus lucificum*	zoanthid anemone	Engle unpubl.
Family Renillidae	*Renilla koellikeri*	Koelliker's sea pansy	Engle unpubl.
Family Rhizangiidae	*Astrangia haimei*	colonial cup coral	NPS 2004
Family Sagartia	*Sagartia catalinensis*	white sea pen	Engle unpubl.
Family Virgulariidae	*Stylatula elongata*	white sea pen	Engle unpubl.
Asteroidea (sea stars)			
Family Asteriidae	*Astrometis sertulifera*	fragile rainbow star	NPS 2004
	Orthasterias koehleri	long-armed star	Engle unpubl.
	Patiria miniata	bat star	NPS 2004
	Pisaster brevispinus	pink sea star	Engle unpubl.
	Pisaster ochraceus	purple sea star	Engle unpubl.
	Pisaster giganteus	giant-spined sea star	NPS 2004
	Pycnopodia helianthoides	sunflower sea star	NPS 2004
Family Astropectinidae	*Astropecten armatus*	spiny sand star	Engle unpubl.
Family Echinasteridae	*Henricia leviuscula*	Pacific blood star	Engle unpubl.
Family Ophidiasteridea	*Linckia columbiae*	fragile star	NPS 2004
Bivalvia (bivalves and clams)			
Family Anomiidae	*Monio macrochisma*	abalone jingle	CRM 1998
Family Cardiidae	*Dallocardia quadragenaria*		Engle unpubl.
Family Cardioidea	*Ctenocardia biangulata*		Engle unpubl.
Family Chamidae	*Chama arcana*	secret jewelbox	NPS 2004
	Pseudochama exogyra	Pacific jewelbox	Engle unpubl.
Family Hiatellidae	*Hiatella arctica*	wrinkled rock borer	Engle unpubl.
	Panopea generosa	Pacific geoduck clam	Engle unpubl.
Family Limidae	*Limaria hemphilli*	hemphill fileclam	Engle unpubl.
Family Lucinidae	*Epilucina californica*	California lucine	Engle unpubl.
Family Mytilidae	*Adula falcatoides*		Engle unpubl.
	Mytilus californianus	California mussel	Merkel & Associates 2007
	Mytilus edulis	blue mussel	Engle unpubl.
	Septifer bifurcatus	bifurcate mussel	Engle unpubl.
	Brachidontes adamsianus	Adams mussel	Engle unpubl.
	Lithophaga plumula	feather datemussel	Engle unpubl.

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Table C-9. Marine invertebrates found around San Clemente Island.

Classification	Species name	Common name	Reference
Family Pectinidae	*Crassedoma giganteum*	giant rock scallop	NPS 2004
Family Pholadidae	*Chaceia ovoidea*	wartneck piddock	Engle unpubl.
	Penitella penita	common piddock	Engle unpubl.
Family Pteriidae	*Pteria sterna*	Pacific wing-oyster	Engle and Richards 2001
Family Semelidae	*Semele decisa*	clipped semele	NPS 2004
Family Solecurtidae	*Tagelus* sp.	tagelus	Engle unpubl.
	Tagelus subteres	lesser tagelus	Engle unpubl.
Family Tellinidae	*Macoma secta*	white-sand macoma	Engle unpubl.
Family Veneridae	*Globivenus fordii*	Venus clam	Engle unpubl.
	Pitar newcombianus	newcomb pitar	Engle unpubl.
Calcarea (calcareous sponges)			
Family Amphoriscidae	*Leucilla nuttingi*	Nutting's sponge	NPS 2004
Family Clathrinidae	*Clathrina coriacea*		Engle unpubl.
	Guancha blanca	sponge	NPS 2004
Family Grantiidae	*Leucandra* sp.		Engle unpubl.
	Leucandra losangelensis		Engle unpubl.
Family Leucosoleniidae	*Leucosolenia eleanor*		NPS 2004
Family Sycettidae	*Sycon* sp.		Engle unpubl.
	Sycon ciliatum		Engle unpubl.
Cephalopoda (octopuses and squids)			
Family Octopodidae	*Octopus* sp.	octopus	Engle unpubl.
	Octopus bimaculatus	two-spotted octopus	Murray and Littler 1974, NPS 2004
	Octopus rubescens	red octopus	Engle unpubl.
Cirripedia (barnacles)			
Family Archaeobalanidae	*Conopea galeata*		Engle unpubl.
Family Balanidae	*Balanus* sp.		NPS 2004
	Balanus glandula	barnacle	Merkel & Associates 2007
	Balanus trigonus	triangle barnacle	Engle unpubl.
	Megabalanus californicus	acorn barnacle	NPS 2004
Family Chthamalidae	*Chthamalus fissus*	barnacle	CRM 1998
	Chthamalis dalli	barnacle	CRM 1998
Family Scalpellidae	*Pollicipes polymerus*	goose neck barnacle	Murray and Littler 1974
Family Tetraclitidae	*Tetraclita rubescens*	red barnacle	Merkel & Associates 2007
	Tetraclita squamosa		Murray and Littler 1974
Echinoidea (sea urchins and sand dollars)			
Family Arbaciidae	*Arbacia stellata*	sea urchin	Engle and Richards 2001
Family Dendrasteridae	*Dendraster* sp.		Engle unpubl.
	Dendraster excentricus	sand dollar	Merkel & Associates 2007
Family Diadematidae	*Centrostephanus coronatus*	crowned sea urchin	NPS 2004
Family Loveniidae	*Lovenia cordiformis*	heart urchin	Engle unpubl.
Family Strongylocentrotidae	*Strongylocentrotus franciscanus*	common red sea urchin	NPS 2004
	Strongylocentrotus purpuratus	common purple sea urchin	NPS 2004

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Classification	Species name	Common name	Reference
Family Toxopneustidae	*Lytechinus anamesus*	white sea urchin	TDI 2010
Enopla (marine worms)			
Family Emplectonematidae	*Paranemertes peregrina*	purple ribbon worm	Engle unpubl.
Demospongiae (sponges)			
Family Acarnidae	*Acarnus* sp.		NPS 2004
	Acarnus erithacus		Engle unpubl.
Family Clionaidae	*Cliona* sp.		NPS 2004
	Cliona californiana	boring sponge	Engle unpubl.
	Spheciospongia confoederata	gray moon sponge	Engle unpubl.
Family Chalinidae	*Haliclona* sp.		NPS 2004
	Haliclona cinerea		Engle unpubl.
Family Dysideidae	*Dysidea amblia*		Engle unpubl.
Family Darwinellidae	*Aplysilla glacialis*		Engle unpubl.
Family Hymedesmiidae	*Hymenamphiastra cyanocrypta*	cobalt sponge	NPS 2004
Family Myxillidae	*Lissodendoryx topsenti*	sponge	NPS 2004
Family Niphatidae	*Amphimedon trindanea*	root beer sponge	Engle unpubl.
Family Petrosiidae	*Amphimedon trindanea*		NPS 2004
Family Raspailiinae	*Endectyon hyle*		Engle unpubl.
Family Stellettidae	*Stelletta estrella*	sponge	Engle unpubl.
	Penares cortius	sponge	NPS 2004
Family Tethyidae	*Tethya aurantium*	orange puffball sponge	NPS 2004
Gastropoda (gastropods, slugs, and snails)			
Family Acmaeidae	*Notoacmea paleacea*	surfgrass limpet	
	Notoacmea scutum	plate limpet	
Family Acteonidae	*Rictaxis punctocaelatus*		Engle unpubl.
Family Aegiridae	*Aegires albopunctatus*	white-spotted dorid	Engle unpubl.
Family Aeolidiidae	*Aeolidia papillosa*	shag rug nudibranch	Engle unpubl.
	Phidiana pugnax		NPS 2004
	Spurilla chromosoma	frosted spurilla	Engle unpubl.
Family Aglajidae	*Navanax inermis*		NPS 2004
Family Aplysiidae	*Aplysia californica*	California brown sea hare	TDI 2010
	Aplysia vaccaria	black sea hare	Engle unpubl.
Family Arminidae	*Armina californica*	striped nudibranch	Engle unpubl.
Family Buccinidae	*Kelletia kelletii*	Kellet's whelk	NPS 2004
Family Bullidae	*Bulla gouldiana*	California bubble	Engle unpubl.
Family Bursidae	*Crossata ventricosa*		Engle unpubl.
Family Cadlinidae	*Aldisa sanguinea*	blood-spot doris	Engle unpubl.
	Cadlina flavomaculata	yellow-spot cadlina	Engle unpubl.
	Cadlina luteomarginata	yellow-edged cadlina	NPS 2004
Family Calliostomatidae	*Calliostoma annulatum*	ringed top snail	Engle unpubl.
	Calliostoma canaliculatum	channeled topsnail	Engle unpubl.
	Calliostoma gloriosum	glorious topsnail	Engle unpubl.
	Calliostoma supragranosum	granulated top snail	Engle unpubl.
Family Calyptraeidae	*Crepidula* sp.	slipper limpet	NPS 2004
	Crepidula dorsata		Engle unpubl.

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Classification	Species name	Common name	Reference
	Crepipatella lingulata	Pacific half-slippersnail	NPS 2004
	Crucibulum spinosum	spiny cup-and-saucer snail	Engle unpubl.
Family Cancellariidae	*Cancellaria cooperii*	Cooper's nutmeg	Engle unpubl.
Family Cerithiopsidae	*Seila montereyensis*		Engle unpubl.
Family Chromodorididae	*Chromodoris macfarlandi*	MacFarland's chromodorid	Engle unpubl.
	Hypselodoris californiensis	California blue doris	Engle unpubl.
	Mexichromis porterae	Porter's chromodorid	Engle unpubl.
Family Columbellidae	*Alia carinata*	carinate dove shell	Engle unpubl.
	Amphissa versicolor		Engle unpubl.
Family Conidae	*Conus californicus*	California cone	NPS 2004
Family Cypraeidae	*Neobernaya spadicea*	chestnut cowrie	NPS 2004
Family Dendrodorididae	*Dendrodoris* sp.		Engle unpubl.
	Doriopsilla albopunctata	white-spotted sea goddess	NPS 2004
Family Discodorididae	*Diaulula sandiegensis*	leopard nutibranch	Engle unpubl.
	Jorunna pardus	leopard jorunna	Engle unpubl.
	Montereina nobilis		Engle unpubl.
	Rostanga pulchra	red sea slug	Engle unpubl.
	Thordisa bimaculata	two-spot thordis	Engle unpubl.
Family Doridiidae	*Conualevia alba*	white dorid	Engle unpubl.
Family Facelinidae	*Hermissenda crassicornis*	opalescent nudibranch	NPS 2004
Family Fasciolariidae	*Fusinus kobelti*	Kobelt's spindle	Engle unpubl.
Family Fissurellidae	*Diodora* sp.	limpet	Engle unpubl.
	Fissurella volcano	volcano keyhole limpet	Murray and Littler 1974
	Megathura crenulata	giant keyhole limpet	NPS 2004
Family Flasbellinidae	*Babakina festiva*	single-stalk aeolis	Engle unpubl.
	Flabellina iodinea	spanish shawl	Engle unpubl.
Family Fusininae	*Fusinus kobelti*	Kobelt's spindle	NPS 2004
	Fusinus luteopictus	painted spindle	NPS 2004
Family Haliotididae	*Haliotis corrugata*	pink abalone	NPS 2004
	*Haliotis cracherodii**	black abalone	Murray and Littler 1974
	Haliotis fulgens	green abalone	NPS 2004
	Haliotis rufescens	red abalone	TDI 2010
	*Haliotis sorensoni**	white abalone	Behrens and Lafferty 2005
Family Haminoeidae	*Haminoea virescens*	green glassy-bubble	Engle unpubl.
Family Hipponicidae	*Blepharipoda occidentalis*	mole crab	Merkel & Associates 2007
	Emerita analoga	mole crab	Merkel & Associates 2007
	Hipponix sp.	hoofsnail	Engle unpubl.
Family Littorinidae	*Littorina planaxis*	gastropod	Murray and Littler 1974
	Littorina scutulata	checkered periwinkle	Merkel & Associates 2007
Family Lottiidae	*Collisella conus*	limpet	Murray and Littler 1974
	Collisella digitalis	ribbed limpet	Murray and Littler 1974
	Collisella limatula	file limpet	CRM 1998
	Collisella scabra	rough limpet	Murray and Littler 1974

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Classification	Species name	Common name	Reference
	Collisella strigatella	strigated limpet	CRM 1998
	Lottia digitalis	limpet	Merkel & Associates 2007
	Lottia gigantea	owl limpet	Merkel & Associates 2007
	Lottia insessa	limpet	Murray and Littler 1974
	Lottia scabra	limpet	Merkel & Associates 2007
Family Marginellidae	*Volvarina taeniolata*	California marginella	Engle unpubl.
Family Mitridae	*Mitra idae*	Ida's miter	NPS 2004
Family Muricidae	*Acanthina* sp.	unicorn snails	Engle unpubl.
	Ceratostoma foliatum	leafy hornmouth	NPS 2004
	Ceratostoma nuttalli	gastropod	NPS 2004
	Maxwellia gemma	gem murex	NPS 2004
	Maxwellia santarosana	Santa Rosa murex	Engle unpubl.
	Nucella sp.	dog winkles	Engle unpubl.
	Ocenebra circumtexta	circled rocksnail	Engle unpubl.
	Pteropurpura festiva	feastive murex	Engle unpubl.
	Pteropurpura macroptera	frill-wing murex	Engle unpubl.
	Pteropurpura trialata	western three-wing murex	Engle unpubl.
Family Nassariidae	*Nassarius* sp.	nassa mud snail	Engle unpubl.
Family Naticidae	*Polinices* sp.	moon snail	Engle unpubl.
Family Olivellidae	*Olivella biplicata*	purple dwarf olive	Engle unpubl.
Family Onchidoridiidae	*Acanthodoris brunnea*	brown spiny doris	Engle unpubl.
	Acanthodoris rhodoceras	black-tipped spiny doris	Engle unpubl.
Family Ovulidae	*Simnia vidleri*	Vidler's simnia	Engle unpubl.
Family Pediculariidae	*Pedicularia californica*	sea snail	Engle unpubl.
Family Phasianellidae	*Tricolia* sp.	sea snail	Engle unpubl.
Family Pleurobranchidae	*Berthella californica*	white berthella	Engle unpubl.
	Berthellina engeli	orange blob	Engle unpubl.
	Pleurobranchus areolatus	nudibranch	Engle and Richards 2001
Family Polyceridae	*Limacia cockerelli*	Cockerell's dorid	Engle unpubl.
	Polycera atra	orange-spike polycera	Engle unpubl.
	Triopha catalinae	clown nudibranch	Engle unpubl.
Family Pseudomelatomidae	*Pseudomelatoma* sp.		Engle unpubl.
	Megasurcula carpenteriana	carpenter's turris	Engle unpubl.
Family Tergipedidae	*Cuthona lagunae*	orange-face cuthona	Engle unpubl.
Family Trimusculidae	*Trimusculus* sp.	button snails	Engle unpubl.
Family Triphoridae	*Triphora* sp.		Engle unpubl.
Family Tritoniidae	*Tritonia festiva*	diamondback tritonia	Engle unpubl.
Family Trochidae	*Norrisia norrisi*	norrissnail	NPS 2004
	Tegula aureotincta	guilded turban snail	NPS 2004
	Tegula eiseni	banded tegula	NPS 2004
	Tegula funebralis	black tegula	CRM 1998
	Tegula gallina	speckled tegula	Engle unpubl.
	Tegula regina	queen tegula	NPS 2004

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Classification	Species name	Common name	Reference
Family Turbiniidae	*Astraea undosa*	wavy tequila turbo snail	Engle unpubl.
	Homalopoma luridum	dark dwarf-turban	NPS 2004
	Lithopoma gibberosum	red turban snail	NPS 2004
	Lithopoma undosum	wavy turban snail	NPS 2004
Family Tylodinidae	*Tylodina fungina*	yellow umbrella snail	Engle unpubl.
Family Vermetidae	*Dendropoma lituella*	flat wormsnail	Engle unpubl.
	Petaloconchus montereyensis	Monterey wormsnail	Engle unpubl.
	Serpulorbis squamigerus	scaled-tube snail	NPS 2004
Gymnolaemata (bryozoans)			
Family Aeteidae	*Aetea* sp.		NPS 2004
Family Antroporidae	*Antropora tincta*		Engle unpubl.
Family Bugulidae	*Bugula* sp.		NPS 2004
	Bugula californica		NPS 2004
Family Candidae	*Scrupocellaria* sp.		Engle unpubl.
Family Diaperoeciidae	*Diaperoecia californica*	southern staghorn bryozoan	NPS 2004
Family Eurystomellidae	*Eurystomella* sp.		Engle unpubl.
	Eurystomella bilabiata	red bryozoan	NPS 2004
Family Membraniporidae	*Membranipora* sp.		NPS 2004
	Membranipora membranacea	kelp encrusting bryozoan	NPS 2004
	Membranipora tuberculata	kelp encrusting bryozoan	NPS 2004
Family Phidoloporidae	*Phidolopora* sp.		NPS 2004
	Ryhnchozoon sp.		Engle unpubl.
	Ryhnchozoon rostratum	colonial bryozoan	CRM 1998
Family Schizoporellidae	*Hippodiplosia insculpta*	fluted bryozoan	NPS 2004
Family Smittinidae	*Mucronella major*	colonial bryozoan	CRM 1998
	Parasmittina sp.		Engle unpubl.
Family Thalamoporellidae	*Thalamoporella californica*		NPS 2004
Holothurioidea (sea cucumbers)			
Family Cucumariidae	*Cucumaria* sp.		Engle unpubl.
	Cucumaria salma	white sea cucumber	Engle unpubl.
Family Sckeridactylidae	*Pachythyone rubra*	aggregated red sea cucumber	NPS 2004
Family Sclerodactylidae	*Eupentacta quinquesemita*	white sea cucumber	Engle unpubl.
Family Stichopodidae	*Parastichopus californicus*	California sea cucumber	CRM 1998
	Parastichopus parvimensis	warty sea cucumber	NPS 2004
Hydrozoa (hydralike animals, hydroids, and hydrozoans)			
Family Aglaopheniidae	*Aglaophenia* sp.		Engle unpubl.
	Aglaophenia struthionoides	hydroid	CRM 1998
Family Bougainvilliidae	*Garveia annulata*	golden hydroid	Engle unpubl.
Family Campanulariidae	*Obelia* sp.		NPS 2004
Family Cerianthidae	*Campanularia* sp.		Engle unpubl.
	Pachycerianthus fimbriatus	tube-dwelling anemone	NPS 2004
Family Corymorphidae	*Corymorpha* sp.		Engle unpubl.
Family Eudendriidae	*Eudendrium californicum*		Engle unpubl.
Family Halopteridídae	*Antenella avalonia*		NPS 2004
Family Hydractiniidae	*Hydractinia* sp.		Engle unpubl.

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Classification	Species name	Common name	Reference
	Hydractinia milleri	hedgehog hydroid	NPS 2004
Family Physophoridae	*Physophora hydostatica*		Engle unpubl.
Family Plumulariidae	*Plumularia* sp.		NPS 2004
	Lytocarpus nuttingi		NPS 2004
Family Sertulariidae	*Abietinaria* sp.		Engle unpubl.
	Sertularella sp.		Engle unpubl.
	Sertularia sp.		Engle unpubl.
Family Stylasteridae	*Stylantheca papillosa*^		Engle unpubl.
	Stylaster californicus^	California hydrocoral	TDI 2010
Family Tubulariidae	*Tubularia* sp.		Engle unpubl.
Malacostraca (crabs, krill, pill bugs, shrimp, and relatives)			
Family Alpheidae	*Alpheus* sp.	snapping shrimp	Engle unpubl.
	Betaeus harfordi	abalone visored shrimp	Engle unpubl.
	Betaeus macginitieae	urchin visored shrimp	NPS 2004
Family Cancridae	*Cancer antennarius*	rock crab	
Family Cirolanidae	*Cirolana harfordi*	speckled pill bug	Engle unpubl.
	Excirolana chiltoni	isopod	Merkel & Associates 2007
Family Crangonidae	*Crangon* sp.	shrimp	Engle unpubl.
Family Diogenidae	*Paguristes* sp.		NPS 2004
Family Epialtidae	*Herbstia parvifrons*	crevice spider crab	NPS 2004
	Loxorhynchus crispatus	decorator crab	Engle unpubl.
	Loxorhynchus grandis	sheep crab	Engle unpubl.
	Pelia tumida	dwarf teardrop crab	Engle unpubl.
	Pugettia dalli	spined kelp crab	Engle unpubl.
	Pugettia gracilis	graceful kelp crab	
	Pugettia producta	northern kelp crab	NPS 2004
	Scyra acutifrons	sharp-nosed crab	Engle unpubl.
	Taliepus nuttallii	southern kelp crab	Engle unpubl.
Family Grapsidae	*Pachygrapsus crassipes*	striped shore crab	CRM 1998
Family Hemisquillidae	*Hemisquilla ensigera*	panamic mantis shrimp	Engle and Richards 2001
Family Hippolytidae	*Heptacarpus* sp.	shrimp	Engle unpubl.
	Lysmata californica	Catalina cleaner shrimp	NPS 2004
Family Idoteidae	*Idotea* sp.		Engle unpubl.
	Idotea urotoma		Engle unpubl.
Family Inachidae	*Stenorhynchus debilis*	panamic arrow crab	Engle and Richards 2001
Family Leucosiidae	*Randallia ornata*	globose sand crab	Engle unpubl.
Family Ligiidae	*Ligia occidentalis*	isopod	CRM 1998
Family Paguridae	*Pagurus* sp.		NPS 2004
	Pagurus hirsutiusculus	hairy hermit crab	
	Pagurus samuelis	blueband hermit crab	Murray and Littler 1974
	Phimochirus californiensis	hermit crab	NPS 2004
	Pylopagurus sp.	hermit crab	Engle unpubl.
Family Palinuridae	*Panulirus interruptus*	California spiny lobster	NPS 2004
Family Porcellanidae	*Pachycheles rudis*	lumpy porcelain crab	Engle unpubl.
	Petrolisthes sp.	porcelain crab	Engle unpubl.

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Classification	Species name	Common name	Reference
	Polyonyx quadriungulatus	western tube crabg	Engle unpubl.
Family Portunidae	*Portunus xantusii*	Xantus swimming crab	Engle unpubl.
Family Talitridae	*Megalorchestia spp.*	amphipod	Merkel & Associates 2007
Family Xanthidae	*Cycloxanthops novemdentatus*	ninetooth pebble crab	Engle unpubl.
	Lophopanopeus sp.	crab	Engle unpubl.
	Lophopanopeus bellus	blackclaw crestleg crab	
	Lophopanopeus leucomanus heathi	knobknee crestleg crab	
	Paraxanthias taylori	lumpy rubble crab	NPS 2004
Ophiuroidea (brittle and basket stars)			
Family Amphiuridae	*Amphiodia occidentalis*	long-armed brittle star	Engle unpubl.
Family Ophiactidae	*Ophiactis simplex*		Engle unpubl.
Family Ophiocomidae	*Ophiopsila californica*		Engle unpubl.
	Ophiopteris papillosa	flat-spined brittle star	NPS 2004
Family Ophiodermatidae	*Ophiothrix spiculata*	spiny brittle star	TDI 2010
	Ophioderma panamensis	panian serpent star	NPS 2004
	Ophioplocus esmarki	Esmark's brittle star	NPS 2004
Family Ophionereididae	*Ophionereis annulata*		Engle unpubl.
Phoronida (horseshoe worms)			
	Phoronis ijimai		Engle unpubl.
Polychaeta (paddle-footed annelids and polychaetes)			
Family Chaetopteridae	*Chaetopterus variopedatus*	parchment worm	NPS 2004
	Spiochaetopterus costarum	spionid worm	CRM 1998
Family Cirratulidae	*Dodecaceria fewkesi*	colonial tube worm	NPS 2004
Family Hesionidae	*Ophiodromus pugettensis*	bat star worm	Engle unpubl.
Family Onuphidae	*Diopatra ornata*	ornate tube worm	TDI 2010
Family Opheliidae	*Euzonus mucronata*	bloodworm	Merkel & Associates 2007
Family Polynoidae	*Arctonoe pulchra*	red commensal scaleworm	NPS 2004
	Arctonoe vittata	red banded scaleworm	NPS 2004
	Malmgreniella lunulata		Engle unpubl.
Family Sabellidae	*Eudistylia polymorpha*	giant feather duster worm	Engle unpubl.
	Myxicola infundibulum	jelly tube worm	Engle unpubl.
	Phragmatopoma californica	colonial sand-tube snail	TDI 2010
Family Serpulidae	*Salmacina tribranchiata*	annelid	NPS 2004
	Spirobranchus spinosus	annelid	NPS 2004
	Paradexiospira sp.	annelid	NPS 2004
Family Spionidae	*Polydora alloporis*		Engle unpubl.
Family Terebellidae	*Pista elongata*	filamentous pad worm	NPS 2004
Polyplacophora (primitive mollusks)			
Family Chaetopleuridae	*Chaetopleura gemma*		Engle unpubl.
Family Ischnochitonidae	*Lepidozona* sp.		NPS 2004
	Stenoplax conspicua		Engle unpubl.
Family Mopaliidae	*Mopalia muscosa*	chiton	Engle unpubl.
	Placiphorella velata	veiled chiton	Engle unpubl.

* = Federally Endangered; ^ = Listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Table C-9. Marine invertebrates found around San Clemente Island.

Classification	Species name	Common name	Reference
Family Tonicellidae	*Cyanoplax cryptica*	Gould's baby chiton	Engle unpubl.
	Cyanoplax hartwegii	chiton	Murray and Littler 1974
	Nuttallina fluxa	southern spiny chiton	Murray and Littler 1974
Polythalamea (foraminifera)			
Family Allogromiidae	*Allogromia ovoidea*		Engle unpubl.
Family Homotrematidae	*Homotrema rubra*	red tree foram	Engle unpubl.
Rhabditophora (flat worms)			
Family Euryleptidae	*Eurylepta aurantiaca*		Engle unpubl.
	Praestheceraeus bellostriatus		NPS 2004
Family Notoplanidae	*Notoplana* sp.	flatworm	Engle unpubl.
Family Prosthiostomidae	*Enchiridium punctatum*	flatworms	Engle unpubl.
Family Pseudocerotidae	*Pseudoceros montereyensis*	monterey flatworm	Engle unpubl.
	Pseudoceros perviolaceus	racing stripe flatworm	Engle unpubl.
	Thysanozoon californicum		Engle unpubl.
Family Stylochidae	*Stylochus insolitus*	oyster leech	Engle unpubl.
Scyphozoa (jellyfish)			
Family Pelagiidae	*Chrysaora colorata*	purple-striped jelly	Engle unpubl.
Stenolaemata (marine bryozoans)			
Family Lichenoporidae	*Lichenopora novae-zelandiae*		NPS 2004
Tunicata (Tunicates)			
Family Didemnidae	*Tridemnum opacum*		Engle unpubl.
Family Clavelinidae	*Clavelina huntsmani*	Taylor's social tunicate	NPS 2004
Family Didemnidae	*Didemnum carnulentum*	colonial tunicate	NPS 2004
Family Euherdmaniidae	*Euherdmania claviformis*		NPS 2004
Family Holozoidae	*Distaplia occidentalis*	mushroom ascidian	NPS 2004
Family Molgulidae	*Molgula* sp.		NPS 2004
Family Polycitoridae	*Archidistoma psammion*		Engle unpubl.
	Cystodytes lobatus	lobed compound tunicate	Engle unpubl.
Family Polyclinidae	*Aplidium* sp.		Engle unpubl.
	Aplidium californicum	California sea pork	NPS 2004
Family Pycnoclavellidae	*Pycnoclavella stanleyi*		Engle unpubl.
Family Pyuridae	*Boltenia villosa*	spiny-headed tunicate	Engle unpubl.
	Pyura haustor	wrinkled seapump	Engle unpubl.
Family Styelidae	*Metandrocarpa dura*		Engle unpubl.
	Metandrocarpa taylori	Taylor's social tunicate	NPS 2004
	Styela sp.		Engle unpubl.
	Styela montereyensis	stalked tunicate	NPS 2004

* = Federally Endangered; ^ = Listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

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Appendix D: Federal and State Laws, Joint Agreements, Biological Opinions, Instructions, and Policies

Table D-1. Federal agencies with responsibilities for natural resources on San Clemente Island (Cylinder et al. 1995; Bass and Herson 1993; California Resources Agency 1997).

Applicable Laws	Responsible Federal Agency	Authority and Activities
■ Clean Water Act § 404 ■ Rivers and Harbors Act of 1899 § 10 Marine Protection, Research ■ Sanctuaries Act of 1972 § 103 ■ National Environmental Policy Act ■ Executive Order 11990	■ U.S. Army Corps of Engineers	■ Responsible for issuing § 404 permits for dredged or fill material into waters of the U.S. (up to higher high water line in tidal waters) including wetlands in compliance with U.S. Environmental Protection Agency regulations. ■ Regulates construction, excavation, and deposition in navigable waters of the U.S. (up to mean high water in tidal waters). ■ Regulates transport for disposal of material into U.S. waters. ■ Commenting or lead agency authority for environmental review of proposed projects.
■ Clean Water Act, as amended ■ National Environmental Policy Act ■ Marine Protection, Research ■ Sanctuaries Act of 1972 ■ Federal Water Pollution Control Act Amendments 1972 ■ Water Quality Act 1987 ■ Clean Air Act	■ U.S. Environmental Protection Agency	■ Develops § 404 regulations and may veto U.S. Army Corps of Engineers § 404 permit. ■ Regulates waste disposal in coastal waters. ■ Administers (with National Oceanic and Atmospheric Administration) the Coastal Nonpoint Pollution Control Program. ■ Administers National Estuary Program. ■ Commenting authority on proposed projects. ■ Regulates pesticide applications. ■ Established the National Pollutant Discharge Elimination System permit program. ■ Established the Storm Water Pollution Prevention Program. ■ Administered by the South Coast Air Quality Management District (Los Angeles).
■ Federal Endangered Species Act ■ Migratory Bird Treaty Act ■ National Environmental Policy Act ■ Fish and Wildlife Coordination Act	■ U.S. Fish and Wildlife Service	■ Jurisdiction over most threatened or endangered terrestrial species. ■ Regulates, monitors, and implements programs for protecting the ecosystems upon which freshwater and estuarine fishes, wildlife, and habitat of listed species depend. Enforces international treaties and conventions related to species facing extinction. ■ Enforces prohibition against the taking of migratory birds, their eggs, or their nests. ■ Commenting authority on proposed projects. ■ Reviews and comments on federal actions that affect many habitat-related issues, including wetlands and waters considered under Clean Water Act § 404 and Rivers and Harbors Act § 10 permit applications.

Table D-1. Federal agencies with responsibilities for natural resources on San Clemente Island (Cylinder et al. 1995; Bass and Herson 1993; California Resources Agency 1997).

Applicable Laws	Responsible Federal Agency	Authority and Activities
■ Federal Endangered Species Act ■ Magnuson-Stevens Fisheries Conservation and Management Act ■ Marine Mammal Protection Act ■ National Environmental Policy Act ■ Fish and Wildlife Coordination Act	■ National Marine Fisheries Service	■ Jurisdiction over most threatened or endangered marine species. ■ Responsible for maintaining and conserving fisheries and rebuilding overfished stocks. Responsible for determining whether projects or activities adversely impact Essential Fish Habitat zones (those waters and substrate necessary to fish for spawning, breeding, feeding, or growing to maturity). ■ Enforces protection provisions for marine mammals. ■ Commenting authority on proposed projects. ■ Reviews and comments on federal actions that affect marine fishery resources and many habitat-related issues, including Clean Water Act § 404 and Rivers and Harbors Act § 10 permit applications.
■ Ports and Waterways Safety Act ■ Oil Pollution Act of 1990 ■ Fish and Wildlife Coordination Act ■ Clean Water Act/Marine Protection, Research, and Sanctuaries Act	■ U.S. Coast Guard	■ Manages maritime transportation over navigable waters. Permitting for marine events. Responsible for maritime safety/law enforcement and environmental protection. Establishes safety standards and conducts inspections. ■ Ensures cleanup of marine oil spills and other pollutants. Responsible for oil spill responses based on Area Contingency Plan. Prepares most regulations needed for implementation of Oil Pollution Act. ■ Commenting authority on navigational issues, such as structures affecting navigation, U.S. Army Corps of Engineers § 404 dredge and fill permits, and new pilings. ■ Enforces standards of oil and other hazardous waste discharge in marine waters.
■ Antiquities Act of 1906	■ Bureau of Land Management	■ Administers the National Landscape Conservation System which includes the California Coastal National Monument.

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Table D-2. State agencies with responsibilities for natural resources on San Clemente Island.

Applicable Laws	Responsible State Agency	Authority and Activities
■ California Coastal Act of 1976 ■ Federal Coastal Zone Management Act of 1972 ■ Federal Coastal Zone Act Reauthorization Amendments ■ California Environmental Quality Act of 1970 ■ California Air Resources Board ■ South Coast Air Quality Management District	■ California Coastal Commission	■ Administers state and federal coastal acts. ■ May concur with a Coastal Consistency Determination or Negative Determination submitted by a federal agency on a proposed project. For a federal agency, activities "within or outside the coastal zone" shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs. ■ Regulatory control over federal activities in the ocean, such as dredge disposal. ■ Works with the State Water Resources Control Board to develop the Coastal Nonpoint Pollution Control Program. ■ Commenting authority.
■ Public Trust Doctrine ■ Public Resources Code ■ California Environmental Quality Act	■ State Lands Commission	■ Exclusive jurisdiction over all ungranted tide and submerged lands that are state owned. ■ May preclude the use of submerged lands if inconsistent with public trust; requires Land Use Lease for encroachments, docks, crossings. ■ Establishes the ordinary high water mark and ordinary low water mark. ■ Commenting authority.
■ California Fish and Game Code ■ Public Resources Code ■ California Endangered Species Act ■ California Oil Spill Prevention and Response Act of 1990 ■ California Environmental Quality Act ■ Fish and Wildlife Coordination Act ■ State Protected Species	■ California Department of Fish and Wildlife	■ Conducts biological studies on fish and wildlife, protects marine resources, and regulates harvest of eelgrass and kelp. Manages marine resources of Areas of Special Biological Significance. ■ Manages sport and commercial harvest of fish and wildlife and aquaculture. ■ Regulates activities resulting in alteration of lakes and streams. ■ Enforces protection of state-listed sensitive animal and plant species. ■ Investigates pollution and toxic spills, in cooperation with the State Water Resources Control Board and Regional Water Quality Control Board. ■ Responsible for oil spill prevention, response, cleanup, and natural resource damage assessment in state waters. ■ Commenting authority, where applicable. ■ Provides recommendations to other state agencies to prevent or mitigate adverse impacts on fish and wildlife; also has commenting authority on federal projects, as applicable.

Table D-2. State agencies with responsibilities for natural resources on San Clemente Island.

Applicable Laws	Responsible State Agency	Authority and Activities
■ Federal Clean Water Act ■ Porter-Cologne Water Quality Control Act ■ California Water Code ■ Federal Coastal Zone Act Reauthorization Amendments ■ California Environmental Quality Act	■ State Water Resources Control Board	■ Protects water quality and administers water rights. ■ Regionally implemented by the Los Angeles Regional Water Quality Control Board. ■ Designates beneficial uses and water quality objectives and protects beneficial uses statewide; adopts California Ocean Plan; designates Areas of Special Biological Significance. ■ Develops statewide nonpoint source pollution control plan. ■ Works with the California Coastal Commission and Regional Water Quality Control Board to develop and implement Coastal Nonpoint Pollution Control Program. ■ Commenting authority.
■ Federal Clean Water Act, Sec. 401, 402 ■ Porter-Cologne Water Quality Control Act ■ California Environmental Quality Act	■ Los Angeles Regional Water Quality Control Board	■ Daily regulation of point source discharges, storm water discharges, underground storage tanks, and above ground petroleum tanks. ■ Designation of beneficial uses and water quality objectives. Protection of beneficial uses. ■ Prepares public reports on condition of water bodies. ■ Commenting authority.
■ Various pesticide regulations	■ California Department of Pesticide Regulation	■ Regulates anti-fouling paints used on boats and ships.

*The California Fish and Game Code expressly addresses management of wildlife on military lands through: Division 4 (Birds and Mammals), Chapter 2 (Commercial Activities), Article 6 (Management of Fish and Wildlife on Military Lands), Section 3450 (encourage the biologically sound management of fish and other wildlife resources on lands administered by the United States Department of Defense), and Section 3452 (authorizes the California Department of Fish and Wildlife to enter into agreements with the U.S. Department of Defense).

*Section 2080.1 of the California Fish and Game Code exempts the incidental take of an endangered, threatened, or candidate species if certain conditions are satisfied and authorized by the Secretary of the Interior or the Secretary of Commerce (16 U.S. Code § 1536 or § 1539).

D.1 Biological Opinions

- U.S. Fish and Wildlife Service Biological Opinion (FWS-LA-09B0027-09F0040) San Clemente Island Military Operations and Fire Management Plan 2008.
- National Marine Fisheries Service Biological Opinion U.S. Navy activities in the Southern California Range Complex 2009-2014.

D.2 Candidate Conservation Agreements

- San Clemente Island Fox (*Urocyon littoralis clementae*) Candidate Conservation Agreement between the U.S. Department of Defense (DoD) and U.S. Fish and Wildlife Service (USFWS) (30 January 2003).

D.3 Cooperative Agreements, MOAs, and MOUs[11]

- A Memorandum of Agreement (MOA) was released (February 2001) between the U.S. Environmental Protection Agency, USFWS, and National Marine Fisheries Service (NMFS) regarding enhanced coordination under the Clean Water Act and Endangered Species Act. One of its key objectives is to institutionalize strong working relationships among regional and local field offices with day-to-day responsibility for administering programs by providing clear and efficient mechanisms for improved interagency cooperation. It establishes local and regional review teams of senior management that meet periodically and establish priorities. The MOA also provides enhanced integration of water quality (Environmental Protection Agency responsibility) and listed species (USFWS and NMFS responsibility) rule-making and methodological guidelines.
- Memorandum of Understanding (MOU) among the DoD, USFWS, and the International Association of Fish and Wildlife agencies for a cooperative Integrated Natural Resource Management Program on military installations (31 January 2006).
- MOU between the DoD and Bat Conservation International (October 2006).
- MOU between the DoD and the USFWS to promote the conservation of migratory birds (31 July 2006).
- MOU between the U.S. Navy and the Bureau of Land Management regarding the California Coastal National Monument (MOU No. CA-939-08-02).
- 1980 Cooperative Agreement between the U.S. Navy and the University of California Santa Barbara Marine Science Institute Associate Research Biologist's Channel Islands Research Program.
- 1978 Cooperative Agreement between Naval Base Coronado and California Department of Fish and Wildlife (CDFW) allowing access of CDFW officials onto Navy land for enforcement of CDFW regulations.
- MOU between the NMFS Southwest Region and Naval Air Station North Island Regarding Management and Protection of the Marine Mammal Populations of San Clemente Island (1981).

D.4 Instructions

- DoD Instruction (DoDINST) 4715.03, "Natural Resources Conservation Program" (18 March 2011).
- DoDINST 4150.07, "DoD Pest Management Program" (29 May 2008).
- Navy Region Southwest Instruction 400.2, prohibits access to the high explosive impact areas within SHOBA for "any activity associated with archaeological or biological monitoring and surveys or recreational (to include hunting) use" (18 July 2006 and updated 07 September 2007).
- DoDINST 6055.06, "DoD Fire and Emergency Services Program" (21 December 2006).
- DoDINST 4715.6, "Environmental Compliance" (24 April 1996).
- Chief of Naval Operations Instruction 5090.1C CH-1, N45 (18 July 2011).

1. Cooperative Agreements are not contractual agreements, rather they are agreements between Naval Base Coronado and a cooperating agency for a natural resource benefit.

- Naval Auxiliary Landing Field San Clemente Island Instruction 12300.1D "Policy Guidance Concerning the Handling and Employment of Weapons by Natural Resources Personnel (29 December 2009).
- Naval Auxiliary Landing Field San Clemente Island Instruction 5585.2 "San Clemente Island Military Working Dog Policy" (3 June 2009).
- Naval Auxiliary Landing Field San Clemente Island Ser N00/587 "Use of Aerial Suppression Assets on Naval Auxiliary Landing Field San Clemente Island" (3 December 2012).

D.5 Policies

- Southern California Eelgrass Mitigation Policy (Adopted 31 July 1991).
- Chief of Naval Operations Policy Letter (10 January 2002) Preventing Feral Cat and Dog Populations on Navy Property.
- Naval Auxiliary Landing Field San Clemente Island Standard Operating Procedure "How to do business onboard San Clemente Island" (3 April 2012).

Appendix E: INRMP Benefits for Migratory Birds

Birds use traditional flyways where they require available food, water, and cover for resting and foraging at stopover sites to help mitigate the extreme energy demands of migration. The availability of these resources throughout the breeding season and during migration may prevent further declines of populations for bird species listed or proposed for listing. The Channel Islands and San Clemente Island (SCI) have recently been identified as globally important bird areas, as well as a California important bird area (Audubon 2011; Audubon California 2011), in part because of the diversity of habitats represented on these islands. Approximately 150 different bird species have been observed on SCI utilizing a variety of habitats. Conservation of a variety of habitats at SCI will provide food, water, and cover for migrant species as well as resident breeders.

Migratory Bird Treaty Act and Migratory Bird Rule

The Migratory Bird Treaty Act (MBTA) of 1918 is the primary legislation in the United States established to conserve migratory birds. It implements the United States' commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The MBTA provides protection for all birds on the MBTA list (http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html), which specifically covers all native birds regardless if they migrate long distances. The MBTA prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation.

The Migratory Bird Rule relates to military readiness activities and was established in accordance with Section 315 of the National Defense Authorization Act for Fiscal Year 2003. The final rule, Migratory Bird Permits: Take of Migratory Birds by the Armed Forces, was published as 50 Code of Federal Regulations Part 21 in the 28 February Federal Register (pg. 8931-8950). It authorizes the military to *take* migratory birds under the MBTA without a permit, but if the military determines that the activity will significantly affect a population of migratory birds, they must work with the U.S. Fish and Wildlife Service (USFWS) to implement conservation measures to minimize/mitigate the effects.

Key to implementing the Migratory Bird Rule is the wording of the authorization for take that requires an understanding of the definition of the following terms:

Population, as used in Section 21.15, is a group of distinct, coexisting (conspecific) individuals of a single species whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some time of the year), and adequately described so that the population can be effectively monitored to discern changes in its status.

Significant adverse effect on a population, used in Section 21.15, means an effect that could, within a reasonable period of time, diminish the capacity of a population of migratory bird species to sustain itself at a biologically viable level. A population is *biologically viable* when its ability to maintain its genetic diversity, to reproduce, and to function effectively in its native ecosystem are not significantly harmed. This effect may be characterized by increased risk to the population from actions that cause direct mortality or a reduction in fecundity. Assessment of impacts should take into account yearly varia-

tions and migratory movements of the impacted species. Due to the significant variability in potential military readiness activities and the species that may be impacted, estimates of significant measurable decline will be determined on a case-by-case basis.

Conservation measures undertaken under the Migratory Bird Rule require monitoring and record-keeping for five years from the date the Armed Forces commence their conservation action. During Integrated Natural Resources Management Plan reviews, the Armed Forces must report to the USFWS the migratory bird conservation measures implemented and the effectiveness of the conservation measures in avoiding, minimizing, or mitigating take of migratory birds.

Executive Order 13186 and Department of Defense–U.S. Fish and Wildlife Service Migratory Bird Memorandum of Understanding

For U.S. Department of Defense (DoD) activities other than military readiness, migratory bird concerns are addressed through a Memorandum of Understanding (MOU) (Federal Register 30 August 2006) developed in accordance with Executive Order (EO) 13186 Responsibilities of Federal Agencies to Protect Migratory Birds (10 January 2001). The USFWS-DoD MOU that evolved out of the requirements of the EO addresses the conservation of migratory birds on military lands in relation to all activities except readiness. The MOU is a guidance document on how the DoD will conserve migratory birds and does not authorize any take. In April 2007, further guidance was issued by the Office of the Under Secretary of Defense (OUSD) for Acquisition, Technology and Logistics on implementing the MOU to Promote the Conservation of Migratory Birds between the USFWS and DoD in accordance with EO 13186. This guidance covers all activities at SCI, including natural resources management, routine maintenance and construction, industrial activities, and hazardous waste cleanups. The guidance emphasizes interdisciplinary collaboration in the framework of North American Bird Conservation Initiative Bird Conservation Regions, collaborative inventory and long-term monitoring. The EO directs executive departments to take certain actions regarding the protection of migratory birds.

A Council for the Conservation of Migratory Birds was established to help agencies implement the EO. The EO requires National Environmental Policy Act (NEPA) evaluations to include effects on migratory birds and advance notice or annual reports to the USFWS concerning actions that result in take of migratory birds. The EO also requires agencies to control the establishment of exotic species that may endanger migratory birds and their habitats. Pursuant to its MOU, each agency shall, to the extent permitted by law and subject to the availability of appropriations and within administration budgetary limits, and in harmony with agency missions:

- Support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;
- Restore and enhance the habitat of migratory birds, as practicable;
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable;
- Design migratory bird habitat and population conservation principles, measures, and practices, into agency plans and planning processes (natural resources, land management, and environmental quality planning, including, but not limited to, forest and

rangeland planning, coastal management planning, watershed planning, etc.) as practicable, and coordinate with other agencies and non-federal partners in planning efforts;

- Within established authorities and in conjunction with the adoption, amendment, or revision of agency management plans and guidance, ensure that agency plans and actions promote programs and recommendations of comprehensive migratory bird planning efforts such as Partners-In-Flight (PIF), U.S. National Shorebird Plan, North American Waterfowl Management Plan, North American Colonial Waterbird Plan, and other planning efforts, as well as guidance from other sources, including the Food and Agricultural Organization's International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries;
- Ensure that environmental analyses of federal actions required by NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern;
- Provide notice to USFWS in advance of conducting an action that is intended to take migratory birds, or annually report to USFWS on the number of individuals of each species of migratory birds intentionally taken during the conduct of any agency action, including but not limited to banding or marking, scientific collecting, taxidermy, and depredation control;
- Minimize the intentional take of species of concern by: i) delineating standards and procedures for such take; and ii) developing procedures for the review and evaluation of take actions. With respect to intentional take, the MOU shall be consistent with the appropriate sections of 50 Code of Federal Regulations parts 10, 21, and 22;
- Identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors. With respect to those actions so identified, the agency shall develop and use principles, standards, and practices that will lessen the amount of unintentional take, developing any such conservation efforts in cooperation with the USFWS and California Department of Fish and Wildlife. These principles, standards, and practices shall be regularly evaluated and revised to ensure that they are effective in lessening the detrimental effect of agency actions on migratory bird populations. The agency also shall inventory and monitor bird habitat and populations within the agency's capabilities and authorities to the extent feasible to facilitate decisions about the need for, and effectiveness of, conservation efforts;
- Within the scope of its statutorily-designated authorities, control the import, export, and establishment in the wild of live exotic animals and plants that may be harmful to migratory bird resources;
- Promote research and information exchange related to the conservation of migratory bird resources, including coordinated inventorying and monitoring and the collection and assessment of information on environmental contaminants and other physical or biological stressors having potential relevance to migratory bird conservation. Where such information is collected in the course of agency actions or supported through federal financial assistance, reasonable efforts shall be made to share such information with the USFWS, U.S. Geological Survey-Biological Resources Division, and other appropriate repositories of such data (e.g., the Cornell Laboratory of Ornithology);
- Provide training and information to appropriate employees on methods and means of avoiding or minimizing the take of migratory birds and conserving and restoring migratory bird habitat;

- Promote migratory bird conservation in international activities and with other countries and international partners, in consultation with the U.S. Department of State, as appropriate or relevant to the agency's authorities;
- Recognize and promote economic and recreational values of birds, as appropriate; and
- Develop partnerships with non-federal entities to further bird conservation.

Other Special Status Birds and Focal Species

A number of avian species are designated by the California Department of Fish and Wildlife as California Bird Species of Special Concern or by the USFWS as Birds of Conservation Concern. These species have declining population levels, limited ranges, and/or continuing threats that make them vulnerable to extinction. Therefore, they have special status in an effort to halt or reverse their decline by calling attention to their plight and addressing issues of concern early enough to secure their long-term viability (Comrack 2008).

Table E-1 lists the bird species that have a species status designation by federal, state, or non-governmental conservation organization and are known to occur on SCI as compiled by Sullivan and Kershner (2005) and Bradley et al. (2011). The term *migrant* refers to a species that occurs at the island for longer periods during migration or that may winter at SCI. The term *transient* refers to a species whose occurrence in the area is rare or incidental; these species do not typically occur at SCI. These transient species do not require special management guidelines.

Assessment of Resource Management

- Current monitoring efforts are insufficient for tracking long-term trends and status of non-listed bird species.
- The implementation of a regular Bird/Animal Aircraft Strike Hazard assessment and implementation of the assessment's recommendations reduces Bird/Animal Aircraft Strike Hazard risk for military aircraft as well as for migratory and resident bird species.
- Invasive non-native flora may reduce habitat quality for birds.
- The predation of native birds by non-native fauna may cause a concern for conservation of migratory birds.
- The EO requires NEPA evaluations to include effects on migratory birds and advance notice or annual reports to the USFWS concerning actions that result in take of migratory birds. One way in which compliance has occurred is through requests from USFWS for concurrence with determinations regarding the potential effects of Vertical Access Wind Turbines at SCI.
- The EO also requires agencies to control the establishment of exotic species that may endanger migratory birds and their habitats. The U.S. Department of the Navy (Navy)is complying with this requirement through the botany program's invasive species control projects and through control of non-native predatory species (i.e. feral cats and black rats).
- Per the MOU, the Navy should develop partnerships with non-federal entities to further bird conservation. The Navy has partnered with USFWS and University of California Santa Cruz for aerial seabird monitoring at SCI as part of a larger coastal California and Channel Islands effort to track long-term trends in seabird nesting. The Navy has also partnered with the Bureau of Land Management to manage birds that utilize the offshore rocks within the SCI footprint, and which are also part of the California Coastal National Monument. San Clemente loggerhead shrike management is in conjunction with the U.S. Fish and Wildlife Service Shrike Recovery Group.

Table E-1. Avian species that have a special status designation by federal, state, or non-governmental conservation organization and are known or expected to occur at San Clemente Island based on surveys by Sullivan and Kershner (2005) and Bradley et al. (2011).

Common Name	Scientific Name	Status	Use on SCI
San Clemente sage sparrow	*Artemisiospiza belli clementae*	BSSC, PIF, FT	Year-round resident
short-eared owl	*Asio flammeus*[a]	BSSC	Migrant
long-eared owl	*Asio otus*[a]	BSSC	Transient
burrowing owl	*Athene cunicularia hypugea*	BCC, BSSC, PIF	Migrant, winter
Lawrence's goldfinch	*Carduelis lawrencei*[a]	BCC	Migrant
Vaux's swift	*Chaetura vauxi*[a]	BSSC	Transient
mountain plover	*Charadrius montanus*	BCC, BSSC	Transient
western snowy plover	*Charadrius nivosus*	FT	Migrant, winter
northern harrier	*Circus cyaneus*[a]	BSSC	Migrant
olive-sided flycatcher	*Contopus borealis*[a]	BSSC, PIF	Migrant
white-tailed kite	*Elanus leucurus*	FP	Migrant
willow flycatcher	*Empidonax traillii*[a]	SE	Vagrant
peregrine falcon	*Falco peregrinus anatum*[a]	BCC, FP	Migrant, breeding
common loon	*Gavia immer*	BSSC	Migrant
black oystercatcher	*Haematopus bachmani*	BCC	Breeding
bald eagle	*Haliaeetus leucocephalus*	BCC, PIF, SE	Transient
yellow-breasted chat	*Icteria virens*[a]	BSSC	Transient
San Clemente loggerhead shrike	*Lanius ludovicianus mearnsi*	BSSC, PIF, FE	Year-round resident
long-billed curlew	*Numenius americanus*	BCC	Migrant
ashy storm-petrel	*Oceanodroma homochroa*	BCC, BSSC, PIF	Transient
black storm-petrel	*Oceanodroma melania*	BSSC	Transient
California brown pelican	*Pelecanus occidentalis californicus*	FP	Migrant, breeding
summer tanager	*Piranga rubra*[a]	BSSC	Transient
bank swallow	*Riparia riparia*[a]	ST	Transient
Allen's hummingbird	*Selasphorus sasin sedentarius*	BCC	Breeding
black-chinned sparrow	*Spizella atrogularis*[a]	BCC, PIF	Transient, breeding
Brewer's sparrow	*Spizella breweri*[a]	BCC, PIF	Transient
elegant tern	*Sterna elegans*	PIF	Transient
Xantus's murrelet	*Synthliboramphus hypoleucus*	BCC, ST	Breeding
Bendire's thrasher	*Toxostoma bendirei*	BCC, BSSC, PIF	Transient
yellow-headed blackbird	*Xanthocephalus xanthocephalus*[a]	BSSC	Migrant

USFWS and California Department of Fish and Wildlife Codes: FE = federally endangered, FT = federally threatened SE = state endangered, ST = state threatened, FP = state fully protected; BCC = USFWS Birds of Conservation Concern (2008); BSSC = California Department of Fish and Game California Species of Special Concern, PIF = DoD Partners in Flight

[a] BSSC and BCC for nesting only

Integrated Natural Resources Management Plan Migratory Bird Objectives

The outline below shows a synopsis of best practices and strategy to be undertaken as practicable.

Objective: *Maintain habitats that support resident and migratory birds, emphasizing special status birds in compliance with the MBTA, the related Migratory Bird Rule, EO 13186, USFWS-DoD MOU, and the OUSD guidance memorandum.*

I. Implement habitat-based strategies for conservation of migratory birds.

A. Identify high-value habitats for native, particularly endemic, birds on SCI, to facilitate development of avoidance and minimization measures during site approvals, as required under NEPA.

1. Develop a NEPA checklist of best practices for the site approval process.

a. See Appendix Q for an expanded list: "NEPA Best Management Practice Check List." For other examples, see Section III below, or consult the PIF list: http://www.partnersinflight.org/pubs/BMPs.htm.

b. Develop installation-level Best Management Practices/Conservation Measures based on the identified habitat values. Support may be obtained from the DoD PIF-L List Serve (http://www.dodpif.org/downloads/DoD_Conservation_Measures.pdf).

2. Map high value habitats for management-focus birds.

B. Conserve and manage priority habitats for migratory birds.

1. Implement long-term priorities for management and conservation of SCI habitat for birds based on habitat value mapping and natural vegetative recovery of SCI.

2. Continue efforts to control and minimize the spread of non-native flora and fauna.

3. Develop and implement a bio-security plan containing specific measures to identify and reduce threats to listed species, reduce the arrival of non-native species, and promote early detection of new arrivals.

II. Comply with responsibilities for special status bird populations, as described in EO 13186, the USFWS-DoD MOU to Promote the Conservation of Migratory Birds, and the OUSD Memorandum 03 April 2007 on implementing the MOU.

A. Continue to maintain and update the installation bird checklist of birds occurring on SCI (OUSD Memorandum 03 April 2007).

B. Report to the national military database DoD Bird Conservation Database (http://www.dodpig.org/projects/) the results of bird surveys, research and monitoring, and species accounts (OUSD Memorandum 03 April 2007).

III. Protect migratory bird populations by avoiding and minimizing impacts to birds using conservation principles, standards and practices, as compatible with mission requirements (EO 13186).

A. Evaluate the effect(s) of actions on migratory birds through the NEPA review process and include avoidance and minimization measures under NEPA, with emphasis on species of concern (EO 13186).

B. Identify and minimize areas of unintentional take of species of concern (EO 13186). In cooperation with USFWS, develop and use, and evaluate principles, standards, and practices to reduce unintentional take.

1. Ensure communications towers avoid take of migratory birds to the extent practicable. Consider USFWS and PIF guidance for their construction (see Chapter 5) (USFWS-DoD MOU).

2. Identify power lines and poles known to electrocute raptors and correct design deficiencies (prioritized by bird electrocution risk and fire hazard).

3. Restrict access into and disturbance of nesting and breeding grounds during critical periods, to the extent compatible with natural resources review and authorized military training activities.

4. Prevent or abate effects on migratory bird populations caused by pollution.

5. Reduce pesticide use to minimize effects on birds (See Section 3.10 Landscaping and Grounds Maintenance).

6. Whenever possible and as compatible with mission requirements, redirect construction and military operations away from high-value habitat areas during the breeding season.

C. Ensure compliance with the Bird/Animal Aircraft Strike Hazard Plan.

IV. Develop and enhance conservation partnerships to further the work of bird conservation (EO 13186, USFWS-DoD MOU, and OUSD Memorandum 2007, Sikes Act).

A. Integrate the population goals and objectives of regional conservation plans into conservation planning on SCI.

B. Coordinate and collaborate with conservation partners focusing on key issues, annual work plans, coordinated monitoring, conservation design, international conservation, and institutional support in state and federal agencies for bird conservation (U.S. North American Bird Conservation Initiative, EO 13186, USFWS-DoD MOU, and OUSD Memorandum 2007).

C. With this and future Integrated Natural Resources Management Plan revisions and updates, ensure that plans and actions promote comprehensive migratory bird planning efforts such as California and national PIF plans, U.S. National Shorebird Plan, as well as guidance from other sources.

1. Attend PIF meetings or other significant bird events. Use information collected from partnership programs to better support DoD mission requirements.

V. Conduct inventory and monitoring for the adaptive management of birds.

A. Set up a baseline and long-term monitoring program for reporting on the status of key avian species and populations at SCI (MBTA, EO 13186, and OUSD Memorandum 2007).

1. Represent all key habitat types in the survey design.
2. Integrate methods and coordinate with the DoD Coordinated Bird Monitoring Plan through an approach that a) Is driven by installation issues; b) Considers quantitative methods; c) Coordinates with other initiatives and with natural resource managers; d) Is consistent with the DoD plan for monitoring species of concern on DoD lands; and e) Considers the DoD role in continental bird monitoring programs (EO 13186, USFWS-DoD MOU, and OUSD Memorandum 2007).
3. Link this effort with surveys of other species groups to cost-effectively evaluate ecological condition and trend.

B. Monitor effectiveness of bird management practices and adjust management strategies as appropriate.

VI. Improve awareness of migratory bird stewardship through education and outreach.

A. Provide training and information to employees on legal compliance to avoid and minimize take and conserve and restore habitat (EO 13186).

1. Continue to conduct briefings and biomonitoring of construction and maintenance work to ensure compliance with the MBTA.

VII. Support research proposals of local institutions that provide a benefit to conservation of migratory birds (OUSD Memorandum 2007).

A. Support research that demonstrates stewardship, leadership, and partnership through the DoD Legacy Program (http://www.dodlegacy.org).

B. Support research through DoD's Strategic Environmental Research and Development Program. Projects should support long-term sustainability and focus on environmental restoration and sustainable infrastructure issues.

C. Support pilot demonstration projects through DoD's Environmental Security Technology Certification Program (http://www.estcp.org). Areas of emphasis are the same as those for Strategic Environmental Research and Development Program, with natural resources projects coming under Sustainable Infrastructure.

VIII. Comply with the take avoidance and reporting requirements that relate to the MBTA and Endangered Species Act with regard to birds.

A. Comply with the military readiness MBTA-Migratory Bird Rule.

1. Develop and implement conservation measures for the effects of military readiness activities on migratory birds, if an action may have a significant adverse effect on a migratory bird population.

a. Identify species which may be impacted, and the military readiness activities that may affect them.

2. Analyze effects of any wildfires caused by military readiness activities on bird populations. Manage fire to reduce effects on bird populations (See Section 3.6 Wildland Fire).

3. For future operations not covered under the Southern California Environmental Impact Statement (2008), conduct NEPA analysis for military readiness activities in accordance with the MBTA-Migratory Bird Rule.

B. Comply with the MBTA for non-readiness activities.

1. *Incidental Take.* Informal consultation will be used to minimize incidental take from non-readiness activities on species listed under the MBTA (in 50 Code of Federal Regulations 10.13).

a. Develop MBTA protocol for routine maintenance activities such as mowing, tree trimming, herbicide application, etc.

2. *Intentional Take.* Formal notification of intentional take will be provided the USFWS in advance of the activity (USFWS-DoD MOU). Disputes regarding compliance with migratory bird laws will be handled according to a process described in the MOU.

Appendix F: INRMP Benefits for Endangered Species

The objective of this appendix is to identify the management and conservation efforts that would be considered when designating critical habitat under the Endangered Species Act (ESA) for Naval Auxiliary Landing Field San Clemente Island (SCI).

Under the ESA, the term "critical habitat" is defined as specific areas within the species' range at the time of listing that contain features, both physical and biological, that are essential to the conservation of the species. These areas may require special management or protection considerations.

Concurrent with a determination to list a species as threatened or endangered, the Secretary of the Interior is required to designate critical habitat for the species. However, the ESA was revised via the National Defense Authorization Act of 2004 (Public Law 108-136) to recognize that projects and objectives of an Integrated Natural Resources Management Plan (INRMP) could obviate the need for critical habitat designation on U.S. Department of Defense lands. Section 4(a)(3) of the revised ESA states that:

The Secretary [of the Interior] shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S. Code 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.

All military installations with federally threatened or endangered species, proposed threatened or endangered species, candidate species, or unoccupied habitat for a listed species where critical habitat may be designated, must structure the INRMP to avoid the designation of critical habitat. The INRMP may obviate the need for critical habitat if it specifically addresses both the benefit provided to the listed species and the provisions made for the long-term conservation of the species. The species benefit must be clearly identifiable in the document and should be referenced as a specific topic in the INRMP table of contents.

The U.S. Fish and Wildlife Service (USFWS) utilizes a three-point criteria test to determine if an INRMP provides a benefit to the species. An installation is strongly encouraged to use the USFWS criteria listed below when structuring its INRMP to avoid the need for critical habitat designation.

1. The plan provides a conservation benefit to the species. The cumulative benefits of the management activities identified in a management plan must maintain or provide for an increase in a species' population, or the enhancement or restoration of its habitat within the area covered by the plan [i.e., those areas deemed essential to the conservation of the species] for the duration of the plan. A conservation benefit may result from reducing fragmentation of habitat, maintaining or increasing populations, ensuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, or testing and implementing new conservation strategies.
2. The plan provides certainty that the management plan will be implemented. Persons charged with plan implementation are capable of accomplishing the objectives of the management plan and have adequate funding for the management plan. They have

the authority to implement the plan and have obtained all the necessary authorizations or approvals. An implementation schedule, including completion dates, for the conservation effort is provided in the plan.

3. The plan provides reasonable certainty that the conservation effort will be effective. The following criteria will be considered when determining the effectiveness of the conservation effort. The plan includes: 1) biological goals (broad guiding principles for the program) and objectives (measurable targets for achieving the goals); 2) quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured; 3) provisions for monitoring and, where appropriate, adaptive management; 4) provisions for reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort; and 5) a duration sufficient to implement the plan and achieve the benefits of its goals and objectives.

Management for long-term conservation of the species involves both occupied and unoccupied habitat. For occupied habitat, the installation first determines whether the area contains the physical and biological features essential to the conservation of the species and whether this area has or needs special management or protection. Additional special management is not required if adequate management or protection is already in place.

Land management of unoccupied habitat areas should also be addressed in the INRMP, even if the listed species that could potentially occupy that habitat are not present on the installation. This will help to prevent the designation of critical habitat for species that could occur or historically occurred on the installation but are not currently present. Special management is not required if adequate management or protection is already in place.

The National Defense Authorization Act of 2004 (Public Law 108-136) further revised the ESA via Section 4(b)(2) to preclude critical habitat designation based on impacts to national security.

Section 4(b)(2) of the revised ESA states that:

The Secretary shall designate critical habitat, and make revisions, thereto, under subsection (a)(3) of this section on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. The Secretary may exclude any area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species concerned.

F.1 San Clemente Island Lotus (*Acmispon dendroideus* subsp. *traskiae*) - Federally Endangered

Species Description

San Clemente Island lotus (Photo F-1) is a distinctive shrub with dark green foliage and light brown legumes. It grows to about 3.2 feet (1 meter [m]) tall. Flowering generally occurs from March to May with small, bisexual yellow flowers. Flowers of this size and color are generally pollinated by small bees, which have been observed foraging on the flowers. Fruits are indehiscent (remain attached to the plant after ripening)

San Clemente Island lotus grows somewhat colonially around rock outcrops in grassy areas or along the interface between grassland and Maritime Sage Scrub. It can be a prominent plant on rock outcrops. It readily occupies disturbed sites (Beauchamp, n.d.), and some locations are close to buildings, roads, and pipelines.

Photo F-1. San Clemente Island lotus on San Clemente Island.

Distribution and Status

The San Clemente Island lotus is endemic to SCI, primarily occurring on north- and east-facing slopes and ridges (Map F-1). While it is currently listed as an endangered species, the Five-Year Review completed in 2012 recommended downlisting this species to threatened (USFWS 2012a).

Early reports from 1996 and 1997 identified over 3,000 individuals in 64 occurrences with the largest population comprising 750 individuals (Junak and Wilken 1998). Between 2003 and 2006, 69 occurrences totaling approximately 6,750 individuals were mapped. The largest population consisted of 2,300 plants (Junak 2010). Surveys by the Soil Ecology and Restoration Group (SERG) in 2011/2012 (unpubl.) recorded 119 populations, with a total of 9,847 individuals and a maximum population size of 1,500 individuals and an average population size of 82 (B. Munson, pers. com. 2011)

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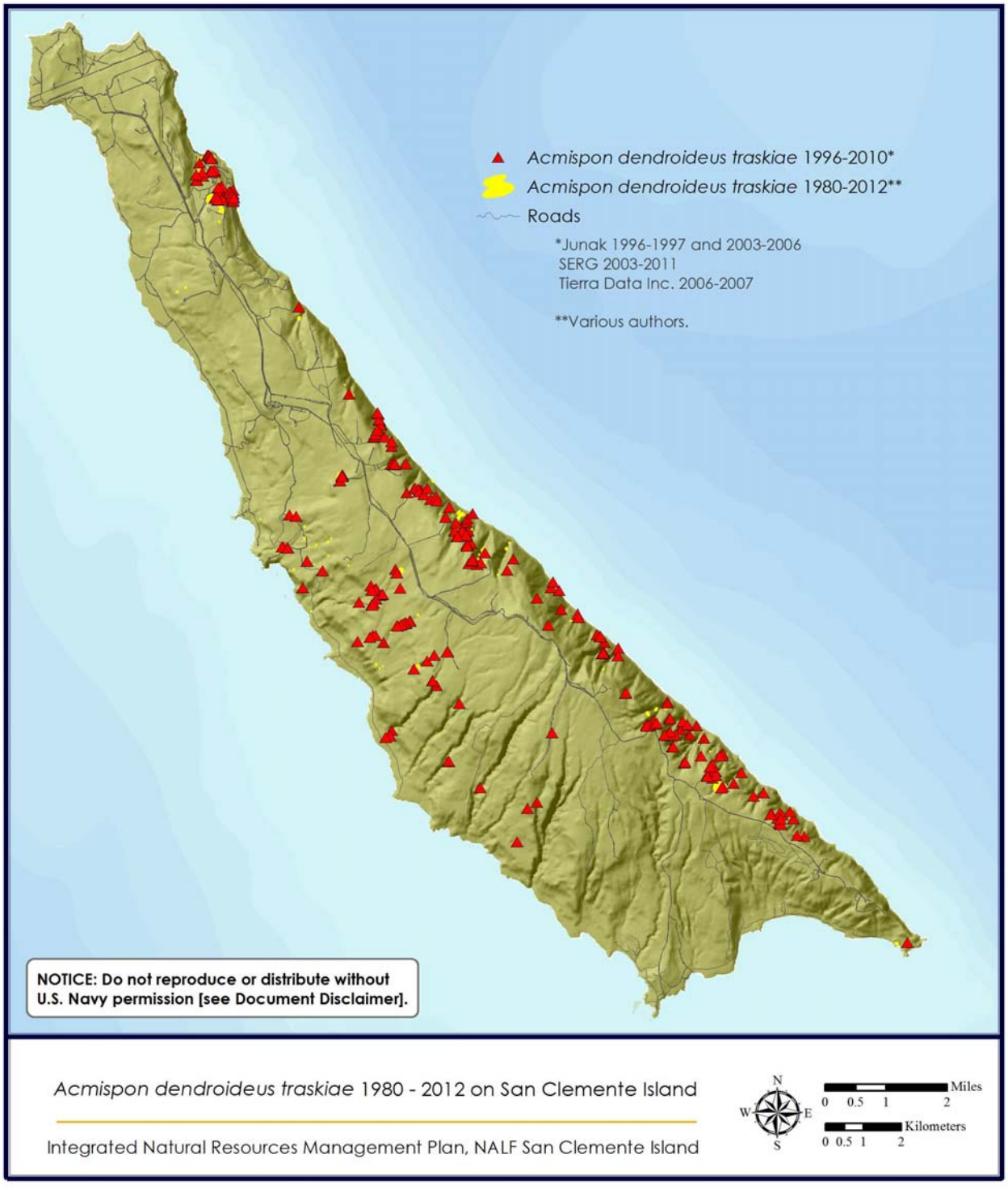


2 *Map F-1. Distribution of the San Clemente Island lotus on San Clemente Island.*

Relevant Biological Opinion

USFWS Biological Opinion (BO) FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the San Clemente Island lotus.
- Continued seed collection will conserve genetic diversity of the San Clemente Island lotus.
- While field observations suggest that the San Clemente Island lotus responds positively to fire, further evaluation will help understand an acceptable fire interval for this species.
- Control of non-native plant species will continue to enhance habitat for the San Clemente Island lotus.
- The erosion control program and adherence to the 2008 BO will help to ensure that erosion from military activities will not be a significant threat to the San Clemente Island lotus.
- The San Clemente Island lotus is recovering dramatically since the removal of the feral grazers from SCI, which was the species primary threat at the time of its federal listing. Since the San Clemente Island lotus is recovering in areas where minimal direct management occurs, it is expected that continued minimal management will aid in the recovery of this species.

F.2 San Clemente Island Indian Paintbrush (*Castilleja grisea*)- Federally Endangered

Species Description

San Clemente Island Indian paintbrush (Photo F-2) is a small, perennial shrub that grows to a height of 15–24 inches (40–60 centimeters [cm]) and has yellow flowers borne in terminal spikes. Its vegetative parts are green and densely hairy (Hickman 1993). Although not demonstrated in this species, all members of the genus *Castilleja* are considered hemiparasitic, with their roots tapped into the root systems of other species to ensure an adequate water, and possibly nutrient, supply (Junak and Wilken 1998). The species generally flowers from February through May, although flowering has also been recorded in December (Junak 2010). Its seeds are passively dispersed from June through August (Beauchamp n.d.). The species may not be able to self-pollinate and is perhaps strongly dependent on insect or hummingbird visitation for pollination and seed set (Junak and Wilken 1998). San Clemente Island Indian paintbrush is found on steep canyon walls along both sides of the island and coastal bluffs, slopes, and flats around the perimeter (Junak 2010).

Distribution and Status

The San Clemente Island Indian paintbrush is endemic to SCI. The species is found primarily in the coastal sage scrub and maritime cactus scrub plant communities. While it is currently listed as an endangered species, the Five-Year Review completed in 2012 recommended downlisting this species to threatened (USFWS 2012b). Given the wide distribution, the sheer number of individuals, and the minimal threats to the species, this species should be removed from the ESA.

Photo F-2. San Clemente Island Indian paintbrush on San Clemente Island (Tierra Data Inc. 2008).

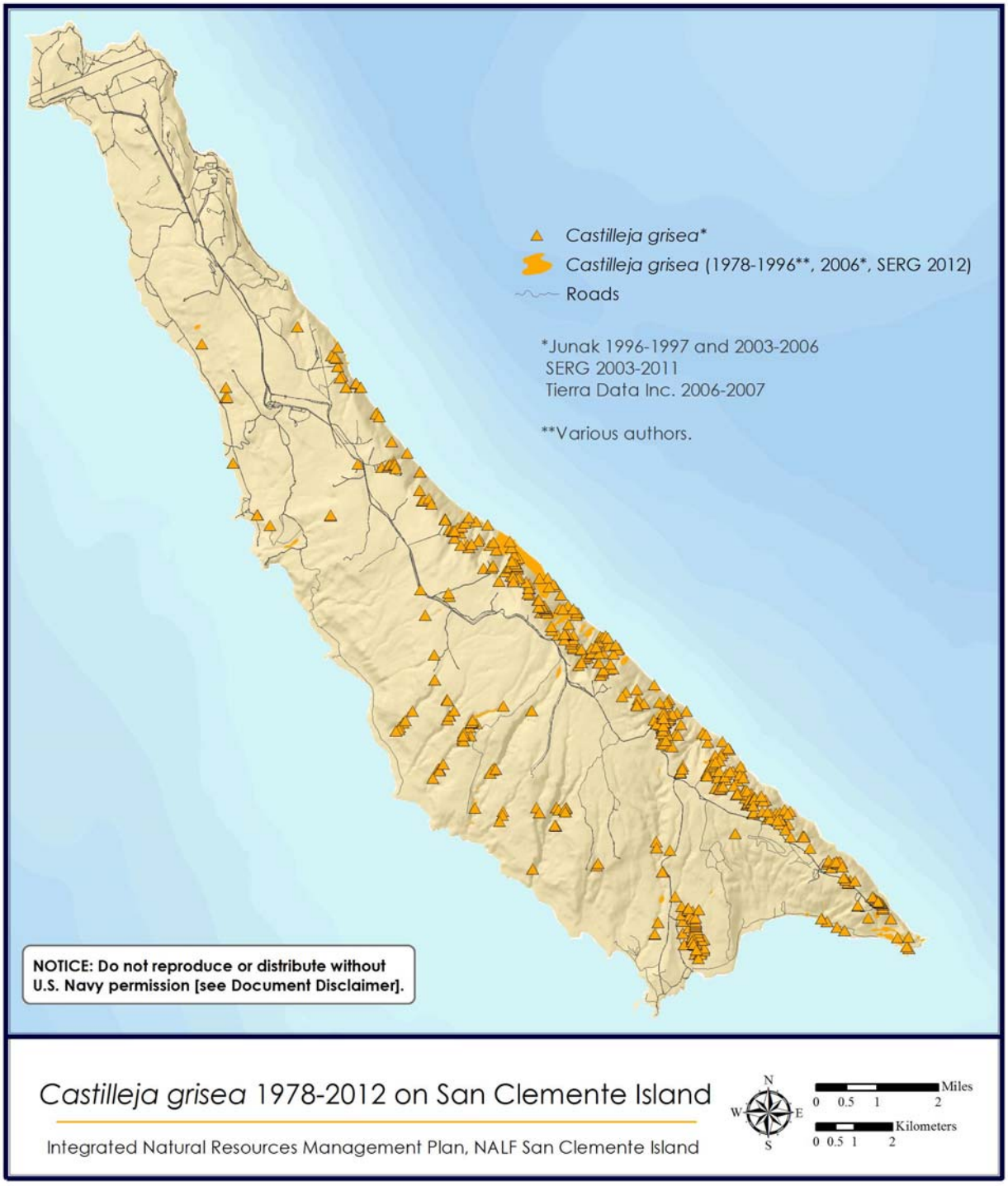
Currently, the species is widely distributed from Jack Point south, on both the east and west sides of SCI (Map F-2). A total of 198 separate occurrences of the San Clemente Island Indian paintbrush, comprising 9,718 individuals, were mapped on SCI between 2003 and 2006 (Junak 2010). Occurrences ranged from isolated plants to populations with 1,400 individuals. The average population size was approximately 49.1 individuals; therefore, the population is listed as increasing (Junak 2006). Estimates from the SERG 2011/2012 surveys recorded 325 total occurrences (compared to 335 occurrences in 2007; many of Junak's points merged into polygons, especially on the east side) for a total of 35,280 individuals (compared to 14,064 individuals in 2007). Maximum population size was approximately 5,000 individuals, with an average population of 108 individuals. In 2011, there were 82 populations inside the Shore Bombardment Area (Bryan Munson, pers. com. 2011). The current population is between 35,000 and 60,000 individuals (B. Munson, pers. com. 2013)

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the San Clemente Island indian paintbrush.
- Continued seed collection will conserve genetic diversity of the San Clemente Island indian paintbrush.
- While observation in the field suggest that the San Clemente Island indian paintbrush responds positively to fire, further evaluation may help understand an acceptable fire interval for this species.



Map F-2. Distribution of the San Clemente Island indian paintbrush on San Clemente Island.

- Control of non-native plant species will continue to enhance San Clemente Island indian paintbrush habitat.
- The erosion control program and adherence to the 2008 BO will help to ensure that erosion from military activities will not be a significant threat to the San Clemente Island indian paintbrush.
- The San Clemente Island indian paintbrush is recovering dramatically since the removal of the feral grazers from SCI, which was the species primary threat at the time of its federal listing. Since the San Clemente Island indian paintbrush is recovering in areas where minimal direct management occurs, it is expected that continued minimal management will aid in the recovery of this species.

F.3 San Clemente Island Larkspur (*Delphinium variegatum* subsp. *kinkiense*)- Federally Endangered

Species Description

The San Clemente Island larkspur (Photo F-3) is one of three subspecies of larkspur (*Delphinium variegatum*) (Warnock 1990a, 1990b), two of which occur on SCI: San Clemente Island larkspur and Thorne's royal larkspur (*Delphinium variegatum* subsp. *thornei*). While San Clemente Island larkspur is listed as endangered, Thorne's royal larkspur has no federal status.

Photo F-3. The Thorne's larkspur (left) and San Clemente Island larkspur (right) are currently recognized as two subspecies (Navy 2012).

Sepal color, lateral sepal length, and lower petal blade length are generally used to distinguish the subspecies (Dodd and Helenurm 2000). However, Dodd and Helenurm (2000) have found broad variation within populations and substantial overlap among the SCI subspecies in regard to these floral characters. Sepal color appears to be the least ambig-

uous for differentiating the island subspecies. However, using sepal color as a distinguishing tool may be problematic where central populations, which represent a large percentage of the total population, contain both light and dark individuals as well as individuals of intermediate color (Dodd and Helenurm 2000, 2002). Hybridization among other taxa in this genus has been documented; as a result, the intermediate character of central populations strongly suggests there may be hybridization among the subspecies in these populations (Dodd and Helenurm 2002).

Alternatively, the variation observed in the island taxa may indicate that they are a single, highly variable subspecies of *D. variegatum* or a completely different species of larkspur (J. Koontz, pers. com. 2008). Genetics work on the two subspecies has yet to show any variation between plants with light or dark flowers (Dodd and Helenurm 2000). Additional genetic studies and morphological projects will further investigate the variation in the two subspecies. In the future, these studies may suggest combining the varieties, perhaps resurrecting *Delphinium kinkiense* Munz as the species of larkspur on SCI, thus combining both subspecies (J. Koontz, pers. com. 2008). They will remain separate until this taxonomy is published or reported. Until additional studies (currently underway) are completed, and in light of existing genetic data, it would be most prudent to manage both island taxa to maintain the variation observed in the field (J. Koontz and B. O'Brien, pers. com.).

The San Clemente Island larkspur is found primarily on open grassy terraces. It is an herbaceous perennial that generally flowers from March to April (California Native Plant Society 2001). The plant grows between 6 and 33 inches (14–85 cm), although it is generally less than 20 inches (50 cm) tall (Warnock 1993). Many species of this genus are self-incompatible and require insect mediation for pollination (Junak and Wilken 1998). Seeds may also require a dormancy period prior to germination.

Distribution and Status

The San Clemente Island larkspur is endemic to SCI. The species is found across most of the central portion of the island (Map F-3), often in open grassy terraces. While it is currently listed as endangered, the Five-Year Review completed in 2008 recommended downlisting this species to threatened. Given the wide distribution, number of individuals, and minimal threats, delisting is warranted in the near future.

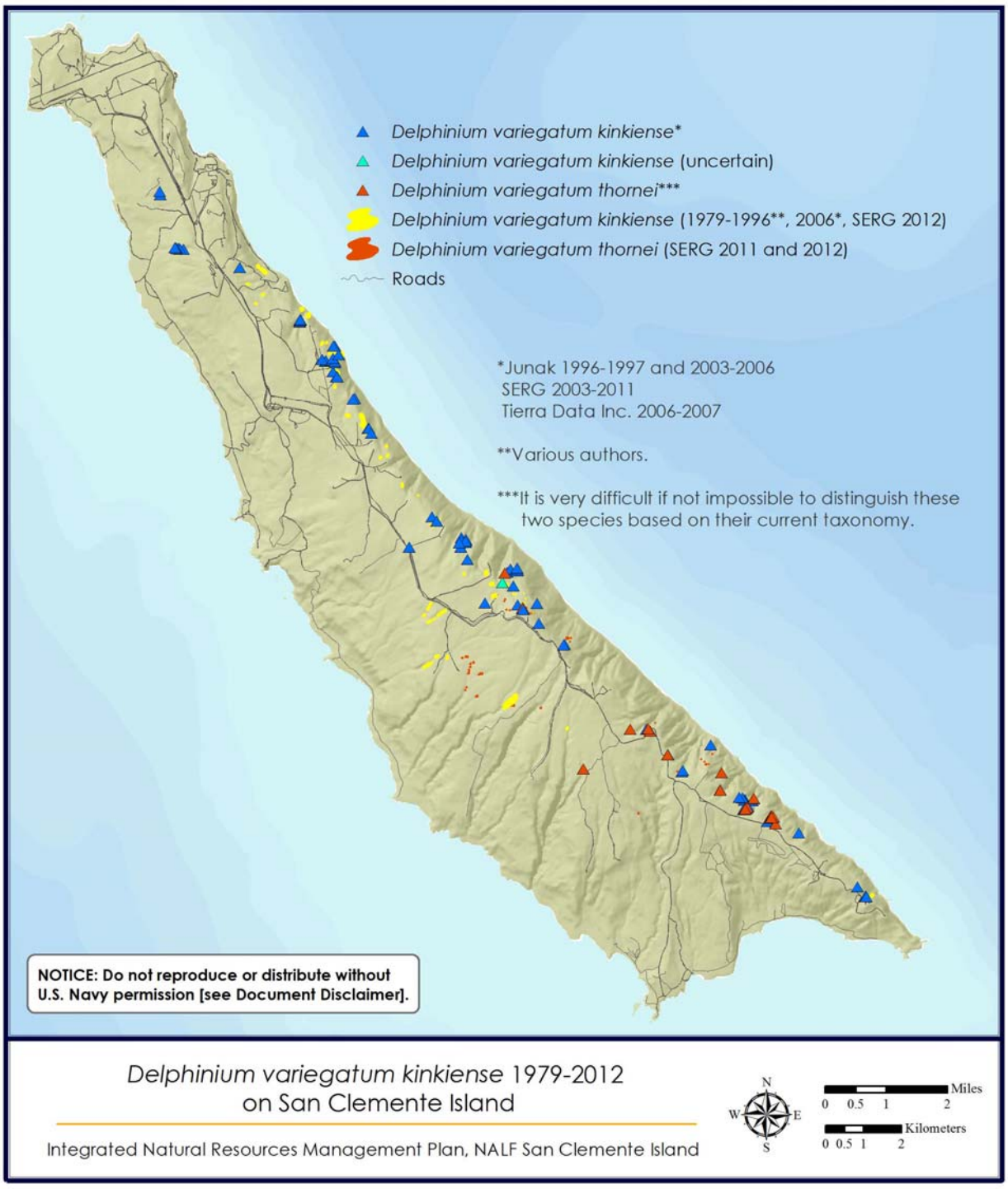
Surveys by SERG in 2011/2012 recorded 36 populations with a total of 2,950 individuals, with a maximum population size of 620 individuals and an average population size of 82 individuals. Counts of individuals were based on numbers of flowering plants; therefore, the total population is likely much higher. Efforts are ongoing to determine the ratio of seedlings, juveniles, non-flowering adults, and reproductive individuals (B. Munson, pers. com. 2011).

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the San Clemente Island larkspur.
- Continued seed collection will conserve genetic diversity of the San Clemente Island larkspur.



Map F-3. Distribution of the San Clemente Island larkspur on San Clemente Island.

- While observation in the field suggest that the San Clemente Island larkspur responds positively to fire, further evaluation may help understand an acceptable fire interval for this species.
- Control of non-native plant species will continue to enhance San Clemente Island larkspur habitat.
- Additional genetic studies will help understand the genetic relationship between *Delphinium veriegatum* subsp. *kinkiense* and *D. v.* subsp. *thornei*.
- Common garden, greenhouse propagation, and reciprocal transplant-type experiments have been proposed and may be implemented in the next several years to investigate the effects of soils, exposure, and microclimate on floral color.
- The San Clemente Island larkspur is recovering dramatically since the removal of the feral grazers from SCI, which was the species primary threat at the time of its federal listing. Since the San Clemente Island larkspur is recovering in areas where minimal direct management occurs, it is expected that continued minimal management will aid in the recovery of this species.

F.4 San Clemente Island Woodland-Star (*Lithophragma maximum*) - Federally Endangered

Species Description

The San Clemente Island woodland-star (Photo F-4) is a perennial, rhizomatous herb that grows to 24 inches (60 cm) in height. It generally flowers from April to June. This species' flowers are small, bisexual, and white but sometimes are tinted pink. All other species in this genus are self-incompatible, and mainland species are mainly pollinated by moths and solitary bees (Junak and Wilken 1998). Its seeds are spiny and depend on wind or animals for dispersal.

Photo F-4. San Clemente Island woodland-star (Navy 2012).

Distribution and Status

The San Clemente woodland-star is endemic to SCI and occurs in moist canyon bottoms on the east side of the island. It is restricted to a few canyons on the east escarpment between Vista Canyon and Mosquito Cove.

A total of 465 individuals were located within ten occurrences during surveys in 1996 and 1997 (Junak and Wilken 1998) (Map F-4). Two occurrences of the San Clemente Island woodland-star, comprising 17 individuals, were mapped on SCI between 2003 and 2006 (Junak 2010); both of these populations were found in previously unreported locations. Current estimates based on surveys through 2007 are 12 occurrences with 17 individuals. The species is difficult to locate in the field, and most populations are not relocated in every survey (B. Munson, pers. com. 2011).

Most sites where populations occur pose access challenges, and relocation of reported sites by new observers is similarly difficult. One new location was found in Grove Canyon under oaks in 2011 and was relocated in 2012, with approximately 30 individuals. No historic locations have been relocated since Junak's surveys in 2006/2007, despite yearly visits to those coordinates. Many of the historic sites have high cover of island snapdragon or island morning glory, which may be obscuring or overtopping the San Clemente Island woodland star (B. Munson, pers. com. 2011). The entirety of this species' range is currently within a restricted access area.

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

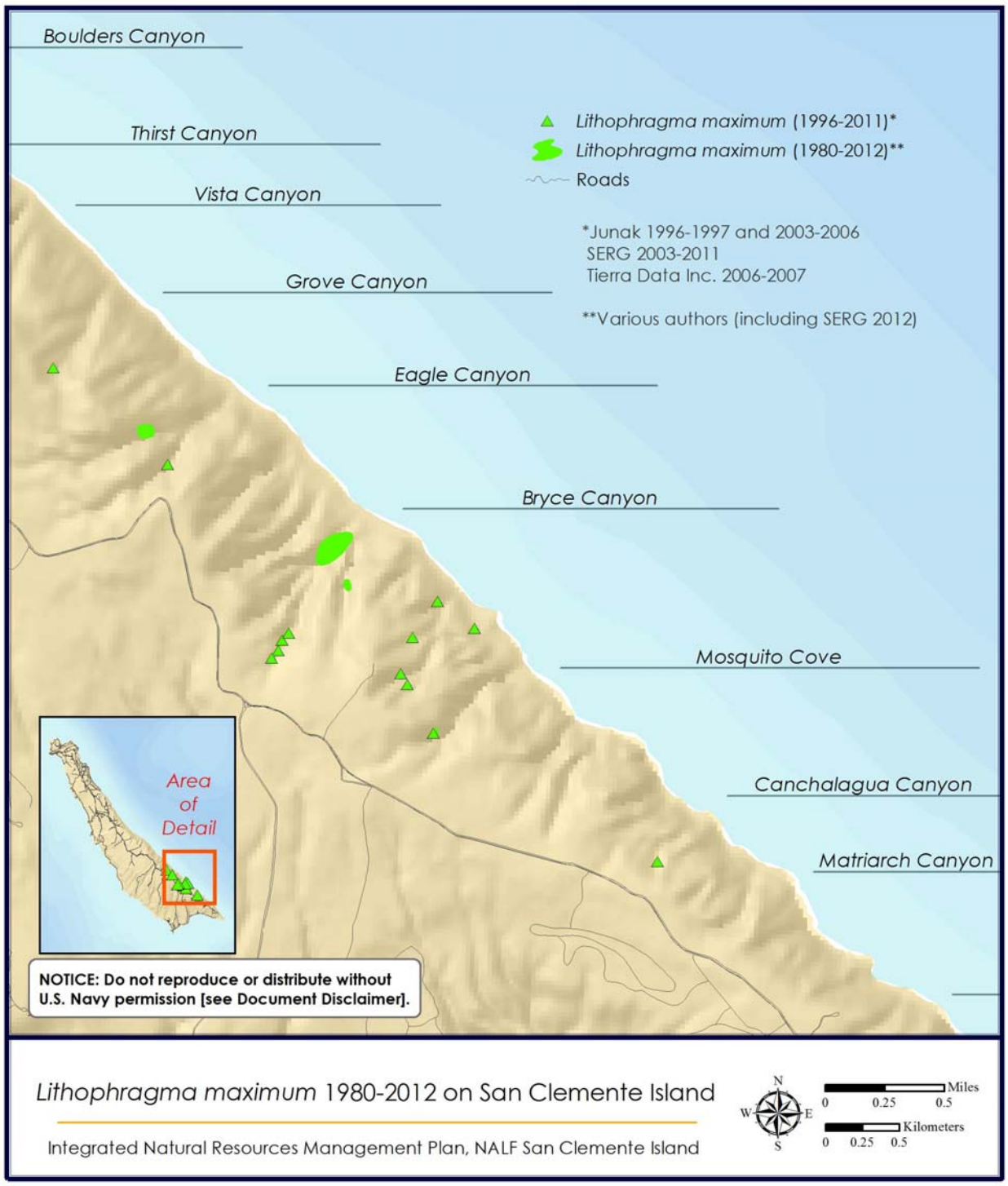
Beneficial Management

- The primarily threat to the San Clemente Island woodland-star, at the time of its federal listing, were feral grazers; this threat has since been removed completely from the island.
- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the San Clemente Island woodland-star.
- Continued seed collection will conserve genetic diversity of the San Clemente Island woodland-star and lower the risk of complete extinction.
- Control of non-native plant species will continue to enhance San Clemente Island woodland-star habitat.

F.5 San Clemente Island Bush-Mallow (*Malacothamnus clementinus*) - Federally Endangered

Species Description

San Clemente Island bush-mallow (Photo F-5) is a low shrub reaching 27.5 to 39 inches (70–100 cm) tall. Its branches are tomentose when young, covered with long, gray, stellate hairs. It produces a spike of densely crowded bisexual, pink flowers, generally from April to August (Munz 1974). Fruits dehisce (ripen and detach from plant) slowly and irregularly. It is probably pollinated by solitary bees (Beauchamp n.d.).



Map F-4. Distribution of the San Clemente Island woodland-star on San Clemente Island.

Photo F-5. San Clemente Island bush-mallow (Tierra Data Inc. 2006).

Distribution and Status

The San Clemente Island bush-mallow is endemic to SCI. The species is primarily found in the southwestern portion of the island on coastal flats with maritime scrub vegetation and on vegetated flats in canyon bottoms.

For the discussion below, an occurrence is defined as an identifiable and separable group of plants in concurrence with USFWS terminology used in their 12-month finding (USFWS 2012c). An occurrence was defined by mapping smaller groupings of plants (point locations) and combining point locations that fall within 0.25 miles (402 m) of one another with any corresponding California Natural Diversity Database polygons. This definition of a species occurrence meets the broader California Department of Fish and Wildlife definition of an element occurrence, which is a record of an observation or series of observations. Given this definition of an occurrence, where past surveys for the species have used the term occurrence to describe their findings, this discussion will describe as a location. In this context, a location will be defined as an individual point or polygon record linked to a geographic coordinate.

Reports from 1996 and 1997 documented 290 individuals in 18 locations (Junak and Wilken 1998). Some of these older locations have not been recorded since their initial reports, such as the location in Lemon Tank Canyon. Although these locations are still depicted in maps of this species, their current status is unknown until surveyors can verify them (some, like the Lemon Tank location, lie within areas with restricted access due to Explosive Ordnance Disposal concerns). More recent surveys indicate the population is growing (Map F-5). Between 2003 and 2006, 61 locations were mapped comprising 1,300 clumps. The best estimate in 2007 was roughly 1,600 individuals (USFWS 2007a). The largest population consisted of 300 clumps and the average population was 22 clumps (Junak 2010). Surveys in 2011/2012 by SERG documented 96 locations, comprised of 5,562 clumps, with the largest location containing 1,200 clumps and an average size of 80 clumps. Determination of genets versus ramets remains extremely difficult,

so the actual number of individuals may be higher or lower. The most recent surveys have not been able to access all populations due to access restrictions. One of largest populations occurs in Horse Beach Canyon, most of which cannot be accessed or counted as they lie within an Impact Area.

In the USFWS 12-month finding, a total of 11 occurrences, including eight that were only documented in recent years, were identified (USFWS 2012c). Most of the new plants found are relatively small, and often quite a distance away from larger plants. Due to the fact the most of the newly discovered populations are comprised of smaller plants, it is likely that these are new plants and not plants missed by a previous survey effort.

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the San Clemente Island bush-mallow.
- Continued seed collection will conserve genetic diversity of the San Clemente Island bush-mallow.
- While observation in the field suggest that the San Clemente Island bush-mallow responds positively to fire, further evaluation may help understand an acceptable fire interval for this species.
- Control of non-native plant species will continue to enhance San Clemente Island bush-mallow habitat.
- The erosion control program and adherence to the 2008 BO will help to ensure that erosion from military activities will not be a significant threat to the San Clemente Island bush-mallow.
- Additional genetic studies will help understand the overall genetic diversity of the San Clemente Island bush-mallow.
- The San Clemente Island bush-mallow is recovering dramatically since the removal of the feral grazers from SCI, which was the species primarily threat at the time of its federal listing. Since the San Clemente Island bush-mallow is recovering in areas where minimal direct management occurs, it is expected that continued minimal management will aid in the recovery of this species.

F.6 Santa Cruz Island Rockcress (*Sibara filifolia*) - Federally Endangered

Species Description

Santa Cruz Island rockcress (Photo F-6) is an annual with small, bisexual, purplish flowers borne on terminal racemes. Flowers of this size suggest self-compatibility and self-pollination (Richards 1986; Rollins 1981 from Junak and Wilken 1998), which has been observed in cultivated individuals (J. Wall, pers. com. 2002). Plants generally flower from January until March. Each fruit produces several seeds (Junak and Wilken 1998).

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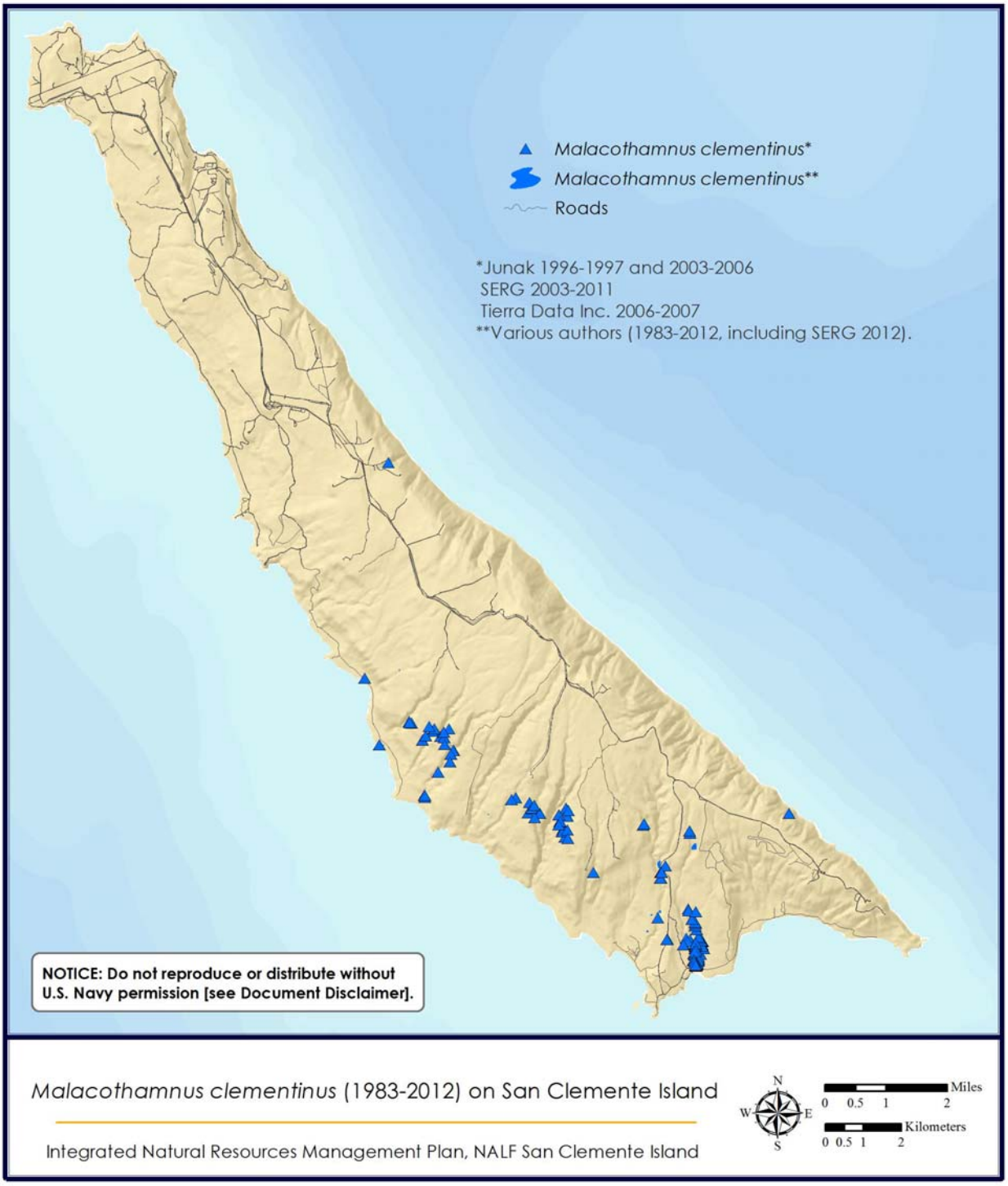


2 *Map F-5. Distribution of the San Clemente Island bush-mallow on San Clemente Island.*

Photo F-6. Santa Cruz Island Rockcress (Tierra Data Inc. 2008).

The species appears to have low genetic diversity, most likely from a lack of pollination and population bottleneck. Genetic data indicate that gene flow between southern California and SCI occurred at historically low rates (B. Munson, pers. com 2013).

Current Distribution and Status

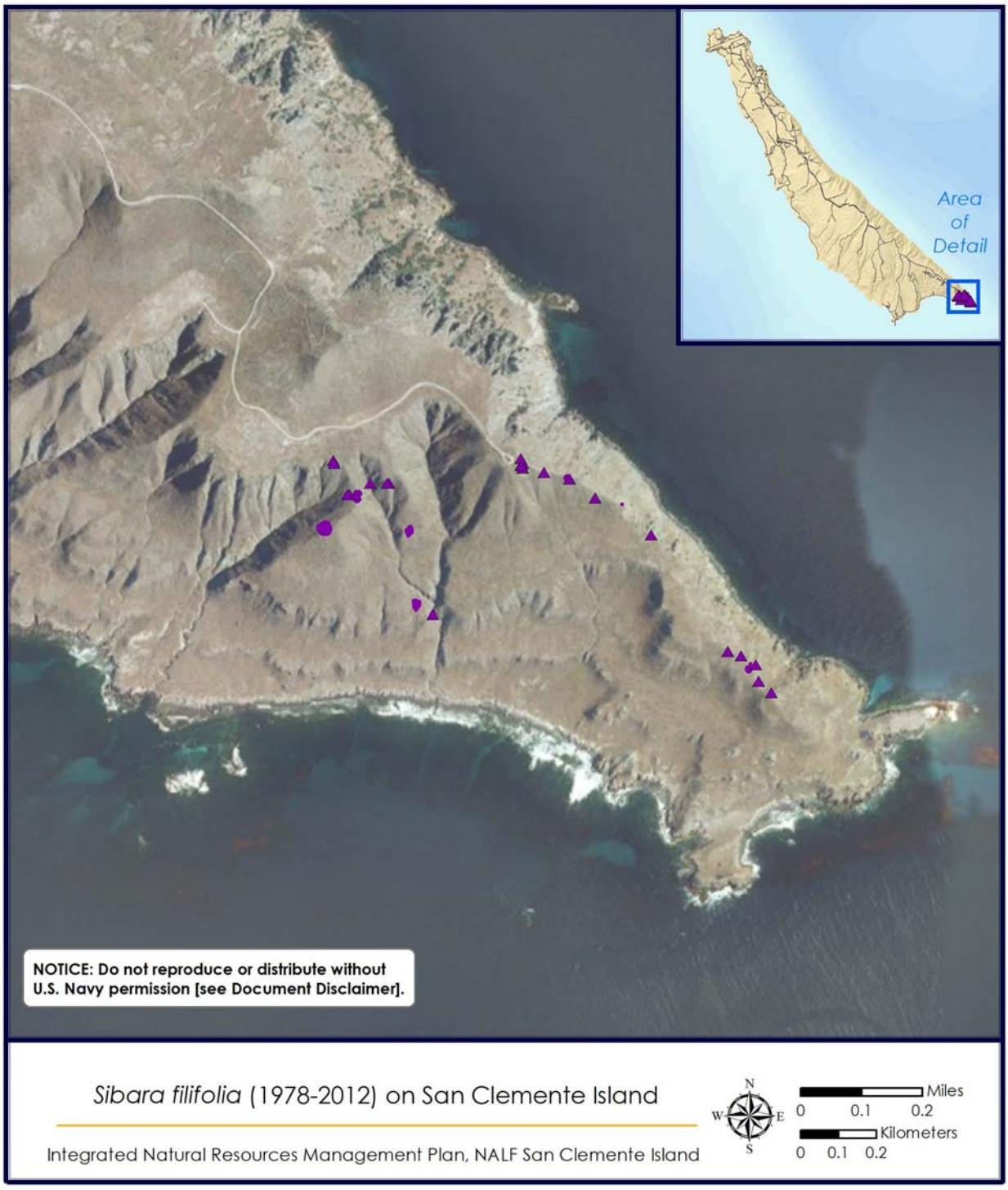
The Santa Cruz Island rockcress (Map F-6) is endemic to Santa Cruz, Santa Catalina, and San Clemente Islands; although, it has not been seen on Santa Cruz Island since 1932 (Junak et al. 1995).

This plant is difficult to see without a search image, and populations have possibly been missed on all three islands. Adding to this difficulty is the fact that, like other island annuals, the rockcress appears to be highly dependent on year-to-year rainfall patterns. there are many island annuals whose populations fluctuate widely from year to year (S. Junak, pers. com. 1996). For these reasons, it is difficult to determine whether populations of this plant are increasing or decreasing. Five locations were reported in Junak and Wilkens' 1996–1997 surveys on three adjacent ridgetops on the very southern tip of the island. One population was visited in 1996 and 29 individuals were counted; when revisited in 1997 (a wetter-than-average season), 208 individuals were recorded at the same site (Junak and Wilken 1998).

The most recent surveys between 2003 and 2006 (years with consecutive drier-that-average seasons) found only three locations of this species with four, 11, and 52 individuals, respectively (Junak 2010). At most, eight locations of this species have been documented since focused rare plant surveys began on SCI (USFWS 2006).

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.



Map F-6. Distribution of the Santa Cruz Island rockcress on San Clemente Island.

■

Beneficial Management

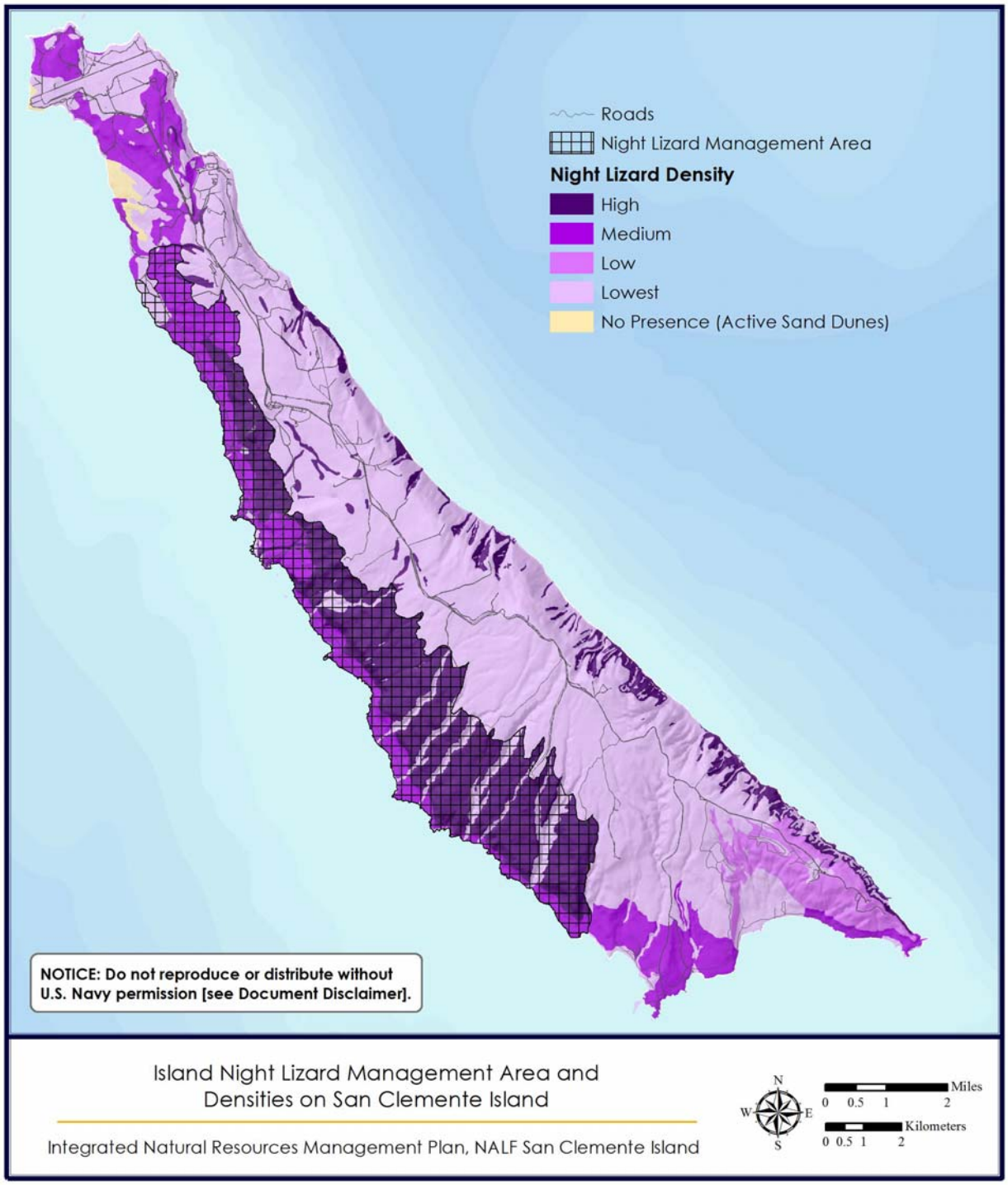
- The primarily threat to the Santa Cruz Island rockcress, at the time of its federal listing, were feral grazers; this threat has since been removed completely from the island.
- Island-wide vegetation surveys and rare plant monitoring provides important population trends and habitat information necessary for managers assessing the status of the Santa Cruz Island rockcress.
- Continued seed collection will conserve genetic diversity of the Santa Cruz Island rockcress.
- Control of non-native plant species will continue to enhance Santa Cruz Island rockcress habitat.
- The potential to cross-pollinate populations on SCI with more genetically robust populations from Catalina Island is a possibility to recover this species on the island.
- The erosion control program and adherence to the 2008 BO will help to ensure that erosion from military activities will not be a significant threat to the Santa Cruz Island rockcress.

F.7 Island Night Lizard (*Xantusia riversiana*) - Federally Threatened

Species Description

The island night lizard (Photo F-7) is a small (2–4 inches [6–10 cm] vent-to-snout), diurnally active yet reclusive reptile that confines its movements to areas of dense vegetation and rocks to shelter from predators and the heat. Individuals reach sexual maturity in their third (males) or fourth (females) year. Breeding begins in March and live young are born in September. Four to five young (mean number of offspring is 4.4) are produced per breeding cycle and their life expectancy ranges from 11 to 13 years (Mautz 2001). They eat a variety of insects as well as the fruits, leaves, and flowers of boxthorn plants. The island night lizard maintains its temperature within a narrower range than most lizards and cannot withstand temperatures in excess of 104°F (40°C) (Mautz 1979).

Photo F-7. Island night lizard on San Clemente Island.



Map F-7. Island night lizard densities on San Clemente Island.

Distribution and Status

The island night lizard is found on SCI, San Nicolas, and Santa Barbara Islands. Of the three islands on which this species occurs, SCI contains the largest population, which was petitioned by the U.S. Department of the Navy (Navy) in 2004 for designation as a distinct population segment and for delisting (Navy 2004b). During the most recent Five-Year Review by the USFWS, it was recommended that the island night lizard warranted delisting (USFWS 2012d). The species is found in all habitats across SCI, except in active sand dunes, which lack sufficient cover and crevices for protection (Map F-7). The population on SCI is estimated to be stable at approximately 20 million individuals (Mautz 2001).

Relevant Biological Opinions

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

Beneficial Management

- Continued population monitoring and habitat evaluations meet Navy obligations for species monitoring and adaptive management.
- Preparation of a Post-Delisting Monitoring Plan will provide both the Navy and USFWS with a clear understanding of future monitoring for planning and species management purposes.

F.8 San Clemente Sage Sparrow (*Artemisiospiza belli clementae*) - Federally Threatened

Species Description

San Clemente sage sparrows (Photo F-8) are medium-sized, nonmigratory sparrows from 4.8 to 5.9 inches (12.1 to 15.0 cm) long (Martin and Carlson 1998; Turner et al. 2005). They have a brownish-gray back and distinctive white and black stripes on their face. Breeding behavior can begin as early as December, but begins more typically in February, and nesting is from mid-March through June. Birds may lay up to five clutches in a year and each clutch contains three to five eggs. Females incubate the eggs for 12 to 13 days; both parents bring food to the chicks (Martin and Carlson 1998; Turner et al. 2005). Nests in maritime desert scrub habitat are placed low in shrubs with dense branches (Martin and Carlson 1998), which provide important protection and cover from predators.

Distribution and Status

The San Clemente sage sparrow population has ranged from a low of 38 individuals in 1984 to a high of 1,519 adults in 2002 (reviewed in Beaudry et al. 2004). The most recent estimates of population size are from 1,047 to 1,457 individuals (Docherty et al. 2011). However, these data should be viewed with caution. To date, nest monitoring plots have been placed exclusively in maritime desert scrub (Map F-8), the primary habitat in which sage sparrows were thought to breed. Recently, individuals were documented using maritime sage scrub, which may be a response to the dramatic recovery of this community. There are likely differences in breeding success and survival between these two habitats. For this reason, analyses to date have been based on incomplete data and are likely underestimating the actual population size; in contrast, population trends are likely well-reflected. Efforts are currently underway to develop a monitoring plan that will include sampling in additional habitats that may be used by sage sparrows as the population continues to recover.

Photo F-8. San Clemente sage sparrow, banded for identification (Navy 2012).

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

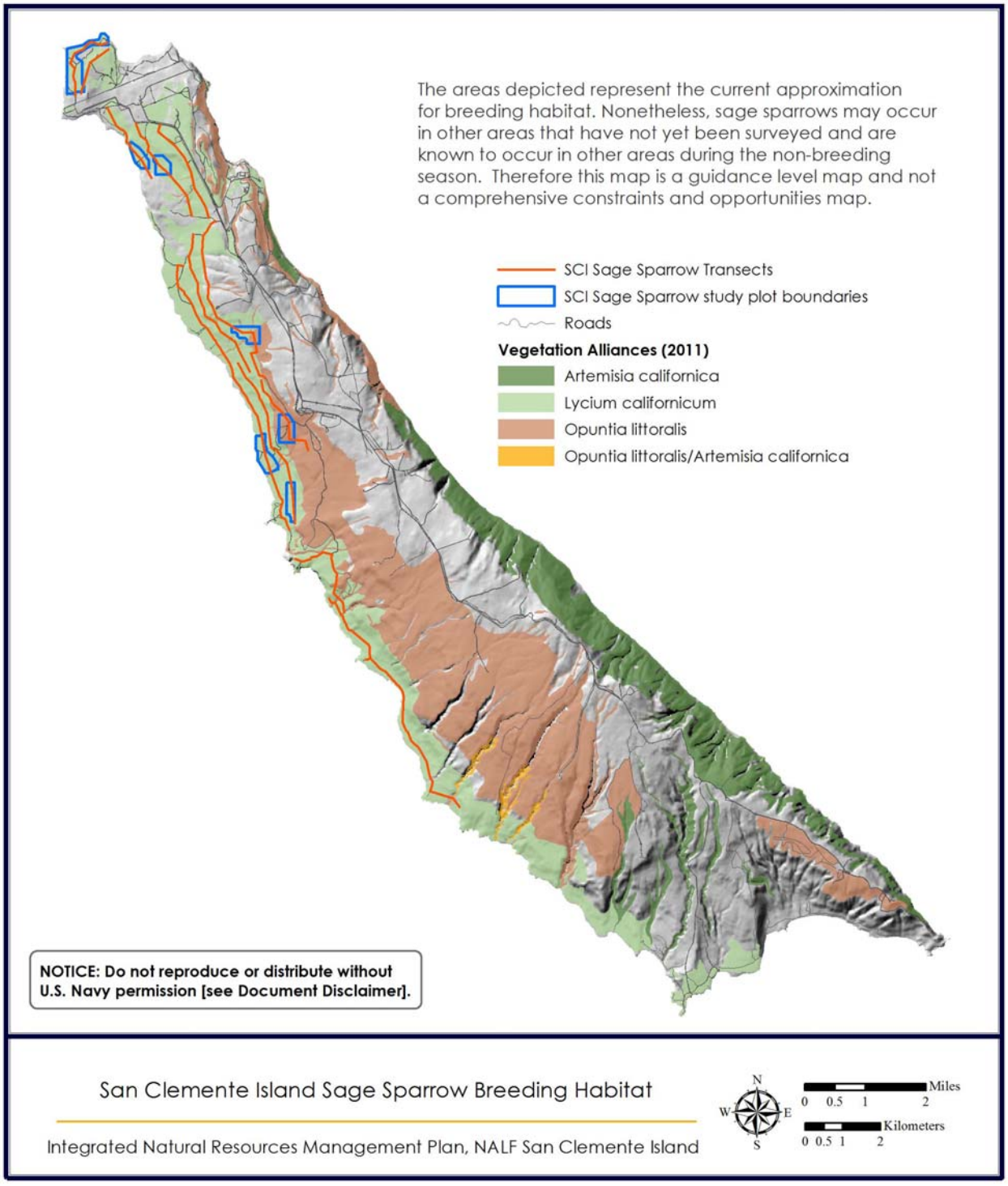
Beneficial Management

- Current monitoring (through 2012) is under redesign to better assess island-wide population numbers and trends. New monitoring methods will improve natural resource managers' ability to assess species progress toward recovery.
- Surveys to assess juvenile survivorship have helped to determine the cause(s) of juvenile mortalities and have triggered management responses to reduce juvenile mortality.

F.9 San Clemente Loggerhead Shrike (*Lanius ludovicianus mearnsi*) - Federally Endangered

Species Description

The San Clemente loggerhead shrike (Photo F-9) is a small, nonmigratory, predatory bird with the unique habit of impaling or wedging its prey. They use elevated perches, snags, shrubs, and rock outcrops from which to hunt and open foraging areas with a readily available supply of invertebrate and small vertebrate prey (insects, lizards, small birds, and mice) (Scott and Morrison 1990). Individuals begin to form pair bonds as early as November and most nesting occurs between April and May. Average clutch size ranges from four to six eggs (Yosef 1996). Nest-building takes approximately one week and is primarily completed by the female. Nests are approximately 3 to 5 inches (8-13 cm) in diameter and consist of an outer structure of twigs lined with grasses and forbs (Scott and Morrison 1990). Females incubate eggs for 16-18 days and males provision females during this time; once the chicks hatch, they are cared for by both parents until they leave the nest as fledglings, approximately 20 days after hatching (USFWS 1984). Fledglings are not fully capable of flight or of feeding themselves until approximately 40 days of age. Shrikes reach maturity at one year (Miller 1931) and some pairs remain together for multiple years.



Map F-8. San Clemente sage sparrow densities on San Clemente Island.

Photo F-9. A banded San Clemente loggerhead shrike (Navy 2012).

Distribution and Status

The San Clemente loggerhead shrike is endemic to SCI. Nest locations in 2010 were found in the following habitats: 24.5% (n = 25) were in Catalina Island cherry (*Prunus ilicifolia*), 19.6% (n = 20) in lemonade berry (*Rhus integrifolia*), 12.7% (n = 13) in sagebrush (*Artemesia* spp.), 10.8% (n = 11) in coyote brush (*Baccharis pilularis*), 7.84% (n = 8) in big berry toyon (*Heteromeles arbutifolia*), and less than 5% each were in oak (*Quercus* spp.), island morning-glory (*Calistegia macrostegia*), Santa Cruz Island ironwood (*Lyonothamnus floribundus* ssp. *asplenifolius*), Nevin's woolly sunflower (*Eriophyllum nevinii*), showy island snapdragon (*Galvezia speciosa*), and big-pod ceanothus (*Ceanothus megacarpus*) (Stahl et al. 2011).

Since intensive monitoring began, the population estimate has ranged from a low of four breeding pairs in 1991 to a high of 82 in 2009 (Stahl et al. 2011). In 1998, the population reached its lowest numbers with 14 individuals (M. Booker, pers. com. 2013). The establishment of a captive breeding program in 1991 with the initiation of captive bred releases in 1992 has dramatically increased the population of loggerhead shrikes. Since the program's inception, 455 birds have been released into the wild and 62 remain in captivity (Farabaugh 2012).

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Continued predator management supports subspecies recovery and eventual delisting while monitoring of the population, in order to assess affects of recovery efforts, will aid adaptive management.
- The captive breeding and release program augment the wild population, enabling and/or expediting recovery, and maximized genetic diversity for this intensely managed subspecies.

F.10 Western Snowy Plover (*Charadrius nivosus*) - Federally Threatened

Species Description

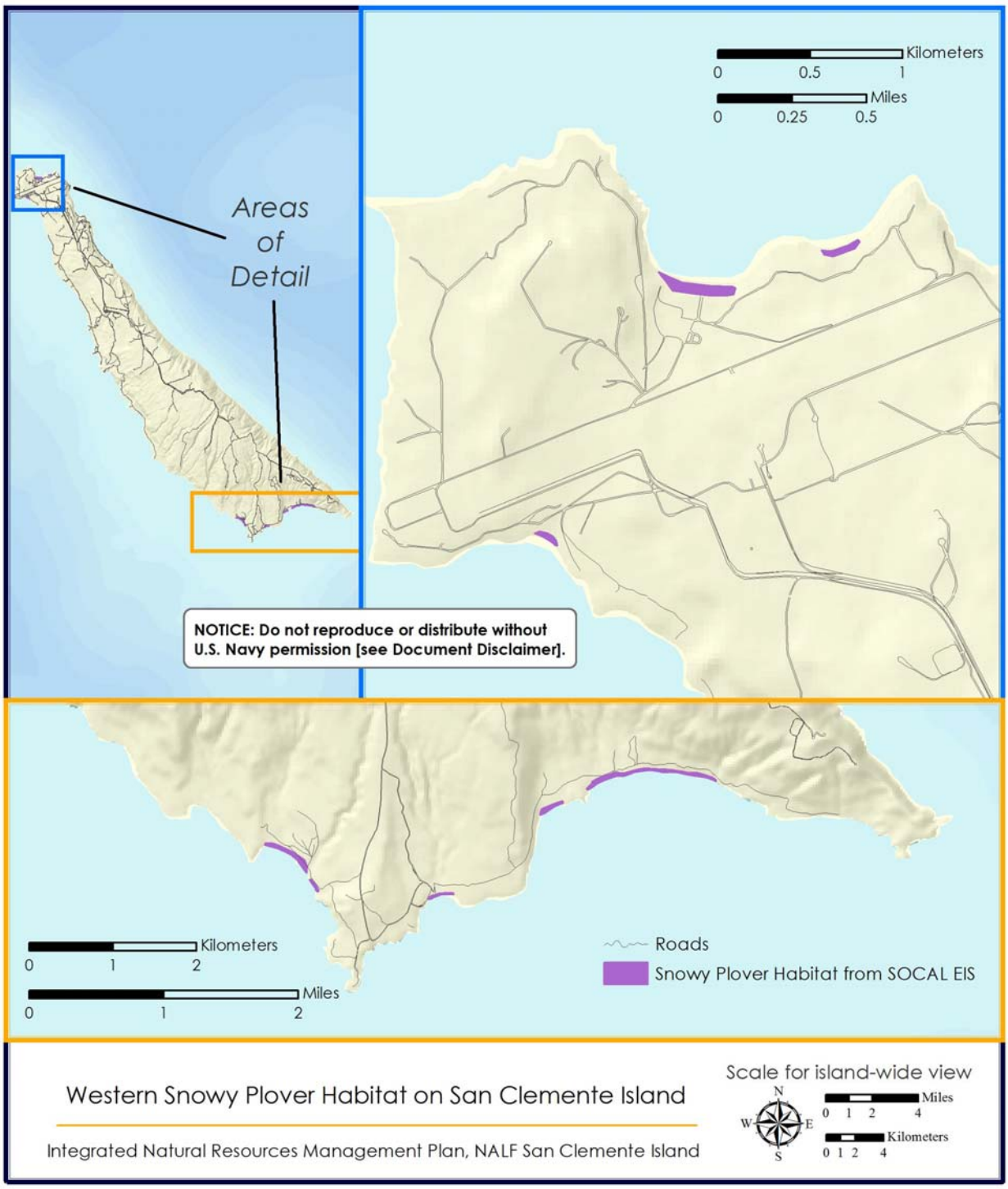
The western snowy plover (Photo F-10) is a small (6–7 inches [15-17 cm] from beak tip to tail tip) brownish-gray shorebird that winters and breeds along the Pacific Coast from southern Washington to southern Baja California. Snowy plovers are partial migrants with some plovers wintering in the same area in which they breed and others migrating to alternate locations throughout their range (Page et al. 1995; Warriner et al. 1986). The breeding season extends from mid-March through mid-September (USFWS 1993). Typical clutch size is three eggs with incubation averaging 27 days and fledging time averaging 31 days (Warriner et al. 1986). The chicks are precocial, leaving the nest within hours after hatching to search for food. At beach locations, they feed on invertebrates in the wet sand and within kelp along the high tide line.

Photo F-10. Wintering Western Snowy Plover on West Cove Beach (J. Stahl, Institute for Wildlife Studies, 2012).

Distribution and Status

The consistent presence of western snowy plovers in the winter, and coastal origin of all identifiable individuals on SCI, suggest that SCI is an important wintering area for the coastal population of this species (Lynn et al. 2006b). The recovery plan for the western snowy plover (USFWS 2007b) identified six beaches on SCI as important for wintering birds: Pyramid Cove, Horse Beach, China Cove, West Cove, Graduation Beach, and BUD/S Beach (Map F-9). Of these, only three are currently monitored (West Cove, Graduation Beach, and BUD/S Beach) due to access restrictions. Plovers are known to winter at all of the surveyed beaches. Of the three currently surveyed beaches, West Cove has the highest number of plovers with 15–25 plovers observed during winter monthly counts (Stahl and Bridges 2010; M. Booker pers. com. 2011). Surveyors in 2010 detected a maximum of 24 plovers at West Cove, BUD/S Beach, and Graduation Beach (Stahl and Bridges 2010). In 2004 at the same locations, 19 plovers were detected. Numbers of wintering plovers typically peak in November. Plovers are occasionally present during the breeding season.

Although breeding on SCI has been confirmed three times, recent surveys from 2000 to 2005 and from 2008 to 2010, have shown no evidence of snowy plover breeding activity (Foster and Copper 2000, 2003; Lynn et al. 2004b, 2005, 2006b; Stahl and Bridges 2010). However, the southern beaches, with the most likely nesting areas, have not been surveyed since 2003 due to access restrictions in high explosive impact areas.



Map F-9. Western snowy plover habitat on San Clemente Island.

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, CA.

Beneficial Management

- Continuation of non-breeding season surveys at West Cove and Northwest Harbor will give managers an assessment of the wintering and/or migration population on SCI.
- Plans to explore the feasibility of using remote sensing technology to monitor plover use of Pyramid Beach and China Beach will hopefully be successful, resulting in a more accurate depiction of plover use on SCI.

F.11 Murrelets (*Synthilboramphus* spp.) - Federal Candidate

Species Description

In July 2012, the two subspecies of the Xantus's murrelet were split into separate species (Chesser et al. 2012) under the support of the American Ornithologists' Union: the Scripps's murrelet (*Synthilboramphus scrippsi*) and the Guadalupe murrelet (*S. hypoleucus*). These murrelets are small (23 to 25 cm in length) seabirds and weigh six ounces (Drost and Lewis 1995). They are most easily distinguished by facial plumage with the Scripps's murrelet having black feathers above and in front of the eye, whereas the Guadalupe murrelet has white feathers. Murrelets spend the majority of their lives at sea, only coming to land to nest. Timing of breeding of alcids in California is related to prey availability within the California Current and is strongly influenced by oceanographic conditions (Ainley and Boekelheide 1990). They typically begin arriving in the vicinity of breeding colonies in December and January (Murray et al. 1983; Gaston and Jones 1998). Egg-laying is unsynchronized but typically peaks from mid-March to mid-April (Gaston and Jones 1998). Nesting occurs on offshore rocks or islands in rock crevices or small caves along or near cliff edges but can also occur under shrubs and ground vegetation (Hunt et al. 1979). By the end of July, murrelets are uncommon on or near offshore breeding areas, as adults with newly hatched young disperse rapidly (Hunt et al. 1979; Murray et al. 1983).

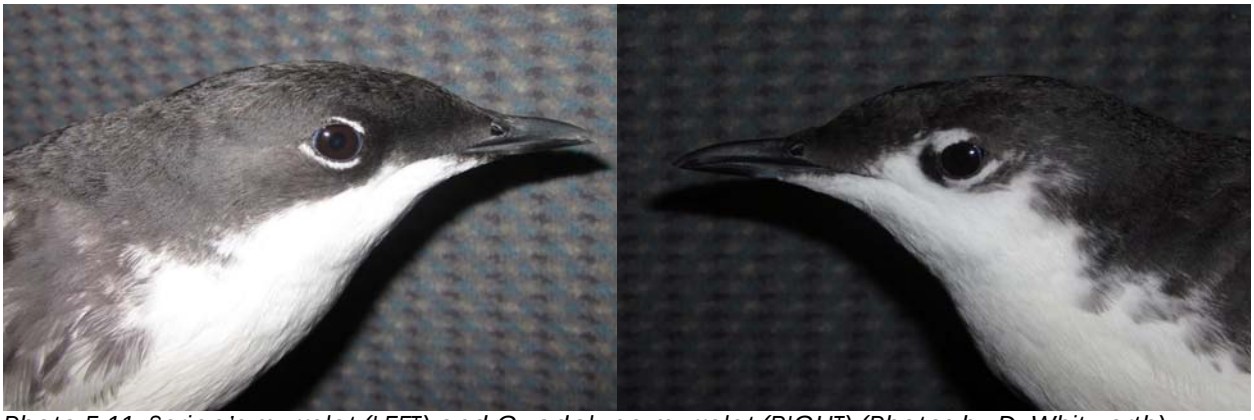


Photo F-11. Scripp's murrelet (LEFT) and Guadalupe murrelet (RIGHT) (Photos by D. Whitworth).

Distribution and Status

Substantial declines have been documented in both the Scripps's and Guadalupe murrelet. The Guadalupe murrelet nests on Guadalupe and San Benito Islands off Baja California, Mexico while the Scripps's murrelet nests from the Channel Islands off the southern California Coast to San Benito Islands (Jehl and Bond 1975). Both subspecies are present at and are thought to breed on SCI (M. Booker, pers. com. 2011).

SCI currently supports one of the smallest Scripps's murrelet colonies in the world (Drost and Lewis 1995; Burkett et al. 2003) and small numbers of Guadalupe murrelets (< 20 pairs) currently breed at SCI. Spotlight surveys in 2008 confirmed that about ten to 25 pairs attend at-sea congregations at SCI (Carter et al. 2009). The majority of this population appears to breed in the Seal Cove area. However, isolated breeding pairs may also nest in small pockets near Castle Rock, the Wilson Cove area, China Point areas, and between Mosquito Cove and Pyramid Head (Carter et al. 2009). However, more surveys are needed to obtain reliable population estimates, examine trends, and identify all, if any, breeding locations on the island. At-sea captures of the Scripps's murrelet increased and slightly increased for the Guadalupe murrelet from 1994 to 2012 (Carter et al. 2009; Whitworth et al. 2012).

Historical data are lacking to suggest murrelets have bred on the island in other than small numbers or isolated breeding pairs since the introduction of the island fox by native people likely within the last 10,000 years (Hunt et al. 1979; Carter et al. 1992; Drost and Lewis 1995; Rick et al. 2009). However, given the great difficulty of obtaining population data on murrelets at SCI, population changes may have occurred but not been detected (Carter et al. 2009). Population trends at SCI are impossible to assess with the available data.

Relevant Biological Opinion

Not applicable.

Beneficial Management

- Long-term, continuous non-native predator control has likely suppressed predation pressure on nesting seabirds. Predator control efforts will continue.
- The continuation and expansion of seabird monitoring on SCI will add to knowledge of seabird habitat and use of the island. These surveys will continue to track trends over time and with climatic shifts, allow for the refinement of oil spill response plans, and potentially provide an indication of the level of anthropogenic effects to nesting species.

F.12 Ashy Storm-Petrel (*Oceanodroma homochroa*) - Federal Candidate

Species Description

The ashy storm-petrel is a smoke-gray, medium-sized seabird with long slender wings, a long forked tail, and webbed feet (Ainley et al. 1995). Their range extends from northern California to central Baja California, Mexico.

They nest in crevices of talus slopes, rock walls, sea caves, cliffs, and driftwood (James-Veitch 1970). The breeding season can occur year-round, although it primarily takes place from February through October, with courtship lasting up to three months (Ainley et al. 1995). Egg-laying extends from late March to October with a peak in June and July (James-Veitch 1970). Adults will feed their chicks, on average, every one to three nights (James-Veitch 1970). Fledging occurs at night, from late August to January (Ainley et al. 1974). Once the chicks leave the nest, they are completely independent of their parents (Ainley et al. 1974).

The majority of the population breeds in coastal areas and on islands off central and southern California (McChesney et al. 2000). The largest breeding colonies are on the Farallon and Channel Islands (San Miguel, Santa Barbara, Santa Cruz, and Anacapa Islands), which together support approximately 98% of the global population (Carter et al. 1992).

Distribution and Status

Aggregations of ashy storm-petrels were observed during surveys from 1999–2002 between Santa Cruz and San Nicolas Islands, in the western Santa Barbara Channel, and 6 to 43 miles (10–70 kilometers) offshore from San Miguel Island to Point Buchon (Takekawa et al. 2004). At-sea densities were greatest during May and September, and densities were greater from 1999–2002 than densities from 1975–1983 throughout the entire study area. Ashy storm-petrels were not observed at any time along the coastal survey area.

About five to 50 breeding pairs or ten to 100 breeding individuals were estimated on SCI in 1994. Observations of ashy storm-petrels during spotlight surveys in 2008 indicated continued attendance of this colony (Carter et al. 2009). Ashy storm-petrel population trends at SCI were not determined due to the lack of current data (Carter et al. 2009). However, no information is available to suggest that ashy storm-petrels have bred on the island in other than small numbers or isolated breeding pairs since the introduction of the island fox (Rick et al. 2009).

Relevant Biological Opinion

Not applicable.

Beneficial Management

- Long-term, continuous non-native predator control has likely suppressed predation pressure on nesting seabirds. Predator control efforts will continue.
- The continuation and expansion of seabird monitoring on SCI will add to knowledge of seabird habitat and use of the island. These surveys will continue to track trends over time and with climatic shifts, allow for the refinement of oil spill response plans, and potentially provide an indication of the level of anthropogenic effects to nesting species.

F.13 California Brown Pelican (*Pelecanus occidentalis*) - Federally Delisted Species

Species Description

The California brown pelican (Photo F-12) is one of the six subspecies of the brown pelican. Adults are a large, dark gray-brown water bird with white on the head and neck. Immature animals are gray-brown above and on the neck, with white on the underside of the body.

Brown pelicans measure up to 54 inches (137 cm) long, weigh 8 to 10 pounds (lbs) (4 to 5 kilograms [kg]), and have a wingspan between 6.5 and 7.5 feet (2 to 2.2 m) (Shields 2002). Pelicans are social, congregating in large flocks for most of the year. In general, they migrate northward in July or August after breeding and return in December or January to breed (Shields 2002); however, some individuals are known to forgo migration and are year-round residents in the Southern California Bight.

Photo F-12. Nesting California brown pelicans on San Clemente Island (J. Stahl, IWS, 2011).

Nests are built in low shrubbery or on the ground on islands or remote coastal areas. They breed primarily in the spring but breeding is asynchronous, with egg laying starting as early as November and as late as June; most nesting occurs from February to October (Anderson and Gress 1984). They typically begin to breed between three and five years old (Shields 2002). Both females and males will share the responsibility of incubating the eggs and raising the young. They feed almost exclusively on small schooling fish, in particular the northern anchovy (*Engraulis mordax*) and Pacific sardine (*Sardinops sagax caerulea*) (Anderson et al. 1980; Anderson et al. 1982).

Distribution and Status

A large breeding colony (~197 fledglings) was discovered in 2011 on SCI (M. Booker, pers. com. 2012). While there was no breeding activity at the colony in 2012, pelican colonies can be dynamic and the area may be reused for nesting in the future. The discovery of the California brown pelican breeding colony in 2011 suggests the species is increasing its use of SCI.

Relevant Biological Opinion

USFWS BO FWS-LA-09B0027-09F0040. San Clemente Island Military Operations and Fire Management Plan 2008. Carlsbad Fish and Wildlife Office, Carlsbad, California.

Beneficial Management

- Surveys of the California brown pelican at SCI will support monitoring of the species no less than five years after delisting from the Endangered Species Act and support an assessment of SCI's importance as a breeding area within the Channel Islands.

F.14 White Abalone (*Haliotis sorenseni*) - Federally Endangered

Species Description

White abalone are herbivorous gastropods found in deep rocky habitat interspersed with sand channels (Tutschulte 1976; Davis et al. 1996). Sand channels may be important for the movement and concentration of drift macroalgae, upon which white abalone are known to feed (National Marine Fisheries Service [NMFS] 2008). Abalone have separate sexes and are broadcast spawners, releasing millions of eggs or sperm into the water column during a spawning event. Fertilized eggs hatch and develop into free-swimming larvae, spending five to 14 days as a non-feeding zooplankton before development (i.e., metamorphosis) into the adult form. After metamorphosis, they settle onto hard substrates in intertidal and subtidal areas where they feed on drift and attached algae. Abalone grow slowly with a relatively long life span of 35 to 40 years, growing to a maximum diameter of 10 inches (25 cm) (NMFS 2008). They reach sexual maturity at age four to six years and 3 to 5 inches (9 to 13 cm) in diameter.

Distribution and Status

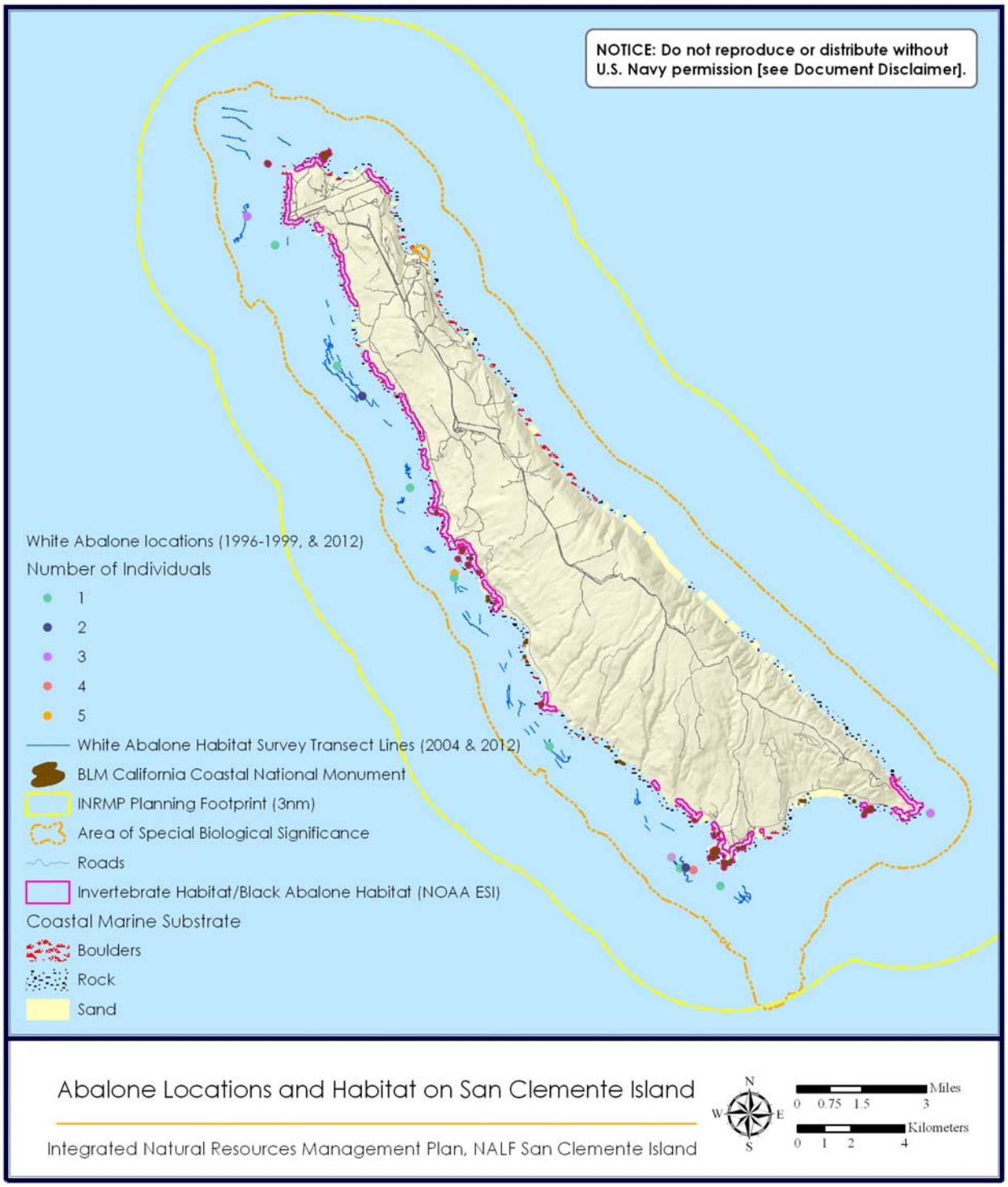
White abalone surveys in nearshore waters of SCI have not included all potential habitat; however, surveys have included habitat where white abalone were known to occur in the past (Map F-10).

Surveys conducted in 2009 were limited to the northern, western, and southern sides of the island. Most of the individuals observed were found offshore of the center of the island on the west side. Individuals and groups of two or more individuals were most abundant offshore from Seal Cove and Seal Point. A total of 24 white abalone were found, ranging from one to six individuals per site, at ten of the 26 sites surveyed. Abalone were found in 100 to 200 feet (30–60 m) of water, with most at approximately 157 feet (48 m).

Surveys conducted in 2004 occurred off the west shore of SCI from Castle Rock south to China Point. All abalone were found at 100 to 130 feet (30–40 m) and 130 to 165 feet (40–50 m) depth ranges with none sighted at 165 to 200 feet (50–60 m). White abalone densities were about three abalone per hectare (1.2 abalone per acres). Sites along the west and south edges of SCI were visited again in 2012. A total of five white abalone were observed in all transects. One white abalone was observed at 100 to 130 feet (30–40 m) and one at130 to 165 feet (40–50 m) depth ranges. Three white abalone were observed at 165 to 200 feet (50–60 m). The abundance of white abalone during this survey (0.25 white abalone per kilometer surveyed) was slightly greater than during the 2004 survey.

Relevant Biological Opinion

None.



Map F-10. Known white and black abalone locations around San Clemente Island.

Beneficial Management

- Surveys to evaluate the population and habitat of white abalone at SCI will give a baseline of the species on the island in order to assess effectiveness of recovery efforts in the future.

F.15 Black Abalone (*Haliotis cracherodii*) - Federally-Listed as Endangered

Species Description

Black abalone (Photo F-13) is a large marine gastropod thought to feed primarily on giant kelp and feather boa kelp in southern California (Haaker et al. 1986). They are the shallowest of the abalone species, inhabiting coastal and offshore island intertidal and shallow subtidal habitats on exposed rocky shores where bedrock provides deep, protective crevices for shelter (Leighton 2005). They generally occur in areas of moderate to high surf. Black abalone reach a maximum size of about 8 inches (20 cm) in diameter, but typically range from 4.0 to 5.5 inches (10 to 14 cm), and are thought to live 20 to 30 years (NMFS 2012h). They have separate sexes and broadcast spawn, primarily in summer months.

Photo F-13. Black abalone at San Clemente Island (Tierra Data Inc. 2008).

Distribution and Status

A survey aimed at recording black abalone distribution at SCI was conducted in January 2008 (Tierra Data Inc. 2008a). The survey was performed between Northwest Harbor and Pyramid Head along the west shore, within primary abalone habitat. Ten abalone were recorded, with most occurring at locations previously documented to support abundant populations (e.g. West Cove, Eel Point, Mail Point). Based on the area surveyed, approximate black abalone density at SCI is one abalone per 2.3 acres (0.9 hectare).

In 2011 and 2012, the Navy contracted University of California Santa Cruz to conduct additional surveys to evaluate the island-wide population of black abalone. A total of 47 black abalone were found, and it is estimated that a total of 187 black abalone are located in the nearshore waters of SCI (Map F-10).

Relevant Biological Opinion

None.

Beneficial Management

- Continued monitoring to evaluate the population and habitat of black abalone at SCI will allow for the assessment of recovery efforts in the future.
- A continuation of long-term monitoring will add to information on the population in nearshore waters of SCI.

F.16 Sea Turtles

Species Description

Four species of sea turtles occur at sea off the coast of southern California: the leatherback, loggerhead, eastern Pacific green, and olive ridley turtles. There are no known sea turtle nesting beaches on the west coast of the United States and SCI is not a concentration area or destination for sea turtles (P. Dutton, pers. com. 2000).

Leatherback Turtle (Dermochelys coriacea)

The leatherback turtle is the only sea turtle that lacks a hard, bony shell. A leatherback's top shell is approximately 1.5 inches (4 cm) thick and consists of leathery, oil-saturated connective tissue overlaying loosely interlocking dermal bones. Leatherbacks are commonly known as pelagic, but they also forage in coastal waters. They are the most migratory and wide-ranging of all sea turtle species.

Loggerhead Turtle (Caretta caretta)

The loggerhead's top shell is slightly heart-shaped and reddish-brown in adults and subadults while the bottom shell is generally a pale yellowish color. Their diet primarily consists of whelks and conch.

East Pacific Green Sea Turtle (Chelonia mydas)

Green sea turtles are unique among sea turtle in that they primarily eat plants. Adult females migrate from foraging areas to mainland or island nesting beaches and may travel hundreds or thousands of kilometers each way.

Olive Ridley Sea Turtle (Lepodochelys olivacea)

The olive ridley is considered the most abundant sea turtle in the world. They get their name from its olive coloration of its heart-shaped shell. Adults are relatively small. They olive ridley has one of the most extraordinary nesting habitats with large groups gathering offshore nesting beaches; then, hundreds to thousands of females come ashore to lay their eggs. This is known as an arribada.

Distribution and Status

There are no data on absolute densities or abundance of sea turtles on the U.S. Pacific coast. The distribution of sea turtles is strongly affected by seasonal changes in ocean temperature (Radovich 1961). In general, sightings increase during summer as warm water moves northward along the coast (Stinson 1984). Sightings may also be higher in warm water years (e.g. El Niño) in comparison with cold water years (e.g. La Niña).

Leatherback Turtle

Off the west coast of the United States, leatherback turtles are most abundant from July to September, rarely reported during winter and spring. Their appearance in southern California coincides with the arrival of the 64° to 68°F (18° to 20°C) isotherms (Stinson 1984). Stinson (1984) noted that the July appearance of leatherbacks, along the west coast of the United States, was two-pronged with turtles suddenly appearing in southern and northern California, Oregon, and Washington; however, only a few sightings occurred along the intermediate coastline. Turtles may be moving onshore from offshore areas where the water temperature is 55° to 59°F (13° to 15°C) (Stinson 1984). Morreale et al. (1994) found that migrating leatherback turtles often travel parallel to deep water contours, ranging in depth from 650 to 11,500 feet (200–3,500 m). Leatherback turtles could pass through offshore waters near SCI during migration; they could pass through as groups of a few adults and not as large concentrations (P. Dutton, pers. com. 2002).

Loggerhead Turtle

Juvenile loggerhead sea turtles are common year-round in the coastal waters of southern California (Stinson 1984), while adult loggerheads are rarely seen. Sightings are most common during July to September (Stinson 1984). The juvenile loggerheads off southern California may represent the fringe of large aggregations that occur off the west coast of Baja California, Mexico (Bartlett 1989; Pitman 1990). Juvenile loggerheads would be the most common sea turtle present in offshore waters of SCI (P. Dutton, pers. com. 2002). An aggregation could pass through in waters adjacent to the island; it is possible that a few could stop and feed in nearshore SCI waters.

East Pacific Green Sea Turtle

The east Pacific green sea turtle is the most commonly observed hard-shelled sea turtle on the Pacific coast from northern Baja California, Mexico to Alaska (Stinson 1984) and is the only sea turtle species with a confirmed sighting in nearshore waters of SCI (D. Lerma, pers. com. 2011). Most of the sightings (62%) were reported from northern Baja California, Mexico and southern California. Green sea turtles are sighted year-round in the waters off southern California with the highest frequency of sightings occurring during the warm summer months of July through October (Stinson 1984). In waters south of Point Conception, Stinson (1984) found this seasonal pattern in sightings to be independent of inter-year temperature fluctuations. The year-round presence of green sea turtles off southern California likely represents a stable northern Mexican population. Green sea turtles feed on seagrasses in nearshore waters; therefore, this species could be found in nearshore waters of SCI (P. Dutton, pers. com., 2000). However, the waters of SCI are colder than those preferred by green sea turtles, making concentrations of this species rare in nearshore waters of SCI.

Olive Ridley Sea Turtle

A small population of olive ridley sea turtles nest along the Pacific coast of Baja California, Mexico, which is the northernmost known nesting area in the eastern north Pacific (Fritts et al. 1982). Outside of the breeding season, olive ridleys disperse, and little is known of their behavior. Individuals exhibit a nomadic pattern, occupying a series of feeding areas in oceanic waters (Plotkin et al. 1994).

Relevant Biological Opinion

NMFS Programmatic BO 2009 on the Navy's proposal to conduct training exercises in the Southern California Range Complex from January 2009 to January 2014. Endangered Species Division, Office of Protected Resources, National Marine Fisheries Service, Sliver Spring, Maryland.

Beneficial Management

- Measures to protect sea turtles in the nearshore waters of SCI is properly addressed in the most current NMFS Programmatic BO on Navy activities in the Southern California Range Complex.

F.17 Marine Mammals

Species Descriptions

Blue Whale (Balaenoptera musculus)

The blue whale is the largest animal in the world, measuring at about 88 feet (27 m) in the northern hemisphere (NMFS 2012a). They have long and slender bodies with various shades of bluish-grey above and lighter beneath. The blue whale is a baleen whale, filter feeding on small crustaceans known as krill. Most reproductive activity occurs during the winter. The North Pacific population of blue whales occurs from Kamchatka to southern Japan in the west, and from the Gulf of Alaska and California south to at least Costa Rica in the east. Individuals are found primarily south of the Aleutian Islands and Bering Sea.

Fin Whale (Balaenoptera physalus)

The fin whale is the second-largest species of whale with a maximum length of about 75 feet (22 m) in the northern hemisphere (NMFS 2012b). Fin whales have a sleek, streamlined body with a v-shaped head. The species' back and sides are black or dark brownish-gray, and the underside is white. During the summer, fin whales filter feed on krill and squid.

Humpback Whale (Megaptera novaengiliae)

The humpback whale is a baleen whale and can reach lengths of up to 60 feet (18 m) (NMFS 2012c). Their body coloration is primarily dark grey, but individuals have a variable amount of white on the pectoral fins and belly. In the summer, humpback whales are found in high latitude feeding grounds in Alaska. They filter feed on crustaceans, plankton, and small fish. During the winter months, individuals will congregate for mating activities. Humpback whales travel long distances during their seasonal migration; the longest of any other mammal.

North Pacific Right Whale (Eubalaena japonica)

The North Pacific right whale is a large baleen whale, measuring between 45 and 55 feet (13 and 16 m) (NMFS 2012d). The right whale has a stocky body, generally black in coloration, with no dorsal fin, a large head (about ¼ of the body length), strongly bowed margin of the lower jaw, and callosities (raised patches of roughened skin) on the head. They feed primarily on copepods, euphausiids, and cyprids from spring to fall. Unlike most baleen whales, which are filter feeders, right whales are skimmers. Right whales are rarely observed due to their low population numbers.

Sei Whale (Balaenoptera borealis)

The sei whale is a member of the baleen whale family. They can reach lengths of about 40 to 60 feet (12 to 18 m) (NMFS 2012e). Sei whales have long, sleek bodies that are dark bluish-gray to black and pale below. They are usually observed alone or in small groups, but are occasionally found in larger (30-50) loose aggregations. Sei whales feed on copepods, krill, small schooling fish, and cephalopods.

Sperm Whale (Physeter macrocephalus)

The sperm whale is the largest toothed whale. They feed on large squid, sharks, skates, and fishes (NMFS 2012f). Sperm whales are sexually dimorphic, with females at 36 feet (11 m) and males reaching 52 feet (16 m). The sperm whale is distinguished by its extremely large head, which is about 25 to 35% of its body length. They are mostly dark gray, but some whales have white patches on their belly. Sperm whales spend most of their time in deep water.

Steller Sea Lion (Eumetipias jubatus)

The Steller sea lion is the largest member of the Otariid family (eared seals). They exhibit extreme sexual dimorphism with adult males 10 to 11 feet (3 to 3.4 m) in length and 2,500 lbs (1,120 kg) and adult females 7.5 to 9.5 feet (2.5 to 3 m) in length and 770 lbs (350 kg) (NMFS 2012g). The coats of adult females and males are light blonde to reddish brown. There are two stocks of Steller sea lions: the eastern and western. The western stock includes individuals that reside in the central and western Gulf of Alaska and along the Aleutian Islands. The eastern stock is distributed from southeast Alaska along the coast to California.

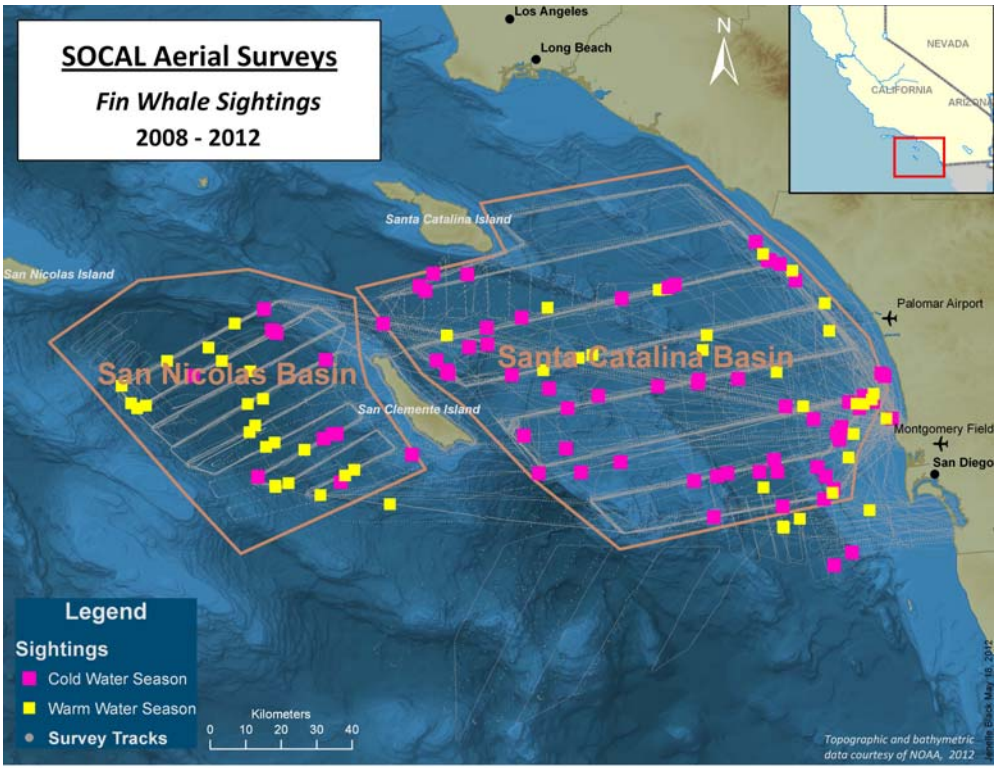
Guadalupe Fur Seal (Arctocephalus townsendi)

The Guadalupe fur seal is a non-migratory pinniped. They exhibit sexual dimorphism, with males reaching an average of 7 feet (2 m) and weighing about 400 lbs (180 kg) while females are much smaller at 5 feet (1.5 m) and 110 lbs (50 kg), respectively (NMFS 2012i). Their coloration is dark brown to black with adult males having tan or yellow hairs on the back of their mane. Guadalupe fur seals are solitary, non-social animals. Guadalupe fur seals can be found from lower Baja California, Mexico to Washington State.

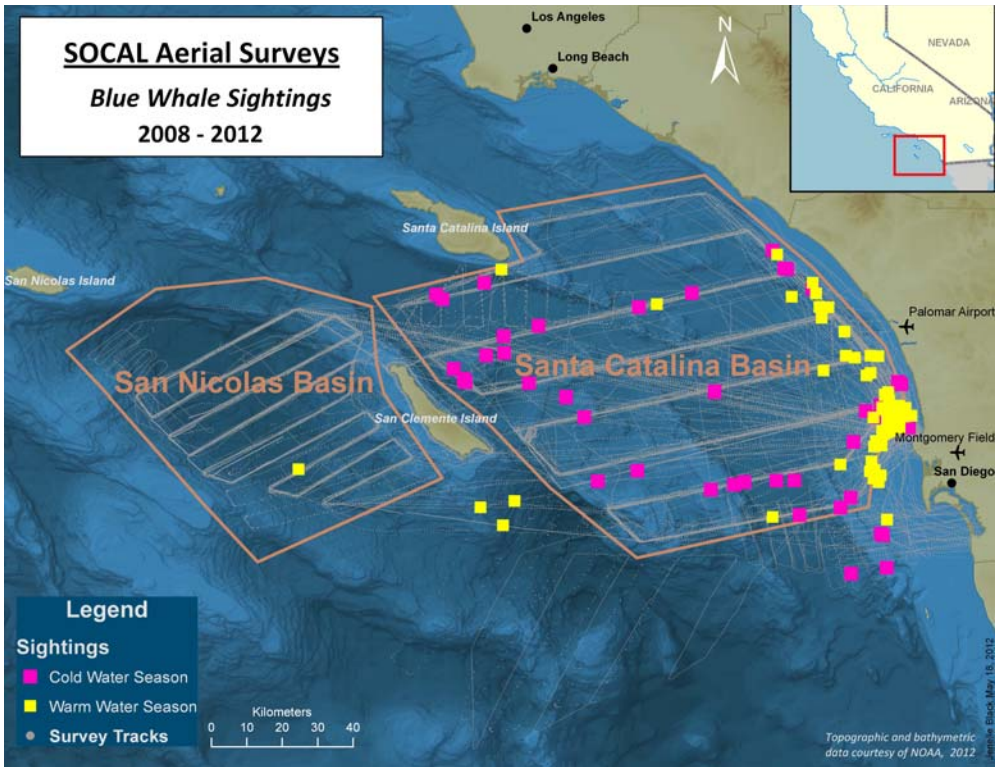
Distribution and Status

Cetaceans

The Navy conducted surveys in the Southern California Bight between October 2008 and April 2012 (Smultea and Bacon 2012), as required by NMFS under the Marine Mammal Protection Act and ESA. For the warm-water season in 2008 through 2012, the estimated average number of individuals present was 317 fin whales, 41 blue whales, and 18 humpback whales. During the cold-water season, the estimated averages were 246 fin whales, and 50 humpback whales. Fin whales (Map F-11) continue to be the most commonly abundant large whale in the Southern California Bight. Blue whales were not observed during the cold-water season and their densities (Map F-12) were well below historical estimates. There were not enough sperm whale sightings (n=1) to estimate numbers present, and there were no sightings of the North Pacific right whale and sei whale.



Map F-11. Fin whale sightings in the Southern California Bight 2008-2012 (Navy 2012).



Map F-12. Blue whale sightings in the Southern California Bight 2008-2012 (Navy 2012).

Steller Sea Lion

There has not been a sighting of a Steller sea lion on SCI since the 1920s (M. Lowry, pers. com. 2011). Contrary to the western stock, the eastern stock has observed an overall decline. The eastern United States stock is increasing throughout the northern portion of its range (Southeast Alaska and British Columbia), and is stable or increasing slowly in the central portion (Oregon through central California). In the southern end of its range (Channel Islands), it has declined considerably since the late 1930s, and several rookeries and haul outs have been abandoned.

Guadalupe Fur Seal

Commercial sealing during the 19th century reduced the once abundant Guadalupe fur seal to near extinction in 1894 (Townsend 1931). However, the population is currently growing at approximately 13.7% per year (NMFS 2000). The Guadalupe fur seal has rarely been sighted at SCI in recent years (1975, 1991, 1997). Several sightings of a male Guadalupe fur seal were made on SCI beginning in July 1991 near Mail Point. This fur seal (if it is the same individual) has not been sighted since the onset of the 1997-1998 El Niño event (J. Carretta and M. Lowry, pers. com. 2002).

Relevant Biological Opinion

National Marine Fisheries Service Programmatic BO 2009 on the Navy's proposal to conduct training exercises in the Southern California Range Complex from January 2009 to January 2014. Endangered Species Division, Office of Protected Resources, National Marine Fisheries Service, Sliver Spring, Maryland.

Beneficial Management

- In accordance with the Navy's Letters of Authorization for training activities, ongoing baseline monitoring data have been collected since 2008. Those data include marine mammal population and abundance within the Southern California Range Complex that includes SCI.

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Appendix G: Landscaping Plant List

All landscaping plants for San Clemente Island must be native to the island and grown in the on-island nursery. Table G-1 has a list of approved landscaping plants.

Table G-1. Approved Plants for Landscaping on San Clemente Island (2012).

Scientific Name	Common Name
Artemisia californica	California sagebrush
Artemisia nesiotica	island sagebrush
Astragalus miguelensis	San Miguel milkvetch
Astragulus nevinii	San Clemente Island milkvetch
Atriplex californica	California saltbush
Calystegia macrostegia subsp. *amplissima*	island morning-glory
Constancea nevinii	Nevin's woolly sunflower
Coreopsis gigantea	giant coreopsis
Crossosoma californicum	Catalina crossosoma
Deinandra clementina	island tarplant
Dodecatheon clevelandii subsp. *insulare*	shooting stars, February flowers
Dudleya virens subsp. *virens*	bright green dudleya
Encelia californica	bush sunflower
Eriogonum giganteum var. *formosum*	San Clemente Island buckwheat
Eriogonum grande var. *grande*	island buckwheat
Eriophyllum confertiflorum var. *confertiflorum*	golden yarrrow
Euphorbia misera	cliff spurge
Hazardia cana	San Clemente Island hazardia
Heteromeles arbutifolia	toyon, Christmas berry
Isomeris arborea	bladderpod
Jepsonia malvifolia	island jepsonia
Keckiella cordifolia	heart-leaf keckiella
Lathyrus vestitus var. vestitus	Pacific pea
Lavatera assurgentiflora subsp. *glabra*	San Clemente Island malva rosa
Lonicera hispidula var. *vacillans*	island honeysuckle
Lotus argophyllus var. *adsurgens*	San Clemente Island bird's foot trefoil
Lotus argophyllus var. *argenteus*	silver lotus
Lotus dendroideus var. *traskiae*	Trask's island lotus
Lyonothamnus floribundus subsp. *asplenifolius*	fern-leaf ironwood
Malacothamnus clementinus	San Clemente Island bush mallow
Malosma laurina	laurel sumac
Mimulus aurantiacus var. *parviflorus*	island monkeyflower
Mirabilis californica	wishbone bush
Munzothamnus blairii	Blair's wirelettuce
Nassella cernua	nodding needlegrass
Nassella pulchra	purple needlegrass
Prunus ilicifolia subsp. *lyonii*	Catalina cherry
Quercus chrysolepis	maul oak, canyon live oak
Quercus tomentella	island oak
Rhamnus pirifolia	island redberry
Rhus integrifolia	lemonadeberry
Ribes malvaceum var. *malvaceum*	chaparral currant
Salvia mellifera	black sage
Sambucus mexicana	Mexican elderberry
Scrophularia villosa	Santa Catalina figwort, beeplant
Spergularia macrotheca var. *macrotheca*	sea spurry

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Appendix H: Previous Contracted and Cooperative Natural Resources Survey, Inventory, Monitoring, and Research Efforts

San Clemente Island Fox

- The Institute for Wildlife Studies (IWS) conducted San Clemente Island fox (*Urocyon littoralis clementae*) surveys (1988–2005) on long-term demography grids to estimate population trends.
- R. Brand Philips and Robert H. Schmidt, Utah State University, regularly collected scats and colon contents from feral cats (*Felis catus*) and island foxes from 1992–1994 to examine the species' diet between years, seasons, and habitats to assess the potential for resource competition between the species.
- The lab of Dr. William F. Andelt, Colorado State University, conducted surveys from July 2006 through July 2010 on the San Clemente island fox to study variables involved in vehicle deaths, home range, habitat use, dispersal rates and distances, den site characteristics, survival and mortality, and disease incidence. Researchers in the lab included Emily E. Hamblen, Nathan P. Snow, and Jessica R. Resnik, each of whom completed their Master's thesis from the surveys conducted, and Research Associate, Nicholas P. Gould.
- Garcia and Associates monitored the island fox from 2007–2010.
- California State University at Stanislaus completed a study of the foraging patterns of the San Clemente island fox. This study: compared food item use and diversity among the six Channel Islands with foxes, examined seasonal variation in item use and diversity across all islands, and determined and assessed the extent to which island foxes are using non-native resources.

Bats and Other Terrestrial Mammals

- R. Brand Philips completed his thesis in 1999 examining the simultaneous effects of mammalian predation and habitat structural heterogeneity on the population dynamics of the house mouse through surveys completed between July 1993 and August 1994.
- O'Farrell Biological Consulting conducted bat surveys in the spring, autumn, and winter of 2002.

San Clemente Loggerhead Shrike

- The Western Foundation of Vertebrate Zoology monitored the population of San Clemente loggerhead shrikes (*Lanius ludovicianus mearnsi*) from 1991–1994.
- The Endangered Species Recovery Council conducted population and habitat surveys of the loggerhead shrike from 1995–1997.
- Sweetwater Environmental Biologists Inc. conducted micro-habitat surveys for the shrike in early March and late July 1997.
- Merkel and Associates conducted surveys to determine abundance, distribution, and reproductive status of the shrike from February to March 1998 and trained incoming Point Reyes Bird Observatory shrike monitors.

- Point Reyes Bird Observatory monitored the loggerhead shrike from 1998–2005.
- The IWS studied San Clemente loggerhead shrike wintering ecology, habitat use, and prey base from 1999–2003.
- The IWS has monitored the loggerhead shrike since 2005.
- Researchers at the University of Connecticut have nearly completed a study on the feeding performance of captive San Clemente loggerhead shrikes. This study is analyzing the method of prey attack and processing behavior of shrikes, primarily using high-speed video cameras during the non-breeding season.

San Clemente Sage Sparrow

- Kenneth Hyde, Point Loma College, conducted surveys from 1980–1985 to study habitat use, breeding biology, movement patterns, and population size of the San Clemente sage sparrow (*Amphispiza belli clementeae*).
- David W. Willey, Northern Arizona University, completed a survey on the nesting habitat and success of the San Clemente sage sparrow from early March through July 1986.
- The IWS has conducted San Clemente sage sparrow monitoring since 1999. Research collected data on the island-wide abundance and distribution of the population, habitat preferences, and the annual reproductive success and survival of juveniles and adults.
- Frederic Beaudry, Humboldt State University, completed surveys from 2001–2003 to monitor the population of San Clemente sage sparrows as part of his Master's thesis.
- Nicole Munkwitz, Humboldt State University, conducted surveys from 2001–2003 to study the natal and breeding dispersal of San Clemente sage sparrows as part of her Master's thesis.
- Jennifer Turner, Humboldt State University, conducted habitat association surveys of the San Clemente sage sparrow during the last two weeks of March through May in 2005 and 2006 as part of her Master's thesis.
- KEA Environmental completed a census and surveys for a habitat suitability study of the San Clemente sage sparrow in 1997.

Western Snowy Plover

- Brian D. Foster, CSU Long Beach, surveyed all sandy beaches from November 1994 through February 1997 for roosting or breeding western snowy plovers (*Charadrius alexandrinus nivosus*).
- The U.S. Geological Survey (USGS) Biological Resources Division surveyed for western snowy plover status and distribution from March 1997 through May 1998 to determine their status and distribution at two sites on San Clemente Island (SCI).
- Brian D. Foster and Elizabeth Copper surveyed all sandy beaches (except for Pyramid Cove from March 2002 through May 2003) from January 2001 through December 2001 and March 2002 through May 2003 for roosting or breeding snowy plovers.
- Limited snowy plover beach surveys were conducted by Point Reyes Bird Observatory from 2003–2005.
- From 2008-2009, the IWS conducted limited beach surveys (northern sandy beaches) to monitor snowy plovers on SCI.
- Limited beach monitoring (northern sandy beaches) from 2010–2012 was conducted by Melissa Booker, SCI Natural Resources Office, with assistance from Justyn Stahl, IWS.

Island Night Lizard

- The reproduction of the island night lizard (*Xantusia riversiana*) was first studied by Stephen R. Goldberg and Robert L. Bezy, Whittier College, with monthly collections on SCI beginning with June 1970 and consecutively from October 1971 through September 1972.
- William J. Mautz completed his dissertation from Cornell University in 1979 on the thermoregulation, metabolism, water loss, and microhabitat selection of the island night lizard.
- Surveys to estimate island night lizard population density in rocky maritime desert scrub were conducted during 1979 through 1986 by Dr. William J. Mautz through the University of California at Irvine.
- Dr. William J. Mautz, currently associated with the University of Hawaii at Hilo, has continued to monitor the island night lizard since receiving a Ph.D. for his research of the species and is currently conducting a long-term demographic study of the island night lizard on SCI.

Raptors and Other Land Birds

- Avian monitors at SCI (through various contracts and agreements) have long kept a list of bird records/sightings, which were compiled for publication by Jorgensen and Ferguson in 1984, Sullivan et al. in 2005, and Bradley et al. in 2011.
- William T. Everett, Everett and Associates Environmental Consultants, conducted raptor and passerine bird surveys in support of the Strategic Environmental Research and Development Program wind farm project from September 1998 to November 1998.
- The IWS used night-time spotlighting to survey for grassland owls from October 2001 to October 2002 to determine their distribution and abundance on SCI.
- The IWS located and mapped 99 American kestrel (*Falco sparverius*) territories and recorded 11 nest-site characteristics at 40 cliff nests from 2001–2002.
- In 2012, biologists from Naval Facilities Engineering Command Southwest surveyed power poles on SCI to identify any poles with evidence of electrocution hazard based on pole configuration and/or presence of bird remains at the pole base.

Fairy Shrimp

- Bitterroot Restoration Inc. conducted fairy shrimp (*Branchinecta lindahli*) surveys during February and October of 2001.

Terrestrial Invertebrates

- Tierra Data Inc. conducted a terrestrial invertebrate survey of SCI to establish information and evaluate the foraging base of certain terrestrial vertebrate animals. Nine sampling locations were chosen and surveyed at least two times during the study in the spring (May-June) and summer (July-August) of 2010.
- Dr. David A. Holway, University of California San Diego, performed a delineation for the Argentine ant (*Linepithema humile*) and native ant species in March 2011. Efforts to eradicate the Argentine ant are currently in the initial planning stages.

Plants

- Vegetation Condition and Trend Program. Surveys began in 1992-1993 to provide long-term monitoring data to support the assessment of SCI's ecological health. Sur-

veys were also conducted in interim years, with reports produced in 1994, 1996, 2000, 2002, 2003, 2006, 2008, and 2011 by Tierra Data Inc.

- Dr. Kaius Helenurm, North Dakota State University, has completed surveys intermittently since 1994 to study plant genetics on SCI.
- Sarah Helm conducted a genetic study on the Santa Cruz Island rockcress (*Sibara filifolia*) for a Master's thesis from the University of South Dakota in 2002 to determine genetic variation within the species, genetic variation within and among populations, and compared the amount and pattern of genetic variation from a previous study.
- Steve Junak, Santa Barbara Botanic Garden, conducted several sensitive plant surveys periodically between 1984-1995, 1996-1998, 2003-2007, and 2010.
- The USGS is researching the control of invasive species through fire to restore habitat and to monitor the response of seeds of federally-listed plant species.
- Emily Howe is conducting research on the benefits of seeding in grassland habitats to promote perennial grasses for her Master's thesis from San Diego State University.

Early Plant Collection Efforts (1885-1962)

- William Scrugham Lyon, (amateur) botanist from Los Angeles, traveled to SCI in 1885 with Rev. Joseph C. Nevin, and made the first collections of plants on SCI; he remained for four days, obtaining 81 species.
- In 1894, with the biological section of the International Boundary Commission, T.S Brandegee visited SCI with Edgar A. Mearns, of the U.S. National Museum, Ludwig Schoenefeldt, and ornithologist, A.W. Anthony. They landed on SCI on August 23 and remained until August 29. Brandegee and Mearns collected plants.
- C.A. Purpus collected two plant species on SCI in 1897.
- Blanche Trask explored the Channel Islands and visited SCI in 1896. She was there for a short time in October 1902, and also returned in 1903.
- Barton Warren Evermann, Director of the California Academy of Sciences, was on SCI on 25 March 1918 and collected a few plants, mostly ferns.
- Herman Knoche visited several of the Channel Islands in 1919, collecting on SCI July 4.
- Philip A. Munz, at the time with Pomona College, visited SCI from 08-12 April 1923 with F.W. Peirson, D.D. Keck, Dr. J.G. Needham, and five others.
- Marcus E. Jones collected a few plants on SCI from 03-09 September 1926.
- E.L House and K.D. Grumbles, from the University of Southern California, visited SCI from 05-13 August 1930, making a few collections.
- L.R. Abrams and I.L. Wiggins of Stanford University obtained 59 collections on 06 July 1931 on SCI. They also visited the other Channel Islands, except San Miguel. Ira L. Wiggins returned to SCI from 21-22 February 1949 with John H. Thomas.
- Nell S. Murbarger, author from Costa Mesa, California, first visited SCI in 1926. In 1935 she returned with her husband, Wilbur B. Murberger, an archaeologist interested in obtaining Indian artifacts from SCI; her parents; and a friend, Dora Tucker. Her collections contained a number of species not otherwise known from the island.
- Francis H. Elmore made 30 collections of vascular plants on SCI on 18-19 February 1939 with a group from the Allan Hancock Foundation.
- Meryl B. Dunkle, botanist of the Los Angeles County Museum Biological Survey of the Channel Islands, visited SCI on 01-08 April 1939 and 23-26 November 1939.
- Wilmatte P. Cockerell made a few collections on SCI in 1939, presumably with her husband, the famous naturalist, T.D.A. Cockerell.

- Reid Moran, botanist for the Los Angeles County Museum Survey, traveled to SCI from 15-20 February 1941. Moran later returned to SCI twice with various projects of Scripps Institution of Oceanography, 15-17 September 1958 and 09 March 1959.
- In 1962, E.R. Blakley and Martin A. Piehl traveled to SCI with the Sierra Club on 09-10 June to collect vascular plants. Piehl and Blakley were from the Santa Barbara Botanic Garden.
- Peter Raven traveled to SCI in 09-12 April 1962, 07-11 May 1962, and 10-13 July 1962.

Soil

- Dr. Daniel R. Muhs conducted several soil surveys on SCI during 1976-1978 for a dissertation from the University of Colorado at Boulder.
- Dr. Daniel R. Muhs, currently associated with the USGS, conducted soil surveys on SCI in 1981, 1985, 1999, 2006, and 2007.

Seabirds

- Humboldt State University conducted two major seabird studies from 1991-1996 to survey seabird breeding populations and colony distribution on SCI. Region-wide studies of the breeding population and distribution of Xantus's murrelets (*Synthliboramphus hypoleucus*), ashy storm-petrels (*Oceanodroma homochroa*), black storm-petrels (*Oceanodroma melania*), western gulls (*Larus occidentalis*), double-crested cormorants (*Phalacrocorax auritus*), Brandt's cormorants (*Phalacrocorax penicillatus*), and black oystercatchers (*Haematopus bachmani*) were carried out from 1994-1996. Aerial surveys were performed from 1993-2003 to determine the breeding status of the Brandt's cormorant, double-crested cormorant, pelagic cormorant (*Phalacrocorax pelagicus*), western gull, and black oystercatcher.
- The USGS, Humboldt State University, and the Minerals Management Service conducted surveys from 1999-2002 to quantify the at-sea distribution of seabirds. Funds or in-kind support came from various agencies, including the California Department of Fish and Wildlife (CDFW), U.S. Navy, National Oceanic and Atmospheric Administration Channel Islands National Marine Sanctuary, National Park Service Channel Islands National Park, U.S. Fish and Wildlife Service, Moss Landing Marine Laboratories, and the Wildlife Health Center.
- University of California Santa Cruz conducted aerial surveys to determine the breeding status of Brandt's cormorant, double-crested cormorant, pelagic cormorant, western gull, and black oystercatcher from 2005-2009.
- The California Institute of Environmental Studies complete a Xantus's murrelet survey in 2008 on SCI, which revealed a small population in the Seal Cove area.
- The California Institute of Environmental Studies and Carter Biological Consulting conducted additional Xantus's Murrelets surveys in 2008.

Marine Mammals

- The National Marine Fisheries Service (NMFS) conducted aerial cetacean surveys in 1998 and 1999.
- The USGS, Humboldt State University, and the Minerals Management Service conducted surveys from 1999-2002 to quantify the at-sea distribution of marine mammals. Funds or in-kind support came from various agencies, including the CDFW, U.S. Navy, National Oceanic and Atmospheric Administration Channel Islands National Marine Sanctuary, National Park Service Channel Islands National Park, U.S. Fish and Wildlife Service, Moss Landing Marine Laboratories, and the Wildlife Health Center.

- Smultea Environmental Sciences, LLC conducted marine mammal aerial surveys from 2008 to 2010 in the coastal and offshore waters of southern California. This effort was in support of Marine Mammal Protection Act permit requirements for the Southern California (SOCAL) Range Complex. A total of eight surveys were completed during this time in cooperation with Marine Mammal Research Consultants, Ltd. Continued surveys efforts are expected to continue from 2011 to 2013.
- The NMFS conducts aerial pinnipeds surveys for each major species (California sea lions [*Zalophus californianus*], northern elephant seals [*Mirounga angustirostris*], and Pacific harbor seals [*Phoca vitulina richardsi*]) on SCI once every three years to estimate populations.

Fish

- Suzanne Kohin, NMFS, conducted tagging surveys of juvenile blue and mako sharks (*Prionace glauca* and *Isurus oxyrinchus*) off the northeast side of SCI four times each summer from 1994-2007.
- Occidental College conducted surveys in August 2000 and September 2004 to collect fish data at SCI. Surveys were conducted in conjunction with the Ocean Resources Enhancement and Hatchery Program monitoring program and the Cooperative Research and Assessment of Nearshore Ecosystems.
- Dr. Jack Engle, University of California at Santa Barbara, conducted roving diver fish surveys on 14-18 January 2011.

Abalone and Other Marine Invertebrates

- The CDFW conducted green abalone (*Haliotis fulgens*) surveys at SCI in 1973.
- The CDFW surveyed SCI from 1988-1993 for black abalone (*Haliotis cracherodii*).
- The National Park Service along with the CDFW, the University of California at Santa Barbara, Scripps Institution of Oceanography, USGS, and NMFS took part in submersible surveys during 1996-1997 and 1999 at SCI as part of a larger white abalone (*Haliotis sorenseni*) survey for the Channel Islands.
- The University of California at Santa Barbara conducted dive surveys in October 1999 using the Research Submersible DELTA and the Research Vessel VELERO IV as part of a larger survey for white abalone in the waters off southern California.
- The NMFS conducted surveys in 2004 to map habitat and determine population size of white abalone using remotely-operated vehicles.
- Tierra Data Inc. conducted a black abalone survey covering 62 locations and approximately 25% of the potential habitat on SCI in 2008.
- The CDFW conducted scientific cruises in the Channel Islands from June 2009 to September 2011 to collect baseline status information for green and pink abalone (*Haliotis corrugata*), including size frequency distribution, abundance, and habitat type. Based on these initial surveys, suitability of sites to serve as donors or recipients of translocated individuals will be determined.
- The University of California at Santa Cruz conducted surveys from 2010-2011 for black abalone.

Marine Algae

- The University of California at Santa Barbara conducted a genetic study on eelgrass (*Zostera marina*) in the Southern California Bight, which included five locations on SCI.

Lichen

- The California Lichen Society conducted lichen surveys by Peter A. Bowler, William A. Weber, and Richard E. Riefner, Jr. in 1996 and Charis Bratt in 1999.

Kelp Forest

- The National Park Service established four sites, located in each of the four ecoregions of SCI in 2002, for a long-term kelp forest monitoring project. In June 2003 and 2004, all four sites were monitored for baseline information.
- Tierra Data Inc. completed kelp forest surveys in August and October in 2008 and June 2009.

Rocky Intertidal

- Steven N. Murray, University of California Fullerton, and Mark M. Littler, University of California Irvine, sampled transect lines in the rocky intertidal near the Wilson Cove sewage outfall. Transect lines located in the Wilson outfall region were samples February and May 1972, while the control regions were sampled in May and June 1972.
- Steven N. Murray and Mark M. Littler sampled the rocky intertidal on the leeward side of SCI along three permanent transect lines, during October 1976, December 1976, March 1977, and June 1977.
- Dr. Jack Engle, associated with the University of California at Santa Barbara, conducted rocky intertidal surveys in 1989 for the Los Angeles County Natural History Museum.
- California State University at Fullerton surveyed one intertidal site on SCI in January 2002, which was originally surveyed in 1975-1978.
- Tierra Data Inc. conducted rocky intertidal surveys at four sites established in the fall of 2009. The four sites were located in tandem to previously developed kelp forest monitoring sites co-occurring within each of the four ecological regions of SCI.
- Tierra Data Inc. conducted rocky intertidal surveys at the four previously established long-term monitoring sites in January and May of 2010.
- The SCI Natural Resources Office has conducted intertidal surveys every spring and fall since 2011.
- The University of California Santa Cruz will be conducting a survey to characterize habitat and conduct a habitat quality study in 2012.

Subtidal

- From June 2008 to January 2009, Occidental College performed SCUBA transects utilizing the Cooperative Research and Assessment of Nearshore Ecosystems methodology at three sites at SCI.
- Dr. Jack Engle, University of California Santa Barbara, conducted subtidal surveys recording relative abundance of dominant species encountered including, kelps, seagrasses, and non-native algae (e.g. *Sargassum*, *Undaria*), sea urchins, seastars, and abalone as well as invertebrate disease incidences from 14-18 January 2011.

Area of Special Biological Significance and Other Water Quality Surveys

- Coastal Resources Management Inc. completed a marine resources inventory survey in June and August 1997 for the Wilson Cove outfall study.

- Merkel and Associates mapped and assessed the marine biological resources adjacent to and within an alignment corridor of the Wilson Cove sewage outfall on 20 December 2003.
- Merkel and Associates conducted surveys in support of the Area of Special Biological Significance exception process at ten locations around SCI. The first survey was conducted between 29 November 2005 to 3 December 2005, and the second survey was conducted between 16 May 2006 to 21 May 2006.
- The CDFW Mussel Watch Program conducted water quality monitoring on SCI in 2011. This program is part of a worldwide monitoring effort designed to detect the presence and concentration of toxic pollutants in estuarine and marine waters through resident and transplanted mussels and clams.

Wetlands and Jursidictional Waters

- Bitterroot Restoration Inc. completed a preliminary survey of wetlands and drainages in 2001.

Predator Management

- The IWS developed a report in 1996 to discuss the video monitoring system developed to observe loggerhead shrike nests on SCI.
- In 1998, the IWS reported on the development of electronic predator deterrent systems and the continued implementation of video monitoring for the protection of the loggerhead shrike.
- In 2001 and 2003, the IWS reported on projects related to predator research and management on SCI.
- The IWS reported on the use of non-lethal management techniques to prevent the island fox from predating on loggerhead shrike nests in 2005.
- The IWS reported on rodent control and food supplementation in support of the recovery of the loggerhead shrike in 2008.
- In support of loggerhead shrike management, the IWS provided reports for 2007, 2010, and 2011.
- In 2001, the IWS initiated research related to management of non-native mammals in support of listed avian species recovery. Projects included measuring rodent densities and effects of rodenticide on density by species and tracking the home range and movements of feral cats and black rats (*Rattus rattus*), using radio telemetry.

Appendix I: Environmental Assessment

The Environmental Assessment for this Integrated Natural Resources Management Plan is currently a Draft report undergoing Government review.

A copy of the finalized Environmental Assessment will be provided with the final version of this Plan.

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Appendix J: INRMP Cross-Walk to the U.S. Department of Defense Template

DoD Template	*SCI INRMP Table of Contents*
DoD Title Page	Title Page
DoD Signature Page	Signature Pages
DoD Executive Summary	Executive Summary
DoD Table of Contents	Table of Contents
DoD 1 - Overview	1.0 Introduction and Overview
DoD 1.a - Purpose	1.1 Purpose and Authority
DoD 1.b - Scope	1.1 Purpose and Authority
DoD 1.c - Goals and Objectives	1.5 INRMP Vision, Goals, and Objectives
DoD 1.d - Responsibilities	1.6 INRMP Responsibilities 1.6.1 INRMP Working Group
DoD 1.d.1 - Installation Stakeholders	1.6 INRMP Responsibilities
DoD 1.d.2 - External Stakeholders	1.6 INRMP Responsibilities
DoD 1.e - Authority	1.1 Purpose and Authority
DoD 1.f - Stewardship and Compliance Discussion	1.7 Stewardship and Compliance
DoD 1.g - Review and Revision Process	1.9 Revision and Annual Review
DoD 1.h - Management Strategy	1.8 Ecosystem Management, Adaptive Management, and the Environmental Management System
DoD 1.i - Other Plan Integration	1.10 Regional Area Use and Planning Processes 4.5 Integrating Other Plans and Programs
DoD 2 - Current Condition and Use	2.0 Military Use and Natural Resources Management
DoD 2.a - Installation Information	2.2.2 Facilities 2.2.3 Transportation, Circulation and Utilities 2.3 Other Land Uses 2.4 Future Land Use Patterns and Plans
DoD 2.a.1 - General Description	1.3 Real Estate Summary
DoD 2.a.2 - Regional Land Uses	1.2 Location and Planning Footprint 1.10.2 Regional Area Uses 2.5 Regional Planning Jurisdictions
DoD 2.a.3 - Abbreviated History and Pre-Military Land Use	2.1 Abbreviated History and Pre-Military Land Use
DoD 2.a.4 - Military Mission	1.4 Achieving Success and No Net Loss to the Military Mission
DoD 2.a.5 - Operations and Activities	2.2 Current Operations and Activities 2.2.1 Ranges and Air Space 2.2.4 Airfield and Operations 2.2.5 Security, Safety, and Other Restricted Zones
DoD 2.a.6 - Constraints Map	Appendix K: Constraints Maps, Map K-1 through Map K-11
DoD 2.a.7 - Constraints Map	N/A (See Appendix K: Constraints Maps)
DoD 2.b - General Physical Environment and Ecosystems	3.1 Ecoregional Setting 3.2 Ecological Isolation and Consequences for Island Communities 3.3 Ecosystem Management 3.4 Climate and Climate Change 3.5 Physical Conditions
DoD 2.c - General Biotic Environment	3.9 Plant, Fish, and Wildlife Populations
DoD 2.c.1 - Threatened and Endangered Species and Species of Concern	3.9.3 Federally Threatened and Endangered Species 3.9.4 Other Special Status Species 3.9.5 Management Focus Species 3.9.6 Plants and Animals Believed Extirpated and/or Extinct at SCI

DoD Template	SCI INRMP Table of Contents
DoD 2.c.2 - Wetlands and Deep Water Habitats	3.7.2 Jurisdictional Waters and Wetlands 3.8.3 Deep Water Habitats
DoD 2.c.3 - Fauna	3.9.2 Fauna
DoD 2.c.4 - Flora	3.9.1 Flora
DoD 3 - Environmental Management Strategy and Mission Sustainability	4.0 Sustainability and Compatible Use at San Clemente Island
DoD 3.a - Supporting Sustainability of the Military Mission and the Natural Environment	4.1 Supporting Sustainability of the Military Mission and the Natural Environment
DoD 3.a.1 - Integrate Military Mission and Sustainable Land Use	1.4 Achieving Success and No Net Loss to the Military Mission 4.1 Supporting Sustainability of the Military Mission and the Natural Environment
DoD 3.a.2 - Impact to the Military Mission	4.1.1 The Impact to the Military Mission
DoD 3.a.3 - Relationship to Range Complex Management Plan or Other Operational Area Plans	4.2 Range Complex Supporting Infrastructure 4.5 Integrating Other Plans and Programs
DoD 3.b - Natural Resources Consultation Requirements	4.4 Natural Resources Documentation and Consultation Requirements
DoD 3.c - NEPA Compliance	4.4 Natural Resources Documentation and Consultation Requirements
DoD 3.d - Beneficial Partnerships and Collaborative Resource Planning	4.4 Natural Resources Documentation and Consultation Requirements
DoD 3.e - Public Access and Outreach	4.3.2 Public Access and Outreach 4.6 Beneficial Partnerships and Collaborative Resources Planning
DoD 3.e.1 - Public Access and Outdoor Recreation	4.3.2 Public Access and Outreach
DoD 3.e.2 - Public Outreach	4.3.2 Public Access and Outreach
DoD 3.f - Encroachment Partnering	4.6 Beneficial Partnerships and Collaborative Resources Planning
DoD 3.g - State Comprehensive Wildlife Plans	4.4 Natural Resources Documentation and Consultation Requirements
DoD 4 - Program Elements	3.0 Natural Resource Condition and Management Strategies
DoD 4.a - Threatened and Endangered Species Management and Species Benefit, Critical Habitat, and Species of Concern Management	3.9.3 Federally Threatened and Endangered Species 3.9.4 Other Special Status Species 3.9.5 Management Focus Species 3.9.6 Plants and Animals Believed Extirpated and/or Extinct at SCI
DoD 4.b - Wetlands and Deep Water Habitats Management	3.7.2 Jurisdictional Waters and Wetlands 3.8.3 Deep Water Habitats
DoD 4.c - Law Enforcement of Natural Resources Laws and Regulations	3.12 Natural Resources Law Enforcement
DoD 4.d - Fish and Wildlife Management	3.9 Plant, Fish, and Wildlife Populations
DoD 4.e - Forestry Management	N/A
DoD 4.f - Vegetative Management	3.7 Terrestrial Habitats and Communities
DoD 4.g - Migratory Birds Management	3.9.2.6 Resident and Migratory Birds
DoD 4.h - Invasive Species Management	3.9.7 Invasive Species
DoD 4.i - Pest Management	3.9.7 Invasive Species
DoD 4.j - Land Management	3.7 Terrestrial Habitats and Communities
DoD 4.k - Agricultural Management	N/A
DoD 4.l - GIS Management, Data Integration, Access, and Reporting	3.11 Data Integration, Access, and Reporting
DoD 4.m - Outdoor Recreation	4.3.3 Outdoor Recreation and Environmental Education for On-Island Personnel
DoD 4.n - Bird Aircraft Strike Hazard	3.9.2.6 Resident and Migratory Birds
DoD 4.o - Wildland Fire Management	3.6 Wildland Fire
DoD 4.p - Training of Natural Resources Personnel	5.1 Staffing and Personnel Training
DoD 4.q - Coastal/Marine Management	3.8 Marine Habitats
DoD 4.r - Floodplains Management	3.5.6 Water Resources and Hydrology
DoD 4.s - Other Leases	4.3.1 Real Estate Outgrants

DoD Template	***SCI INRMP Table of Contents***
DoD 5- Implementation	5.0 Implementation Strategy
DoD 5.a - Process of Preparing Prescriptions Driving Projects	5.3 INRMP Project Programming and Budgeting
DoD 5.b - Achieving No Net Loss	1.4 Achieving Success and No Net Loss to the Military Mission
DoD 5.c - Use of Cooperative Agreements	5.3.4.2 External Assistance
DoD 5.d - Funding	5.3.4 Funding Sources
Appendix 1 - List of Acronyms	Appendix A: Acronyms and Abbreviations
Appendix 2 - Natural Resources Management Prescriptions Driving Projects	Appendix B: Implementation Summary Table for the SCI INRMP
Appendix 3 - List of Projects	Appendix B: Implementation Summary Table for the SCI INRMP
Appendix 4 - Surveys	Appendix H: Previous Contracted and Cooperative Natural Resources Survey, Inventory, Monitoring, and Research Efforts
Appendix 5 - Research Requirements	5.3.5 Research Funding Requirements
Appendix 6 - Migratory Bird Management	Appendix E: INRMP Benefits for Migratory Birds
Appendix 7 - INRMP Benefits for Endangered Species	Appendix F: INRMP Benefits for Endangered Species
Appendix 8 - Critical Habitat Issues	Appendix F: INRMP Benefits for Endangered Species

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Appendix K: Constraints Maps

Map K-1 through Map K-11 show locations of terrestrial and marine sensitive resources on San Clemente Island. The Navy Integrated Natural Resources Management Plan Template (Deputy Assistant Secretary of the Navy Memorandum, 14 August 2006) requires these *constraints* maps. An *opportunities* map is also required in the Navy Template (Deputy Assistant Secretary of the Navy Memorandum, 14 August 2006), but is not applicable to San Clemente Island because there are no potential encroachment opportunities. Natural Resources Office staff should be contacted for the most current natural resources maps. Map K-1 through Map K-7 show the locations of terrestrial sensitive resources. Map K-8 through Map K-11 show the locations of marine sensitive resources.

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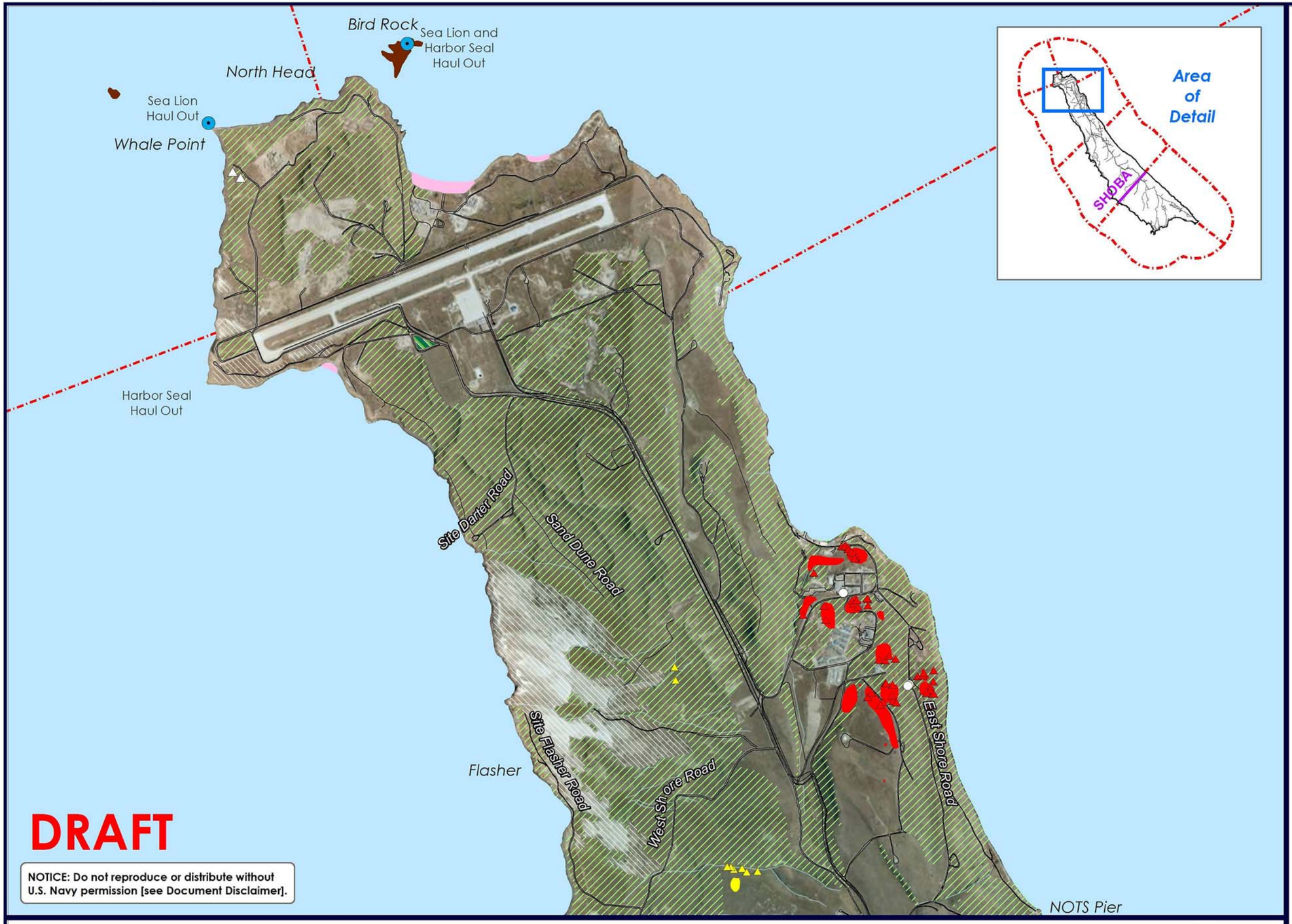

Safety Zone Boundaries
Sensitive Species Planting Area
Federally Endangered Plant Locations (1996-2010)*
Acmispon dendroideus traskiae
Delphinium variegatum kinkiense
Federally Endangered Plant Locations (1978-2011)**
Acmispon dendroideus traskiae
Delphinium variegatum kinkiense
Dissanthelium californicum 2010 Locations
Marine Mammal Locations
BLM California Coastal National Monument
San Clemente Island Shrike Nests (1993 - 2012)
Western Snowy Plover Habitat
Roads
Active sand dunes
Water Courses
SCI Sage Sparrow Habitat***

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica*.

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be coordinated through the NAVFAC Public Works Office, NBC.

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San Clemente Island Terrestrial Natural Resources Map 1

Integrated Natural Resources Management Plan, NALF San Clemente Island

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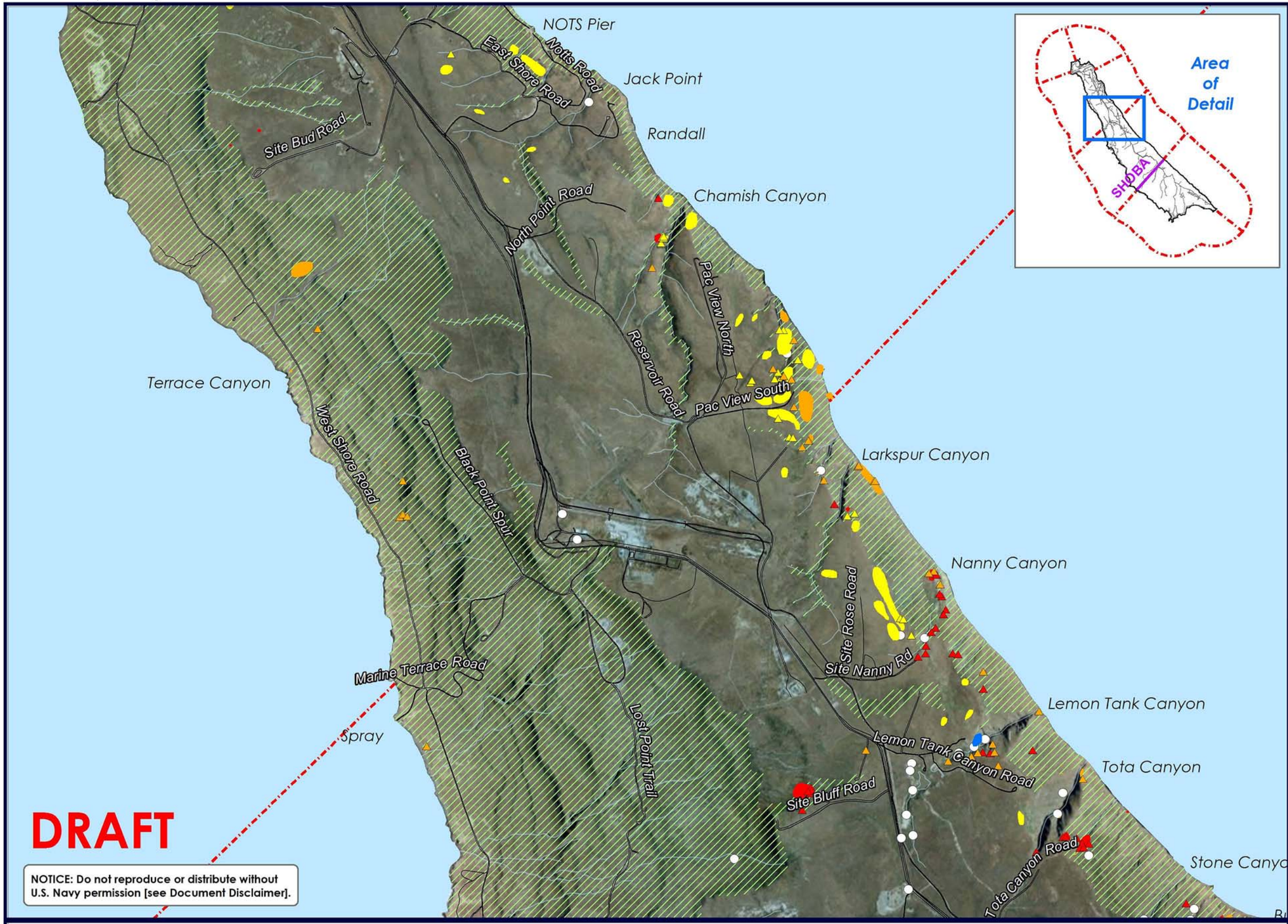

- Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Acmispon dendroideus traskiae*
- *Malacothamnus clementinus*

Federally Endangered Plant Locations (1978-2011)**

- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Acmispon dendroideus traskiae*
- *Malacothamnus clementinus*
- Marine Mammal Locations
- BLM California Coastal National Monument
- San Clemente Island Shrike Nests (1993 - 2012)
- Roads
- Water Courses
- SCI Sage Sparrow Habitat***

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be coordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 2

Integrated Natural Resources Management Plan, NALF San Clemente Island

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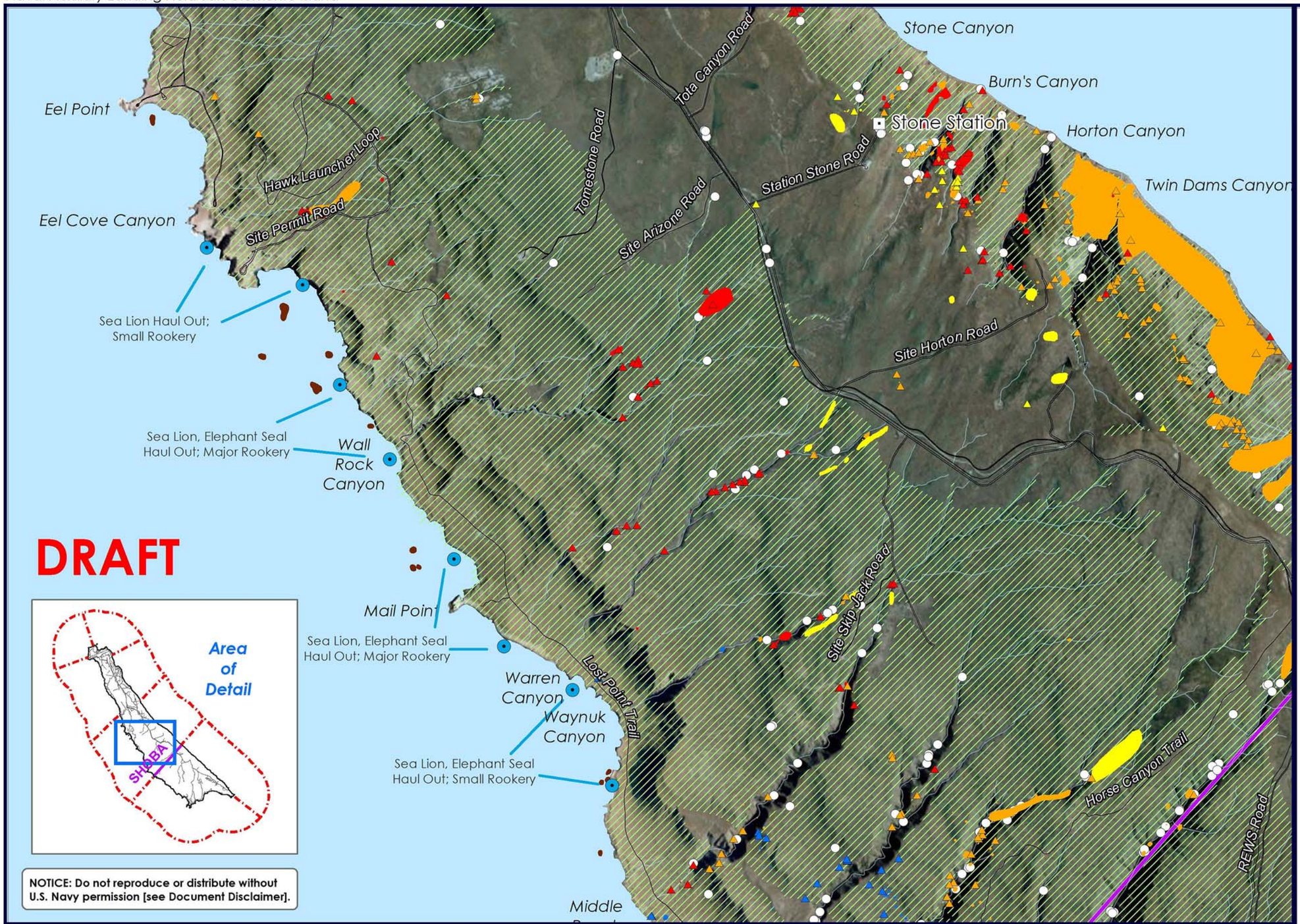

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- Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Malacothamnus clementinus*

Federally Endangered Plant Locations (1978-2011)**

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Malacothamnus clementinus*
- Marine Mammal Locations
- BLM California Coastal National Monument
- San Clemente Island Shrike Nests (1993 - 2012)
- Roads
- Water Courses
- SCI Sage Sparrow Habitat***
- SHOBA Boundary

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 3

Integrated Natural Resources Management Plan, NALF San Clemente Island

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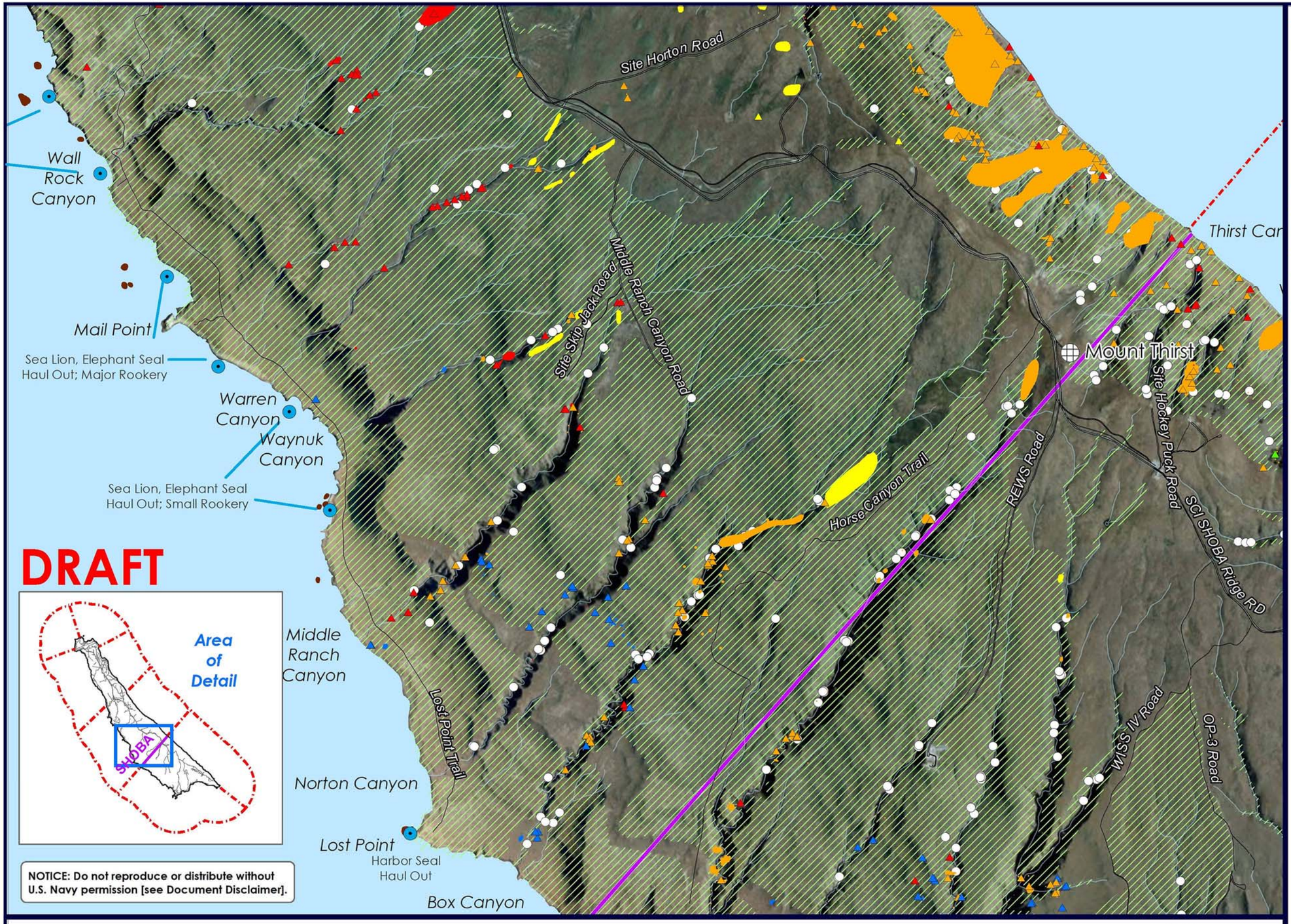

Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*

Federally Endangered Plant Locations (1978-2011)**

- *Acmispon dendroideus traskiae*
- CAGR
- *Delphinium variegatum kinkiense*
- *Malacothamnus clementinus*

Marine Mammal Locations

BLM California Coastal National Monument

San Clemente Island Shrike Nests (1993 - 2012)

Roads

Water Courses

SCI Sage Sparrow Habitat***

SHOBA Boundary

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 4

Integrated Natural Resources Management Plan, NALF San Clemente Island

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Map K-4 San Clemente Island Terrestrial Natural Resources (Map 4).
Constraints Maps

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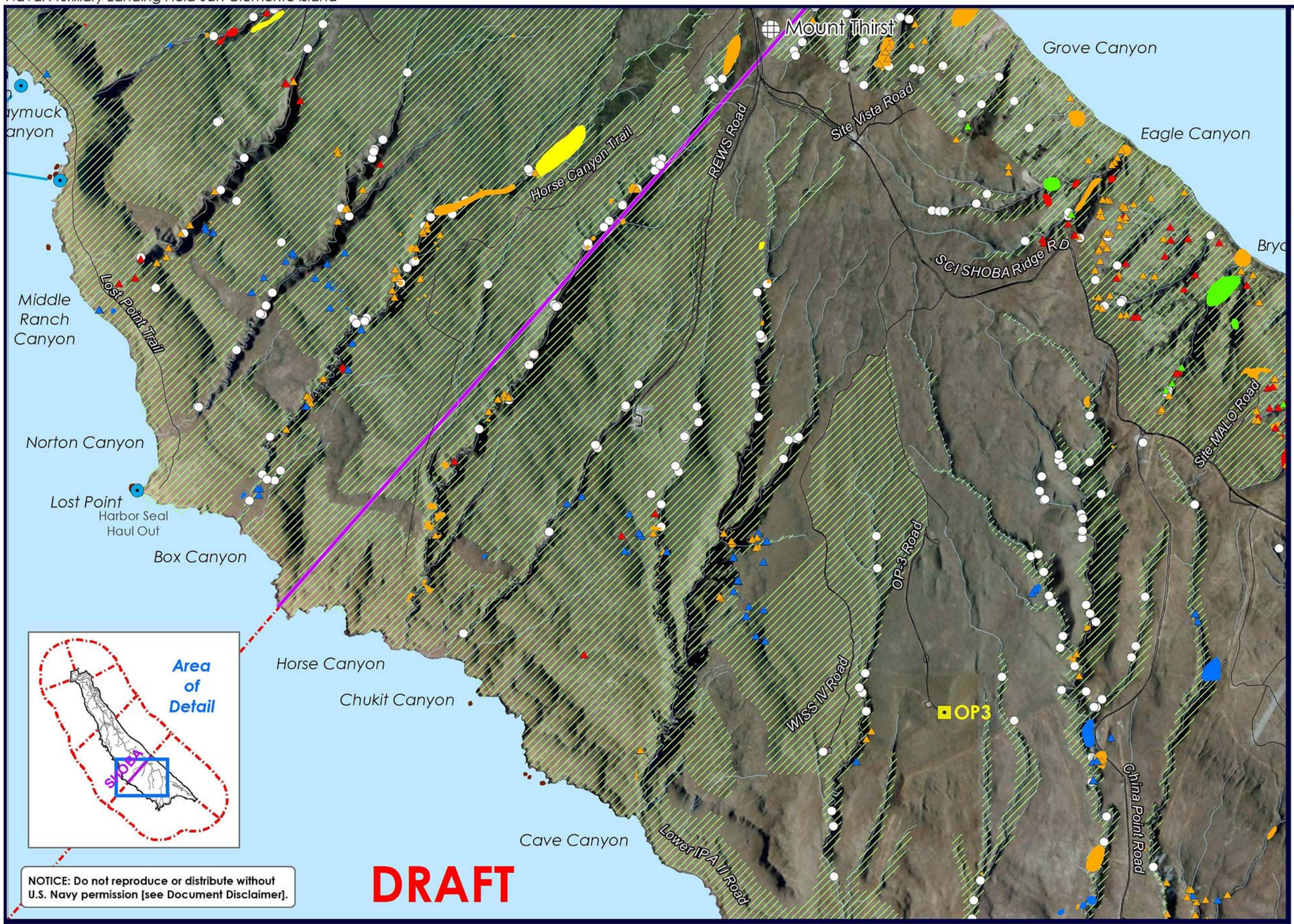

- Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*

Federally Endangered Plant Locations (1978-2011)**

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*
- Marine Mammal Locations
- BLM California Coastal National Monument
- San Clemente Island Shrike Nests (1993 - 2012)
- Observation Points
- Roads
- Water Courses
- SHOBA Boundary
- SCI Sage Sparrow Habitat***

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be coordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 5

Integrated Natural Resources Management Plan, NALF San Clemente Island

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Horse Canyon Trail
REWS Road
Site MALO Road
SCI SHOBA Ridge RD
OP-3 Road
WISS IV Road
OP3
orse Canyon
Chukit Canyon
Cave Canyon
Lower IPA II Road
Robby's Road
Pyramid Cove Trail
Chenetti Canyon
Kinkipar Canyon
Red Canyon
Cove Point
China Canyon
Cortez RD
China Point Road
Horse Shoe Cove Road
OP2
Horse

Area of Detail
SHOBA

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- Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*

Federally Endangered Plant Locations (1978-2011)**

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*
- Marine Mammal Locations
- BLM California Coastal National Monument
- San Clemente Island Shrike Nests (1993 - 2012)
- Western Snowy Plover Habitat
- Observation Points
- Roads
- Water Courses
- SHOBA Boundary
- SCI Sage Sparrow Habitat***

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007);
Junak (1996-1997);
Junak (2003-2006);
SERG (2003-2006);
SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be coordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 6

Integrated Natural Resources Management Plan, NALF San Clemente Island

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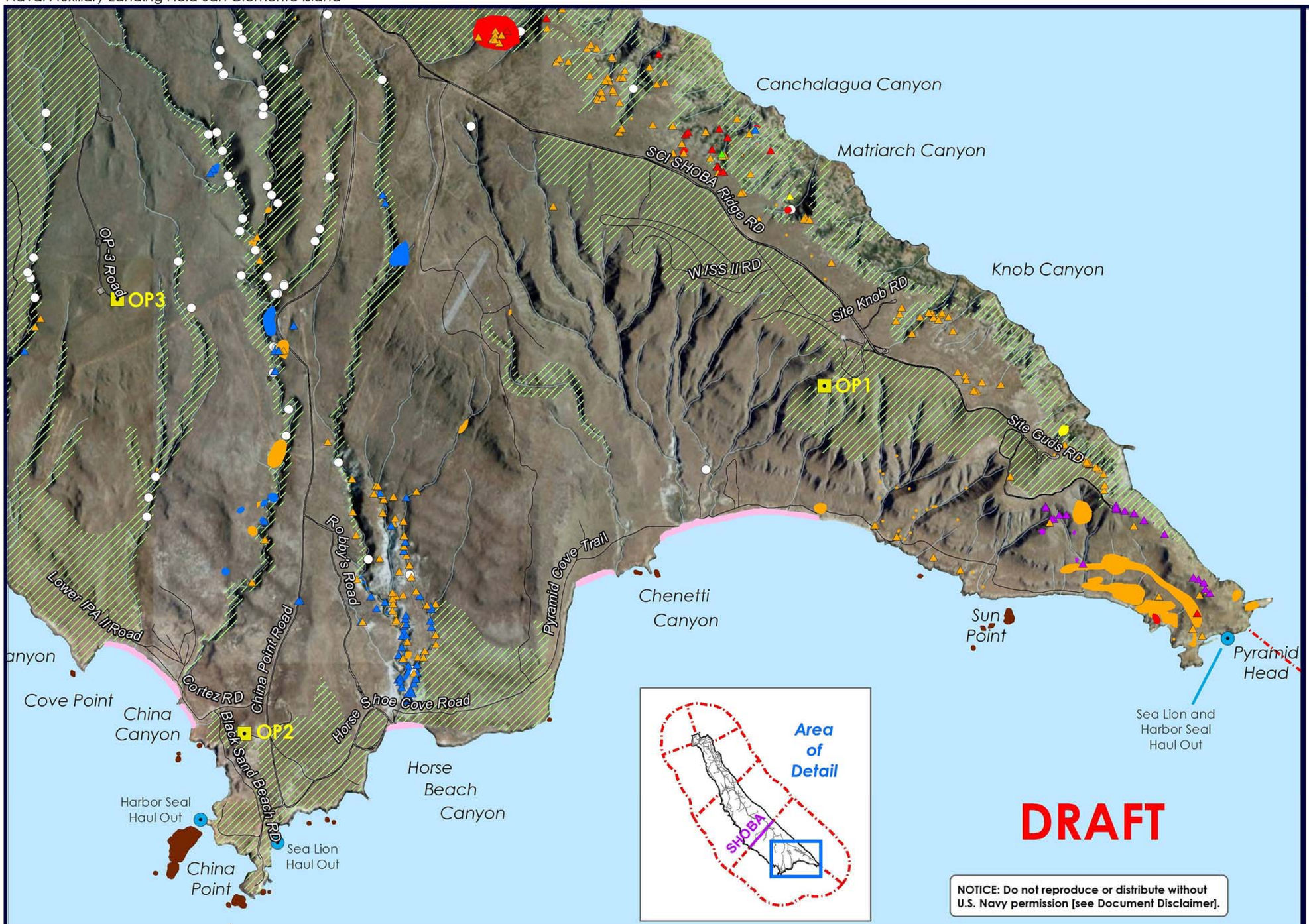

Safety Zone Boundaries

Federally Endangered Plant Locations (1996-2011)*

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Lithophragma maximum*
- *Malacothamnus clementinus*
- *Sibara filifolia*

Federally Endangered Plant Locations (1978-2011)**

- *Acmispon dendroideus traskiae*
- *Castilleja grisea*
- *Delphinium variegatum kinkiense*
- *Malacothamnus clementinus*
- *Sibara filifolia*

- Marine Mammal Locations
- BLM California Coastal National Monument
- San Clemente Island Shrike Nests (1993 - 2012)
- Western Snowy Plover Habitat
- Observation Points
- Roads
- Water Courses
- SCI Sage Sparrow Habitat***

Note that all of SCI terrestrial habitats with the exception of the active sand dunes presented on Terrestrial Resources Natural Resources Map 1, are considered San Clemente Island Night Lizard potential habitat.

*Tierra Data Inc. (2006-2007); Junak (1996-1997); Junak (2003-2006); SERG (2003-2006); SERG (2006-2011).

**Historic Navy Observations (1978-1996), and SERG (2011 & 2012).

***The areas depicted represent the current approximation for breeding habitat, as defined by the following vegetation alliances (2011): *Artemisia californica, Lycium californicum, Opuntia littoralis, and Opuntia littoralis/Artemisia californica.*

NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be coordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Terrestrial Natural Resources Map 7

Integrated Natural Resources Management Plan, NALF San Clemente Island

Miles: 0 0.25 0.5 1

Meters: 0 500 1,000 2,000

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DRAFT

North Shore Region

Sea lion haul out

Bird Rock

Sea lion & Harbor seal haul out

North Head

Northwest Harbor

Whale Point

Dolphin Bay

West Cove

Wilson Cove

Flasher

West Shore Region

East Shore Region

NOTS Pier

Jack Point

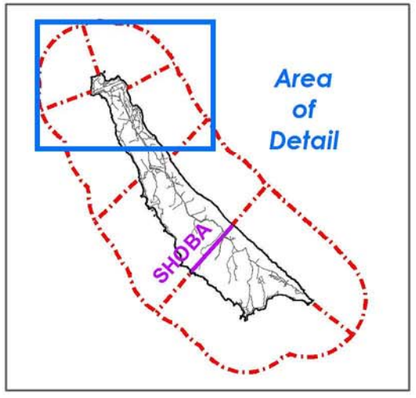
Randall

Chamish Canyon

Safety Zone Boundaries
BLM California Coastal National Monument
Marine Mammal Locations
ASBS Ecoregions
Invertebrate/Black Abalone Habitat (NOAA ESI)
White Abalone Locations (1996-1999)
Sandy Beaches
Eelgrass (Nearshore discontinuous small patches)
Kelp
Black Corals
Hydrocoral and Gorgonians
10 Meter Bathymetric Contours

Coastal Marine Substrate
Boulders
Rock
Sand
Hard Substrate
Probable Hard Substrate
Soft Substrate

Roads
Water Courses
SHOBA Boundary



NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Marine Resources Map 1

Integrated Natural Resources Management Plan, NALF San Clemente Island

Miles: 0 0.5 1 1.5 2 2.5

Meters: 0 1,000 2,000 3,000 4,000 5,000

Map K-8 San Clemente Island Marine Natural Resources (Map 1).
Constraints Maps

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DRAFT

Flasher

NOTS Pier

Jack Point

Randall

Chamish Canyon

East Shore Region

Terrace Canyon

West Shore Region

Larkspur Canyon

Nanny Canyon

Lemon Tank Canyon

Tota Canyon

Stone Canyon

Stone Station

Horton Canyon

Twin Dams Canyon

Spray

Eel Point

Eel Cove Canyon

Seal Cove

Sea lion haul out; Small rookery

Wallrock Canyon

Sea lion, Elephant seal haul out, Major rookery

Mail Point

Boulders Canyon

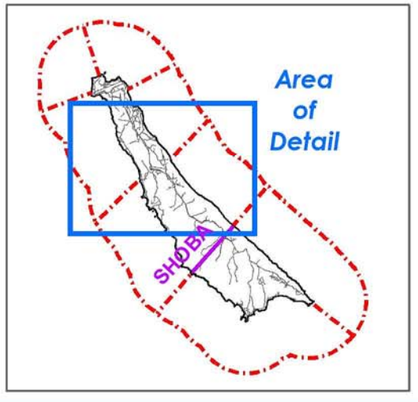
Thirst Canyon

Mount Thirst

Safety Zone Boundaries
BLM California Coastal National Monument
Marine Mammal Locations
Eelgrass (Nearshore discontinuous small patches)
ASBS Ecoregions
Invertebrate/Black Abalone Habitat (NOAA ESI)
White Abalone Locations (1996-1999)
Kelp
Black Corals
Hydrocoral and Gorgonians
10 Meter Bathymetric Contours

Coastal Marine Substrate
Boulders
Rock
Sand
Hard Substrate
Probable Hard Substrate
Soft Substrate

Roads
Water Courses
SHOBA Boundary



NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Marine Resources Map 2

Integrated Natural Resources Management Plan, NALF San Clemente Island

Miles
0 0.25 0.5 1 1.5 2 2.5

Meters
0 500 1,000 2,000 3,000 4,000 5,000

Map K-9 San Clemente Island Marine Natural Resources (Map 2).
Constraints Maps

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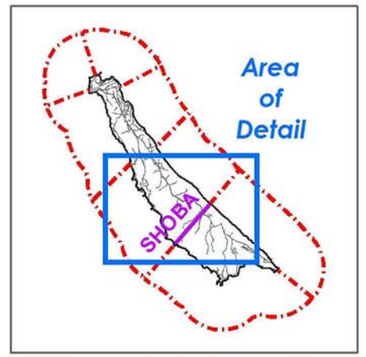
DRAFT

Spray
Eel Point
Eel Cove Canyon
Sea lion haul out; Small rookery
Seal Cove
Wallrock Canyon
Sea lion, Elephant seal haul out, Major rookery
Mail Point
Warren Canyon
Waynuk Canyon
Middle Ranch Canyon
Sea lion, Elephant seal haul out; Major rookery
West Shore Region
Norton Canyon
Lost Point
Box Canyon
Horton Canyon
Sea lion, Elephant seal haul out; Small rookery
Chukit Canyon
Cave Canyon
Lemon Tank Canyon
Tota Canyon
Stone Canyon
Burn's Canyon
Stone Station
Horton Canyon
Twin Dams Canyon
East Shore Region
Boulders Canyon
Thirst Canyon
Vista Canyon
Mount Thirst
Grove Canyon
Eagle Canyon
Bryce Canyon
Mosquito Cove
OP3

- Safety Zone Boundaries
- BLM California Coastal National Monument
- Marine Mammal Locations
- ASBS Ecoregions
- Invertebrate/Black Abalone Habitat (NOAA ESI)
- White Abalone Locations (1996-1999)
- Kelp
- Black Corals
- Hydrocoral and Gorgonians
- Eelgrass (Nearshore discontinuous small patches)
- 10 Meter Bathymetric Contours

Coastal Marine Substrate

- Boulders
- Rock
- Sand
- Hard Substrate
- Probable Hard Substrate
- Soft Substrate
- Roads
- Water Courses
- Observation Points
- SHOBA Boundary
- Sandy Beaches



NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Marine Resources Map 3

Integrated Natural Resources Management Plan, NALF San Clemente Island

Miles
0 0.25 0.5 1 1.5 2 2.5

Meters
0 500 1,000 2,000 3,000 4,000 5,000

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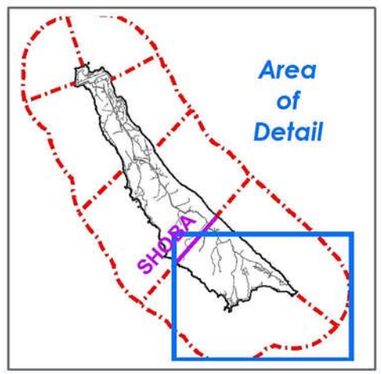
Safety Zone Boundaries
BLM California Coastal National Monument
Marine Mammal Locations
Sandy Beaches
ASBS Ecoregions
Invertebrate/Black Abalone Habitat (NOAA ESI)
White Abalone Locations (1996-1999)
Kelp
Black Corals
Hydrocoral and Gorgonians
Eelgrass (Nearshore discontinuous small patches)
10 Meter Bathymetric Contours

Coastal Marine Substrate
Boulders
Rock
Sand
Hard Substrate
Probable Hard Substrate
Soft Substrate

Roads
Water Courses
Observation Points
SHOBA Boundary



NOTE: This map is for informational purposes only. Species locations are for known occurences only, and do not represent island-wide distributions as most surveys are limited in scope. Presence of T&E species does not preclude training. The NEPA site approval process should be co-ordinated through the NAVFAC Public Works Office, NBC.

San Clemente Island Marine Resources Map 4

Integrated Natural Resources Management Plan, NALF San Clemente Island

Miles
0 0.25 0.5 1 1.5 2 2.5

Meters
0 500 1,000 2,000 3,000 4,000 5,000

Map K-11 San Clemente Island Marine Natural Resources (Map 4).

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Appendix L: INRMP Updates and Metrics Scores

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NR Metrics 2012 NAVBASE Coronado - SAN CLEMENTE ISLAND

Note: Click on the links to the right to jump to a focus area. Please click "Save" to add your draft answers to the database. If you leave and are logged out of the system, your answers will be retained the next time you log in.

Assignment Information

Assigned To:	Bryan Munson, Melissa Booker, Tiffany Shepherd		
Special Area(s):	SAN CLEMENTE ISLAND		
Due Date:		**Status:**	Reviewed
Sent:	9/24/2012	**Sent By:**	Matt Hawkins (DoD)
Modified:	11/15/2012	**Modified By:**	Shannon Shea
Completed:	11/15/2012	**Completed By:**	Melissa Booker
Reviewed:	11/19/2012	**Reviewed By:**	Tom Mayes

Select "New Item" to add an attendee

Attendees

Name	Organization	Phone	Email	Lead
Sandy Vissman	USFWS	(760) 431-9440	Sandy_Vissman@fws.gov	No
Melissa Booker	NBC SCI Wildlife Biologist, NAVFAC	(619) 545-7188	melissa.booker@navy.mil	Yes
Bryan Munson	NBC Botanist, NAVFAC	(619) 545-7186	bryan.munson@navy.mil	Yes
Shannon Shea	NAVFAC SW	(619) 532-4265	shannon.shea1@navy.mil	No
Michelle Cox	NAVFAC SW	(619) 556-9759	michelle.c.cox@navy.mil	No
Susan Wang	NMFS NOAA			No
Walter Wilson	CNRSW	(619) 532-2747	walter.l.wilson2@navy.mil	No
Jessica Bredvik	NAVFAC SW	(619) 532-4182	jessica.bredvik@navy.mil	No

Navy INRMP Status Check/Data Call

1. Has the site been surveyed to determine if significant natural resources exist?

SIGNIFICANT - sources identified as having special importance to an installation and/or its ecosystem. Natural resources may be significant on a local, regional, national, or international scale. All threatened, endangered and at-risk species are significant natural resources that normally will require an INRMP. Installations that actively manage or execute projects for fish and wildlife, forestry, vegetation and erosion control, agricultural outleasing or grazing, or wetlands protection should be evaluated for significance, but normally will require an INRMP. An evaluation for significance should also consider the degree of active management, special natural features, aesthetics, outdoor recreational opportunities, and the ecological context of the installation. (DoDI 4715.03)

Options: Yes, No

Yes

1a. If the site has been surveyed, were significant natural resources found?

Options: Yes, No

Yes

1b. If the site has not been surveyed, please explain why a survey has not been conducted.

2. If significant natural resources were found, is there a compliant INRMP that covers this site?

COMPLIANT INRMP - A complete plan that meets the purposes of the Sikes Act (§101(a)(3)(A-C)), contains the required plan elements (§101(b)(1)(A-J)), and has been reviewed for operation and effect within the past 5 years (§101(2)(b)(2)).

Options: Yes, No

Yes

3. If there is a compliant INRMP for the site, then please enter the name and date of the INRMP that covers this site

Please upload the INRMP and Signature Page to the Conservation Website. Go to the Natural Resources Program

Overview page and select the Documents tab.

3a. Name of INRMP
San Clemente Island INRMP

3b. Date of INRMP
5/20/2002

4. If there is no INRMP for the site, has funding been requested to develop an INRMP?
Options: Yes, No

4a. If funding has been requested, what is the expected date to receive funding?

4b. If no funding has been requested, please explain.

5. Has a 5-year INRMP review for operation and effect been completed for this INRMP?
REVIEW FOR OPERATION AND EFFECT – A comprehensive review by the Parties, at least once every 5 years, to evaluate the extent to which the goals and objectives of the INRMP continue to meet the purpose of the Sikes Act, which is to carry out a program that provides for the conservation and rehabilitation of natural resources on military installations. The outcome of this review will assist in determining if the INRMP requires a revision (§101(f)(1)(A)). The annual review can qualify for the 5-year review for operation and effect, which is legally required by the Sikes Act, if mutually agreed upon by both partners (i.e. USFWS and State).
Options: Yes, No
Yes

5a. If a 5-year INRMP review for operation and effect been completed, did the review result in a revision of the INRMP?
REVISION – A substantive change to an INRMP that requires coordination and mutual agreement by the Parties. [List examples of things that would trigger a revision – Navy needs to review current list.] A revision is not minor changes to the INRMP text, work plans, or projects. Rather, these changes are updates that should be made as a result of annual reviews per DoD policy, to ensure the INRMP reflects the current condition of the natural resources and program goals and objectives. (CNO-N45)
Options: Yes, No
No

5b. If yes, when was State concurrence received?

5c. If yes, when was USFWS regional concurrence received?
8/12/2012

5d. If yes, when was Installation Commanding Officer approval received?
9/20/2002

5e. If no, please explain why a review for operation and effect has not been completed.
Major revision of SCI INRMP will be signed 2013. CDFG and USFWS have been involved with the development of the INRMP, and they will sign the revised INRMP in 2013

1. Ecosystem Integrity

Focus Area Purpose: *Evaluate the current status, management effectiveness, and trends of the ecosystems at the installation to support and maintain a community of organisms that have a species composition, diversity, and functional organization comparable to those in the respective region.*

Instructions: *The list below contains the ecosystems occurring on the site(s) that were selected during the FY11 NR Metrics data call. Please review the list and update as necessary. Select the red 'X' to delete an ecosystem from the list. Select "New Item" to add an ecosystem and begin answering questions. Select the name of the preloaded ecosystem to answer the questions for the current reporting period. Note: The "Comment on my response" option is available for each question and can be used to (1) provide supplemental information about how you answered a question for future reference or (2) provide feedback to HQ if you have any questions/concerns about a question.*

Assessment of ecosystem integrity

	Ecosystem	Fragmentation	Stressors	Species Populations	Condition
▫					
▫	California Central Valley and Southern Coastal Gra...	Ecosystem fragmentation is the result of two (2) o...	Moderately Vulnerable to Stress	Effectively managed	Condition is better on the installation
▫	Pacific Coastal Marsh Systems	Ecosystem fragmentation is the result of one (1) o...	Highly Vulnerable to Stress	Minimally effective management	Condition is similar both on and off the installat...
▫	Baja Semi-Desert Coastal Succulent Scrub	Ecosystem fragmentation is the result of one (1) o...	Slightly Vulnerable to Stress	Effectively managed	Condition is better on the installation
▫	Southern California Coastal Scrub	No fragmentation	Slightly Vulnerable to Stress	Effectively managed	Condition is better on the installation

Ecosystem	Fragmentation	Stressors	Species Populations	Condition
Marine Nearshore	No fragmentation	Slightly Vulnerable to Stress	Moderately effective management	Condition is better on the installation
Coastal Dunes	Ecosystem fragmentation is the result of one (1) o...	Slightly Vulnerable to Stress	Effectively managed	Condition is better on the installation
Rocky intertidal	No fragmentation	Moderately Vulnerable to Stress	Effectively managed	Condition is better on the installation
Canyon Woodland	Ecosystem fragmentation is the result of five (5) ...	Moderately Vulnerable to Stress	Moderately effective management	Condition is worse on the installation

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Are conservation easements, or buffers, in place to provide an ecosystem integrity benefit on the installation?

Options: Yes, No = opportunity exists, but easements/buffers have not been pursued, N/A = no opportunity, development is immediately adjacent to installation

N/A = no opportunity, development is immediately adjacent to installation

Findings

Recommendations

Change the fragmenetation question to clarify that this is assessing the current situtation, and not what occured during the FY. Remove "reporting period" from the question. This seems to imply we are only assessing fragmentation that has occurred during the last FY. Assessing the current state is the direction that was given to us at the Sept 2012 N45 Symposium.

Section Score: 0.80

2. Listed Species & Critical Habitat

Focus Area Purpose: *Evaluate the extent to which federally listed species have been identified and the INRMP provides conservation benefits to these species and their habitats.*

The list below contains the federally listed species occurring on the site(s) that were selected during the FY11 NR Metrics data call. Species that are not protected under the federal Endangered Species Act (e.g. marine mammals protected solely under MMPA, state listed species, Birds of Conservation Concern, etc.) have been removed from the list. INRMP coverage, status, management of non-federally listed species should be addressed or discussed in the Ecosystem Integrity and/or INRMP Implementation Focus Areas.

Instructions: *Please review the list and ensure that it is correct. To **ADD** a species select "New Item" and search for the species list. Select the name of the preloaded species to answer the questions for the current reporting period. To ADD species that are not on the pre-populated list or to **DELETE** species from the list please contact Mr. Matt Hawkins (matt.hawkins@navy.mil). Note: The "Comment on my response" option is available for each question and can be used to (1) provide supplemental information about how you answered a question for future reference or (2) provide feedback to HQ if you have any questions/concerns about a question.*

Status codes include*:*

E *= endangered. A species in danger of extinction throughout all or a significant portion of its range.*

T *= threatened. A species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.*

Assessment of Federally Listed Species and Critical Habitat

Species	Beneficial Surveys	Beneficial Surveys	Goals	Critical Habitat	Exemption/Exclusion

	(Habitat)	(Population)			
Black Abalone (Haliotis cracherodii)	Yes	Yes	Good	Yes	Yes
Brown pelican (Pelecanus occidentalis)	Yes	Yes	Excellent	No	N/A
San Clemente loggerhead shrike (Lanius ludovicianu...	Yes	Yes	Excellent	No	N/A
San Clemente sage sparrow (Amphispiza belli clemen...	Yes	No	Good	No	N/A
Western snowy plover (Charadrius alexandrinus nivo...	No	No	Moderate	No	No
Island night lizard (Xantusia riversiana)	Yes	Yes	Excellent	N/A (Critical habitat designation was not proposed...	N/A
White Abalone (Haliotis sorenseni)	Yes	Yes	Moderate	N/A (Critical habitat designation was not proposed...	N/A
San Clemente Island woodland-star (Lithophragma ma...	No	No	Minimal	N/A (Critical habitat designation was not proposed...	N/A
Santa Cruz Island rockcress (Sibara filifolia)	Yes	Yes	Moderate	N/A (Critical habitat designation was not proposed...	
San Clemente Island indian paintbrush (Castilleja ...	Yes	Yes	Excellent	N/A (Critical habitat designation was not proposed...	N/A
San Clemente Island larkspur (Delphinium variegatu...	Yes	Yes	Excellent	N/A (Critical habitat designation was not proposed...	N/A
San Clemente Island broom (Lotus dendroideus ssp. ...	Yes	Yes	Excellent	N/A (Critical habitat designation was not proposed...	N/A
San Clemente Island bush-mallow (Malacothamnus cle...	Yes	Yes	Good	N/A (Critical habitat designation was not proposed...	N/A

Unoccupied Critical Habitat Questions

1. Has unoccupied critical habitat for any federally listed species been designated on the installation?

Options: Yes, No, N/A

No

1a. For which species?

User selects from preloaded federal species list.

2. Have management projects addressing unoccupied critical habitat been clearly identified in the INRMP?

Options: Yes, No, N/A

N/A

3. Have management projects addressing unoccupied critical habitat been clearly identified in the EPRWeb?

Options: Yes, No, N/A

N/A

Candidate Species / Species of Special Concern

Sub-Focus Area Purpose: *Evaluates the extent to which USFWS candidate species and NMFS species of special concern species have been identified and the INRMP addresses these species and their habitats or the ecosystems in which they are found.*

Instructions: *The list below should include all USFWS candidate species and NMFS species of special concern species, including USFWS Candidate Notice of Review (CNOR) and Work Plan (WP) lists, which have been documented or are likely to occur on your installation. Please add all species that have been documented or are likely to occur on your installation. To ADD a species select "New Item" and search for the species list. Select the name of the preloaded species*

to answer the question regarding which management approach benefits the species. To ADD species that are not on the pre-populated list or to DELETE species from the list please contact Mr. Matt Hawkins (matt.hawkins@navy.mil). Note: The "Comment on my response" option is available for each question and can be used to (1) provide supplemental information about how you answered a question for future reference or (2) provide feedback to HQ if you have any questions/concerns about a question.

Select "New Item" to add a candidate species and begin answering questions.

Candidate Species / Species of Special Concern

Candidate Species	**Conservation Benefit**
Xantus's Murrelet (Synthliboramphus hypoleucus)	Yes

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

Recommendations

Section Score: 0.86

3. Recreational Use and Access

Focus Area Purpose: *Evaluate the availability and adequacy of public recreational use opportunities, such as fishing and hunting, and access for handicapped and disabled persons, given security and safety requirements for the installation.*

1. Are recreational opportunities available on the installation?

Options: Yes, No: landscape doesn't support recreational opportunities, N/A: security constraints limit/prohibit recreational opportunities

Yes

2. If recreational opportunities are available, are they offered to the public?

Options: Yes, No, NA: Recreational opportunities are not available due to landscape or security constraints.

Yes

3. If recreational opportunities are available, are they offered to DoD civilian personnel?

Options: Yes, No, NA: Recreational opportunities are not available due to landscape or security constraints.

Yes

4. If recreational opportunities are available, are they accessible by disabled veterans/Americans?

Options: Yes, No, N/A: Recreational opportunities are not available due to landscape or security constraints.

Yes

5. Are Sikes Act fees collected for outdoor recreational opportunities?

Options: Yes, No, N/A: Recreational opportunities do not include hunting and fishing.

No

6. Are recreational areas and facilities in good condition?

Options: Yes, No, NA: Recreational opportunities are not available due to landscape or security constraints.

Yes

7. Is there an active natural resources law enforcement program on the installation?

Options: Yes, No, N/A: recreational opportunities do not include hunting and fishing

No

8. Are sustainable harvest goals in the INRMP effective for the management of the species' population?

Options: Not effective, Minimal effectiveness, Moderate effectiveness, Effective, Highly effective, N/A: Recreational opportunities do not include hunting and fishing

Moderate effectiveness

Comment:

CDFW laws apply

9. To what extent did the installation develop and provide public outreach/educational awareness, e.g. environmental educational opportunities, natural resource field trips/tours, pamphlets?

Options: No public outreach provided, Low outreach, Moderate outreach, Good outreach, Excellent outreach, N/A

Excellent outreach

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

Due to safety and security restrictions, outdoor recreation opportunities are limited to in-water activites

Recommendations

recommend rewording these questions. We should not get a low score due to safety, security, and accessability issues.

Section Score: 0.72

4. Sikes Act Cooperation (Partnership Effectiveness)

Focus Area Purpose: *Determine to what degree USFWS, State Fish and Wildlife Agency, and when appropriate, NOAA Fisheries Service, partnerships are cooperative and result in effective INRMP development and review for operation and effect.*

1. Was the USFWS invited to participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No

Yes

1a. By what method was the USFWS invited to participate in the annual INRMP/Natural Resources Program review?

Options: Telephone call, Electronic mail, Official letter, Multiple methods, Other, NA (USFWS was not invited)

Electronic mail

1b. Did the USFWS respond to the invitation to participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No, N/A

Yes

1c. How many attempts were made to invite the USFWS to participate in the annual INRMP/Natural Resources Program review?

Options: 0-3, 4-6, 7-10, >10, NA (USFWS was not invited)

0-3

1d. Did the USFWS participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No

Yes

1e. If the USFWS participated in the annual INRMP/Natural Resources Program review, was it recognized as a review for operation and effect?

Options: Yes, No

Yes

1f. If the USFWS did not participate in the annual review, what type of correspondence was received from the USFWS to inform the installation that they were not able to participate?

Options: Telephone call, Electronic mail, Official letter, Multiple methods, Other, NA (USFWS did participate)

NA (USFWS did participate)

1g. If the USFWS did not participate in the annual INRMP/Natural Resources Program review, was a separate meeting held/correspondence sent as a review for operation and effect? When?

When? User enters date in comment text box below question.

Options: Yes, No

No

1h. Was a report of the previous year's annual review submitted to the USFWS during this reporting period?

Options: Yes, No

No

2. Was the State Fish and Wildlife Agency invited to participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No

Yes

2a. By what method was the State Fish and Wildlife Agency invited to participate in the annual INRMP/Natural Resources Program review?

Options: Telephone call, Electronic mail, Official Letter, Multiple methods, Other, NA (the State Fish and Wildlife Agency was not invited)

Multiple methods

2b. Did the State Fish and Wildlife Agency respond to the invitation to participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No, N/A

No

2c. How many attempts were made to invite the State Fish and Wildlife Agency to participate in the annual INRMP/Natural Resources Program review?

Options: 0-3, 4-6, 7-10, >10, NA (the State Fish and Wildlife Agency was not invited)

4-6

2d. Did the State Fish and Wildlife Agency participate in the annual INRMP/Natural Resources Program review?

Options: Yes, No, N/A

No

2e. If the State Fish and Wildlife Agency participated in the annual INRMP/Natural Resources Program review, was it recognized as a review for operation and effect?

Options: Yes, No, N/A

N/A

2f. If the State Fish and Wildlife Agency did not participate in the annual review, what type of correspondence was received from the State Fish and Wildlife Agency to inform the installation that they were not able to participate?

Options: Telephone call, Electronic mail, Official letter, Multiple methods, Other, NA (State did participate)

NA (State did participate)

2g. If the State Fish and Wildlife Agency did not participate in the annual INRMP/Natural Resources Program review, was a separate meeting held/correspondence sent as a review for operation and effect? When?

When? User enters date in comment text box below question.

Options: Yes, No, N/A

Yes

Comment:

Letter will be sent January 2013

2h. Was a report of the previous year's annual review submitted to the State Fish and Wildlife Agency during this reporting period?

Options: Yes, No, N/A

No

3. Was NOAA Fisheries Service invited to participate in the annual INRMP/Natural Resources Program review, if applicable?

Options: Yes, No, N/A

Yes

3a. By what method was NOAA Fisheries Service invited to participate in the annual INRMP/Natural Resources Program review, if applicable?

Options: Telephone call, Electronic mail, Official letter, Multiple, Other, N/A

Multiple

3b. Did NOAA Fisheries Service respond to the invitation to participate in the annual INRMP/Natural Resources Program review, if applicable?

Options: Yes, No, N/A

Yes

3c. How many attempts were made to invite the NOAA Fisheries Service to participate in the annual INRMP/Natural Resources Program review, if applicable?

Options: 0-3, 4-6, 7-10, >10, N/A

0-3

3d. Did NOAA Fisheries Service participate in the annual INRMP/Natural Resources Program review, if applicable?

Options: Yes, No, N/A

Yes

3e. If NOAA Fisheries Service participated in the annual INRMP/Natural Resources Program review, was it recognized as a review for operation and effect, if applicable?

Options: Yes, No, N/A

Yes

3f. If the NOAA Fisheries Service did not participate in the annual review, what type of correspondence was received from the State Fish and Wildlife Agency to inform the installation that they were not able to participate? When?

When? User enters date in comment text box below question.

Options: Telephone call, Electronic mail, Official letter, Multiple methods, Other, NA (was not invited)

Other

Comment:

NA NOAA Participated

3g. If NOAA Fisheries Service did not participate in the annual INRMP/Natural Resources Program review, was a separate meeting held/correspondence sent as a review for operation and effect? When?

When? User enters date in comment text box below question.

Options: Yes, No, N/A

N/A

3h. Was a report of the previous year's annual review submitted to NOAA Fisheries Service during this reporting period, if applicable?

Options: Yes, No, N/A

No

4. What is the level of collaboration/cooperation between Sikes Act partners ?

Sikes Act partners: USFWS, State Fish and Wildlife Agency, and NOAA Fisheries Service, if applicable.

Options: None, Minimal collaboration/cooperation, Satisfactory collaboration/cooperation, Effective collaboration/cooperation, Highly effective collaboration/cooperation

Effective collaboration/cooperation

5. How well are installation natural resource management goals and objectives aligned with conservation goals of Sikes Act partners, e.g. USFWS/NOAA Fisheries Service regional goals and State Wildlife Action Plans (SWAPs)?

Options: Not aligned, Somewhat aligned, Completely aligned, N/A: Option for NOAA only

Somewhat aligned

Comment:

give us an option between Somewhat and COmpletely aligned

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

CDFG was contacted multiple times. Navy met with Regional Manager for Cal South Coast Region, and it was assumed after that meeting that CDFG was aware of the meeting, and someone would attend. NBC INRMP meeting was the week before this meeting, and we asked who would attend next week, and they said that they hadn't worked that out. We had assumed CDFG would participate in this meeting, and aren't sure why someone didn't represent CDFG

Recommendations

Section Score: 0.64

5. Team Adequacy

Focus Area Purpose: *Asses the adequacy of the natural resources team (the natural resource management professional and installation support staff) in accomplishing INRMP goals and objectives at each installation.*

1. Is there a Navy professional Natural Resources Manager designated by the Installation Commanding Officer?

COs of shore activities holding Class 1 plant accounts shall appoint, by letter, an installation Natural Resources Manager/Coordinator whose duties include ensuring that the CO is informed regarding: natural resources issues, conditions of natural resources, objectives of the INRMP, and potential or actual conflicts between mission requirements and natural resources mandates. Designated installation POC's are responsible for the inherently governmental decisions made on behalf of the installation and CO with regard to Sikes Act compliance. [OPNAVINST 5090.1C]

Options: Yes, No

Yes

2. Is there an on-site Navy professional Natural Resources Manager?

Options: Yes, No

Yes

2a. Please enter the GS grade level and job series code

Enter the GS grade level and job series code (i.e. GS-0401-12) of each on-site Natural Resources Manager

12-0401, 12-0486

3. Is there adequate installation staff assigned or available to properly implement the INRMP goals and objectives?
staff assigned or available: Defined as NR staff or other reach back EV staff.

Options: Yes, No

No

3a. Please enter the GS grade level and job series code
Enter the GS grade level and job series code (i.e. GS-0401-12) of each installation staff member assigned or available to assist the Natural Resources Manager in implementing the INRMP goals and objectives.

12-0401, 12-0486, 13-0401

4. How well do higher echelon offices support the installation natural resources program, e.g. reach back support for execution, policy support, etc.)?

Options: No support, Minimal support, Satisfactory support, Well supported, Very well supported

Satisfactory support

5. The team is enhanced by the use of contractors.
Contractors: Defined as supplemental staff to the onsite NR staff, not contractors working in support of contracted projects.

Options: Disagree, Somewhat agree, Neutral, Agree, Strongly agree, N/A

N/A

6. The team is enhanced by the use of volunteers.

Options: Disagree, Somewhat agree, Neutral, Agree, Strongly agree, N/A

N/A

7. The Natural Resources team is adequately trained to implement the goals and objectives of the INRMP.

Options: Disagree, Somewhat agree, Neutral, Agree, Strongly agree

Disagree

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

low scores due to inadequate training and inadequate staffing

Recommendations

increase ability to attend training.

Section Score: 0.51

6. INRMP Implementation

Focus Area Purpose: *Evaluate the execution of actions taken to meet goals and objectives outlined in the INRMP.*

Supplemental Information: *The intent of this Focus Area is to assess how well actions are being implemented to execute the goals and objectives of the INRMP. Actions can include projects submitted via EPRWeb, as well as activities executed with alternative funds, not programmed through EPRWeb, or carried out by the use of volunteers or cooperative partnerships with other entities. Only include actions that occurred fully or partially during the CURRENT REPORTING PERIOD, e.g. the PREVIOUS FISCAL YEAR.*

Instructions: *Select a project from the list below (imported from EPRWeb) to begin answering questions. Select the red 'X' to delete a project, if a preloaded project doesn't apply to the site (s) or is not a project that occurred during the current reporting period. In addition, any INRMP actions, e.g. emergent projects, non-funded actions, projects involving volunteers, etc., not preloaded in the table should be entered manually in order to be assessed. Select "New Item" to add additional INRMP actions or missing EPRWeb projects, and begin answering questions. Note: Conservation recommendations identified during regulatory consultations (e.g. ESA Section 7, EFH, etc.), over the past year, may have resulted in the development of emergent requirements. These projects should also be evaluated during this annual review.*

Assessment of INRMP Implementation

FY	Project #	Title	Obligated ($)	Spent ($)	Met INRMP Goals	On Schedule	Status	Ecosystem Benefited
(#12101) Flora, Fauna and Habitat								
								Southern

FY	Project #	Title	Obligated ($)	Spent ($)	Met INRMP Goals	On Schedule	Status	Ecosystem Benefited
2010	31466NR001	SW SCI - Fairy Shrimp Surveys	$0.00		Fully Agree	Yes	Funding Received	California Coastal Scrub
2012	00242MR100	CHE SW SCI Plankton Inventory	$69,775.00	$69,775.00	Fully Agree	Yes	Awarded/Executed	
2012	31466SNAIL	4SAR SW SCI Land Snail Survey	$28,600.00	$0.00	Fully Agree	Yes	Now In-Progress	
2012	31466NR911	MBTA SW SCI Avian Community Monitoring	$0.00		Fully Agree	No	In EPRWeb	
2012	3146612198	3 SAR Seabird Monitoring SCI	$167,334.00	$167,334.00	Strongly Agree	Yes	Now In-Progress	
		(#12103) INRMP - Overarching						
2010	3146600043	CHE SW SCI INRMP Revision	$11,848.00	$11,848.00	Strongly Agree	Yes	Now In-Progress	
		(#12104) Listed Species						
2010	3146600009	2 BO SITE SELECTION, OUTPLANTING AND MAINTENANCE	$184,184.00	$184,184.00	Fully Agree	Yes	Now In-Progress	Baja Semi-Desert Coastal Succulent Scrub
2010	3146600010	2 BO EXOTIC PLANT MGMT AND CONTROL FOR END SP. PRO...	$111,471.90	$111,471.90	Fully Agree	Yes	Now In-Progress	California Central Valley and Southern Coastal Gra...
2012	31466NR005	1 CP Marine Habitat Monitoring/Assessment	$447,783.00	$447,783.00	Strongly Agree	Yes	Now In-Progress	
2010	31466NR012	2 BO SCI/SOCAL EIS Mitigation - Terrestrial	$1,121,009.00	$1,121,009.00	Strongly Agree	Yes	Now In-Progress	
2012	3146600011	2 BO LOGGERHEAD SHRIKE CAPTIVE BREEDING/REARING	$724,594.00	$724,594.00	Strongly Agree	Yes	Now In-Progress	
2010	3146600001	2 BO END SPECIES RECOVERY ASSESSMENT- VEG PLOTS		$2,926.00	Fully Agree	Yes	On-Hold	Baja Semi-Desert Coastal Succulent Scrub
2010	3146600012	2 BO LOGGERHEAD SHRIKE MONITORING	$499,046.00	$499,046.00	Strongly Agree	Yes	Now In-Progress	
2010	31466NR101	1 CP SW SCI - Grassland Restoration to benefit 5 S...	$21,068.00	$3,146.00	Fully Agree	Yes	Now In-Progress	California Central Valley and Southern Coastal Gra...
2010	3146600002	2 BO SW SCI - ENDANGERED PLANT STATUS (6 Species) ...	$0.00		Fully Agree	Yes	In EPRWeb	Southern California Coastal Scrub
2010	3146600014	2 BO LOGGERHEAD SHRIKE AND ENDANG SPECIES PREDATOR...	$617,255.00	$617,255.00	Strongly Agree	Yes	Now In-Progress	
2010	31466NR102	2 BO SW SCI - Prescribed Burns to enhance protecti...	$1,600.00	$1,600.00	Fully Agree	Yes	Now In-Progress	California Central Valley and Southern Coastal Gra...
2011	3146600003	2 BO SCI Western Snowy PLover Surveys	$0.00		Strongly Agree	Yes	Now In-Progress	
								Baja Semi-

FY	Project #	Title	Obligated ($)	Spent ($)	Met INRMP Goals	On Schedule	Status	Ecosystem Benefited
2012	3146600016	END. SPECIES HABITAT MAPPING	$90,934.00	$90,934.00	Strongly Agree	Yes	Completed	Desert Coastal Succulent Scrub
2012	31466NR666	2 BO SW SCI Fuel Moisture Monitoring - Fire Manage...	$90,586.00	$595.00	Strongly Agree	Yes	Now In-Progress	Coastal Dunes
2010	3146600004	2 BO Endangered Species Monitoring/Survey (SCI Sag...	$212,442.00	$212,442.00	Strongly Agree	Yes	Now In-Progress	
2012	3146600030	2 BO Endangered Species Management	$11,306.88	$11,306.88	Strongly Agree	Yes	Now In-Progress	
2010	3146600005	2 BO ENDANGERED SP. (ISLAND NIGHT LIZARD) SURVEY O...	$128,500.00	$128,500.00	Strongly Agree	Yes	Now In-Progress	
2010	31466NR902	2 BO LOGGERHEAD SHRIKE RELEASE PROGRAM	$422,405.00	$422,405.00	Strongly Agree	Yes	Now In-Progress	
2010	3146600034	1 CP EQUIPMENT AND SUPPLIES 18N	$53,000.00	$53,000.00	Strongly Agree	Yes	Completed	
2010	31466NR907	2 BO END. SP. MGT (MULTIPLE SP) FIRE SUPPRESSION H...	$495,633.00	$388,633.00	Somewhat Agree	Yes	Now In-Progress	
2012	3146612002	2 BO CREATION AND MAINTENANCE OF FIRE BREAKS	$425,405.00	$425,405.00	Strongly Agree	Yes	Completed	Baja Semi-Desert Coastal Succulent Scrub
2010	3146600035	1 CP Endangered Species Management Support	$50,000.00	$50,000.00	Strongly Agree	Yes	Completed	
2010	31466NR910	2 BO SCI INRMP - Sage Sparrow Management Plan	$84,175.00	$84,175.00	Strongly Agree	Yes	Now In-Progress	
2010	3146600037	1 CP VEHICLE RENTAL 18N	$82,874.00	$82,874.00	Strongly Agree	Yes	Completed	
2010	3146600006	GENETIC DIVERSITY OF ENDANGERED PLANTS	$171,000.00		Fully Agree	Yes	Now In-Progress	Southern California Coastal Scrub
2012	3146612991	2 BO OPERATION AND MAINTENANCE OF WEATHER STATIONS...	$54,886.00	$54,886.00	Strongly Agree	Yes	Completed	Baja Semi-Desert Coastal Succulent Scrub
2010	31466NR915	1 CP CHS SW SCI Black Abalone INRMP - Rocky Intert...	$89,798.00	$89,798.00	Strongly Agree	Yes	Now In-Progress	Rocky intertidal
2010	3146600046	3 CA Island Fox Threat Reduction	$65,719.00	$65,719.35	Strongly Agree	Yes	Now In-Progress	
2012	3146600008	2 BO SEED COLLECTION AND PROPAGATION	$48,149.00	$48,118.00	Strongly Agree	Yes	Now In-Progress	California Central Valley and Southern Coastal Gra...
2010	3146612025	3 CA ISLAND FOX MANAGEMENT IN SUPPORT OF THE LOGG...	$422,443.00	$422,443.00	Strongly Agree	Yes	Now In-Progress	
2012	3146600009	2 BO SITE SELECTION, OUTPLANTING AND	$184,184.00	$184,183.00	Strongly Agree	Yes	Now In-Progress	California Central Valley and Southern

FY	Project #	Title	Obligated ($)	Spent ($)	Met INRMP Goals	On Schedule	Status	Ecosystem Benefited
		MAINTENANCE						Coastal Gra...
2012	31466NR100	2 BO San Clemente Island Erosion Control and Habit...	$66,892.00	$66,892.00	Strongly Agree	Yes	Completed	
2010	3146612999	1 CP HELICOPTER SUPPORT FOR FIELD PROGRAMS	$75,411.00	$75,411.00	Strongly Agree	Yes	Now In-Progress	
2010	31466AAA44	2 BO SW SCI - Wildland Fire Management Plan, Upda...			Fully Agree	No	Now In-Progress	California Central Valley and Southern Coastal Gra...
2012	31466MAR20	SW F White Abalone Habitat Delineation	$98,972.00	$98,972.00	Strongly Agree	Yes	Now In-Progress	Marine Nearshore
2012	31466MAR23	1 S Black Abalone Surveys	$20,370.00	$20,370.00	Strongly Agree	Yes	Now In-Progress	Rocky intertidal
2012	31466MAR24	SW F - SCI Safety Zone Fish Study	$189,696.00	$189,696.00	Strongly Agree	Yes	Now In-Progress	Marine Nearshore
		(#12106) Invasives						
2012	3146642687	CHS SW SCI Invasive Ant Mngmnt	$0.00		Fully Agree	No	In EPRWeb	
		(#12999) Other Natural Resources Requirements (MISC)						
2012	3146617224	SW SCI SCA Support for NR Programs	$0.00		Fully Agree	No	In EPRWeb	

For each INRMP action executed during the reporting period for the installation, provide the amount of funding spent on listed species related-actions. Note: If a single project benefitted multiple listed species, please break out the funding amount spent per species, e.g. add the same INRMP action for each listed species benefitted. Select "New Item" to add federally listed species that benefitted from various INRMP projects/actions.

Assessment of Listed Species Benefitted by INRMP Implementation

Action	Species	Spent
31466NR907 - 2 BO END. SP. MGT (MULTIPLE SP) FIRE ...	San Clemente sage sparrow (Amphispiza belli clemen...	$200,000.00
3146600009 - 2 BO SITE SELECTION, OUTPLANTING AND ...	San Clemente Island bush-mallow (Malacothamnus cle...	$184,184.00
3146600010 - 2 BO EXOTIC PLANT MGMT AND CONTROL FO...	San Clemente Island woodland-star (Lithophragma ma...	$111,471.00
3146612999 - 1 CP HELICOPTER SUPPORT FOR FIELD PRO...	San Clemente loggerhead shrike (Lanius ludovicianu...	$75,411.00
31466NR666 - 2 BO SW SCI Fuel Moisture Monitoring ...	San Clemente Island broom (Lotus dendroideus ssp. ...	$595.00
3146612002 - 2 BO CREATION AND MAINTENANCE OF FIRE...	San Clemente Island indian paintbrush (Castilleja ...	$100,000.00
3146612991 - 2 BO OPERATION AND MAINTENANCE OF WEA...	San Clemente Island larkspur (Delphinium variegatu...	$24,000.00
3146600008 - 2 BO SEED COLLECTION AND PROPAGATION	Santa Cruz Island rockcress (Sibara filifolia)	$45,000.00
31466AAA44 - 2 BO SW SCI - Wildland Fire Manageme...	San Clemente Island broom (Lotus dendroideus ssp. ...	$35,444.00
31466NR012 - 2 BO SCI/SOCAL EIS Mitigation - Terre...	San Clemente Island bush-mallow (Malacothamnus cle...	$89,000.00
31466NR100 - 2 BO San Clemente Island Erosion Cont...	San Clemente Island woodland-star (Lithophragma ma...	$10.00
3146600011 - 2 BO LOGGERHEAD SHRIKE CAPTIVE BREEDI...	San Clemente loggerhead shrike (Lanius ludovicianu...	$724,594.00
3146600012 - 2 BO LOGGERHEAD SHRIKE MONITORING	San Clemente loggerhead shrike (Lanius ludovicianu...	$499,046.00

Action	Species	Spent
3146600003 - 2 BO SCI Western Snowy PLover Surveys	Western snowy plover (Charadrius alexandrinus nivo...	$0.00
3146600014 - 2 BO LOGGERHEAD SHRIKE AND ENDANG SPE...	San Clemente loggerhead shrike (Lanius ludovicianu...	$617,255.00
3146600004 - 2 BO Endangered Species Monitoring/Su...	San Clemente sage sparrow (Amphispiza belli clemen...	$212,422.00
31466NR902 - 2 BO LOGGERHEAD SHRIKE RELEASE PROGRA...	San Clemente loggerhead shrike (Lanius ludovicianu...	$422,405.00
3146600005 - 2 BO ENDANGERED SP. (ISLAND NIGHT LIZ...	Island night lizard (Xantusia riversiana)	$128,500.00
31466NR910 - 2 BO SCI INRMP - Sage Sparrow Managem...	San Clemente sage sparrow (Amphispiza belli clemen...	$84,175.00
31466NR907 - 2 BO END. SP. MGT (MULTIPLE SP) FIRE ...	San Clemente loggerhead shrike (Lanius ludovicianu...	$200,000.00

General INRMP Implementation Questions

1. Do the goals and objectives of the INRMP/Natural Resources Program support other conservation partnerships/initiatives?

Options: Yes, No

Yes

2. Which conservation partnerships/initiatives are supported?

Select all that apply

*Other (please specify in comments), Joint Venture...

Comment:

San Clemente Island fox candidate conservation agreement island fox working group MarinE network

3. To what level are Natural Resource program executions meeting USFWS conservation management expectations?

Options: Dissatisfied, Minimally satisfied, Somewhat satisfied, Completely satisfied, More than satisfied

Completely satisfied

Comment:

need an option between somewhat and completely

4. To what level are Natural Resource program executions meeting State Fish and Wildlife Agency conservation management expectations?

Options: Dissatisfied, Minimally satisfied, Somewhat satisfied, Completely satisfied, More than satisfied

Somewhat satisfied

5. To what level are Natural Resource program executions meeting NOAA Fisheries Service conservation management expectations, if applicable?

Options: N/A: Not supported, Minimally supported, Satisfactorily supported, Well supported, Very well supported

Satisfactorily supported

6. To what extent has the INRMP/Natural Resources program successfully supported other mission areas? (e.g. encroachment, BASH, range support, port operations, air operations, facilities management, etc.)

Options: Not supported, Minimally supported, Satisfactorily supported, Well supported, Very well supported

Well supported

7. Are Cooperative Agreements used to execute natural resources program requirements?

Options: Yes, No

Yes

8. Describe any obstacles to INRMP implementation

lack of funding leaves many projects unfunded

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

Recommendations

Section Score: 0.80

7. INRMP (Natural Resource Program) Support of the Installation Mission

Focus Area Purpose: *Evaluate the level to which existing natural resources requirements support the installation's ability to sustain the current operational mission, ensuring no net loss of mission capability.*

Mission statement

The mission of SCI is to support Tactical Training and RDT&E efforts in the SCI Range Complex by maintaining and operating facilities and providing services, arms, and material support to the U.S. Pacific Fleet and other operating forces.

1. The Natural Resources program effectively considers current mission requirements.

Options: Strongly disagree, Disagree, Neutral, Agree, Strongly agree

Agree

2. What is the level of coordination between natural resources personnel and other installation departments and military staff?

Options: No coordination, Minimal coordination, Satisfactory coordination, Effective coordination, Highly effective coordination

Satisfactory coordination

Comment:

There is significant coordination, but the coordination is often not as effective as it should be. More effective coordination needs to be developed, due to the difficult nature of working on this installaion

3. To what extent has the INRMP successfully supported other mission areas? (e.g. encroachment, BASH, range support, port operations, air operations, facilities management, etc.)

Options: Not supported, Minimally supported, Satisfactorily supported, Well supported, Very well supported

Satisfactorily supported

4. To what extent has there been a net loss of training lands or mission-related operational/training activities?

Options: Mission is fully impeded; training activities cannot be conducted due to regulatory requirements, Mission/Training activities are somewhat impeded with workarounds due to regulatory requirements, Neutral, No loss occurred, Mission has seen benefits

No loss occurred

Please enter Findings and Recommendations in the space provided below. Findings and Recommendations are required if the score for this focus area results in a Yellow or Red score. You will be unable to proceed to the next focus area until Findings and Recommendations have been entered.

If your score is Green, Findings and Recommendations serve as additional clarification to the answers provided for this Focus Area, and they are encouraged in order to provide a better understanding of existing activities, issues to be addressed, and unique circumstances.

Findings

USFWS's failure to delist and downlist species in a timely fashion has significantly increased encumberences on SCI, and reduced the effectiveness of operational training and the NR program on SCI.

Recommendations

USFWS needs to delist the island night lizard immediately. USFWS also needs to downlist the 4 plants that they recommended for downlisting in 2007. Failure to delist and downlist these species makes justifying the funds expended on the NR program more difficult.

Commanding Officer Signature

Name

Gary Mayes

Rank

Captain

Section Score: 0.65

Summary

1. As a result of this year's annual review, have any additional actions, such as management recommendations related to regulatory drivers (ACOE permits, EFH Issues, etc.), been identified that should be considered for incorporation into the INRMP?

The purpose of this question is to assess whether the INRMP needs to be updated, either in content or projects to be implemented, as a result of the outcome of the annual review for operation and effect that was conducted.

Options: Yes, No

No

2. In addition to any findings submitted in the 7 Focus Areas please provide any additional or general findings?

3. In addition to any recommendations submitted in the 7 Focus Areas please provide any additional or general recommendations?

4. List the top three accomplishments for the Natural Resources Program during this reporting period.

4a. [1st accomplishment]*
Partnered with USFWS to get 5-year reviews completed for 6 plants and the island night lizard

4b. [2nd accomplishment]*
partnered with the channel island restoration group to remove dozens of acres of invasive ice plant in the sensitive habitats of SCI at no cost to the Navy

4c. [3rd accomplishment]*
Worked effectively with island operators to drastically reduced off-roading incursions in sensitive habitat from dozens per year to zero.

Scorecard

Focus Area	Final
1. Ecosystem Integrity	0.80
2. Listed Species & Critical Habitat	0.86
3. Recreational Use and Access	0.72
4. Sikes Act Cooperation (Partnership Effectiveness)	0.64
5. Team Adequacy	0.51
6. INRMP Implementation	0.80
7. INRMP (Natural Resource Program) Support of the Installation Mission	0.65
	0.71

***Legend**: Green (1.00-0.67), Yellow (0.66-0.34), Red (0.33-0.0)*

To finalize your scorecard, please save this form, and then select the Submit button above.

Appendix M: INRMP Stakeholder Commentors

- Melissa Booker, SCI Wildlife Biologist, Naval Base Coronado
- Bryan Munson, Botanist, Naval Base Coronado
- Tammy Conkle, Commander Naval Installation Command
- Jacque Rice, Environmental Representative, Commander Pacific Fleet
- Michelle Cox, Naval Facilities Engineering Command
- Sandy Vissman, U.S. Fish and Wildlife Service
- Nancy Ferguson, U.S. Fish and Wildlife Service
- Shin Lauderdale, Naval Facilities Engineering Command
- Gary Wallace, U.S. Fish and Wildlife Service
- Loni Adams, Department of Fish and Wildlife, Marine Region
- Commander Glenn, Officer-In-Charge San Clemente Island
- James Weigand, Bureau of Land Management
- Alex Ibarra, Naval Facilities Engineering Command
- John Bergman, Commander Naval Air Pacific
- Jessica Bredvik, Naval Facilities Engineering Command
- Jenny Marshall, Southern California Range Sustainment Coordinator
- George Ellis, Regional Range and Training Area Planner, U.S. Marine Corps
- Shin Lauderdale, Naval Facilities Engineering Command Public Works Office Naval Base Coronado Planner
- Vicky Ngo, National Environmental Policy Act Coordinator Environmental Division, Naval Base Coronado
- Justyn Stahl, Institute of Wildlife Studies
- Nancy Frost, Department of Fish and Wildlife, Wildlife, Inland Fisheries and Lands
- Scott Harris, Department of Fish and Wildlife, South Coast Region Habitat Conservation Planning
- Alex Stone, Environmental Representative, Commander Pacific Fleet
- Chris Haynes, Naval Facilities Engineering Command, EV 1 Water Team

- Michael Medina, Regional Entomologist and Pest Management Lead, Naval Facilities Engineering Command
- Tininia Guzman, Naval Facilities Engineering Command
- Emily Howe, San Diego State University Soil Ecology and Restoration Group