

Appendix D3
Restore Seabirds to San Nicolas Island

D3.1 GOALS AND NEXUS TO INJURY

The goal of this action is to restore western gull and Brandt's cormorant colonies on San Nicolas Island by eradicating feral cats. Eggshell thinning and/or elevated levels of DDTs were documented in eggs of the western gull and Brandt's cormorant in the Southern California Bight (SCB) (Kiff 1994, Fry 1994). Section 5.1.1 provides a detailed description of seabird nexus.

D3.2 BACKGROUND

Introduced predators, in particular feral cats and rats, are one of the greatest threats to seabird populations on islands (Moors et al. 1992, Whittaker 1998). On islands worldwide, feral cats are directly responsible for a number of extinctions and extirpations across multiple taxa (Iverson 1978, Moors 1985b, Kirkpatrick and Rauzon 1986, Cruz and Cruz 1987, Towns et al. 1990, Donlan et al. 2000, Veitch 2001). Cats are opportunistic hunters and consume a wide variety of mammals, reptiles, birds, and insects (Kirkpatrick and Rauzon 1986, Konecny 1987, Fitzgerald 1988, Fitzgerald and Turner 2000). Predation by feral cats is responsible for the extinction of at least 33 bird species (Lever 1994), including the Stephen Island wren (*Traversia lyalli*, New Zealand), Socorro dove (*Zenaida graysoni*, Mexico), and Guadalupe storm-petrel (*Oceanodroma macrodactyla*, Mexico). Cats have also led to local extirpations of seabird colonies on the Channel Islands, including the Cassin's auklet from Santa Barbara Island (Willet in Hunt et al. 1979).

D3.2.1 San Nicolas Island

The U.S. Navy-owned island of San Nicolas is one of four southern Channel Islands, and totals 58 square kilometers (km²) (22 square miles [mi²]) in size. The island is about 15 kilometers (km) (9 miles) long and 6 km (3.6 miles) wide. The highest elevation is 277 meters (908 feet). In general, the island exhibits sparse vegetation that is mostly attributable to past sheep ranching, the island's arid climate, and high winds.

San Nicolas Island provides missile and aircraft launch facilities and radar tracking in support of the Navy's mission. Infrastructure on the island includes an asphalt runway, water wells, a desalination plant, water distribution and sewage systems, roads, telecommunication facilities, and buildings. Approximately 200 people work and live on the island. There is no public access to the island primarily due to security and safety requirements.

D3.2.2 Fauna on San Nicolas Island

San Nicolas Island supports a number of species endemic either to the Channel Islands or the island itself, including at least 20 plant species, 25 invertebrates, 1 reptile, 2 birds, and 2 mammals (U.S. Navy 2003). State and federal threatened and endangered species on the island include the threatened western snowy plover (*Charadrius alexandrinus nivosus*), threatened island night lizard (*Xantusia riversiana riversiana*), endangered California brown pelican, and threatened San Nicolas island fox (*Urocyon littoralis dickeyi*). San Nicolas Island also supports important marine mammal rookeries, as well as breeding colonies of Brandt's cormorants and western gulls.

D3.2.3 Brandt's Cormorant

Historical records have shown that Brandt's cormorants have nested on San Nicolas Island since at least the late 1800s (McChesney 1997). Most documented nesting occurred at the west end of the island. Prior to the mid-1970s, a total of 600 to 800 pairs were estimated to breed on the island (McChesney 1997). This population subsequently declined in the mid-1970s to only 100 to 200 pairs. This decline is consistent with the widespread failure of cormorant nests throughout the SCB due to DDT contamination (Gress et al. 1973). The Brandt's cormorant colony then underwent dramatic increases from the late 1970s to the early 1990s. In 1991, San Nicolas Island supported the second largest Brandt's cormorant colony in the Channel Islands, with 5,089 breeding individuals (Carter et al. 1992). Between 1991 and 1995, the population on San Nicolas Island varied annually due to a variety of factors including human disturbance, El Niño conditions, and predation by the island fox. Annual aerial surveys since 1996 have documented that the Brandt's cormorant population has expanded and shifted into intertidal environments.

D3.2.4 Western Gulls

Historically, San Nicolas Island supported one of the largest western gull colonies in Southern California. A large western gull colony was first documented in 1991 and was estimated at 6,038 breeding individuals (Carter et al. 1992). However, more recent surveys have documented a decline in the western gull colony (Smith, pers. comm., 2004). Western gulls have become more distributed across the island, perhaps due to the increases in sea lion disturbance at the main colony site and predation by island foxes. Because western gulls nest on the ground, they are particularly susceptible to predation.

D3.2.5 San Nicolas Island Fox

The San Nicolas Island fox population has remained stable and is estimated at 614 individuals (USFWS 2004). This species is listed as threatened by the State of California. The U.S. Fish and Wildlife Service (USFWS) recently determined that the federal listing of the San Nicolas population of the island fox was not warranted under the Endangered Species Act (USFWS 2004). However, its small population size, insular nature, lack of resistance to canine distemper and other diseases, high densities, and low genetic variability increase the vulnerability of this subspecies (USFWS 2004).

San Nicolas Island foxes are omnivorous, foraging on insects, vegetation, mice, and seasonally available bird eggs. Predation by the island fox has caused nesting failure and abandonment of both Brandt's cormorant and western gull colonies on the island (McChesney 1997). The San Nicolas Island fox population is negatively affected both by competition with feral cats and impacts from humans.

D3.2.6 Presence and Impacts of Feral Cats on San Nicolas Island

Cats were first introduced to San Nicolas Island during the 1800s and later by Navy personnel. Negative impacts from feral cats on the island's fauna have been documented. Humboldt State University studies from 1992 to 1996 documented impacts to nesting Brandt's cormorant and western gulls from feral cats (McChesney 1997, Carter, pers. comm., 2004). As described in the Navy's 2003 Integrated Natural Resources Management Plan (INRMP) for San Nicolas Island:

Feral cats have long been established on San Nicolas Island and pose a serious risk to the integrity of the entire ecosystem. Cats are implicated in the decline of small animal and bird populations worldwide and have especially devastating impacts on closed island systems. Cats have detrimental impacts on San Nicolas Island land bird populations, seabird colonies, and prey upon the federally listed island night lizard and the western snowy plover. Cats directly impact the San Nicolas Island fox through competition for prey and indirectly through spatial displacement.

In an effort to protect endangered species and sensitive seabird colonies, the Navy has funded intermittent efforts to control feral cats since the 1980s. The INRMP identifies the continued control/removal of cats as a recommended guideline to protect the western snowy plover, island night lizard, resident and migratory birds, island fox, and island deer mouse. In addition, Navy personnel are prohibited from bringing pets onto the island (U.S. Navy 2003).

D3.3 PROJECT DESCRIPTION AND METHODS

The goal of this action is to eradicate feral cats and increase seabird colonies on San Nicolas Island. This action will expand the ongoing control efforts by the Navy with the goal of eradicating cats from the island over an approximate three-year time frame. Proven techniques (e.g., trapping) used worldwide in recent cat removal programs will be employed as part of this action. However, given the overlap between cats and island foxes in terms of size and diet, the methods selected to eradicate cats will be given careful consideration to avoid impacts to the fox. This action will explore various techniques for eradication, but will use methods that pose the least risk to the island fox.

The specific methodologies for this action will be developed and evaluated in future additional environmental documentation prepared pursuant to the National Environmental Policy Act (NEPA) and/or the California Environmental Quality Act (CEQA) in coordination with the U.S. Navy.

D3.4 ENVIRONMENTAL BENEFITS AND IMPACTS

D3.4.1 Biological

Benefits

Eradication of cats from San Nicolas Island will provide long-term conservation benefits for Brandt's cormorants and western gulls by removing a non-native predator from the island ecosystem. The Natural Resource Trustees for the Montrose case (Trustees) anticipate that this action will result in increased reproductive success for these species and therefore expansion of these colonies. Both of these species are endemic to the west coast of North America and have limited ranges. The colonies on San Nicolas are located within the center of their range and have historically supported large colonies. This action will contribute to the protection of these colonies, though they will still be subject to predation by the native island fox. However, it is anticipated that larger, more robust colonies will more effectively withstand the ongoing predation pressure from the island fox.

In addition to seabirds, this action will also have collateral benefits to the island ecosystem. Sensitive species such as the island fox, endemic deer mouse, threatened island night lizard, and threatened snowy plover will likely benefit from reduced predation and competition. This action will also likely benefit both resident and migratory land birds on San Nicolas Island because of the removal of this non-native predator. The Navy's INRMP identifies the control/eradication of cats as a recommended management action to protect the island's biological resources (U.S. Navy 2003).

Impacts

There is the potential for non-target impacts to the island fox due to its similarity in size and diet to the feral cat. However, techniques will be further developed to avoid and minimize potential impacts to the fox. Although there may be some short-term impacts to individual foxes, the fox population will benefit overall from the eradication of feral cats since they are competitors for food resources and habitat. The methodologies and potential impacts will be discussed fully in subsequent environmental documentation for the action.

D3.4.2 Physical

Benefits

This action will not result in benefits to the physical environment.

Impacts

This action will not result in impacts to the physical environment.

D3.4.3 Human Use

Benefits

Removal of non-native species is a critical step in the restoration of island ecosystems. The eradication of feral cats will help restore populations of native species on San Nicolas Island. Such restoration will provide aesthetic and recreational benefits to Navy personnel. Because the island has restricted access, this action will not likely provide aesthetic or recreational benefits to the general public.

Impacts

During the eradication program, there may be closures or restriction on use of certain areas for safety reasons. Such restrictions may limit recreational opportunities for Navy personnel. However, feral cat control was initiated in the 1980s and Navy personnel have accommodated this activity. Although the action is designed to be an intensive effort over approximately 3 years, it will be compatible with the military use of the island.

D3.5 LIKELIHOOD OF SUCCESS/FEASIBILITY

Although difficult, feral cat eradication has been successfully carried out on at least 48 islands worldwide (Nogales et al. 2004). In northwest Mexico, cats have been successfully eradicated from 15 islands (Wood et al. 2002). Cats have been eradicated from large islands such as Marion Island (290 km² [112 mi²]) and Macquarie Island (120 km² [46 mi²]) in the Indian Ocean (Nogales et al. 2004). San Nicolas Island (58 km² [22 mi²]) is within the size range of successful cat eradications. The experience, expertise, and lessons learned from previous efforts will be applied to this action to ensure its success.

The greatest challenge for this action is the presence of the island fox. Proven techniques used in past eradications may not be available for this action because of the potential for impact to this sensitive species. The success of the action will be defined by complete eradication of feral cats from the island. Therefore, should subsequent project developments indicate that complete eradication is infeasible due to limited available techniques or constraints, the Trustees will not consider this action further.

Close coordination and partnering with the Navy is essential to the success of this action. By supporting the ongoing control of cats and identifying this action in its INRMP, the Navy has demonstrated its support for the action. The Navy also prohibits personnel from bringing pets to the island and will continue to do so in the future (U.S. Navy 2003). The prevention of cat reintroduction to the island in the future is a key factor to the long-term success of the action.

D3.6 PERFORMANCE CRITERIA AND MONITORING

This action will be considered successful on the complete eradication of feral cats from the island. The benefits of cat removal to seabirds that breed and roost on the island may be evaluated by increase in population number, increase in habitat availability, and reduced predation. Monitoring of the colonies will determine breeding success, distribution, and predation levels. Measuring statistically meaningful population increases of these colonies may take years or even decades. Protocols for seabird monitoring are well established and standardized. A monitoring plan will be developed during the subsequent phase of this action.

D3.7 EVALUATION

The Trustees have evaluated this action against all screening and evaluation criteria developed to select restoration actions and have concluded that this action is consistent with these selection factors. The Trustees determined that this type and scale of action will provide long-term benefits to Brandt's cormorants and western gulls. Both of these species are priorities for restoration in the SCB. This action will also provide long-term benefits to the ecosystem on San Nicolas Island. This action will undergo additional planning and evaluation during future subsequent environmental documentation prepared pursuant to NEPA and/or CEQA.

D3.8 BUDGET

Costs for years 1-3:

- Labor\$1,121,500
- Equipment\$184,600
- Travel/housing\$134,200
- Supplies\$32,900
- Contingency\$71,900
- Overhead\$309,000
- **Estimated total\$1,854,100**