The removal of feral cats from San Nicolas Island, California, to Protect Native and Endemic Species: 2011 Annual Report

Cooperative Agreement #F07AC00158

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Annual Report

April 2012

Suggested Citation:

Hanson, C.C., 2012. The removal of feral cats from San Nicolas Island, California, to Protect Native and Endemic Species: 2011 Annual Report. Unpublished report, Island Conservation, Santa Cruz, CA. 12 pp.

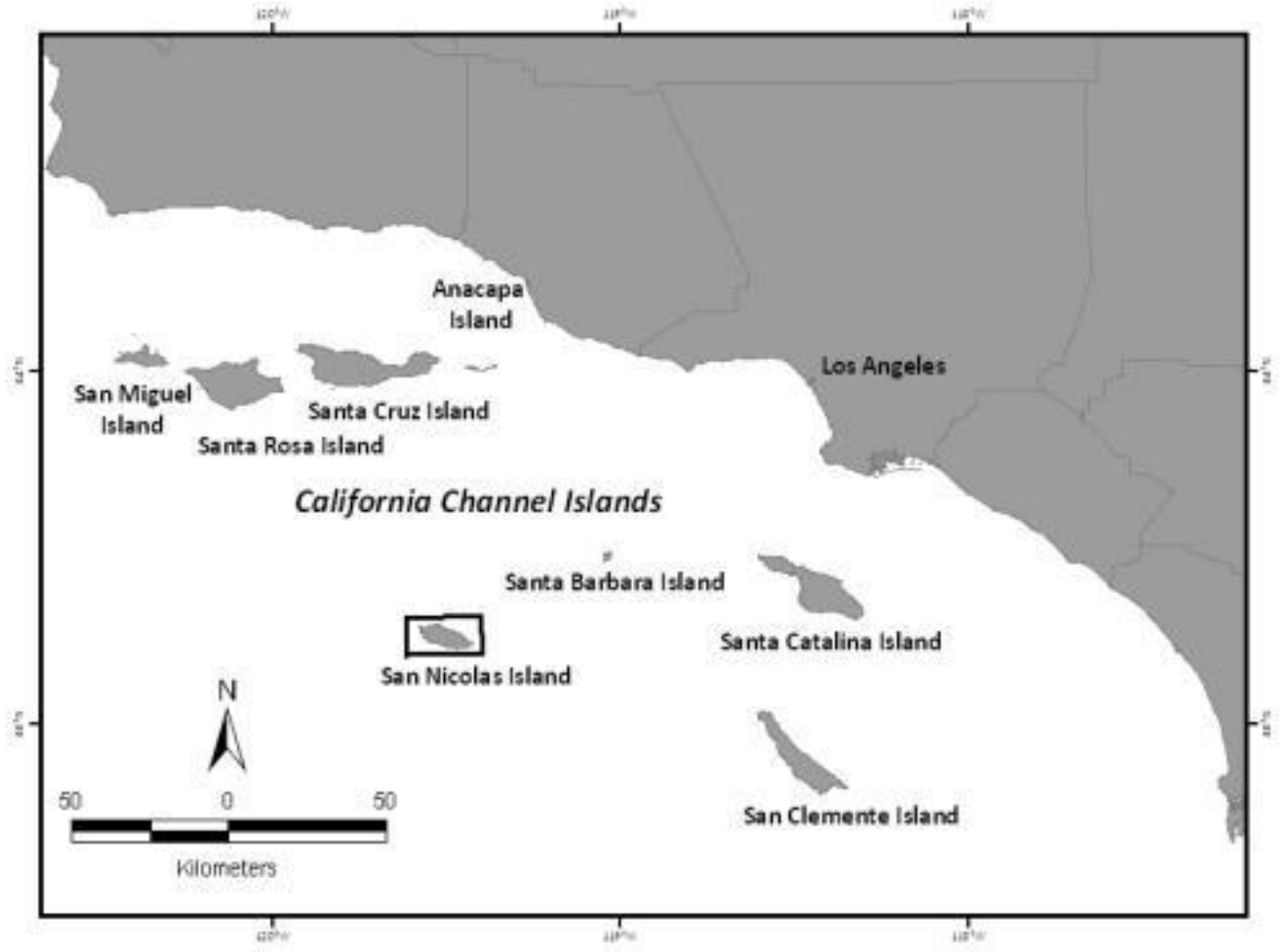
EXECUTIVE SUMMARY

Island Conservation, funded by the Montrose Settlements Restoration Program, began conducting a seabird restoration project on San Nicolas Island in 2009. The restoration project continued through 2011 in an effort to counter the negative impacts of feral cats on marine birds and other native wildlife through the removal of invasive feral cats. In coordination with the U.S. Navy, U.S. Fish and Wildlife Service, Institute for Wildlife Studies, and The Humane Society of the United States, Island Conservation (IC) was unable to detect any remaining cats on San Nicolas Island in 2011. A total of fifty- nine feral cats have been removed to date. Of these, fifty-two animals were transferred to The Humane Society of the United States, where they are housed and cared for in an outdoor, enclosed facility in Ramona, California.

On island, camera traps were strategically placed to remotely collect data for a duration of two to three months at a time. Staff would return to the island to upload, review and archive photos taken, assess the condition of the equipment and its placement, as well as relocate various cameras to new locations that were considered potential habitat for cats if any remained on island. This action was in line with current best practices and with achieving results using a detection probability analysis. The model suggested that to confirm complete removal with 99% confidence, 427-1200 camera nights or 55-75 km of sign searching should occur (Ramsey and Parks, 2010). By December 9, 2011, a total of 27,224 camera trap nights and 278.04 km of sign search had occurred with no cat detections since the last feral cat was removed on June 27, 2010. Based on information collected, efforts put toward detection, and our likelihood of detecting a feral cat had one been present, San Nicolas Island is now considered to be free of feral cats. Eradication confirmation will be publicly declared in early 2012.

INTRODUCTION

Figure 1. The California Channel Islands and San Nicolas Island.



U.S. Navy-owned San Nicolas Island is one the Channel Islands located off the southern California coast (Figure 1). Feral cats on San Nicolas Island (SNI) were known to depredate birds, both marine and terrestrial, including Brandt's Cormorants (*Phalacrocorax penicillatus*) and Western Gulls (*Larus occidentalis*), as well as the federally-listed threatened Island Night Lizard (*Xantusia riversiana*) and the island endemic Deer Mouse (*Peromyscus maniculatus exterus*) (Kovach and Dow 1981, McChesney 1997). In addition, feral cats are likely competitors with the state-listed threatened island endemic San Nicolas Island Fox (*Urocyon littoralis dickeyi*) (Kovach and Dow 1981). SNI supports the highest density of island fox of any of the

Channel Islands, with >600 individuals (Garcelon and Hudgens 2008). Fortunately, techniques to remove feral cats from islands have been developed, making the removal of feral cats from islands possible (Campbell *et al.* 2011). The removal of introduced species, such as feral cats, has become a widely accepted method for restoring island ecosystems. The goal of the project was to restore seabird populations and ecosystem function on SNI by removing feral cats.

This report presents activities from January 1, 2011 through December 31, 2011. The preferred alternative for removing feral cats from SNI was identified in the Final Environmental Assessment (EA; USFWS 2009) and included an adaptive management approach using live trapping and hunting. Effort exerted in 2009 resulted in the removal of the majority of feral cats existing on SNI (Hanson *et al.*, 2010a). Two remaining feral cats were detected with the use of camera trap monitoring and sign search prior to being removed in June, 2010 (Hanson and Bohnam, 2011). Camera monitoring was initiated in December of 2009 and concluded on December 9, 2011. Monitoring methods were continually being assessed for efficacy and reviewed to ensure all actions remained in line with best practices. Since December, 2011, the SNI restoration project is considered complete and successful.

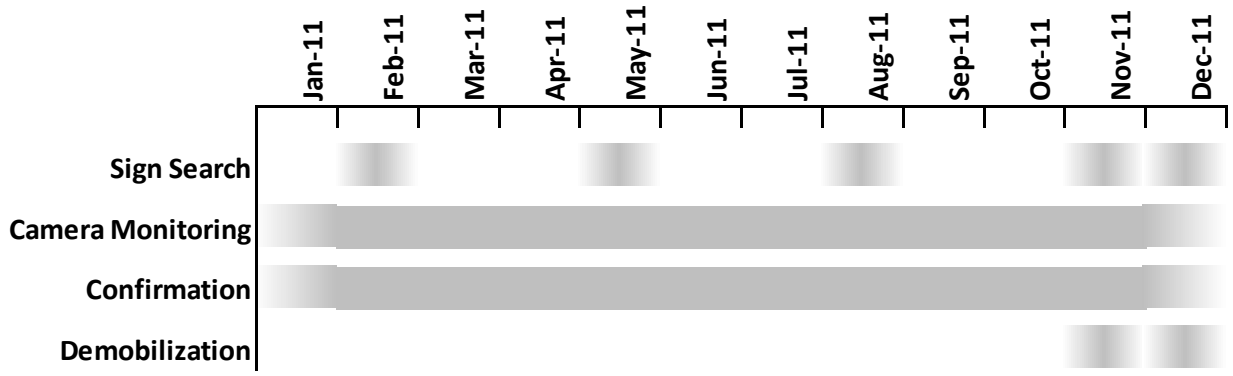
METHODS

Island Preparation

Facilities

A full-time presence on island by Island Conservation was not necessary in 2011. Visits to SNI were reduced to one week-long trip every two to three months. With minimal maintenance being required, Building 187 remained a functional workspace and storage area for project equipment and supplies. Staff sleeping quarters located behind 187 fell out of code and were decommissioned early in 2011; before demobilizing this site was prepared for demolition. Since long-term lodging was not required for camera monitoring trips, staff were able to utilize the on-island hotel (BEQ) as an economic alternative for both sleeping and meal preparation.

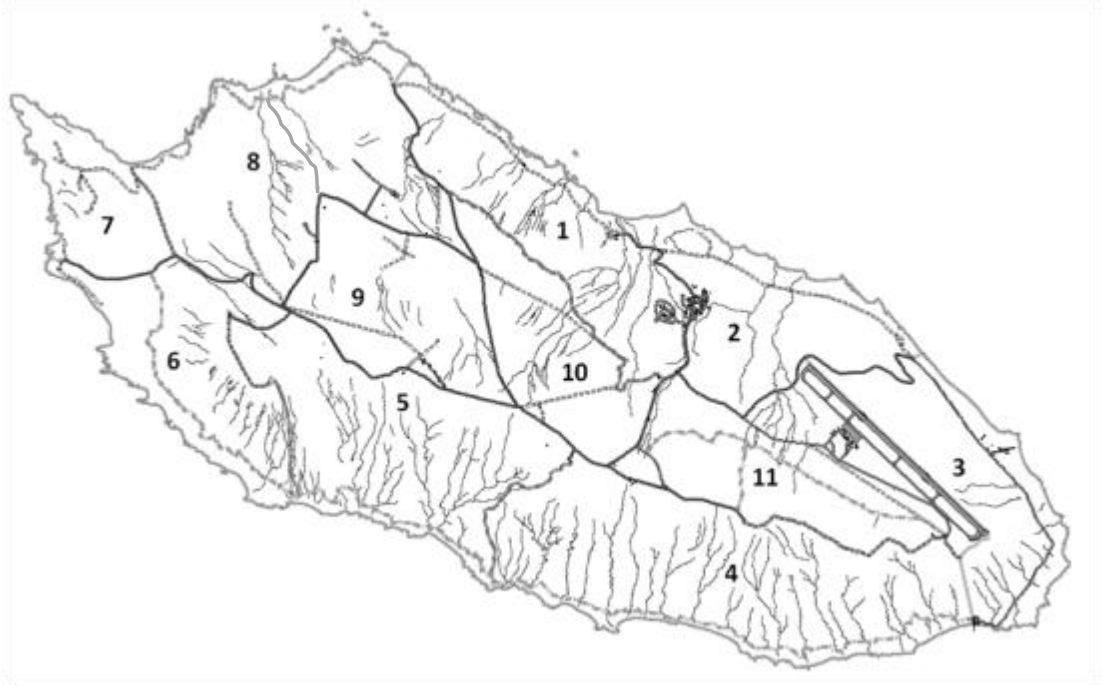
Figure 2. Time sequence of activities on SNI for feral cat monitoring and project demobilization.



Trail Restoration

During the winter of 2010 and spring of 2011, SNI experienced multiple rainfall events, though only one zone (Zone 6, Figure 3), required repair to allow access to/from previously installed cameras. A significant vegetation response to rainfall was noted in May 2011. As a result, trails no longer receiving heavy use became difficult to detect and follow. Archer handheld computers with integrated GPS and trail maps were used to maintain course on over-grown trails and in areas where tire tread residue had been washed away from the sandstone. As described in the Final Environmental Assessment (EA; USFWS 2009), IC followed the established erosion mitigation measures and continued to monitor for any changes in the environment caused by human/vehicle presence. Chain link netting and anchors used for track stabilization were reassessed for condition and determined to be satisfactory. Additional culverts were not needed as current culverts remained intact and functional. Prior to demobilizing from the island in December, trail improvements (lengths of chain link and anchoring devices) that had been installed to reduce erosion were removed because UTV (Utility Terrain Vehicle) access would no longer be necessary. Additionally, remaining route cues (flagging and pin flags) were removed from trails and disposed of appropriately.

Figure 3. Map of San Nicolas Island showing work zones, roads, drainages and ATV trails.



Vehicles

Project operations utilized one truck and two UTVs to access the island until the final demobilization off island occurred on December 16th. Per Navy regulation, all IC field staff remained certified to operate each piece of equipment. Certifications included an ATV safety course and a valid class C driver's license. Vehicles were pressure washed as needed to minimize risk of spreading weedy plant species.

Prior to demobilization, the remaining UTVs were determined to be valuable and in operational condition. As a result, both UTVs were left on island to support additional SNI restoration activities. This equipment, as well as the equipment necessary to continue routine maintenance and cleaning, was donated by IC with partner approval. The remaining truck and a flatbed trailer were utilized to remove project equipment via the barge and the final removal of equipment occurred on December 19, 2011.

Military Closures

Military closures continued to occur on SNI throughout 2011. The project no longer had active traps thereby removing the requirement to manage zones accordingly prior to a closure.

As a result, staff were able to effectively work around restricted areas and remain productive checking camera traps on schedule. Navy range activities varied in length though most closures experienced lasted from a partial day to several days.

Trap Monitoring System and Padded Leg-hold Live Traps

A contingency of trap monitors, padded leg-hold live traps, and support equipment (computer operating system, base station receiver, and fresh batteries) remained on island through 2011. In the event a cat was detected, this equipment remained operational to conduct spot trapping within the local area where the detection occurred. All trap monitors and traps were removed from SNI during the final demobilization in December, 2011.

Data Collection System

Archer field computers were utilized to capture data throughout 2009 and 2010 and continued to remain a critical resource in 2011. Emphasis was directed towards logging accurate sign search track-logs and managing camera trap locations. The database and ArcPad interface replaced paper forms and streamlined the process of gathering information in the field and processing it at the end of each day. Captured information about camera checks allowed IC field staff to manage scheduling of regular maintenance, relocation of traps/cameras, and camera removals efficiently. This information was collected during a visual inspection of each camera trap as the protocol directed. All information was archived at the end of each workday and saved within a redundant database.

Sign Search

Sign such as prints, scat, latrines, scratch posts and predated seabird carcasses were used during the course of the project to detect the presence of feral cats. In 2011, sign searching by IC field staff occurred as spot treatments while accessing camera traps and finding new locations for camera traps.

Weather and substrate conditions continued to affect sign search results and confidence of search results. Efforts were made to take advantage of calm days and weather conditions that would deliver optimal tracking conditions. The greatest factor affecting sign search was the large number of fox tracks, wind, and poor tracking substrate. Discerning feral cat from fox

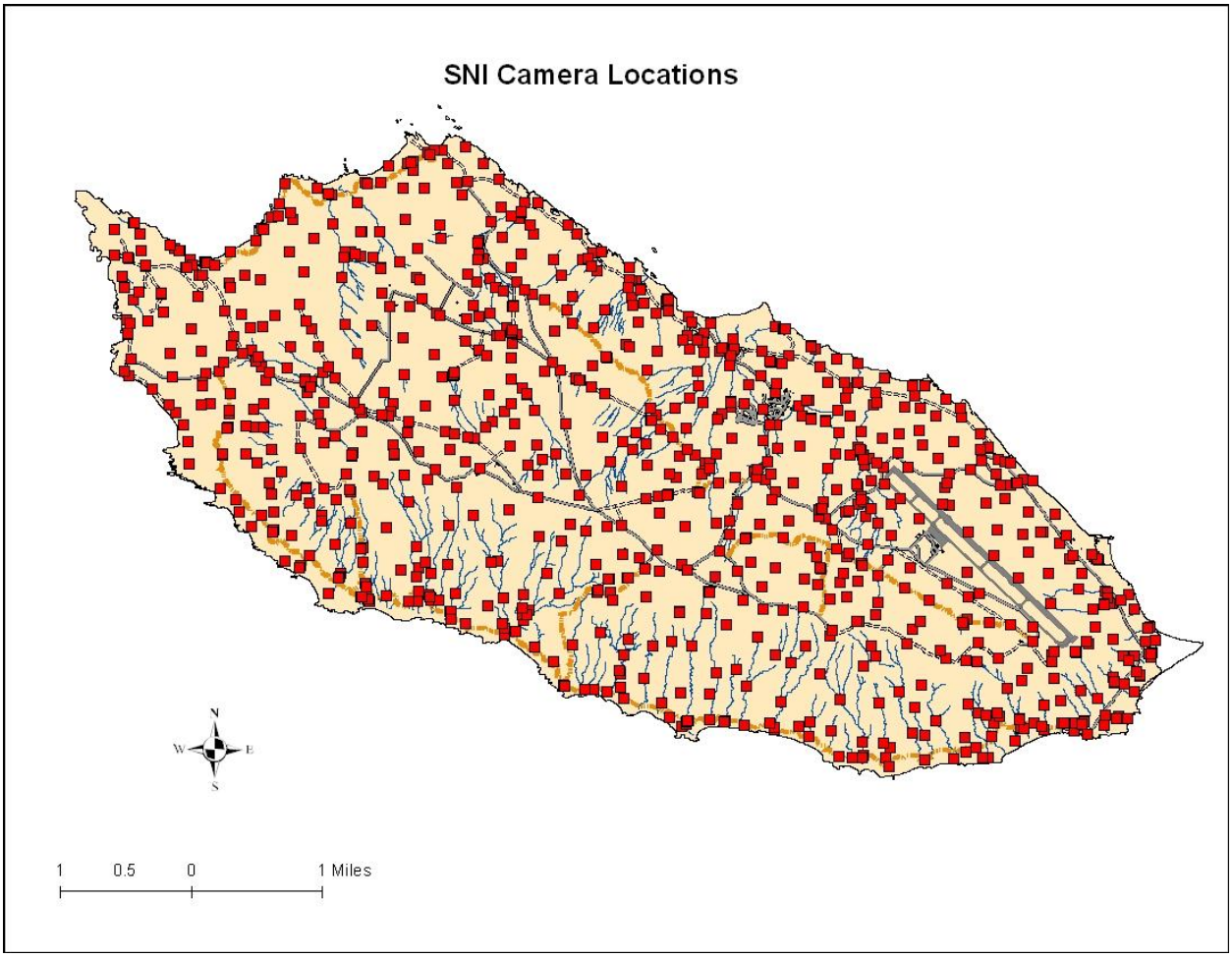
tracks is particularly difficult, though a number of key features allow staff to make the best estimate of species type. No tracks or other sign of questionable origin were detected in 2011.

Camera Monitoring

After removal of the last two known feral cats in 2010, an organized and structured camera management program was implemented (Hanson and Bonham, 2010). The final phase of the program began in August 2010 and continued through December 9, 2011, when cameras were deactivated and removed from the field. This phase required personnel visit the island to service all cameras in operation at least once every 2-3 months. As a result, five week-long tours were scheduled (Figure 2) to allowed staff adequate time to service all operational cameras, perform sign search, and compensate for any security closure delays. Previous camera location data were analyzed at the beginning of each tour to determine areas that had not been previously monitored. These areas were given preference for camera relocation. In addition to relocating cameras, servicing of cameras included switching memory cards, verifying battery life would exceed 2-3 months of operation, and ensuring cameras were functioning properly. Personnel decided whether to allow cameras to remain in locations for more than one tour length based on their perceived need for additional monitoring in that area. A full two years of continued camera trap monitoring was achieved in December 2011.

Once all cameras had been removed from the field, a total of 27,224 camera trap nights (353,912 hours of monitoring), had been collected with no feral cat detections on island. This information assisted managers in confidently declaring SNI cat-free.

Figure 4. Camera trap locations from 6.27.2010 – 12.9.2011.



Detection Probability Model

IC contracted Landcare Research to develop a detection probability model to determine the probability of detecting a feral cat if one was present, which has been done for other removal projects (e.g. pigs; Ramsey *et al.* 2009). In addition to estimating the probability that no feral cats remained on SNI, the optimal amount of effort utilizing preferred methods was determined to provide the most cost effective and efficient means of confirming complete removal; a first for any removal campaign. The model incorporated data collected throughout the project, projected cost estimates of methods and activities, and feedback obtained from expert opinion on the project's status.

It was determined that once the last detected animal was removed, 55-75 km of sign search and 427-1200 camera trap nights would be needed (without a detection being made) to provide a 99% confidence level that complete removal was achieved (Ramsey and Parkes 2010).

Methods used in post-2010 monitoring trips have been determined in consultation with the lead and cooperating agencies, Montrose Settlements Trustee Council, and other stakeholders. Efforts made to confirm SNI free of feral cats exceeded Ramsey and Parkes' recommendations by August, 2010.

Sightings on Island

Efforts were made to encourage the report of potential sightings by informing island residents and contractors that the project was nearing completion. This proactive approach considered the time necessary to investigate any reports prior to demobilizing the team and equipment from the island. No sightings were reported in 2011.

RESULTS AND DISCUSSION

Between January 1, 2011, and December 31, 2011, up to 54 camera traps were in operation to monitor SNI for feral cats. A total of 27,224 camera trap nights and 278.04 kilometers of sign search were logged with zero detections since the last cat was removed in June, 2010. Padded leg-hold traps were not activated during this time and no other removal methods were necessary or utilized. Zero fox injuries or fatalities occurred in 2011 due to this project's operations. After a more detailed review of data collected, a total of 1,011 fox captures had occurred throughout the project; as opposed to 1,013 as previously reported (Hanson and Bonham, 2011).

Project equipment and supplies were fully demobilized in December 2011 and placed on the barge to return to the mainland. The final pick-up of equipment occurred on December 19, 2011, thereby completing the field portion of the project. The last feral cat removal occurred on June 26, 2010. Following that date, no feral cat sign was detected or photo of a cat taken. As a result, Island Conservation and partners can confidently declare that the plan to help restore San Nicolas Island by removing cats was successful and the island is now considered cat-free.

RECOMMENDATIONS

It is recommended that best-practice biosecurity measures be followed to prevent the reintroduction of cats or other invasive species that may cause harm to San Nicolas Island's ecosystem. The Navy has a biosecurity plan available for SNI that suggests the measures necessary to prevent the introduction of invasive species. This plan will continue the use of remote cameras to detect any accidental introductions; a method shown to be critical in the detection of cats at low densities.

ACKNOWLEDGEMENTS

This campaign would not have been possible without the dedicated support of all parties involved, specifically Grace Smith, Annie Little, IWS staff, Bill Wood, and Jeff Davis. The removal of feral cats from SNI was funded by the Montrose Settlements Restoration Program and supported by the U.S. Navy and the U.S. Fish and Wildlife Service.

REFERENCES

Campbell, K. J., G. Harper, David Algar, C. C. Hanson, B. S. Keitt, and S. Robinson. 2011. An updated review of feral cat eradications on islands. Turning the Tide II. ISSG, Gland, Switzerland.

Garcelon, D.K. and B.R. Hudgens. 2008. Island fox monitoring and demography on San Nicolas Island 2007. Unpublished report prepared by the Institute for Wildlife Studies, Arcata, CA. 28pp.

Hanson, C. C., K. J. Campbell, J. E. Bonham, and B. S. Keitt. 2010a. The removal of feral cats from San Nicolas Island: Methodology. Proc. Vertebr. Pest Conf. 24.

Hanson, C.C., Will, D.J., Bonham, J.E., and B. S. Keitt. 2010b. The removal of feral cats from San Nicolas Island, California to Protect Native and Endemic Species: 2009 Annual Report.

Unpublished report, Island Conservation, Santa Cruz, CA. 19 pp.

Hanson, C. C. and J. E. Bonham. 2011. The removal of feral cats from San Nicolas Island, California to Protect Native and Endemic Species: 2010 Annual Report. Unpublished report, Island Conservation, Santa Cruz, CA. 12 pp.

Kovach, S.D., and R.J. Dow. 1981. Ecology of the feral cat on San Nicolas Island. 1980. Pacific Missile Test Center, Point Mugu, California. 27pp.

McChesney, G.J. 1997. Breeding biology of the Brandt's Cormorant on San Nicolas Island, California. M.S. thesis, California State Univ., Sacramento.

Ramsey, D. S. L., Parkes, J., 2010. Quantifying the Success of Feral Cat Eradication on San Nicolas Island, California. Landcare Research New Zealand Contract Report. 34pp.

Ramsey, D.S.L., Parkes, J., Morrison, S., 2009. Quantifying eradication success: The removal of feral pigs from Santa Cruz Island, California. Conservation Biology 23, 449-459.

USFWS. 2009. Final Environmental Assessment for the Restoration of San Nicolas Island's Seabirds and Protection of other Native Fauna by Removing Feral Cats. U.S. Fish and Wildlife Service, Carlsbad, CA. 105 pp.