

The Anacapa Island Restoration Project

The Purpose and Need for Rat Eradication On Anacapa Island

Around the world, offshore islands are important to the conservation of biological diversity. They can harbor many endemic species (species found only on those islands) and provide critical habitat for seabirds, marine turtles seals and sea lions. These endemic species and seabirds are vulnerable to anthropogenic (human caused) extinctions. The most significant cause of extinctions and ecosystem disturbances on islands are introduced species, especially rats (*Rattus* spp.).

Rats have been introduced onto as many as 82% of the world's islands. On Anacapa Island, the black rat or ship rat (*Rattus rattus*), was likely introduced by a shipwreck, such as the Winfield Scott in 1853. Once ashore on Anacapa Island, the rats began to alter the ecosystem.

Once rats are established on islands, the effects can be measured throughout the ecosystem. Bird species tend to decline in abundance or are extirpated (locally extinct). Introduced rats are responsible for an estimated 40-60% of all bird and reptile extinctions. On rat infested islands the abundance and distribution of both terrestrial and intertidal invertebrates declines. Plant distribution and abundance may also decline. For humans visiting islands, rats can threaten their health through the transmission of disease.

With the advent of refined techniques, the ability to eradicate (remove all) rats from islands is possible. Around the world, many islands have had successful rat eradication operations and the local species have responded positively. This pamphlet is designed to answer common questions and provide information to the public on the expected effects of the rat removal.

Frequently Asked Questions

1. How large of a problem are the introduced species? Why is restoration necessary?

The introduction of non-native species does not usually receive a significant amount of publicity and professional attention. Introduced species, however, are a substantial threat to native environments. An estimated 39% of all recorded animal extinctions since 1600 (for which a cause could be attributed) are a result of introduced species into a native environment. Of the 484 recorded animal extinctions (since 1600), 75% have been island endemics. Introduced species were completely, or partially responsible for 67% of these extinctions (based on the 147 island species for which the cause of extinction is known).¹

2. Why is it important to preserve island ecosystems?

¹All statistics were cited from the World Conservation Monitoring Centre (1992).

Preserving islands contributes to the conservation of biodiversity. Islands are important to the conservation of biodiversity for four reasons:

1. A large percentage of their biota are endemic species and subspecies.
2. They are important breeding areas for seabirds, pinnipeds (sea lions and seals), and sea turtles, which forage over thousands of square kilometers of ocean, but are dependent on relatively small amounts of protected land on islands for breeding and nesting.
3. Many islands are uninhabited by humans, keeping socioeconomic costs of protection low.
4. The species and ecological communities on islands have evolved in natural fragments, making them less susceptible than continental species to the problems of habitat fragmentation caused by small reserve size.

3. What are the impacts of *Rattus rattus* on Anacapa Islands?

The most obvious impacts of introduced rats on island ecosystems are extinctions. Research on the Anacapa Islands demonstrated that black rats feed on native mammals, reptiles, insects, intertidal invertebrates, and plants. Consumption of these native species has drastically altered the ecosystems on Anacapa Islands.

Anacapa Island provides critical breeding habitat for rare seabirds such as: California Brown Pelicans, Ashy Storm-Petrels, Cassin's Auklets, and Xantus' Murrelets (auklets and murrelets are in the Family Alcidae or commonly known as alcids). Many of these species nest colonially (in large groups) on the ground in burrows or other natural cavities. These species have evolved to nest on islands free of ground based predators commonly found on the mainland. Introduced rats on Anacapa have reduced the abundance of small alcids and storm-petrels on Anacapa Island to the point of going almost unreported despite efforts to look for them. For example, the Xantus' Murrelet historically has been reported to be relatively common on Anacapa, but today, they are restricted to nesting in areas where rats are unable to gain access such as in sea caves. A recent survey of potential nest sites revealed depredated murrelet eggshells. Rats not only depredate the eggs of these small seabirds but consume the adults and chicks as well. Rats keep populations of seabirds on islands to either low levels or extirpate them altogether. Reclaiming Anacapa Island from rats is necessary for the long term conservation of the ecosystem.

5. What would be the impacts/implications of *Rattus rattus* eradication on Anacapa Islands?

HERE I THINK WE NEED TO TALK ABOUT UNCERTAINTY OF SCIENCE AND HOW WE WON'T KNOW BUT ARE TESTING HYPOTHESES, MAKING PREDICTIONS BASED ON WHAT WE KNOW ABOUT THE BIOLOGY OF THE ANIMALS & OF RATS, THE BEHAVIOR/BIOLOGY OF RATS ON ANACAPA & THE IMPACT OF RATS ON OTHER ISLAND ECOSYSTEMS. The eradication of the introduced *Rattus rattus* would affect each category (i.e. birds, reptiles and amphibians, terrestrial invertebrates, marine intertidal invertebrates, plants, and visitor safety and enjoyment) differently.

Birds

The eradication of black rats should result in a population increase of one or more of the small hole nesting seabirds on the Anacapa Islands, but would have less effect on larger ground nesting species (such as the brown pelican, etc.). This is because small and larger hole nesting seabirds (such as alcids and storm-petrels) rarely coexist for long periods of time with introduced black rats (Atkinson 1985), while large ground birds are not impacted by them. The eradication may result in a long-term increase in the number of birds which prey on deer mice (such as the western burrowing owl, short-eared owl, kestrel, etc.) and a decrease in Barn Owls which prey primarily on rats. **Can we mention Barn Owls were not historically present here or are not native residents...**

Reptiles and Amphibians

The eradication of black rats may result in a long term increase in the population size of side-blotched lizards and California alligator lizards. Rats are usually the cause of numerous reptile extinctions on many islands and the removal of rats has lead to increases in lizard numbers on other islands.

Terrestrial Invertebrates

Black rats prey on a number of terrestrial invertebrates on the Anacapa Islands. However, it is difficult to predict whether the eradication of the *Rattus rattus* species may lead to increased population sizes of these invertebrates, or larger populations of other native invertebrate predators (i.e. deer mice, lizards, ravens, kestrels, etc.).

Marine Intertidal Invertebrates

Rats are most abundant along the shoreline of the Anacapa Islands, the home to many marine intertidal species. The eradication of black rats would most probably increase the size distribution of lined shore crabs and periwinkles, both which have been identified in their diet.

Plants

The eradication of rats would most likely result in recruitment of island oaks on West Anacapa. Most of the acorns of the island oak on West Anacapa are eaten by rats. However, deer mice eat acorns as well, and although they are not currently abundant in the tree-filled canyons of West Anacapa, they could move there in the absence of the rats.

Visitor Safety and Enjoyment

Black rats can threaten the health of human visitors to East Anacapa Island by transmitting diseases such as plague, murine typhus, Salmonellosis, Leptospirosis, and rat bite fever. The eradication of the rats would increase visitor safety and enjoyment, as it would prevent rat chewing of food and equipment.

7. What are some of the potential problems that the Channel Island National Park foresees with the Anacapa Island Restoration Project?

Rat eradication campaigns typically have three major technical constraints: weather, island size and topography, and native species. There are no major weather constraints

from May to November. In regards to the island size and topography, the three Anacapa Islands total 196ha (East 43, Middle 71, West 182). This is well within the size range of islands from which rats have been successfully eradicated before. However, the extensive sheer cliffs and unstable soil present problems in any manual campaign.

With respect to the native species, the Park does not want to disturb them with the possible impacts of soil erosion and loud machines, etc. Again, some of the impact could be lessened with the timing of the operations. The field work could be performed from September through December without major disturbance, particularly to the nesting Brown Pelican.

The Channel Island National Park is extremely concerned with species protection, specifically of the deer mouse. Some mitigation measures that the Park could take to ensure species protection would involve isolating a small area of the Island to be reserved for deer mouse habitat; and/or capturing a small sample size during the eradication and reintroducing the population back onto the islands after completion. Similar procedures could be conducted to ensure the survival of short term impacts on other species from such a project.

The Channel Island National Park is also very concerned with the public placing a negative connotation on an eradication project. The Park thinks that it is in its best interest to remove the *Rattus rattus* species in the long-run. The Park considers the public opinion to be very important, but would like to invite displays of support in restoring and conserving the native species and island biodiversity by eradicating the *Rattus rattus* species on the Anacapa Islands.

*****For more detailed information:**
