



Monitoring Breeding Success of Xantus's Murrelets on the Channel Islands



Graphic by Fiona Morris

The Question: Has removing non-native black rats from Anacapa Island benefited breeding populations of Xantus's murrelets?

Islands are important to seabirds

Many seabirds depend on remote islands and offshore rocks for breeding and nesting success. Channel Islands National Park in southern California serves as a major seabird breeding area, hosting half the world's population of Western gulls and 95% of the U.S. breeding population of Xantus's murrelets (40% of the world's population). Xantus's murrelets typically nest in caves or in rocky crevices on the steep cliffs of offshore islands along the Pacific Coast.

Impacts of non-native rats on island ecosystems

Invasive mammals can wreak havoc on island ecosystems where species have typically evolved in the absence of terrestrial predators. On most islands, introduced species are the major cause of extinctions and disturbance. Rats can be particularly destructive and are responsible for the extinction of 40- 60 % of birds and reptiles worldwide. Omnivorous scavengers with voracious appetites, rats can severely impact seabird breeding habitats by eliminating burrow-nesting seabirds and drastically reducing numbers of ground-nesting species. Over the past century, nonnative predators have decimated several murrelet populations from islands along the Pacific Coast. On Anacapa Island, the smallest of the four northern Channel Islands, rats have severely reduced breeding populations of Xantus's murrelets.



Hatching success for Xantus's murrelet chicks on Anacapa Island has nearly doubled in the absence of rat predation

Island Restoration

Non-native black rats arrived on Anacapa Island nearly a hundred years ago, with the first record of rats recorded in 1939. Since their introduction, rats have caused widespread ecological degradation and major declines of island seabird populations. In 1999, it was determined that protection and restoration of critical seabird nesting habitats would not be possible without removal of these non-native predators. Supported by funds from The American Trader oil spill settlement, the American Trader Trustee Council and Channel Islands National Park sponsored a restoration program to improve seabird nesting habitat on Anacapa Island by eradicating non-native black rats. The Xantus's murrelet was expected to be the seabird most likely to benefit from the Island Restoration Program, and it was anticipated that rat eradication would prevent the eventual loss of this seabird colony.

The Project: *Monitor murrelet nesting efforts and nest success on Anacapa Island in the absence of rat predation and compare to pre- eradication values.*

From 2000 to the present, scientists from the California Institute of Environmental Studies have been monitoring nests of Xantus's murrelets in sea caves and other rocky-cliff habitats at Anacapa Island. The work began in 2000 to generate baseline data prior to the eradication of black rats in 2001 and 2002. From 2003 to the present, the group has monitored murrelet nesting efforts in the absence of rat predation to assess the outcomes of the island restoration effort.



Xantus's murrelets typically nest in small rocky crevices or sea caves on offshore islands from February through July. Photo: Darrell Whitworth.

Preliminary Results: *Numbers of nests established and nest success have consistently increased in the absence of rat predation.*

Results so far indicate that eradication of rats has improved breeding success for Xantus's murrelets on the island, including:

- Near doubling of hatch success in the sea caves (80% success in 2003-2006 vs. 42% in 2000-2002)
- the number of active nests has increased by 48%
- Murrelets are expanding nesting efforts into habitats previously occupied by rats. Active nests are being counted in rocky-cliff areas where murrelets have been absent for decades, reflecting expansion of nesting grounds beyond the sea caves.
- Since 2002, there have been no signs of rat predation on eggs, compared to 52% nest failure from rat predation prior to eradication. Endemic island mice accounted for only 3 depredated murrelet nests between 2003 and 2006.
- Surveys conducted in 2007 found small to moderate murrelet populations on islands where they were previously believed to have been extirpated.

A separate study conducted by researchers at Humboldt State University and Island Conservation International examined predation of artificial murrelet nests on middle and west Anacapa Island and determined that nest predation was reduced from 96% of nests to just 3% following rat eradication (Jones et al. 2006).

While other factors such as oil spills or changes in prey availability could slow population recovery, nest depredation by rats appears to have been the primary cause for the decline of Xantus's murrelets on Anacapa Island. The removal of rats has resulted in improved breeding success and colony growth that should eventually lead to a much larger nesting colony of Xantus's murrelets on the Channel Islands.

Additional Resources:

Whitworth, D.L., J.S. Koepke, H.R. Carter, F. Gress, and D. Lipski. 2006. Nest monitoring of Xantus's murrelets at Anacapa Island, California: 2006 annual report. Unpublished report, California Institute of Environmental Studies, Davis, CA. 27pp.

Jones, H.P., R.W. Henry III, G.R. Howald, B.R. Tershy and D.A. Croll. 2006. Predation of artificial Xantus's murrelet nests before and after black rat eradication. *Environmental Conservation* **32**(4): 320-325.

<http://www.nps.gov/chis/naturescience/birds>
