Xantus's Murrelet Status Review
Executive Summary
November 14, 2003

Petition History

On April 16, 2002, the Fish and Game Commission (Commission) received a petition to list the Xantus's Murrelet (*Synthliboramphus hypoleucus*) as a threatened species under the California Endangered Species Act (CESA). The Commission referred the petition to the Department of Fish and Game (Department) for evaluation on April 25, 2002. Based on its review, the Department determined the petition included sufficient information to indicate the petitioned action may be warranted, and recommended that the Commission accept the petition and designate the Xantus's Murrelet as a candidate species pursuant to CESA. The Commission accepted the petition based on the Department's recommendation on October 23, 2002, and provided notice of its findings in the California Regulatory Notice Register designating the Xantus's Murrelet as a candidate species on November 15, 2002.

Following the Commission's action designating the Xantus's Murrelet as a candidate species, the Department solicited information and undertook a status review of the species using the best scientific information available. This report contains the results of the Department's status review, including input from four peer reviewers with expertise on the Xantus's Murrelet, or closely related species. Also included are the Department's recommendations to the Commission regarding a preliminary identification of habitat that may be essential to the continued existence of the species, as well as management activities and other recommendations for the recovery of the species.

Conclusions

The Department recommends listing of the Xantus's Murrelet as threatened due primarily to:

1) Small breeding population size in California (approximately 3,460 breeding birds);

2) Documented population decline of approximately 30% from 1977 to 1991 on Santa Barbara Island; this island supports 51% of the murrelet population in California;

3) Declining occupancy rates at nesting sites on Santa Barbara Island, coupled with low productivity as compared to the closely related Ancient Murrelet (*Synthliboramphus antiquus*);

4) Near extirpation from previously known nesting sites based on historic and current scientific information;

5) Vulnerability to oil spills during the breeding and non-breeding season, within and outside California;

6) Suppression of population growth by a variety of native and non-native predators; and

7) Impacts from artificial light pollution and human disturbance activities, and including cumulative impacts.

Habitat changes associated with human activities, and introduced predators (feral cats and rats) have caused population declines throughout the range of the murrelet. In particular, the Department finds that habitat modification has been severe on Santa Barbara Island due to various human activities (for example, farming, burning, and livestock grazing). Fifty-one percent of the murrelet population in California now nests on this small island of only one square mile in size.

The loss of a large Cassin's Auklet (*Ptychoramphus aleuticus*) colony (a burrow-nesting alcid), and the extinction of the Santa Barbara Island Song Sparrow (*Melospiza melodia graminea*) are indicative of the massive habitat loss that occurred on Santa Barbara Island. A coordinated management effort will be necessary to return the island vegetation and wildlife species to a condition more closely approaching natural conditions.

Rat eradication efforts at Anacapa Island were recently initiated in 2001 and 2002 as part of the *American Trader* Oil Spill Restoration Plan. Murrelets had been limited from occupying suitable habitat on this island because of rat presence and predation. Initial monitoring efforts indicate that rats have been eradicated, and that more murrelets are now occupying the waters around Anacapa Island. Additionally, the number of known nests has increased slightly, and nest success has increased. However, due to the low reproductive rate, low juvenile survival, and high colony fidelity, it may take 10 years or more to see substantial increases in nesting effort and reproductive success at Anacapa Island. If rats were accidentally reintroduced onto the island, then the situation would soon revert to a serious bottleneck to murrelet recovery, without immediate efforts to re-eradicate rats.

Life History, Distribution, Population Trend, and Management Status

The Xantus's Murrelet is a member of the seabird family Alcidae, which includes murres and puffins. Alcids are known for their longevity and low reproductive rate. With few exceptions, alcids must nest on offshore rocks or islands where adult birds are free from predation by terrestrial predators such as rats, cats, and foxes.

Murrelets spend most of their lives at sea foraging for small fish and zooplankton, and only come ashore for breeding purposes. They are nocturnal when attending to their nest sites and lay only 1-2 eggs per clutch, although a replacement clutch can be laid if the first clutch is lost. Nests are located in natural cavities, and under shrubs, especially along or near cliffs. Sea caves are also used for nesting. They have been documented to live up to 15 years in the wild and they usually return to the same island for breeding each year.

The worldwide breeding range of the murrelet is restricted to the Channel Islands of southern California, and small islands along the west coast of Baja California, Mexico. Xantus's Murrelets are known to nest on only 12 islands scattered along 500 miles of coastline. Santa Barbara Island, the smallest of the Channel Islands in size, is the largest current colony in California. Anacapa Island may have been the largest colony in the past, and may become the largest colony in the future. Post breeding and winter distribution is offshore from British Columbia south to Baja California.

Historical accounts and literature from the 1940s indicates that murrelets were more abundant at that time than today. Currently, the murrelet is considered an uncommon species, with only 3,460 breeding birds in California, and approximately 8,310 breeding birds worldwide. Research from the 1970s to 1991 documented a decline in murrelet numbers on Santa Barbara Island of approximately 30%. However, it is difficult to directly compare the studies since different methods were utilized.

More recently, a marked decline has occurred during the past 15 years, continuing the trend noted above, based on murrelet occupancy rates at National Park Service (NPS) nest monitoring plots on Santa Barbara Island. In general, nest site occupancy rates for identified potential nest sites have declined from approximately 35-70%, to less than 30%. A statistical analysis of this data indicates the decline is significant and continuing downward. Another (larger) nest plot monitoring study, outside of, but also including a part of one NPS nest plot, showed a decline of 14% in the number of active nests when comparing 1991 to 2001. Some nest sites on the island have been lost due to reduction in shrub cover; the reasons for this need investigation.

Additionally, based on data collected in the field, murrelet productivity (murrelet chicks per adult pair) is low. Productivity at Santa Barbara Island averaged 0.81 from 1983 -1995. This productivity measure is low compared to Ancient Murrelets that average 1.44 to 1.69 chicks/pair. Low productivity is probably contributing to the Xantus's Murrelet population decline and warrants further investigation.

The small worldwide population size, population declines, and numerous threats have led to special status classification for the murrelet as follows: 1) **"Vulnerable"** (International Union for Conservation of Nature and Natural Resources); 2) **"Species of Special Concern"** (Department of Fish and Game); 3) **"Bird of Conservation Concern"** (U.S. Fish and Wildlife Service); and 4) **"Conservation Priority Species"** (Marine Species of Common Conservation Concern Initiative, North American Commission for Environmental Cooperation). These classifications have proven insufficient to reverse population declines.

Threats

Non-native Mammals The introduction of non-native mammals including sheep, goats, cats, rats, and rabbits is implicated in major declines in several murrelet colonies from the Channel Islands to Mexico. Feral cats prey on adult murrelets and chicks, and rats prey on eggs, chicks, and adult murrelets. Sheep, goats, and rabbits heavily graze the native vegetation and cause vegetation changes, including vegetation loss and changes in plant species abundance and composition. Loss of shrub cover due to overgrazing reduces

nesting opportunities for murrelets. Vegetation change was compounded by the introduction of annual non-native grasses by human activities.

Oil Pollution Like all other alcids, murrelets are extremely vulnerable to oil pollution because, in contrast to more aerial species such as gulls and terns, murrelets spend most of their time at sea swimming on the ocean surface, where oil pollution is concentrated. In southern California, seabird mortality has been documented due to oil spills from offshore platforms, pipelines, tankers, and other military and commercial shipping. Oil shipping lanes pass through murrelet foraging habitat, and numerous oil platforms exist in the Channel Islands area. Some dead and oiled Xantus's Murrelets have been reported on beaches in central California. Murrelets are not easily found during oil spill events due to their distribution away from the coast line, where little carcass recovery activity occurred, at least in the past, and due to at-sea carcass loss due to sinking or scavenging following exposure far offshore. If a large spill occurred in the Channel Islands during the breeding season, when the murrelets are present in greatest numbers, the population could be heavily impacted. They may also be impacted, though to a lesser degree, when they are dispersed both north and south of the Channel Islands during the non-breeding season (approximately mid July through January).

Native Predators Deer mice (*Peromyscus* spp.) are known predators on murrelet eggs, and occasionally they prey on chicks. Deer mice densities on Santa Barbara Island are unusually high, and studies indicate these densities are the highest recorded from published studies in North America. A study on Santa Barbara Island concluded that 44% of murrelet eggs laid were consumed by mice. Barn Owl (*Tyto alba*) densities track the population pattern of deer mice, lagging just slightly behind the peaks. Up to 30 Barn Owls have been noted on Santa Barbara Island during peak mouse periods. Barn Owls are significant predators of adult murrelets. It is estimated that an average of 57 murrelets were killed per year from 1982-1987. Peregrine Falcons (*Falco peregrinus*) have been extirpated from the Channel Islands as breeders since 1955 due to DDT effects. They have only recently returned as breeding birds in the late 1990s. Because peregrines are known predators of Xantus's Murrelets, falcon predation is potentially an emerging threat.

Artificial Light Pollution Murrelets, like many other nocturnal seabirds, are attracted to lights at night. Once attracted, the blinding lights often cause birds to collide with the vessel. In turn, this may cause immediate death, or more commonly, injuries or oil-contamination on board that may lead to later death at sea after escape or release by humans. Small amounts of vessel lighting have been documented to cause parent-chick separation in the Channel Islands, though *temporary* separation may not cause chick mortality. Chicks will die if *permanently* separated from their parents after departing nesting sites as they are dependent on their parents for an extended period of time. Increased lighting near breeding colonies, for example by commercial squid fishing boats, may contribute to increased predation of murrelets by Barn Owls and Western Gulls (*Larus occidentalis)*. Bright lights may also disrupt courtship and breeding activities. A variety of vessels in the Channel Islands utilize artificial lights that could impact murrelets.

Human Disturbance at Colonies Human visitation to nesting areas can result in habitat degradation, nest site destruction, and nest or colony abandonment. Park visitors at Santa Barbara Island need to be reached with educational materials so that they avoid straying

off the trails. The Department is already working with NPS and others on educational materials as part of the Anacapa Island rat eradication effort. Interagency cooperation is necessary to design management solutions for protection of murrelet nest sites, including sea caves and offshore rocks.

Oceanographic and Prey Changes Murrelets forage widely in the Southern California Bight and prey on numerous species of fish and zooplankton. Prey items include various life stages of Northern anchovies (*Engraulis mordax*), but also include larval Pacific sauries (*Cololabis saira*), rockfish (*Sebastes* sp.), juvenile Bluefin Driftfish (*Psenes pellucidus*) or Medusafish (*Icichthys lockingtoni*), sand lance (*Ammodytes* sp.), and zooplankton. In general, murrelets are probably capable of foraging opportunistically on a variety of both small fish and zooplankton prey. Total zooplankton (including salps and jellyfish) in southern California waters declined by 80 percent between the 1950s and the early 1990s, but the overall decline was largely due to reductions in salps and jellyfish, species that are not known to be murrelet prey items. Declines in larval anchovies have also been documented, but Xantus's Murrelets may be able to "prey-switch" from northern anchovies to Pacific sardines (*Sardinops sagax*). The magnitude of the sardine population increase since 1983 was greater than the corresponding decline in northern anchovy, which may mitigate the loss of anchovy in the diet of murrelets. Murrelet reproduction is affected by prey availability, as with most seabirds. The Department believes prey decline may be a factor in murrelet population decline, but more studies are needed.

Military Operations/San Clemente Island San Clemente Island is used as a Department of Defense U.S. Navy (US Navy) training facility. A small breeding population of 10-50 pairs of Xantus's Murrelets is known from the island. In the past, sea stacks and rocky shores where murrelets could nest have been used as military targets. There is a "Sea Test Range" for military activities in the Channel Islands area, and studies of radio-marked murrelets from Santa Barbara Island showed high overlap between murrelet foraging distribution and areas of the test range. The US Navy recently completed their Integrated Natural Resources Management Plan (INRMP) for San Clemente Island in May 2002. Xantus's Murrelets were specifically identified in the INRMP and measures to protect murrelets were described. Impacts to murrelets from military activities are poorly known, but the Department will continue to work with the US Navy to further the conservation of the murrelet.

Bycatch in Fisheries Xantus's Murrelets have been reported as bycatch in drift gill nets off the coast of British Columbia while other murrelets have been taken in various set and drift gill net fisheries with mesh sizes ranging from 2.75 to 9 inches. While Xantus's Murrelets have not been reported as bycatch in California set and drift gill net fisheries, bycatch may be occurring due to the size of the mesh used. In 2003, an observer program was initiated for the white seabass (*Atractoscion nobilis*) fishery, but no bird species were documented as being taken. At this time, the Department needs additional data to determine the extent of potential impacts. However, even a chronic low level of bycatch could be a problem for the species when considered in the context of population decline and on going impacts from other factors. The Department believes bycatch in fisheries may have a minor effect on murrelet populations, but more information is needed.

Recommendations

The Department recommends that the Commission add Xantus's Murrelet to the list of threatened species.

Interagency coordination should be established with the goal of stopping, and then reversing the population decline of the murrelet. Protection and enhancement of existing nesting colonies and protection of the marine environment essential to the continued existence of the species are important.

Management recommendations for recovery and conservation are outlined in the status review report. An interagency team should be developed to prioritize the management recommendations, and to develop additional recommendations.

The team should work to implement the management recommendations, and develop new recommendations as needed. Non-governmental organizations should also be included in murrelet conservation efforts.