

Band-rumped Storm-petrel

Oceanodroma castro cryptoleucura

Hawaiian: akeake

Other: Harcourt's Storm-petrel

Family: Hydrobatidae

State Listing: Endangered

Federal candidate for listing

Identification

Although the Hawaiian population of Band-rumped Storm-petrels was previously recognized as a distinct subspecies, taxonomists today generally combine the various Pacific populations into a single taxon. However, the available information indicates that the Hawaiian population of Band-rumped Storm-petrels is discrete based on geographic isolation from other Band-rumped Storm-petrel populations in Japan, the Galapagos Islands, and the Atlantic Ocean. The Band-rumped is a medium-sized storm-petrel. Its tail is slightly notched (may appear almost squared), unlike most other Hydrobatidae, which are more deeply notched. Their plumage is overall blackish brown with a sharply defined narrow white band across their "rump", extending slightly onto lateral undertail coverts. They have a slightly paler brownish-gray wing bar across their upper wing coverts typically not extending to the leading edge of the wing. Sexes are alike in size and appearance.

This species can be confused with several other dark shearwaters (*Puffinus* sp.) and petrels, as well as the Brown Noddy (*Anous stolidus*). Band-rumps can be distinguished from the dark morph of Wedge-tailed Shearwater (*Puffinus pacificus*), and Christmas Shearwater (*P. nativitatis*) by their much smaller size, shorter bill, erratic flight, and pale band across the wings. The Brown Noddy is similar in shape and coloration, but they lack the pale bar on the upperwings and have a longer, pointed bill. Bulwer's Petrels (*Bulweria bulwerii*) are larger with longer tails that are distinctly wedge-shaped, not notched. Their square tail and white rump distinguishes them from Tristram's Storm-petrels (*O. tristrami*), which have a deeply notched tail and dark rump.

Survival and Lifespan

Little information is available; however, storm-petrels are generally long-lived for their relatively small body size. Many storm-petrel species live to 15 -20 years of age or older as evidenced by one 36 year old Leach's Storm-Petrel (*Oceanodroma leucorhoa*). Average annual adult mortality is estimated at 5 - 7% in the Galapagos and 9% on Ascension Island.

Distribution

Breeding (April-Nov)

Because of the difficulty of accessing Band-rumped colonies, evidence of extant nesting populations in the Hawaiian Islands is based on the detection of adult birds during breeding season surveys and by retrieval of fledglings in the fall. Fledglings have been retrieved on the islands of Hawaii and Kauai, and provide additional evidence of nesting colonies within the Hawaiian archipelago. Colonies have been pinpointed only on the very steep cliffs of Kauai (one colony is known from the Na Pali Coast and one likely occurs in Waimea Canyon), but some birds are also likely nest on barren lava flows at the tops of major volcanoes: Haleakala on Maui and Mauna Loa on Hawaii. Some nests are believed to occur at elevations of 3,050 m or more. Elsewhere in the Pacific, the Band-rumped Storm-petrel breeds in Japan (Hidejima and Sanganijima) and the Galapagos. In the Atlantic, it breeds in the Azores, Berlengas, Madeira, Salvages, Cape Verdes, Ascension, St. Helena, and possibly Sao Tome.

Marine

During the nonbreeding season, some birds apparently remain near their breeding islands, while others undertake long-distance movements of unknown extent (observed up to 5,100 km from colonies). Band-rumped Storm-petrels have been detected west of the Galapagos Islands during spring but not during autumn counts; >1,000 km north of Hawaiian Islands during summer surveys; and >1,600 km south of Hawaii in the Phoenix Islands, as well as the entire distance from Hawaiian Islands to Japan. The three populations in the Pacific are separated by major

distances across the ocean where birds are not continuously found. There are virtually no records of birds from the Galapagos outside the immediate area of the Galapagos Islands. This indicates an at-sea distribution of birds in the central Pacific that is disjunct from the other Pacific nesting colonies to the east and west. Extensive at-sea surveys of the Pacific near Hawaii have revealed a broad gap in distribution of the Band-rumped Storm-petrel to the east and west of Hawaii. Movement between Atlantic and Pacific populations is unlikely because storm-petrels avoid overland flight.

Breeding Ecology

Band-rumped Storm-petrels make their nests in crevices, holes, or along protected ledges along sheer cliff faces that are inaccessible to mammalian predators. Breeding phenology in Hawaii is difficult to ascertain because colonies are remote and difficult to access. More information is available outside of Hawaii, but nest time varies with location. Known information for birds in Hawaii is based on data from colonies in the Galapagos, Azores, and Madeira and fall-out data from Kauai. Nest building likely starts in April with egg laying beginning in May-June. The incubation period averages 42 days and the young reach fledging stage in 64 to 70 days. Adults are believed to leave the nesting grounds in October.

Feeding and Prey

- Feeding guild – NOCTURNAL PETREL
- Food capture – Band-rumps feed by dipping prey from the ocean's surface on the wing, often pattering the water with their feet. In addition, they often alight on the water to feed.
- Foraging Distribution – Overall, they prefer warmer parts of oceans. Their preferred habitat may be tied to depth or to upwellings because 90% of individuals and 75% of all occurrences of Band-rumped Storm-petrels were at upwellings.
- Microhabitat for foraging – Band-rumps are found foraging or feeding at internal wave crests, where prey is caught at or just below the surface. They likely forage during the day, based on direct observations, but may forage at night, based on stomach samples that reveal prey normally found in deeper water during the daytime. Diet samples are few, however, and prey likely becomes available diurnally when chased to surface by large predatory fish such as tuna (Scombridae) or by local, physical oceanographic processes such as upwellings. Still, foraging at night cannot be ruled out and may occur on bioluminescent prey and prey more visible by moonlight and by smell.
- Diet – Likely includes small fish, squid, crustaceans, oily scraps of marine animal carcasses, and garbage remnants. However, no food samples have been collected from the Hawaiian Islands. Samples from the Galapagos consist primarily of small fish (37-50 mm length) and squid with few crustaceans; of 15 stomachs collected, 14 had fish-eye lenses, 4 had cephalopod remains, and 1 had a 3- 4-g Myopsida.

Threats and Status

The Band-rumped Storm-petrel was probably common on all of the main Hawaiian Islands when Polynesians arrived about 1,600 years ago. As evidenced by abundant storm-petrel bones found in middens on the island of Hawaii, and in excavation sites on Oahu and Molokai, Band-rumped Storm-petrels once were numerous enough to be used as a source of food and possibly for feathers. Given the current lack of breeding colonies in Hawaii compared to pre-historic population levels, the Band-rumped Storm-petrel probably was significantly reduced in numbers upon the settlement of Polynesians in the Hawaiian Islands. This likely was the beginning of a decline in the Band-rumped Storm-petrel population that has continued to the low numbers found today in the Hawaiian Islands.

Population modeling of the Dark-rumped petrel indicates that predation levels as low as 10 percent in a single season would require a recovery period of at least seven years. The Dark-

rumped petrel study sites on Mauna Loa and Haleakala are in areas where Band-rumped storm-petrels have been detected during night-time surveys. The effects of introduced predators on the breeding success of Dark-rumped petrels are probably similar to the effects on Band-rumped Storm-petrel breeding success since these birds are equally vulnerable and nest in the same areas. Populations in Japan and the Galapagos are comparatively large and number in the thousands, while the Hawaiian birds represent a small, remnant population of possibly only a few hundred pairs.

Main threats to the species include:

- Light attraction and collision – The significant impact to the Band-rumped Storm-petrel results from the effects of artificial lights on fledgling young and, to a lesser degree, adults. Artificial lighting of roadways, resorts, ballparks, residences, and other development in lower elevation areas both attracts and confuses night-flying, storm-petrel fledglings, resulting in “fall-out” and collisions with buildings and other objects. Artificial lights modify the night sky through which the fledgling birds must navigate after leaving the nest to reach the open sea. Over a 12-year period, from 1978 to 1990, 15 Band-rumped storm-petrels, 13 of which were young, were recovered on Kauai as a result of fall-out. The actual extent of such loss and its overall impact on the population is not known because the majority of “fall-outs” are not detected (“fall-outs” are likely scavenged and consumed by predators such as feral cats), but any loss in such a small population is significant. The impact from artificial lighting is expected to increase as human population grows and development continues on Kauai and other Hawaiian Islands. The human population on Kauai increased by 24 percent between 1970 and 1980. The County of Kauai has recognized the potential threat caused by artificial lighting and is using shields on street lights in the vicinity of some presumed storm-petrel nesting areas.
- Predation – Predation by introduced species (rats (*Rattus* spp., domestic cat (*Felis sylvestris*), mongooses (*Herpestes auro-punctatus*), and common barn owl (*Tyto alba*)) has played a significant role in reducing storm-petrel numbers and in exterminating colonies in the Pacific and other locations worldwide. The Band-rumped storm-petrel, like many seabirds, is relatively small in size, lacks effective anti-predator behavior, and has a lengthy incubation and fledgling period, making the species highly vulnerable to predation by introduced mammals. The effect of these predators, particularly the cat, on the Band-rumped Storm-petrel is likely devastating, given the evidence on the islands of Hawaii and Maui of predation on the Dark-rumped petrel (*Pterodroma phaeopygia*), a related seabird that suffers huge losses to introduced predators and nests in close proximity to the suspected location of Band-rumped Storm-petrel nests.

Selected Readings

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