

Bulwer's Petrel

Bulweria bulwerii

Hawaiian: Ou

Family: Procellariidae

Identification

The Bulwer's Petrel is intermediate in size compared with gadfly petrels (*Pterodroma* sp.) and storm-petrels (*Ocanodroma* sp.) as a group, but larger than other completely dark storm-petrels. They are sooty brown above with a pale band across their greater wing-coverts. This band is difficult to see, so their wings appear uniformly dark above. Below, they are a dull, sooty brown, sometimes with a paler chin and face. Their wings are long and pointed, bill is black, legs are pale-colored, and tail is long and wedge-shaped. Juveniles resemble adults and sexes are alike in plumage and size.

This species can be confused with several other dark shearwaters (*Puffinus* sp.) and petrels, as well as the Brown Noddy (*Anous stolidus*). They can be distinguished from the dark morph of Wedge-tailed Shearwater (*P. pacificus*), and Christmas Shearwater (*P. nativitatis*) by their much smaller size, shorter bill, erratic flight, paler plumage, and pale band across the wings. The Brown Noddy is very similar in shape and coloration, especially immatures, but they lack the pale bar on the upperwings and have a longer, pointed bill. Tristram's storm petrels (*Oceanodroma tristrami*) are smaller with shorter tails that are distinctly notched, not wedge-shaped.

Survival and Lifespan

Little is known, but oldest banded bird was 24 years old.

Distribution

Breeding (Mar-Sept)

Bulwer's Petrels nest on small islands off the main Hawaiian Islands (Molokini, Puu Ku, Alau, Hulu Mokeehia and Kaemi [Maui] Mokapu, Okala, Mokuhooniki, Kanaha Rock [Molokai], Kiei, Poopoo, Puupehe [Lanai], Puu Koaie [Kahoolawe], Kaohikaipu, Popoia, Kekepa, Manana, Mokuluas, Moku Manu [Oahu], and, Kaula and Lehua [Niihau]). No nesting on the shores of the main islands has been confirmed in recent years, although small colonies have probably gone undetected. The majority of the population breeds on all of the Northwest Hawaiian Islands. Outside of Hawaii, they nest on a few islands in the North and South Pacific, eastern North Atlantic, and Indian oceans.

Marine

Little is known of movements in Pacific waters outside the breeding season. Bulwer's Petrels are highly pelagic and individuals are only seen at great distances from land. They migrate to warm waters of intermediate salinity with strong upwellings, where predatory fishes such as skipjack tuna (*Katsuwonus pelamis*) drive plankton and smaller fishes to surface waters. From the Northwestern Hawaiian Islands, Bulwer's Petrels probably follow prevailing winds and disperse to the southwest Pacific. However a second theory is that they disperse north and west of Hawaiian breeding colonies with little movement to the south and east.

Breeding Ecology

Bulwer's Petrels form long-term pair bonds and breed in large colonies. They are found in a variety of nest sites, including rock or coral rubble, small cracks, crevices and ledges at the base of coastal cliffs, under rocks or in dense vegetation. They are not known to dig burrows, but may dig hollow depressions in sand or under vegetation. Limited data suggests they return to their natal colonies to breed and pairs return to the same nest site year after year. Both parents incubate the egg, and brood and feed the chick. Adults arrive at the nesting grounds in April. After copulation, all breeders, and probably nonbreeders, leave the colony for an average of 27-31 days. Within 3 days of their return to the colony, females lay their eggs, which are then incubated for an average of 44 days. Chicks leave the nest 57-67 days after hatching and all birds depart by

the end of September. Their breeding cycle is apparently controlled by seasonal changes in the availability of food. Birds begin to breed at 6 years of age and annually thereafter.

Feeding and Prey

- Feeding guild – NOCTURNAL PETRELS
- Food capture – Bulwer's Petrels feed at night by surface-seizing or dipping. They also dive for prey occasionally with a maximum depth of 2.4 m.
- Foraging Distribution – Bulwer's breeding period takes advantage of seasonal upwellings and food flushes in the Pacific and North Atlantic. They are most abundant in Hawaiian waters near the northern divergence and at the equatorial upwelling.
- Microhabitat for foraging – Generally they forage alone or in pairs at sea, but are occasionally associated with flocks of Wedge-tailed Shearwaters and other loose groups.
- Diet – Bulwer's Petrels eat mainly small fish, but also fish eggs, squid and crustaceans. Most prey species are luminescent nocturnally and migrate vertically to surface waters only at night. In Hawaii, the primary prey are hatchetfishes, and lanternfishes (mainly *Lampanyctus* spp) followed by sea-striders (*Halobates sericeus*), an important prey species during the breeding season in the Northwest Hawaiian Islands. Other fish prey found included jacks, Carangidae (*Decapterus macrosoma*), flying fish, Exocoetidae (*Exocoetus volitans*), Gonostomatidae, Nomeidae, Opisthoproctidae (*Opisthoproctus* sp.), Pleuronectidae, and other unidentified fish. They also consume squid (Ommastrephidae), annelids (Polychaeta), and crustaceans (amphipods, copepods, shrimp, crab [*Megalopa*]).

Threats and Status

Historical changes are poorly known, but the species may have previously nested on the main Hawaiian Islands. Populations in the Northwest Hawaiian Islands have generally increased since exploitation earlier in the twentieth century by plume hunters, guano miners and introduction of rabbits (*Oryctolagus cuniculus*). Today, approximately 412,000 individuals occur in the Northwest Hawaiian Islands with the largest breeding colony (an estimated 75,000-100,000 pairs) on Nihoa. An additional 500-1,000 pairs is estimated on offshore islets in the main Hawaiian Islands.

Main threats to the species include:

- Predators – Adults and nests of burrowing and ground-nesting species are extremely vulnerable to predation by introduced mammals (e.g., rats, cats, dogs, mongoose, pigs). Although all sites in Northwest Hawaiian Islands are currently predator-free, the Main Hawaiian Islands support large populations of non-native mammalian predators. Here, seabirds are limited to nesting on predator-free offshore islets, but these areas are prone to re-invasion.
- Invasive species – Introduced big-headed ants (*Pheidole megacephala*) at Kure and Midway may cause nestling mortality, but also facilitate the destruction of native vegetation by a nonnative scale insect.
- Catastrophic events – Given that a large portion of the world's population breeds on Nihoa, a single catastrophic event (e.g., hurricane) could decimate the species.

Selected Readings

Division of Forestry and Wildlife (DOFAW). 2005. Hawaii's Comprehensive Wildlife Conservation Strategy. Div. Of Forestry and Wildlife, Dept. of Land and Natural Resources, Honolulu, HI.
www.state.hi.us/dlnr/dofaw/cwcs/process_strategy.htm

Harrison, C.S. 1990. Seabirds of Hawaii. Cornell University Press, Ithaca.

James, P.C. and Robertson, H.A. The Call of Bulwer's Petrel (*Bulweria bulwerii*), and the Relationship Between Intersexual Call Divergence and Aerial Calling in the Nocturnal Procellariiformes. *Auk* 102: 878-882 <http://elibrary.unm.edu/sora/Auk/v102n04/p0878-p0882.pdf>

Megyesi, J.L. and O'Daniel, D.L. 1997. Bulwer's Petrel (*Bulweria bulwerii*). In: The Birds of North America, No. 281 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.