

Wedge-tailed Shearwater

Puffinus pacificus chlororhynchus

Hawaiian: Uau kani

Family: Procellariidae

Identification

The Wedge-tailed Shearwater is the largest of the tropical shearwaters with a slender body and long, wedge-shaped tail and hooked bill. It is a dusky brown bird with a musky odor to its feathers. Wedge-tailed Shearwaters are polymorphic: There are light, dark, and intermediate forms. In Hawaii there are predominantly light-morphs, which are grayish brown above with white underparts except for dark edges on wings and dark undertail coverts. They have a dark slate-colored bill and flesh-colored legs. Dark morphs are uniformly soot brown. The light and dark morphs bear no relation to age, sex, or breeding status. In the air, the irregularly white undersurfaces of the wings are apparent in birds with light plumage; so is the wedge-shaped tail from which the species derives its name.

In the Hawaiian Islands, Wedge-tailed Shearwaters can be distinguished from Newell's Shearwaters (*Puffinus auricularis*), which have glossy black upperparts contrasting sharply with pure white underparts and Christmas Shearwaters (*Puffinus nativitatis*), which are uniformly sooty-brown, including bills, legs and feet, with short round tails.

Survival and Lifespan

The oldest banded bird recovered was 29 years old, but longevity may be greater.

Distribution

Breeding (Feb-Nov)

The Wedge-tailed Shearwater is a pelagic seabird that breeds on all the Northwest Hawaiian Islands and on offshore islets of most of the main Hawaiian Islands. Colonies exist at Lehua and Kaula (Niihau); Kilauea Point NWR and numerous coastal sites on Kauai especially at Barking Sands and Spouting Horn; Mokolii, Manana, Mokuluas, Kaohikaipu, Moku Manu, Mokuauia, Kapapa, Kaena Point Natural Area Reserve, Melaekahana State Park, Makapuu, and Black Point (Oahu); Molokini, Mokeehia, Kaemi, Hulu, Hawea Point, Hookipa Beach Park (Maui); Mokapu, Okala, Huelo, Mokuhooniki, Kanaha, [Molokai] Kiei, Poopoo, Puupepe, [Lanai] and Kahoolawe. Outside of Hawaii, Wedge-tails breed on islands throughout the tropical and subtropical Indian and Pacific oceans. The worldwide population is estimated at over one million breeding pairs.

Marine

In the Pacific Ocean, this species' marine range is only slightly larger than their breeding range. The eastern Pacific is probably wintering "grounds" for light morphs from the Hawaiian Islands, which migrate there along the Equatorial Countercurrent and return via the North Equatorial Current. Hawaiian birds would have to travel south to the Equatorial Countercurrent after the breeding season, and then east to the coast of Central America. Birds are mostly absent from Hawaiian waters in December.

In the Pacific, sightings have been most abundant at seawater salinities of 34.6-34.9 ppt, while they are not seen at salinities <32.6 or >36.54 ppt. The lowest sea temperature at which species occurs is 15°C and highest is 33°C; being most abundant at sea surface temperature of 26°C, within the vicinity of equatorial currents.

Breeding Ecology

Like most seabirds Wedge-tailed Shearwaters breed in their natal colonies where they form long-term pair bonds (although breeding failure in this species may result in divorce) and have high site fidelity. Although most birds make burrows in sand or soil, some nest on the ground, particularly in crowded colonies where nest sites are scarce, where ground is difficult to excavate, or when sand and rocks have blocked their burrow. Only those surface nests that are shaded are likely to be successful. One egg is laid per season and both parents participate in all aspects of

raising the young. Breeding is very synchronous and birds arrive at their nesting grounds starting in February with peak egg-laying in mid-June. Eggs hatch in late July to August and fledging is completed by the end of November. Birds first breed at four years of age.

Feeding and Prey

- Feeding guild – TUNA BIRD
- Food capture – Wedge-tailed Shearwaters use a variety of foraging techniques, most frequently they feed by plunging their head into the water while on the wing (contact-dipping), but they also seize prey while sitting on the water.
- Foraging distribution – Wedge-tails are offshore feeders typically found feeding within 80 km of the Hawaiian Islands, but they are sited in all directions within 160 km of the islands.
- Microhabitat for foraging – In the Pacific, Wedge-tails usually (93.4% of the time) feed in large mixed species flocks (shearwaters [Procellariidae], Boobies [*Sula* spp.], Sooty Terns [*Sterna fuscata*] and Noddies [*Anous* spp.], which feed over schools of predatory fishes, especially Yellowfin Tuna (*Neothunnus macropterus*) and Skipjack Tuna (*Katsuwonus pelamis*) that drive smaller prey to the surface making them available. They also follow fishing vessels.
- Diet – Wedge-tailed Shearwaters feed mostly on larval forms of goatfishes (Mullidae), Mackerel Scad (Carangidae), Flying Fish (Exocoetidae), Squirrelfish (Holocentridae), and Flying Squid (Ommastrephidae) that are driven to surface by fish schools. Goatfishes are the most frequently taken prey; they constitute 17.6% by volume of stomach content. Mackerel Scad make up 25.2% of volume, Flying Squid 21.8%, and unidentified squid 6.4%. Within the Hawaiian Islands there are differences in selection of food items between islands and also between seasons. At Midway, squid are important foods in spring, summer, and fall; on Laysan, squid are replaced by carangids in the summer.

Threats and Status

There is evidence for former large concentrations in the main Hawaiian Islands, but at present few nest there. Some colonies have decreased greatly due to exploitation, introduced predators and habitat loss, but the population is probably stable at present.

The current population in Hawaii is estimated at 270,000 breeding pairs with the largest colonies occurring on Laysan (125,000 - 175,000 pairs), Nihoa (30,000 - 40,000 pairs), and Lisianski (10,000 - 30,000 pairs). The population in the main Hawaiian Islands is estimated at 40,000 - 60,000 breeding pairs with the largest colonies occurring on the offshore islands of Lehua (23,000 pairs), Manana (10,000 - 20,000 pairs), Moku Luas (10,000 - 20,000 pairs), and Kaula (1,500 - 2,500 pairs). The worldwide population is estimated at over five million individuals with most in the Pacific Ocean.

Main threats to the species include:

- Predation – No terrestrial mammalian predators are native to the Hawaiian Islands, so this species is incapable of defending itself or its nest from mammals such as rats (*Rattus* spp.), cats (*Felis sylvestris*), dogs (*Canis familiaris*), pigs (*Sus scrofa*), and mongooses (*Herpestes auropunctatus*). Predation, therefore, is a serious threat to adult seabirds and their eggs and chicks. Burrowing species such as shearwaters and petrels are especially vulnerable. Dogs and cats have been significant predators at remnant colonies on the main islands where one animal is capable of killing an entire colony in a matter of weeks. Read details at: <http://www.birdinghawaii.co.uk/XShearwaterkills2.htm>.
- Light attraction and collision – Many fledgling shearwaters die from groundings or “fallout” on their first nocturnal flight from the burrow to the sea. The young birds are attracted to and blinded by light sources, and they frequently collide with power lines, buildings, cars, and

other obstacles, or simply fall to the ground exhausted after fluttering around lights for long periods. Stunned birds land on roads and beaches where they are vulnerable to predation. Since 1978, the organization Save Our Shearwaters (http://www.kiuc.coop/save_our_shearwaters.htm) has banded and released about 23,000 shearwaters picked up by Kauai residents and brought to stations set up around the island. On Oahu, downed birds can be brought to Sealife Park <http://www.sealifeparkhawaii.com/parkInfo/>.

- Human disturbance – Collapse of burrows by visitors is a major problem on popular offshore islets on Oahu (Mokolii [Chinaman's Hat], Mokuluas, Popoia [Flat Island], Mokuauia [Goat Island], and Kapapa). Adults, chicks, and eggs may be crushed or become trapped in their burrow and suffocate.
- Fisheries – In Hawaii, overfishing may directly or indirectly harm seabird populations; harvest of Skipjack and Yellowfin Tuna (*Thunnus albacares*) could eliminate predatory fish needed to drive prey species to surface. Also, live bait needed for the fishery could potentially decrease goatfishes (Mullidae) and mackerel scad (Carangidae), the shearwater's primary food source. Development of a squid fishery could also impact this species.
- Invasive species – Non-native plants, specifically Golden Crown-beard (*Verbesina encelioides*) and sandbur (*Cenchrus echinatus*), degrade nesting habitat by providing poor soil stabilization. Also, birds nesting in dense *Verbesina* become exposed when the plants die off annually and this dramatically decreases nesting success. 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.
- Contaminants – Mercury, lead, and organochlorines have been detected in Hawaiian birds.
- Disease – Pox-like lesions have been observed on birds breeding on Maui and Molokai.

Selected Readings/References

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.

Olson, S.L. and James, H.F. 1982. Prodrum of the fossil avifauna of the Hawaiian Islands. *Smithsonian Contributions to Zoology* No. 365.

Reed, J.R., Sincock, J.L., and Hailman, J.I. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation. *Auk* 102: 377-383. <http://elibrary.unm.edu/sora/Auk/v102n02/p0377-p0383.pdf>

Spear, L.B., Ainley, D.G., Nur, N. and Howell, S.N.G. 1994. At-sea study of four endangered or threatened Procellariids in the Tropical Pacific, Part 1: Population estimates. *Pacific Seabirds*; Vol.21, No. 1.

Spear, L.B., Ainley, D.G., Nur, N. and Howell, S.N.G. 1995. Population size and factors affecting at-sea distributions of four endangered procellariids in the tropical Pacific. *Condor* 97:613-638. The Cooper Ornithological Society

Whittow, G.C. 1997. Wedge-tailed Shearwater (*Puffinus Pacificus*). In *The Birds of North America*, No. 305 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

