

Brown Booby

Sula leucogaster plotus

Hawaiian: A

Family: Sulidae

Identification

Adult Brown Boobies are dark chocolate brown with white underwing coverts and belly. There is a sharp demarcation across their lower breast between the white of their belly and brown of their neck. Sexes are distinguishable by face, bill, and leg color. These parts are yellow in females and are grayish green in males, which in addition, have a bluish throat and bill. Females are also slightly larger than males. Juveniles have plumage similar to adults except that their belly and underwing covert color is light brown.

Survival and Lifespan

The oldest recorded Brown Booby is over 26 years in age (banded as an adult). Annual survival varies from 85% - 95%.

Distribution

Breeding (Mar-Nov)

The Brown Booby has a pantropical distribution, with populations in the Pacific Ocean, the tropical Atlantic Ocean, the Indian Ocean and the Caribbean. Birds along the continental coast of the North American west coast have been split into a separate species, the Nazca Booby (*Sula granti*). In Hawaii the species nests on the Northwest Hawaiian Islands (Kure Atoll, Midway Atoll, Peal and Hermes Reef, Laysan, Lisianski, Gardner Pinnacles, La Perouse at French Frigates Shoals, Necker, Nihoa) and on the main Islands, Brown Boobies nest on Lehua and Kaula as well as Moku Manu off of Oahu. Local range may be controlled by availability of food at upwellings or other rich feeding sites.

Marine

There are few data for individuals, but Brown Boobies can range hundreds to thousands of miles from colonies. Distribution of most birds during the nonbreeding season is unclear. It is not known where or how far nonbreeding birds go when not breeding. Dispersal may depend on location of feeding areas outside the breeding season. Some data suggest that juveniles disperse to different areas than adults.

Breeding Ecology

The peak of egg laying is mainly March to May in Hawaii, but at some colonies egg laying occurs in all months (e.g., Kure). Incubation period averages 43 days, hatchlings are brooded for 20-60 days, they fledge at about 100 days and postfledgling feeding occurs for an additional 20-30 days thereafter (total season normally 25-35 weeks). Pairs lay 2 eggs on the ground in a small nest made of twigs and vegetation but generally raise only 1 chick. The first to hatch usually outcompetes its sibling during feedings and frequently pushes it out of the nest.

Over a 10 year period on Johnston Atoll it was found that: 1% of birds first breed at 2 years, 5% at 3 years, 29% at 4 years, 32% at 5 years, 15% at 6 years and the remainder at 7+ years. Breeding occurs annually thereafter with pairs occasionally skipping a year.

Feeding and Prey

- Feeding guild – PELECANIFORMES
- Food capture – Brown Boobies feed by plunging head first into the water from the air at heights of up to 15 meters. They will also make shallow dives repeatedly at a low angle to the water, skimming the surface if there is a fish source directly below. At times, Brown Boobies may pursue fish underwater, submerging for 25 - 40 seconds. Birds present near Red-footed Booby colonies will often join Great Frigatebirds in chasing the Red-foots until they disgorge

part of their meal or they reach the safety of the nest and will swoop in to grab any missed food, or sit on the waters surface feeding on any stray fish particles.

- Foraging Distribution – This species usually forages near shore, often within 80 km of their breeding grounds. They probably feed mainly at oceanographic features that concentrate nutrients near surface, attracting smaller fish and larger predator fish, as opposed to random searching. Features include upwellings and convergences; such as occur on north and south side of Intertropical Convergence Zone across central Pacific, or downstream from islands.
- Microhabitat for foraging – Brown Boobies often feeds solitarily, but most commonly are found in feeding flocks with other species (shearwaters [Procellariidae], Red-footed [*Sula sula*] and Masked boobies [*S. dactylatra*], noddies [*Anous* spp.], and White Terns [*Gygis alba*]). Flocks frequently feed over predatory fish (jacks [Carangidae] or tuna [Scombridae]) that drive smaller fish to the surface. Boobies may depend on larger fish to make food available to them.
- Diet – Flying fish (*Exocoetus* and *Cypsilurus* spp.) and squid are the major food sources for Brown Boobies; Halfbeak (*Hemiramphus* spp.), Mullet (*Mugil* spp.), Sea Catfish (*Galeichthys* spp.), Garfish (*Belone ardeola*), *Cottus* spp., Parrotfish (Coridae), and Flatfish are also taken. Species taken are more diversified during el Nino events. Brown Boobies take smaller prey than Masked Boobies and up to twelve fishes may be present in a bird's stomach, compared to two or three large fish in Masked. Flying fish make up about one-twentieth of the diet of this species compared to one-quarter in Red-footed Boobies.

Threats and Status

Currently, there are an estimated 221,000-275,000 breeding pairs worldwide. Many colonies have not been visited in 30-50 years, so data may not be accurate. In Hawaii, there are approximately 2,000 breeding adults and 1,000 non-breeders. Many colonies worldwide have been extirpated since the arrival of humans. Populations today may be an estimate 1-10% of those before the arrival of humans. The largest populations are found on Lehua, Kaula, and Nihoa.

Main threats to the species include:

- Human impacts – The most severe human impact is the loss of nesting sites to development and general human disturbance in colonies. Although they generally tolerate disturbance by researchers, a new pairs may desert eggs if disturbed several times early in the breeding season.
- 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 prey items. Development of a squid fishery could also impact Brown Boobies.
- Invasive species – Non-native plants, specifically golden crown-beard (*Verbesina encelioides*), degrade nesting habitat. Brown Boobies nest on the ground on bare rock or low-growing vegetation. *Verbesina* grows in dense swaths that reach over 6 ft in height thereby precluding nesting by boobies. Birds nesting early in the growing season may become surrounded by *Verbesina* and die of heat stress once the plants reach their full height.

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.

Schreiber, E.A. and Norton, R.L. 2002. Brown Booby (*Sula leucogaster*).). *In* The Birds of North America, No. 649 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.