

Great Frigatebird

Fregata minor palmerstoni

Hawaiian: Iwa

Family: Fregatidae

Identification

The Great Frigatebird is an unparalleled flying machine. They are highly specialized for an aerial life, having a greater ratio of wing area to body mass than any other bird, a deeply forked tail for agile maneuvering, and very small legs and feet (which make walking impractical). They are among the few seabirds that are sexually dimorphic in plumage as well as in size with adult females weighing almost one-third more than males. Males are entirely black above, with long, metallic green and purple scapular feathers. Their inflatable red gular pouches are used for mating displays and fade to a pale orange. Juvenile plumage lasts between five and nine years and is extremely variable, tending to be primarily black with much white. The rufous feathers on juveniles' heads, necks, and breasts disappear after the first few years. Their long, slender wings, deeply forked tails and saber-like bills render frigatebirds unmistakable in the field.

Survival and Lifespan

Great Frigatebirds are long-lived. They live to be at least 30 years of age and some reach 40 or 50.

Distribution

Breeding (Dec-Oct)

Great Frigatebirds range widely over the warm waters of the Indian and Pacific oceans but are restricted to Trinidad and Marin Vas in the tropical Atlantic. They breed on or visit all island groups in the tropical Pacific except Palau, ranging between 28°N (Kure) and 25°S (Pitcairn). In Hawaii, they nest in on all the Northwest Hawaiian Islands except Gardner Pinnacles and roost on Moku Manu (Oahu), Kaula and Lehua (Niihau) in the main Islands.

Marine

Frigatebirds are non-migratory residents that do not wander far from their breeding islands. Residents return to land to roost on still evenings when air currents are unfavorable but otherwise may soar all night

Breeding Ecology

Frigatebirds lay a single egg on a loosely woven but substantial platform of sticks, twigs, vines, and leaves which they build near tops of trees or shrubs. In Hawaii, they typically nest on Tree Heliotrope (*Tournefortia argentea*) and naupaka (*Scaevola sericea*). Courtship begins in December, peaks between December and April and usually ceases by May. Egg-laying commonly occurs in the colony over a 5 – 6 month span with a peak in March – May. There is a 55 day incubation period with most juveniles fledging by October. Frigatebirds have the longest post-fledging parental care period of any species of bird with adults continuing to feed young up to a year after fledging. Unlike many seabirds, pairs usually switch partners every breeding season, likely because females often only nest every two to four years. Both parents incubate the single egg, and brood and feed the chick. Birds first breed at eight to ten years of age.

Feeding and Prey

- **Food capture** – Frigates have a highly specialized feeding method—they use their long, hooked bills to snatch prey on the wing or during brief contact with the water. Because of a structural inability to take off again if they settle on the water (not a lack of oil glands and associated waterlogging), frigates are limited to snatching prey from surface waters, probably no deeper than the length of a bill. Early writers emphasized kelp parasitism as frigatebirds' sole method of feeding. This behavior inspired both its Hawaiian and English names: iwa means "thief" and "frigate" refers to the fast ships used by pirates. However, frigates in Hawaii earn most of their living by honest fishing; piracy is primarily a supplementary activity of females or of juveniles that are struggling to learn a highly specialized type of aerial feeding.

- Foraging Distribution – They are pelagic feeders during both the breeding and nonbreeding seasons and generally feed out of sight of land. Little is known about their distribution due to limited at-sea data, but they have been found primarily in tropical and subtropical areas, in highly saline waters with surface temperatures $\geq 22^{\circ}\text{C}$. Frigatebirds probably feed at oceanographic features (e.g., upwellings, divergences, convergences) that bring nutrient-rich, cooler, deeper waters to the surface or that concentrate nutrients.
- Microhabitat for foraging – Usually solitary at sea, yet when ephemeral food is available they will join fairly large flocks of other species, especially Sooty terns (*Sterna fuscata*) and Wedge-tailed Shearwaters (*Puffinus Pacificus*) that feed over foraging schools of tuna (e.g., *Katsuwonus* and *Euthynnus* spp.), other predatory fishes, or dolphins (*Stenella*, *Delphinus*, and *Steno* spp.), which drive smaller fish to surface, where they are available to frigatebirds. Less commonly, they forage on land, taking small seabird chicks (less often eggs) from exposed nests.
- Diet – Frigates' diet in Hawaii includes about six-sevenths fish and one-seventh flying squid, together with the occasional juvenile Sooty Tern. Although crustaceans are occasionally found in frigates' stomachs elsewhere, none have turned up in Hawaiian samples. Frigates take fish of a particularly wide range of sizes from a thumbnail-size cowfish to a halfbeak over 8 inches in length. Flyingfish are the most common family of fish taken, especially *Cypselurus* spp. and Linne's flyingfish. Mackerel scad are frequently eaten during summer and fall. Some prey is taken primarily at certain locations or during certain months. For example, frigates consume many Pacific sauries near Midway during winter and numerous small fantail filefish near Laysan during summer, but eat neither of them in other areas or during other seasons. Frigates also may eat hatchling green sea turtles, Gray-backed Terns (*Sterna lunata*), fledgling shearwaters (*Puffinus* spp.), and other young birds.

Threats and Status

Fossils of Great Frigatebirds chicks have been found along coastal Oahu and Kauai indicating that they once nested on the main islands. This species is very sensitive to human disturbance and currently nests only in the Northwest Hawaiian Islands.

The world population is estimated at 500,000 - 1,000,000 individuals. Frigates rarely begin to breed until they are at least nine years old, so a substantial portion of the population consists of nonbreeders. The total Hawaiian population consists of 64,000 individuals, of which 20,000 are breeders. The largest breeding colonies occurring on Nihoa (3,500 - 4,500 pairs) and Laysan (2,000 - 2,500 pairs). Smaller colonies in Northwest Hawaiian Islands include French Frigate Shoals (350 - 375 pairs), Necker (700 - 900 pairs), Lisianski (750 - 850 pairs), Pearl and Hermes Atoll (300 - 400 pairs), and Kure Atoll (200 - 250 pairs).

- Habitat degradation and loss – Probably the most significant conservation problem for Hawaiian Great Frigatebirds is the loss of nesting vegetation, as on Laysan and Lisianski early in the twentieth century when rabbits were introduced. The frigate population on Laysan may still not have attained its former level because the *naupaka* (*Scaevola sericea*) there has never completely recovered.
- Disturbance at nest sites – Frigates are particularly disturbed by human intruders in their colonies. Uncontrolled human activities not only can cause reproductive failure in the year of disturbance but can result in the abandonment of an entire colony. Frigates once nested on Sand Island, Midway, but have not done so for decades, likely as a result of intense and regular disturbance there.
- Fisheries – In Hawaii, overfishing may directly or indirectly harm seabird populations; harvest of skipjack and yellowfin tuna (*Thunnus albacare*) could eliminate predatory fish needed to drive prey species to the surface.

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.

Metz VG, Schreiber EA. 2002. Great frigatebird (*Fregata minor*) In The Birds of North America, No. 681 (Poole A, Gill F, editors.). Philadelphia, (PA): The Academy of Natural Sciences; and Washington DC: The American Ornithologists' Union.

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

video link: <http://www.hbw.com/ibc/phtml/votacio.phtml?idVideo=633&tipus=0>