

# Petrels in the Pacific: Tracking the Far-ranging Movements of Endangered 'Ua'u (Hawaiian Petrel)

Josh Adams, US Geological Survey, Western Ecological Research Center

Known to the Hawai'ians as 'Ua'u for their haunting, nocturnal flight call, the Hawai'ian Petrel (*Pterodroma sandwichensis*) retains mystery. A member of the procellariid family of seabirds commonly referred to as tubenoses for their pronounced tubular nares,

*Pterodroma* petrels are among the ocean's most wide-ranging and pelagic vertebrates. These birds truly exist in an environment of wind and waves,

only returning to the Hawai'ian Islands to nest during the subtropical spring and summer. Established breeding pairs will first attempt nesting at approximately 6 years of age, and will return to the same nest site year after year for upwards of 40 years

in an annual effort to produce a single chick (typically, procellariids lay only one egg per year; replacement eggs are very rare). Such a life history strategy can facilitate rapid population decline (if adult or subadult mortality rates increase) and ensures slow population recovery because of naturally low fecundity.

Coincident with the early colonization of the Hawai'ian Islands, first by Polynesians and subsequently by American, European and Asian settlers, rapid proliferation of introduced mammalian predators and ungulates, diseases, industrialized agriculture and fishing, and urbanization have imposed substantial pressure on the Hawai'ian Petrel population. As a

result, 'Ua'u were listed as Endangered by the Secretary of the Interior in 1967 only one year after the passage of the Endangered Species Preservation Act. Remnant colonies of once abundant 'Ua'u now are confined to the summit areas of Mauna Kea and Mauna Loa, Hawai'i, Haleakala, Maui, and remote forested areas on Hawai'i, Kaua'i, and Lana'i. 'Ua'u continue to be impacted by loss of habitat, predation, and threats both on land and at sea.



USGS photo J. Adams

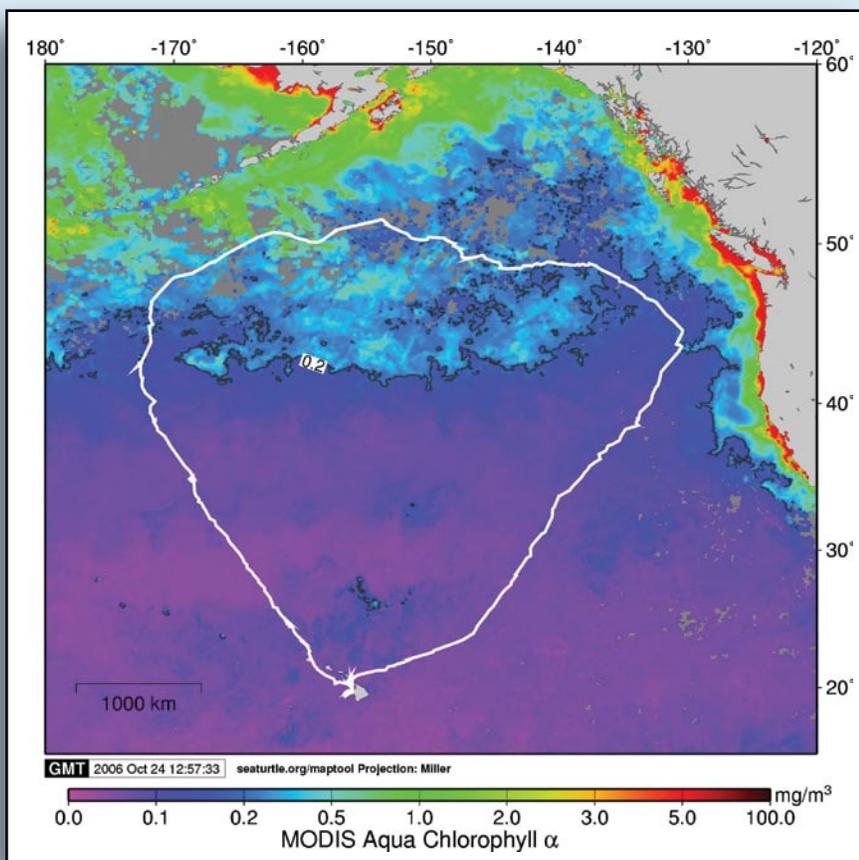
The Hawai'ian Petrel is an endangered, endemic seabird. Before MTI developed miniature solar-powered satellite transmitters, the high-resolution movements of these relatively small petrels (~470g) could not be measured.



USGS photo J. Adams

Hawai'ian Petrels nest in remote, isolated areas in Hawaii. Although easily detected flying over their colonies at night, finding a petrel burrow amidst dense, head-high uluhe fern stands on Lana'i Hale, can be extremely difficult.

Effective conservation of 'Ua'u requires a better understanding of its biology and ecology. In 2006, the US Geological Survey partnered with the US Fish & Wildlife Service and initiated a broadly collaborative research effort to use satellite telemetry to better understand 'Ua'u. The overarching goal of any research involving 'Ua'u is to provide information that will contribute toward efforts that will enable recovery of the species and eventual "down-listing" from the Endangered Species list.



USGS unpublished image J. Adams

Rivaling the foraging trips described for albatrosses, a single foraging trip for a Hawai'ian Petrel (only a fraction the size of an albatross) can exceed 10,000 km and last greater than two weeks. This individual tracked from Haleakala, Maui performed a clockwise loop throughout the greater North Pacific and into the Transition Chlorophyll Zone (color-shading indicates satellite-sensed chlorophyll concentration) before returning to feed its chick.

Whereas predation and habitat degradation by non-native species are principal threats to endangered Hawai'ian Petrel, we are using satellite telemetry to address several prerequisites for conservation. Our studies aim to establish methods that will help generate precise locations of remote, montane nesting areas, enable more refined techniques for population assessment, and to identify at-sea habitat. In summer 2006, we made an initial attempt to track the fine-scale movements of four 'Ua'u using 12g solar PTTs. We discovered that breeding birds make dramatic, clockwise looping foraging trips throughout a broad area of the north Pacific (individual trips can exceed 10,000 km). Tests on Haleakala, indicate the feasibility of using satellite telemetry techniques in the near future to track the inland movements of both petrels, and potentially smaller Newell's Shearwaters, to help locate previously undescribed colonies. We are looking forward to examining interannual variations in the movements of individual 'Ua'u as our telemetry studies continue throughout the next several years.

josh\_adams@usgs.gov