

# First Visual Record of a Hoary Bat (*Lasiurus cinereus*) over the Open Ocean

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# *Journal of North American Bat Research*

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**Cover Photograph:** A Hoary Bat flying over the ocean off Arcata, CA. Photograph © W.L. Kennerley.

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## First Visual Record of a Hoary Bat (*Lasiurus cinereus*) over the Open Ocean

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Leigh G. Torres<sup>1,2</sup>, and Donald I. Solick<sup>3,4,\*</sup>

**Abstract** - We document the first visual observation of a *Lasiurus cinereus* (Hoary Bat) flying over the open ocean, 49 km from the northern California coast. This observation provides further evidence that this migratory species at times utilizes offshore habitat. Hoary Bats face significant, population-level threats from collisions with onshore wind turbines, particularly during late-summer and autumn migration periods. The location of this sighting within a leased offshore wind-energy area highlights the potential for Hoary Bats to be impacted by planned offshore wind-energy development.

On 3 October 2022, at 13:05 PDT, one of us (WLK) observed a *Lasiurus cinereus* (Palisot de Beauvois) (Hoary Bat) over the Pacific Ocean at 40°56'59" N, 124°43'08" W, 49 km off the coast of Arcata, California (Fig. 1). The sighting occurred during a research cruise aboard the *R/V Pacific Storm*, on which WLK was conducting strip-transect surveys for seabirds. Observing conditions were rated “excellent” (Ballance 2018) at the time of the sighting, with sea state conditions of Beaufort 2, equating to a wind speed of approximately 2.1–3.1 ms<sup>-1</sup>. Winds were from the north-northeast and conditions the previous night were calm, with light winds 1.0–2.2 ms<sup>-1</sup> from the north-northwest (NOAA National Data Buoy Center 1971). The Hoary Bat was first observed flying at a height of 5–10 m, approaching generally towards the vessel from the north. The bat and vessel came within 50 m of each other, and the bat was photographed (Sony A9, 200–600 mm lens with 1.4x teleconverter, Sony Corporation, New York, NY) before continuing to fly towards the south-southwest. We identified the individual as a Hoary Bat based on grayish body pelage, a buffy collar, white elbow patches, and lightly colored leading edges of the wings (Fig. 2).

Hoary Bats are strong fliers capable of traveling long distances. The species is highly migratory, with individuals moving from breeding areas widely spread across North America to southern or coastal wintering areas (Baerwald et al. 2014, Cryan 2003, Cryan et al. 2014b). During migration, Hoary Bats are regular visitors to the Farallon Islands off California (Cryan and Brown 2007, Tenaza 1966) and to Bermuda (Allen 1923, Van Gelder and Wingate 1961), demonstrating a capacity for sustained, overwater flight. However, a recent review of current and historic records of offshore bats in North America (Solick and Newman 2021) indicated that Hoary Bats had never been visually identified from ships. Although Hoary Bats have been detected acoustically from offshore structures (e.g., buoys and lighthouses) and boats in the Atlantic, such detections are rare compared to other migratory species, like *L. borealis* (Müller) (Eastern Red Bat) and *Lasionycteris noctivagans* (LeConte) (Silver-haired Bat) (Solick and Newman 2021).

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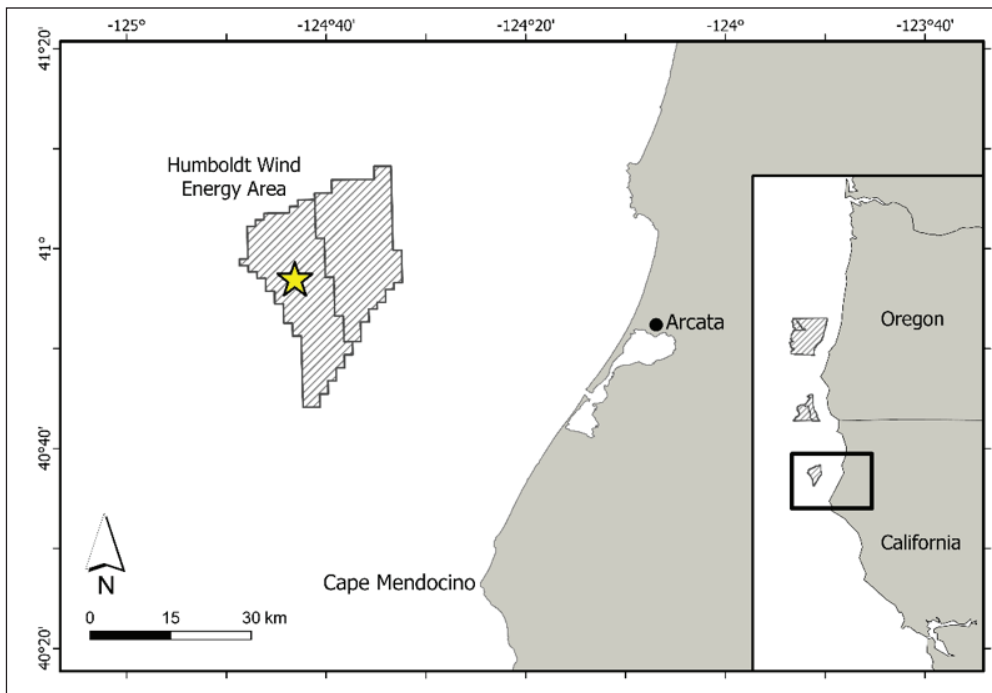


Figure 1. Location of the Hoary Bat sighting (yellow star), within lease area OCS-P0562 in the Humboldt Wind Energy Area (hatched), off the northern California coast. The inset map shows the area of the sighting in relation to two proposed wind-energy areas off Oregon.



Figure 2. Photographs of the Hoary Bat, taken by WLK from the *R/V Pacific Storm*, on 3 October 2022.

Hoary Bats can fly at high altitudes ( $\leq 2400$  m; Peurach 2003), well beyond the visual range of human observers and outside the acoustic range of ultrasonic detectors (about 30 m; Adams et al. 2012); perhaps partly explaining the low number of offshore records. The observed individual was flying at a perceptible height in daylight, about 6 hrs after sunrise. Bats flying during daylight hours on land are rare and may indicate disease, disturbance, or an early start to foraging. However, most offshore bat sightings (Solick and Newman 2021) and many offshore acoustic detections have occurred during daytime (Peterson et al. 2016). It is often assumed that these day-flying bats are searching for a place to rest, as indicated by several accounts of bats landing on ships in the Atlantic and remaining for many hours (Solick and Newman 2021). However, the Hoary Bat we observed did not attempt to land on our vessel, suggesting it was not in need of rest, although it likely had been in continuous flight for many hours. Day-flying bats are vulnerable to diurnal predators, such as gulls (Boshamer and Bekker 2008, Mikula et al. 2016), and although a *Larus occidentalis* Audubon (Western Gull) was seen following the ship at the time of our sighting, we did not observe any obvious interaction with the Hoary Bat.

The lack of oceanic, visual records for any bats off the Pacific Coast, compared to the mid-Atlantic region of North America (Solick and Newman 2021), may indicate some combination of less activity by bats over the Pacific Ocean, less survey effort by researchers, or the lack of a centralized reporting system for casual observers. Recent research has attempted to rectify this knowledge gap. In 2014 and 2015, acoustic detectors (Anabat II, Titley Scientific, Brendale, Australia) were deployed on Newport Hydrographic Line cruises out to 60 km off the central Oregon coast, but no confirmed bat detections were identified (R. Suryan, NOAA Fisheries, Juneau, AK, 2023 pers. comm.). In 2021, the U.S. Geological Survey began long-term acoustic surveys for bats at multiple locations 0.3–110 km off the California coast, which should provide more systematic insight into offshore activity by Hoary Bats and other species (G. Reyes and B. Schulze, USGS Western Ecological Research Center, Sacramento, CA, 2023 pers. comm.).

Given the time of year and the southerly direction of flight, this individual was possibly migrating. Hoary Bats apparently move south along the Pacific Coast in autumn (Brown 1935, Dalquest 1943), but recent attempts to track Hoary Bats during this time of year indicate that individuals fly in various directions. While two Hoary Bats tagged in Humboldt Redwoods State Park, California, remained somewhat locally, one bat flew a circuit of >1,000 km inland before returning to the initial point of capture (Weller et al. 2016). During the same month as our observation, a Hoary Bat was tagged in Muir Woods National Monument, California, before being detected by an automated telemetry station (Motus), near Olympia, Washington, about 1,000 km north (G. Reyes, USGS Western Ecological Research Center, Sacramento, CA, 2023 pers. comm.). Thus, recent observations suggest that seasonal movements of Hoary Bats may be more complex than previously described.

On land, Hoary Bats are the predominant bat species killed by collisions with wind-turbine blades (Allison and Butryn 2020) and are at risk of population decline or extinction if the current rate of fatalities is not reduced (Frick et al. 2017, Friedenbergl and Frick 2021). Notably, our sighting occurred within the Humboldt Wind Energy Area (Fig. 1) in a section that has since been leased for offshore wind-energy development (lease number OCS-P0562; BOEM 2023). While it is currently unknown how frequently this species flies offshore or what proportion of the population uses these areas, our sighting demonstrates that Hoary Bats can occur in offshore wind-energy areas during autumn, when the annual peak in collisions occurs at onshore turbines (Allison and Butryn 2020). Although the individual we observed was flying well below the typical height of wind-turbine rotors, some

bats may display a degree of attraction to turbines under certain wind conditions (Cryan et al. 2014a). The degree of risk Hoary Bat populations face from offshore wind-energy development, therefore, remains uncertain but is worthy of further investigation.

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