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Source: Journal of Raptor Research, 51(2):184-186.

Published By: The Raptor Research Foundation

<https://doi.org/10.3356/JRR-16-95.1>

URL: <http://www.bioone.org/doi/full/10.3356/JRR-16-95.1>

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LETTERS

J. Raptor Res. 51(2):184–186

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FIRST EVIDENCE PROVIDED BY SATELLITE TELEMETRY OF NOCTURNAL FLIGHT OVERLAND BY AN OSPREY (*PANDION HALIAETUS*)

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KEY WORDS: *Osprey*; *Pandion haliaetus*; *migration*; *nocturnal flight*; *Sahara desert*.

Ospreys are mainly diurnal migrants, although direct observations and satellite-tracking data have shown that nocturnal flights are not uncommon when crossing large expanses of water (Beaman and Galea 1974, DeCandido et al. 2006). However, documented examples of nocturnal flights overland are very rare and restricted to short movements (see DeCandido et al. 2006), despite the several Osprey satellite-tracking programs originating in Europe and North America (Bierregaard et al. 2014). Here we describe the first nocturnal overland flight of an Osprey to be recorded by satellite telemetry.

In 2013 an Osprey reintroduction program was initiated in the Urdaibai Biosphere Reserve (Basque Country, northern Spain; 43°22'N, 2°40'W), aiming to establish a breeding population that would potentially interconnect the small breeding populations of southern Spain and central France. For that purpose, 12 Ospreys, 4–5 wk old, were translocated each year from Scotland to northern Spain during the 2013–2016 period. Twelve of those young Ospreys were fitted with 30-g Argos/GPS Solar-PTT satellite transmitters (Microwave Telemetry Inc., Columbia, MD U.S.A.) and half of these tracked birds successfully migrated to sub-Saharan western Africa, the main wintering quarters of Ospreys breeding in Europe (Zwarts et al. 2009).

In the fall of 2015, one of the satellite-tracked Ospreys departed from northern Spain and travelled to the Senegal River, covering a distance of 3200 km in 10 d (Fig. 1). On 10 September, the bird spent the night close to Agadir, Morocco (30°18'N, 9°08'W) and departed south on 11 September at 0900 H. We received further locations of the bird flying

during the day at 1000 H, 1200 H, 1300 H and 1500 H. The bird was flying over the Sahara Desert in Mauritania at 2100 H (altitude: 860 masl, transmitter-recorded speed: 92.6 km/hr) and at 2300 H (430 masl, 83.4 km/hr). Due to programmed transmission times, we did not receive any other location during the remainder of that night. However, the Osprey was perched in the desert (21°21'N, 12°50'W) on 12 September at 0700 H after covering a distance of 370 km from the previous location, taken at 2300 H (24°51'N, 11°56'W), indicating that it had continued traveling several more hours before stopping at dawn. Moreover, the total distance covered by this bird between both night roosts was 1060 km, an exceptionally long distance to cover in one day for an Osprey (Kjellén et al. 2001). During that night, the wind down to 925 mb (equivalent to an altitudinal range from sea level to 725 m) was moderate (20–30 km/hr), with a prevailing direction of 143°–193° (<http://www.noaa.gov>), which signified prevailing winds, good conditions for migration. However, these conditions are frequent in the Sahara during fall migration and therefore, by themselves, do not explain the recorded behavior.

Mortality rate of migrant raptors, including Ospreys, increases during migration, especially when crossing ecological barriers, such as the Sahara Desert in Africa (Strandberg et al. 2010, Klaassen et al. 2014). Raptors reach faster speeds during Sahara crossings, presumably minimizing associated risks, such as starvation, dehydration, or disorientation (Kjellén et al. 2001, López-López et al. 2010). More information is needed to clarify whether the recorded nocturnal flight is just an anomalous behavior or is a strategy of some individuals to reduce travel time when flying over the desert.

We thank Roy Dennis for assessing and making possible the Osprey reintroduction program in the Basque Country carried out by the Urdaibai Bird Center. We also thank two

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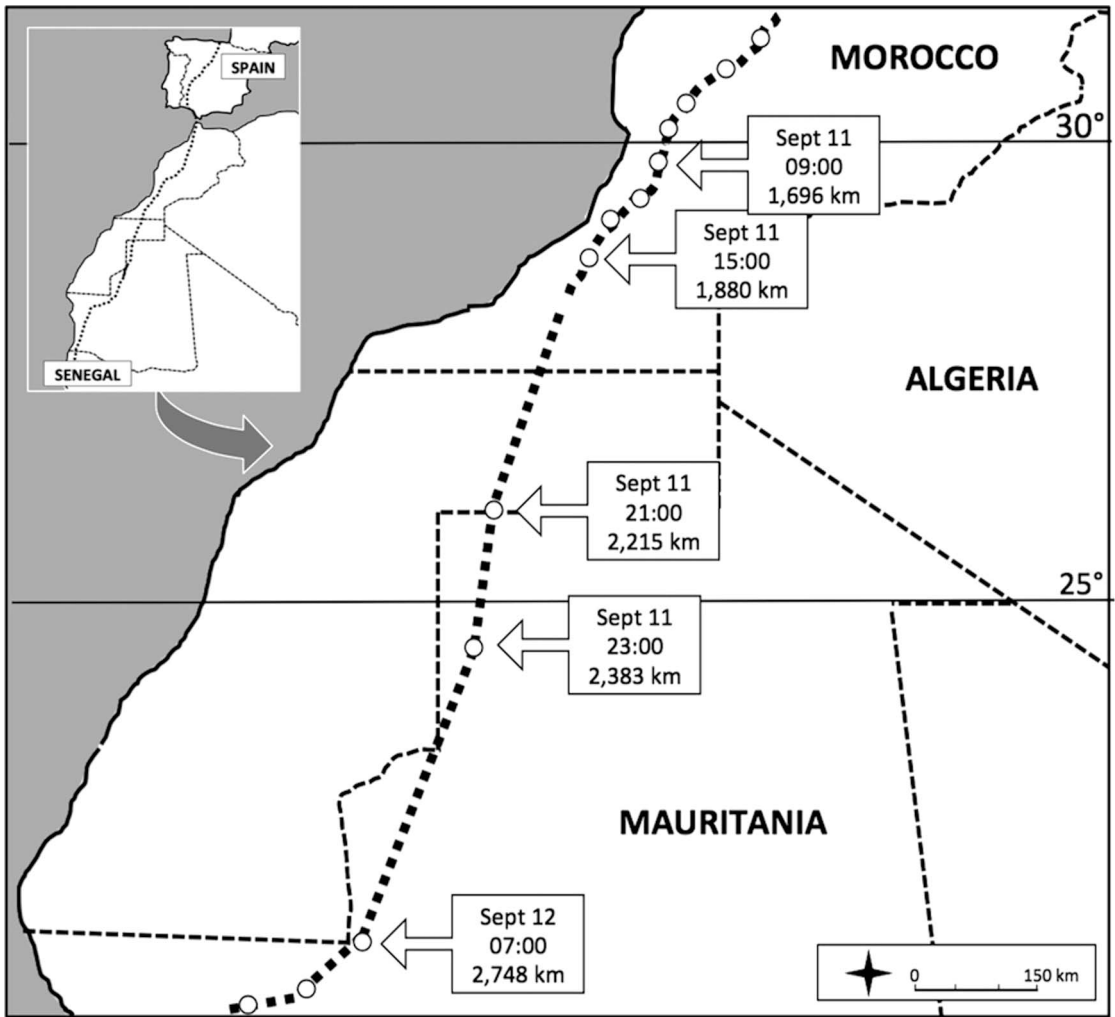


Figure 1. Fall route of the tagged Osprey over the Sahara desert from 0900 H on September 11 to 0700 H on September 12. Distance from the origin is also shown for each location.

anonymous referees for reviewing an early draft of this letter. The Biscay County Council financed the reintroduction program, including the telemetry equipment. The young Ospreys were collected in Scotland under license of the Scottish Natural Heritage. Banding and telemetry equipment attachment procedures were approved by the Department of Environment of the Biscay County Council (OF7828).

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Received 1 November 2016; accepted 25 January 2017