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Short Note

Unprecedented Resighting in Mexico of a Male California Sea Lion (*Zalophus californianus*) from Oregon During the 2014 Breeding Season

Fernando R. Elorriaga-Verplancken,[1] Matthew J. Tennis,[2] and Robin F. Brown[3]

[1]*Departamento de Pesquerías y Biología Marina, Centro Interdisciplinario de Ciencias Marinas, Instituto Politécnico Nacional (CICIMAR-IPN), Avenida IPN s/n, Colonia Playa Palo de Santa Rita, 23096, La Paz, Baja California Sur, México*
E-mail: felorriaga@ipn.mx
[2]*Pacific States Marine Fisheries Commission, 2001 Marine Drive, Room 120, Astoria, OR 97103, USA*
[3]*Oregon Department of Fish and Wildlife, Marine Mammal Research Program, 7118 NE Vandenberg Avenue, Corvallis, OR 97330, USA*

The California sea lion (*Zalophus californianus*) is an abundant otariid in the northern hemisphere, with an estimated population of ~350,000 individuals (Lowry & Maravilla, 2005; Szteren et al., 2006; Carretta et al., 2007). Its breeding distribution spans from California in the United States to Baja California and the Gulf of California in Mexico. This species is polygynous and sexually dimorphic. The breeding season extends from late May through August (Peterson & Bartholomew, 1967; Brownell et al., 1974). Once this period ends, males from California migrate north to waters adjacent to Oregon, Washington, British Columbia, and sometimes to southeastern Alaska (Bigg, 1973; Mate, 1975; Aurioles-Gamboa & Trillmich, 2008). Satellite tracking detected maximum trip distances of 222 to 644 km in adult and subadult males tagged in Monterey Bay, California (2003 to 2005), which in some cases reached southern Oregon, ~950 km north of their breeding sites in the Channel Islands (Weise et al., 2006), while adult male *Zalophus* branded as pups on San Miguel Island, California (34º 2.185' N, 120º 22.318' W), are commonly observed at various locations in Oregon and Washington during the fall, winter, and spring months, representing a maximum distance of nearly 1,800 km into Puget Sound, Washington (P. Gearin, pers. comm., National Marine Mammal Laboratory/AFSC/NOAA, Seattle, WA, 30 July 2014). Although migratory routes of male *Zalophus* from Baja California have not been well-established, isotopic analyses indicate that there is trophic segregation between adult sexes (Elorriaga-Verplancken et al., 2013), wherein males might adopt a strategy of moving north, as California males do, which would explain the increase in the number of males seen on some California islands during the winter (Odell, 1975). Apart from these usual dispersal patterns, there are reports of extreme individual dispersion in subadult/adult male *Z. californianus*, from its southernmost rookeries in Mexico to as far south as Acapulco, Mexico (16º 45.391' N, 99º 53.604' W), and the border between Mexico and Guatemala (14º 22.942' N, 92º 16.825' W) (Gallo-Reynoso & Ortega, 1986; Gallo-Reynoso & Solórzano, 1991).

An unprecedented *Z. californianus* long-distance movement occurred on 5 July 2014 at the San Benito (SB) Archipelago rookery in Baja California, Mexico (Figure 1), where ~7,500 sea lions of this species can usually be found during the breeding season (Angell, 2014). A marked adult male California sea lion was recorded by photographs, video, and GPS location. This individual had been hot-branded on the dorsum with the code U203 (Figure 2) and was observed holding a reproductive territory (Figure 3) on the central island of the archipelago (28º 18.482' N, 115º 33.737' W).

The U203 individual is part of a hot-branding program in Oregon, conducted by the Oregon Department of Fish and Wildlife (Wright et al., 2010). This program has tagged 1,590 California sea lions in the Columbia River (CR) during the past 18 y, and an additional 56 sea lions at Bonneville Dam, ~240 km upriver from the mouth of the CR.

This adult male sea lion was branded on 26 September 2011 in the CR (46º 12.636' N, 123º 59.011' W) at Astoria, Oregon. It was later observed in Astoria during the fall of 2011, and in northwestern Washington in June 2012, and was seen again in Astoria during the fall of 2012 and the spring of 2013. It was more recently sighted in Astoria on 29 May 2014, 37 d before being sighted at the SB rookery. The U203 individual is the first sea lion branded in

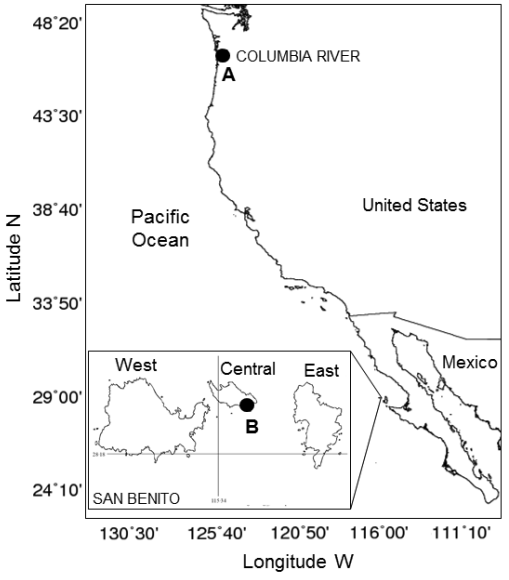

Figure 1. Location where U203 was marked (A: Columbia River, USA) and where it was resighted (B: San Benito Archipelago, Mexico) maintaining a territory

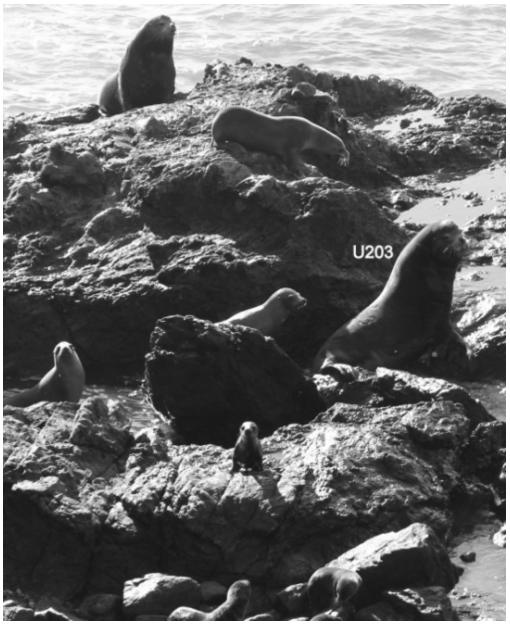

Figure 3. U203 male California sea lion holding a territory in the San Benito Central Island

Figure 2. U203 male California sea lion (*Zalophus californianus*) sighted in the San Benito Central Island on 5 July 2014

the CR that has been resighted in Mexico, providing an unprecedented behavioral display that must be added to what is known about this species. There is only one previous record of a male California sea lion hot-branded in Puget Sound, Washington, that was resighted on San Martín Island, Baja California (30º 29.011' N, 116º 7.060' W), in 1997 (P. Gearin, pers. comm., National Marine Mammal Laboratory/ AFSC/NOAA, Seattle, WA, 15 July 2014).

We propose two hypotheses to explain the presence of U203 at the SB Archipelago: (1) U203 was born at a California rookery; its migration pattern would usually take it to Oregon and Washington, but during the 2014 breeding season, it reached the SB rookery as an unusual event, where it was found displaying reproductive behavior. This hypothesis would be an exceptional counter to the philopatric character that has been typically assigned to this species, despite its capacity to travel great distances (Hernández-Camacho et al., 2008; Schramm et al., 2009); or (2) U203 was born in the SB Archipelago and migrated to the Columbia River, Oregon (a distance of 18º of latitude and over 2,000 km). This is the first time that U203 was observed on SB, although we cannot rule out that it had been previously unobserved. This hypothesis involves a distance approximately three or four times further than the ones established by Weise et al. (2006), twice the distance between the Channel Islands and south Oregon, but similar to the distance traveled by the male

Zalophus from San Miguel Island, California, to Puget Sound, Washington.

Whatever the circumstances that resulted in the presence of this individual at both CR and SB, this migratory behavior has not been previously reported, and it provides evidence of an extreme individual dispersal behavior. If U203 started migrating when it was last seen on 29 May in Astoria, and had just arrived at SB on the day it was first observed (5 July), this individual travelled approximately 2,200 km at a speed of ~60 km/d, or ~2.5 km/h, which is under the average speed established for the species (5.8 km/h; Feldkamp, 1987). These values are probably an underestimate, since we do not know the actual dates of departure from Astoria and arrival at SB.

An additional behavioral component of our report is the fact that this individual was observed maintaining a territory, a typical behavior of the *Zalophus* polygynous system (Peterson & Bartholomew, 1967). This event is relevant due to the potential reproductive role that this male could have within the rookery. We believe that the presence of sea lions at SB with an Oregon origin is rare and should not have a significant genetic influence (in terms of the number of males) on rookeries such as SB or others in the region. Studies based on mitochondrial DNA, such as that by Schramm et al. (2009), have separated the *Z. californianus* population that comprises the rookeries of the Channel Islands, California, and Coronado (near the border between U.S. and Mexico) from the population that encompasses the most important rookeries from the western coast of Baja California (SB included), approximately 500 km south of Coronado Island.

Other non-genetic evidence of the low interchange between rookeries is the notable difference in chlorinated hydrocarbon levels in the blubber of sea lions from southern California compared to those from Ensenada, Baja California, which are only ~350 km distant (Del Toro et al., 2006). These apparent boundaries between *Zalophus* populations are related to surrounding oceanographic patterns such as eddies, fronts, and jets (Hickey, 1998; Santamaría del Ángel et al., 2002; Espinosa-Carreón et al., 2004), which consolidate a structure or separation that probably reflects the species' adaptation to regional environmental conditions (Schramm et al., 2009).

The U203 sea lion is the first reported case of a sea lion branded in the CR, and then resighted in Mexico; there is no certainty regarding how many cases like this could have occurred in the past. We consider that this report is a contribution to the description of an extreme behavior in *Z. californianus*, not only in terms of dispersion but also of probable reproduction, similar to the one provided by Ortega-Ortiz et al. (2013), who registered a birth in Manzanillo, Mexico, ~900 km south of the southernmost rookeries and well outside the known pupping range for the species. The tracking and recording of these unusual sightings are important and should continue in order to document the movement of individuals, previously unknown, between distant locations that could have previously been considered not to have any connection.

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