

CHARACTERISTICS OF NESTS OF BELDING'S SAVANNAH SPARROW AT ESTERO PUNTA BANDA, MÉXICO

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Belding's Sparrow (*Passerculus sandwichensis beldingi*) is one of the 17 currently recognized subspecies of the Savannah Sparrow (Wheelwright and Rising 2008). It can be found in saltmarshes from Point Conception, California, to the estuary of Arroyo El Rosario, Baja California (Van Denburgh 1924, Zembal et al. 1988, Wheelwright and Rising 2008) and since 1974 has been designated as endangered by the California Department of Fish and Wildlife. Bradley (1994) suggested that this subspecies is largely isolated, with a low capability for dispersal, and Powell and Collier (1998) found no movement in or out of a marsh on San Diego Bay isolated by only 0.5 km from the next nearest marsh.

Here we describe the nests and habitat of Belding's Sparrow at Estero Punta Banda, Ramsar site no. 1604 (31° 44' N, 116° 37' W), in Baja California, México. This is a wetland with 300 ha of salt marshes on the Pacific coast, 13 km south of Ensenada.

From May to July of 2017, 2018, and 2019, Moreno-Higareda monitored Belding's Sparrow nests at Estero Punta Banda from 06:30 to 10:30 every third day during the reproductive season for a total of 120 hours/year over 30 days/year, covering 13 of 72 ha (18%) of the marsh available for nesting. Although around San Diego Belding's Sparrow begins nesting as early as 15 March (Unitt 2004, egg collections in the Western Foundation of Vertebrate Zoology, Camarillo, California), we found no evidence of nests before May; neither did we observe young of the year during our first observations. Our search efforts follow the dates reported by Zembal et al. (1988) and local nesting dates obtained from casual observations since 2014.

All nests found were on mounds above high tide levels, helping guide our searches. During this study we found 36 nests: three in 2017, 14 in 2018, and 19 in 2019. Overall, five nests were lost to high tides. Massey (1979) and Powell and Collier (1998) reported that these birds prefer to nest in middle and high marshes, building their nests in vegetation whose base may be flooded at high tide. The availability of high marsh that is currently rarely if ever flooded could prove critical to Belding's Sparrow in the future as sea levels are on the rise worldwide. At present we have no detailed maps of the highest points around Estero Punta Banda that could become the only suitable nesting habitat.

In Estero Punta Banda, where the most dominant and conspicuous plants are the pickleweeds *Salicornia pacifica* and *S. bigelovii* and the cordgrass *Spartina foliosa* (Delgado et al. 1992), nests were also built near saltwort (*Batis maritima*), Western Marsh Rosemary (*Limonium californicum*), Marsh Jaumea (*Jaumea carnosa*), Estuary Seablite (*Suaeda esteroa*), and Salt Marsh Bird's Beak (*Chloropyron maritimum maritimum*). No nests were recorded near or in a plant foreign to the salt marsh. Most invasive plants are above the higher marsh, and their cover in the marsh area is <

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3%. Notably, Belding's Sparrows used the same nesting sites from year to year, at the same spot. Whether the same pairs reoccupy nesting sites or the sites are determined and limited by their availability above the level of the high tide are questions to be answered in the future. On the San Benito Islands, Salinas-Ortiz et al. (2015) found nests of Savannah Sparrows of subspecies *sanctorum* reoccupied for a second time during the same reproductive season.

All nests found at Estero Punta Banda were consistently wineglass-shaped and built with dry material from the native grasses, desert saltgrass (*Distichlis spicata*) and California cordgrass (*Spartina foliosa*). Nests have a thick exterior layer attached to the various supporting plants. The nests' inner lining was of thinner material, forming a small disc at the bottom. Marbled Godwit (*Limosa fedoa*) feathers lined one nest, and other species' feathers were found in other nests (Figure 1). Salinas-Ortiz et al. (2015) reported gull feathers in the nests in the San Benito Islands; both subspecies used materials readily available locally. We found no human-made material in the nests at Estero Punta Banda (e.g., no synthetic fibers). All nests were placed between 5 and 18 cm from the ground. The mean exterior diameter was close to 7 cm, similar to that of Savannah Sparrow nests reported by Dixon (1972) for the Bay of Fundy, New Brunswick. Salinas-Ortiz et al. (2015) reported a mean internal diameter of 6.48 cm for three nests of *P. s. sanctorum* archived at the Universidad Autónoma de Baja California, Ensenada.

The nest characteristics are shared with subspecies *alaudinus*, found north of Point Conception to Humboldt Bay (Wheelwright and Rising 2008) and with sub-



FIGURE 1. Sequence of construction of a Belding's Sparrow nest at Estero Punta Banda. (1) Small disk used as the base for the whole nest. Over this, a wineglass-shaped nest is interwoven with nearby vegetation, and (2) lined with feathers, here Marbled Godwit (*Limosa fedoa*), but other species' feathers have been observed. (3) The eggs are laid in the shadow of dwarf saltwort (*Salicornia bigelovii*), and the nest is woven with blades of desert saltgrass (*Distichlis spicata*) and California cordgrass (*Spartina foliosa*). This nest had a diameter of 9 cm and was 20 cm above the ground.

Photos by Hiram Moreno-Higareda

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species *rostratus* from the Colorado River delta. This last subspecies uses Palmer's grass (*Distichlis palmeri*), abundant in the area, but its nests lack an inner lining (Bancroft 1927). Dixon (1972) mentioned that Savannah Sparrow nests in the Bay of Fundy contained "a few feathers."

At Estero Punta Banda, the Belding's Sparrow lays one to four eggs; the mean clutch size is 3.06 ± 0.05 [s.d.] eggs. The incubation period is 13 days; chicks stay in the nest 7–11 days. Only females incubate, regulating nest temperature (Davis et al. 1984); chick care in this subspecies is biparental.

Publications on nesting habits for the subspecies in California are abundant: Bradley (1973), Massey (1979), Zembal et al. (1988), Powell (1993), and Powell and Collier (1998), but we found no published literature for Baja California, México.

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