UNUSUAL RECORDS OF WATERBIRDS IN COSTA RICA: POSSIBLE CONNECTION TO EL NIÑO 2015–2016

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Costa Rica's marine environments can be split into two categories: habitats arrayed along approximately 1 470 km of coast and marine waters, encompassing approximately 589 683 km^2—including both the Caribbean Sea and the Pacific Ocean (Cortés & Werthmann 2009). In this large marine area, a total of 117 species of shorebirds and seabirds have been recorded, of which 18 are resident, 68 are migratory and 31 are considered accidental visitors (Sandoval & Sánchez 2015). The majority of these occurrences are from the Pacific Ocean side of the country (Stiles & Skutch 1989, Young & Zook 2016), which has a longer coastline (1 254 km) than that of the Caribbean, as well as a larger oceanic area (Cortés & Werthmann 2009) and a richer, more speciose seabird community (e.g. Spear & Ainley 1999, Ballance *et al.* 2006). While the composition of the Costa Rican shorebird and seabird communities is well known, we largely lack information on how climatic events such as the El Niño-Southern Oscillation (ENSO) may affect interannual variation in composition (Sandoval *et al*. 2010, Elizondo & Sandoval 2010). Therefore, our goal is to present new information about the occurrence of three seabirds (pelican and two gulls) and inland records of three shorebirds (including one pelagic shorebird) in Costa Rica, likely facilitated by the very intense ENSO of 2015–2016.

Fig. 1. Photographs documenting several of the records during 2015–2016 in seven Costa Rican localities: (A) *Pelecanus occidentalis*, at Arenal Lake, Alajuela province (Photo: Víctor Acosta). (B) *Calidris himantopus* and (C) *Phalaropus tricolor* at Coris, Cartago province (Photos: Chuck Mora and Daniel Martínez). (D) *Phalaropus fulicarius* and (E) *Xema sabini* at Matapalo beach, Guanacaste province (Photos: Anthony Cheke). (F) *Leucophaeus pipixcan*, at La Angostura reservoir, Cartago province (Photo: Víctor Acosta).

Brown Pelican *Pelecanus occidentalis*

On 29 January 2016, two individuals were photographed approximately 40 km inland on Arenal Lake, Alajuela Province (10°27′N, 84°50′W), flying close to the mouth of Río Chiquito (Fig. 1A). This is the first published inland record of this species in Costa Rica; this species is, otherwise, a common breeding resident on the Pacific coast (Stiles & Skutch 1989).

Stilt Sandpiper *Calidris himantopus*

One individual was photographed foraging in partially flooded grasslands at Coris, Cartago province (09°52′N, 83°59′W), on 21 November 2015 (Fig. 1B). This is the first inland record of this species in Costa Rica, where it is considered an uncommon migrant, observed mostly along the Pacific coast: on mudflats during low tide and at salt and shrimp ponds during high tide (Stiles & Skutch 1989, Sandoval 2013). Stilt Sandpipers commonly migrate across the eastern portion of North America and winter inland on the Pacific slope of South America (O'Brien *et al.* 2006, Chandler 2009).

Wilson's Phalarope *Phalaropus tricolor*

During the ninth Costa Rican shorebird census, undertaken in 2015, two individuals were seen on 16 August, six on 23 August and 10 on 20 September at a swine manure treatment plant at Coris. A single individual was also photographed at Coris on 21 November 2015 (Fig. 1C). These sightings represent the first records of this species inland in Costa Rica. Wilson's Phalarope is a common migrant along the Pacific coast of Costa Rica,

occurring mainly in adjacent salt ponds (Sandoval 2013). The species migrates inland across North America and winters on both coastal and inland ponds of South America (O'Brien *et al*. 2006, Chandler 2009).

Red Phalarope *Phalaropus fulicarius*

One moribund individual was collected on a sandy beach in Playa Islita, Guanacaste province (10°57′N, 84°41′W) on 18 October 2015 (deposited at Museo de Zoología Universidad de Costa Rica: MZUCR-5003). Other individuals in a weakened state were found (1) in a tropical dry forest (*ca*. 300 m offshore) at Estación Biológica Nancite (10°48′N, 85°42′W) on 30 November 2015 (MZUCR-5002) and (2) on a sandy beach in Playa Matapalo (10°31′N, 85°45′W) on 19 November 2015 (Fig. 1D). A fourth individual was observed, on 27 November 2015, foraging in salt ponds in Punta Morales, Puntarenas province (10°04′N, 84°56′W) (Unión de Ornitólogos 2015). These are the first records of the species in coastal habitats of Costa Rica. According to Young & Zook (2016), the lack of observations during the dry season suggests that this species is a migrant in Costa Rican offshore waters. This phalarope species winters offshore on the Pacific coast of South America, from Colombia to Chile (O'Brien *et al.* 2006, Chandler 2009).

Sabine's Gull *Xema sabini*

One moribund individual was photographed on a sandy beach in Matapalo on 19 November 2015 (Fig. 1E). This is the first onshore record in Costa Rica, where it is otherwise a common passage migrant in offshore waters from August to November and from April to May (Stiles & Skutch 1989, Young & Zook 2016); it winters in waters of the Humboldt Current and is rarely seen along the shore (Spear & Ainley 2008).

Franklin's Gull *Leucophaeus pipixcan*

Two individuals were photographed on the Angostura water reservoir, Cartago province (09°52′N, 83°39′W), on 23 November 2015 (Fig. 1F). This is the first inland record in Costa Rica. This species is a common passage migrant along the Pacific Coast of Costa Rica from October to November and from April to June (Stiles & Skutch 1989), nesting in North America and wintering along the Pacific coast of South America (Spear & Ainley 2008). Although it often uses inland habitats during migration, there are only a few records inland in Central America.

DISCUSSION

These records were reported during the winter migrations in 2015 and 2016; five of the six species were apparently migrating from their reproductive sites in North America to their wintering grounds on the Pacific coast of South America (Burger & Gochfeld 1996, Chandler 2009). However, the ENSOs of 2015–2016 were the strongest on record, and they displaced the Humboldt Current to the north (Instituto Meteorológico Nacional 2015). As a consequence, pelagic species such as the Red Phalarope and Sabine's Gull, which winter mainly in the Humboldt Current (Burger & Gochfeld 1996, Chandler 2009) and are known to occur farther north, accidentally came closer to shore (Murphy 1936). The ENSO also significantly decreased Costa Rican precipitation (Waylen *et al.* 1998), reducing, and in some cases, eliminating the availability of coastline wetlands (pers. obs.). This may have driven species such as Wilson's Phalarope and Stilt Sandpiper to move away from their regular migratory routes in search of adequate habitats.

According to our observations, climatic phenomena such as ENSOs influence the occurrence and distribution of Costa Rican seabirds and shorebirds. Given that ENSOs are apparently becoming more frequent and more powerful, monitoring programs are very important to determine their effects on the distribution and abundance of marine bird species that migrate and winter along the Pacific coast of America, an area highly influenced by this phenomenon (Murphy 1936).

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