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NOTES ON THE BREEDING STATUS OF LEAST TERN (*STERNULA ANTILLARUM*) ON ST. KITTS, WEST INDIES

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Abstract: The breeding population of the Least Tern (*Sternula antillarum*) in the Caribbean is small and requires monitoring due to anthropogenic disturbances of fragile marine and terrestrial ecosystems. In 2006 and 2007, surveys were conducted of all historical colony sites on the South East Peninsula salt pond system and along beaches during the breeding season (May–July). Three small nesting colonies of 2–32 adults were observed at three Atlantic beach sites (one historical, two new); however, none were observed at historical colony sites associated with a salt pond on the South East Peninsula. The current nesting sites are all located on or near the beach, indicating a shift in the type of habitat chosen for nesting, possibly due to disturbance by humans, livestock, or predators. Only one hatchling was recorded. Further studies are needed to identify and assess environmental, human, and predator related causes of reproductive failure.

Key words: colony shift, human disturbance, Least Tern, predators, St. Kitts, *Sternula antillarum*, wetlands

Resumen: NOTAS SOBRE EL ESTADO REPRODUCTIVO DE *STERNULA ANTILLARUM* EN ST. KITTS, CARIBE INSULAR. La población reproductiva de *Sternula antillarum* en el Caribe es pequeña y requiere de un seguimiento debido a los disturbios antropogénicos en los frágiles ecosistemas marinos y terrestres. En 2006 y 2007, durante la temporada de cría (mayo–julio), se muestrearon todos los sitios históricos del sistema de lagunas salobres y playas de la península sudeste donde se habían reportado colonias. Se registraron tres colonias reproductivas pequeñas de 2-32 adultos en tres sitios de playa del Atlántico (uno histórico, dos nuevos); sin embargo, no se observó ninguna colonia en los sitios históricos asociados con lagunas salobres en esta península. Todos los sitios de cría actuales están localizados en playas o cerca de estas, lo que indica un cambio en el tipo de hábitat seleccionado para la reproducción; posiblemente debido al disturbio provocado por humanos, ganado o depredadores. Durante los muestreos sólo se observó un pichón. Son necesarios estudios más profundos para identificar y evaluar las causas ambientales, humanas y los depredadores relacionados con el fracaso reproductivo. Palabras clave: cambio de colonias, disturbio humano, depredadores, St. Kitts, Sternula antillarum, humedales.

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Résumé : NOTES SUR LE STATUT DE REPRODUCTION DE LA PETITE STERNE (STERNULA ANTILLARUM) À SAINT-KITTS, ANTILLES. La population nicheuse de Petite sterne (*Sternula antillarum*) dans la Caraïbe est réduite et nécessite un suivi en raison des perturbations anthropiques des fragiles écosystèmes marins et terrestres. En 2006 et 2007, des enquêtes ont été menées pendant la saison de reproduction (mai à juillet) sur tous les sites de colonies historiques du système des étangs salés de la péninsule du sud-est ainsi que le long des plages. Trois petites colonies de reproduction de 2 à 32 adultes ont été observées sur trois sites des plages de l'Atlantique (un site historique et deux nouveaux sites), mais aucune n'a été observée sur les sites connus associés aux étangs salés de la péninsule du sud-est. Les sites de nidification actuels sont tous situés sur une plage ou à proximité d'une plage, ce qui indique un changement du type d'habitat choisi pour la nidification, probablement en raison de perturbations causées par l'homme, le bétail ou les prédateurs. Un seul poussin a été observé. D'autres études sont nécessaires pour identifier et évaluer les causes de l'échec de la reproduction liées à l'environnement, aux prédateurs et à l'homme

The Least Tern (*Sternula antillarum*) is currently not listed as an endangered species (BirdLife International 2013), but two North American subpopulations, the California Least Tern (*S. a. browni*) and the Interior Least Tern (*S. a. athalassos*), have been designated as federally endangered (Thompson *et al.* 1997). However, the validity of the current taxonomic subspecies classification is being challenged (Whittier *et al.* 2006). Although the Least Tern in the Caribbean is currently not considered threatened or endangered, the estimated number of breeding pairs is small (4936 pairs; Lowrie *et al.* 2012) and local populations may be declining (Jackson 2000, Schreiber and Lee 2000, Lombard *et al.* 2010).

Nesting by the Least Tern on St. Kitts has been documented on the South East Peninsula (Bond

Table 1. Survey results of Least Tern nesting sites on St. Kitts. A dash represents no data; a plus represents unquantified observation.

Location	Year-Month	Habitat	Adults	Nests	Eggs / Nest	Hatch-lings	Source
South East Peninsula Saltponds	1988-7	wetlands	20+	–	–	–	Steadman *et al.* 1997
Greatheed Pond	1936-6	mudflats	60[a]	+	+	+	Danforth 1936
	2004	mudflats	36	–	–	–	Collier and Brown 2004
Great Salt Pond	2004	mudflats	54	–	–	–	Collier and Brown 2004
Little Salt Pond	1985-7	mudflats	20	5	1–2	–	Arendt 1985
Mosquito Bay Pond	2004	mudflats	40	–	–	–	Collier and Brown 2004
Beaches							
Cayon to Keys	2006-6	beach	6	4	1–2	–	this study
	2007-6	beach	16	–	–	–	this study
Half Moon Bay	2007-5	beach	2	2	1–2	–	this study
North Frigate Bay	2007-5,6,7	dune	32	9	2	1	this study
Turtle Beach	1985-7	beach	?	1	2	–	Arendt 1985
Cockleshell Bay	1985-7	beach	32	–	–	–	Arendt 1985

[a]includes eggs and chicks

1929, Danforth 1936, Arendt 1985, Steadman *et al.* 1997, Collier and Brown 2006). However, no systematic survey, including all known historical Least Tern nesting sites, has been conducted. Similar to many other Caribbean islands, beach development and expansion of the tourism industry on St. Kitts proceeds at a rapid rate, thus exerting pressure on important local bird habitats (Collier and Brown 2009) and near shore marine resources (Stimmelmayr *et al*. 2010). The objective of our study is to provide baseline data that will facilitate future research and the development of management plans for the conservation of nesting Least Terns on St. Kitts.

STUDY AREA AND METHODS

St. Kitts (17°9' N, 62°45' W) is a small Caribbean island of volcanic origin that is part of the Lesser Antilles chain. Forests occurs mostly at higher elevations whereas agriculture predominates at lower elevations. The South East Peninsula is semi-arid with dry scrub woodland and small patches of mangroves adjacent to Great Salt Pond and Little Salt Pond. The majority of sandy beaches on St. Kitts are located on the peninsula. Extensive coral reefs and seagrass beds surround the peninsula and the main island.

During May–July 2006 and 2007, we surveyed 21 potential breeding sites of the Least Tern, including those where nesting had been previously reported by local birders and naturalists (Wilson 1999, K. Orchard pers. comm.). Surveyed sites included 12 sandy beaches (Cockleshell Bay, Majors Bay, Whitehouse Bay, South Friar's, Timothy Beach, Turtle Beach [also called Mosquito Bay], Sandbank, North Friar's, North Frigate Bay, Half Moon Bay, Conaree, and Cayon to Keys), nine coastal salt ponds (Majors Bay, Cockleshell Salt Pond, Mosquito Pond, Great Salt Pond, Little Salt Pond, South Friar's Salt Pond, Muddy Point Pond, Greatheed Pond [also called Canada Pond], Conaree Pond [also called Half Moon Pond]), and one artificial dune (North Frigate Bay). All sites were surveyed on at least three occasions. All surveys took place on clear days with high visibility. The survey of salt ponds consisted of circumnavigating the entire perimeter of a given salt pond when possible. During each survey, we recorded the numbers of adults, nests, and eggs per nest. To assess the current status of ecological threats at the nesting sites, we recorded data on the absence or presence of anthropogenic disturbances (i.e., human traffic, off-road vehicles, free-ranging livestock), mammalian or avian predators, and evidence of nest inundation by flooding.

RESULTS

Three Least Tern nesting colony sites, including a historical site (Cayon to Keys; K. Orchard pers.

Fig. 1. A Least Tern nesting at Cayon to Keys Beach, St. Kitts, in June 2006. Photo by Raphaela Stimmelmayr.

comm.) and two new sites (Half Moon Bay and North Frigate Bay), were documented on or near beaches (Table 1, Fig. 1). The terns chose open spaces that were in proximity to open water, and placed eggs adjacent to rubble or marine debris. With the exception of one nesting site (Half Moon Bay), nests were located well above the tide line. The data for each historical and new colony are summarized in Table 1.

Anthropogenic disturbance factors were observed at all surveyed sites, including the three currently active colony sites. These included foot traffic, off-road vehicle use (tire tracks), and free-ranging livestock. Potential predators observed included the Domestic Dog (*Canis lupus familiaris*), Domestic Cat (*Felis silvestris catus*), Small Asian Mongoose (*Herpestes javanicus*), Green Monkey (*Chloracebus sabeus*), Yellow-crowned Night-Heron (*Nyctanassa violacea*), and Laughing Gull (*Leucophaeus atricilla*). A sighting of a Red-tailed Hawk (*Buteo jamaicensis*) was limited to North Frigate Bay.

DISCUSSION

Our study confirms that Least Terns continue to nest on St. Kitts in a few scattered colonies. Individual colony size (2–32 adults) is in the lower range of previously reported numbers (up to 60 adults; Danforth 1936, Arendt 1985, Steadman *et al*. 1997, Collier and Brown 2006). The total number of breeding pairs in St. Kitts (three in 2006, 25 in 2007) constitutes about 0.06% (2006) and 0.5% (2007) of the Caribbean breeding pair estimate (4936 pairs; Lowrie *et al*. 2012). No nesting occurred at historical sites associated with Great Salt Pond and Little Salt Pond on the South East Peninsula (Table 1).

Despite the fact that a potential nesting population of 50 adults nested on three beaches on St. Kitts in 2007, we observed only a single hatchling, indicating that reproductive success is low. During an island-wide survey from 31 May to 4 June 2010, Lowrie *et al.* (2012) found 38 pairs at Great Salt Pond but failed to find any evidence of nesting.

The Least Tern nesting colonies on St. Kitts were located on or near beaches. The successful use of the temporary artificial dune area adjacent to North Frigate Bay emphasizes their adaptability in nest site selection (Jackson 2000) and suggests that provision of artificial nesting habitats adjacent to beaches could provide feasible wildlife management solutions to enhance nesting success on St. Kitts. Beach nesting by Least Terns has declined in both the USA and the Caribbean due to increased recreational use and habitat loss for development (Jackson 2000).

Least Terns are thought to show weak site tenacity, which allows them to easily shift colony sites in response to altered environmental and disturbance conditions (Atwood and Massey 1988, Burger 1984). Predation (Nisbet 1975) and anthropogenic disturbances (Carney and Sydeman 1999), including habitat loss, foot traffic, pets, off-road vehicles, and jet skis (Jackson 2000), have been identified as major causes of colony site shifts in seabird species. Disturbance at nesting habitats may significantly affect colony site dynamics on St. Kitts.

Predation on eggs and chicks by mammalian and avian predators has been implicated as a major cause of reproductive failure in Least Terns (Thompson *et al*. 1997). Potential mammalian predators, including three introduced species, were common on the South East Peninsula. These included the Small Indian Mongoose, which has been observed preying on Least Tern chicks in St. Kitts (Wilson 1999), the Green Monkey, which has been observed preying on Least Terns in St. Kitts (Raffaele *et al.* 1998), and the Domestic Cat.

Potential avian predators of the Least Tern in St. Kitts include the Yellow-crowned Night-Heron and Laughing Gull, both common species on St. Kitts (Steadman *et al*. 1997).

Tourism, land development, and free-ranging Cattle (*Bos primigenius*) and Goats (*Capra aegagrus hircus*) continue to increase in the South East Peninsula (K. Orchard pers. comm.). Trampling of nests and nest disturbance by free ranging livestock have been documented in the USA (Schulenberg

and Ptacek 1984, Beck *et al*. 1990) and may contribute to nest losses of Least Terns in St. Kitts.

We did not observe egg poaching by humans; however, it is thought to still occur in some villages (K. Orchard pers. communication). In the wider Caribbean, consumption of seabirds and their eggs has been a part of traditional subsistence activities (Wilson 1999, Udvardy *et al*. 1973, Lowrie *et al*. 2012).

An additional complication is the presence of nesting Leatherback Sea Turtles (*Dermochelys coriacea*) in Least Tern colonies. Cayon to Keys is a well established nesting beach for Leatherback Sea Turtles (Eckert and Honebrink 1992), with ongoing tagging and research by a local non-government organization (St. Kitts Sea Turtle Monitoring Network). In the USA and the Caribbean, the temporal overlap of nesting Least Terns (May–July) and Leatherback Sea Turtles (February–June) on the same beaches can result in disturbances to tern nests when nesting turtles and patrolling humans trample on tern eggs (Krogh and Schweitzer 1999, Garner *et al*. 2005). Future development of beach management procedures (e.g., directed nest site selection of terns; Marcus *et al*. 2007) may be needed to enhance the reproductive success of Least Terns.

In conclusion, a few scattered Least Tern colonies continue to nest on St. Kitts; however, these small nesting Least Tern colonies are exposed to a variety of ecological threats, including predators and anthropogenic disturbances. In light of the intensive tourism industry, ongoing marina developments, and hardening of coastlines on St. Kitts (Collier and Brown 2009, Stimmelmayr *et al*. 2010), Least Tern nesting habitats will likely continue to decline, and with it jeopardize the future of successful seabird nesting including Least Terns on St. Kitts.

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