

LEAST TERNS (*Sternula antillarum antillarum*) NESTING ON SHELL RAKES IN WACCASASSA BAY, FLORIDA

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Historically, Least Terns (*Sternula antillarum antillarum*) have nested on open, sandy coastal beaches and islands devoid of vegetation (Bent 1921). Preferred nesting substrate consists of sand or gravel with <20% shell (Gore 1996). As a result of habitat loss and degradation, Least Terns began to use alternative, anthropogenic habitats (e.g., rooftops, parking lots, and agricultural fields; Gochfeld 1983, Gore et al. 2007), some of which became important nesting habitat in Florida (Gore and Kinnison 1991, Forsy and Borboen-Abrams 2006). Gravel rooftops are being converted to new roofing materials that are smoother, less expensive, more energy-efficient and easier to install (DeVries and Forsy 2004). In 2010 the federal government began offering tax incentives for conversion of rooftops from gravel to these new materials (EPA 2013), which do not provide suitable nesting substrate for Least Terns; reducing the already limited nesting habitat for the species in Florida.

The study area consisted of nearshore oyster rakes and islands near Cedar Key, Levy County, Florida (Fig. 1). Surveys were focused on the Corrigan's Reef complex (hereafter, "Corrigan's"), Gomez Key, McClamory Key, Rattlesnake Key, Derrick Key, and Dog Island. Corrigan's is a collection of islands consisting of oyster rakes, which are composed of both living and dead oysters. At low tide some of the exposed rakes are connected by flats. The other islands are a mix of oysters, open sand and vegetated marsh.

Least Terns had never been documented nesting in Waccasassa Bay, near Cedar Key, Florida. The nearest Least Tern colony is 27 km south, on the Marjorie Harris Carr Cross Florida Greenway spoil islands, which consist of limestone, sand, and shell hash. To the north, the nearest colony is 162 km away, on Alligator Point at the John S. Phipps Preserve, Franklin County, where the nesting substrate is a mixture of sand and fine shell hash. At those locations, birds nest in open sandy areas, but in Waccasassa Bay, where there are no open sandy areas, they nest on weathered oyster shell (Fig. 2).

We conducted surveys during the 2011, 2012, and 2014 nesting seasons. We followed the Breeding Bird Protocol for Florida's Seabirds and Shorebirds (BBP), provided by the Florida Fish and Wildlife Conservation Commission (FWC 2013), and collected data when weather and tides permitted. In 2011, eight surveys were conducted, from 21 April to 4 August; in 2012, nine surveys were conducted, from 21 April to 8 August; and in 2014, five surveys were conducted, from 1 April to 8 July. We surveyed within a two-hour window on either side of the predicted high tide, due to tide-dependant accessibility. We first observed islands from a boat. When possible we conducted direct counts of adults, chicks, and nests, but to minimize disturbance, we spent as little time as possible in the colony. We recorded a GPS location for each nest in 2011 and 2014. Due to time constraints in 2012, we estimated the number of nests by counting incubating adults from the boat.

We observed one colony during the 2011 breeding season. On 13 May, individuals were seen copulating at the eastern end of Corrigan's. We found two nests 12 days later, on 25 May, but both had failed by the 8 June survey, during which no adult Least

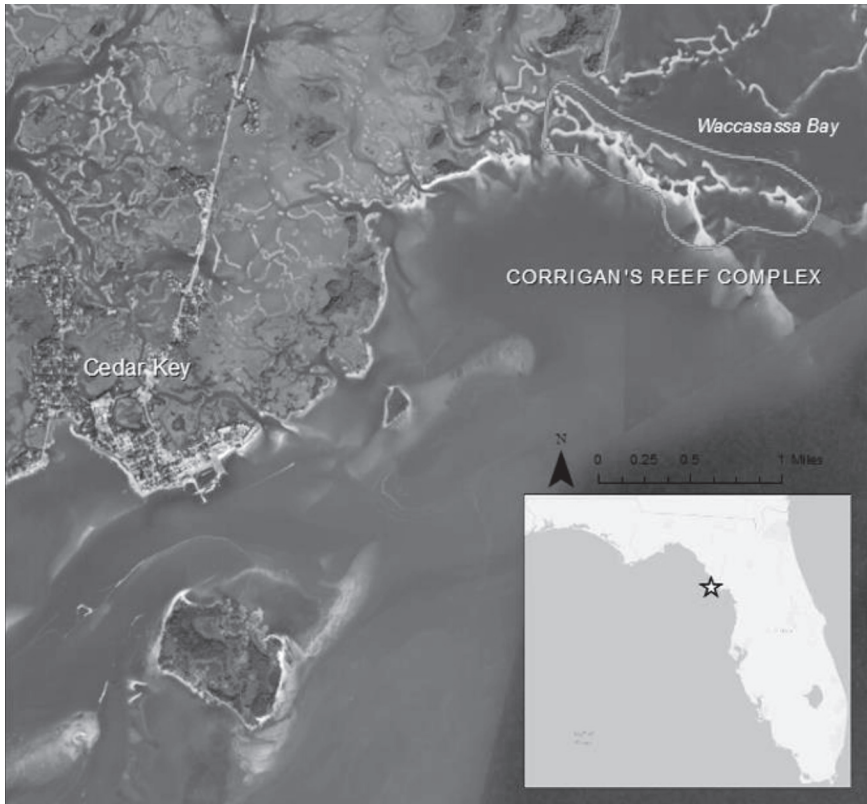


Figure 1. Map of Corrigan's Reef complex and west edge of Waccasassa Bay, Florida.

Terns were observed on the island. We suspect that these nests were abandoned due to overwash caused by strong south-southwest winds in combination with new moon tides. The eggs had been abandoned, and one was found in the storm-tide wrack line, approximately 2 meters outside of the nest bowl. On the island at the northwestern end of Corrigan's (Fig. 3), we observed 14 pairs of terns with nest scrapes. We found no eggs and observed no further nesting attempts that season. No birds were present in the area of the colony on 7 July.

In 2012, terns returned to the northwestern end of Corrigan's. Nesting was confirmed on 30 April. On 4 June we observed five downy chicks 2–5 days old. Tropical Storm Debby made landfall on 26 June just north of Cedar Key, Florida. According to the National Oceanic and Atmospheric Administration's observed water levels for Cedar Key (NOAA 2013), the islands were inundated for four days (Mean Lower Low Water >4 ft), leaving oyster rakes scoured clean of vegetation. In some places oyster shell had been moved or completely washed away. It is unlikely that chicks were flight-capable and could have survived the storm. Least Terns were not observed reneesting after this weather event.

In 2014, we conducted monthly surveys beginning in April and concluding in July. We saw no adult Least Terns on the 1 April survey, but observed nesting on 16 May. On 10 June we located 10 nests with 1 or 2 eggs and observed three downy chicks (5–7 days



Figures 2 and 3. Least Tern nest on weathered shell (left). Northwestern island of Corrigan's Reef (right).

old) and one flight-capable chick within the colony. We saw no nests or chicks on 8 July indicating colony abandonment for the breeding season.

We observed a shift in nesting habitat by Least Terns. Future breeding surveys need to be conducted in areas of Florida with similar habitats that were historically devoid of nesting Least Tern. Without marked birds we are unable to know where these birds nested in previous years and can only speculate the cause for immigration. In addition, we have learned that the colony at Corrigan's appears to be a site used during the early nesting season and abandoned by early to mid-July. More intensive surveys are needed to determine the cause of colony abandonment.

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