

FINAL REPORT

Project Title: Restoring Florida's Shorebird and Seabird Populations – Phase 1 (FL)

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Project Period: February 21, 2019 to December 31, 2019

For the 2019 shorebird season, monitoring was accomplished at Gulf Islands National Seashore (GINS) due to a collaborative effort between FWRI and NPS staff and volunteers. FWRI dedicated one seasonal shorebird biologist (Emily Hunter) to assist GINS biologists for 6 months (or 1020 hours) and to fulfill state data entry requirements as part of the [Florida Shorebird Database](#) (FSD) and associated protocol. The objectives behind this collaborative effort were to:

- 1) Conduct full surveys during the FSD monthly survey window to provide monthly abundance snapshots for all focal shorebird species at a statewide level (American oystercatcher, black skimmer, least tern, snowy plover, and Wilson's plover). FWRI is developing population estimates for FL and data from GINS is critical.
- 2) Determine the total number of breeding adults for solitary species
- 3) Estimate the total number of fledglings produced for solitary species
- 4) Determine nesting distribution and hatch rates for all focal species at GINS units
- 5) Assess predator pressures at each of the units based on observed tracks (e.g., mammals), individuals (e.g., avian predators), or predation events at nests.

Given the limited availability of staff and the amount of potential shorebird habitat available at Gulf Islands, full surveys of each Gulf Islands unit (Santa Rosa, Fort Pickens, and Perdido Key) were only completed once per month, coinciding with the FSD monthly survey window (see survey window [schedule](#)). More frequent, weekly surveys were conducted at Fort Pickens to inform predation management strategies for the 2020 season. For the remaining

management unites, Santa Rosa and Perdido Key, the focus was on spot checking known nests, broods, and territories for solitary species and reoccurring counts at known colonial.

FSD Monthly Windows Counts

During the 2019 season, all 6 count windows, March to August were completed at all 3 GINS units.

A total of 784 shorebird nests were documented on GINS beaches (Table 1, Figure 1-3). Total numbers should be viewed as a minimum, particularly for least terns. The nest estimate for least terns is based on the maximum number of nests documented on a single visit per colony and does not reflect nests that occurred prior to the high-count or nests initiated afterwards. There were 42 total colonies and 693 nests. The total includes established colonies and nest that were considered as outliers (i.e., scattering of low-density tern nests between larger colonies). A total of 9 black skimmer nests were documented in 2019, no skimmer nests were documented the previous 2018 season. A total of 74 snowy plover breeding attempts were documented. Eight Wilson's plover nests were documented. For both species, these should be viewed as a minimum as nests could have disappeared between visits due to predation and broods may have failed from hatched nests before they were documented by observers. Total nest estimates for both species include surprise broods in addition to confirmed nest sites.

The data collected as part of the window counts will be combined with data collected statewide for population estimates for the five focal shorebird species mentioned above. Estimates will be available by the end of 2020 and will be disseminated to partners, including GINS.

Table 1. Total number of nesting attempts documented by species and the source of data for 2019.

Species	Total Nests	Source
Least Tern	693	Summed nests count by 21-day intervals, or incubation period.
Black Skimmer	9	Summed nests count by 21-day intervals, or incubation period.
Snowy Plover	74	Ground count- based on located nests and surprise broods

Wilson's Plover	8	Ground count- based on located nests and surprise broods
Total	784	

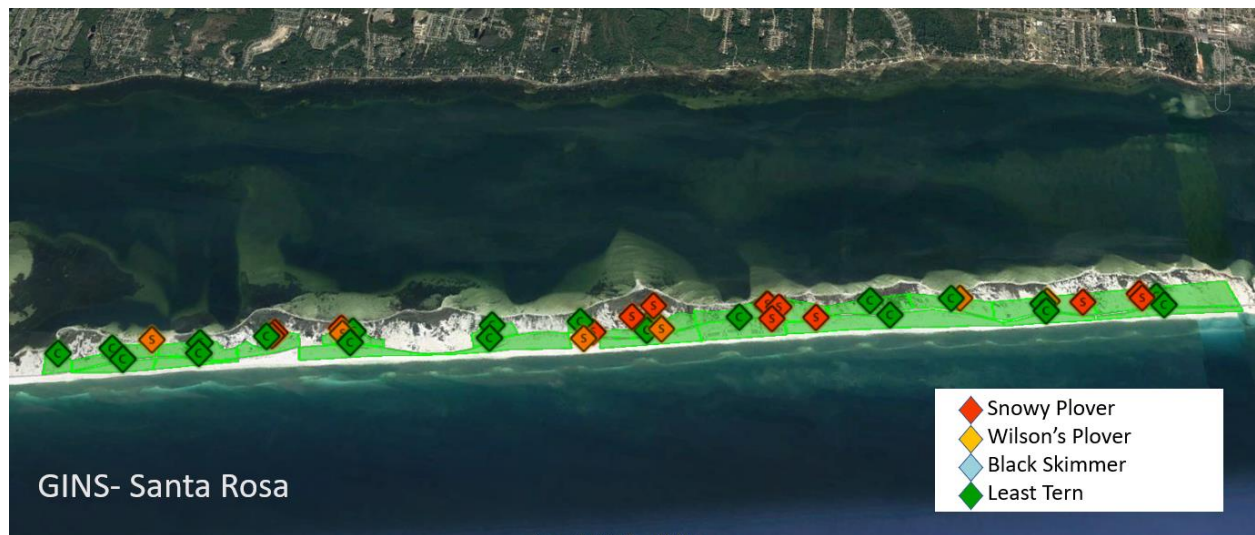
Figure 1. Nesting distribution for GINS- Perdido Key, 2019. *Map also shows nearby Robertson Island.



Figure 2. Nesting distribution for GINS- Fort Pickens, 2019.



Figure 3. Nesting distribution for GINS- Santa Rosa, 2019.



Determine the total number of breeding adults for solitary species

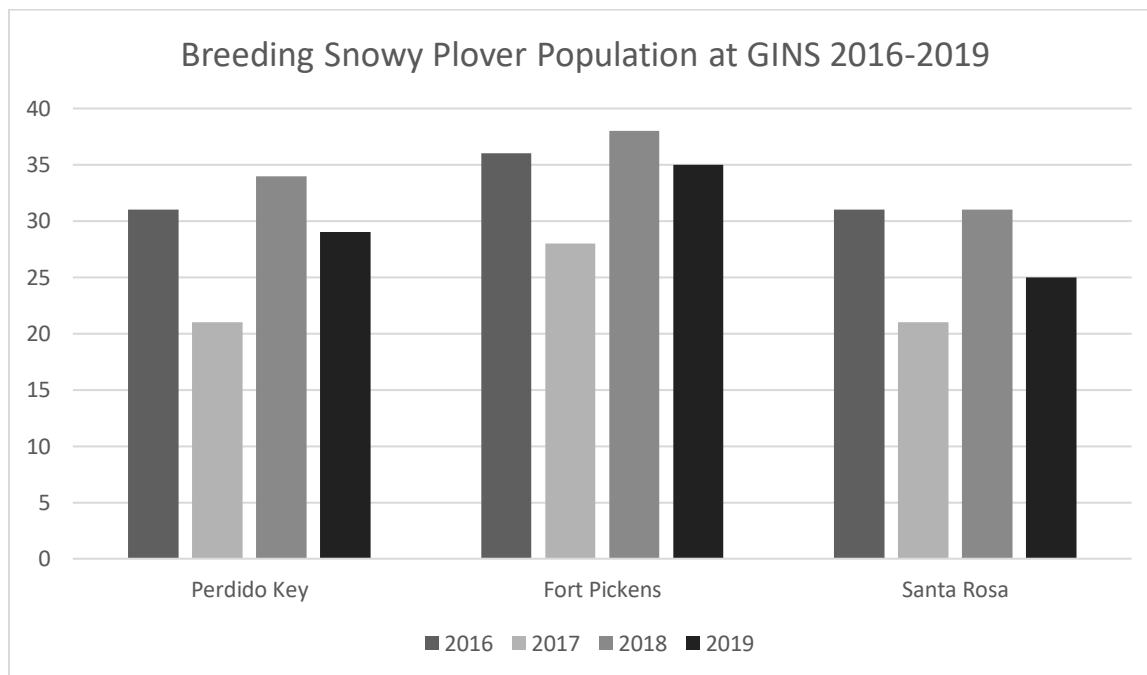
To assess productivity for solitary nesting species, it is necessary to have an estimate for the local breeding population. Estimating the local breeding population enables the assessment of trends in the breeding population over time and helps inform subsequent management objectives. Many of the GINS snowy plover are individually color banded from a prior research project on GINS and from recruitment from regional state parks. The presence of banded individuals in the population provides an opportunity for greater accuracy in developing estimates. Solitary species can be especially difficult to estimate because of their polygynous breeding behavior, movement capabilities from nests to brood-rearing areas and the tendency to nest on multiple routes depending on local predation pressures.

A total of 89 snowy plover and 16 Wilson's plover breeding adults were documented at GINS during the 2019 season (Table 2.) All three park units supported similar numbers of breeding snowy plovers, with Fort Pickens supporting the highest. In comparison all Wilson's plover were documented at the Santa Rose unit, Snowy plover numbers seem lower but consistent with prior estimates (Figure 4). 2019 estimates are similar to 2017, both seasons had a lower frequency of survey coverage and the dip in adult counts likely reflects detection.

Table 2. The total number of breeding snowy and Wilson's plover breeding adults at the GINS units in 2019.

Species	Site	Female	Male	Total	Total Combined
Snowy plover	Perdido Key	16	13	29	89
	Fort Pickens	18	17	35	
	Santa Rosa	12	13	25	
Wilson's plover	Santa Rosa	8	8	16	16

Figure 4. The breeding snowy plover population estimate at each GINS unit for 2016 and 2019.



Determine hatch rates at GINS units

Determining hatch rates at any site where shorebirds occur will provide an indicator of management needs. However, depending on survey coverage, there is often a strong bias towards finding successful nests. This is because there are often more opportunities to find a successful nest compared to failed nests. For that reason, the hatch rates listed here should be viewed cautiously. Full surveys were completed bi-weekly to monthly during this

project. It is highly likely that nests were initiated and subsequently failed between the monthly surveys.

For solitary nesting species hatch rates are based on direct observations at the nest (Table 3). Hatch rates were unexpectedly high for the second year in a row compared to prior nesting season, with 58% for snowy plover and 88% for Wilson's plover. Wilson's plovers' nests are extremely challenging to locate and likely represent an underestimate of nesting attempts at GINS. Fort Pickens had the lowest hatch rates.

Table 3. Hatch rate for solitary shorebird species at GINS during the 2019 breeding season.

Species	Site	Hatched	Total	Hatch Rate	Total Combined
Snowy plover	Perdido Key	14	23	61%	58%
	Fort Pickens	18	35	51%	
	Santa Rosa	10	16	63%	
Wilson's plover	Santa Rosa	7	8	88%	88%

While solitary shorebirds appeared to have high hatch rates at GINS in 2018 and 2019, least terns did not. For least terns, we present the maximum number of chicks observed at each colony. This count is likely an underestimate. Using this method, a total of 84 downy least tern chicks were observed from 693 documented nests. If we assume 1 chick equals 1 hatched nest, this is a 12.1% hatch rate. A maximum of 4 black skimmer chicks were documented, for a 36.0% hatch rate. Additional monitoring is needed for colonies at the park to develop improved estimates of nest fate, determine sources of loss and develop management recommendations.

Estimate the total number of fledglings produced for solitary species

In addition to looking at nest hatch rates, it is critical to assess overall productivity, or the total number of chicks to fledge (Table 4). It is important to quantify the total number of fledglings produced based on the breeding population. In general, it is recommended that plovers produce an average of 1 fledgling per male over a 5-year period. At GINS, snowy plovers fledged an average of 0.43 chicks per male (range of 0.15 to 0.62) and Wilson's plovers fledged an average of 0.88 chicks per male. While these values are less than the recommended value, they are higher than rates observed in prior years at GINS and compared to rates at adjacent breeding areas (e.g., panhandle state parks). However, the

productivity for Santa Rosa dropped from 0.59 in 2018 to 0.15 in 2019. Additional monitoring at Santa Rosa may be needed to assess chick survival and associated management strategies. Accurate estimates of fledglings were possible at GINS because a large percentage of adult plovers are banded.

Least tern estimates were calculated by adding the maximum number of least tern fledgling observed every 14 days and likely represent an underestimate for GINS. However, this estimate indicates that productivity for least terns is alarmingly low and of management concern.

Table 4. The total number of fledglings produced per GINS unit in 2019.

Species	Site	Fledged	Fledge Combined	Fledgling/Male	Fledgling/Male Combined
Snowy Plover	Perdido Key	8	19	0.62	0.43
	Fort Pickens	9		0.53	
	Santa Rosa	2		0.15	
Wilson's plover	Santa Rosa	7	7	0.88	0.88
Least Tern	Combined	68	68	Undetermined	Undetermined
Black Skimmer	Fort Pickens	1	1	Undetermined	Undetermined
Total	95				

Assess predator pressures at each of the units based on observed tracks (e.g., mammals), individuals (e.g., avian predators), or predation events at nests.

Based on surveys conducted at GINS in 2019, predation was the primary source of nest failure, with evidence of loss by coyote, fish crow, ghost crab. Ghost crabs and unknown were the major sources of predation documented (Figure 5). The dominant predator by unit were, fish crow at Fort Pickens, unknown at Perdido Key, and coyote at Santa Rosa. Coyotes appeared to be the primary predator responsible for loss of least tern colonies.

Predators documented in the habitat included American kestrel, coyote, domestic dog, fish crow, gull-billed tern, loggerhead shrike, merlin, northern harrier, Virginia opossum, raccoon, and yellow-crowned night heron. Predators documented were through tracking evidence

observed in the nesting habitat and individual predators observed. Coyote, dogs, and fish crow were the three most frequently documented predators in the nesting habitat.

Figure 5. Sources of predation for snowy plover nests at Gulf Islands in 2019.

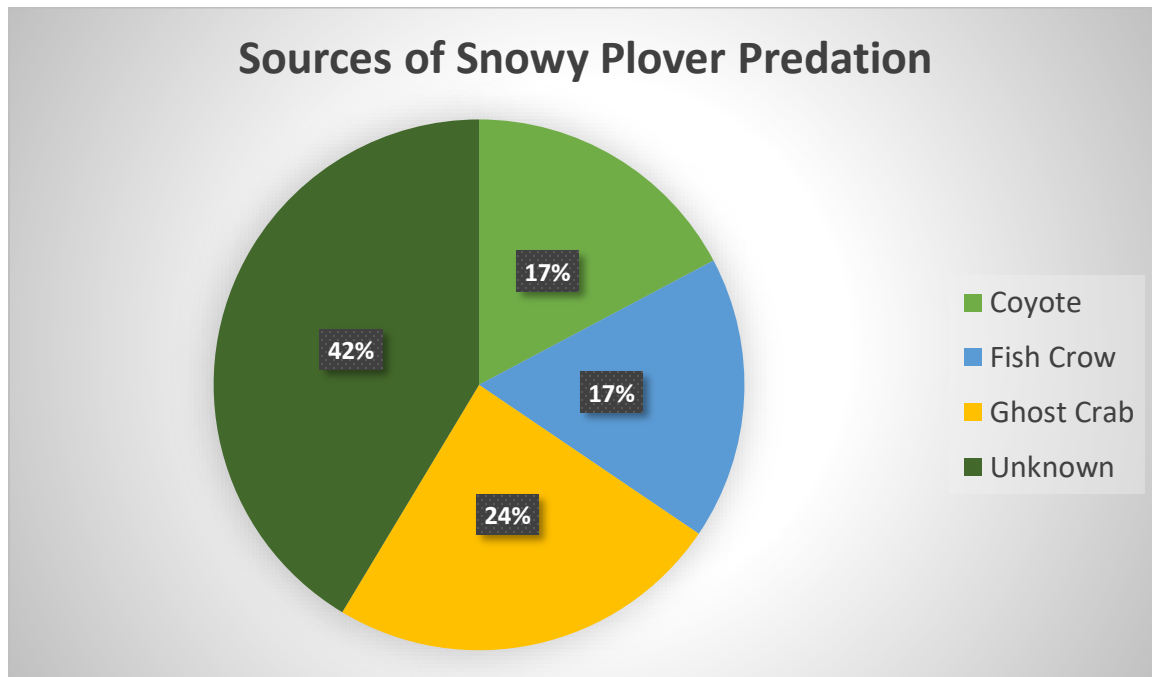
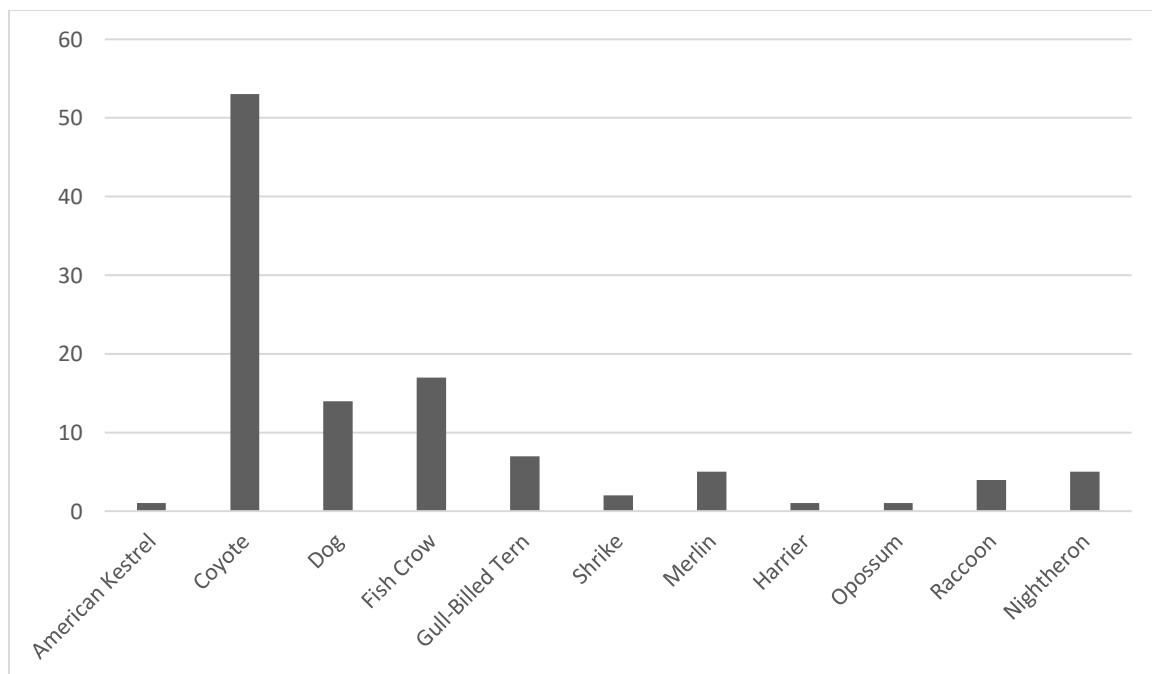


Figure 6. Survey frequency of predators by species at GINS in 2019



Recommendations

We recommend that GINS focus survey efforts on improving the general understanding of predator species in the habitat to inform predation management. Predator management is most effective when it occurs in an adaptive framework, targeting the individual predators that are responsible for predation. Based on current data, predation management should focus on ghost crab, coyote and fish crow. FWC has guidance on predator tracking and nest fate determination that can be made available to GINS field staff if needed.

We encourage the increased use of game cameras to increase assessments of nesting outcomes. However, we also encourage that game camera placement follows strategies aimed at reducing unintended impacts to nests. Strategies include camouflaging cameras, placing cameras 3-10 meters from active nests, no glow IR flash only, etc. FWC is currently working on game camera guidance and a copy will be made available to GINS when available.

To better understand productivity and management needs for shorebirds at GINS, we recommend increasing the frequency of full surveys at all managed units. FWC recommends weekly surveys. To achieve this level of monitoring, we recommend pursuing funding for a dedicated shorebird monitoring team.

We recommend GINS consider focusing shorebird protection efforts at the habitat level. By protecting habitat rather than nests posting provides critical connectivity for solitary nesting species between nesting and brood-rearing areas. Habitat-level posting provides additional protection for non-breeding shorebird species and protection of the beach/dune natural community critical to other coastal reliant imperiled species (e.g., beach mice, sea turtles).