Black-capped Petrel Nest Monitoring in Parc National Naturel La Visite, Haiti: 2019 Breeding Season

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ABSTRACT: *Between March and July 2019, we monitored nesting success of Black-capped Petrels near Tet Opak in Parc National Naturel La Visite, Haiti. We located and followed 42 nests. Thirty-three of the nests had an egg/chick, of which 15 chicks successfully fledged, 13 were preyed on by a mammal, and five were abandoned by the adult. The remaining nine nests were blocked by tree fern cutting debris prior to egg laying and eliminated access to the nest cavities. At the nest colony, we observed cats, black rats, and mongoose on camera trap recordings.*

INTRODUCTION:

The Black-capped Petrel (*Pterodroma hasitata*), known locally on Hispaniola as the "*Diablotin*" or "*Chewan*" is a seabird known to nest only in the Caribbean. Historically, the species was documented nesting on Hispaniola as well as numerous smaller islands in the Lesser Antilles, however due to the removal of nesting habitat, the introduction of mammals and overhunting throughout its range, the current known nesting range of the species is limited to Hispaniola.

On Hispaniola, there are several petrel colonies, scattered among the main mountain ranges on the island, including (Haiti) Massif de la Hotte and Massif de la Selle and (Dominican Republic) Sierra de Bahoruco and Cordillera Central. Following RADAR surveys for petrels throughout Hispaniola between 2012-2017, we identified Parc National Naturel La Visite to have 85% (~1,900 pairs) of the island-wide petrel population. This large population identified the national park as critical habitat to breeding Black-capped Petrels.

In 2018, to better understand breeding success and conservation issues within this critical breeding area, we began monitoring a nesting colony of Black-capped Petrels near Tet Opak in La Visite. During that first year of monitoring, we located 11 active petrel nests and determined that three chicks fledged, a breeding success rate of 0.272. It was unclear, during this first year of monitoring, why the breeding success was so low, and we prioritized understanding these factors, during our nest monitoring plans in 2019.

Between March and July 2019, we carried out Black-capped Petrel nest monitoring research in Parc National Naturel La Visite, Haiti (PNLV). Our goals were to (1) monitor known nesting colonies near Tet Opak and (2) to locate new Black-capped Petrel nest colonies within the national park.

METHODS:

Within our nest monitoring program, our main objectives were to (1) locate all nests within the Tet Opak Black-capped Petrel nest colony, (2) check the contents of each known nest monthly, (3) determine the breeding success of each known nest within the nest colony and (4) determine the threats to birds and breeding success within and adjacent to the nest colony.

Within our program to locate new Black-capped Petrel nest colonies, our main goal was to explore the recently un-searched sections of the La Visite Escarpment within La Visite National Park, that historically

had petrel flight and calling activity (determined through both audio/visual and radar surveys) and locate evidence of breeding petrels by carrying our visual and olfactory searches of potential areas.

Nest Monitoring Method:
During the first visit of the season to the colony in March 2019, we revisited each known petrel nest crevice from 2018, as well as searched for new nest crevices within the same valley. Once a cavity was located and identified as a nest, we labeled a rock near the nest with a distinctive number and then recorded the nest information in a field notebook (nest status and GPS coordinates).

We returned monthly, between March and July, to the study site, inspected each known nest cavity, and recorded its contents and status/relative feathering status of chicks. When needed, we used an endoscope to determine the contents for the nest cavity. Within the nest study site, in addition to monitoring breeding success, we also collected feathers located in the nest cavity. The feathers were saved in an envelope labeled with the nest number, collector name, date of collection and place collected. The feathers will be used for future genetic study.

Furthermore, we deployed camera traps (BUSHNELL 24MP with *32-GB SD* card.) at ten active nests within the colony. The camera traps allowed us to monitor nests remotely and document activity at the nest site. On the devices, we preset the sensor level on auto to capture images on hybrid mode (2 photos and a 10-second video) with a 10-second interval between captures and allowed capture during all 24-hours each day. The image format was set on full screen while the video was calibrated to record 1280 x 720 image size.

Nest Search Method:
Starting in March and going through July 2019, we spent three days each month searching new areas along the La Visite Escarpment, for additional nesting area. At each area that was accessible by foot, we walked through the forested escarpment, looking for natural rock crevices or burrows dug into the hillside. Once a cavity was located, we inspected the nest entrance to see if it was free of spider webs and vegetation (a sign of activity in the burrow), looked for petrel feathers or bird feces at the entrance, as well as smelled the burrow to see if it smelled like fish (a sign that petrels were using the burrow). Finally, we used a digital endoscope to inspect the inner part of the nest cavity for additional evidence of nest occupation such as an egg, petrel adult, or petrel chick. If a cavity was located, we labeled a rock near the nest with a distinctive number and then recorded the nest information in a field notebook (nest status and GPS coordinates).

RESULTS:
Nest Colony Searches:
No new nest colony sites were located along the La Visite Escarpment in 2019.

Nest Monitoring:
We located and monitored three sub-colony areas adjacent to Tèt Opak in La Visite National Park. These colonies are all within one large main drainage with small ridges separating the sub-colonies. (Table 01)

We located 42 Black-capped Petrel nest cavities. Of these 42 nests, 29 were initially located and monitored in 2018 and re-located in 2019, while 13 of the nests were newly located in 2019. Of these 42 nest cavities, nine were blocked by tree fern cuttings prior to egg laying and were therefore not used further during 2019. Thirty-three nests were considered “active” (‘active’ = an egg and/or a chick were observed). Of the 33 active nests; 15 chicks fledged successfully, 13 nesting efforts failed due to predation, and five were abandoned for unknown reasons. Fledging success for the greater Tet Opak petrel colony was 0.454 (n=33).

DISCUSSION:
While overall breeding success during 2019 (0.454) was up from 2018 (0.272), the conservation threats encountered during our first year of the project remained: forest fires, tree fern harvest, and introduced predators. All three conservation threats had large impacts during the 2019 breeding season; with a forest fire reportedly killing hundreds of adult Black-capped Petrels, introduced predators causing the failure of almost half the tracked nests, and tree fern cuttings blocking almost a quarter of tracked petrel nests.

It should be noted that the sample size of nests followed in 2019 (n=33), was three times larger than in 2018 (n=11), and this substantial difference in nests followed might have been a factor in the considerable difference in observed nesting success between years.

In 2018, the breeding season was extremely rainy, and we noted several large rainstorms associated with times of documented petrel nest failures. Comparatively, in 2019, the breeding season was very dry. The dry conditions led to drought-like conditions in the national park, in turn leading farmers and ranchers who work land in the park to clear forested areas for additional land to use. The common method to clear forests in La Visite is to burn them, a practice which is hazardous to flying petrels, as they are often attracted to and disoriented by these fire events and frequently are documented crashing into them.

During our monitoring efforts, we identified numerous conservation threats to nesting petrels, including fires, tree fern cuttings, and introduced mammals. We provide some specific thoughts on each issue here:

FIRES:
During our visit in April, we observed a large forest fire adjacent to the Tet Opak petrel nest colony area. The fire had been starting as part of a wedding ritual that links starting forest fires to the health of new couples. The fire, in this case, did not reach the nest colony, however, residents that lived near the ceremony reported that "hundreds" of adult Black-capped Petrels, attracted to the fire, crashed into the fire and died. The five petrel nests that were abandoned this year were abandoned during this same time period and it is possible that these birds were some of the hundreds that died during this event. Additional fires were documented throughout the breeding season, with farmers and ranchers using slash and burn techniques to clear forested areas. Prior to and during the nesting season, we will meet with the community leaders to discuss with them the best approaches to create awareness in the community regarding fire danger and options to reduce the practice of clearing forests with fire. (Table 01)

TREE FERN CUTTINGS:
As per our observations in 2018, there is a local industry in La Visite National Park where Tree Ferns are cut down and brought to markets in Port au Prince. This activity removes much needed root systems as well as soil/water retention systems for the forest. Also, once the tree ferns are fallen, they are cut up into small bricks which are stacked on the forest floor. During 2018 and 2019, these tree-fern cuttings were incidentally placed in front of nine known petrel nest cavities, in turn, blocking any chance for petrels to use these burrows for a nest. These nine nests crevices were active petrel nests in 2018. To offset these impacts in 2020, we plan to clear nest entrances prior to the nesting season and work to keep them clear through the season.

INTRODUCED MAMMALS:
Once our ten camera traps were deployed at petrel nests, we began to document the presence of introduced mammals, at each nest that cameras were deployed. At all ten petrel nests, during each month, we documented the presence of house cats, black rats, mongoose, and dogs. Additionally, we documented humans in the areas of the nests but never documented them looking into nest burrows. To offset the

impacts of introduced predators, we plan on trapping mammals prior to the season with live and kill traps and plan to do lower impact trapping through the season that will keep mammal numbers low but not interfere with nesting petrels.

FUTURE RESEARCH AND CONSERVATION PLANS:
In 2020, we plan to continue Black-capped Petrel nest monitoring in La Visite National Park, reduce the threats of mammalian predators to nesting petrels by trapping mammals in the nesting colony, reduce tree fern clearing and impacts of clearing in petrel nesting areas, and to find solutions to fire use as a tool to clear forests in the national park. Further, we hope to carry out a socio-economic study within the human communities near the petrel nesting grounds, that will inform future conservation planning in the region. We also plan on incorporating a program to reduce petrel tower strikes in the park as well as work with communities on strategies to safely release grounded petrels.

With approximately 85% of the Hispaniola population of Black-capped Petrels nesting in La Visite National Park, the conservation measures we incorporate in the park will have a substantial impact on the island-wide population of petrels.

TABLES:

Table 01. Coordinates of nest colony sites, new area searched for nesting petrels, and area we observed the most forest fires during 2019 in La Visite National Park.

Nest Site	Latitude	Longitude	Altitude (meter)
Site-1	18.351463°	-72.236568°	2142
Site-2	18.350923°	-72.231261°	2142
Site-3	18.35090°	-72.23165°	2249
Forest Fire Area	18.347831°	-72.255816°	2152
Potential nesting site visited (no nests located)	18.349459°	-72.213839°	2000

IMAGES

La Visite National Park, Haiti. The Black-capped Petrel colony is on the steep north facing slope of this escarpment.

EPIC field biologist, Tinio Louis, rappelling down to check Black-capped Petrel nest burrows

Anderson Jean using an endoscope to check the contents of a Black-capped Petrel nest in La Visite National Park.

Forest fire burning the forest adjacent to known Black-capped Petrel nest colony in La Visite National Park.

Tree fern cuttings stacked on the top of the Black-capped Petrel nesting escarpment in La Visite National Park

Cat investigating a Black-capped Petrel nest burrow in La Visite National Park

Map of Black-capped Petrel colony in La Visite National Park, Haiti