Black-capped Petrel Nest Monitoring in Parc National La Visite, Haiti: 2018 Breeding Season

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ABSTRACT - *From February through July 2018, following up on previous radar surveys, we carried out nest search surveys and breeding monitoring of Black-capped Petrels in La Visite National Park. Our goal was to survey the La Visite Escarpment, a prominent forested north-facing mountainside where petrel nests have been found in the past, for all areas with petrel nests. Once nests were located, we had the additional goal of monitoring breeding success in 25 nests during monthly visits to each nest from the time of nest discovery to determination of nest success or failure. Overall, we located and monitored 29 Black-capped Petrel nests within La Visite National Park, specifically at Tête Opaque.*

INTRODUCTION

The Black-capped Petrel is an endangered bird species, known from breeding records in the Caribbean and at-sea records throughout the north Atlantic Ocean and Caribbean Sea. Breeding surveys for the species have been carried out in the Dominican Republic (Sierra de Bahoruco and the Cordillera Central) as well as in the western end of the Sierra de Bahoruco that lies in Haiti along the border with the Dominican Republic. Additional nest surveys have been carried out on the island of Dominica, following up on historical nest records and recent radar surveys which showed petrel-like flight activity. Further radar surveys have been carried out on Jamaica, although no nests surveys have been completed in that location.

Recent surveys of flying Black-capped Petrels, done with marine radar over-land throughout Hispaniola, have shown large concentrations of flying petrels in La Visite National Park, Haiti, with approximately 750-1,000 petrel-like targets detected during each of multiple surveys from 2013-2017. Additionally, expeditions over the previous decade to locate and determine petrel activity, located nests in the National Park. Specifically, between previous nest surveys and radar surveys, petrels were known to be active along the La Visite Escarpment, a steep forested mountainside with heavy human-use areas located above and below the mountainside.

During 2018, to determine specific locations where Black-capped Petrels were nesting in La Visite National Park, we surveyed the La Visite Escarpment, specifically areas that were accessible by foot, with the intention of locating and mapping as many petrel nests as possible. Additionally, we wanted to following breeding success in a small colony, to assess the nest colony-based factors that affected breeding success.

Herein, we report our survey methods, our mapping and nest success results, and discuss factors that we discovered affected nesting as well as the team's survey success.

METHODS

Nest search method:

During our initial visit to La Visite National Park, we conducted a three-day survey along the La Visite Escarpment to locate Black-capped Petrel nests and identify a suitable petrel breeding location for our nest monitoring study site. Specifically, we focused on the area of the escarpment between Tet Kay Jak and Tet Opaque.

To locate the petrel nests, we conducted eight-hours of nest searching on each of the first three days in areas along the escarpment, for a total of 24 hours. We were looking for areas that had both extensive forest cover and were approachable via foot. To identify petrel nest burrows, the team 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. Once a cavity was located and identified as an active nest, we labeled a rock near the nest with a distinctive number and then we recorded the nest information in a field notebook (nest status and GPS coordinates).

Once we identified the nest study site, we returned monthly to the site, inspected each known nest cavity, and recorded its contents and status/relative feathering status of chicks. Additionally, we spent three days each month looking for petrel nests in additional areas along the escarpment, for the purpose of mapping nest areas as well as identifying potential future nest monitoring locations.

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 described the habitat of the petrel nesting location using the scoring system described in *Howard 1973 and Judd et al. 1987, a* scoring model to describe the level of the vegetation degradation with scoring buckets as follows: 0= Pristine hardwood forest, 1= Dense, secondary forest with few cutting and trail, 2= Secondary forest, with active trail, gardening, fire wood and/or tree fern harvesting, 3= Natural vegetation cut and replace by animal forage, garden and may have sign of erosion.

We collected daily weather data on rainfall occurrence during nest survey/monitoring dates.

Equipment used included: Digital endoscope, Samsung Galaxy Note II (as monitor), Garmin GPS 60cx, note book, vegetation clippers, climbing rope, paint (to mark nests).

RESULTS

Nest mapping:

Along the La Visite Escarpment, we were able to locate active nests in the area of Tet Opaque (Table 1). In this location, we identified 29 nest cavities with evidence of petrel activity, over two sub-areas. We subdivided the Tet Opaque nest colony into two areas as they were naturally divided geographically into two shallow valleys. Within the subdivided areas, one valley contained 11 nests (nest #1-#11) while the other valley contained 18 nests (nest #12 to #29).

Access to nests near Tet Opaque proved easier for staff to navigate, when compared to other areas where we searched. We did not locate active nests in any other location. We specifically hoped to find nests

around Pik Cabaio, however the area was difficult to navigate due to steep slopes and additionally the understory was densely covered with climbing bamboo making nest detection difficult.

Breeding results:
Of a total of 29 petrel nests followed, 15 of the nests were detected to contain an egg, a chick, and/or an adult. The other 14 nests were determined to be petrel nests by the detection of either petrel feathers, petrel feces, or petrel scent. We observed petrel adults in ten nest cavities. We observed an egg in seven nests. In four nests we observed a chick.

For the sake of assessing breeding success, we assume that nests where an egg and/or a chick were observed were 'active nests' (n=11). Other detected petrel nests perhaps were active, but due to lack of observation of egg and/or chick, breeding success was not determined. Of the 11 active nests, three chicks fledged, resulting in a breeding success of 0.272. Notably, the seven nests that were initially located with an egg all failed. The cause of failure of petrel eggs to hatch was undetermined. In the four nests that were detected with chicks, three chicks successfully fledged while one nest failed (found with a dead chick). The entrance to the failed nest was found blocked by harvested tree fern cuttings that had been incidentally stacked by cutters. The duration that the nest was blocked was unknown, however the petrel chick was found dead inside the nest and we assume the petrel adults were unable to access the burrow to feed the chick, likely causing death by starvation (Table 2).

Habitat description:
The two sample sites we worked in were dominated by a wet hardwood forest located within the steep north-facing karst limestone cliff-face that runs for 15 kilometers near the northern border of La Visite National Park. The two sites along the escarpment that we worked in were actively being cleared by residents from both the top as well as the bottom of the escarpment with residents focusing on the collection of firewood and tree fern roots, as well as for agricultural expansion (Table 1 and Table 3).

Weather:
During the breeding monitoring period, we recorded three periods of heavy rain in La Visite National Park: The first from March 10-20th, the second from May 5-18 (this storm severely negatively affected the agriculture crops in Seguin due to flooding), the third from 14-16 June when a tropical storm passed near Haiti. Despite the heavy rain associated with these three events, no nests were observed to be negatively affected by the rain or any associated run-off.

Economical/Social condition of La Visite Community:
From its inception, La Visite National Park has never had a study completed on either the social or economic status of the local regional population. During our research visits to the region in 2018, we made some general observations into the social/economic status of this community. Overall, it appeared that this community was living in extreme poverty. The average shelters size in this area did not exceed 50 meters^2 and each household hosted approximately 6 people. It appeared that approximately 400 families are living within the Park boundaries, notably a similar estimate was made by Araucaria XXI (2012). Within this community there appeared to be a lack of access to portable water, healthcare, education, and electricity. The forest hardwood was a main source of energy for this community for cooking as well as a source of income. Agriculture was an additional source of income for most local families. Many farmers that live in and around La Visite lack appropriate farming tools and most did not appear to practice sustainable agricultural practices.

DISCUSSION
The nest research we conducted in La Visite this year provided us with relevant information that will help

in planning future conservation activities in and around the petrel breeding colony. Information such as the human use of the escarpment areas, most noticeably the collection of tree ferns from the escarpment, will provide a baseline for future conservation efforts.

Breeding success of Black-capped Petrels in our study site appeared low, with approximately a quarter of the active nests successfully fledging a chick. As this was the first year of the study, there are no previous years to compare our results. It should be noted that in most cavities detected with petrel activity, we were unable to determine if there was active breeding. This was due to the difficulty of seeing into deep and/or multi-chambered cavities despite the use of an endoscope. To allow for additional monitoring of nesting activity in the future, we will monitor nests using camera-traps, allowing us to monitor parent nest-visit frequency, chicks venturing outside the nest entrance, as well as potential predators that might be in the area.

The closest proximity of petrel nest sites to human houses was approximately 300 meters. There was grazing of livestock within 10 meters of the closest petrel nest. There are human used trailed throughout both colony areas. The trails are used almost daily to access trees along the escarpment, which are harvested for fire wood, cooking wood, and building materials. Additionally, the trails are used to access tree ferns which are collected and sold for planting material in decorative plants. Introduced animals including dogs, cats, rats were detected in human areas immediately adjacent to the breeding colony. However, we did not detect evidence of these animals interacting directly with petrels along the escarpment. During this first year of petrel breeding monitoring, we were unable to determine how the human pressures along the escarpment affected the breeding activity and success of the Black-capped Petrels.

In the future, we would like to collect biometric measurements of the adult birds, chicks during different feathering phases, and of eggs. Additionally, we would like to collect more precise egg laying, egg hatching, and chick fledging data.

It is currently unclear the extent of the breeding area along the escarpment. Additional effort must be placed in locating all nest colonies along the escarpment, allowing us to define the boundaries of the nest colony location and address all relevant conservation issues in the region.

Conservation of the Black-capped Petrel in La Visite National Park will hinge on the conservation team's ability to work with human communities in the region and begin to off-set the human-based pressures that are currently negatively affecting the breeding habitat of the petrel.

LITERATURE CITED

Project Araucaria XXI, September 2011, *Document préliminaire technique pour l'élaboration du plan de gestion du Parc National La Visit*e.

Walter S. Judd and James D. Skean, Jr.1987 *Floristic Study of Morne La Visite and Pic Macaya National Parks, Haiti*.

TABLE 1 : Nest habitat description and scoring. Nest No.- unique identifier, Site – 1A or 1B, North/West – coordinates in decimal degrees, Alt (m) – elevation of nest in meters, Habitat type – general description, Habitat score - 0= Pristine hardwood forest, 1= Dense, secondary forest with few cutting and trail, 2= Secondary forest, with active trail, gardening, firewood and/or tree fern harvesting, 3= Natural vegetation cut and replace by animal forage, garden and sign of erosion, Survey date-date nest located.

Nest Nº	Site	North	West	Alt. (m)	Habitat type	Habitat score	Survey date
1	S-1A	18.349996	-72.238330	2147	Foraging Grass	3	11-Feb-18
2	S-1A	18.349996	-72.238330	2147	Foraging Grass	3	11-Feb-18
3	S-1A	18.349660	-72.238430	2215	Karst Limestone Broad leaf forest	2	27-Mar-18
4	S-1A	18.349660	-72.238530	2215	Karst Limestone Broad leaf forest	2	28-Mar-18
5	S-1A	18.349510	-72.238300	2209	Karst Limestone Broad leaf forest	2	28-Mar-18
6	S-1A	18.349510	-72.238300	2209	Karst Limestone Broad leaf forest	2	28-Mar-18
7	S-1A	18.349510	-72.238300	2209	Karst Limestone Broad leaf forest	2	27-Mar-18
8	S-1A	18.349510	-72.238300	2209	Karst Limestone Broad leaf forest	2	28-Mar-18
9	S-1A	18.349680	-72.238480	2215	Karst Limestone Broad leaf forest	2	11-Feb-18
10	S-1A	18.349680	-72.238480	2215	Karst Limestone Broad leaf forest	2	11-Feb-18
11	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
12	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	28-Mar-18
13	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
14	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
15	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
16	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
17	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
18	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
19	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
20	S-1B	18.348830	-72.238140	2237	Karst Limestone Broad leaf forest	2	29-Mar-18
21	S-1B	18.349410	-72.237740	2239	Karst Limestone Broad leaf forest	2	29-Mar-18
22	S-1B	18.349410	-72.237740	2238	Karst Limestone Broad leaf forest	2	29-Mar-18
23	S-1B	18.349410	-72.237740	2239	Karst Limestone Broad leaf forest	2	17-May-18
24	S-1B	18.349350	-72.238200	2220	Karst Limestone Broad leaf forest	2	17-May-18
25	S-1B	18.349350	-72.238200	2220	Karst Limestone Broad leaf forest	2	17-May-18
26	S-1B	18.349320	-72.237940	2223	Karst Limestone Broad leaf forest	2	17-May-18
27	S-1B	18.349320	-72.237940	2223	Karst Limestone Broad leaf forest	2	17-May-18
28	S-1B	18.349660	-72.238530	2215	Karst Limestone Broad leaf forest	2	14-Jul-18
29	S-1B	18.349260	-72.237780	2237	Karst Limestone Broad leaf forest	2	18-Jul-18

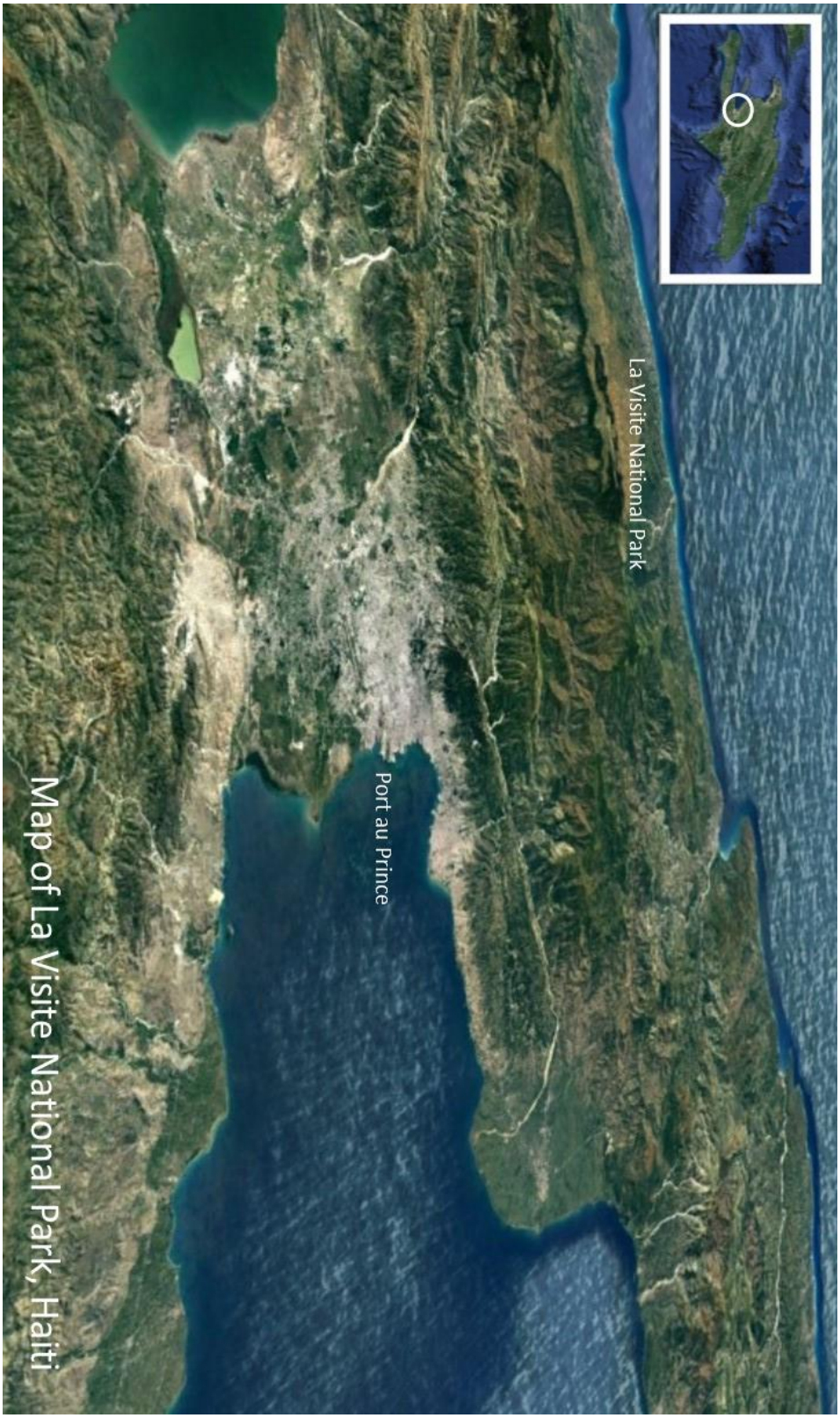
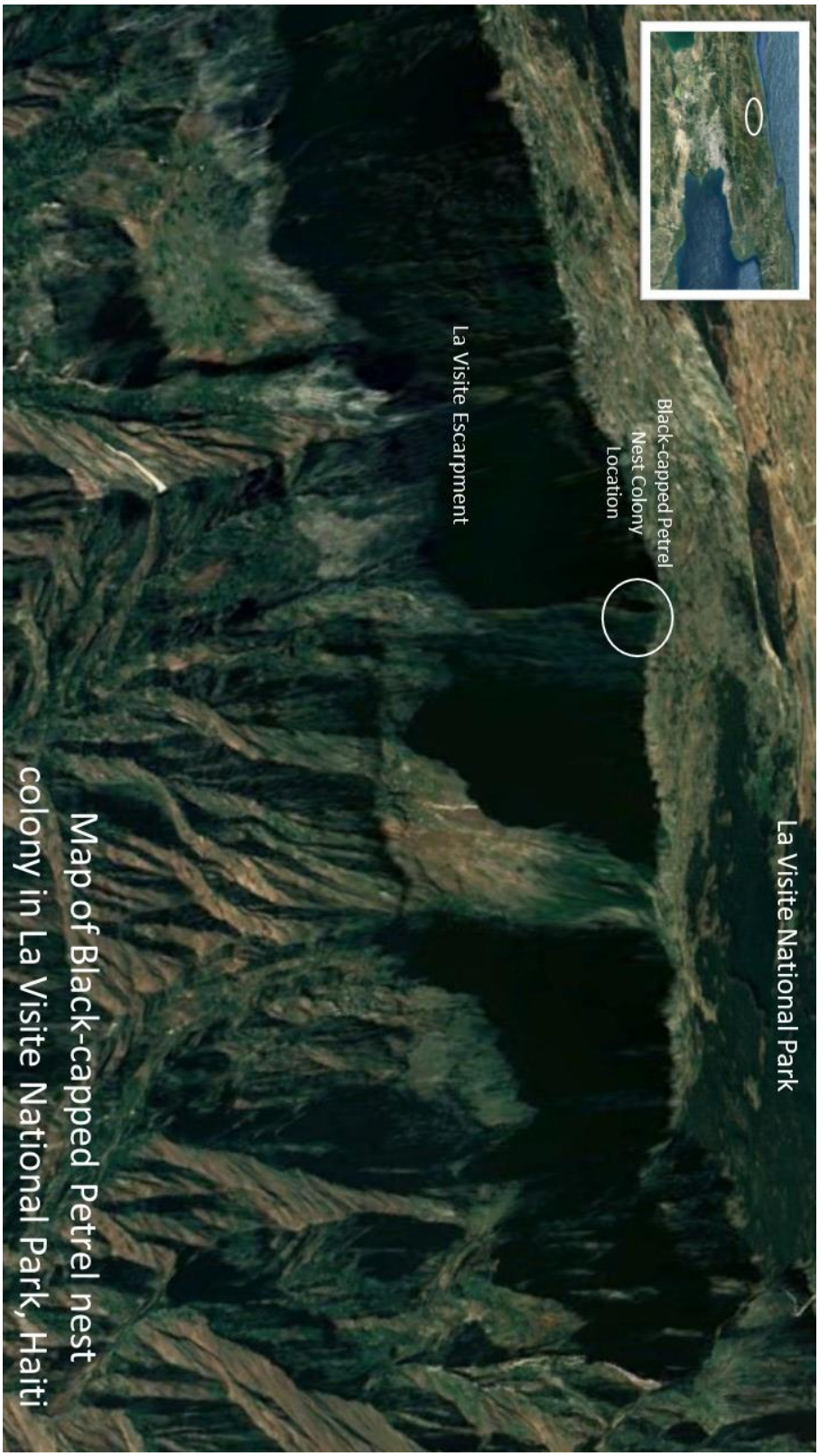
TABLE 2: Black-capped Petrel activity recorded at each nest at La Visite National Park. Nest No – unique nest identifier, Nest access status – E (easy), D (difficult). Adult, Egg, Chick, Smell, Feces, Feather - 0= absence, 1= presence, Habitat type – general description, Survey date – date nest was initially located.

Nest Nº	Nest access status	Nº Adult	Nº Egg	Nº Chick	Smell	Feces	Feathers	Habitat type	Survey date
1	E	1	1	0	0	0	1	Foraging Grass	11-Feb-18
2	E	1	1	0	0	0	1	Foraging Grass	11-Feb-18
3	E	1	1	0	0	0	1	Karst Limestone Broad leaf forest	27-Mar-18
4	E	0	0	1	0	0	0	Karst Limestone Broad leaf forest	28-Mar-18
5	E	1	1	0	1	1	1	Karst Limestone Broad leaf forest	28-Mar-18
6	E	1	1	0	1	1	1	Karst Limestone Broad leaf forest	28-Mar-18
7	E	0	0	1	0	0	1	Karst Limestone Broad leaf forest	27-Mar-18
8	E	1	0	0	0	0	1	Karst Limestone Broad leaf forest	28-Mar-18
9	E	1	0	0	0	1	1	Karst Limestone Broad leaf forest	11-Feb-18
10	E	1	0	0	0	0	0	Karst Limestone Broad leaf forest	11-Feb-18
11	E	1	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
12	D	0	1	0	0	1	1	Karst Limestone Broad leaf forest	28-Mar-18
13	D	1	1	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
14	D	0	0	1	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
15	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
16	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
17	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
18	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
19	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
20	D	0	0	1	0	0	0	Karst Limestone Broad leaf forest	29-Mar-18
21	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
22	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	29-Mar-18
23	D	0	0	0	0	1	1	Karst Limestone Broad leaf forest	17-May-18
24	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	17-May-18
25	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	17-May-18
26	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	17-May-18
27	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	17-May-18
28	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	14-Jul-18
29	D	0	0	0	0	0	1	Karst Limestone Broad leaf forest	18-Jul-18

TABLE 3: List of the most common plants in Black-Capped Petrel nest colony at La Visite National Park

	Family	Species common name	Scientific name
1	Araliaceae	Bois tremblé	*Didymopanar tmmulum*
2	Brunelliaceae	Bois san	*Brunellia comocladifolia*
3	Cyatheaceae	Fougère arborescente	*Alsophila minor*
4	Hymenophyllaceae	Unknown	*Hymenophyllum fucoides*
5	Lauraceae	Uknown	*Persea anomala*
6	Melastomataceae	Uknown	*Miconia lanceolata*
7	Myrtaceae	Uknown	*Calyptranthes densifolia*
8	Papaveraceae	Uknown	*Bocconia frutescens*
9	Poaceae	Liane à scie	*Arthrostylidium haitiense*
10	Primulaceae	Unknown	*Ardisia fuertesii*
11	Primulaceae	Unknown	*Ardisia fuertesii*

MAP 1 : Location of La Visite National Park, Haiti



MAP 2 : Location of Black-capped Petrel nest colony in La Visite National Park, Haiti