

# An Update on the Population of the Oilbird, *Steatornis caripensis*, in Trinidad, W.I.

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## ABSTRACT

The last island wide census of the Oilbird, *Steatornis caripensis*, population of Trinidad was conducted in the late 1950s to early 1960s by David Snow with an estimate of 1,460 individuals. A new census of the known roosts was undertaken between February 2016 and September 2019. Caves were entered and counts were taken by one to three observers. The total number of birds in known colonies was estimated to be 3,320. This shows a more than doubling in population since the last count and suggests that the hunting of Oilbirds may no longer be the threat it once was to the survival of the species in Trinidad.

Key words: Caves

## INTRODUCTION

The Oilbirds, *Steatornis caripensis*, of Trinidad have been documented for almost 200 years. Early mentions by writers, including John Latham in 1823 and Charles Kingsley in 1871, were mainly concerned with the description of the bird and their capture for consumption and focused on the colonies in the Bocas Islands. The Oilbird colonies in caves in the Northern Range were first mentioned in the literature by G.P Wall and J.G. Sawkins in a report on the geology of Trinidad in 1860. Many more accounts of visits to some of these caves were written in the following decades including F.W. Urich in 1895 and M.A. Carricker in 1931. These accounts are summarised by Shaw (1993).

The most comprehensive work on the Oilbirds in Trinidad was carried out by David Snow, starting in 1957. He studied all aspects of the Oilbird's life history, focusing mainly on the population at Spring Hill Estate in the Arima Valley, he published two extensive papers (1961 and 1962) detailing everything from general appearance, stance and locomotion to the weights of fruits eaten by the birds. As part of his work he conducted an island wide survey, visiting all the known caves where the birds roosted and estimating the number of birds in each cave (Table 1). The identity and location of three of these caves is still open to debate.

The current survey began when David Oehler, a board member of the Asa Wright Nature Centre (AWNC) and Curator of Ornithology at the Wildlife Conservation Society, New York, instigated a project using GPS tracking tags on Oilbirds. The project's aim was to find out more about where they travel during their foraging forays, specifically the ones roosting in Dunston's Cave, situated within the lands of the AWNC. As the project proceeded it became necessary to visit the other caves to determine whether the birds that had been tagged had changed roosts. Whilst the scanning for tags was underway the opportunity was taken to conduct a count of Oilbirds in each cave. The results of the tagging project are pending publication at the time of writing.

**Table 1.** "Present Colonies of Oilbirds in Trinidad and Their Populations" (reproduced from Snow, 1962).

Colony	Population
Oropouche cave	200
Aripo caves	
"Main cave"	400
"Small cave"	10
"Middle cave"	140
"Well cave"	80
Arima gorge (Spring Hill cave)	30
La Vache cave	300
Huevos cave	300
<b>Total</b>	<b>1460</b>

The routes to the well-known populations - Dunston's Cave, Cumaca Cave and Aripo Main Cave - are familiar to naturalists and hikers. The trails to the lesser-known populations in the Northern Range, Soho Cave and Carricker's Cave, are described in the TTFNC field guide (Comeau, Potter and Roberts, 2006) but they still took more time to locate as fallen trees and overgrown paths meant that several visits were required to find the entrances. The exact locations of the sea caves at La Vache Point and on the island of Huevos were found by direct searching along the coastline as geographic coordinates and the descriptions for both were either vague or not available (Shaw, 2009). The location of the sea cave at Morne Poui was indicated by TTFNC members and confirmed by a local boatman from Blanchisseuse.

## METHODS

To survey Oilbirds in Trinidad, all known cave populations (Table 2 and Fig. 1), were visited (some more than once) between February 2016 and September 2019. A handheld GPS unit (Garmin GPSmap 62s) was used to record coordinates of the entrance to each cave, altitude was taken from Google Earth.

Snow (1962) wrote "Direct counting of all the adults is

impossible in most of the caves; instead, it is necessary to count all the nests which appear to be occupied, count all the birds that can be seen perched on nests and ledges, estimate the number of birds flying about, and from these figures assess the number of birds present". We used a similar method and can confirm that accurate counts are very difficult to attain. Upon entering the caves, Oilbirds would react and start to fly around in alarm, therefore before counting began we would wait a period of around five minutes to allow the birds to calm down and return to their nests or roosts, although in the sea caves where conditions were dangerous we did not have the time to wait. A central position was taken up in every chamber where birds were seen and roosting birds were counted from floor to ceiling whilst slowly rotating around. Whilst doing this a bright LED torch was held at the side of the head so that the eye shine of the birds could be seen, this helped on crowded ledges where it was often difficult to discern one bird from the next. When more than one person was present each person made their own count then totals were compared

**Table 2.** Geographic coordinates (WGS84) and elevations of visited Oilbird colonies

Colony	Lat. & Long.	Elevation (m)
Cumaca Cave	10.7196°, -61.1754°	152
Soho Cave	10.7181°, -61.2211°	715
Carricker's Cave	10.7144°, -61.2270°	656
Aripo Main Cave	10.7184°, -61.2385°	797
Dunston's Cave	10.7154°, -61.2993°	337
Morne Poui Sea Cave	10.7946°, -61.2659°	sea level
La Vache Sea Cave	10.7770°, -61.4748°	sea level
Huevos Sea Cave	10.7036°, -61.7211°	sea level

and the larger count used as we thought it was more likely that an observer would miss birds than they would over count. Large fledglings, which are often hard to tell apart from adults, were included in the count but chicks were not. The count was then repeated at least once. In several caves the spot count had to be repeated at various locations as the birds were scattered throughout the chambers. Estimates of flying birds were then made and added to the total. Video footage was also taken in some caves using a camcorder with an infrared light attachment.

## RESULTS

### Cumaca Cave

Also known as the Oropouche Cave, and referred to as such by Snow, it consists of three main chambers linked by low passages stretching back from the entrance for more than 200 metres (Shaw, 2009). It is an outflow cave with a permanent stream running along the base. I first visited this cave on 28 March 2016 before this census began and made a rough count of over 1000 adults. There were both chicks and eggs present. A second visit took place on 17 March 2017 with Léa Blondel and Jarome Ali. We conducted counts in each of the three main chambers resulting in the following: first chamber 1050, middle chamber 100, deep chamber 250. There were fledglings, eggs and chicks present. In total there were approximately 1400 Oilbirds. A third visit on 26 August 2019 gave the same count.

### Soho Cave

This cave consists of a wide sloping entrance in a karst depression leading into large domed chamber with a large mound in the middle, horizontal paths lead to lower down sloping chambers and there is a chimney leading to a "well-like" entrance (Shaw, 2009). I conducted a count on



**Fig. 1.** Map of northwest Trinidad showing locations of visited Oilbird colonies; Cumaca Cave (1), Soho Cave (2), Carricker's Cave (3), Aripo Main Cave (4), Dunston's Cave (5), Morne Poui Sea Cave (6), La Vache Sea Cave (7), Huevos Sea Cave (8).

8 February 2016 with Elliot Petkovic and Jessica Rozek. There were 60 birds in the main cave, 5 in the lower section and 25 in the chimney at the back of cave for a total count of 90 Oilbirds. A follow up visit on 4 August 2019, accompanied by Mark Charran and Richard Smith, gave a much lower count of no birds in the main cave, 10 in the lower section and 20 in the chimney for a total of 30 Oilbirds.

#### Carricker's Cave

This cave has a tall mouth leading down a 45° slope to a narrow tunnel and is about 30 metres long. There is an intermittent stream along the base of the cave which only flows after heavy rain and a small side cave with a vertical chamber (Shaw, 2009). Birds roost in the main chamber and in the narrow tunnel. I visited the cave on 13 April 2016 with Andrew Watson, this being our second attempt at locating the cave as a large tree fall had obscured the path to the entrance. We did a rough count of 150 birds, there were several chicks present at the time. A second visit was conducted on 8 February 2017 with Elliot Petkovic and Jessica Rozek. We counted 120 birds in the main chamber, 60 in the lower chamber and approximately 20 flying for a total of 200 Oilbirds. Eggs were seen on several nests. A follow up visit in 4 August 2019 gave a count of 90, we also noted a large treefall over the entrance to the cave which reduced the size of the opening by about 50%.

#### Aripo Main Cave

This is the largest known cave system in Trinidad at over 860 metres long. It is an inflow cave with an intermittent stream (Shaw, 2009). Oilbirds occupy the main chamber at the entrance, and a smaller chamber deeper inside. A first visit on 10 November 2016 gave a quick count of approximately 350 birds. A second visit on 16 February 2017 with Elliot Petkovic allowed time for a more thorough survey. We counted 280 Oilbirds in the main chamber, 80 in the middle section and 105 in the lowest chamber for a total count of 480 birds. We also observed several nests containing eggs and chicks.

#### Dunston's Cave

This is the most accessible Oilbird population in Trinidad, located in the grounds of the AWNC, previously known as the Spring Hill Estate. It was called the *Arima gorge* or *Spring Hill cave* by Snow and is actually a narrow gorge with a permanent stream flowing through it and some daylight penetrates throughout (Shaw, 2009). When surveyed for this study on 2 March 2017 the count was 180 Oilbirds. A follow up visit on 23 July 2019, accompanied by AWNC staff and board members, gave a very low count of two birds, the population had abandoned the cave for unknown reasons.

#### Morne Poui Sea Cave

A small cave in a cleft to the west of a beach at the end of a small cove about 0.8 km west of Cathedral Rock. The cave is approximately 10 metres deep, 17 metres high and 3 to 4 metres wide. This cave was visited on 25 August 2019 during a second period of surveying. A count of 80 Oilbirds was made including fledglings.

#### La Vache Sea Cave

The entrance is located at the end of a small inlet on the eastern tip of La Vache Point. The cave consists of one large dome shaped cavern approximately 25 metres high in the centre with a smaller cavern at the back. A first attempt to reach the cave was made on 24 September 2016 when Glenn Wilkes, Luke Rostant and I paddled in kayaks from Maracas Beach heading west along the coast, despite searching many inlets around La Vache Point we did not locate the cave and increasing wave height led to us calling off the search. A second attempt was made on 15 July 2017, this time using a pirogue captained by Imran Khan. We approached La Vache Point heading east and finally found the cave by referring to a photograph of the entrance taken by Edward Rooks in the 1980s. I swam in on a high tide at 8:30am and had to tread water whilst conducting the count as there was no area to stand. As I was the only person conducting a count I repeated it three times resulting in an average of 405 roosting and 45 flying birds for a total of 450. However, due to the conditions this total should be taken as a less accurate estimate than the other cave populations. A second visit was made on 21 September 2019 where I was accompanied by Mark Hulme and Zakaryya Ali. The count was higher at 650 birds roosting and around 40 flying for a total of 690 Oilbirds.

#### Huevos Sea Cave

The low entrance to the cave is at the end of an inlet on the north side of the northern half of Huevos. There is a single large dome reaching about 30 metres high in the middle with a small beach at the back of the cave. After a first failed attempt to locate the cave, partly due to rough seas making access impossible, a second visit on 21 May 2017 yielded success. Using a pirogue, again captained by Imran Khan, we got as close as safely possible to the entrance and then I swam in to the cave at 0750 h accompanied by Robbery Rennie Jr. and Kevin Mycoo. Standing on the beach I counted approximately 120 roosting birds and 80 flying birds for a total of 200. There were chicks on some nests. A second visit was made on 21 September 2019, also accompanied by Mark Hulme, where we counted 160 roosting and around 40 flying for a total of 200 once again.



## DISCUSSION

### Cumaca Cave

Previous counts by members of the TTFNC have ranged widely but generally increased over time. In March 1976 Victor Quesnel reported that “The birds occupy only the first chamber. Two independent counts gave 254 and 247 nests, very good agreement given the difficult conditions. There are probably more nests than are visible from the floor so that counting two adults per nest there may well be 550 – 600 adult birds in the cave.” (Quesnel, 1976). A few years later in January 1980 Richard French reported “A recent visit... showed that the Oilbirds are thriving... A rough estimate of the numbers was 400.” (French, 1980). In 1985 Quesnel again reported on a trip to the cave in April “Most of the group went into the cave with David Rooks where he organised a count of the Oilbird nests. He found [ ], a considerable increase over the approximately 250 nests found on our trip of 7 March 1976. This difference is probably not due to an inaccurate count on the earlier occasion but to genuine increase in number. In 1976 the birds occupied only the first chamber. Now, the birds have established nests in the second chamber as well.” (Quesnel, 1985). Unfortunately, the space for the number was left blank on the type written copy of the bulletin! Perhaps it was meant to have been confirmed and filled in by hand later. Finally, in January 2012 Stefanie White wrote “Graham White did a count of the apparently occupied Oilbird nests and came up with a total of 273. This was lower than a previous count in 1991, especially in the first chamber, but is much higher than the original counts conducted by Snow. There was no sign of any recent poaching of the birds and there were a few occupied nests which were within reaching distance and would probably not be there had poachers preceded us.”

The latest count is significantly higher than previous ones, this may be due to different counting methods being used but the fact that the birds seem to have expanded into the deeper chambers should also be taken into account. Overall there is a definite trend of increasing numbers over the years in this cave making it the most numerous population in Trinidad.

### Soho Cave, Carricker's Cave and "Small cave"

The exact locations of Snow's Aripo “Well cave”, “Middle cave” and “Small cave” have been the subject of some debate amongst naturalists in Trinidad. Shaw (2009) suggested that the location of Aripo “Well cave” was now lost and that Carricker's Cave might be “Small cave” and that Soho Cave was a new discovery. I tentatively suggest here that “Well cave” is Soho Cave, “Middle cave” is Carricker's cave and “Small cave” has been relocated but abandoned by Oilbirds.

In Snow's 1962 paper, the Text-Fig. 1 map shows the locations of Oilbird colonies, with the three smaller Aripo caves running in a sloping line from east to west with “Well cave” at the top eastern end, “Middle cave” in the middle (as to be expected!) and “Small cave” at the bottom western end of the line. This matches up roughly with the locations of Soho, Carricker's and a third smaller cave.

Regarding Soho Cave I suggest that between the 1960s and the late 1970s when it was rediscovered, there had been a major collapse of the roof on the south end of what Darlington called the entrance chamber (1995). This exposed an easier entrance which you walk into rather than climb and would have completely changed the look and description of the cave. The sinkhole which leads to this “new” entrance is filled with wild tannia (*Xanthosoma undipes*), a species which takes advantage of gaps in rain-forest (Kerbs, 2015), rather than mature trees as found in the area immediately surrounding the sinkhole. This lends credence to the idea that the forest floor collapsed at this sinkhole causing the trees to fall and the tannia to take over.

Carricker wrote of his visit “the first cave... proved to be a huge well-like affair, some sixty feet deep and twenty-five feet across, and with the top bridged over with solid rock, leaving a small opening on either side. One of these was sheer-walled to the bottom, but the other offered a precarious descent for about thirty feet, but from there a sheer drop. A pyramid of rock rose from the centre of the floor to a height of about thirty feet.” (Carricker, 1931). In Soho Cave, Darlington's 1995 description of “a vertical shaft opens to the forest floor by a hole only about 1m wide... The shaft is 20.7 m deep, getting wider with depth...” corresponds well with Carricker's. The main chamber (Darlington's entrance chamber) is dominated by a large pointed mound of rock which could easily be described as a pyramid again matching Carricker's account. I am convinced that Carricker's first cave and Soho Cave are the same and when Snow goes and describes “Well cave” as a dry limestone cave with top entrance, and presumably named it “Well cave” after Carricker's description, I think that he must also be referring to the same cave. The dramatic change to the cave may explain why, when Darlington spoke to Snow describing the “newly discovered” Soho Cave, he said it was not his Well Cave (Darlington, 1995).

Previous counts for Soho Cave include a trip in March 1990 “estimated the number of Oilbirds to be 70 pairs.” (Comeau, 1991) and in February 1993 it was reported that “The Oilbird population in Soho Cave is estimated at more than 90 individuals of which we were able to count 40.” (Jaggernaut, 1993). Snow counted 80 birds for “Well cave” whereas this survey gave a total of 90 birds for Soho

Cave, which matches very well lending further weight to my suggestion.

The evidence for “Middle cave” being Carricker’s Cave is not as comprehensive and is largely based on the location of this cave, between Soho Cave and the lower down “Small Cave”. Unfortunately, Snow did not include a description of the cave in his 1962 paper, seemingly mistakenly, as he did describe all the other caves to some degree. Snow’s count of 140 and my count of 200 for this colony are quite similar giving this cave the third largest population in the Northern Range. The population here appears to have stayed fairly constant over the years possibly indicating that the cave has avoided much disturbance and that all possibly nesting sites have been taken.

I am sure that the bounteous resources found in Soho and Carricker’s Caves would have been well known to hunters in the past and that visitors such as Carricker and Snow would have been guided to these caves when they asked the locals.

The location of Snow’s Aripo “Small cave” could not be confirmed from any literature sources or local knowledge. However, extensive searching of the possible area (based on the map Text-Fig. 1 in Snow, 1962) resulted in the discovery on 16 February 2017 of a small gorge like cave approximately 0.6 km WSW of Carricker’s Cave (at 10.7122°, -61.2324°, altitude 580m). The cave has a small triangular entrance roughly 2m high leading into a narrow gorge with several gaps in the ceiling letting in light; Snow describes his cave as “Small limestone cave with dry floor; nests in subdued light” which corresponds quite well with this cave. There were no Oilbirds present but several ledges looked like they could have been suitable for roosting. If this is indeed “Small cave” it is possible that this population was wiped out by over collecting as this cave was the closest of the Aripo caves to human habitation and easier to access than the others in the area. At the time of the visit a large plastic pipe irrigation system was observed passing by only a few metres from the cave entrance, which suggests people would have been well aware of this population. The possible loss of the population at Aripo “Small cave” is not too significant given Snow’s count of only ten birds. Further exploration should still be undertaken in the Aripo area to ascertain if another location could be the missing cave and a full description of this cave needs to be undertaken.

#### Dunston’s Cave

Not surprisingly, given its accessibility, this is the most surveyed Oilbird population in Trinidad and over the years counts, undertaken by members of the Trinidad and Tobago Field Naturalists’ Club in the past and more recently by staff of the AWNC, have varied from 25 to 203

(Lambie, 2010). The sudden drop in population in mid-2019 could be due to many factors, no obvious signs of disturbance or change to the cave structure were seen. One possible explanation is that the birds moved to a new area to take advantage of an abundance of fruiting trees or left the area because of a lack of fruiting trees, however this requires further investigation.

#### Morne Poui Sea Cave

This cave was not known to Snow. The first mention of it in the literature was by Quesnel (1979b) who wrote “David Rooks and a small party were recently shown a cave near Paria [the cave is approximately 1 km west of Paria Beach] which houses a large and previously unreported colony of Oilbirds...” and asked for help in confirming its existence. Ten years later, on the return boat journey after a TTFNC trip to Grand Tacaribe beach, several members of the club visited the cave and described “a thriving colony of 20 to 25 pairs of oil birds” (Acham, 1988). The increase to 80 Oilbirds bodes well and suggests that the cave is a secure roosting site.

#### La Vache Sea Cave

There are no records of any counts conducted after Snow. A visit was made by members of the TTFNC in November 1980 but they only confirmed the presence of Oilbirds and did not conduct a count (Boos, 2017). The increase in population since the 1960s is quite significant and is likely due to a decrease in harvesting of birds. The relative inaccessibility of this cave and its large size will hopefully mean it is a secure site for years to come but the former factor also works against it being an easy site to monitor regularly.

#### Huevos Sea Cave

This is the last surviving population in the Bocas Islands and a count of 200 birds is significantly less than Snow’s count of 300. Perhaps it is still occasionally targeted by hunters but further investigation, perhaps subtle questioning of fishermen, could find out if this is the case.

Over the years several attempts have been made by members of the TTFNC to find the Huevos Sea Cave but they were unsuccessful (see Quesnel, 1979a; Kelly, 2012) so there are no further counts available between the 1960s and present day to help ascertain if the lower count now is the result of a long term downward trend or just a seasonal change.

The final count for all caves surveyed is presented in Table 3. The highest population count taken during the survey period for each cave was used. The current names of the caves are used with Snow’s names in parentheses for comparison.

Snow estimated that there were 1,460 birds in Trinidad in the late 1950s to early 60s. This count puts the total at around 3,320, which is encouraging for a species that used to be heavily persecuted.

One of the factors that should be considered in the overall population is that it may be limited by the availability of suitable roosting sites with each cave having a carrying capacity. In the case of Dunston's Cave, the birds only increased in number when artificial nesting ledges were added in the 1960s (Lambie, 2010). The expansion of birds into the deeper chambers of Cumaca Cave as documented over the years could suggest that some caves have not reached their full capacity and as changes happen to caves from roof collapses and the opening of new sinkholes more roosting sites may become available in the future.

#### Other Caves Visited

Several other caves were visited during this project to check for signs of Oilbirds but none were expected and no birds were seen. These included Sanderson's Cave, Aripo Cave 2 and 3 (at the time of surveying the entrance of Cave 2 was blocked by an infill of river bed gravel caused by major flooding), Devil's Hole Cave, Colado Cave, Caura Cave, Gasparee Cave and Precipice Cave on Gaspar Grande, an unnamed sea cave on the south side of Point Gourde and L'Anse Paua sea cave (for details of locations of these caves see Shaw 2009).

#### Other Possible Colonies

There are quite likely to be other small populations of Oilbirds scattered throughout the Northern Range but none were confirmed as part of this study. One possible cave, roughly 3 km southwest of Grande Riviere, was mentioned to me by Joshua Spiers who was conducting unrelated studies in the area but due to time constraints this site was not visited as part of this study. It is also possible

**Table 3.** Present known colonies of Oilbirds and their populations between February 2016 and September 2019.

<b>Colony</b>	<b>Population</b>
Cumaca Cave (Oropouche Cave)	1400
Aripo Main Cave	480
Carricker's Cave (possibly "Middle cave")	200
Soho Cave (possibly "Well cave")	90
Dunston's Cave (Arima Gorge)	180
La Vache Sea Cave	690
Morne Poui Sea Cave	80
Huevos Sea Cave	200
<b>Total</b>	<b>3320</b>

that further populations are to be found in sea caves along the north coast but as seen in our searching access to parts of the coastline is difficult and it is very likely that small caves could remain undocumented.

Journalist Heather-Dawn Herrera, in an article in the Trinidad Express on 6 June 2013, documented a trip to El Chiquero Cavern to observe an Oilbird roost. According to the writer the precise location of the cave is kept secret by the family of the original discoverers but it is surmised that the cave is located somewhere in the El Chiquero Forest to the north of the Cumaca Cave. A count of approximately 200-plus birds is mentioned at the end of the article.

Confirmation of these colonies exact locations and numbers are needed to facilitate long term monitoring of the total Trinidad Oilbird population and to help safeguard against these colonies disappearing without our knowledge.

Snow also acknowledged that there could be unrecorded populations of Oilbirds in caves, sinkholes and gorges hidden in the Northern Range but it is likely that these populations would be small numbering in the tens rather than hundreds. Part of the reasoning for this is that the economic value of the Oilbird in past times meant that all large populations were likely to have been previously discovered.

#### Conclusion

I would estimate that with these unconfirmed populations and with the high likelihood that at any time a certain percentage of each cave population is out foraging and roosting in the forests, that an overall population for Trinidad of more than 3,500 birds is not unrealistic. Snow wrote "I think it unlikely that the estimated total of 1,460 is out by more than 500 either way" (1962) and I agree that a fairly large range of variance could be included in future population estimates. However, to minimise this I suggest that future surveys should ideally have multiple teams visiting all the caves on the same day to get a more accurate 'snapshot' count and take into account the possibility of birds moving temporarily from one cave to another.

As long as the Oilbird stays off the menu the population would seem to be in good condition for the future. However, major threats could still materialise, the most likely being loss of forest habitat in which the birds feed and increased quarrying of limestone sites as the lower down more accessible sites are depleted. Increasing local awareness, as already conducted by the AWNC, and their important role in the environment as agents of seed dispersal and as a keystone species of tropical rainforest (Roca, 1994) should lead to the birds becoming another iconic Trinidad species.



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