Radar Surveys, Nest Monitoring and Conservation of the Black-capped Petrel on Hispaniola: February 2017

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Introduction:

Populations of the Black-capped Petrel, one of the most endangered Caribbean seabird species, have been in precipitous decline over the previous 50 years. It is estimated that only 1,000-2,000 pairs of petrels remain. Although they historically nested on islands in the Lesser Antilles, they are currently known to nest only on the island of Hispaniola. The dire conservation status of the Black-capped Petrel has prompted its listing by various authorities as Endangered (IUCN 2011), Threatened, by the International Council for the Preservation of Birds (Collar and Andrew 1988), and Critically Endangered by the Society for the Study and Conservation of Caribbean Birds (Schreiber and Lee 2000). Further, the North American Waterbird Conservation Plan considers the species to be Highly Imperiled, making it an official Focal Species of the U.S. Fish and Wildlife Service (USFWS).

Black-capped Petrel conservation teams on Hispaniola are currently focusing on locating new nest colonies, monitoring known nest sites, doing outreach with communities near known petrel nesting areas, and working alongside land-users (i.e. farmers, charcoal harvesters, etc…) to conserve petrel habitat.

During February 2017, EPIC along with its partners Grupo Jaragua, Societe, Audubon Haiti, Plant with Purpose, and Soulcraft Allstars, completed radar surveys for, nest surveys of, and conservation activities of the Black-capped Petrel on Hispaniola. This work was done as part of a larger conservation effort to study and conserve the Black-capped Petrel throughout its range. All of the work completed builds on previous year's work to better understand the conservation needs of the species.

This report will describe our recent petrel-based activities at locations throughout Hispaniola.

Methods

Radar surveys from 2012-2014 by EPIC, within the Hispaniola mountain ranges, successfully located previously unrecorded flight corridors and nesting areas. Additionally, we established the first ever baseline population indexes for petrel activity centers throughout Hispaniola. Furthermore, using this data, EPIC successfully mapped all known flight corridors as well as nest locations on Hispaniola and prioritized areas of critical importance to the species. Most recently, in 2015, EPIC used radar techniques it mastered on Hispaniola and located what is likely a nesting population of petrels on Dominica.
As part of the current proposal, we will conduct radar surveys for Black-capped Petrels over a three-week period on Jamaica during early 2016. By the end of this period we will have successfully determined if petrel activity persists on Jamaica as well as established baseline population data at numerous nest sites and flight corridor sites throughout Jamaica.

Radar data collected in 2012-2016 allowed us to better understand the timing and movements of petrels in and around the nesting areas on Hispaniola as well as petrel activity on Dominica and potentially on Jamaica. Based on this data, surveys will begin at sunset, when petrels become active at the nesting area and end five hours later, when petrel activity slows.

Our goal with radar surveys this year on Hispaniola was to re-visit the five highest populated flyways on Hispaniola, based on previous year's surveys. This year's data was to be used to compare to previous years data to monitor trends in the overall Black-capped Petrel population on Hispaniola.

For radar surveys, we set up our radar within 1.5km of the potential nesting sites or fight corridors. Setting the range at 1.5 km is standard practice when surveying for seabirds as it allowed the surveyor to detect targets at a substantial range while recording a clear and powerful target on the radar (Cooper et al. 1991). A laptop computer was attached to the radar unit and recorded all radar images, for subsequent review and analysis.

The radar operator monitored all targets that appeared on the radar's monitor, and recorded time, direction of flight (to the nearest degree), flight behavior (e.g. straight, erratic), velocity (to the nearest 5 km/hr), and if known, noted species and number of individuals detected.

A second surveyor was stationed at the base of the known nesting cliff or along the flight corridor with 10x binoculars for observations during dawn and dusk observations, and a night-vision scope or a thermal imaging scope when daylight was insufficient. This observer constantly visually scanned the airspace above potential nesting habitat and all visible sky for flying petrels and listened for calling petrels. We will use an infrared spotlight to increase the range and target visibility. The light emitted from the spotlight is invisible to the naked eye and therefore does not affect bird behavior.

Following each survey, we downloaded data and reviewed the recorded images of the radar survey. During this review, we will re-analyze all targets measuring flight speed, flight direction, and target size. This second evaluation of the survey assured researchers that no targets were missed or incorrectly measured.

Nest monitoring was accomplished at known petrel nest colonies. Our goal was to re-locate known nest cavities from previous years and to discover new nest cavities within the known nest colony locations. To nest monitor, staff moved methodically though known and potential nest areas searching in all optimal sized nest cavities and crevices. Once evidence of occupation (adult petrel, petrel chick, egg, feathers, or fecal material) was observed, the location of the nest and nest contents was recorded. Additionally, the nest was numbered uniquely. Further, we collected data nest attributes, including nest depth, width, height, substrate composition, crevice aspect, crevice slope, and vegetative cover.

Results

Dominican Republic

CORDILLERA CENTRAL: VALLE NUEVO NATIONAL PARK: FEBRUARY 3-4, 2017
2013: 84 TARGETS
2017: 71 TARGETS

In 2013, we visited this radar site near the southern gate to Valle Nuevo National Park. That year, we had tracked petrel-like targets from the lower drainage to this location at the headwaters. This location was characterized by high elevation (~5,700ft) steep slopes vegetated with pine forest. There is heavy agricultural use of the land right up to the national park boundaries.

During our visit this year, there was a conflict on-going between the national park and farmers. The farmers had encroached their farms into the national park and the park was trying to remove these people and activities from within their boundaries. By the time we arrived, the park had received the services of the Dominican Republic military to remove the trespassing farmers. The two days that we were on site, there were physical and verbal altercations between the farmers, the park staff, and the military. This activity precluded us from surveying any additional sites in Valle Nuevo National Park due to the dangerous nature of the interactions between the parties.

We completed a radar survey at site DR-8. This site monitors a heavily pine forested slope and a number of forested peaks that guard the entryway into Valle Nuevo National Park. In 2013, we detected 84 petrel-like targets at this site. In 2017, we detected 71 targets.

Following our surveys in 2013, Grupo Jaragua had deployed numerous song-meter autonomous sound recording devices along forested slopes in the area. Black-capped Petrel calls were detected in 2016 on slopes immediately southwest of our radar site in an area we detected numerous petrel-like targets. We again detected on radar, petrels flying towards this area. We would have liked to follow up on these targets and petrel calls, but the localized armed conflict hindered our ability and comfort level pursuing this goal.

SIERRA DE BAHORUCO: LOMA DEL TORO: FEBRUARY 6, 2017
2012: 114
2013: 99
2017: 71

This radar station is located just downslope of the Loma del Toro summit. This location overlooks the farming slopes east of the village of Boukan Chat. Loma del Toro is one of the first locations that conservationists monitored Black-capped Petrels. Recently, Grupo Jaragua has monitored nesting petrels at this site over the past number of years.

We have previously monitored this radar site for petrel activity in 2012 and 2013. The site, in past years, was observed to be heavily forested with pine trees. The slopes in the area were steep and rocky. During this year's visit, the site was observed to be recently burned. Most large trees were on the ground or standing but mostly burned. We observed young trees growing. Our view, downslope was more open than in past years.

During this year's visit to the site, we looked for and located a number of active petrel nests near the summit of Loma del Toro. Additionally, we the Save the Devil film team filmed Grupo Jaragua monitoring petrel nests. Additionally, they filmed petrel habitat and the Haiti/Dominican border region.

Over the three years of surveying this site we have noted declines each visit; 114 in 2012, 99 in 2013, and 71 in 2017.

SIERRA DE BAHORUCO: EASTERN BAHORUCOS: FEBRUARY 7, 2017
2013: 320
2017: 104

This radar station overlooks the eastern end of the Sierra de Bahoruco just west of the Pelempito area. The station itself is located in an old bauxite mining area on a bench between two distinct east/west running ridges. The station is in an open area and radar beams would not be hindered by vegetation.

We have previously monitored this site in 2013. In 2013, we had surveyed at Pelempito and detected 87 petrel-like targets flying up from the sea to the south towards this section of the Bahoruco range. We moved in the direction of those Pelempito targets and identified this site based on its openness and proximity to potential petrel nesting areas on the ridges above the station. During that initial survey, we detected 320 petrel-like targets. The following night, in 2013, we surveyed further west of this station and detected 117 targets.

Since 2013, Grupo Jaragua has followed up with monitoring activity at this site, deploying song meter acoustic detection units and searching for nests by hiking in the area. The Grupo Jaragua team has since discovered numerous petrel nests in the ridgeline area north of the radar station.

During the survey this year, we detected 104 petrel-like targets. As in the past, we detected circling behavior at this station, indicating interest in the area by the petrels.

Haiti

MASSIF DE LA SELLE: SAVANNE ZOMBIE; FEBRUARY 11, 2017
2013: 633 (TARGETS BETWEEN SUNSET AND 75 MIN POST SUNSET; *1,570 BETWEEN SUNSET AND 4 HR POST SUNSET)
2017: 160 (TARGETS BETWEEN SUNSET AND 75 MIN AFTER SUNSET)

This radar station overlooks a distinct south to north running valley. This is a mid-elevation site and would be a flyway only with no nesting habitat in the area. The site is completely void of trees. The valley itself splits right at the station proper with one valley leading to Morne La Selle and the other leading towards Foret des Pins and Loma del Toro area.

We have previously monitored this site in 2013. During this survey, we detected more targets than at any other site on Hispaniola. The behavior at this site was unique for Hispaniola in that we detected a distinct shift in flight direction. Early in the night, we observed targets heading southbound (leaving nest areas) and later in the evening the majority of targets were heading northbound (in toward nest areas).

During this first year at this site, we met with village leaders prior to our survey and explained our work. The leaders gave us permission to use the site for work and stayed with us during the survey. During our surveys this year, we arrived at the site very close to the beginning of the survey period and instead of talking to village leaders, talked to the people who lived in the immediate area. These people said they were comfortable with us working in this area again. However, as our survey started, we attracted a large crowd and a number of people that arrived became very agitated with our equipment and with us being in the area. While surveying, members of our team talked to the members of the crowd who

appeared agitated. But despite our best efforts, we could not get the crowd to completely agree with our purpose to be at the site and we had to end the survey prematurely.

Due to the curtailed survey, we can only compare target activity during common times, between sunset and 75 minutes after sunset.

TET KAY JAK: FEBRUARY 13, 2017
2013: 457
2017: 569

This radar site is located immediately west of the petrel nests sites at Pic Visit and Tet Opak, all within La Visite National Park. We previously surveyed this location in 2013 and 2014. Our 2014 surveys were curtailed by rain. This location is in a cleared area on the top of the La Visite Escarpment and has a clear view to the north and the drainages that reach Port aux Prince and the Caribbean Sea.

This location is also adjacent to two large communication towers, one of which is guyed and the other is not. During our surveys in 2013, we observed multiple downed Black-capped Petrels under the communication towers and we heard multiple birds hit the guy wires of the one tower.

The residents who live near this site say that they occasionally see downed petrels near the towers. Additionally, they hear petrels fly over their home sites nightly.

Our surveys this year went from sun set to 3 hours after sunset. We observed activity from petrels throughout the survey period. The majority of activity was birds arriving to the escarpment from the north or leaving the escarpment and heading north. We had very little activity of birds to the south side of the escarpment. We observed circling behavior as well as joining/splitting behavior with the petrels.

This site continues to be one of the most important population monitoring sites as we observe high numbers of birds and are able to access their flight corridor along the escarpment very closely.

SEGUIN AND TET OPAK NEST SURVEYS: FEBRUARY 14, 2017
2017: 4 NESTS

Over the past 4 years, surveys have been done at certain areas of accessibility along the La Visite Escarpment near Seguin. Numerous Black-capped Petrel nests have been located and documented.

During this survey effort, we started at Tet Opak on the ridgeline and worked our way down slope past numerous limestone outcroppings. We located four active nests. The nests were documented with GPS and photographed.

This site is a sub-colony of what is most likely the world's largest Black-capped Petrel colony, along the La Visite Escarpment. The conservation team plans to revisit this site in 2018, so carry out nest success surveys.

Discussion

Overall, the Black-capped population trend on Hispaniola is moving downward. In the Dominican Republic, we are seeing slight downward trends in the Cordillera Central with more pronounced

downward trends in both the eastern and western Sierra de Bahoruco. In Haiti, we are seeing substantial declines in the eastern Massif de la Selle and robust upward trends in the western Massif de la Selle.

Declines in the Sierra de Bahoruco might be related to the extensive forest fires that have raged through this mountain range over the past few years. Locations throughout the Bahorucos that hosted petrel activity in the past were severely impacted by forest fires, which potentially affected petrel nest colonies.

Declines in the numbers of petrels detected in the eastern Massif de la Selle , were likely affected by our ability to survey in a safe and effective manner near the village of Savanne Zombie. During our night of surveying, numerous members of the local population were very nervous with our radar unit and we decided to curtail our survey in favor of keeping the peace in this village. We plan on additional preparation in this community prior to future surveys.

Programs to offset the root causes related to Black-capped Petrel population declines have been recently established in the eastern Massif de la Selle, specifically in the Foret de pins/Boukan Chat region. Recognizing that humans and petrels share a rare and threatened habitat, our conservation team strongly believes that to protect the petrel, we must work with petrels and people. EPIC and its conservation partners have established a diverse conservation program designed to work equally with people and petrels.

These programs include:

- Monitoring known nest sites in Haiti and the Dominican Republic, as well as discovering new nest colonies.
- Implementing a primary school education program in the village of Boukan Chat, Haiti which uses Black-capped Petrel themes to describe water, soil, and forest conservation. Over the past two years, this program has reached hundreds of youth.
- Forming contracts with hundreds of farmers in Haiti who farm near nesting Black-capped Petrels. These contracts lay out clear goals shared by farmers and conservationists to reduce poverty through sustainable farming while simultaneously conserving petrel habitat.
- Building community greenhouses and nurseries to grow vegetables and fruits for human consumption as well as trees for petrel habitat.
- Using art to bring the petrel to the people by creating murals on water cisterns that show dramatic images of the petrel and its connection to forest habitat. This artwork builds on our recent successes working with Haitian families to rebuild broken cisterns.
- Creating inspiring multi-media content that shares the story of the petrel, the humans that live around the petrel's habitat, and the conservationists who are working to protect the petrel from extinction.

These diverse strategies are beginning to have a positive impact on both people and petrels while protecting habitat critical to petrels and many other threatened species.

Starting in 2018, we are planning on scaling up these programs, bringing them to additional villages on Hispaniola. In addition, we are hoping to create artificial burrow cavities to increase petrel nesting potential in areas with established habitat. This method has been shown to be successful in other

closely-related petrel species, and it will address what might be an additional cause of low petrel population numbers.

Radar will continue to be a primary tool to monitor Black-capped Petrel population trends on Hispaniola. We plan to use radar to track trends at high use areas, every five years. Additionally, the radar will be used to locate new flight corridors and nest colonies throughout Hispaniola as well as on other islands in the Caribbean. Radar, while not directly conserving the Black-capped Petrel, has shown itself to be a very useful tool for identifying and monitoring areas of importance for Black-capped Petrels.