Results of a follow-up survey of the bats of the Mayflower-Bocawina National Park

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Introduction

A preliminary survey of the bats of Mayflower-Bocawina National Park was conducted December 10-11, 2002 (see prior report for details). Twenty-three species were recorded by capture or acoustic monitoring. These species represented five families and 18 genera ranking the park eleventh in bat diversity of those protected areas that are well surveyed. The preliminary bat survey was restricted to the lower areas of the park. Based upon the increased plant diversity found during transects of the higher elevations of the national park during December 2002, it was suspected that an increase in bat diversity would also be found in these areas.

With the anticipated increase in diversity a follow up survey was conducted March 20-21, 2003. This survey concentrated on the trail that formed an altitudinal transect from the Bocawina Falls parking area to the top of Bocawina Hill. These dates were chosen so that this survey would be during a favorable phase of the moon as was the December survey. This was an important consideration since during the brightest phases of the moon bat activity is generally reduced. Bats avoid flying during the bright moon phases to avoid potential predators. Unfortunately, the weather was unseasonably hot with temperatures exceeding 104°F during the day. The forest was extremely dry and detected bat activity was very depressed in the forest area.

Methods

As with the preliminary survey, the focus was on the species comprising the non-phyllostomid bats. Double-frame harp traps and acoustic survey techniques were again used to sample species belonging the five families of bats recorded during the last survey. Six harp traps

were deployed along the trail that extends south from the access road near the parking lot which is used for access to the water falls (Fig. 1).

Acoustic sampling used the Anabat system as described in the previous report and was comprised of both active and passive monitoring. During active acoustic monitoring, bat calls were monitored in real time and all representative calls for species were saved as voucher records. Passive monitoring was carried out simultaneously at selected points along the transect line. For the active acoustic surveys, monitoring continued until bat activity waned and passive monitoring was conducted for twelve hours each night to coincide with the period from sunset to sunrise (18:00-06:00). Calls were identified by comparing them to known reference calls recorded and verified previously in Belize.

The active acoustic sampling site for the first night was adjacent to the clearing at Mama Noots Resort and passive monitoring sites were established at both ends of the trap line, adjacent to traps 1, 2, 4 and 6. During the second night, active monitoring was at Silk Grass Creek, at the same location as the December survey. Two passive monitoring units were moved from both ends of the transect (traps 1 and 6) to the top of the trail at the highest elevation area. These units were placed 100 meters apart. The southern most unit had the transducer aimed so that it would record bats flying in the understory and the other unit was placed near a gap in the canopy. This was aimed so that it would also record species flying over the canopy as detected through he gap as well as the adjacent understory.

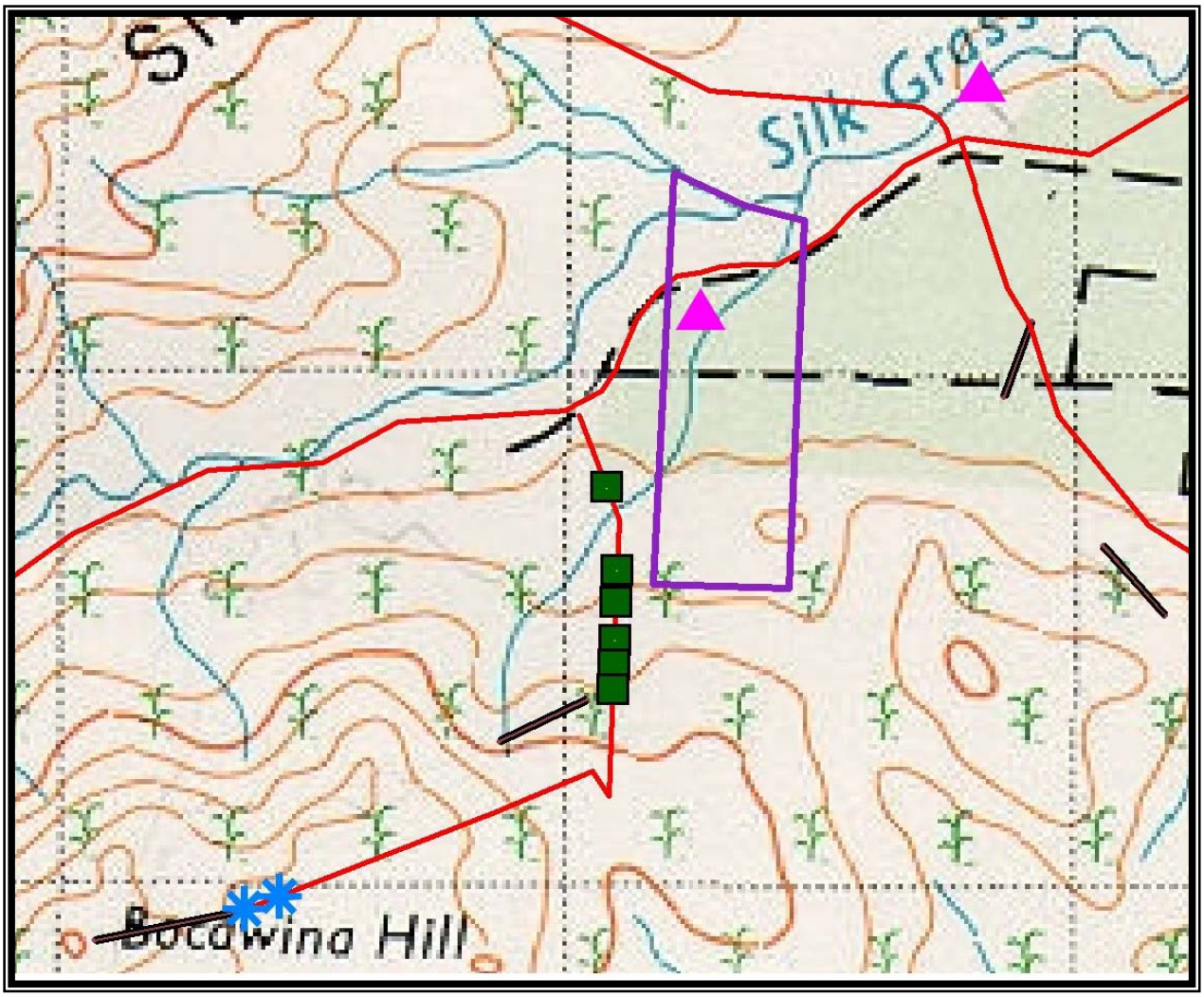

Figure 1. Map of March survey area of Mayflower-Bocawina N.P. showing trap and locations (green squares) and acoustic sampling locations not associated with traps are shown by blue stars and active monitoring indicated with the pink triangle. Denny property delineated with purple line.

Results

Compared to the previous survey bat activity was extremely low. Only 3 individuals representing two families and 3 species (*Pteronotus parnellii*, *Carollia perspicillata* and *Glossophaga commissarisi*) were captured on the night of March 20 and no bats were captured on the night of March 21. The results of acoustic sampling along the forest transect were equally low with only a single species (*Pteronotus parnellii*) detected. The main activity detected was was at the lowest elevation (adjacent to trap 1), 180 meters from the access road. Only a single bat was recorded at the highest unit (Fig. 2).

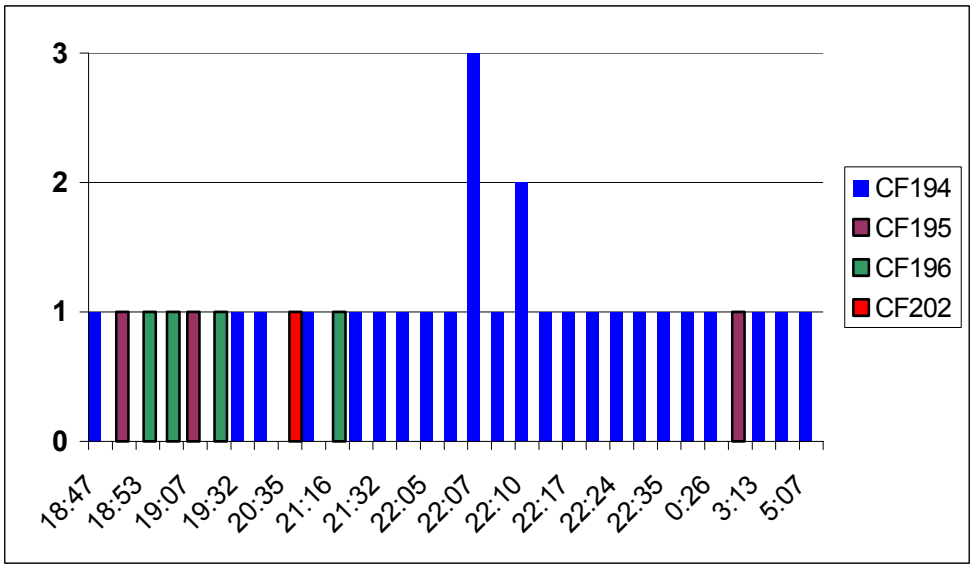

Figure 2. Bat activity as number of bat passes per 1-minute time interval for the night of March 20 as recorded by the four passive units. Unit 194 was at the lowest elevation and unit 202 was at the highest elevation along the transect. Unit 195 was at trap 2 and 196 at trap 5.

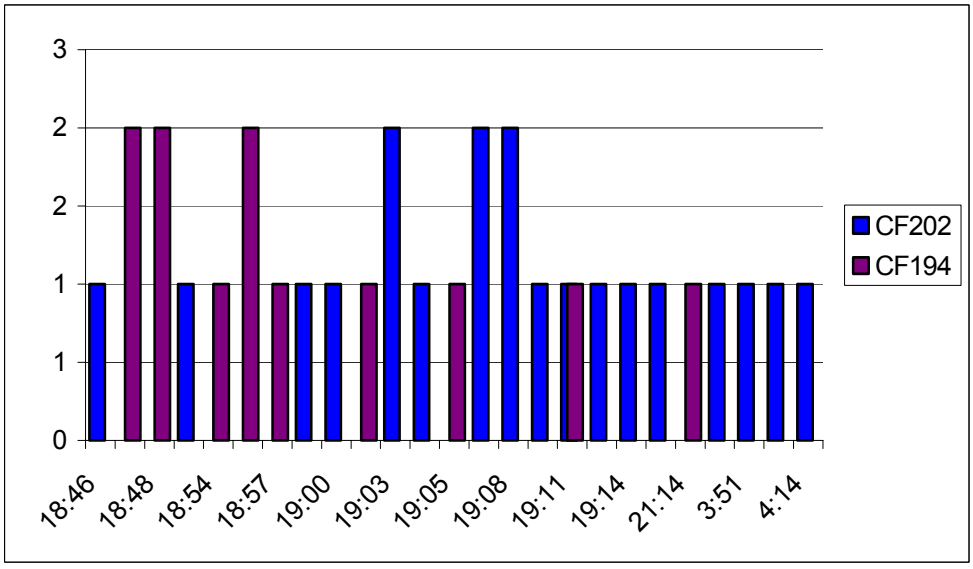

Figure 3**. Bat activity as number of bat passes per 1-minute time intervals for the night of March 21 as recorded by the two passive units at the top of Bocawina Hill. Unit 194 was at the western-most location and unit 202 at the eastern location (see Fig. 1).**

Including active monitoring, only nine species were recorded during this survey (Table 1). Bat activity in the forest was very low. It was slightly greater in the clearing near Mamma Noots Lodge but highest at the Bocawina Creek monitoring site.

Table 1. Summary of bats recorded during the March follow up survey at Mayflower-Bocawina National Park, A=active acoustic, P= passive acoustic, H= harp trap capture.

Species	20-Mar	21-Mar
Emballonuridae		
Saccopteryx bilineata	A	A
Saccopteryx leptura		A
Mormoopidae		
Pteronotus davyi		A
Pteronotus parnellii	P-H	A-P
Mormoops megaphylla		A
Phyllostomidae		
Carollia brevicauda	H	
Glossophaga commissarisi	H	
Vespertilionidae		
Myotis keaysi		A
Molossidae		
Molossus rufus	A	A

Table 2. Summary of harp trap captures during the March follow up survey at Mayflower-Bocawina National Park.
Age: all bats were adults; Sex: M=Male, F=Female, Reproductive status: NA=Not active.

Species	Sex	Reproductive
Pteronotus parnellii	1F	NA
Glossophaga commissarisi	1M	NA
Carollia perspicillata	1M	NA

Discussion

The unseasonably hot and extremely dry weather no doubt influenced the activity of these aerial insectivorous bats. This follow up survey did not detect any species that were not previously reported in the December report. Overall impressions are that within the areas of the Mayflower-Bocawina National Park surveyed, the bat species were habitat generalists found across Belize.

A notable species was the Ghost-faced bat (*Mormoops megalophylla*) recorded at Bocawina Creek during the December survey and again during this survey. This is a species of conservation concern and is an obligate cave roosting species. It does not tolerate disturbance in roost caves. This species is at risk in Belize and is threatened in Mexico, due to tourism visitation to caves that serve as roosts. Because this species was detected early in the evenings, one can assume that they are roosting within 5-10 miles of where they were recorded (the foot bridge at Bocawina Creek). This would warrant searching for potential cave roost sites within the park and restricting access to these.

Bats are often maligned by the public, primarily out of ignorance. Their nocturnal habitats lend an additional aura of mystery to these important creatures. While the common vampire bat and a few of the fruit bats can become a pests in agricultural settings, the majority of the 72 species known to occur in Belize are rarely encountered directly by people. Most people who have a chance to learn of the role they play in the ecosystem, tend to be more understanding and less likely to harm them.

Many species are quite attractive and have interesting faces. I have included in the appendix a selection of photos of some of the bats that are now known to occur in the Mayflower-Bocawina National Park.

Acknowledgments

I thank Roberto Pott, Belize Audubon Society staff biologist who assisted with this survey under the most extreme temperatures I have ever worked in Belize. I thank the Forest Department, Ministry of Natural Resources, for permit issuance. Long-term support for our work in Belize is provided by the Wildlife Conservation Society, the Terra Foundation, and Bowen & Bowen, Ltd. I thank Jan Meerman who invited us to undertake this survey and Kevin and Nannette Denny and staff of Mama Noots Backabush Resort for their hospitality. Funding for this survey was from the Protected Areas Conservation Trust, Belmopan, Belize.

Photos of selected bats known to occur in Mayflower-Bocawina National Park.

Photos courtesy of Carolyn M. Miller

Emballonuridae- Sac-winged bats

Greater white-lined sac-wing bat (*Saccopteryx bilineata*)

Mormoopidae – Mustached and ghost faced bats

Naked backed bat (*Pteronotus davyi*)

Ghost-faced bat (*Mormoops megalophylla*)

Mustached bat (*Pteronotus parnellii*) actively echolocating

Phyllostomidae Leaf-nosed bats

Greater Fruit bat (*Artibeus lituratus*)

Long-tongued bat (*Glossophaga commissarisi*)

Pygmy fruit-eating bat (*Artibeus phaeotis*)

Vespertilionidae Evening bats

Elegant Myotis (*Myotis elegans*)

Southern Yellow bat (*Lasiurus ega*)

Molossidae Free-tailed or Mastiff bats

Underwood's Mastiff bat (*Eumops underwoodi*)