BAT CAVE ROOST RECONFIRMATION AND BAT SPECIES CENSUS

APRIL 2008 – JANUARY 2009

Prepared by
Ecosystems Management Branch
National Environment and Planning Agency

JANUARY 2009

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Cover photographs (clockwise) are: NEPA team taking a calico bag with a bat at Thatchfield Great Cave in St. Ann; a bat in flight at Peyton Cave in St. Mary; a *Pteronotus macleayii* capture at Peyton Cay; entrance to Tydixon Cave in St. Catherine.

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EXECUTIVE SUMMARY

Jamaica is rated fifth in islands in terms of endemic plants and has a high level of endemism for a number of animal species such as bats. It is believed that bats are the keystone species in tropical ecosystems because their roles as pollinators and seed dispersal agents. Like other faunal and floral species of Jamaica, limited information is available on the population and habitat status of Jamaica's bat population. In an effort to close this gap the Ecosystems Management Branch, National Environment and Planning Agency commenced the implementation of a more structure assessment of the species. This document provides a report on the activities implemented under the 2008-2009 Work plan.

A total thirty-one (31) caves were visited or attempts made to visit them during the period April to August 2008 in the parishes selected for assessment (Manchester, Clarendon, St. Catherine, Portland and St. Thomas) and two other parishes (St. Ann and St. Mary). Fifteen caves were confirmed as still active bat cave roosts. Bat species were censured in seven caves Thatchfield Great Cave, Gourie Cave, Peyton Cave, Browns/Industry Cave, Richmond Park Cave, and St. Clair Cave and Lemon Ridge Cave which were visited after completion of the report as bat weather delayed their completion. Bats were recorded at all caves, except Gourie Cave where the entrance of emergence could not be located. Seven different bat species were recorded (all the *Pteronotus* sp., *Mormoops blainvillii*, *Monophyllus redmani*, *Natalus micropus* and *Artibeus jamaicensis*).

Based on the work conducted the following was recommended for the Ecosystems Management Branch 2009/2010 work plan:

- Caves previously identified as bat roosts in the parishes of St. Ann, Hanover, St. James and sections of Trelawny and St. Elizabeth should be visited to determine whether they still act as roosts and where possible identify any threats to the survival of any bats present.
- Continue the census of bat caves identified during the reconfirmation exercise or caves who species list have been mentioned in the literature
- Develop for distribution to assist in the protection of cave dwelling and non-cave dwelling bats a series of brochures which will focus on the importance of bats to people and the environment, endemic species of Jamaica and bat species of Jamaica.
- Bat guano is collected by farmers to fertilize their crops and toured by persons interested in bat caves. These visits can have a negative impact on the cave and the cave dwelling and invertebrates

which occupy the caves. Thus to reduce the impact on the caves, a fact sheet on enviro-friendly method of extraction of bat guano and touring of bat caves should be developed and distribution.

Section 1 Background

Jamaica is rated fifth in islands in terms of endemic plants and has a high level of endemism for a number of animal species (NBSAP 2003). Bats are one such group of species. Bogan (2003) stated that a decline in the bat populations is critical as "In many tropical ecosystems, bats are keystone species by virtue of their roles as pollinators and seed dispersal agents" (Gannnon et. al. 1998). Like other faunal and floral species of Jamaica, limited information is available on the population and habitat status of Jamaica's bat population. It is therefore not clearly known to what extent the population has declined or what, if any species have been lost or the status of their roosting and foraging habitats. What is certain is that there is a need the Agency to understand the requirement for a healthy bat population.

There has not been in Jamaica any focused assessment of Jamaica's bat population. Sporadic assessment or assessments of selected caves have been conducted; however an overall analysis of the status of the islands population has not been conducted. The Ecosystems Management Branch, National Environment and Planning Agency has recorded the cave species, thus reconfirming their activeness as a bat roost, in a number of caves in the Cockpit Country (11 caves), Negril Environment Protection Area (3 caves), St. Ann (1 cave) and Canoe Valley (8 caves).

In an effort to close the gap in information to facilitate proper management, the Ecosystems Management Branch commenced the implementation of a more structure assessment programme.
The Ecosystems Management Branhc in seeing a need for more coordinate management strategy for the protection of the islands bat species and habitat a management plan was developed with the draft completed in March 2008. The following report represents outcomes of assessments conducted as part of the start of activities aimed at aiding in the management of these important species and their habitat (both cave and non-cave roosts).

This document provides a report on the activities implemented under the 2008-2009 Work plan.

Section 2 Introduction

Jamaica has twenty-one (21) bat species (four which are endemic) that roost include caves, crevices, trees, and man-made structures such as building, tunnels. One hundred and fifty-five (155) caves have been identified as bat roosts (Appendix I), however their status as active roosts or the species present is not fully known as there is no regular monitoring conducted. The exception is the Windsor Great Cave in the Cockpit Country where the Windsor Research Station had implemented a monitoring programme. A few of the 157 caves have been sampled in the pass five years (e.g. St. Clair Cave, Oxford Cave, Monarva Cave), however regular monitoring needed to determine if any changes in type or number of species has occurred.

Most of Jamaica's bat population, inclusive of the rare/very rare species (e.g. *Natalus stramineus*, *Natalus micropus*, *Eumops auripendulus*, *Eumops glaucinus*), those considered uncommon (*Lasiurus degelidus*, *Erophylla sezekorni*, *Mormoops blainvillii* and *Noctilio leporinos*) and the one species now considered extinct *Phylloncteris aphylla* are all cave dwellers. Not all caves are suitable for bats and where they are, only parts of the cave provide an appropriate microclimate for them. Some caves are home to a number of different bats, for example the St. Clair Cave in Polly Ground, Ewarton, St. Catherine is home to ten of Jamaica's twenty-one species, while for some caves only one species has been recorded for them (example Birdgiddie in Mocho Mountains, Clarendon which only has the species *Tadarida brasiliensis*). Temperature, humidity and cavity size were noted to be the most important factors which determine whether a cave is suitable as a roost or not (Altringham, 1996). The species *Natalus* has been shown to require a cave with high humidity which is typical of the Windsor Great Cave and St. Clair Cave.

In the first in a series of activities to gather information to direct management strategies and as more information is available on caves, the Ecosystems Management Branch focused on cave systems commenced the reconfirmation of the recorded bat caves and bat species census of caves confirmed with bat species. Areas selected for reconfirmation and selected cave species census was in the parishes of St. Catherine, Manchester, Clarendon, St. Thomas and Portland as part of the Branches 2008-2009 work plan activities.

Rational: Implementation of the Bat Management Plan for the conservation and protection of Jamaica's bat population and their roosts.

Section 3 Methodology

3.1 Bat Cave Reconfirmation

Five parishes were selected to conduct the reconfirmation of active bat cave roost. The parishes selected were St. Catherine, Manchester, Portland, St. Thomas and Clarendon. Caves were selected based on information in Donaldson & Griffiths (unpublished 1997), "The Caves and Sinkholes of Manchester, Jamaica-Conservation Priorities, July 2, 2007" by R. S. Steward, Jamaican Caves Organisation and a list of bat caves in Jamaica complied by the Jamaica Caves Organisation (received by NEPA in 2005).

The caves were located using GPS coordinates from Jamaica Caves Organisation documents which were placed on the respective 1:50,000 map sheets and also through interviews with persons in the expected locations. The residents in the area were censured to first to confirm the location of the cave and secondly to ascertain whether it is known to be a bat cave. At each cave a data sheet was completed, see Appendix II, and the coordinates for the caves recorded using a handheld Global Positioning System (GPS) unit. A description of the area where the cave is located inclusive of the route to the cave if not in an obvious location was recorded. The presence of bats were confirmed either by directly observing them, information from the residents or evidence of their presence in the caves (either plant seedlings or the smell of guano/bat droppings).

3.2 Bat Species Census

The bat caves selected for census was based either on caves confirmed to have bats in 1997, known to have the rare and uncommon species or caves identified during the reconfirmation exercise described in 2.1 above. A harp trap[1] or mist net[2] was used to capture the bats (figures 1). These were placed at the cave mouth where the bats were thought to exit. The harp trap is placed directly in front of the cave mouth, suspended above the ground with curtains (cloth or plastics) erected at the edges of the harp (if needed) or any other exits to ensure the bats fly into the harp trap while the mist net is located away from the mouth of the cave at to allow for the capture of the bats, and ease of access for the persons removing the bats from the net. The location of the mist net is also dependent on the expected flight path out of the cave and the distance can vary from exactly at the cave mouth or further (e.g. at water holes, across trails which are part of the flight path).

[1] a bat capture trap consisting of a large frame with a bank of fine wires space approximately 2.5cm apart which are detected by the echolocating bats however there are enough wires to stop their flight momentum causing them to fall into the bag below
[2] large finely woven net that is setup to capture birds or bats flight

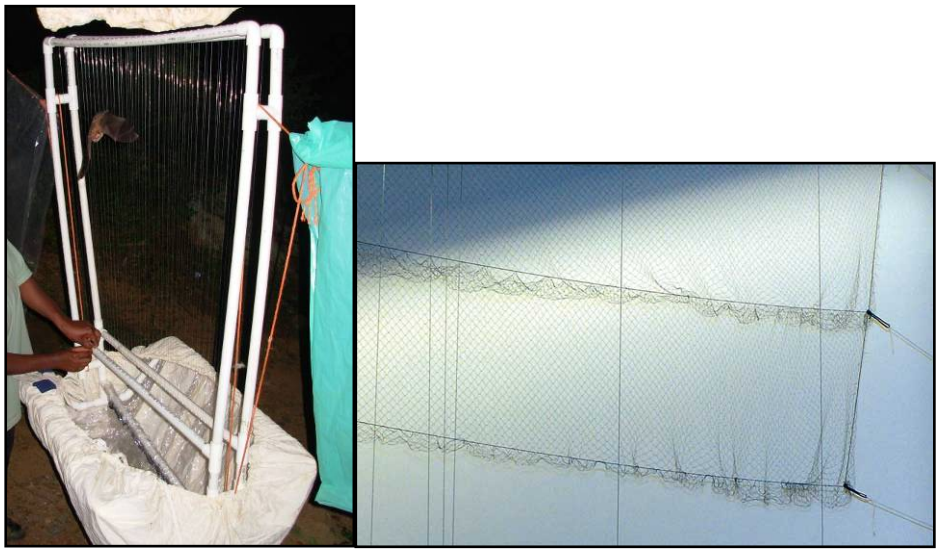

Figure 1 Harp trap (curtains left and right of frame) to the left and a mist net on the right.

Depending on the number of bats, approximately two to four hours is spent at the cave. For each bat captured the species name, sex, reproductive status (pregnant, lactating or scrotum descended), weight and forearm length were recorded (Appendix III). The hair of the bat on the back was also clipped so as to identify that data was collected from this individual.

Section 4 Results

4.1 Bat Cave Reconfirmation

A total thirty-one (31) caves were either visited or an attempt made to visit them during the period April to August 2008. This included caves within the selected parishes and six caves (three each) from St. Ann and St. Mary (figure 2 and Appendix IV). Of the thirty-one, fifteen (15) were confirmed to still be active bats roosts.

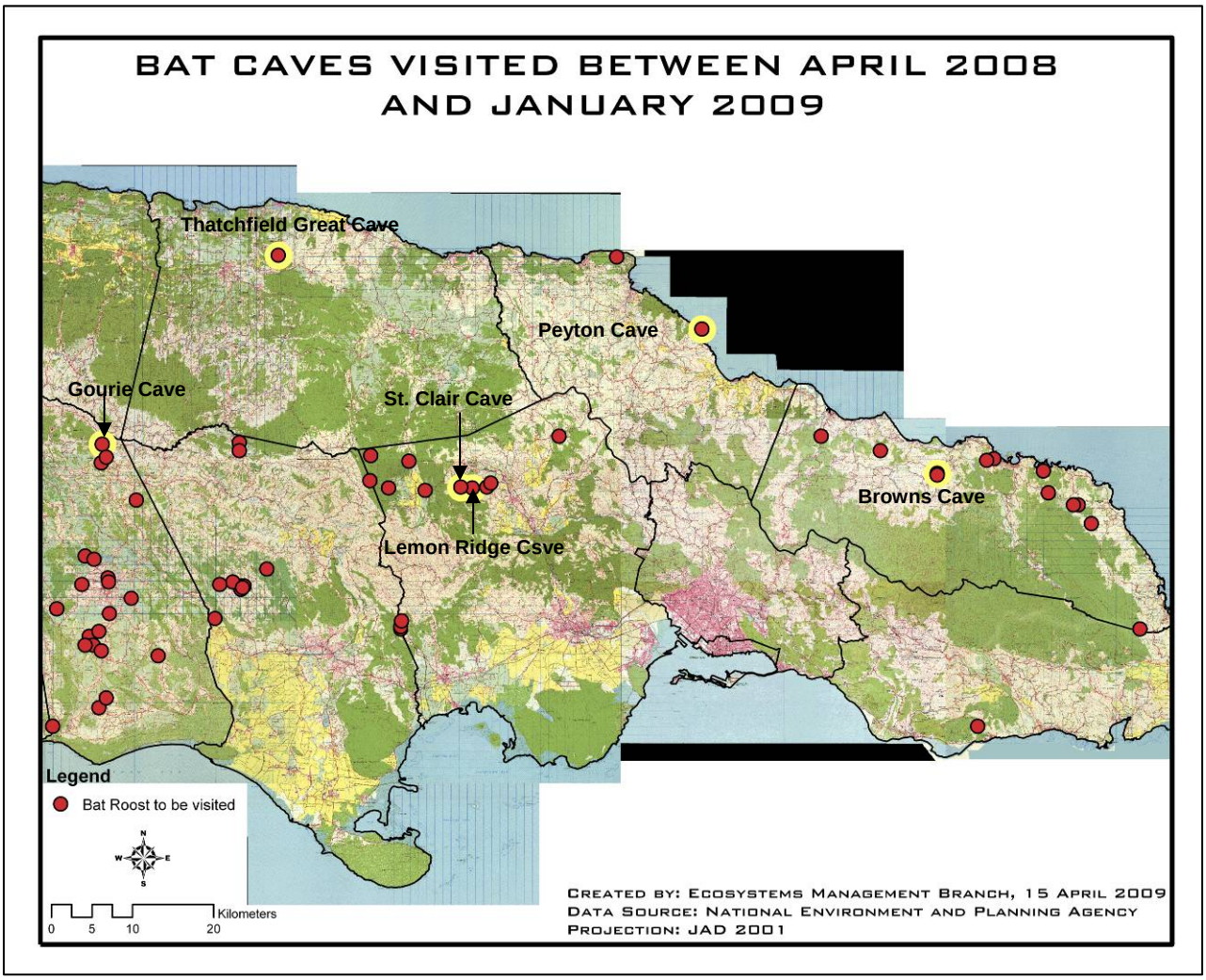

Figure 2 The location of caves visited for their reconfirmation as active bat roosts (red dots) and assessment of the bat species present (yellow dots)

In the parish of Manchester only four caves (Knowsley Park Cave, Caledonia Cave, Gourie Cave and Berry Hill Cave) were located as the other seven were either unknown to the persons in the area or destroyed due to bauxite mining activities or residential development. Gourie Cave was the only cave confirmed to still be an

active roost, while a night assessment would be required to confirm whether Caledonia Cave and Berry Hill Cave was still active. Residence indicated that a farmer burnt out the bats in Knowsley Park and he felt they were damaging his crops.

For the remainder of the parishes only two caves could not be located (Clark Hole #1 and Creighton Hall Cave) as while citizens were aware of the caves and that they had bats, they could not give directions to be caves.

Overall, all caves visited and even those not visited which were not destroyed by bauxite mining or residential development were still active bat roosts. These caves will now need to be assessed to determine what species are present and significance (size) of the bat population.

4.2 Bat Species Assessment

Seven caves were visited to be censured; Thatchfield Great Cave, Gourie Cave, Peyton Cave, Browns/Industry Cave, Richmond Park Cave, St. Clair Cave and Lemon Ridge Cave (at the time of this report St. Clair Cave was still to be assessed). Due to weather conditions, visits to St. Clair and Lemon Ridge Cave had to be delayed to January 2009 as the river to be crossed was impassable (the data sheets and a report on the caves will be included as an addendum to the report). Appendix V includes the completed data sheets for Thathcfield Cave, Richmond Park Cave, Peyton Cove Cave and Thatchfield Great Cave and Appendix VI provides images of the bats captured. No data sheet was completed for Gourie and Browns/Industry Cave as no bats were caught.

4.2.1 Gourie Cave

The cave is located in a Forest Reserve in Coleyville, Manchester (figure 3). It is a complex cave that is a cave containing interconnecting shafts, passages and chambers. Two entrances were noted on the first visit on 13 May 2008, one of which lead to a stream flowing through (figure 4). The Forestry Department Ranger on site indicated that on occasions visitors were taken to the cave. The Ranger also advised that bats were in the caves.

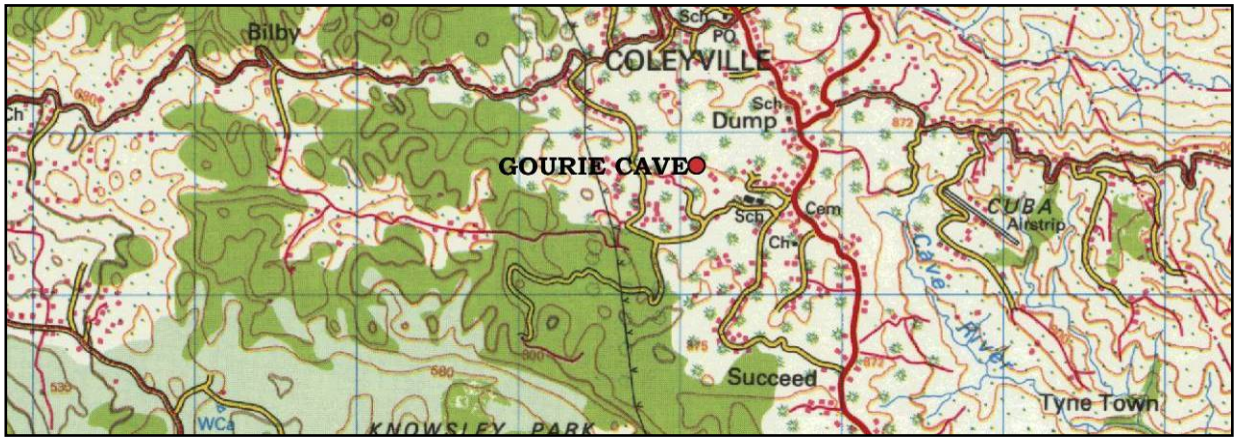

Figure 3 Location map for Gourie Cave in Coleyville, Manchester

Figure 4 The first entrance of Gourie Cave with stairway and railings leading to a stream (left) and the second entrance (right)

An attempt to capture and identify bat species from the cave was conducted on 21 & 22 May 2008. The first day was to be used determine which exit the bats utilized and the second to capture the bats. Neither entrances noted on May 13 showed any bats exiting, therefore on the second night based on discussion with a resident in the area, the team attempted to locate a third exit. This was unsuccessful; however, bats were observed flying in the vicinity of the cave which could indicate that the bats are coming from the exit that was not located, or unidentified exit.

4.2.2 Industry Cave/Brown's Cave

Industry Cave is located in Industry Village, Portland (figure 5). The cave was visited to conduct a bat species census on 23 July 2009. It is a wet passage cave, that is, a wet cavity which is much longer than wide or high and may join larger cavities.

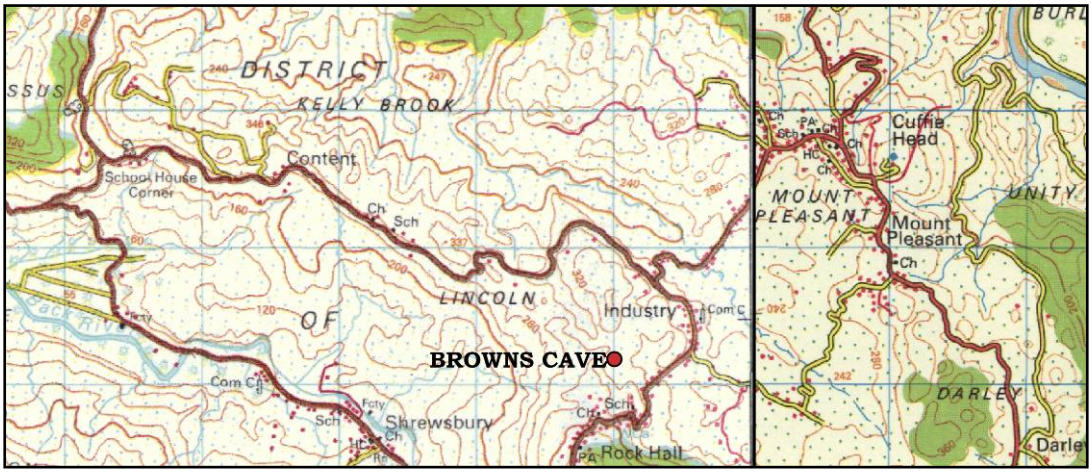

Figure 5 Location map for Browns Cave/Industry Cave

No bats were captured at this cave as the entrance was too wide for effective use of the harp trap and the area in front of the cave was too small to safely erect and use the mist net (figure 6).

Figure 6 Entrance of Brown's/Industry Cave with harp trap plus curtains and the assessment team waiting patiently

4.2.3 Richmond Park Cave

Richmond Park Cave, located in Richmond, Clarendon (Figure 7 & 8) was visited on 16 September 2008. It is described as a shaft to a cave (a shaft is a "vertical cavity roughly equal in horizontal dimensions but much deeper than broad" and it is wider than a chimney). Sixteen (16) individuals were captured, fifteen males and one female. All were the species *Tadarida brasiliensis*. The bats commenced emerging at 6:15 p.m. and this stopped at approximately 6:30 p.m. Residence in the area indicated that usually the bats usually return at 5:15

a.m. and that they feed on the Naseberry (*Manilkara zapota*), Coffee beans and Guinep (*Melicoccus bijugatus*), dropping the seeds on their roofs.

Figure 7 Location map for Richmond Park Cave

Figure 8 Two views of the entrance of Richmond Park Cave from outside (left) and inside the cave (right)

4.2.4 Peyton Cove Cave

Peyton Cave is located in Robins Bay, St. Mary and is adjacent to the coastline (figure 9) and was visited on 3 December 2008. This is a chamber cave (a cave with a large cavity, with considerable width and length but not necessarily great height).

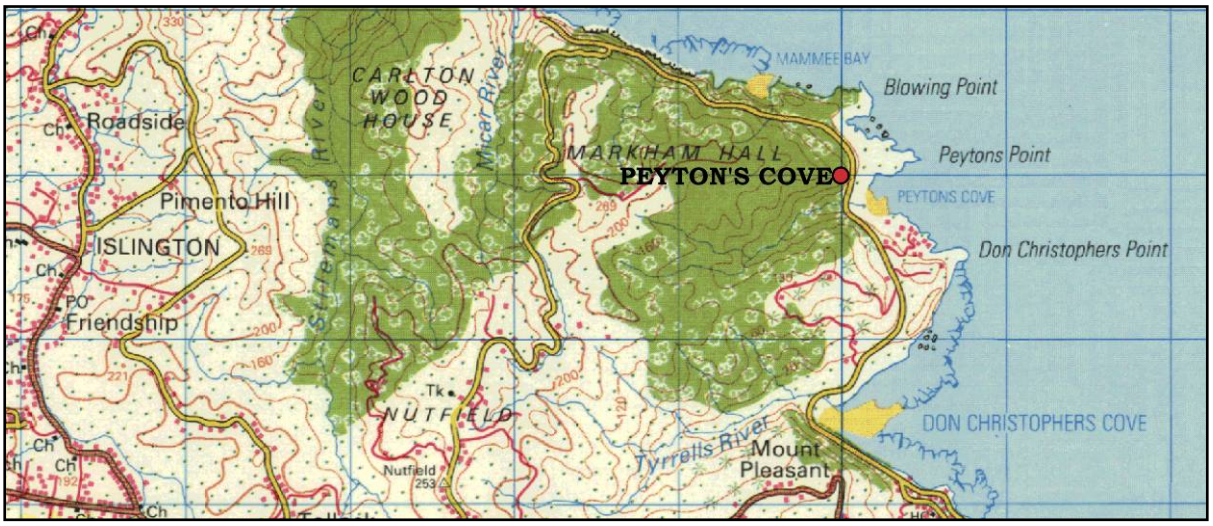

Figure 9 Location map for Peyton's Cove Cave

Fifty-one (51) bats were captured and included the species *Pteronotus parnellii* and *P. macleayii*. The majority of the bats captured were *P. parnellii* and three of them were pregnant. Exit of the bats started at 5:15 p.m.

4.2.5 Thatchfield Great Cave

Thatchfield Great Cave is located in Lilyfield, St. Ann (figure 10) and is a complex cave, that is, it contains interconnected shafts, passages and chambers. The caves main entrance is called *Light Hole Sink* due to large entrance with its vertical drop of 30.48m (figure 11). Two smaller entrances are also to be found to the south-west of the latter entrance (figure 12).

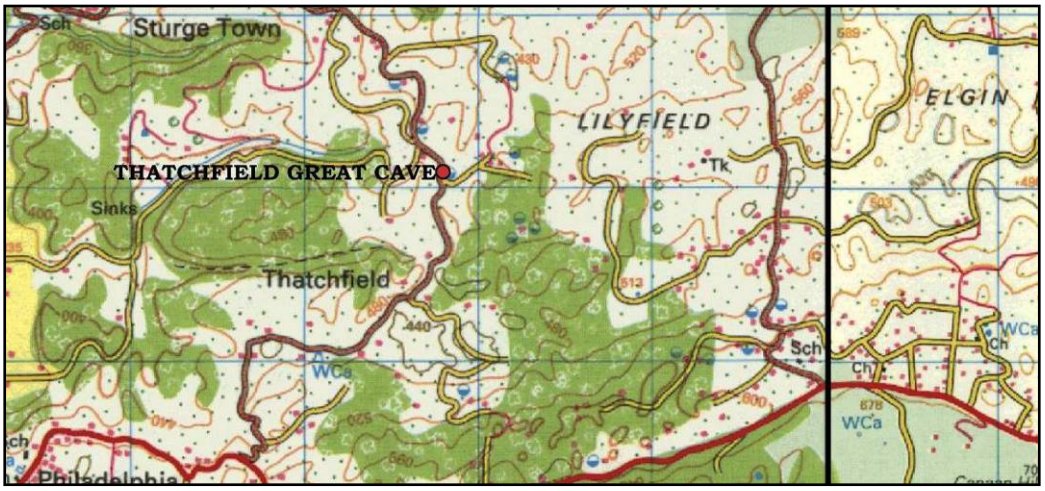

Figure 10 Location map for Thatchfield Great Cave

Figure 11 Main entrance for Thatchfield Great Cave

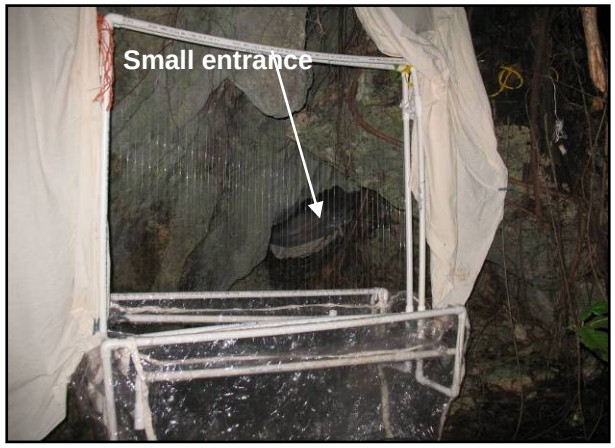

Figure 12 The harp trap placed in front of the other entrance to Thatchfield Cave

This cave was censured twice on 17 December 2008 and 7 January 2009, this was done because on the first visit the assessment team arrived when the bats were emerging (5:30p.m.). The harp was erected nonetheless and a total of six bats were captured representing five species of bats (*Natalus micropus*, *Pteronotus macleayii*, *P. parnellii* and *Artibeus jamaicensis*). On the second visit the harp was erected prior to the bats emerging, however on this occasion, only three species of bats were captured out of a total of eight-two bats. All three species belonged to the same genus *Pteronotus* (*P. parnellii*, *P. macleayii* and *P. quadridens*). Unfortunately on this occasion there were two mortalities.

Section 5 Discussions

Not much can be discussed at this time the information now being gather is preliminary, however, based on the observations in Manchester, a significant amount of the caves may have been lost due to mining activities. There is however, due to limited to no assessments conducted on these caves to determine what species have been displaced/lost, whether alternative exits have been found by the bats or if lost the consequences of this loss.

Regarding the species census conducted as a single assessment, especially for caves with multiple exits, is unlikely to provide an accurate impression of the species diversity or the size of the populations resident in the cave. This was clearly reflected with Thatchfield where on the first visit six bats were collected representing five species while on the second assessment eighty-two bats were collected representing three species all in the same genus (*Pteronotus*). While it is necessary to have multiple monitoring events the frequency of these assessment must however be regulated because if it is too often the bats may leave the roosts.

Section 6 Recommendations

In continuation of information gathering and to implement some management actions, the following is being recommended for the Ecosystems Management Branch 2009/2010 workplan:

- Caves previously identified as bat roosts in the parishes of St. Ann, Hanover, St. James and sections of Trelawny and St. Elizabeth should be visited to determine whether they still act as roosts and where possible identify any threats to the survival of any bats present.
- Continue the census of bat caves identified during the reconfirmation exercise or caves who species list have been mentioned in the literature
- Develop for distribution to assist in the protection of cave dwelling and non-cave dwelling bats a series of brochures which will focus on the importance of bats to people and the environment, endemic species of Jamaica and bat species of Jamaica.
- Bat guano is collected by farmers to fertilize their crops and toured by persons interested in bat caves. These visits can have a negative impact on the cave and the cave dwelling and invertebrates which occupy the caves. Thus to reduce the impact on the caves, a fact sheet on enviro-friendly method of extraction of bat guano and touring of bat caves should be developed and distribution.

Reference

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Altringham, John D. 1996. Bats, Biology and Behaviour. Oxford University Press.

Bogan, Michael A. 2003. Potential Effects of Global Change on Bats. Wildlife Research Biologist, Biological Resources Division, USGS and Research Professor of Biology, University of New Mexico. [http://geochange.er.usgs.gov/sw/impacts/biology/bats/]

APPENDIX I

CAVES IDENTIFIED AS BAT ROOST

BABYLON CAVE
BAT HOLE CAVE #1.
BATH MOUNTAIN CAVE
BELMONT CAVE #1.
BELMONT CAVE #2.
BERRY HILL CAVE
BIG BOTTOM CAVE
BIRDGIDDIE CAVE
BIRTHDAY CAVE
BLOOMFIELD CAVE
BOG HOLE
BOG HOLE
BRAMBRIBO CAVE
BRISCOE CAVE
BRISTOL CAVE
BROWNS CAVE
BURNT HILL CAVES
BUSHA MOUTH CAVE
BOG HOLE
BOG HOLE

CALEDONIA CAVE
CAMP CAVE
CARAMBIE CAVE
CHARLESTOWN CAVE
CHATSWORTH CAVE
CHESTERFIELD CAVE
CLARENDON PARK CAVES
CLARKS HOLE #1.
CLOVER HILL CAVE
CLERMONT CAVE
COUSINS COVE CAVE 1
COUSINS COVE CAVE 2

DADDY'S SINK
DALEY DEEP SINK
DALEY LITTLE SINK
DALEY TWIN SINKS
DEVILS STAIRCASE
DORIS VILLA CAVE
DOVER CAVE
DRAPERS CAVE #1.
DRAPERS CAVE #2.
DRAPERS CAVE #3.
DROMILLY CAVE
DRUM CAVE
DUNG HOLE

ENGLAND CAVE
ESSO SHELTER CAVE

FLORENCE HALL CAVE
FREE MOUNTAIN CAVE

GOOD HOPE CAVE
GOURIE CAVE
GRIERFIELD CAVE
GUINEA CORN CAVE

HALL AND HILL CAVE
HAMMONDS CAVE
HARTIES CAVE #2
HOLMES RIVER CAVE
HOPETON SINK 3
HUDSONS CAVE

IDLEWILD CAVES

KINOWL CAVE
KNOWSLEY PARK CAVE

LEMON RIDGE CAVE
LIGHT HOLE CAVE
LOGAN HOLE #2.
LOOKOUT CAVE

McKENZIE CAVE
McKENZIE CAVE
MARNE CAVE
MARSHALLS PEN CAVE
MARTA TICK CAVE
MOCHO CAVE
MORGANS POND HOLE
MOSELY HALL CAVE

NEMBHARD PIT CAVE
NEW FOREST CAVE 1.
NEW FOREST CAVE 2.
NEW GREEN CAVE
NEW HALL CAVE
NORWOOD RATBAT HOLE

PATRICK CAVE
PEDRO BLUFF CAVES
PERU CAVE
PEYTON'S COVE
PLANTERS HALL CAVE 1
PLANTERS HALL CAVE 2
PLEASANT HALL CAVE
POLE CAVE
PONDSIDE CAVE

OLD MAN CAVE
OXFORD CAVE

RAMBLE BAT HOLE
RATBAT CAVE
RAT BAT HOLE #2.
RAYMONDS CAVE
RETREAT GULLY CAVE
RHODEN CAVE
RICHMOND PARK CAVE
RIGLEY'S CAVE
RIO MAGNO CAVE
ROCK RAMBLE CAVE
ROCK SPRING CAVERNS
ROTA CAVE
RUNAWAY BAY CAVES

SALMON GULLEY CAVE
SCHWALLENBURGH CAVE
SHERWOOD FOREST CAVE
SHERWOOD FOREST CAVE
SMOKEY HOLE CAVE
SOMERVILLE CAVE
SPANIARD CAVE
SPANIARD CAVE
SPANIARD HOLE CAVE
SPRING GROUND CAVE
SPRINGVALE SOUTH CAVE
STANFORD CAVE
ST. CLAIR CAVE
ST. LEONARDS CAVE
STONES HOPE CAVE
STONY HILL CAVE

THATCHFIELD GREAT CAVE
THOMPSON'S CAVE
THUNDER CAVE
TYDIXON RATBAT CAVE

UPPER SPRINGVALE CAVE

VAUXHALL CAVE
VENUS CAVE
VICTONS CAVE
VICTORIA CAVE
VICTORIA CAVE

WALLINGFORD COLLAPSE CAVE
WALLINGFORD MAIN CAVE
WALLINGFORD RIVER CAVE
WALLINGFORD ROADSIDE CAVE
WALLINGFORD SINKHOLE-1
WALLINGFORD SINKHOLE-2
WALLINGFORD TUNNEL CAVE
WILLIAMSON CAVE
WINDSOR CASTLE CAVE
WINDSOR FOREST CAVE
WINDSOR GREAT CAVE
WINDSOR MAIN ENT
WONDROUS CAVE
WORTHY PARK CAVE #1.
WRIGHT CAVE

YARDLEY CHASE CAVES
YOUNG GULLY CAVE

COVENTRY CAVE
CREIGHTON HALL CAVE
CROFTS RIVER CAVE #1
CROYDON MOUNTAIN CAVE
JACKS HILL CAVE
JACKSONS BAY CAVE
JOHNNIE SPRING CAVE
PORTLAND CAVE #1.
PORTLAND CAVE #2.
PORTLAND CAVE #6-8.
STONY HILL CAVE
SWANSEA CAVE

APPENDIX II

BAT CAVE ASSESSMENT DATA SHEET

Parish: _____ **Name of the Cave:** _____

Date: _____ **Site Name:** _____

GPS Coordinates: _____

Type of Caves: _____

Contact Persons: _____

Relief Description: _____
_____
_____
_____
_____
_____
_____
_____

Notes and Observations: _____
_____
_____
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Name of person completing form:

APPENDIX III

Pictorial Representation of data collection activities during assessments

Plate 2 The measuring of the forearm with a calliper and cutting of hair on the back of the bat to ensure there is no double recording of captured animals.

Plate 1 The sex of each animal is determined. This is a male *Pteronotus*

Plate 3 The spring balance being used to weigh the bat which is contained in a cloth bag.

APPENDIX IV

List of Caves Visited for Reconfirmation and Assessment

PARISH	CAVE	TOWN	DATE VISITED	BATS P/A	COMMENT
Clarendon	Birdgiddie Cave	Mocho	12-Jun-08	P?	believed located
	Marne Cave	Marne	17-Jul-08	P	
	Crofts River Cave				inaccessible
	Clarendon Park Cave	Scotts Pasture	07-Aug-08	no	shelter cave no bats?;
	Dung Hole Cave		09-Aug-08		
	Richmond Park Cave	Richmond Park	13-Aug-08	P	Bat species assessed 16 Sept. 08
	Belmont Cave #1 Cave	Mocho (Belmont)		P	
	Daddy Sink Hole Cave	Belmont area		A?	inaccessible
	Patrick Cave				Not visited
	Raymonds Cave				Not visited
St. Catherine	Tydixon Cave	Tydixton	17-Jul-08	P	
	Rhoden Cave	Planters Hall	25-Aug-08	P	
	Planters Hall #1		25-Aug-08	P	
	Planters Hall #2		25-Aug-08	P	
	Swansea Cave	Tydixton Park	October 2008	P	
	St. Clair Cave	Polly Ground		P	Bat species to be assessed 28 Jan 09
	Clark Hole #1	Jericho			could not locate
	Lemon Ridge Cave	Lemon Ridge		P	Bat species assessed 21 Jan 09
	Camp Cave	Tydixton Park			Not visited
	Worthy Park Cave #1	Worthy Park			Not visited
	Victoria Cave				Not visited
	Rio Mango Cave				Not visited
St. Thomas	Creighton Hall Cave	Creighton Hall	16-Jul-08	P	cannot be located

List of Caves Visited for Reconfirmation and Assessment cont'd.

PARISH	CAVE	TOWN	DATE VISITED	BATS P/A	COMMENT
Portland	Browns Cave		13-Jul-08	P	Bat species assessed 23 July 08
	Stony Hill Cave			P	located
	Sherwood Forest Cave		05-Dec-08		Unable to view as under vegetation
	Windsor Forest Cave				too far to visit at the time of the survey - cave was 4.8km from location
	Charlestown Cave				Not visited
	Clermont Cave				Not visited
	Ratbat Cave				Not visited
	Bog Hole				Not visited
	Drapers Cave #1, 2 &3				assess in 1997 and bats present
	Rat Bat Hole #2				assess in 1997 and bats present
	Nembhard Pit Cave				Not visited
	Briscoe Cave				Not visited
Manchester	Berry Hill Cave	Dalys Grove	30-Apr-08		Only Berry Hill Cave and Caledonia Cave were located. The other caves could not be located as a number of them were in areas which had been mined
	Hudson Cave	Dalys Grove			
	Daley Deep Sink	Dalys Grove			
	Bloomfield Cave	Mandeville			
	Caledonia Cave	Mandeville			
	Daley Little Sink	Daley Hillside			
	Daley Twin Sink	Meadsfield			
	Esso Shelter	Newport			
	Knowsley Park Cave	Mollison	May 13, 2008	A	
	Gourie Cave	Coleyville		P	Attempted assessment 21 & 22 May 08
St. Mary	Peyton Cave	Robins Bay	24-Jul-08	P	Bat species assessed 3 Dec. 08
	Rockspring Cavern	Rockspring	24-Jul-08		surrounded by water thus unable to tell if bats were in the cave.
	Idlewild Cave	Dirlton			assess in 1997 and bats present
St. Ann	Chesterfield Cave	Chesterfiled	29-Jul-08	P	
	Johnnie Spring/Ambrose Cave	Johnnie Spring	29-Jul-08	P	
	Thatchfield	Lilyfield	29-Jul-08	P	Bat species assessed 17 Dec 08 & 7 Jan 09

APPENDIX V

Bat Cave Species Assessment Data Sheets

Richmond Park Cave

Location: Richmond Park Cave
Richmond, Clarendon

Date: Sept. 16, 2008

Personnel: Andrea Donaldson, Richard Nelson, Noreen Chambers

Time net opened: 5:30 p.m

Time net closed: 6:55 p.m.

# of nets: harp (Sketch on Back_____)

Net hours: 1hr 25min

Moon phase:

Weather: rain, stopped, relatively clear skies

Netting conditions*: good (bag weight = 10g)

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	6:15	*Tadarida brasiliensis*	A	F	lactating	48.60	20	The bats starting emerging at 6:00 pm and
2	6:56	*Tadarida brasiliensis*	A	M		48.6	17	emergence was completed by 6:3 pm.
3	7:00	*Tadarida brasiliensis*	A	M		42.0	20	
4	7:03	*Tadarida brasiliensis*	A	M	genital extended	49.0	20	A resident in the area said that the bats would
5	7:05	*Tadarida brasiliensis*	A	M	genital extended	38.5	17	return at 5:15 am the next day. He said that
6	7:06	*Tadarida brasiliensis*	A	M		40.5	20	the bats eat the naseberry, coffee beans, Guinep
7	7:31	*Tadarida brasiliensis*	A	M	genital extended	41.0	19	and said you here them dropping things on the
8	7:44	*Tadarida brasiliensis*	A	M		37.7	17	house roof.
9	7:44	*Tadarida brasiliensis*	A	M	genital extended	39.4	17	
10	7:45	*Tadarida brasiliensis*	A	M		39.4	19	
11	7:50	*Tadarida brasiliensis*	A	M	genital extended	39.4	17	
12	7:52	*Tadarida brasiliensis*	A	M	genital extended	39.6	20	
13	7:53	*Tadarida brasiliensis*	A	M	genital extended	38.3	17	
14	8:03	*Tadarida brasiliensis*	A	M		38.9	19	
15	8:03	*Tadarida brasiliensis*	A	M	genital extended	39.7	20	
16	8:07	*Tadarida brasiliensis*	A	M		40.1	19	

*** Excellent** = no adverse conditions (wind, rain, moon), **Good =** 1 adverse condition for less than 25% of net time, **Fair =** 1 or more adverse conditions less than 50 % of net time, **Poor =** 1 or more adverse conditions more than 50 % of net time

Thatchfield Great Cave

Location: Thatchfield Cave
Lilyfield, St. Ann

Date: December 17, 2008

Personnel: Andrea Donaldson, Richard Nelson
Loureene Jones Smith, David Reid, Jan Pauel (JCO)

Time net opened: 6:02 p.m. **Time net closed:** 7"27 p.m. **# of nets:** harp 1 **Net hours:** 1hr 5min

Moon phase: **Weather:** overcast **Netting conditions*:** good (bag weight = 10g)

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	6:02	*Natalus micropus*	A	M		34.90	10	long genitalia
2	5:20	*Pteronotus quadridens*	A	M		42.8	15	big genitalia
3	5:25	*Artibeus jamaicensis*	A	M		61.5	55	
4	5:27	*Pteronotus macleayii*	A	M		44.1	15	Bats were observed flying through the forest while on the road side at 5:30pm and by 6:00pm the exit was not noted. The harp was erected and bats were caught. Bats were recorded at the frequency 40, 45, 30, 55
5	5:30	*Pteronotus macleayii*	A	M		41.2	15	
6	5:32	*Pteronotus parnellii*	A	F	pregnant	51.6	25	

*** Excellent** = no adverse conditions (wind, rain, moon), **Good =** 1 adverse condition for less than 25% of net time, **Fair =** 1 or more adverse conditions less than 50 % of net time, **Poor =** 1 or more adverse conditions more than 50 % of net time

Peyton Cave

Location: Peyton Cave
Robins Bay, St. Mary

Date: December 3, 2008

Personnel: Andrea Donaldson, Richard Nelson
Noreen Chambers, Jan Pauel, Vivian Blake, Dale (community person

Time net opened: 5:30 p.m. **Time net closed:** 6:53 p.m **# of nets:** harp **Net hours:** 1hr 53min

Moon phase: Half phase **Weather:** clear skies **Netting conditions*:** good (bag weight = 10g)

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	5:15	*Pteronotus parnellii*	A			50.22	20	
2	5:20	*Pteronotus parnellii*	A			50.45	20	
3	5:25	*Pteronotus parnellii*	A	M		50.20	15	
4	5:27	*Pteronotus parnellii*	A	M		50.21	20	
5	5:30	*Pteronotus parnellii*	A	M		50.55	15	
6	5:32	*Pteronotus parnellii*	A	M		50.35	20	
7	5:35	*Pteronotus parnellii*	A	M		50.25	20	
8	5:40	*Pteronotus parnellii*	A	M		50.25	20	
9	5:41	*Pteronotus parnellii*	A	M		50.56	20	
10	5:44	*Pteronotus parnellii*	A	M		50.51	20	
11	5:46	*Pteronotus parnellii*	A	M		50.08	20	
12	5:48	*Pteronotus parnellii*	A	M		50.44	20	
13	5:50	*Pteronotus parnellii*	A	M		50.27	30	
14	5:52	*Pteronotus parnellii*	A	M		50.43	20	
15	5:55	*Pteronotus parnellii*	A	M		50.50	30	
16	5:57	*Pteronotus parnellii*	A	M		50.28	30	
17	5:59	*Pteronotus parnellii*	A	M		50.38	30	
18	6:00	*Pteronotus macleayii*	A	M		49.00	30	
19	6:03	*Pteronotus parnellii*	A	M		50.34	30	scar section wing at the base of the body
20	6:04	*Pteronotus parnellii*	A	M		50.19	20	
21	6:05	*Pteronotus parnellii*	A	M		50.32	30	
22	6:10	*Pteronotus parnellii*	A	M		50.47	30	
23	6:12	*Pteronotus parnellii*	A	M		50.49	30	
24	6:13	*Pteronotus parnellii*	A	M		50.30	30	
25	6:13	*Pteronotus parnellii*	A	M		50.30	30	

Excellent = no adverse conditions (wind, rain, moon), **Good =** 1 adverse condition for less than 25% of net time, **Fair =** 1 or more adverse conditions less than 50 % of net time, **Poor =** 1 or more adverse conditions more than 50 % of net time

Peyton Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
26	6:14	*Pteronotus parnellii*	A	M		50.30	30	
27	6:14	*Pteronotus parnellii*	A	M		50.28	30	
28	6:15	*Pteronotus parnellii*	A	M		50.40	20	
29	6:16	*Pteronotus parnellii*	A	M		50.42	20	
30	6:17	*Pteronotus parnellii*	A	M		50.42	20	
31	6:18	*Pteronotus parnellii*	A	M		50.44	20	
32	6:20	*Pteronotus parnellii*	A	M		50.44	20	
33	6:22	*Pteronotus parnellii*	A	M		50.44	20	
34	6:25	*Pteronotus parnellii*	A	M		50.29	20	
35	6:26	*Pteronotus parnellii*	A	M		50.42	20	
36	6:28	*Pteronotus parnellii*	A	M		50.38	20	
37	6:29	*Pteronotus parnellii*	A	M		50.23	20	
38	6:30	*Pteronotus parnellii*	A	M		50.17	20	
39	6:31	*Pteronotus parnellii*	A	M		50.24	20	wing had a scar
40	6:32	*Pteronotus parnellii*	A	M		50.15	20	
41	6:33	*Pteronotus parnellii*	A	M		50.32	20	
42	6:35	*Pteronotus parnellii*	A	M		50.31	20	
43	6:36	*Pteronotus parnellii*	A	M		50.31	20	
44	6:40	*Pteronotus parnellii*	A	M		50.33	20	
45	6:42	*Pteronotus parnellii*	A	M		50.41	20	
46	6:43	*Pteronotus parnellii*	A	M		50.61	20	
47	6:44	*Pteronotus parnellii*	A	M		50.61	20	
48	6:44	*Pteronotus parnellii*	A	M		50.58	20	
49	6:45	*Pteronotus parnellii*	A	F	pregnant		20	all caught returning to the cave and when the harp was being dismantled.
50	6:47	*Pteronotus parnellii*	A	F	pregnant	50.20	20	
51	6:47	*Pteronotus parnellii*	A	F	pregnant	50.23	20	

Thatchfield Great Cave

Location: Thatchfield Cave
Lilyfield, St. Ann

Date: January 7, 2009

Personnel: Andrea Donaldson, Ricardo Miller, Loureene Jones Smith
David Reid, Kapleton Hall, Noreen Chambers, Ainsley Henry

Time net opened: 5:40 p.m. **Time net closed:** 7:40 p.m. **# of nets:** harp 1 **Net hours:** 2hr

Moon phase: **Weather:** overcast **Netting conditions*:** good (bag weight = 10g)

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	5:49	*Pteronotus parnellii*	A	M		52.60	10	
2	5:50	*Pteronotus parnellii*	A	M		52.43	10	
3	5:56	*Pteronotus parnellii*	A	M		52.31	10	
4	5:58	*Pteronotus parnellii*	A	M		52.42	10	
5	5:59	*Pteronotus parnellii*	A	M		52.22		
6	6:00	*Pteronotus parnellii*	A	M		52.43	10	
7	6:01	*Pteronotus parnellii*	A	M		52.37	10	
8	6:02	*Pteronotus quadridens*	A	M		31.47	10	euthenised as wing was broken
9	6:03	*Pteronotus parnellii*	A				10	flew away
10	6:04	*Pteronotus parnellii*	A	M		52.20	10	
11	6:05	*Pteronotus parnellii*	A	M		52.25	10	
12	6:05	*Pteronotus parnellii*	A	M		52.44	10	
13	6:06	*Pteronotus parnellii*	A	M		52.49	10	
14	6:07	*Pteronotus parnellii*	A	M		52.50	10	
15	6:07	*Pteronotus parnellii*	A	M		52.45	10	
16	6:08						10	flew away
17	6:09	*Pteronotus quadridens*	A	M		40.00	5	boils on the right leg (from back)
18	6:09	*Pteronotus parnellii*	A	M		52.23	12	wing broken and thus was euthanised
19	6:12	*Pteronotus parnellii*	A	M		52.50	10	
20	6:13	*Pteronotus parnellii*	A	M		52.27	10	
21	6:14	*Pteronotus parnellii*	A	M		52.54	10	
22	6:14	*Pteronotus parnellii*	A	M		52.38	10	
23	6:15	*Pteronotus parnellii*	A	M		52.32	10	
24	6:16	*Pteronotus parnellii*	A	M		52.44	10	with orange-yellow insects

*** Excellent** = no adverse conditions (wind, rain, moon), **Good =** 1 adverse condition for less than 25% of net time, **Fair =** 1 or more adverse conditions less than 50 % of net time, **Poor =** 1 or more adverse conditions more than 50 % of net time

Thatchfield Great Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
25	6:18	*Pteronotus parnellii*	A	M		52.35	8	
26	6:18	*Pteronotus parnellii*	A	M		52.25	10	
27	6:19	*Pteronotus parnellii*	A	M		52.46	12	orange-yellow insects
28	6:19	*Pteronotus quadridens*	A	M		38.30	5	with long gentitals
29	6:20	*Pteronotus parnellii*	A	M		52.30	10	
30	6:20	*Pteronotus parnellii*	A	M		52.32	9	
31	6:22	*Pteronotus parnellii*	A	F		52.36	8	not pregnant
32	6:24	*Pteronotus parnellii*	A	M			10	released without FA measurements taken
33	6:25	*Pteronotus parnellii*	A			52.33	10	
34	6:26	*Pteronotus parnellii*	A	M		52.33	6	
35	6:26	*Pteronotus parnellii*	A	M		52.05	10	
36	6:27	*Pteronotus parnellii*	A	M		52.48	10	
37	6:28	*Pteronotus parnellii*	A	M		52.58	10	
38	6:29	*Pteronotus parnellii*	A	M		52.25	10	
39	6:29	*Pteronotus parnellii*	A	M		52.48	10	
40	6:30	*Pteronotus parnellii*	A	M		52.48	10	flew away
41	6:30	*Pteronotus parnellii*	A	M		52.24	10	boils on the right leg (from back)
42	6:32	*Pteronotus parnellii*	A	M		52.37	10	wing broken and thus was euthanised
43	6:33	*Pteronotus parnellii*	A	M		52.48	10	
44	6:33	*Pteronotus parnellii*	A	M		52.25	10	
45	6:34	*Pteronotus parnellii*	A	F		52.05	10	
46	6:35	*Pteronotus parnellii*	A	M		52.49	8	a bat was captured which had ticks and the majority had the orange-yellow looking insects.
47	6:36	*Pteronotus parnellii*	A	M		52.33	10	
48	6:38	*Pteronotus parnellii*	A	M		52.71	10	
49	6:38	*Pteronotus parnellii*	A	M		52.25	10	
50	6:39	*Pteronotus parnellii*	A	M		52.25	10	
51	6:39	*Pteronotus parnellii*	A	M		25.37	10	
52	6:40	*Pteronotus quadridens*	A	M		52.48	10	
53	6:41	*Pteronotus parnellii*	A	M		52.52	10	
54	6:42	*Pteronotus parnellii*	A	M		52.31	10	
55	6:42	*Pteronotus parnellii*	A	F		52.35	12	
56	6:43	*Pteronotus quadridens*	A	M		31.87	5	

Thatchfield Great Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
57	6:44	*Pteronotus macleayii*	A	M		41.22	5	
58	6:45	*Pteronotus parnellii*	A	M		52.42	10	
59	6:45	*Pteronotus parnellii*	A	M		52.39	10	
60	6:46	*Pteronotus parnellii*	A	M		52.23	10	
61	6:47	*Pteronotus macleayii*	A	M		41.40	5	
62	6:47	*Pteronotus parnellii*	A	M		52.31	10	
63	6:48	*Pteronotus parnellii*	A	M		52.47	10	
64	6:50	*Pteronotus parnellii*	A	F		52.42	10	
65	6:51	*Pteronotus parnellii*	A	M		52.14	10	
66	6:53	*Pteronotus parnellii*	A	M		52.39	10	
67	6:54	*Pteronotus parnellii*	A	M		52.04	10	
68	6:54	*Pteronotus macleayii*	A	M		31.97	5	
69	6:55	*Pteronotus parnellii*	A	M		52.37	10	
70	6:56	*Pteronotus parnellii*	A	M		52.29	10	
71	6:57	*Pteronotus parnellii*	A	M		52.55	10	
72	6:57	*Pteronotus parnellii*	A	M		52.30	10	old scar on right wing
73	6:58	*Pteronotus parnellii*	A	M		52.42	10	
74	6:59	*Pteronotus parnellii*	A	F		?	10	not pregnant/lactating; escaped before FA taken
75	7:00	*Pteronotus parnellii*	A	M		52.35	10	
76	7:01	*Pteronotus parnellii*	A	M		?	10	Escaped before FA taken
77	7:02	*Pteronotus parnellii*	A	F		52.11	6	
78	7:02	*Pteronotus parnellii*	A	M		52.28	10	
79	7:03	*Pteronotus parnellii*	A	M		52.35	10	
80	7:04	*Pteronotus parnellii*	A	F		52.48	6	
81	7:05	*Pteronotus quadridens*	A	M		31.03	5	
82	7:07	*Pteronotus parnellii*	A	M		52.29	10	
								bat was captured had ticks and the majority bats had the orange-yellow looking insects.

APPENDIX VI

Images of the bat species captured during Cave species assessment between May 2008 and January 2009

Mormoops blainvillii
(Antillean Ghost-faced bat)

Pteronotus parnellii
(Parnell's Mustached bat)

Pteronotus quadridens
(Sooty Mustached bat)

Artibeus jamaicensis
(Jamaican Fruit Eating Bat)

Pteronotus macleayii
(Macleay's Mustached Bat)

Brazilian Free-Tailed Bat (*Tadarida brasiliensis*)
(Source – Bat Conservation International)

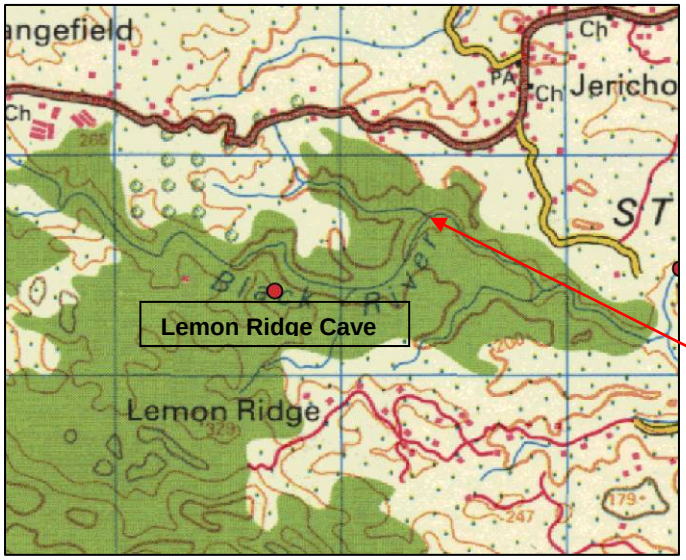
Natalus micropus **(Cuban Funnel-eared Bat)**

ADDENDUM

The following is the information gathered as it regards Lemon Ridge Cave and St. Clair Cave

Lemon Ridge

Lemon Ridge is located in Orangefield, St. Catherine and was assessed on January 21, 2009. It is a resurgence cave and is on the south bank of the Black River. The terrain of the land in front of the cave entrance made netting difficult and dangerous however the harp trap used as it would be unsafe to use a mist net. A total of forty-four (43) bats were captured (4 *Pteronotus quadridens*, 17 *Pteronotus macleayii* and 22 *Mormoops blainvilli)*. The bat commenced their emergence at 5:50p.m and this ended at approximately 7:30p.m. A number of bats avoid the trap as it was difficult to close all possible exit points. The Black River is traversed to reach the cave.



Location of Lemon Ridge Cave (red dot) in Orangefield, St. Catherine

The Black River at low water flow

NEPA team to the left of the cave entrance

A bat flying at the entrance and to the rear of the trap

Lemon Ridge Cave

Location: Lemon Ridge Cave
Orangefield, St. Catherine

Date: 21 January, 2009

Personnel: Andrea Donaldson, Richard Nelson, Sakinah Allen, Jan Pauel
Vivian Blake, Sean Green

Time net opened: 5:10pm **Time net closed:** 7:40pm **# of nets:** harp **Net hrs:** 2hr 30 min

Moon phase: Half phase **Weather:** clear skies **Netting conditions*:** Excellent

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	5:50							flew through harp
2	6:01	*Pteronotus quadridens*						flew from bag
3	6:02	*Pteronotus quadridens*	A	M		37.90	5	
4	6:05	*Pteronotus macleayii*	A	M		42.60	5	
5	6:06	*Pteronotus quadridens*	A	M		37.10	5	
6	6:09	*Pteronotus macleayii*	A	M		43.30	5	
7	6:10	*Mormoops blainvillii*	A	M		45.10	5	
8	6:11	*Pteronotus quadridens*	A	M		37.10	5	
9	6:12	*Pteronotus macleayii*	A	M		45.10	5	
10	6:13	*Mormoops blainvillii*	A	M		46.10	6	
11	6:14	*Pteronotus macleayii*	A	M		43.70	10	
12	6:15	*Mormoops blainvillii*	A	F		45.70	10	
13	6:16	*Pteronotus macleayii*	A	M		42.60	6	
14	6:19	*Mormoops blainvillii*	A	M		45.70	5	
15	6:21	*Pteronotus macleayii*	A	M		42.90	5	
16	6:22	*Mormoops blainvillii*	A	M		46.10	5	
17	6:23	*Mormoops blainvillii*	A	M		46.50	5	
18	6:24	*Pteronotus macleayii*	A	M		42.30	5	
19	6:24	*Pteronotus macleayii*	A	M		43.40	5	
20	6:25	*Mormoops blainvillii*	A	M		46.50	10	
21	6:26	*Mormoops blainvillii*	A	F		46.4	5	
22	6:27	*Mormoops blainvillii*	A	M		47.1	5	
23	6:28	*Mormoops blainvillii*	A	M		46.2	9	

* Excellent = no adverse conditions (wind, rain, moon), Good = 1 adverse condition for less than 25% of net time, Fair = 1 or more adverse conditions less than 50 % of net time, Poor = 1 or more adverse conditions more than 50 % of net time

Lemon Ridge Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
24	6:29	*Pteronotus macleayii*	A	M		42.90	10	
25	6:29	*Mormoops blainvillii*	A	M		44.10	9	
26	6:29	*Pteronotus macleayii*	A	M		42.20	5	
27	6:30	*Mormoops blainvillii*	A	M		47.20	9	
28	6:31	*Mormoops blainvillii*	A	M		47.20	6	
29	6:31	*Mormoops blainvillii*	A	M		47.40	6	
30	6:33	*Pteronotus macleayii*	A	M		47.80	10	
31	6:38	*Pteronotus macleayii*	A	M		42.90	5	
32	6:41	*Pteronotus macleayii*	A	M		43.60	7	
33	6:42	*Mormoops blainvillii*	A	M		45.70	5	
34	6:46	*Mormoops blainvillii*	A	M		45.20	7	
35	6:50	*Mormoops blainvillii*	A	M		45.70	5	
36	6:53	*Mormoops blainvillii*	A	M		45.60	10	
37	6:56	*Mormoops blainvillii*	A	M		45.90	5	
38	6:57	*Mormoops blainvillii*	A	M		45.20	5	
39	6:57	*Pteronotus macleayii*	A	M		44.30	9	
40	6:58	*Pteronotus macleayii*	A	M		45.50	5	
41	7:01	*Mormoops blainvillii*						escaped
42	7:01	*Mormoops blainvillii*						escaped
43	7:04	*Pteronotus macleayii*	A	M		42.3	6	
44	7:27	*Pteronotus macleayii*	A	M		43.4	5	emitting sounds at this frequency 25KHz

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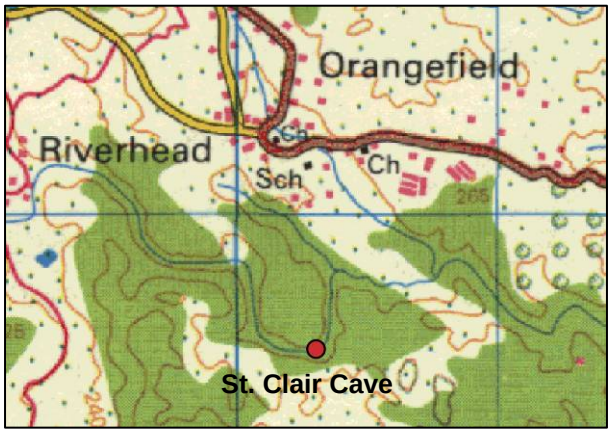
St. Clair Cave

St. Clair Cave is located in Polyground, Ewarton, St. Catherine and was visited on January 28, 2009. It is a river passage cave and is connected to the Lemon Ridge Cave. A total of eighty-three (83) bats were captured (12 *Pteronotus parnellii*, 26 *P. quadridens*, 20 *P. macleayii*, 20 *M. blainvillii* and 5 *Monophyllus redmani*). A mist net was used to capture the bats, however the net was not kept open all the time as the volume of bats exiting the cave was too many to handle by the team present. The team was therefore closed periodically. A proper assessment of the teams requires at least six persons to remove the bats from the cave. The bats emerged at 5:53 p.m. and the bats seem to emerge at different intervals. Similar to Lemon Ridge the Black River is crossed to reach the cave.



Location of St. Clair Cave (red dot) in St. Catherine

Black River at low water flow

Entrance to the cave is in this depression

St. Clair Cave

Location: St. Clair Cave Pollyground, Ewarton, St. Catherine **Date:** January 28, 2009 **Personnel:** Andrea Donaldson, Richard Nelson, Rochelle Afflick, Sakinah Allen, Jan Pauel, Ricardo Miller, Michael Myles

Time net opened: 5:10 p.m. **Time net closed:** 7:40 p.m. **# of nets:** one **Net hours:** 2hr 30min

Moon phase: not recorded **Weather:** clear skies **Netting conditions*:** good

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
1	5:53							Bats started exiting the cave at this time
2	5:56	*Pteronotus parnellii*	A	M		51.80	10	
3	6:00	*Pteronotus parnellii*	A	M		50.65	10	
4	6:00	*Pteronotus quadridens*	A	F	pregnant?	39.10	3	blood noticed at genetalia
5	6:04	*Pteronotus quadridens*	A	M		39.10	5	
6	6:05	*Pteronotus parnellii*	A	F	pregnant	52.30	10	pregnant
7	6:06	*Pteronotus quadridens*	A	F		38.30	10	
8	6:06	*Pteronotus quadridens*	A	M		38.90	6	
9	6:07	*Pteronotus quadridens*	A	M		37.10	5	
10	6:07	*Pteronotus quadridens*	A	F	pregnant	39.70	5	
11	6:07	*Pteronotus quadridens*	A	F		38.30	5	died
12	6:07	*Pteronotus quadridens*	A	F	pregnant	39.30	3	
13	6:08	*Pteronotus macleayii*	A	M		43.80	4	
14	6:08	*Pteronotus quadridens*	A	F		37.00	5	
15	6:08	*Pteronotus parnellii*	A	F		54.30	4	likely to be 9g
16	6:08	*Pteronotus quadridens*	A	F	pregnant?	38.60	5	
17	6:09	*Pteronotus parnellii*	A	M		52.60	10	
18	6:09	*Pteronotus quadridens*	A	M		37.40	5	
19	6:09	*Pteronotus quadridens*	A	F		37.40	5	
20	6:10	*Pteronotus macleayii*	A	M		43.20	5?	
21	6:10	*Pteronotus macleayii*	A	M		43.00	5?	
22	6:10	*Pteronotus quadridens*	A	M		42.9	6?	
23	6:10	*Pteronotus macleayii*	A	M		41.8	5?	
24	6:11	*Pteronotus quadridens*	A	F		37.90	4	

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St. Clair Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
25	6:11	*Pteronotus quadridens*	A	M		39.00	4	
26	6:11	*Pteronotus quadridens*	A	F		39.00	4	
27	6:11	*Pteronotus quadridens*	A	M		38.80	5	
28	6:12	*Pteronotus quadridens*	A	F		39.1	6	
29	6:12	*Pteronotus quadridens*	A	M		38.5	5	
30	6:12	*Pteronotus macleayii*	A	M		42.9	5	
31	6:12	*Pteronotus macleayii*	A	M		43.6	7	
32	6:13	*Pteronotus macleayii*	A	M		43.8	6	
33	6:13	*Pteronotus macleayii*	A	M	scrotum descended	42.5	5	
34	6:13	*Pteronotus parnellii*	A	F		52.4	10	
35	6:13	*Pteronotus macleayii*	A	M		43.3	7	
36	6:13	*Pteronotus macleayii*	A	M		41.00	4	
37	6:14	*Pteronotus quadridens*	A	F		37.9	4	passing red liquid from genitalia
38	6:14	*Pteronotus quadridens*	A	F		37.1	4	
39	6:14	*Pteronotus macleayii*	A	M		40.90	4	
40	6:14	*Mormoops blainvillii*	A	F		45.50	6	
41	6:14	*Pteronotus quadridens*	A	F		38.50	4	
42	6:14	*Mormoops blainvillii*	A	M		48.20	6	
43	6:15	*Pteronotus macleayii*	A	M		44.90	4	
44	6:15	*Pteronotus macleayii*	A	M		42.20	5	
45	6:15	*Mormoops blainvillii*	A	M		46.2	5	
46	6:15	*Pteronotus macleayii*	A	M		43.1	5	
47	6:15	*Mormoops blainvillii*	A	F		46.7	5	
48	6:17	*Mormoops blainvillii*	A	M		45.6	5	
49	6:17	*Mormoops blainvillii*	A	F		48	5	
50	6:18	*Pteronotus quadridens*	A	M		42.7	3	
51	6:18	*Mormoops blainvillii*	A	F		46.3	3	
52	6:20	*Mormoops blainvillii*	A	M		46.90	6	
53	6:20	*Monophyllus redmani*	A	F	pregnant			
54	6:38	*Mormoops blainvillii*	A	F		45.90	5	
55	6:38	*Mormoops blainvillii*	A	F		46.00	5	

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St. Clair Cave cont'd.

#	Time	Species	Age	Sex	Repro. Status	FA (mm)	Wt. (gm)	Notes
56	6:40	*Pteronotus macleayii*	A	F		47.10	5	
57	6:40	*Mormoops blainvillii*	A	F		46.4	6	
58	6:45	*Mormoops blainvillii*	A	F		47.0	6	
59	6:45	*Mormoops blainvillii*	A	M		46.1	8	
60	6:45	*Mormoops blainvillii*	A	M		46.1	7	fur not bright rusty orange
61	6:50	*Mormoops blainvillii*	A	F		44.8	7	
62	6:50	*Pteronotus macleayii*	A	F		42.9	4	
63	6:55	*Mormoops blainvillii*	A	F		46.3	4	
64	6:55	*Pteronotus parnellii*	A	M		53.7	11	
65	7:00	*Mormoops blainvillii*	A	F		46.1	4	
66	7:00	*Pteronotus quadridens*	A	M		37.0	5	
67	7:01	*Pteronotus quadridens*	A	M		38.3	5	
68	7:05	*Pteronotus parnellii*	A	F	pregnant?	30.9	10	
69	7:05	*Mormoops blainvillii*	A	F		44.5	5	
70	7:30	*Pteronotus macleayii*	A	M		46.3	6	
71	7:32	*Pteronotus quadridens*	A	M		39.0	4	
72	7:47	*Pteronotus parnellii*	A	M		32.7	11	
73	7:49	*Mormoops blainvillii*	A	M		45.3	4	
74	7:50	*Pteronotus macleayii*	A	M		41.00	5	
75	7:23	*Monophyllus redmanii*	A	F		45.00	15	
76	7:56							flew away - Mormoops blainvillii?
77	7:57	*Monophyllus redmanii*	A	M		45.4	10	
78	8:02	*Pteronotus parnellii*	A	F		54	15	
79	8:05	*Pteronotus parnellii*	A	F	pregnant	53.5	15	
80	8:06	*Monophyllus redmanii*	A	M		46.8	10	
81	8:10	*Pteronotus macleayii*	A	M		44.6	9	
82	8:17	*Pteronotus macleayii*	A	M		41.7	8	
83	8:20	*Monophyllus redmanii*	A	M		44.5	7	
84	8:22	*Pteronotus parnellii*	A	F	pregnant	52.5	11	

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