

DAVIS EXPEDITION FUND

REPORT ON EXPEDITION/PROJECT

Expedition/Project Title: 'Upper Raspaculo River Valley Expedition - botanical assessment in the Maya mountains of Belize'

Travel Dates: 15th April - 22nd August 2006

Location: Upper and Lower Raspaculo River Valley, Maya Mountains, Cayo District, Belize, Central America.....

Group Members: Tiina Sarkinen (UK), Maria Baden (UK), Andrew Matthews (UK), David Bayly (UK), Chris Pennil (Belize), Santos Chicas (Belize). Associates: Hervé Vandrot (France)

Aims: To carry out a baseline floristic survey of the species composition and vegetation types in the Lower and Upper Raspaculo areas by:

- 1) increasing the number of botanical collections from the remote area of the Raspaculo river valley
- 2) establishing vegetation transects throughout the area to study the vegetation types found in both Lower and Upper Raspaculo area
- 3) establishing a 1ha permanent forest dynamics plot in the Upper Raspaculo area to study the forest dynamics and regeneration patterns of the limestone forest area

The expedition also aimed to provide botanical field work experience for the two Belizean university students and provide them with training in botanical field identification and ecological field methodology.

OUTCOME (not less than 300 words):

The Upper Raspaculo River Valley Expedition was a botanical study of the remote areas of the Raspaculo River in the Chiquibul National Park and Forest Reserve in western Belize. The expedition was a collaborative effort between the University of Edinburgh, Royal Botanic Garden Edinburgh, University of Belize and University of Leeds. Project Raspaculo was the first study to survey the forests in the Raspaculo watershed, and to initiate monitoring impacts of the newly built dam and its reservoir further downstream from the study area.

The Raspaculo watershed encompasses approximately 150 km² of karstic mountain terrain (Figure 1). Water levels of the Raspaculo River fluctuate dramatically month to month depending on the rainfall in the surrounding areas. Due to extremely low water levels in the whole of the Raspaculo river during May, the first three weeks of the field period were spent collecting specimens at Natural Arch on the Chiquibul River, a field site accessible by 4 wheel drive vehicle. In June when the water level in the Raspaculo river had risen enough to gain access to the Lower Raspaculo, survey work was started in the Lower Raspaculo valley (Figure 1), where access was given by canoe as well as via flatbottom boat made available through Belize Electric Company Ltd (BECOL) staff from the hydroelectric dam. Finally, rising water levels at the end of July made access to Cuxta Bani possible during the last two weeks of the field period. The expedition teamed up with 22 Trekforce volunteers to canoe upstream the Raspaculo river for three days to reach the very remote area of Cuxta Bani (Figure 1).

During the 90 days spent on the field, the expedition team gathered quantitative field data for 11 transects within 10 km of Natural Arch, and 26 vegetation transects in the Lower Raspaculo valley. A permanent 1 ha study plot was established in the Upper Raspaculo, at the Cuxta Bani study site. Altogether the team collected 1054 plant specimens, all of which have been stored at the Royal Botanic Garden Edinburgh herbarium. Wide patrolling was done throughout the field period and high quality plant specimens were acquired: for each fertile plant specimen collected, digital photos and silica gel DNA samples were obtained.

The vegetation transects followed the methodology by Gentry (Gentry 1982, Phillips and Miller 2002) where all individuals ≥ 2.5 cm diameter at breast height (1.35m, DBH) within 50m \times 2m transects were recorded. Both trees and lianas were included if they were above the diameter limit; palms with individual leaf stalks greater than 2.5cm DBH were also included. Specimens from each morphospecies were collected for identification from each transect. From the data obtained, forest type descriptions can be made with species lists and abundance data.

The 1 ha permanent sampling plot at Cuxta Bani was established and sampled according to the RAINFOR methodology (Phillips and Baker 2002). All trees and lianas ≥ 10 cm DBH within the sample area were tagged, their DBH recorded and leaf samples collected if required for identification. Wood density samples were collected for as many species as possible, as the samples can be used by University of Leeds research group for studies that aim to understand the variation in carbon sequestration in tropical forests. Wood cores, soil and leaf nutrient samples were also collected and sent to the University of Leeds research group for further analysis. The Cuxta Bani plot was the first 1 ha plot established in a tropical rainforest area on a limestone substrate within the RAINFOR network, and will give new insights into tropical rainforest dynamics in limestone areas. Future re-measurements of the trees within the 1 ha study plot will be carried out by the University of Leeds.

Based on the transect work, the vegetation in the area surrounding Natural Arch seemed to form one continuous type distinct from the types observed in the other two study sites. These forests were dominated by *Heisteria media* (Olacaceae), *Protium copal* (Burseraceae), *Trichilia* sp. (Meliaceae), *Sabal mauritiiformis* (Arecaceae), White Poison Wood (*Sebastiania tuerckheimiana*, Euphorbiaceae), *Spondias mombin* (Anacardiaceae); Mahogany (*Swietenia macrophylla*, Meliaceae), Nargusta (*Terminalia amazonia*, Combretaceae), *Ouratea* sp. (Ochnaceae) and *Platymiscium dimorphandrum* (Leguminosae) were present in lower abundance but some common species such as *Attalea cohune* (Arecaceae) were totally lacking. The Lower Raspaculo forests were observed to be much patchier in character; five different vegetation types were identified around the area surveyed. Descriptions of the vegetation types remain to be done as identification of the field material has just begun and will take a few months to be completed.

The Upper Raspaculo forest at Cuxta Bani was of a distinct semi-evergreen lowland forest type (Type 4a) as defined by Penn *et al.* (2004); this type is known to be a rare type within Belize, and as scant plant collections exist from this location, the collections done by the expedition team will serve to further define the rare vegetation type.

Two Belizean university students, Chris Pennil and Santos Chicas, took part in the expedition from June until the end of July, and gained valuable experience in tropical field work. Dr Elma Kay from the University of Belize acted as our university contact. Both students gained credits that counted towards their bachelor degrees in biology from the field work. The expedition team would strongly recommend any future expeditions going to Belize to be in contact with Dr Elma Kay in regard to collaboration with the University of Belize as funds for field work are rarely available for Belizean students.

References

- Gentry, A. H. 1982. Patterns of Neotropical Plant Species Diversity. In *Evolutionary Biology* 15:1, 1-84.
- Penn, M. G., D. A. Sutton, and A. Monro. 2004. Vegetation of the Greater Maya Mountains, Belize. *Systematics and Biodiversity* 2: 21-44.
- Phillips, O., and T. Baker, 2002. RAINFOR - Field manual for plot establishment and remeasurement. <http://www.geog.leeds.ac.uk/projects/rainfor/projdocs.html>
- Phillips, O. and Miller, J.S. 2002. Global Patterns of Plant Diversity: Alwyn H. Gentry's Forest Transect Data Set. In *Monographs in Systematic Botany from the Missouri Botanical Garden* 98: 6-15.

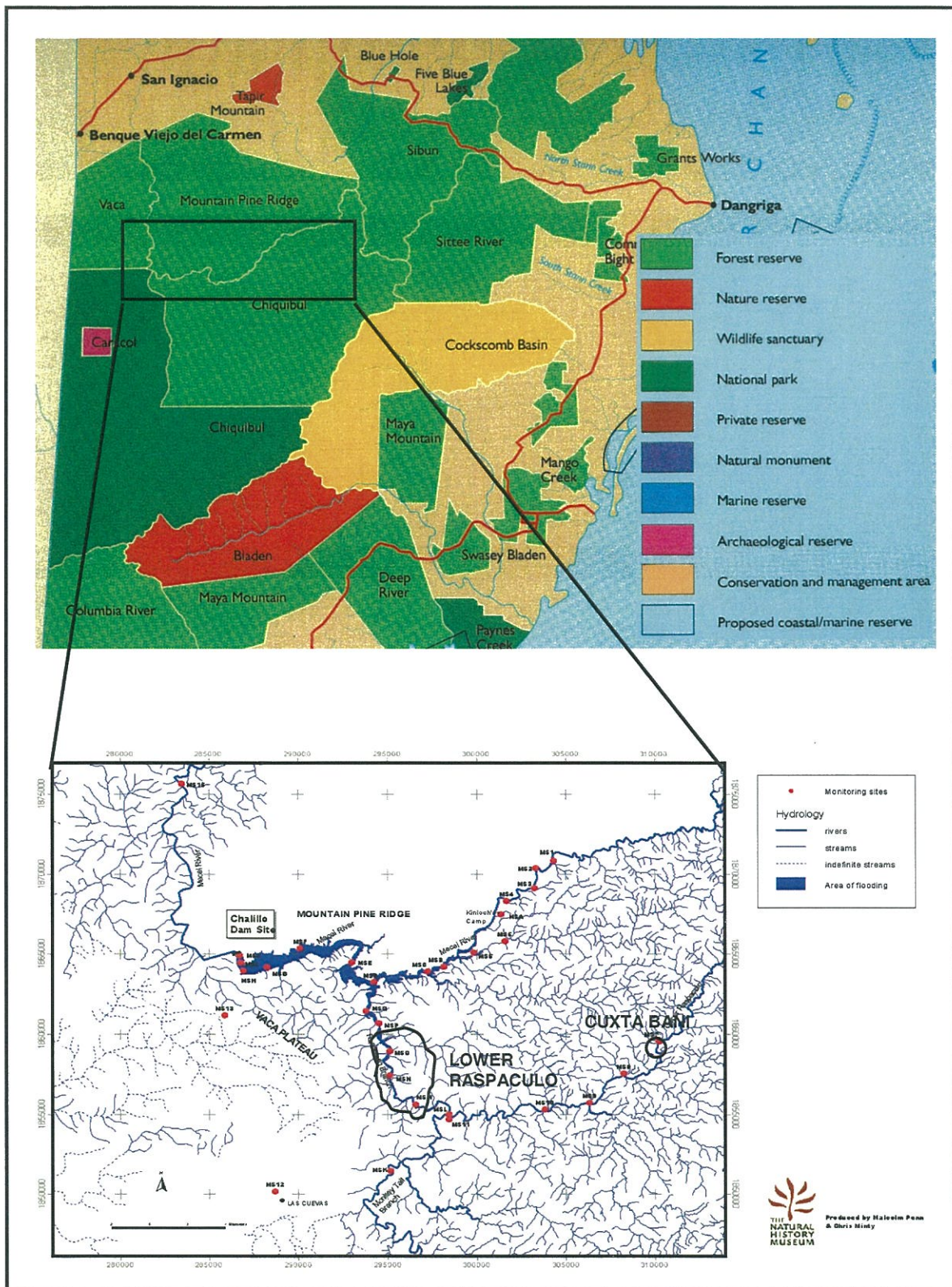


Figure 1. Map of Belize showing the main national parks and forest reserves. Chiquibul Forest Reserve and National Park is located in the western part of the country (above). The Macal and Raspaculo rivers are located to the north side of the reserve. Chalillo Dam has created a reservoir (shown in blue) that reaches from the dam to the Lower Raspaculo river. Red dots indicate monitoring areas used by the Natural History Museum research team for assessing the environmental impact of the dam on the area. Areas surveyed by the expedition team in 2006 are circled in black.