

A close-up photograph of a tree trunk, likely a cypress, showing its characteristic yellowish-brown bark and green, scale-like leaves. A cluster of small, white flowers with long, yellow, thread-like petals is in bloom. The background is a soft-focus green field.

# Last Frontiers

## Rapid Ecological Assessment

Jan Meerman, February 2010

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## Geology

The surface geology of the project area is rather straightforward. The steep hills on and around the property are Cretaceous limestone. These limestone hills have been strongly weathered and karstified, resulting in many caves and crevices. The remaining area consists of recent (Pleistocene) deposits. Since these deposits consist of weathered material from the nearby Maya Mountains, these deposits consists of acidic sands and clays poor in nutrients.

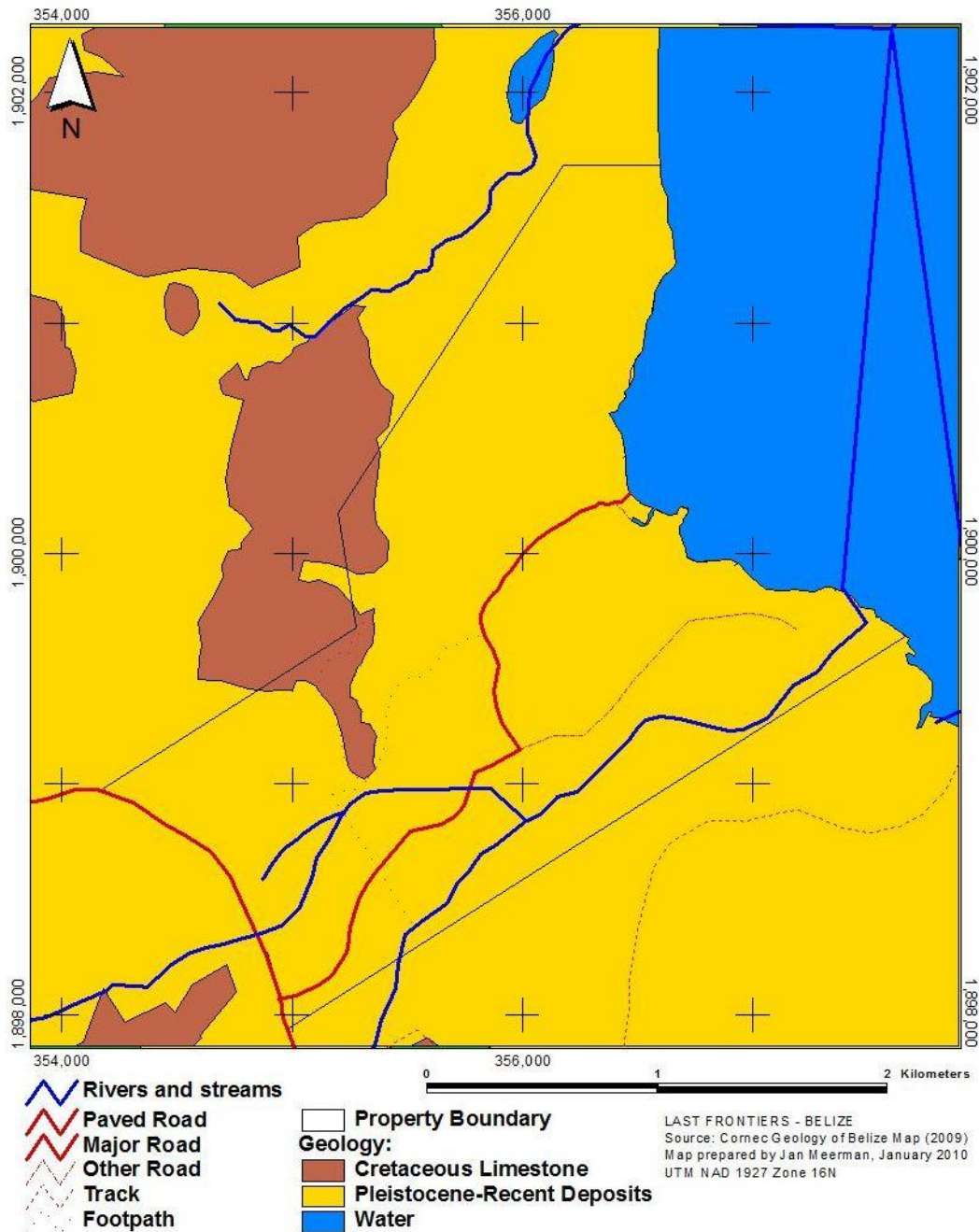


Figure 1. Geology of Last Frontiers, Modified from Corneic 2009)

A prominent geological feature is formed by the Limestone hill. As so often this hill is heavily eroded and full of caves. Most of these caves are “wet” caves and most likely devoid of significant Maya artifacts that are usually associated with caves in Belize. It is rumored that fish is present in this cave, but none were seen during the survey.



**Figure 2. Main cave entrance**

Typical for limestone hills in savanna terrain as is the case here, the acidic waters from the surrounding savanna gradually dissolves the foundation of the limestone hill, causing numerous narrow caves at ground level which are essentially no more than sinks. Rainwater from the savanna disappears here underground to join underground aquifers. See the Hydrology section. As part of the same process, the ground level around these limestone hills is typically lower than the rest of the savanna resulting in a moat of water with associated swamp forest. This moat with swamp vegetation is an important component of this ecosystem complex as it prevents savanna fires from reaching the dry vegetation on the limestone hills. Disturbance of this moat often leads to fire damage on these hills.



**Figure 3. Sink cave at the foot of the limestone hill, Note water and swamp forest vegetation.**

## Hydrology

### Introduction:

The hydrology of an area is closely linked to its rainfall and topography. The topography in itself determines the watershed and technically the Last Frontiers property sits in the Manatee River watershed (Figure 4).

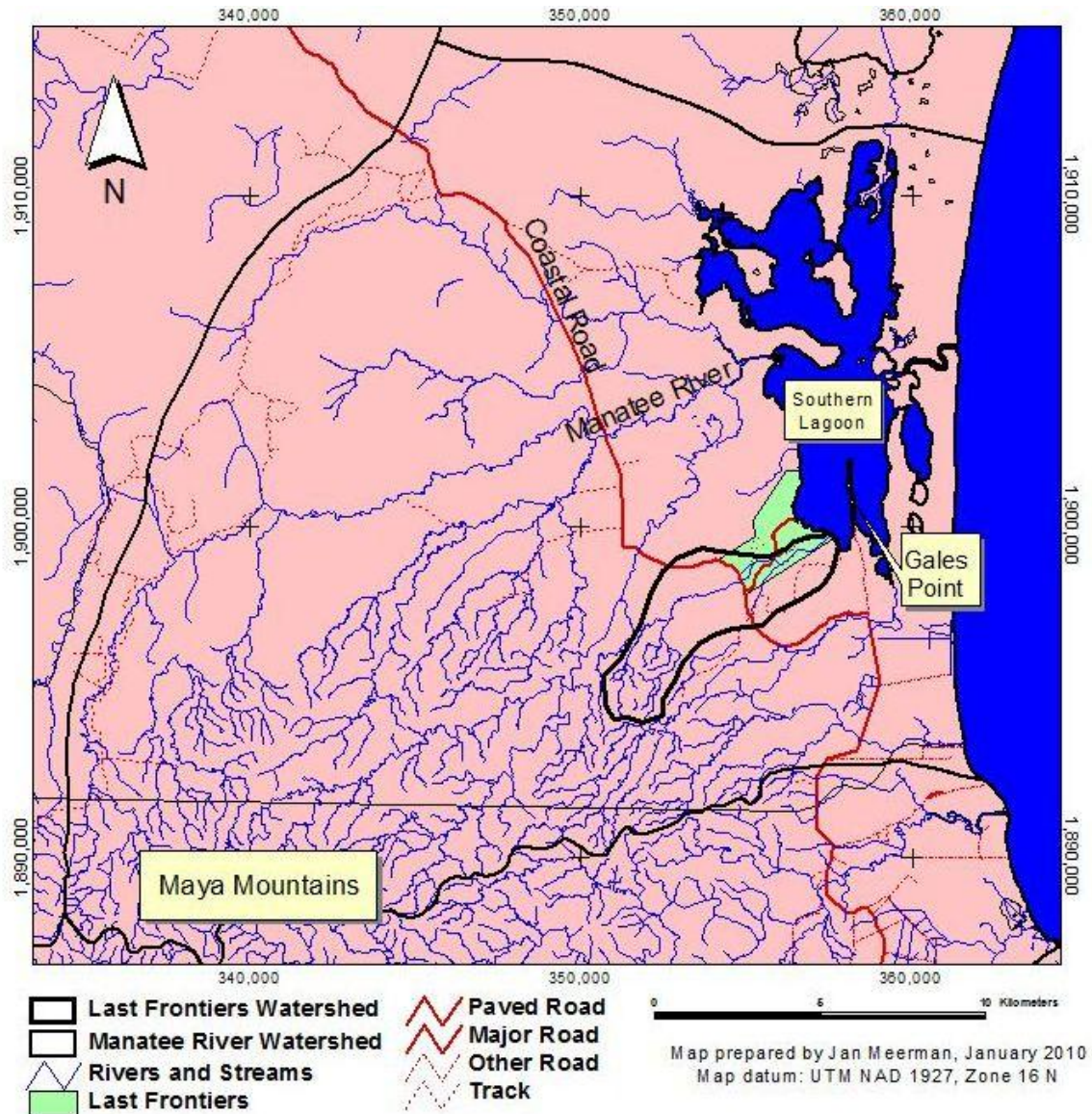


Figure 4. Watersheds in relation to the study area

However, this is a simplification of the situation on the ground. The Manatee River enters Southern Lagoon north of the property and the Last Frontiers property has effectively its own watershed centered on the un-named creek that dissects the property from SW to NE. This creek reaches into the foothills of the Maya Mountains and covers a fairly small watershed of approximate 1,700 ha.

### Findings:

The hydrological situation gets even more complicated at the local scale. To establish elevation of the terrain, much of the property was traversed with GPS and level in order to establish approximate elevation above sea level (Figure 5).

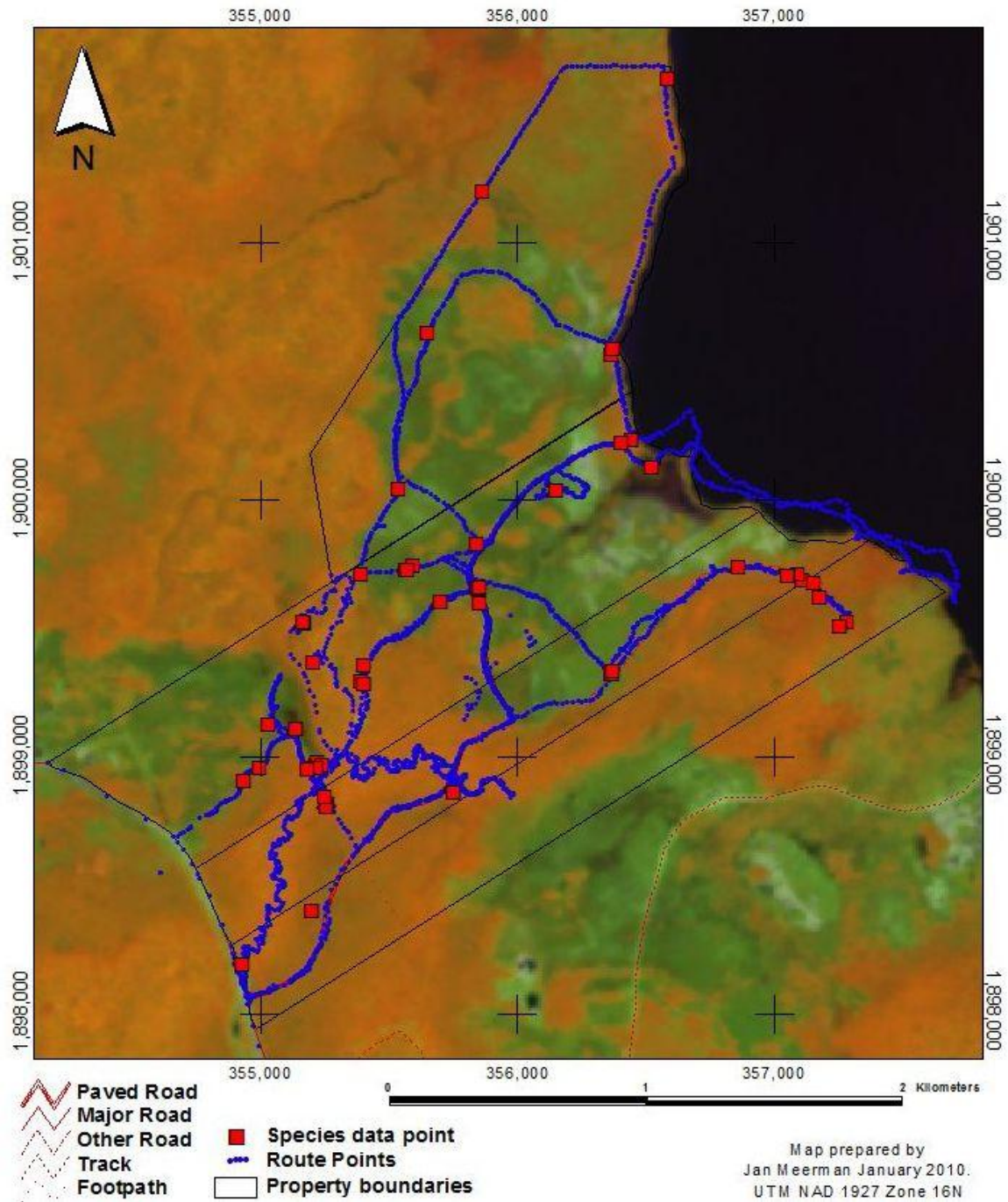
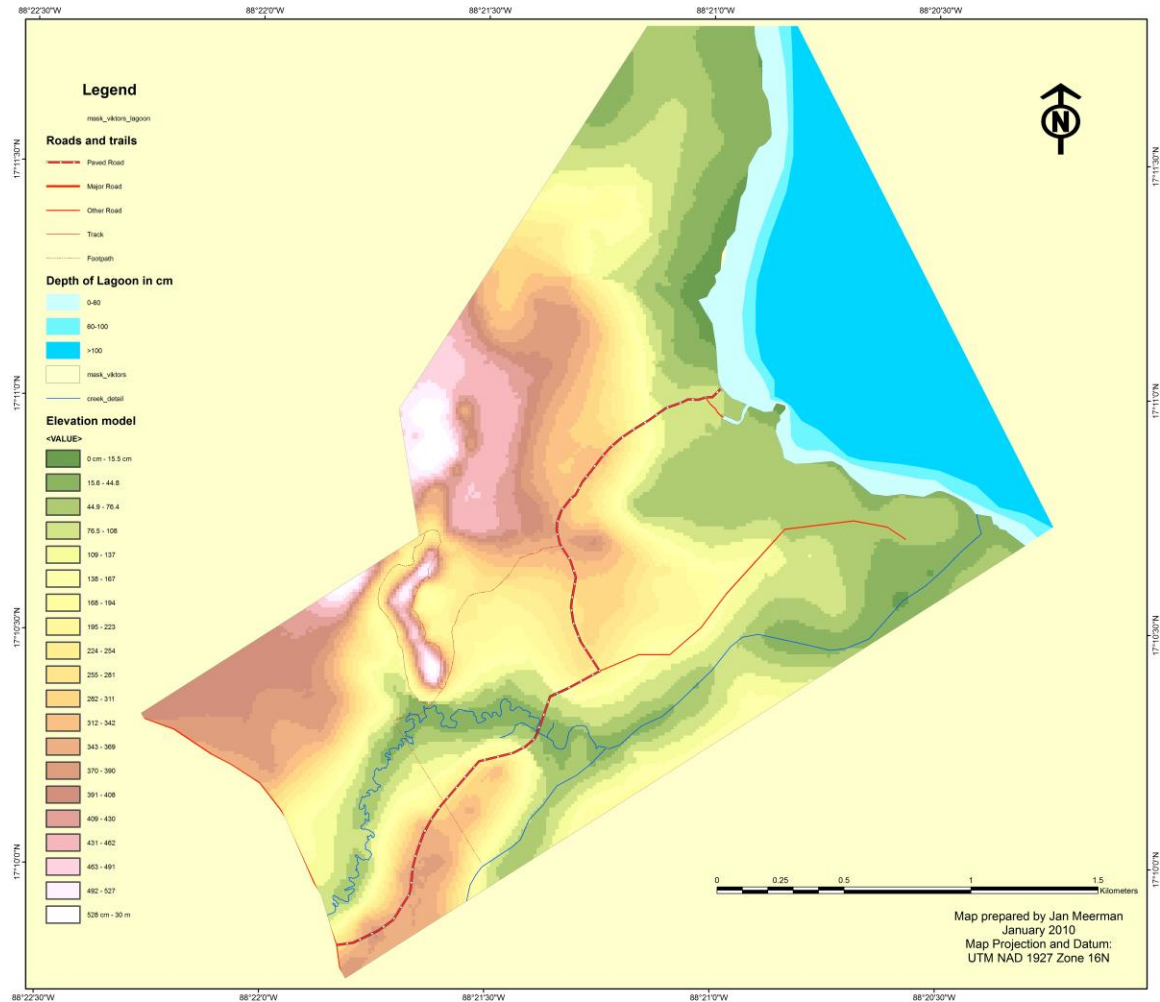


Figure 5. Routes traversed and elevation established using GPS and Level (Blue dots)

The results of these measurements and approximations are presented in figure 6 below. It should be noted that the technique and equipments used is rather coarse, however it serves to establish general elevations and thereby drainage patterns.



**Figure 6. Approximate elevation levels within Last Frontiers.**

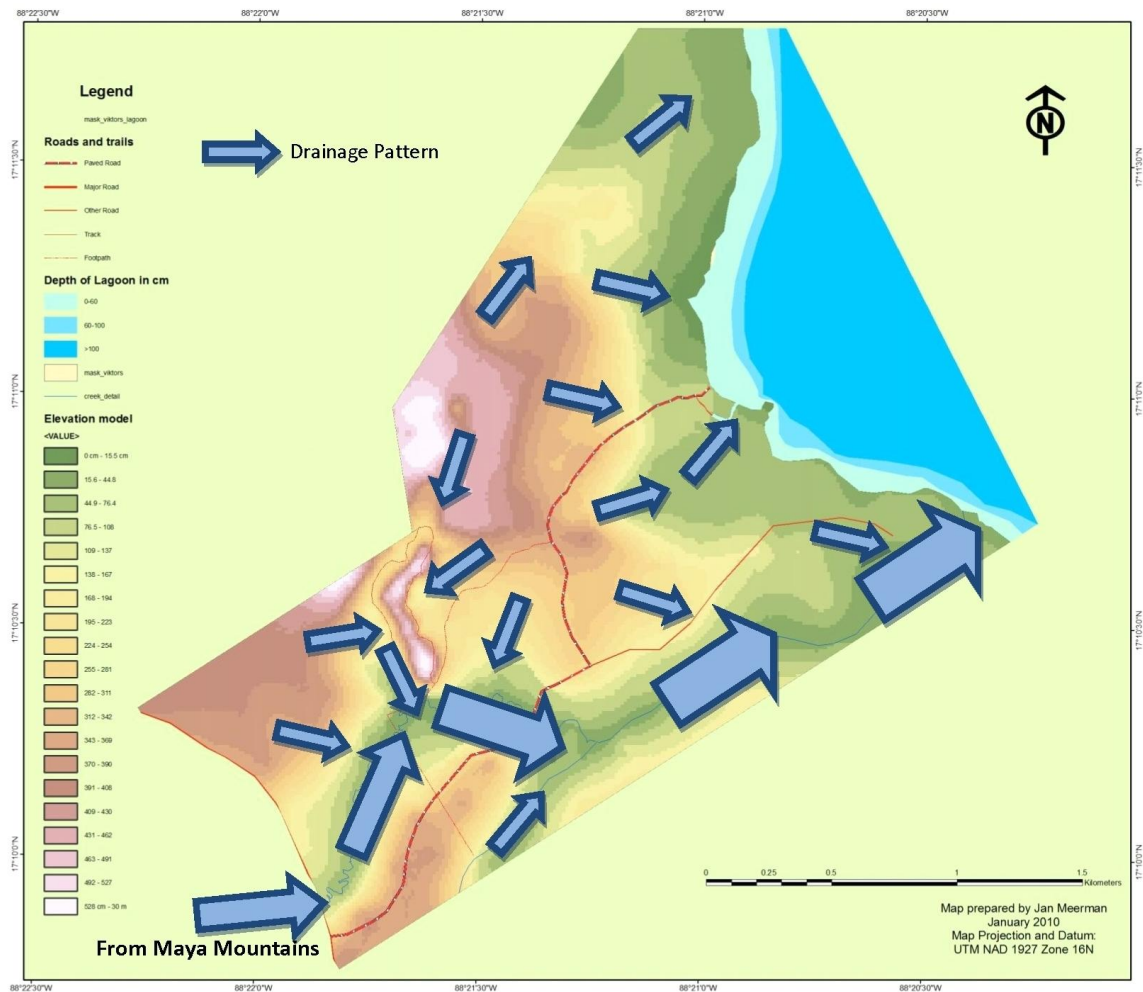
Key elements within the property are the Southern Lagoon, the un-named creek, the limestone karst hills and the savanna.

As noted before the un-named creek carries water from the lower slopes of the Maya Mountains just south of the property (Figure 4). While the actual watershed is very small, the water throughput during heavy rain can be substantial.

On the property itself the flow is augmented with local drainage. Parts of the savanna drain ultimately into this creek as well. Interestingly, much of the water from the savanna drains as sheet flow (over the surface rather than underground) first to the karstic limestone hills. As the water from the savanna is distinctly acidic, it will dissolve the limestone at the base of



these hills, and as a result the hills are full of caves. Some of this water may drain away through an unknown system of underground rivers, but much ultimately ends up in the creek (Figure 7). When this happens, the amount of water in the creek increases quite substantially resulting in a very strong flow in the creek. In the past this heavy and often very sudden flow has wrought havoc with the road and bridge. Once the water has passed the bridge it finds an unimpeded way through swamp forest towards the lagoon. Part of the swamp forest below the bridge has been cleared in the past, ostensibly to “improve” drainage. Ironically this clearing could conceivably have added to the problem; by improving the drainage towards the east of the bridge, but not impacting the flow from the left of the bridge, a pressure difference was created which would have added to the risk of damage to road and bridge. For this same reason, further clearing of swamp forest to the east and Northeast should be avoided, and if flood damage to the bridge and road remains a problem, the size of the bridge needs to be increased instead (or additional culverts added in the road at strategic spots).



**Figure 7. General drainage patterns on Last Frontiers. Weight of the arrows indication differences in water volume.**

While part of the savanna ultimately drains through the creek, the northern part of the savanna will drain more directly into the lagoon. (Figure 7). Most of the water drainage will occur as sheet flow and some parts of the savanna act as clear water passages. There exist for example a low spot immediately east of the current house building site. This spot is more or less permanently water logged and vegetation wise characterized as a “marine salt marsh” (figure 7). Very likely this spot is also prone to flooding when the lagoon level rises and gets covered with brackish lagoon water.

**Conclusions:**

The actual coastline (lagoon) exists of low lying land, with only a few places more that 50 cm above normal high water level. Any structures in the immediate coastal zone will therefore be subject to occasional flooding and only raised buildings (on pilings) can be recommended. While raised buildings are the only way to go close to the lagoon, they should even be recommended elsewhere on the terrain as much of the terrain, with exception of the limestone karst hills are prone to frequent flooding after heavy rain storms.

## Vegetation and Ecosystems

### Introduction:

The geology and hydrology of the terrain are immediately reflected in the vegetation, which can be grouped into distinct ecosystems. Geology and hydrology are therefore key elements in the understanding of the vegetation types. Ecosystems/vegetation types typically arrange themselves according to geological and hydrological features which have been discussed previously.

In order to assess vegetation cover further, it is customary to assess satellite imagery. For the purpose of this assessment, a number of satellite images were used but ultimately, the most useful proved to be a 2004 SPOT image at a resolution of 10 m



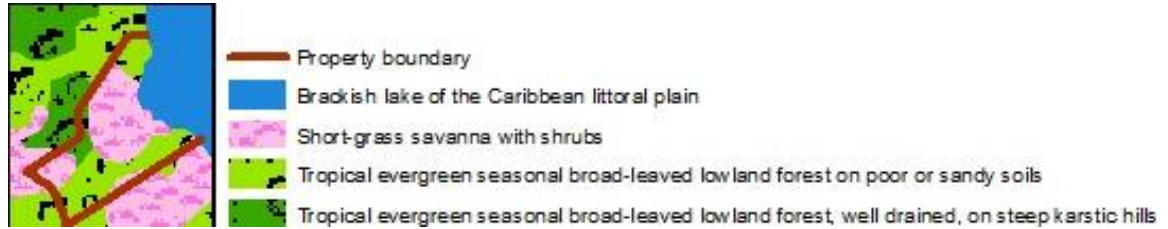
**Figure 8. 2004 False Color SPOT image. Orange/Red colors indicate dense vegetation. Blueish/green colors indicate open vegetation and white areas without vegetation.**

In addition to satellite imagery, an important source of vegetation cover came from the over flights of 15 (fixed wing) and 16 (helicopter) November 2009.

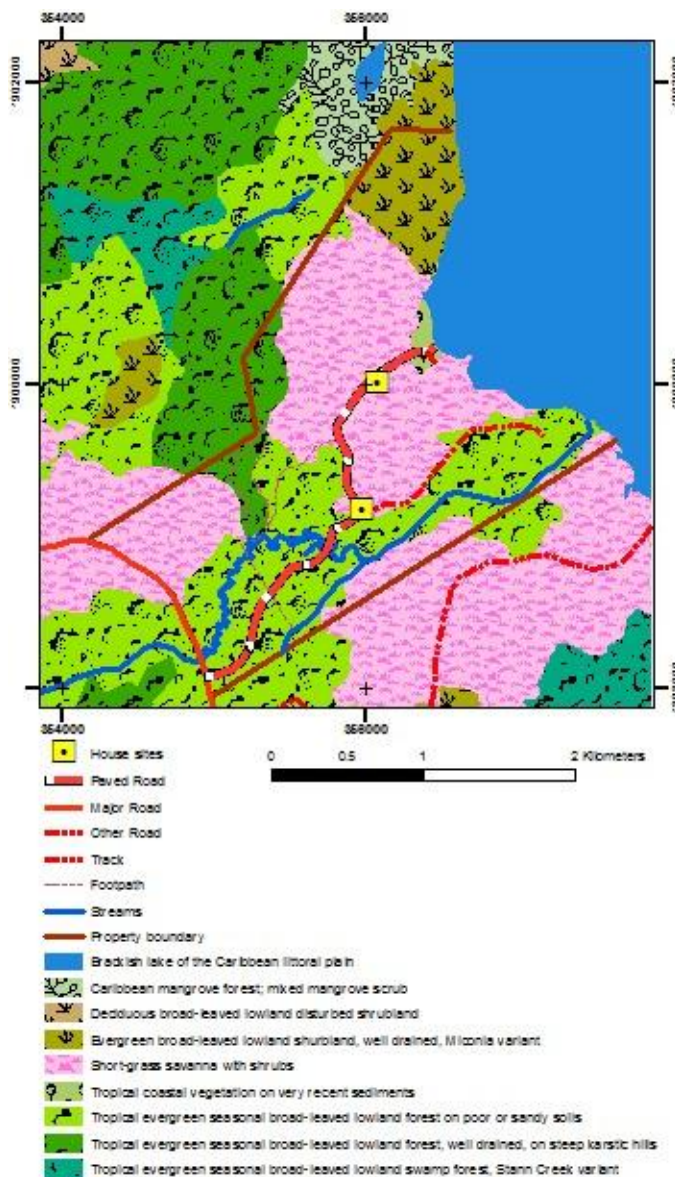
Most important however were the various field visits undertaken between September 2009 and January 2010 (Figure 5).

**Results**

To establish the number of ecosystems is largely a matter of scale. Most of the maps of Belize covering the entire country are at a scale of 1:250,000. Using that approach, only 4 broad ecosystems can be mapped (figure 9).



**Figure 9. Vegetation types of Last Frontiers 1:250.000**



**Figure 10. Map at a scale of 1:50,000**

At a level of 1:50,000; the scale of most topographic maps, more detail can be identified. In this case about 9 ecosystems can be indicated with some level of confidence (Figure 10).

For local management purposes this 1:50,000 scale is still rather coarse and for this reason, vegetation and ecosystem research on Last Frontiers has attempted to survey and map at a scale of 1:20,0000 (Figure 11). At this scale no less than 13 distinct ecosystems could be identified and mapped (16 when taking the different depths of the lagoon into account).

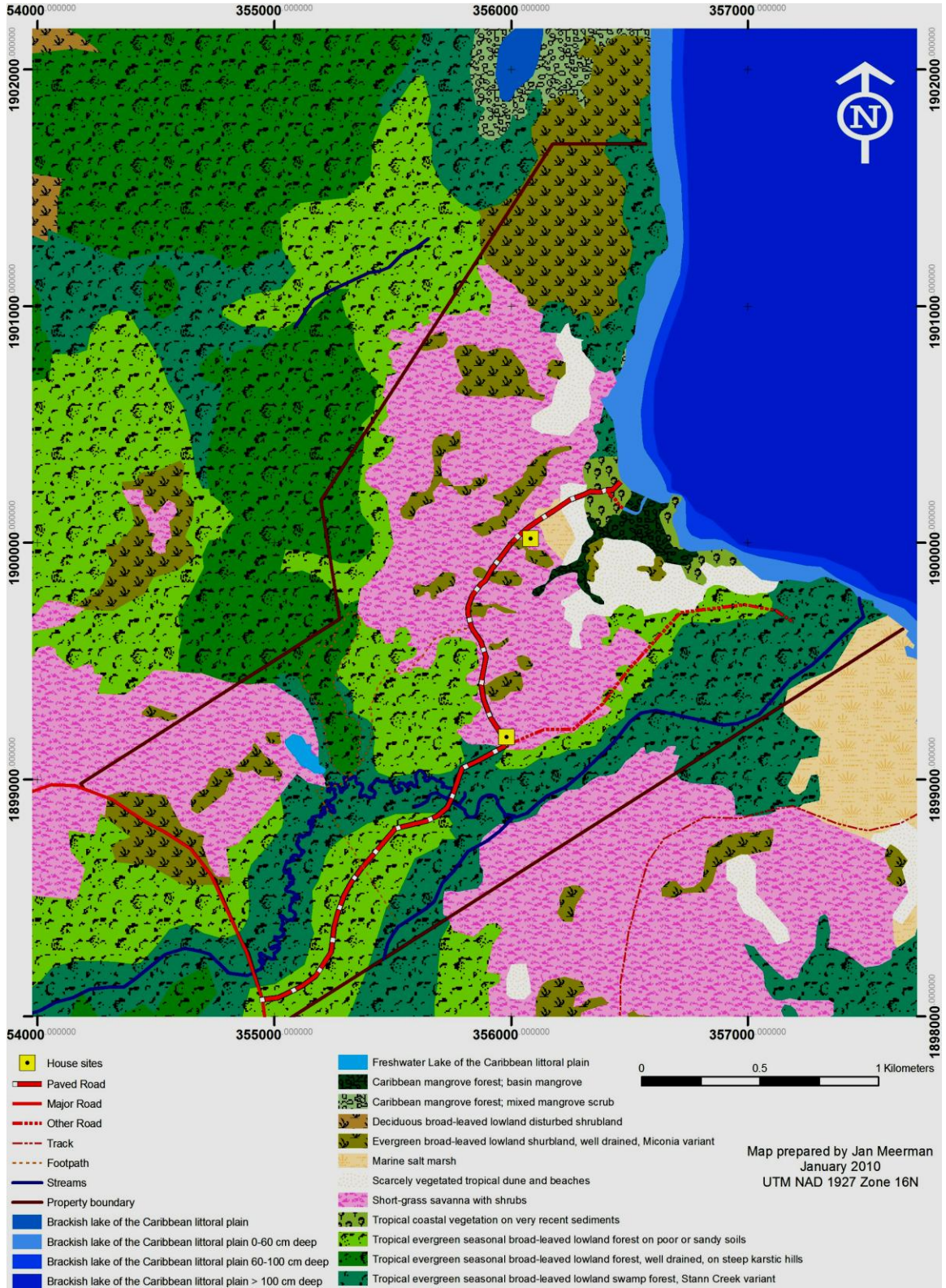


Figure 11. Map of Last Frontiers with ecosystems/vegetation types indicated at a scale of 1:20,000

The vegetation/ecosystems surveys revealed a highly complex matrix of ecosystems each with their typically associated species. As such the species encountered were not unexpected. Only one particularly rare and endangered species was found “*Zamia meermanii*” a species of Cycad<sup>1</sup> that was recently discovered and named only in 2009 (Figure 12). The species is endemic to Belize and even within Belize it has a very limited distribution. As a consequence, the species is considered “endangered”.



**Figure 12. *Zamia meermanii* on a cliff on one of the limestone hills.**

Otherwise, the species encountered were not highly unusual or endangered.

A list of species with their ecosystem, is presented in table 1 below. A full list of species recorded during the surveys is presented in appendix 1. Note that voucher specimens of many species were collected as pictures, and the collection number represents the “voucher picture” taken.

In Appendix 3 a picture guide is presented identifying some of the more recognizable plant species found on Last Frontiers.

**Table 1. Plant species identified during fieldwork at Last Frontiers**

Family	Scientific Name	Common Name	Ecosystem
Aizoaceae	<i>Sesuvium portulacastrum</i>		Marine Salt Marh
Anacardiaceae	<i>Metopium brownei</i>	Black Poisonwood	Savanna, Broken Ridge
Annonaceae	<i>Annona glabra</i>		Swamp in savanna
Annonaceae	<i>Xylopia frutescens</i>	Polewood	Broken Ridge
Apocynaceae	<i>Cameraria latifolia</i>	White Poisonwood	Savanna, Marine Salt Marsh
Apocynaceae	<i>Pentalinon andrieuxii</i>		Broken Ridge
Aquifoliaceae	<i>Ilex guianensis</i>		Savanna, Broken Ridge
Araceae	<i>Philodendron fragrantissimum</i>		Broken Ridge

<sup>1</sup> Cycad are evolutionary ancient plants. Cycads were particularly numerous in the Mesozoic (65 to 230 million years ago) that this era is often called the "Age of Cycads and Dinosaurs." Cycads are dioecious species with pollen cones and seed cones produced on separate male and female individuals.

Family	Scientific Name	Common Name	Ecosystem
Araceae	<i>Philodendron smithii</i>		Swamp Forest
Arecaceae	<i>Attalea cohune</i>	Cohune	Limestone Hills
Arecaceae	<i>Bactris mexicana</i>	Pokenoboy	Swamp forest
Arecaceae	<i>Cocos nucifera</i>	Coconut	Littoral Forest
Arecaceae	<i>Schippia concolor</i>	Palmetto	Broken Ridge
Asclepiadiaceae	<i>Metastelma stenomeres</i>		Savanna
Bignoniaceae	<i>Amphitecna breedlovei</i>	Calabash	Savanna, Broken Ridge
Bombacaceae	<i>Pachyra aquatica</i>	Provision tree	Swamp Forest
Bromeliaceae	<i>Catopsis beteroana</i>		Swamp Forest, Swamps
Bromeliaceae	<i>Tillandsia utriculata</i>		Broken Ridge
Bromeliaceae	<i>Vriesea heliconioides</i>		Swamp Forest
Chrysobalanaceae	<i>Chrysobalanos icaco</i>	Coco Plum	Savanna, Swamp Forest, Broken Ridge
Chrysobalanaceae	<i>Hirtella racemosa</i>		Broken Ridge
Clusiaceae	<i>Callophyllum brasiliensis</i>	Santa Maria	Swamp Forest
Clusiaceae	<i>Hypericum terrae-firmae</i>		Savanna
Clusiaceae	<i>Symphonia globulifera</i>	Waika Chewstick	Swamp Forest
Combretaceae	<i>Bucida buceras</i>	Bullet Tree	Swamp forest
Combretaceae	<i>Conocarpus erecta</i>	Buttonwood	Marine Salt Marh
Convolvulaceae	<i>Ipomoea squamosa</i>		Swamp Forest
Cyperaceae	<i>Cyperus ligularis</i>		Savanna
Cyperaceae	<i>Eleocharis geniculata</i>		Swampy Savanna
Cyperaceae	<i>Fimbristylis cymosa</i>		Littoral Forest
Cyperaceae	<i>Rhynchospora barbata</i>		Savanna
Cyperaceae	<i>Rhynchospora cephalotes</i>		Swamp Forest
Cyrillaceae	<i>Cyrilla racemiflora</i>		Broken Ridge
Cyrillaceae	<i>Purdeae belizensis</i>		Broken Ridge
Ebenaceae	<i>Diospyros bumelioides</i>		Savanna
Eleocarpaceae	<i>Sloanea tuerkheimii</i>	Wild Anatto	Swamp Forest
Erythroxylaceae	<i>Erythroxylon guatemalense</i>		Savanna, Broken Ridge
Erythroxylaceae	<i>Erythroxylum rotundifolium</i>		Savanna, Marine Salt Marsh
Euphorbiaceae	<i>Dalechampia schippii</i>	Pica pica	Savanna
Euphorbiaceae	<i>Drypetes laterifolia</i>		Broken Ridge
Fabaceae	<i>Acoelorrhapha wrightii</i>	Palmetto	Swampy Savanna
Fabaceae	<i>Calliandra houstoniana</i>		Broken Ridge
Fabaceae	<i>Chamaecrista desvauxii</i>		Savanna
Fabaceae	<i>Diphysa carthagensis</i>		Marine Salt Marh
Fabaceae	<i>Mimosa pellita</i>	Prickle	Swamps near lagoon
Fabaceae	<i>Pithecellobium lanceolatum</i>		Savanna
Fabaceae	<i>Pterocarpus officinalis</i>	Kaway	Swamp Forest
Fabaceae	<i>Zygia cognata</i>		Swamp Forest
Flacourtiaceae	<i>Xylosma sp</i>		Swamp Forest
Gentianaceae	<i>Schultesia guianensis</i>		Savanna

Family	Scientific Name	Common Name	Ecosystem
Iridaceae	<i>Cipura campanulata</i>		Savanna
Lamiaceae	<i>Marsypianthes chamaedrys</i>		Savanna
Lentibulariaceae	<i>Utricularia gibba</i>		Swampy Savanna
Lentibulariaceae	<i>Utricularia juncea</i>		Savanna
Lentibulariaceae	<i>Utricularia purpurea</i>		Swampy Savanna
Malpighiaceae	<i>Byrsonima bucidifolia</i>	Craboo	Savanna, Broken Ridge
Malvaceae	<i>Hibiscus pernambucensis</i>		Swamps near lagoon
Mayacaceae	<i>Mayaca fluviatilis</i>		Swampy Savanna
Melastomataceae	<i>Mouriri myrtilloides</i>		Swamp Forest
Menyanthaceae	<i>Nymphoides indica</i>		Swampy Savanna
Myricaceae	<i>Myrica cerifera</i>	Teabox	Savanna
Myristicaceae	<i>Virola koschneyi</i>	Banak	Swamp Forest
Myrtaceae	<i>Calyptranthes chytraculia</i>		Swamp Forest
Myrtaceae	<i>Eugenia aeruginea</i>		Swamp Forest
Myrtaceae	<i>Eugenia faramaeoides</i>		Swamp Forest
Najadaceae	<i>Najas wrightii</i>		Swamps near lagoon
Ochnaceae	<i>Ouratea nitida</i>		Littoral Forest
Orchidaceae	<i>Brassavola nodosa</i>		Savanna
Orchidaceae	<i>Encyclia (belizensis?)</i>		Marine Salt Marsh
Orchidaceae	<i>Encyclia cochleata</i>		Swamp Forest
Orchidaceae	<i>Isochilus carnosiflorus</i>		Swamp Forest
Orchidaceae	<i>Pleurothallus microphylla</i>		Swamp Forest
Passifloraceae	<i>Passiflora foetida var nov.</i>		Littoral Forest
Polygalaceae	<i>Polygala sp</i>		Savanna
Polygonaceae	<i>Coccoloba belizensis</i>	Wild Grape	Swamp Forest
Polygonaceae	<i>Coccoloba swartzii</i>		Littoral Forest
Polygonaceae	<i>Coccoloba uvifera</i>	Sea Grape	Littoral Forest
Polygonaceae	<i>Gymnopodium floribundum</i>		Savanna, Marine Salt Marsh
Pteridophyta	<i>Acrostichum aureum</i>	Mangrove Fern	Swamps near lagoon
Rhamnaceae	<i>Gouania lupuloides</i>		Limestone Hills
Rhizophoraceae	<i>Cassipourea guianensis</i>	Waterwood	Littoral Forest
Rhizophoraceae	<i>Rhizophora mangle</i>	Red Mangrove	Mangrove
Rubiaceae	<i>Alibertia edulis</i>		Swamps near lagoon
Rubiaceae	<i>Machaonia lindeniana</i>		Swamp Forest
Rubiaceae	<i>Randia lundelliana</i>		Broken Ridge
Scrophulariaceae	<i>Anisantherina hispidula</i>		Savanna
Scrophulariaceae	<i>Bacopa lacertosa</i>		Swamps near lagoon
Scrophulariaceae	<i>Buchnera pusilla</i>		Savanna
Theophrastaceae	<i>Jacquinia macrocarpa</i>		Savanna, Marine Salt Marsh
Turneraceae	<i>Turnera aromatica</i>		Savanna
Turneraceae	<i>Turnera difusa</i>		Marine Salt Marsh
Typhaceae	<i>Typha domingensis</i>		Swamps near lagoon




Family	Scientific Name	Common Name	Ecosystem
Violaceae	<i>Rinorea guatemalensis</i>		Swamp Forest
Xyridaceae	<i>Xyris ambigua</i>		Savanna
Zamiaceae	<i>Zamia meermanii</i>		Limestone Hills
Zamiaceae	<i>Zamia prasina</i>	Bullrush	Broken Ridge


To assist in the understanding of the various ecosystems, the following pages present the individual ecosystems as encountered on last Frontiers with a description of ecological identifiers and plant species typically encountered.





**Figure 13. Swampy savanna lake just west of the limestone hill.**


<b>UNESCO Classification code</b>	<b><u>I.A.2.a.(1).(a).K-s</u></b>
<b>Name</b>	<b><u>Tropical evergreen seasonal broadleaf lowland forest over steep calcareous hills = Limestone Karst Hills</u></b>
<b>Altitude</b>	< 500 m.
<b>Geology and soil</b>	Over calcareous rock. Soils may be extremely organic due to the leaching of the mineral soil and the build-up of organic matter in the limestone cracks and fissures.
<b>Water regime</b>	Well drained
<b>Rainfall</b>	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
<b>Fire exposure</b>	Fires can do tremendous damage to this ecosystem. The soil at the base of steep limestone hills is often quite fertile and sought after for slash and burn agriculture. Agricultural fires associated with this practice frequently escape and creep up the hills, commonly doing relatively minor damage at the lower elevations but completely destroying the tops of the hills.
<b>Description</b>	Found in steep terrain, often where there is more non-vegetated ground surface, particularly bare rock. Altitude is less important than steepness and the vegetation cover is dictated by the seasonally extreme droughtiness. Normally the valleys between these steep hills have an ecosystem that should be termed IA2a(1)(a)K-r but the current mapping effort does not allow this type of detail. The canopy tends to reach 25-30 m.
	
<b>Frequent plant species</b>	Distinctive species include: <i>Acalypha</i> sp., <i>Achimenes erecta</i> , <i>Alseis yucatenensis</i> , <i>Aphelandra scabra</i> , <i>Astronium graveolens</i> , <i>Bauhinia divaricata</i> , <i>Brosimum</i> spp., <i>Bursera simaruba</i> , <i>Cedrela odorata</i> , <i>Clusia</i> sp., <i>Coccoloba acapulcensis</i> , <i>Costus pictus</i> , <i>Cryosophila stauracantha</i> , <i>Cupania belizensis</i> , <i>Cymbopetalum mayanum</i> , <i>Dendropanax arboreus</i> , <i>Desmoncus orthacanthos</i> , <i>Dracaena americana</i> , <i>Deherainia smaragdina</i> , <i>Drypetes laterifolia</i> , <i>Gausia maya</i> , <i>Gouania lupuloides</i> , <i>Heliconia spissa</i> , <i>Louleridium chartaceum</i> , <i>Louleridium donnell-smithii</i> , <i>Manilkara zapota</i> , <i>Oreopanax obtusifolius</i> , <i>Passiflora xiikzodz</i> , <i>Pimenta dioica</i> , <i>Piper</i> spp., <i>Plumeria rubra</i> , <i>Pouteria campechiana</i> , <i>Protium copal</i> , <i>Pseudobombax ellipticum</i> , <i>Swartzia cubensis</i> , <i>Talisia oliviformis</i> , <i>Thouinia paucidentata</i> , <i>Trichilia havanensis</i> , <i>Trichilia minutiflora</i> , <i>Vitex gaumeri</i> and <i>Zanthoxylum</i> sp. Epilithic herbs are locally abundant, e.g. <i>Anthurium slechtendahlii</i> , <i>Anthurium verapazense</i> , <i>Tradescantia discolor</i> , <i>Begonia sericoneura</i> and locally the endemic <i>Zamia meermanii</i> . The vegetation of burned hilltops is replaced by vines such as <i>Bidens squarrosa</i> and <i>Calea</i> sp. or more commonly with the fern <i>Pteridium caudatum</i> .
	
<b>Faunistic comments</b>	Rich environment favored by many species. Animal diversity will be higher here than in the surrounding ecosystem types on acidic soils
<b>References</b>	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Meerman 1998b, 1999a, 1999c, Hawkes et al. 1998, Schultze and Whitacre 1999, Wright et al. 1959: 2d, 2e (where on hills)  Picture top: Runaway Creek. Belize district. J. Meerman  Bottom: <i>Heliconia spissa</i> : Green Hills, Cayo district. J. Meerman

<b>UNESCO Classification code</b>	<b><u>I.A.2.a.(1).(b).S</u></b>
<b>Name</b>	<b><u>Tropical evergreen seasonal broadleaf lowland forest over poor or sandy soils = "Broken Ridge"</u></b>
<b>Altitude</b>	< 100 m.
<b>Geology and soil</b>	Nutrient poor, acidic soils
<b>Water regime</b>	Moderately well drained
<b>Rainfall</b>	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
<b>Fire exposure</b>	Fire is of at least occasional occurrence in this ecosystem
<b>Description</b>	Medium high forests over poor, acidic soils.
<b>Frequent plant species</b>	 <p>Characterized by low <i>Attalea cohune</i>, <i>Calophyllum brasiliense</i>, <i>Miconia</i> spp., <i>Terminalia amazonia</i>, <i>Virola koschnyi</i>, <i>Vochysia hondurensis</i> and <i>Xylopia frutescens</i>. Other, frequently encountered species include: <i>Aspidosperma</i> sp., <i>Bactris major</i>, <i>Bactris mexicana</i>, <i>Belotia campbellii</i>, <i>Bucida buceras</i>, <i>Byrsonima crassifolia</i>, <i>Calliandra houstoniana</i>, <i>Chrysobalanus icaco</i>, <i>Chrysophyllum mexicanum</i>, <i>Clidemia</i> sp., <i>Coccoloba</i> sp., <i>Cyrilla racemiflora</i>, <i>Desmoncus orthacanthos</i>, <i>Drypetes laterifolia</i>, <i>Guettarda combsii</i>, <i>Hampea trilobata</i>, <i>Hirtella racemosa</i>, <i>Licania hypoleuca</i>, <i>Luhea speciosa</i>, <i>Metopium brownei</i>, <i>Mouriri exilis</i>, <i>Ouratea</i> sp., <i>Pentalinon andrieuxii</i>, <i>Philodendron fragrantissimum</i>, <i>Pinus caribaea</i>, <i>Pouteria</i> sp., <i>Psychotria poeppigiana</i>, <i>Purdeae belizensis</i>, <i>Randia lundelliana</i>, <i>Roupala montana</i>, <i>Schippia concolor</i>, <i>Scleria bracteata</i>, <i>Simarouba glauca</i>, <i>Tetracera volubilis</i>, <i>Tillandsia utriculata</i>, <i>Zamia prasina</i>.</p>
<b>Faunistic comments</b>	As the principal forest system on Last Frontiers, this is the main habitat for forest species such as Jaguar, Tapir and Great Curassow.
<b>References</b>	Meerman 1999c, Wright et al. 1959: 1, 11a, 11c, 11d, 11e, 11g, Iremonger and Brokaw 1995: I.2.2.4.  Picture: <i>Xylopia frutescens</i> . Toledo district. J. Meerman

<b>UNESCO Classification code</b>	<b><u>I.A.2.g.(1).(a).SC</u></b>
<b>Name</b>	<b><u>Tropical evergreen seasonal broadleaf lowland swamp forest: Stann Creek variant = Swamp Forest</u></b>
<b>Altitude</b>	< 50 m.
<b>Geology and soil</b>	Mostly over calcium-poor soils. Some hog-wallow micro-relief exists.
<b>Water regime</b>	Ill drained, often waterlogged for part of the year.
<b>Rainfall</b>	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
<b>Fire exposure</b>	Limited to areas with slash and burn cultivation.
<b>Description</b>	Swampy stands of thin stemmed, partly deciduous trees and shrubs without emergents in the coastal zone of Central Belize.
<b>Frequent plant species</b>	Frequently encountered plants in these forests are <i>Acosmium panamense</i> , <i>Aspidosperma cruenta</i> , <i>Astrocaryum mexicanum</i> , <i>Attalea cohune</i> , <i>Bactris mexicana.</i> , <i>Bucida buceras</i> , <i>Callophyllum brasiliensis</i> , <i>Calyptrocalyx chytaculia</i> , <i>Clidemia sp.</i> , <i>Coccoloba belizensis</i> , <i>Cryosophila stauracantha</i> , <i>Dialium guianense</i> , <i>Dracaena americana</i> , <i>Encyclia cochleata</i> , <i>Eugenia aeruginea</i> , <i>Eugenia farameoides</i> , <i>Guettarda combsii</i> , <i>Heliconia vaginalis</i> , <i>Hirtella racemosa</i> , <i>Inga sp.</i> , <i>Isochilus carnosiflorus</i> , <i>Jacquinia paludicola</i> , <i>Miconia sp.</i> , <i>Mouriri exilis</i> , <i>Mouriri myrtilloides</i> , <i>Pachira aquatica</i> , <i>Philodendron smithii</i> , <i>Pleurothallus microphylla</i> , <i>Psychotria glomerulata</i> , <i>Psychotria poeppigiana</i> , <i>Rinorea guatemalensis</i> , <i>Scleria bracteata</i> , <i>Swietenia macrophylla</i> , <i>Symphonia globulifera</i> , <i>Tabebuia chrysantha</i> , <i>Terminalia amazonia</i> , <i>Viola koschnyi</i> , <i>Vismia ferruginea</i> , <i>Vochysia hondurensis</i> , <i>Vriesea heliconioides</i> , <i>Xylosma sp</i> , <i>Xylopia frutescens</i> and <i>Zygia cognata</i> . On richer soils <i>Pterocarpus officinalis</i> is found; on poorer soils more Melastomataceae and <i>Acoelorrhaphe wrightii</i> .
	
<b>Faunistic comments</b>	Relatively poor in animal species, Jaruar, Tapir and White-tailed Deer will find a home here.
<b>References</b>	Meerman 1999a, Wright et al. 1959: 14,14a, 14b, 14c; Iremonger and Brokaw 1995: 1.1.1.1.2.1. Picture: <i>Bucida buceras</i> . Stann Creek District. J. Meerman

<b>UNESCO Classification code</b>	<b><u>I.A.5.b.(1).(c).</u></b>
<b>Name</b>	<b><u>Mixed Mangrove scrub</u></b>
<b>Altitude</b>	Sealevel
<b>Geology and soil</b>	Coastal deposits, usually clays or mangrove peat.
<b>Water regime</b>	Not permanently inundated.
<b>Rainfall</b>	NA
<b>Fire exposure</b>	None
<b>Description</b>	Mixed mangrove communities.
<b>Frequent plant species</b>	All three mangrove species occur: <i>Avicennia germinans</i> , <i>Laguncularia racemosa</i> , and <i>Rhizophora mangle</i> . Other frequent species include <i>Acoelorrhaphe wrightii</i> , <i>Acrostichum aureum</i> , <i>Conocarpus erectus</i> , <i>Eragrostis prolifera</i> , <i>Myrica cerifera</i> and <i>Rhabdadenia biflora</i> .
	
<b>Faunistic comments</b>	Mostly rich in birds such as herons and other waders.
<b>References</b>	Furley & Ratter 1992, Gray <i>et al.</i> 1990, Wright <i>et al.</i> 1959: 29, 31, Iremonger and Brokaw 1995: II.1.2.2 Picture: <i>Avicennia germinans</i> . Dangriga. J. Meerman


<b>UNESCO Classification code</b>	<b><u>I.A.5.b.(1).(f).</u></b>
<b>Name</b>	<b><u>Basin Mangrove forest = Mangrove</u></b>
<b>Altitude</b>	Sealevel
<b>Geology and soil</b>	Mostly coastal deposits such as clay and mangrove peat
<b>Water regime</b>	Mostly waterlogged.
<b>Rainfall</b>	NA
<b>Fire exposure</b>	None
<b>Description</b>	Found along coastal lagoons and in land-locked coastal depressions. Species composition and structure in these communities are highly variable depending on frequency and depth of inundation, nutrient exchange and water salinity levels.
	
<b>Frequent plant species</b>	<i>Rhizophora mangle</i> dominates in areas which receive frequent tidal flooding or where flood waters are predominantly deeper than 15 cm. Where water depth is less and tidal flushing, amplitude and kinetic energy of floodwaters decrease, other mangrove species and associates invade. Where salinity reaches levels above 50 % <i>Avicennia germinans</i> dominates. In addition to being highly saline the soils may be very reduced (anaerobic), giving the <i>Avicennia</i> an ecological advantage through its pneumatophores. Where salinity is about 30-40 %, dominant species include <i>Avicennia germinans</i> , <i>Laguncularia racemosa</i> , and <i>Rhizophora mangle</i> . When disturbed the fern <i>Acrostichum aureum</i> becomes the dominant species.
<b>Faunistic comments</b>	Mostly rich in birds such as herons and other waders.
<b>References</b>	Furley & Ratter 1992, Gray <i>et al.</i> 1990, Iremonger and Brokaw 1995: I.21.2.3. Picture: Gra-Gra Lagoon, Dangriga. J. Meerman

<b>UNESCO Classification code</b>	<b><u>III.A.1.b.(a).Mi</u></b>
<b>Name</b>	<b><u>Broad-leaved lowland shrubland: <i>Miconia</i> variant = Savanna Hammocks</u></b>
<b>Altitude</b>	< 100 m.
<b>Geology and soil</b>	Soil has a "hog-wallow" micro-relief, and is gray sandy clay, fairly well mottled below.
<b>Water regime</b>	Ill drained, frequently inundated.
<b>Rainfall</b>	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
<b>Fire exposure</b>	Where Karst limestone hills occur in association with savannas, this ecosystem acts as a buffer, protecting the vegetation on the hills from being affected by the frequent savanna fires.
<b>Description</b>	This is a swampy stand of thin-stemmed trees and shrubs 3-4 m high with no emergents, often associated with savannas. Where Karst limestone hills occur in association with savannas, this ecosystem is often found at the base of these hills,
	
<b>Frequent plant species</b>	Frequently encountered species include <i>Acoelorrhaphe wrightii</i> , <i>Aspidosperma cruenta</i> , <i>Bucida buceras</i> , <i>Calyptanthes</i> sp., <i>Chrysobalanus icaco</i> , <i>Clidemia</i> sp., <i>Haematoxylon campechianum</i> , <i>Miconia</i> spp., <i>Mimosa hemendieta</i> , <i>Tetragastis stevensonii</i> , and <i>Xylopia frutescens</i> .
<b>Faunistic comments</b>	Main reservoir for many typical Savanna species, particularly birds
<b>References</b>	Meerman 1999c, Wright et al. 1959: 15, Iremonger and Brokaw 1995: II.1.1.2.2. Picture: Runaway Creek, Belize District. J. Meerman

<b>UNESCO Classification code</b>	<b><u>V.A.2.b.(2).</u></b>
<b>Name</b>	<b><u>Short-grass savanna with shrubs = Savanna</u></b>
<b>Altitude</b>	< 50 m.
<b>Geology and soil</b>	The soils all have in common that they have a pale colored, coarse textured topsoil sharply overlying a compact, brightly red and white mottled finer textured subsoil. The soils are all acid and very deficient in nutrients (King et al. 1992).
<b>Water regime</b>	The very dense subsoil prevents vertical water movements causing the landscape to be partially inundated during the wet season and extremely dry in the dry season.
<b>Rainfall</b>	Average rainfall generally less than 2500 mm per year with a pronounced dry season from February through May.
<b>Fire exposure</b>	The extreme drought in the dry season caused by the soil conditions makes this ecosystem extremely vulnerable for fires. Some areas burn more than once a year. The wetter conditions in most of the Toledo district do not favor extensive fires and although favorable soil conditions exist, savannas in the Toledo district are extremely limited in extend. Documentation of lowland broadleaf forest fires started by lightning is rare (Middleton et al., 1997). Consequently, fire in tropical lowland forests has traditionally been considered as human induced (Janzen, 1986; Koonce & Gonzalez-Caban, 1990).
<b>Description</b>	Typical Belizean lowland savannas are found on gently sloping alluvial deposits in the coastal plain. The combination of poor nutrient availability, extremes in water availability and recurring fire regime has resulted in a species poor but highly specialized ecosystem. The aspect of this community is quite variable. Moss (1998) classified 12 different savanna land classes from cutting grass marsh through to pine woodland. The scrublands generally appear as islands of small, densely packed trees and shrubs in a grassland area; in some areas the islands are large and merging, in others they are quite separate.
<b>Frequent plant species</b>	The graminoid vegetation is usually being dominated by sedges. Frequent woody species are <i>Acoelorrhaphe wrightii</i> , <i>Cameraria latifolia</i> , <i>Chrysobalanus icaco</i> , <i>Cipura campanulata</i> , <i>Clidemia sp.</i> , <i>Crescentia cujete</i> , <i>Curatela americana</i> , <i>Diospyros bumelioides</i> , <i>Erythroxylum guatemalense</i> , <i>Gliricidia sepium</i> , <i>Hippocratea excelsa</i> , <i>Hypericum terrae-firmae</i> , <i>Metopium brownei</i> , <i>Miconia sp.</i> , <i>Mimosa albicans</i> , <i>Myrica cerifera</i> , <i>Pinus caribaea</i> , <i>Pithecellobium lanceolatum</i> , <i>Quercus oleoides</i> and <i>Roupala montana</i> . There is a strong herbaceous component with typically: <i>Anisantherina hispidula</i> , <i>Brassavola nodosa</i> , <i>Buchnera pusilla</i> , <i>Bletia purpurea</i> , <i>Borreria sp.</i> , <i>Casytha filliformis</i> , <i>Chamaecrista desvauxii</i> , <i>Chamaecrista spp.</i> , <i>Cipura campanulata</i> , <i>Coutoubea spicata</i> , <i>Dalechampia schippii</i> , <i>Drosera cappilaris</i> , <i>Eriocaulon sp.</i> , <i>Marsypianthes chamaedrys</i> , <i>Metastelma stenomeris</i> , <i>Passiflora urbaniana</i> , <i>Polygala sp</i> , <i>Schultesia guianensis</i> , <i>Turnera aromatica</i> , <i>Utricularia juncea</i> , <i>Xyris ambigua</i> and <i>Zamia prasina</i> . Grasses reported from this ecosystem include: <i>Aristida appressa</i> , <i>Axonopus poiophyllus</i> , <i>Eragrostis maypurensis</i> , <i>E. acutifolia</i> , <i>E. elliotii</i> , <i>Gymnopogon spicatus</i> , <i>Leptocoryphium lanatum</i> , <i>Mesosetum filifolium</i> , <i>Panicum rudgei</i> , <i>Paspalum peckii</i> , <i>P. pulchellum</i> , <i>Sporobolus cubensis</i> and <i>Trachypogon plumosus</i> . Sedges include mostly <i>Rhynchospora barbata</i> , <i>Rhynchospora spp.</i> , but also <i>Bulbostylis paradoxa</i> and <i>Fimbristylis vahlii</i> . Wet places usually have <i>Eleocharis spp.</i> and <i>Cyperus ligularis</i> . The latter mostly near the coast.




<b>Faunistic comments</b>	The short-grass savannas are characteristic habitat for a number of bird species such as the Fork-tailed Flycatcher <i>Tyrannus savanna</i> , the Grasshopper Sparrow <i>Ammodramus savannarum</i> and the Aplomado falcon <i>Falco femoralis</i> .
<b>References</b>	Meerman 1999a, Wright et al. 1959: 19, 19a, 19b, Iremonger & Brokaw II.1.1.2.3. Picture top: Western Highway, Cayo district. J. Meerman Bottom: <i>Passiflora urbaniana</i> . Belize district. J. Meerman

<b>UNESCO Classification code</b>	<b><u>V.E.1.a.(1)</u></b>
<b>Name</b>	<b><u>Marine salt marsh with many succulent species = Marine Salt Marsh</u></b>
<b>Altitude</b>	Sealevel
<b>Geology and soil</b>	Over calcareous rock.
<b>Water regime</b>	Partially inundated with brackish water during the rainy season. Salinity increases as water evaporates.
<b>Rainfall</b>	Variable
<b>Fire exposure</b>	Very rare
<b>Description</b>	This community type occurs in marshes in the coastal plains where the salinity level is high, and is generally greater than 5%. This community is highly heterogeneous and containing patches dominated by different species, which are all taken together here to indicate one main salt marsh community type. The variant found on Last Frontiers, is dominated by fresh water swamp species.
	
<b>Frequent plant species</b>	Common dominants in the vegetation are <i>Batis maritima</i> , <i>Distichlis spicata</i> , <i>Fimbristylis spadicea</i> , <i>Fuirena</i> sp., <i>Juncus</i> spp., <i>Turnera difusa</i> , <i>Encyclia belizensis</i> , <i>Salicornia perennis</i> , <i>Sesuvium portulacastrum</i> , <i>Solanum donianum</i> and <i>Spartina cynosuroides</i> . Flats with these principally herbaceous species contain stunted <i>Cameraria latifolia</i> , <i>Conocarpus erecta</i> , <i>Erythroxylum rotundifolium</i> , <i>Gymnopodium floribundum</i> , <i>Jacquinia macrocarpa</i> , <i>Chrysobalanos icaco</i> and dwarf <i>Rhizophora mangle</i> .
<b>Faunistic comments</b>	Poor in species. During fieldwork a migratory Snipe was seen here.
<b>References</b>	Davis 1943, Gray et al. 1990, Meerman 1993, Bijleveld 1998, Iremonger & Brokaw III.1.2.1 Picture: Gales Point, Belize District. J. Meerman

<b>UNESCO Classification code</b>	<b><u>VI.B.3.a.</u></b>
<b>Name</b>	<b><u>Tropical Littoral forest and beach communities = Littoral Forest</u></b>
<b>Altitude</b>	0 - 5 m.
<b>Geology and soil</b>	Littoral forests are found in a narrow coastal strip on recent dune sands.
<b>Water regime</b>	Well drained
<b>Rainfall</b>	NA
<b>Fire exposure</b>	Unknown
<b>Description</b>	This ecosystem is typically bordered by Mixed mangrove scrub IA5b(1)(c), with mostly <i>Rhizophora mangle</i> and <i>Myrica cerifera</i> . These forests are not widespread in Belize and under considerable pressure from coastal development. In the past much of it has been transformed to coconut plantations and more recently, tourist and residential developments have claimed much of what remained.
<b>Frequent plant species</b>	The littoral forest itself varies in composition but usually contains the following species: <i>Brassavola nodosa</i> , <i>Bursera simaruba</i> , <i>Cassipourea guianensis</i> , <i>Cassytha filiformis</i> , <i>Chrysobalanus icaco</i> , <i>Coccoloba swartzii</i> , <i>Coccoloba uvifera</i> , <i>Cordia sebestena</i> , <i>Fimbristylis cymosa</i> , <i>Hymenocallis latifolia</i> , <i>Metopium brownei</i> , <i>Myrmecophylla tibicinis</i> , <i>Ouratea nitida</i> , <i>Pouteria campechiana</i> , and <i>Sophora tomentosa</i> . The introduced <i>Cocos nucifera</i> now forms an integral part of this community.
<b>Faunistic comments</b>	Important habitat for migratory birds and breeding habitat for marine turtles and American Crocodiles <i>Crocodylus acutus</i> .
<b>References</b>	Meerman and Boomsma 1995a, Wright et al. 1959: 32, Iremonger and Brokaw 1995: II.2.2.  Pictures top: Ambergris Caye. J. Meerman Bottom: Laughing Bird Caye. J. Meerman

<b>UNESCO Classification code</b>	<b><u>VII.C.1.</u></b>
<b>Name</b>	<b><u>Rooted floating leaf communities of fresh water lakes = Swampy Savanna Lakes</u></b>
<b>Altitude</b>	< 100 m.
<b>Geology and soil</b>	Variable
<b>Water regime</b>	Inundated year through but water level may fluctuate strongly. Some lakes may occasionally dry up during the dry season.
<b>Rainfall</b>	NA
<b>Fire exposure</b>	None
<b>Description</b>	Not mapped  Distinctive aquatic assembly of freshwater lakes, lagoons and slow flowing rivers. Due to its often linear occurrence difficult to map but to be expected in most shallow freshwater habitats. Good examples can be found in the New River and Crooked Tree Lagoons.
<b>Frequent plant species</b>	Typical species include <i>Nymphaea ampla</i> , <i>Nymphoides indica</i> <i>Mayaca fluviatilis</i> , free floating <i>Utricularia gibba</i> , <i>Utricularia purpurea</i> and blue green algae The shores are often rimmed with <i>Eleocharis geniculata</i> and other <i>Eleocharis</i> spp. Aquatic tree species include <i>Annona glabra</i>
<b>Faunistic comments</b>	Important habitat for water birds and Morelet's Crocodile.
<b>References</b>	Rejmánková et al. 1996 Picture: New River Lagoon, Orange Walk District. J. Meerman

<b>UNESCO Classification code</b>	<b><u>VI.B1a(1).</u></b>
<b>Name</b>	<b><u>Scarcely vegetated tropical dune and beaches</u></b>
<b>Altitude</b>	< 100 m.
<b>Geology and soil</b>	Sandy, the Last Frontier sandflats may be remnants of ancient dunes.
<b>Water regime</b>	Inundated during unusual high tide and floods
<b>Rainfall</b>	NA
<b>Fire exposure</b>	None
<b>Description</b>	Sandy flats and shores without much permanent vegetation.
	
<b>Frequent plant species</b>	None, some <i>Sesuvium portulacastrum</i> just outside Last Frontiers
<b>Faunistic comments</b>	None
<b>References</b>	None

## Fauna

The focus of this Rapid Ecological Assessment was on Ecosystems. Nevertheless, faunal records were taken when species were encountered opportunistically. Most of the species encountered are birds. Mammals, Reptiles and Amphibians are much more difficult to encounter and were noted principally as tracks. A full list of species recorded during the surveys is presented in appendix 2. Note that voucher specimens of many species were collected as pictures, and the collection number represents the “voucher picture” taken.

Particularly for birds, very few species were noted. The most species rich area (but least researched) appears to be the limestone hill in the center of the property.

**Table 2. Birds and other fauna species recorded**

Group	Common Name	Scientific Name	Ecosystem
Birds	Acorn Woodpecker	<i>Melanerpes formicivorus</i>	Savanna
Birds	Anhinga	<i>Anhinga anhinga</i>	Savanna Pond
Birds	Bare-throated Tiger Heron	<i>Tigrisoma mexicanum</i>	Creek
Birds	Black-throated Bobwhite	<i>Colinus nigrogularis</i>	Savanna
Birds	Blue-crowned Motmot	<i>Motmotus momota</i>	Limestone Hill
Birds	Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	Savanna
Birds	Blue-winged Warbler	<i>Vermivora pinus</i>	Savanna
Birds	Brown Jay	<i>Cyanocorax morio</i>	Limestone Hill
Birds	Common Black Hawk	<i>Buteogallus anthracinus</i>	Mangrove
Birds	Common Yellowthroat	<i>Geothlypis trichas</i>	Swamp Forest
Birds	Couch's Kingbird	<i>Tyrannus couchii</i>	Savanna
Birds	Eastern Kingbird	<i>Tyrannus tyrannus</i>	Savanna
Birds	Fork-tailed Flycatcher	<i>Tyrannus savana</i>	Savanna
Birds	Gray-throated Chat	<i>Granatellus sallaei</i>	Swamp Forest
Birds	Great Blue Heron	<i>Ardea herodias</i>	Mangrove
Birds	Great Currasow	<i>Crax rubra</i>	Swamp Forest
Birds	Great Egret	<i>Ardea alba</i>	Savanna Pond
Birds	Great Tinamou	<i>Tinamus major</i>	Swamp Forest
Birds	Green Honey Creeper	<i>Chlorophanes spiza</i>	Broken Ridge
Birds	Green Jay	<i>Cyanocorax yncas</i>	Broken Ridge
Birds	Green Kingfisher	<i>Chloroceryle americana</i>	Creek
Birds	Hepatic Tanager	<i>Piranga flava</i>	Savanna
Birds	Hooded warbler	<i>Wilsonia citrine</i>	Limestone Hill
Birds	Keel-billed Toucan	<i>Ramphastos sulfuratus</i>	Limestone Hill
Birds	Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	Savanna

Group	Common Name	Scientific Name	Ecosystem
Birds	Little Blue Heron	<i>Egretta caerulea</i>	Mangrove
Birds	Long-billed Hermit	<i>Phaethornis longirostris</i>	Swamp Forest
Birds	Montezuma oropendola	<i>Psarocolius montezuma</i>	Limestone Hill
Birds	Olive-throated Parakeet	<i>Aratinga nana</i>	Broken Ridge
Birds	Plain Chachalaca	<i>Ortalis vetula</i>	Swamp Forest
Birds	Red-lored Parrot	<i>Amazona autumnalis</i>	Limestone Hill
Birds	Ringed Kingfisher	<i>Megaceryle torquata</i>	Creek
Birds	Short-tailed Hawk	<i>Buteo brachyuris</i>	Savanna
Birds	Squirrel Cuckoo	<i>Piaya cayana</i>	Limestone Hill
Birds	Strong-billed Woodcreeper	<i>Xiphocolaptes promeropyrhinchus</i>	Broken Ridge
Birds	Tawny-winged Woodcreeper	<i>Dendrocincla anabatina</i>	Broken Ridge
Birds	Tropical King Bird	<i>Mimus gilvus</i>	Savanna
Birds	Tropical Mockingbird	<i>Mimus gilvus</i>	Savanna
Birds	White-collared Manakin	<i>Manacus candei</i>	Limestone Hill
Birds	White-colored Seedeater	<i>Sporophila torqueola</i>	Savanna
Birds	Wilson's Snipe	<i>Gallinago delicata</i>	Savanna
Birds	Yellow breasted Chat	<i>Icteria virens</i>	Broken Ridge
Birds	Yellow-crowned Night Heron	<i>Nyctinassa violaceae</i>	Mangrove
Birds	Yellow-throated Euphonia	<i>Euphonia hirundinacea</i>	Broken Ridge
Butterflies	Hairstreak	<i>Electrostrymon joya</i>	Savanna
Crustacea	Blue Land Crab	<i>Cardisoma guanhumi</i>	Mangrove
Fishes	Mexican Tetra	<i>Astyanax fasciatus</i>	Creek
Mammals	Jaguar	<i>Panthera onca</i>	Broken Ridge (Tracks)
Mammals	Tapir	<i>Tapirus bairdi</i>	Broken Ridge (Tracks)
Mammals	White-tailed Deer	<i>Odocoileus virginianus</i>	Savanna (Tracks)
Mammals	Raccoon	<i>Procyon lotor</i>	Savanna, Mangrove (Tracks)
Snails	Jute Snail	<i>Pachychilus indiorum</i>	Creek

Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Acoelorrhaphe wrightii</i>	Last Frontiers	1901199	355863	Acoelorrhaphe wrightii swamp partly inundated.	2009	9	9	
<i>Acoelorrhaphe wrightii</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Acrostichum aureum</i>	Last Frontiers	1899506	357252	Last Frontiers REA	2009	10	30	Acr_aur_4797.JPG
<i>Alibertia edulis</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Ali_edu_6199.JPG
<i>Amphitecna breedlovei</i>	Last Frontiers	1898901	354934	Last Frontiers REA	2009	10	30	Amp_bre_4885.JPG
<i>Anisantherina hispidula</i>	Last Frontiers	1898901	354934	Last Frontiers REA	2009	10	9	Ani_his_4465.JPG
<i>Annona glabra</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	9	Ann_gla_4458.JPG
<i>Attalea cohune</i>	Last Frontiers	1898800	355256	Swampforest. Stream crossing, really more a swampy flow	2009	9	9	
<i>Bacopa lacertosa</i>	Last Frontiers	1899617	357173	Last Frontiers REA	2009	10	30	Bac_lac_4794.JPG
<i>Bactris mexicana</i>	Last Frontiers	1898966	355217	Last Frontiers REA	2009	10	30	Bac_mex_4911.JPG
<i>Bactris Mexicana</i>	Last Frontiers	1898800	355256	Swampforest. Stream crossing, really more a swampy flow	2009	9	9	
<i>Brassavola nodosa</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Bra_nod_6403.JPG
<i>Brassavola nodosa</i>	Last Frontiers	1899742	355593	Last Frontiers REA	2009	10	16	Bra_nod_4570.JPG
<i>Buchnera pusilla</i>	Last Frontiers	1899723	355563	Last Frontiers REA	2009	10	30	Buc_buc_4819.JPG
<i>Bucida buceras</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Bucida buceras</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	9	Buc_pus_4537.JPG
<i>Byrsonima bucidifolia</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Byr_buc_4852.JPG
<i>Calliandra houstoniana</i>	Last Frontiers	1899733	356861	Last Frontiers REA	2009	10	30	Cal_chy_4814.JPG
<i>Callophyllum brasiliensis</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	
<i>Calyptanthus chytraculia</i>	Last Frontiers	1899685	357103	Last Frontiers REA	2009	10	30	Cal_hou_4860.JPG
<i>Cameraria latifolia</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Cam_lat_6397.JPG

Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Cardisoma guanhumi</i>	Last Frontiers	1900559	356362	Last Frontiers REA	2009	10	9	Car_gua_4547.JPG
<i>Cassipourea guianensis</i>	Last Frontiers	1900230	356444	Last Frontiers REA	2009	10	9	Cas_gui_4489.JPG
<i>Cassipourea guianensis</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Cas_gui_4844.JPG
<i>Cassipourea guianensis</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Catopsis beteroana</i>	Last Frontiers	1900644	356552	Last Frontiers REA	2009	10	9	Cat_ber_4524.JPG
<i>Catopsis beteroana</i>	Last Frontiers	1899708	357091	Last Frontiers REA	2009	10	30	Cat_ber_4837.JPG
<i>Chamaecrista desvauxii</i>	Last Frontiers	1899638	355854	Last Frontiers REA	2009	10	30	Cha_des_4765.JPG
<i>Chrysobalanos icaco</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Chr_ica_4818.JPG
<i>Cipura campanulata</i>	Last Frontiers	1899723	355573	Last Frontiers REA	2009	10	9	Cip_cam_4438.JPG
<i>Coccoloba belizensis</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Coc_bel_4836.JPG
<i>Coccoloba swartzii</i>	Last Frontiers	1900230	356444	Beach, Littoral Forest	2009	10	9	Coc_swa_4485.JPG
<i>Coccoloba swartzii</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Coc_swa_4849.JPG
<i>Coccoloba uvifera</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Cocos nucifera</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Conocarpus erecta</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Conocarpus erecta</i>	Last Frontiers	1898076	358644	Silver form	2009	10	30	Con_ere_4880.JPG
<i>Conocarpus erecta</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Con_ere_6318.JPG
<i>Cyperus ligularis</i>	Last Frontiers	1899521	357278	Last Frontiers REA	2009	10	30	Cyp_lig_4784.JPG
<i>Cyrilla racemiflora</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	30	Cyr_rac_4883.JPG
<i>Dalechampia schippii</i>	Last Frontiers	1899319	356362	Last Frontiers REA	2009	10	30	Dal_sch_4870.JPG
<i>Diospyros bumelioides</i>	Last Frontiers	1899122	355031	Last Frontiers REA	2009	10	9	Dio_bum_4462.JPG



Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Diospyros bumelioides</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Dio_bum_4854.JPG
<i>Diphysa carthagenensis</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Dip_car_6315.JPG
<i>Drypetes laterifolia</i>	Last Frontiers	1898955	354996	Last Frontiers REA	2009	10	30	Dry_lat_4893.JPG
<i>Electrostrymon joya</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Ele_joy_6393.JPG
<i>Eleocharis geniculata</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Ele_gen_4788.JPG
<i>Encyclia (belizensis?)</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Enc_bel_6306.JPG
<i>Encyclia cochleata</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Enc_coc_6278.JPG
<i>Erythroxyton guatemalense</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Eryt_gua_4841.JPG
<i>Erythroxyton guatemalense</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Erythroxyton rotundifolium</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Ery_rot_6348.JPG
<i>Eugenia aeruginea</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Eug_aer_4835.JPG
<i>Eugenia faramoides</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Eug_far_4856.JPG
<i>Fimbristylis cymosa</i>	Last Frontiers	1900230	356444	Beach, Littoral Forest	2009	10	9	
<i>Gouania lupuloides</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Gou_lup_4796.JPG
<i>Gymnopodium floribundum</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Gon_flo_6330.JPG
<i>Hibiscus pernambucensis</i>	Last Frontiers	1900583	356369	Last Frontiers REA	2009	10	9	Hib_per_4501.JPG
<i>Hirtella racemosa</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Hypericum terrae-firmae</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	Hyp_ter_4775.JPG
<i>Ilex guianensis</i>	Last Frontiers	1900230	356444	Last Frontiers REA	2009	10	9	Ile_gui_4497.JPG
<i>Ilex guianensis</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Ipomoea squamosa</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Ipo_squ_6238.JPG

Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Isochilus camosiflorus</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Iso_car_6274.JPG
<i>Jacquinia macrocarpa</i>	Last Frontiers	1900037	355536	Last Frontiers REA	2009	10	9	Jac_mac_4542.JPG
<i>Jacquinia macrocarpa</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Jac_mac_6340.JPG
<i>Machaonia lindeniana</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Mar_cha_4867.JPG
<i>Marsypianthes chamaedrys</i>	Last Frontiers	1898901	354934	Last Frontiers REA	2009	10	9	May_flu_4461.JPG
<i>Mayaca fluviatilis</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	9	Met_ste_4529.JPG
<i>Metastelma stenomeres</i>	Last Frontiers	1899595	355849	Last Frontiers REA	2009	10	30	Mim_pel_4780.JPG
<i>Metopium brownei</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Met_bro_6321.JPG
<i>Mimosa pellita</i>	Last Frontiers	1899506	357252	Last Frontiers REA	2009	10	9	Myr_cer_4460.JPG
<i>Montezuma oropendola</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
<i>Mouriri myrtilloides</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Mou_myr_6203.JPG
<i>Myrica cerifera</i>	Last Frontiers	1898901	354934	Last Frontiers REA	2009	10	9	Nym_ind_4446.JPG
<i>Nymphoides indica</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	9	Our_nit_4523.JPG
<i>Ouratea nitida</i>	Last Frontiers	1900230	356444	Last Frontiers REA	2009	10	9	Pac_aqu_4506.JPG
<i>Pachychilus indiorum</i>	Last Frontiers	1898190	354930	Jenkins Creek: Stream from Maya Mountains flowing into Manatee Lagoon on Viktor's property	2010	1	5	Pac_ind_6196.JPG
<i>Pachyra aquatica</i>	Last Frontiers	1898800	355256	Swampforest. Stream crossing, really more a swampy flow	2009	9	9	
<i>Pachyra aquatica</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Pen_and_4822.JPG
<i>Passiflora foetida var nov.</i>	Last Frontiers	1901636	356582	Along Shoreline	2009	9	9	
<i>Pentalinon andrieuxii</i>	Last Frontiers	1899671	357152	Last Frontiers REA	2009	10	9	Pit_lan_4532.JPG
<i>Philodendron fragrantissimum</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	

Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Philodendron smithii</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Phi_smi_6294.JPG
<i>Piranga flava</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
<i>Pithecellobium lanceolatum</i>	Last Frontiers	1899707	355393	Last Frontiers REA	2009	10	30	Ple_mic_4910.JPG
<i>Pleurothallus microphylla</i>	Last Frontiers	1898976	355224	Last Frontiers REA	2009	10	9	Pte_off_4444.JPG
<i>Polygala sp</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Pol_6406.JPG
<i>Pterocarpus officinalis</i>	Last Frontiers	1898814	355264	Last Frontiers REA	2009	10	30	Mac_lin_4817.JPG
<i>Pterocarpus officinalis</i>	Last Frontiers	1898800	355256	Swampforest. Stream crossing, really more a swampy flow	2009	9	9	
<i>Purdeae belizensis</i>	Last Frontiers	1899292	355393	Last Frontiers REA	2009	10	16	Pur_bel_4615.JPG
<i>Randia lundelliana</i>	Last Frontiers	1900220	356403	Last Frontiers REA	2009	10	9	Ran_lun_4496.JPG
<i>Rhizophora mangle</i>	Last Frontiers	1899702	357051	Last Frontiers REA	2009	10	30	Rhi_man_4798.JPG
<i>Rhizophora mangle</i>	Last Frontiers	1900125	356520	Mangrove Channel in Southern Lagoon, at Viktor's place	2010	1	5	Rhi_man_2422.JPG
<i>Rhynchospora barbata</i>	Last Frontiers	1899651	355847	Last Frontiers REA	2009	10	9	Rhy_bar_4543.JPG
<i>Rhynchospora cephalotes</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Rhy_cep_6247.JPG
<i>Rinorea guatemalensis</i>	Last Frontiers	1898965	355240	Last Frontiers REA	2009	10	30	Rin_gua_4913.JPG
<i>Schippia concolor</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Schultesia guianensis</i>	Last Frontiers	1899723	355573	Last Frontiers REA	2009	10	16	Sch_gui_4577.JPG
<i>Sesuvium portulacastrum</i>	Last Frontiers	1898076	358644	Last Frontiers REA	2009	10	30	Ses_por_4873.JPG
<i>Sloanea tuerkheimii</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Slo_tue_6202.JPG
<i>Symphonia globulifera</i>	Last Frontiers	1898800	355256	Swampforest. Stream crossing, really more a swampy flow	2009	9	9	
<i>Tillandsia utriculata</i>	Last Frontiers	1899353	355400	Last Frontiers REA	2009	10	16	Til_utr_4614.JPG
<i>Turnera aromatica</i>	Last Frontiers	1899320	356367	Last Frontiers REA	2009	10	30	Tur_aro_4872.JPG

Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
<i>Turnera difusa</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	Tur_dif_6301.JPG
<i>Typha domingensis</i>	Last Frontiers	1899506	357252	Last Frontiers REA	2009	10	30	Typ_dom_4779.JPG
<i>Utricularia gibba</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	30	Utr_gib_4932.JPG
<i>Utricularia juncea</i>	Last Frontiers	1899827	355841	Last Frontiers REA	2009	10	9	Utr_jun_4467.JPG
<i>Utricularia purpurea</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	30	Utr_pur_4925.JPG
<i>Virola koschneyi</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Vir_kos_6200.JPG
<i>Vriesea heliconioides</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Vri_hel_6225.JPG
<i>Xylopi frutescens</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Xylopi frutescens</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	
<i>Xylosma sp</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Xyl_6207.JPG
<i>Xyris ambigua</i>	Last Frontiers	1899658	355851	Last Frontiers REA	2009	10	30	Xyr_amb_4770.JPG
<i>Zamia meermanii</i>	Last Frontiers	1899362	355205	Last Frontiers REA	2009	10	16	Zam_mee_4612.JPG
<i>Zamia meermanii</i>	Last Frontiers	1899521	355166	On Limestonecliff	2009	9	9	
<i>Zamia meermanii</i>	Last Frontiers	1899516	355169	On Limestonecliff	2009	9	9	
<i>Zamia prasina</i>	Last Frontiers	1898399	355200	Broken Ridge on Viktors Property near Coastal Highway	2010	1	5	
<i>Zygia cognata</i>	Last Frontiers	1898953	355214	Last Frontiers REA	2009	10	30	Zyg_cog_4918.JPG
<i>Zygia cognata</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Zyg_cog_6251.JPG

Common Name	Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
Anhinga	<i>Anhinga anhinga</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	30	
Mexican Tetra	<i>Astyanax fasciatus</i>	Last Frontiers	1898190	354930	Jenkins Creek: Stream from Maya Mountains flowing into Manatee Lagoon on Viktor's property	2010	1	5	Ast_fas_6221.JPG
Bare-throated Tiger Heron	<i>Tigrisoma mexicanum</i>	Last Frontiers	1899506	357252	Last Frontiers REA	2009	10	30	
Black-throated Bobwhite	<i>Colinus nigrogularis</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
Blue-crowned Motmot	<i>Motmotus momota</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	16	
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
Blue-winged Warbler	<i>Vermivora pinus</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
Brown Jay	<i>Cyanocorax morio</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Common Black Hawk	<i>Buteogallus anthracinus</i>	Last Frontiers	1901636	356582	Last Frontiers REA	2009	10	16	
Common Yellowthroat	<i>Geothlypis trichas</i>	Last Frontiers	1898946	355183	Last Frontiers REA	2009	10	30	Com_Yell_4903.JPG
Couch's Kingbird	<i>Tyrannus couchii</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
Couch's Kingbird	<i>Tyrannus couchii</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
Fork-tailed Flycatcher	<i>Tyrannus savana</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
Gray-throated Chat	<i>Granatellus sallaei</i>	Last Frontiers	1898800	355256	Last Frontiers REA	2009	10	16	
Great Blue Heron	<i>Ardea herodias</i>	Last Frontiers	1900125	356520	Mangrove Channel in Southern Lagoon, at Viktor's place	2010	1	5	
Great Currasow	<i>Crax rubra</i>	Last Frontiers	1898840	355250	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	
Great Egret	<i>Ardea alba</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	9	Gre_Egr_4456.JPG
Great Egret	<i>Ardea alba</i>	Last Frontiers	1901636	356582	Last Frontiers REA	2009	10	16	

Common Name	Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
Great Egret	<i>Ardea alba</i>	Last Frontiers	1899106	355136	Last Frontiers REA	2009	10	30	
Great Tinamou	<i>Tinamus major</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Green Honey Creeper	<i>Chlorophanes spiza</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
Green Jay	<i>Cyanocorax yncas</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Green Kingfisher	<i>Chloroceryle americana</i>	Last Frontiers	1898190	354930	Jenkins Creek: Stream from Maya Mountains flowing into Manatee Lagoon on Viktor's property	2010	1	5	
Hooded warbler	<i>Piranga flava</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
Jaguar	<i>Wilsonia citrine</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Jaguar_6250.JPG
Keel-billed Toucan	<i>Ramphastos sulfuratus</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	16	
Keel-billed Toucan	<i>Ramphastos sulfuratus</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Lesser Yellow-headed Vulture	<i>Cathartes burrovianus</i>	Last Frontiers	1901636	356582	Last Frontiers REA	2009	10	16	
Little Blue Heron	<i>Egretta caerulea</i>	Last Frontiers	1901636	356582	Last Frontiers REA	2009	10	16	
Long-billed Hermit	<i>Phaethornis longirostris</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Olive-throated Parakeet	<i>Psarocolius montezuma</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Plain Chachalaca	<i>Aratinga nana</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	16	
Red-lored Parrot	<i>Ortalis vetula</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Ringed Kingfisher	<i>Amazona autumnalis</i>	Last Frontiers	1899506	357252	Last Frontiers REA	2009	10	30	
Ringed Kingfisher	<i>Megaceryle torquata</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	
Short-tailed Hawk	<i>Buteo brachyuris</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	16	

Common Name	Scientific Name	Locality	Northing	Easting	Notes	Year	Month	Day	CollectorNumber
Squirrel Cuckoo	<i>Piaya cayana</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	30	
Strong-billed Woodcreeper	<i>Xiphocolaptes promeropyrhinchus</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
Tapir	<i>Tapirus bairdi</i>	Last Frontiers	1898860	355750	Swamp forest south of Manatee Lagoon on Viktor's property	2010	1	5	Tapir_6266.JPG
Tawny-winged Woodcreeper	<i>Dendrocincla anabatina</i>	Last Frontiers	1899521	355166	Last Frontiers REA	2009	10	16	
Tropical King Bird	<i>Tyrannus melancholicus</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
Tropical Mockingbird	<i>Mimus gilvus</i>	Last Frontiers	1899600	355700	Savanna	2009	9	9	
Tropical Mockingbird	<i>Mimus gilvus</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
White-collared Manakin	<i>Manacus candei</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
White-colored Seedeater	<i>Sporophila torqueola</i>	Last Frontiers	1899331	356367	Last Frontiers REA	2009	10	30	
Wilson's Snipe	<i>Gallinago delicata</i>	Last Frontiers	1900030	356150	Wet Savanna, South of Southern (Manatee) Lagoon, On Viktor's property	2010	1	5	
Yellow breasted Chat	<i>Icteria virens</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	16	
Yellow-crowned Night Heron	<i>Nyctinassa violaceae</i>	Last Frontiers	1901636	356582	Last Frontiers REA	2009	10	16	
Yellow-throated Euphonia	<i>Euphonia hirundinacea</i>	Last Frontiers	1899281	355400	Last Frontiers REA	2009	10	30	

# Last Frontiers-Belize (I)

## Gales Point – Belize District - Belize

Quick identification guide for some conspicuous or common native vegetation

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***Typha dominguensis***  
Typhaceae  
Reed: Wetland



***Bulbostylis* sp.**  
Cyperaceae  
Sedge: Savanna



***Rhynchospora barbata***  
Cyperaceae  
Sedge: Savanna



***Fibristylis* sp.**  
Cyperaceae  
Sedge: Savanna



***Acrostyrium aureum***  
Pteridophyta  
Fern: Wetland



***Zamia prasina***  
Zamiaceae  
Cycad: Savanna/Forest



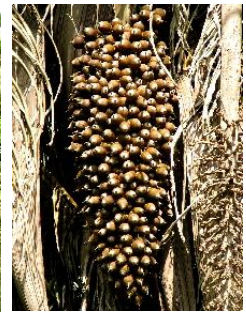
***Zamia meermanii***  
Zamiaceae  
Cycad: Steep Cliffs



***Acoelorrhaphe wrightii***  
Arecaceae  
Palm: Wet areas



***Attalea cohune***  
Arecaceae  
Palm: Hills



***Attalea cohune***  
Arecaceae  
Palm: Hills



***Schippia concolor***  
Arecaceae  
Palm: Savanna scrub



***Bactris mexicana***  
Arecaceae Palm:  
Wet forest



***Bactris mexicana***  
Arecaceae  
Palm: Wet forest



***Brassavola nodosa***  
Orchidaceae  
Orchid: Savanna



***Oeceoclades maculata***  
Orchidaceae  
Orchid: Hill forest



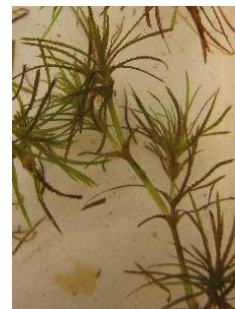
***Catasetum integerrimum***  
Orchidaceae  
Orchid: On Trees



***Vriesea heliconoides***  
Bromeliaceae  
Bromeliad: on Trees in  
wet forest



***Catopsis berteriana***  
Bromeliaceae  
Bromeliad: on trees



***Najas wrightii***  
Najadaceae  
Aquatic plant:  
wetlands



***Xyris ambigua***  
Xyridaceae  
Herb: Savanna



# Last Frontiers-Belize (II)

## Gales Point – Belize District - Belize

Quick identification guide for some conspicuous or common native vegetation

Photos © Jan Meerman, Belize Tropical Forest Studies, 2010



**Anisantherina hispidula**  
Scrophulariaceae. Herb:  
Savanna



**Buchnera pusilla**  
Scrophulariaceae  
Herb: Savanna



**Dalechampia schippii**  
Euphorbiaceae Vine:  
Savanna



**Hypericum terra-firmae**  
Clusiaceae Herb:  
Savanna



**Polygala sp. Polygalaceae**  
Herb: Savanna



**Utricularia juncea**  
Lentibulariaceae  
Herb: Wet savanna



**Passiflora foetida**  
Passifloraceae  
Vine: Disturbed areas



**Nymphaea indica**  
Menyanthaceae Aquatic  
herb: Wetland



**Marsypianthes  
chamaedrys** Lamiaceae  
Herb: Savanna



**Ipomoea squamosa.**  
Convolvulaceae Vine:  
Forest Edges



**Melastema steteris**  
Asclepidaceae Vine:  
Savanna



**Philodendron  
fragrantisium** Araceae  
Vine: Forest



**Byrsonima bucidifolia**  
Malpighiaceae  
Shrub: Savanna



**Byrsonima crassifolia**  
Malpighiaceae  
Shrub: Savanna



**Byrsonima crassifolia**  
Malpighiaceae  
Shrub: Savanna



**Calliandra houstoniana**  
Mimosoideae Shrub:  
Savanna



**Calophyllum brasiliense**  
Clusiaceae Timber  
tree: Forest



**Calyptanthus  
chytraculia** Myrtaceae.  
Tree: Wet forest



**Cameraria latifolia**  
Apocynaceae Shrub:  
Savanna



**Cameraria latifolia**  
Apocynaceae Shrub:  
Savanna

# Last Frontiers-Belize (III)

## Gales Point – Belize District - Belize

Quick identification guide for some conspicuous or common native vegetation

Photos © Jan Meerman, Belize Tropical Forest Studies, 2010



**Cecropia peltata**  
Cecropiaceae Tree:  
Hill Forst



**Ochroma pyramidale**  
Bombacaceae Tree:  
Disturbed forest



**Cassipourea guianensis**  
Rhizophoraceae Small  
Tree: Wet forest



**Rhizophora mangle**  
Rhizophoraceae  
Mangrove: Lagoon edge



**Chrysobalanus icaco**  
Chrysobalaceae. Shrub:  
Wet savanna



**Conocarpus erecta**  
Combretaceae Shrub:  
Savanna



**Cyrilla recemosa**  
Cyrillaceae Shrub:  
Savanna Scrub



**Cyrilla recemosa**  
Cyrillaceae Shrub:  
Savanna Scrub



**Diospyros bumeloides**  
Ebenaceae. Shrub:  
Savanna



**Diphysa carthagensis**  
Papilionoideae Shrub:  
Savanna



**Erthroxylon guatemalensis**  
Erythroxylaceae Shrub:  
Savanna



**Erthroxylon rotundifolia**  
Erythroxylaceae Shrub:  
Savanna



**Erthroxylon rotundifolia**  
Erythroxylaceae Shrub:  
Savanna



**Eugenia sp. Myrtaceae.**  
Shrub: Savanna



**Eugenia sp. Myrtaceae.**  
Shrub: Savanna



**Eugenia sp. Myrtaceae.**  
Shrub: Savanna



**Eugenia eruginea**  
Myrtaceae. Shrub: Wet  
forest



**Hibiscus pernambucensis**  
Malvaceae. Shore line  
shrub



**Hirtella racemosa**  
Chrysobalaceae.  
Shrub: Forest



**Ilex guianensis**  
Aquifoliaceae Shrub:  
Savanna

# Last Frontiers-Belize (IV)

## Gales Point – Belize District - Belize

Quick identification guide for some conspicuous or common native vegetation

Photos © Jan Meerman, Belize Tropical Forest Studies, 2010



**Jacquinia macrocarpa**  
Theophrastaceae Shrub:  
Savanna



**Jacquinia macrocarpa**  
Theophrastaceae Shrub:  
Savanna



**Machaonia lindeniana**  
Rubiaceae Shrub:  
forest edges



**Metopium brownei**  
Anacardiaceae  
Shrub: Savanna



**Amphitecna breedlovei**  
Bignoniaceae.  
Shrub: Forest



**Hamelia rovirosae**  
Rubiaceae Shrub:  
Forest edges



**Pithecellobium lanc**  
Mimosoidea Shrub:  
Savanna



**Purdiea belizensis**  
Cyrillaceae. Shrub:  
Savanna



**Purdiea belizensis**  
Cyrillaceae. Shrub:  
Savanna



**Symphonia globulifera**  
Clusiaceae. Tree:  
Swamp forest



**Mimosa peltata**  
Mimosoidea. Shrub:  
Wetlands



**Ouratea nitida**  
Ochnaceae Shrub:  
Swamp forest



**Ouratea nitida**  
Ochnaceae Shrub:  
Swamp forest



**Pachyra aquatica**  
Bombacaceae Tree:  
Swamp forest



**Thevetia ahouai**  
Apocynaceae  
Shrub: Forest



**Pterocarpus officinalis**  
Papilioidea Tree:  
Swamp forest



**Turnera aromatica**  
Turneraceae  
Shrub: Savanna



**Xylopia frutescens**  
Annonaceae Tree:  
Forest



**Lonchocarpus rugosus**  
Papilionoidea Tree:  
Forest



**Zygia cognate**  
Mimosoidea Shrub:  
Swamp Forest