CENTRAL AMERICAN ECOSYSTEMS MAP

Belize

Volume II: Ecosystem Descriptions

J. C. Meerman & W. Sabido

2001

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Central American Ecosystems Map: Belize

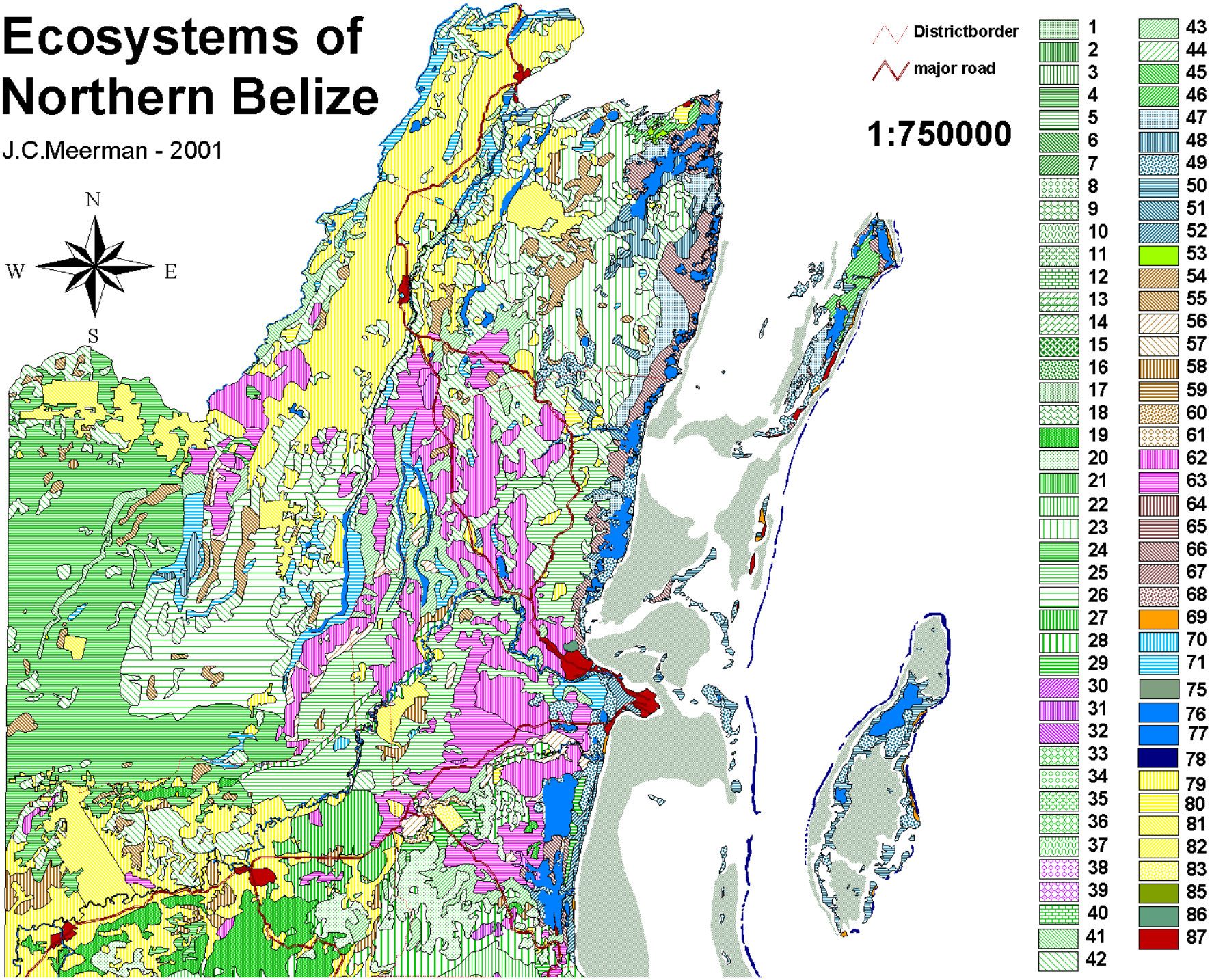
Volume II

ECOSYSTEM MAP AND DESCRIPTIONS

2001 - Programme for Belize, 1 Eyre Street, Belize City, Belize

Ecosystems of Northern Belize

J.C.Meerman - 2001



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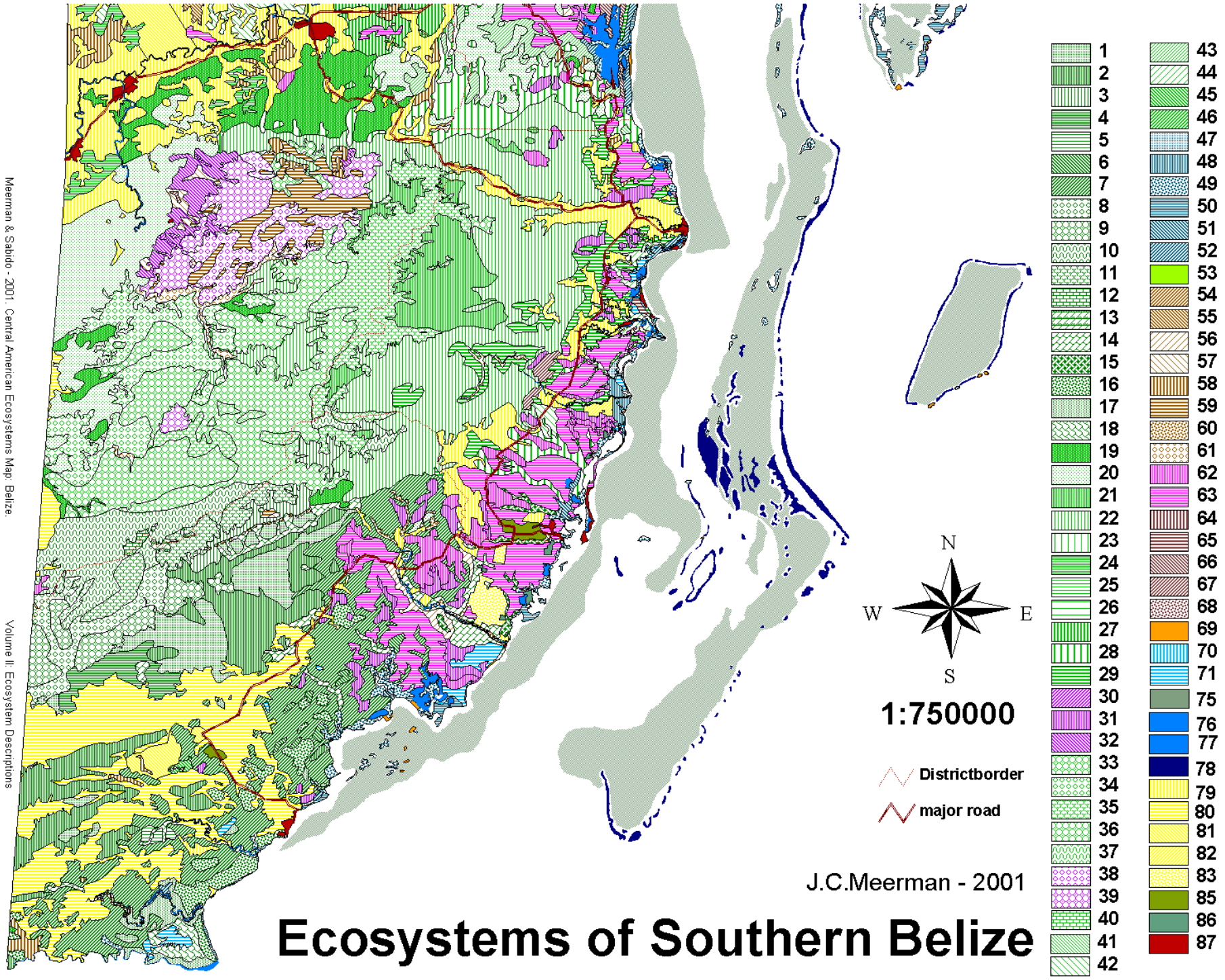
Volume II: Ecosystem Descriptions



Meerman & Sabido - 2001. Central American Ecosystems Map: Belize.

Volume II: Ecosystem Descriptions

How to interpret the ecosystem description tables:

Legend Code	Unique code for the Belize ecosystems. This code is the same as used in the 1:750.000 map in this document. They can not be applied to ecosystems in any of the other Central American countries
UNESCO Classification code	Unique UNESCO classification code for the ecosystem. This code is interchangeable for all Ecosystems identified as part of the Central America Ecosystems Mapping Project.
Name	English name of the Ecosystem. This name is linked to the unique UNESCO classification code. For Belize the English names have been adapted slightly but are essentially interchangeable for all Ecosystems identified as part of the Central America Ecosystems Mapping Project.
Altitude	Indication of the altitude in which this ecosystem is found. Important are the 500 and 1000 m contour lines.
Geology and soil	Indication of the underlying geology and associated soils of the ecosystem. For Belize, the distinction between calcareous (limestone) based soils and other, more acidic soils is very important.
Water regime	Indicates drainage.
Rainfall	Indicates the approximate annual rainfall affecting the ecosystem (when applicable).
Fire exposure	Indicates how sensitive the ecosystem is to wildfires.
Description	Short description of the ecosystem. Sometimes with picture.
Frequent plant species	Plant species identified during expeditions into the ecosystem. This list is not exhaustive and does not necessarily indicate species unique to this ecosystem. The list is merely meant to give some indications of plant species that can frequently be encountered in the ecosystem. Sometimes with picture of plant species found in the ecosystem
Faunistic comments	Indicates typical or unique faunal element associated with the ecosystem. Since the relation between the (floristically based) ecosystem and fauna has not been well studied in Belize, such relations are listed only when very clear and of importance
References	Refers to studies describing the ecosystem. Also refers back to the 1959 Wright et al. and 1995 Iremonger and Brokaw studies. In these cases, the relevant vegetation class number used by these authors is listed (e.g. Wright et al. 1959: 3, 3a, 3b, 4, 4a, 4b; Iremonger and Brokaw 1995: I.2.3.1). Also lists credits for any pictures used.

Legend Code	**1**
UNESCO Classification code	**I.A.1.a.(1).(a).K-r**
Name	**Tropical evergreen broadleaf lowland forest over rolling calcareous hills**
Altitude	< 500 m.
Geology and soil	Over Calcareous soils in gently sloping or rolling terrain.
Water regime	Mostly well drained.
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Sensitive to fire. Repeated fires (mostly human induced) will change species composition.
Description 	These forests are distinguished by topography because there are distinct differences between the lowland forests in Belize and those covering the hills probably as a result of differences in drainage. These forests display characteristics intermediate between lowland tropical forests and the submontane forests of higher altitudes in the Maya Mountains. Due to the prolonged dry season there is some drought stress, but deciduousness is not a pronounced feature. The canopy reaches 15-40 m.
Frequent plant species	Common woody plants are; *Ampelocera hottlei, Aspidosperma* spp, *Attalea cohune, Bauhinia hondurensis, Brosimum alicastrum, Calophyllum brasiliense, Calyptrogyne ghiesbreghtiana, Crysophila stauracantha, Guarea glabra, Hirtella americana, Licaria peckii, Manilkara zapota, Sideroxylon foetidissimum, Ouratea lucens, Peperomia* spp*., Pimenta dioica, Pouteria amygdalina, Pouteria durlandii, Sabal mauritiiformis, Sebastiana tuerckheimiana, Spondias mombin, Tabebuia rosea, Trichilia minutiflora, Trichilia moschata, Vatairea lundellii* and Myrtaceae. Rubiaceae of the genus *Psychotria* are abundant in the shrub layer and lianas are frequent.
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Meerman 1998b, Wright et al. 1959: 3, 3a, 3b, 4, 4a, 4b; Iremonger and Brokaw 1995: I.2.3.1. Picture: Columbia River Forest Reserve. J. Meerman

Legend Code	**2**
UNESCO Classification code	**I.A.1.a.(1).(a).K-s**
Name	**Tropical evergreen broadleaf lowland forest over steep calcareous hills**
Altitude	< 500 m.
Geology and soil	Found in steep terrain over calcareous rocks, often where there is more non-vegetated ground surface, particularly bare 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.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	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. The vegetation of such hilltops is then replaced by vines such as *Bidens squarrosa* and *Calea* sp. or more commonly with the fern *Pteridium caudatum*.
Description 	Altitude is less important than steepness and the vegetation cover is dictated by the seasonal droughtyness. But because of the high rainfall figures in southern Belize, deciduousness is not a conspicuous feature even on these steep hills. Normally the valleys between these steep hills have an ecosystem that should be termed IA1a(1)(a)K-r but the current mapping effort does not allow this type of detail. The canopy tends to reach 25-30 m.
Frequent plant species	Distinctive species include: *Acalypha* sp., *Achimenes erecta, Alseis yucatenensis, Aphelandra scabra, Astronium graveolens, Bauhinia divaricata, Bernoullia flammea, Brosimum* spp., *Bursera simaruba, Ceiba aesculifolia, Clusia* sp., *Coccoloba acapulcensis, Crysophila stauracantha, Dendropanax arboreus, Desmoncus orthacanthos, Drypetes brownii, Louteridium donnell-smithii, Manilkara zapota, Malmea depressa, Metopium brownei, Oreopanax obtusifolius, Pimenta dioica, Piper psilorrhachis, Piper* spp., *Plumeria rubra, Pouteria campechiana, Pouteria reticulata, Protium copal, Pseudobombax ellipticum, Sapindus saponaria, Sebastiania tuerckheimiana, Trichilia minutiflora* and *Vitex gaumeri.*
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Meerman 1998b, 1999a, 1999c, Hawkins et al. 1998, Schultze and Whitacre 1999, Wright et al. 1959: 2d, 2e (where on hills) Picture: Blue Creek, Toledo district. J. Meerman

Legend Code	**3**
UNESCO Classification code	**I.A.1.a.(1).(a).VT**
Name	**Tropical evergreen broadleaf lowland hill forest: *Vochysia-Terminalia* variant**
Altitude	< 500 m.
Geology and soil	Soils are gray stony non-calcareous clays, the subsoils sometimes having iron-coated gravels.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Reverts to pine forest under anthropogenic fire pressure.
Description	These forests reportedly occur in the wetter areas of the Maya Mountain foothills.
Frequent plant species 	Frequently encountered species include *Aspidosperma cruenta*, *Calophyllum brasiliense*, *Euterpe precatoria*, *Pseudolmedia sp*., *Simarouba glauca*, *Terminalia amazonia*, *Vismia ferruginea*, *Vochysia hondurensis*, and *Xylopia frutescens*, with *Astrocaryum mexcianum,* treeferns and Melastomataceae in the understory.
Faunistic comments	
References	Wright et al. 1959: 12,12a,12b; Iremonger and Brokaw 1995: I.2.3.3.2. Picture: *Euterpe precatoria*, White Ridge Farm, Stann Creek District. J. Meerman

Legend Code	**4**
UNESCO Classification code	**I.A.1.a.(1).(a).C**
Name	**Tropical evergreen broadleaf lowland hill forest: *Calophyllum* variant**
Altitude	< 500 m.
Geology and soil	Non-calcareous soils of the Toledo uplands. Sensitive to erosion.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	Usually tall forest between 20 – 30 m in the South of Belize where there is abundant rainfall.
 **Frequent plant species**	Frequently encountered trees include *Acosmium panamense*, *Aspidosperma cruenta*, *Attalea cohune, Calophyllum brasiliense*, *Erblichia odorata*, *Guarea glabra*, *Licania platypus*, *Orbignya cohune*, *Pouteria mammosa*, *Pouteria* sp., *Simarouba glauca*, *Terminalia amazonia*, *Virola koschnyi*, *Vismia ferruginea*, *Vochysia hondurensis*, and *Xylopia frutescens*. In places where drainage is impeded *Ficus* sp., *Dialium guianense*, *Pterocarpus officinalis*, *Spondias mombin*, and *Symphonia globulifera* occur.
Faunistic comments	
References	Wright et al. 1959: 8, 8a, 8b, 8c, Iremonger and Brokaw 1995: I.2.3.3.3. Picture: *Erblichia odorata*. Macal River, Cayo district. J. Meerman

Legend Code	**5**
UNESCO Classification code	**I.A.1.a.(1).(a).ST**
Name	**Tropical evergreen broadleaf lowland hill forest: *Simarouba-Terminalia* variant**
Altitude	
Geology and soil	
Water regime	
Rainfall	
Fire exposure	
Description	Ecosystem erroneous. No polygons identified
Frequent plant species	
Faunistic comments	
References	Iremonger and Brokaw 1995: I.2.3.3.4.

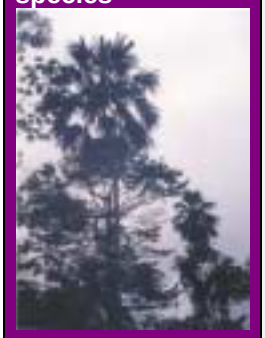
Legend Code	**6**
UNESCO Classification code	**I.A.1.a.(1).(b).K**
Name	**Tropical evergreen broadleaf lowland forest, over calcareous soils**
Altitude	< 50 m.
Geology and soil	Soils are pale gray brown clays derived from calcareous shales and sandy limestones of the Toledo Beds.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	They are lush forests with trees 30-40m high, with megaphyll herbs and many woody climbers. Most of the land area that was once covered by these forests is now under agriculture as the soils are fertile and the areas accessible.
Frequent plant species 	Frequently encountered species include *Acosmium panamense, Manilkara chicle, Calophyllum brasiliense, Terminalia amazonia, Cojoba arborea, Swietenia macrophylla*, and *Vochysia hondurensis*.
Faunistic comments	
References	Wright et al. 1959: 4b, Iremonger and Brokaw 1995: I.2.1.1. Picture: *Vochysia hondurensis*. Mountain Pine Ridge. Cayo District. J. Meerman

Legend Code	**7**
UNESCO Classification code	**I.A.1.a.(1).(b).P**
Name	**Tropical evergreen broadleaf lowland forest over poor or sandy soils**
Altitude	< 50 m.
Geology and soil	Corresponding to where they occur in lowland areas, soils are acidic and may be dull reddish-brown, brown or gray clays, often mottled and/or stony.
Water regime	Drainage varies. Often ill drained.
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Where fires have penetrated this system, small patches of scrubby "savanna" occur with associated species such as *Byrsonima crassifolia* and *Pinus caribaea* appearing. High rainfall figures in these areas prevent major expansion of these savannas but under a regime of recurring droughts and increased human pressure, these forests may well degenerate towards savanna.
Description	Generally dense forests with a broken canopy.
Frequent plant species 	Distinctive species include *Acosmium panamense, Acoelorrhaphe wrightii, Aspidosperma cruenta, Attalea cohune, Bactris* sp., *Calophyllum brasiliense, Chrysobalanus icaco, Clidemia* spp., *Coccocypselum herbaceum, Dialium guianense, Dicranopteris, Erblichia odorata, Ficus* sp., *Guarea* sp., *Guettarda combsii, Licania hypoleuca, Licania platypus, Miconia* spp., *Mouriri exilis, Mouriri myrtilloides, Pouteria mammosa, Psychotria poeppigiana, Pterocarpus rohrii, Scleria bracteata, Simarouba glauca, Spondias mombin, Symphonia globulifera, Terminalia amazonia, Tetracera volubilis, Tococca* sp., *Virola koschnyi, Vismia ferruginea, Vochysia hondurensis* and *Xylopia frutescens.*
Faunistic comments	
References	Meerman 1999a, Wright et al. 1959: 8, 8a, 8b, 8c, Iremonger and Brokaw 1995: I.2.1.4. Picture: *Simarouba glauca.* Mountain Pine Ridge, Cayo district. J. Meerman

Legend Code	**8**
UNESCO Classification code	**I.A.1.b.(1).K-r**
Name	**Tropical evergreen broadleaf submontane forest over rolling calcareous hills**
Altitude	500-1000 m.
Geology and soil	Over calcareous rock.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Not resistant to fire but frequently exposed to fire from uncontrolled slash and burn cultivation activities.
Description	This forest type is the medium altitude (> 500 m) version of type IA1a(1)(a)K-r.
Frequent plant  **species**	There is a rich understory with Cyclanthaceae, *Chamaedorea* spp., *Peperomia* spp. *Psychotria* spp. and apparently unique species such as *Heliconia librata* and *Passiflora obovata.*
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Wright et al. 1959: 3, 3a, 3b, 4, 4a, 4b, Iremonger and Brokaw 1995: I.2.3.1. Picture: *Heliconia librata.* Columbia River Forest Reserve. Toledo district. J. Meerman

Legend Code	**9**
UNESCO Classification code	**I.A.1.b.(1).K-s**
Name	**Tropical evergreen broadleaf submontane forest over steep calcareous hills**
Altitude	500-1000 m.
Geology and soil	Over calcareous rock.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Not resistant to fire but frequently exposed to fire from uncontrolled slash and burn cultivation activities. Effects most severe on hillcrests.
Description	This forest type is the medium altitude (> 500 m) version of type IA1a(1)(a)K-s. Since travel through this ecosystem is difficult, there is little information available of this forest type.
Frequent plant species 	Rich in understory palms and ferns. It appears to be the habitat for the endemic *Zamia prasina.*
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Wright et al. 1959: 2d, 2e; Iremonger and Brokaw 1995: I.2.3.2. Picture: *Zamia prasina*. Columbia River Forest Reserve. Toledo district. J.Meerman

Legend Code	**10**
UNESCO Classification code	**I.A.1.b.(1)**
Name	**Tropical evergreen broadleaf submontane forest over non-calcareous rocks**
Altitude	500-1000 m.
Geology and soil	Soils are acidic gray stony clays, the subsoils sometimes having iron-coated gravels.
Water regime	Mostly well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	These forests occur on acidic soils in the wetter upland areas of the Maya Mountains.
Frequent plant species 	Frequently encountered species include *Aspidosperma cruenta, Calophyllum brasiliense, Euterpe precatoria, Pseudolmedia* sp., *Simarouba glauca, Terminalia amazonia, Vismia ferruginea, Vochysia hondurensis,* and *Xylopia frutescens,* with *Astrocaryum mexicanum* and Melastomataceae in the understory.
Faunistic comments	
References	Wright et al. 1959: 12,12a,12b; Iremonger and Brokaw 1995: I.2.3.3.2. Picture: *Vismia* sp. Toledo district. J. Meerman

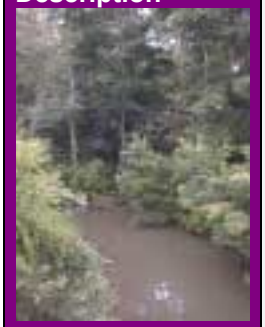
Legend Code	**11**
UNESCO Classification code	**I.A.1.b.(3)**
Name	**Tropical evergreen submontane palm forest over non-calcareous rocks**
Altitude	500-1000 m.
Geology and soil	Over non-calcareous rocks.
Water regime	Well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	Found on the peaks of the Little Quartz Ridge area and extending along the main divide of the Maya Mountains to Richardson's Peak and possibly beyond.
Frequent plant species 	The most noticeable aspect of this vegetation is that many of the plants grow epiphytically, and the palms *Colpothrinax cookii* and *Euterpe precatoria* dominate the scene and often extend above the general canopy of the forest. Other tree species are *Alchornea latifolia*, *Calophyllum brasiliense*, *Cojoba arborea, Cyrilla racemiflora*, *Dendropanax arboreus, Ilex guianensis, Inga sp., Magnolia yoroconte, Miconia impetiolaris, Myrcia splendens, Nectandra* spp., *Psychotria elata, Quercus cortesii*, *Roupala montana*, and *Simarouba* sp. *Chamaedorea* sp., *Critonia sexangularis,* Rubiaceae and Melastomataceae form a sparse shrub layer, and the herb layer is mostly represented by the ferns *Danaea elliptica, Polybotrya* sp. and *Lindsaea* spp. Epiphytes and hemi-epiphytic *Clusia* spp. are abundant.
Faunistic comments	
References	Iremonger and Brokaw, 1995: I.2.4.1. Picture: *Colpothrinax cookii*. Maya Mountain Divide. Cayo District. J.Meerman

Legend Code	**12**
UNESCO Classification code	**I.A.1.c.(1)**
Name	**Tropical evergreen lower montane broadleaf forest over non-calcareous rocks**
Altitude	>1000 m.
Geology and soil	Over non-calcareous rocks.
Water regime	Well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	Essentially replaces IA1b(1) above the 1000 m contour. Restricted to a very limited area around “Doyle’s Delight”. Possibly a transition to IA1b(3) (Tropical evergreen seasonal submontane palm forest over non-calcareous rocks).
Frequent plant species	Noted plant species include *Alchornea latifolia, Calophyllum brasiliense, Cojoba arborea, Cyrilla racemiflora, Dendropanax arboreus, Ilex guianensis, Inga* sp., *Magnolia yoroconte, Miconia impetiolaris, Myrcia splendens, Nectandra spp., Psychotria elata, Quercus cortesii, Roupala montana,* and *Simarouba* sp.
Faunistic comments	
References	Iremonger and Brokaw 1995: I.2.3.3.2

Legend Code	**13**
UNESCO Classification code	**I.A.1.c.(4)**
Name	**Tropical evergreen lower montane palm forest over non-calcareous rocks**
Altitude	>1000 m.
Geology and soil	Over non-calcareous rocks.
Water regime	Well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	Essentially the extension of IA1b(3) (Tropical evergreen seasonal submontane palm forest over non-calcareous rocks) in the very limited area above the 1000 m contour. Doubtfully distinct from this. Found on the peaks of the Little Quartz Ridge area and on the highest ridges of the Maya Mountains including the area around “Doyle’s Delight”.
Frequent plant species 	The most noticeable aspect of this ecosystem is that many of the plants grow epiphytically, and the palms *Colpothrinax cookii* and *Euterpe precatoria* dominate the scene and often extend above the general canopy of the forest. Other tree species are *Alchornea latifolia, Calophyllum brasiliense, Cojoba arborea, Cyrilla racemiflora, Dendropanax arboreus, Ilex guianensis, Inga* sp., *Magnolia* sp., *Miconia impetiolaris, Myrcia splendens, Nectandra* spp., *Prunus tikalana, Psychotria elata, Quercus cortesii, Roupala Montana, and Simarouba* sp. *Chamaedorea* sp., *Critonia sexangularis, Synechantus fibrosus*, Rubiaceae and Melastomataceae form a sparse shrub layer, and the herb layer is mostly represented by the ferns *Danaea elliptica, Polybotrya* sp. and *Lindsaea* spp. Epiphytes and hemi-epiphytic *Clusia* spp. are abundant.
Faunistic comments	
References	Allen 1995; Holst in press; Iremonger and Brokaw 1995: I.2.4.1. Picture: *Euterpe precatoria*. Stann Creek District. J. Meerman

Legend Code	**14**
UNESCO Classification code	**I.A.1.f.(2).(a).K**
Name	**Tropical evergreen broadleaf lowland forest over calcium-rich alluvium**
Altitude	< 50 m.
Geology and soil	Deep, calcium-rich soils.
Water regime	Subject to occasional river flooding
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	Tall lowland forests. Commonly developed on riverbanks in the south of the country where occasional flooding deposits fresh alluvium. Their canopy is often very broken and floods may periodically destroy part of the forest.
Frequent plant species 	Frequently encountered species include *Acosmium panamense, Attalea cohune, Brosimum* sp., *Calophyllum brasiliense, Carapa guianensis, Castilla elastica, Ceiba pentandra, Celtis schippii, Dendropanax arboreus, Dialium guianense, Ficus guajavoides, Ficus* sp., *Grias cauliflora, Guarea glabra, Guarea grandifolia, Inga affinis, Licania platypus, Nectandra* sp., *Ochroma lagopus, Poulsenia armata, Pouteria durlandii, Pouteria mammosa, Protium schippii, Pseudolmedia* sp., *Pterocarpus rohrii, Quararibea funebris, Rheedia* sp*., Sabal mauritiiformis, Schizolobium parahybum, Simira salvadorensis, Symphonia globulifera, Vochysia hondurensis.* Palms are a significant feature of the understory (3-4 m), particularly *Astrocaryum mexicanum*, *Bactris* sp., *Calyptrogyne ghiesbreghtiana*, and the rattan *Desmoncus orthocanthos.* Soils are deep, fertile and well drained, the fertility being maintained by seasonal silt deposition. Where the rivers break their banks the forests may periodically be destroyed, and patches of *Guadua longifolia* and *Dieffenbachia seguine* occur.
Faunistic comments	This ecosystem appears to be a favored habitat for the Yucatan Black Howler Monkey *Alouatta pigra.*
References	Brokaw & Lloyd-Evans 1987, Brokaw et al. 1997, Iremonger & Sayer 1994, Wright et al. 1959: 5, 5a, 6, 6a, Iremonger and Brokaw 1995: I.2.1.2. Picture: *Calyptrogyne ghiesbreghtiana*. Toledo District. J. Meerman

Legend Code	**15**
UNESCO Classification code	**I.A.1.f.(2).**
Name	**Tropical evergreen broadleaf lowland forest over calcium-poor alluvium**
Altitude	< 500 m.
Geology and soil	Soils deep, calcium poor, brown-brown to gray in the topsoil but mottled below.
Water regime	Subject to occasional river flooding
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Frequently exposed to savanna fires but vegetation mostly resistant.
Description	Low scrubby forests in the depressions caused by creeks crossing short-grass savannas (type VA2).
Frequent plant species 	Frequently encountered plant species are *Acacia* sp., *Coccoloba* sp., *Guazuma ulmifolia, Guettarda combsii, Hirtella racemosa, Miconia spp. Mouriri excelsa, Sabal mauritiiformis, Simarouba glauca, Vochysia hondurensis* and *Xylopia frutescens*. In places where drainage is impeded a thick herb layer of *Scleria bracteata* and other sedges develops.
Faunistic comments	
References	Wright et al. 1959: 11f; Iremonger and Brokaw 1995: I.2.1.3. Picture: *Hirtella racemosa.* Toledo district. J. Meerman

Legend Code	**16**
UNESCO Classification code	**I.A.1.g.(1).(a)**
Name	**Tropical evergreen broadleaf lowland swamp forest: Seasonally waterlogged.**
Altitude	< 50 m.
Geology and soil	Mostly calcium poor
Water regime	Ill drained, often waterlogged for part of the year.
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description 	Swampy thickets of thin stemmed trees and shrubs without emergents in the high rainfall areas of southern Belize. Some hog-wallow micro-relief exists.
Frequent plant species 	Frequently encountered plants in these forests are *Acosmium panamense, Aspidosperma cruenta, Astrocaryum mexicanum, Attalea cohune, Bactris* spp*., Bucida buceras, Calyptranthes chytraculia, Clidemia* sp., *Coccoloba* sp., C*rysophila stauracantha, Dalbergia cubilquitzensis, Dalbergia stevensonii, Dialium guianense, Dracaena americana, Guettarda combsii, Heliconia vaginalis, Hirtella racemosa, Inga* sp*., Jacquinia paludicola, Miconia* sp*., Mouriri exilis, Mouriri myrtilloides, Pachira aquatica, Psychotria glomerulata, Psychotria poeppigiana, Scleria bracteata, Swietenia macrophylla, Symphonia globulifera, Terminalia amazonia, Virola koschnyi, Vismia ferruginea, Vitex kuylenii, Vochysia hondurensis* and *Xylopia frutescens.* On richer soils *Pterocarpus officinalis* is found; on poorer soils more Melastomataceae and *Acoelorraphe wrightii*. Where this ecosystem comes close to the coast, *Anacardium occidentale* and *Byrsonima crassifolia* can be found.
Faunistic comments	
References	Meerman 1999a, Wright et al. 1959: 14,14a, 14b, 14c; Iremonger and Brokaw 1995: I.1.1.1.2.1. Picture top: Punta Gorda, Toledo district. J. Meerman Bottom: *Heliconia vaginalis*. Stann Creek district. J. Meerman

Legend Code	**17**
UNESCO Classification code	**I.A.1.g.(1).(b)**
Name	**Tropical evergreen broadleaf lowland swamp forest: Permanently waterlogged.**
Altitude	< 50 m.
Geology and soil	Soils range from gray clays to loams and sandy loams, in places having a surface mat of fibrous peat, which has a high live root content.
Water regime	Ill drained, waterlogged for most of the year.
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description 	This forest reaches up to 30 m in height. The soil water table is more or less permanently at least within a few cm of the soil surface, if not above it. These are confined to the Toledo District.
Frequent plant species 	Frequently encountered species include: *Acacia* sp., *Acosmium panamense, Acrostichum aureum, Astrocaryum mexicanum, Attalea cohune, Bactris* spp., *Bucida buceras, Calophyllum brasiliense, Calyptranthes karlingii, Calyptrogyne ghiesbreghtiana, Carapa guianensis, Cassipourea guianensis, Chrysobalanus icaco, Coccoloba belizensis, Crysophila stauracantha, Dalbergia stevensonii, Dendropanax arboreus, Desmoncus orthacanthos, Erythroxylum guatemalense, Euterpe precatoria, Grias cauliflora, Guettarda combsii, Hirtella racemosa, Inga affinis, Lindsaea lancea, Lonchocarpus rugosus, Manilkara zapota, Manicaria saccifera, Maytenus schippii, Montricardia arborescens, Mouriri exilis, Pachira aquatica, Pterocarpus officinalis, Randia* sp., *Rhabdadenia paludosa, Rhizophora mangle, Rinorea hummelii, Sabal mauritiformis, Strychnos panamensis, Symphonia globulifera, Terminalia amazonia, Virola koschnyi, Vitex kuylenii, Vochysia hondurensis* and *Xylopia frutescens.*
Faunistic comments	
References	Meerman 1999a, Wright et al. 1959: 26, 27, Iremonger and Brokaw 1995: I.1.1.2.1. Picture top: Temash River, Toledo district. J. Meerman Bottom: *Cassipourea guianensis.* Temash River, Toledo district. J. Meerman

Legend Code	**18**
UNESCO Classification code	**I.A.1.g.(2).(b).M**
Name	**Tropical evergreen broadleaf lowland swamp forest: *Manicaria* variant**
Altitude	Just above sealevel.
Geology and soil	Soils are peaty to a depth of 25-30 cm, and below the peat is fairly tight gray clay.
Water regime	Ill drained, waterlogged for most of the year.
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description 	The soil water table is more or less permanently within at least a few cm of the soil surface, although some hog-wallow relief suggests at least temporary drying of the topsoil.
Frequent plant species	Dominated by the Comfrey Palm *Manicaria saccifera*. Other common species include: *Astrocaryum mexicanum, Bucida buceras, Calophyllum brasiliense, Ceratozamia robusta, Connarus lambertii, Euterpe precatoria, Mouriri exilis, Mouriri myrtilloides, Pachira aquatica, Pterocarpus officinalis* and *Symphonia globulifera.*
Faunistic comments	
References	Meerman 1999a, Wright et al. 1959: 28, Iremonger and Brokaw 1995: I.1.1.2.2. Picture: *Manicaria saccifera.* Temash River, Toledo district. J. Meerman

Legend Code	**19**
UNESCO Classification code	**I.A.2.a.(1).(a).K-r**
Name	**Tropical evergreen seasonal broadleaf lowland forest over rolling calcareous hills**
Altitude	< 500 m.
Geology and soil	Soils over limestone rock.
Water regime	Mostly well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Fires can do tremendous damage to this ecosystem. The soil at the base of these 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.
Description	These forests are distinguished by topography because there are distinct differences between the lowland forests in Belize and those covering the hills probably as a result of differences in drainage. These forests display characteristics intermediate between lowland tropical forests and the submontane forests of higher altitudes in the Maya Mountains. The canopy trees 15-40 m tall. There is a distinct deciduous element.
Frequent plant species 	Common woody plants are; *Acacia dolychostachya, Alseis yucatenensis, Ampelocera hottlei, Annona primigenia, Aspidosperma cruenta, Attalea cohune, Bourreria oxyphylla, Brosimum alicastrum, Calophyllum brasiliense, Casearia bartlettii, Cedrela odorata, Cordia gerescanthus, Crysophila stauracantha, Cupania belizensis, Cymbopetalum mayanum, Exothea paniculata, Guarea glabra, Hirtella americana, Licaria peckii, Lysiloma acapulcense, Manilkara zapota, Sideroxylon foetidissimum, Matayba oppositifolia, Ouratea lucens, Pimenta dioica, Pouteria amygdalina, Pouteria durlandii, Protium copal, Pseudolmedia oxyphyllaria, Rehdera penninervia, Sabal mauritiiformis, Sebastiana tuerckheimiana, Simira salvadorensis, Spondias mombin, Stemmadenia donnell-smithii, Tabebuia guayacan, Trichilia havanensis, Trichilia moschata, Trophis racemosa, Vatairea lundellii, Vitex gaumeri, Wimmeria concolor, Zanthoxyulum procerum, Zuleania guidonia* and Myrtaceae. Palms and Rubiaceae are abundant in the shrub layer and lianas are frequent.
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Meerman 1998b, Schultze and Whitacre 1999, Wright et al. 1959: 3, 3a, 3b, 4, 4a, 4b; Iremonger and Brokaw 1995: I.2.3.1. Picture: Fruits of *Cedrela odorata*. Cayo district. J. Meerman

Legend Code	**20**
UNESCO Classification code	**I.A.2.a.(1).(a).K-s**
Name	**Tropical evergreen seasonal broadleaf lowland forest over steep calcareous hills**
Altitude	< 500 m.
Geology and soil	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.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	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.
Description 	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 droughtyness. 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.
Frequent plant species 	Distinctive species include: *Acalypha* sp., *Achimenes erecta, Alseis yucatenensis, Aphelandra scabra, Astronium graveolens, Bauhinia divaricata, Bernoullia flammea, Brosimum* spp., *Bursera simaruba, Cedrela odorata, Ceiba aesculifolia, Clusia* sp., *Coccoloba acapulcensis, Costus pictus, Crysophila stauracantha, Cupania belizensis, Cymbopetalum mayanum, Dendropanax arboreus, Desmoncus orthacanthos, Dracaena americana, Deherainia smaragdina, Drypetes laterifolia, Gausia maya, Heliconia spissa, Louteridium chartaceum, Louteridium donnell-smithii, Manilkara zapota, Malmea depressa, Metopium brownei, Oreopanax obtusifolius, Passiflora cobanensis, Passiflora xiikzodz, Pimenta dioica, Piper psilorrhachis, Piper* spp., *Pithecellobium arboreum, Plumeria rubra, Pouteria campechiana, Pouteria reticulata, Protium copal, Pseudobombax ellipticum, Rhus* sp., *Sapindus saponaria, Sebastiania tuerckheimiana, Swartzia cubensis, Talisia oliviformis, Thouinia paucidentata, Trichilia havanensis, Trichilia minutiflora, Vitex gaumeri and Zanthoxylum* sp. Epilithic herbs are locally abundant, e.g. *Anthurium slechtendahlii, Anthurium verapazense, Tradescantia discolor,* and *Begonia sericoneura*. The vegetation of burned hilltops is replaced by vines such as *Bidens squarrosa* and *Calea sp.* or more commonly with the fern *Pteridium caudatum.*
Faunistic comments	
References	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: *Heliconia spissa*: Green Hills, Cayo district. J. Meerman

Legend Code	**21**
UNESCO Classification code	**I.A.2.a.(1).(a).VT**
Name	**Tropical evergreen seasonal broadleaf lowland hill forest: *Virola-Terminalia* variant**
Altitude	< 500 m.
Geology and soil	Soils are shallow over non-calcareous rocks of the harder “Santa Rosa” formations and granite exposures, dull gray brown and stony.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Unknown
Description	This ecosystem is found on steep and moderately steep quartzite hills. Canopy height is low (13-20 m).
Frequent plant species 	*Cyathea* sp., *Euterpe precatoria*, *Guettarda combsii, Miconia* sp., *Mouriri myrtilloides, Podocarpus guatemalensis*, *Schippia concolor*, *Symphonia globulifera*, *Terminalia amazonia*, *Virola brachycarpa, Vismia ferruginea, Vochysia hondurensis* and *Xylopia frutescens* are frequent.
Faunistic comments	
References	Wright et al. 1959: 11b, Iremonger and Brokaw 1995: I.2.3.3.1. Picture: *Miconia* sp. Stann Creek District. J. Meerman

Legend Code	**22**
UNESCO Classification code	**I.A.2.a.(1).(a).ST**
Name	**Tropical evergreen seasonal broadleaf lowland hill forest: *Simarouba-Terminalia* variant**
Altitude	< 500 m.
Geology and soil	The soils are reddish brown or gray sandy clays with stones, overlying quartzite or shale hills.
Water regime	Mostly well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	This ecosystem is very sensitive to fire damage and repeated burning can replace this ecosystem with areas of *Dicranopteris* with *Pinus caribaea*.
Description 	They extend over large areas of the Maya Mountain massif.
Frequent plant species 	Frequently encountered tree species in these forests are *Attalea cohune, Bactris sp., Calophyllum brasiliense, Castilla elastica, Clidemia* sp*., Combretum farinosum, Dendropanax arboreus, Desmoncus orthacanthos, Dialium guianense, Dicranopteris* sp., *Euterpe precatoria, Ficus* sp*., Geonoma* sp*., Guarea* spp*., Heliconia vaginalis, Hirtella racemosa, Inga* sp*., Licania platypus, Licania hypoleuca, Miconia* spp., *Mimosa pigra, Mimosa watsoni, Mouriri myrtilloides, Nectandra sp., Ochroma lagopus, Passiflora ambigua, Podocarpus guatemalensis, Pourouma aspera, Protium schippii, Psychotria poeppigiana, Pterocarpus rohrii, Quararibea* sp*., Rheedia* sp*., Schefflera morototoni, Schizolobium parahybum, Scleria bracteata, Simarouba glauca, Sloanea tuerckheimii, Souroubea* sp*., Spondias mornbin, Stemmadenia donnell-smithii, Swietenia macrophylla, Symphonia globulifera, Terminalia amazonia, Tococca* sp*., Trichospermum grewiifolium., Virola koschnyi, Vismia ferruginea, Vochysia hondurensis, Xylopia frutescens* and *Zanthoxylum* sp., with *Astrocaryum mexicanum* and Melastomes in the understory. In the higher areas *Cyathea* tree ferns occur and some ground ferns.
Faunistic comments	
References	Stevenson 1942, Brokaw 1991, Meerman 1999a, Wright et al. 1959: 9, 9a, 9b, 9c, 9d, 9e, Iremonger and Brokaw 1995: I.2.3.3.4. Picture top: White Ridge Farm. Belize District. J. Meerman Bottom: *Passiflora ambigua*. Cockscomb Wildlife Sanctuary. Stann Creek District. J. Meerman

Legend Code	**23**
UNESCO Classification code	**I.A.2.a.(1).(b).K-Y**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Yucatan Variant**
Altitude	< 50 m.
Geology and soil	Calcareous rock close below the surface.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 1500 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	These are forests in lowland or low hilly areas (to about 200 m) on shallow limestone soils in the north of the country. These forests receive a medium amount of rainfall (1200-1500 mm p.a.). They are semi-deciduous and have a canopy height of 15-20 m.
Frequent plant species 	Characterized by the scarcity of the palms *Attalea cohune* and *Crysophila stauracantha* which are so common in similar forests elsewhere in Belize. The predominant tree is the chilcle or chicosapote *Manilkara zapota.* Some other common species include *Brosimum alicastrum, Bursera simaruba, Caesalpina gaumeri, Cordia dodecandra, Desmoncus orthacanthos, Esenbeckia pentaphylla, Gymnanthes lucida, Pouteria campechiana, Sabal mauritiiformis, Sabal yapa, Simarouba glauca, Swartzia cubensis, Swietenia macrophylla, Talisia oliviformis* and *Vitex gaumeri*.
Faunistic comments	
References	Meerman 1993, Bijleveld 1998, Wright et al.: 1, Iremonger and Brokaw 1995, I.2.2.1.1. Picture: *Manilkara zapota*. Runaway Creek. Belize District. J. Meerman

Legend Code	**24**
UNESCO Classification code	**I.A.2.a.(1).(b).K-TP**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Tehuantepec-Peten Variant**
Altitude	50 – 250 m.
Geology and soil	Soils are well drained gray or brown clays, variably stony over calcareous rock.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	This variant is characterized by taller forest than the eastern variants. It is also found only west of the Booth river escarpment. The canopy attains 20-30 m.
Frequent plant species 	Common trees are *Alseis yucatanensis, Ampelocera hottlei, Aspidosperma cruenta, Attalea cohune, Brosimum alicastrum, Bursera simaruba, Calophyllum brasiliense, Cedrela odorata, Clusia salvinii, Cupania belizensis, Crysophila stauracantha, Dendropanax arboreus, Drypetes laterifolia, Drypetes brownei, Ficus* spp., *Hirtella americana, Lonchocarpus castilloi, Manilkara zapota, Matayba oppositifolia, Metopium brownei, Passiflora mayarum, Pimenta dioica, Pouteria reticulata, Protium copal, Pseudobombax ellipticum, Pseudolmedia* sp.*, Sabal mauritiiformis, Schizolobium parahybum, Spondias mombin, Stemmadenia donnell-smithii, Swietenia macrophylla, Talisia olivaeformis, Trichilia minutiflora, Trophis racemosa* and *Zuleania guidonia. The understory has species such as Adiantum pulverulatum, Malvaviscus arboreus, Piper jacquemontianum, Psychotria pubescens, Pteris longifolia* and *Tectaria heracleifolia.* A freqently found graminoid is *Ichnanthus lanceolatus.*
Faunistic comments	
References	(Brokaw and Mallory 1992, Wright et al. 1959: 2, 2a, 2b, 2c, Iremonger and Brokaw 1995: I.2.2.1.3); Cabrera and Sanchez, 1994. Picture: *Passiflora mayarum*. Spanish Lookout, Cayo district. J. Meerman

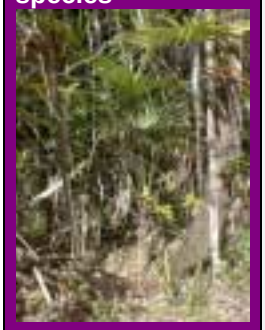
Legend Code	**25**
UNESCO Classification code	**I.A.2.a.(1).(b).CE**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Central-eastern Variant**
Altitude	< 50 m.
Geology and soil	Over calcareous rock.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description 	Level, fairly well drained forest 15-20 m tall on limestone soils, locally deciduous.
Frequent plant species 	Frequently encountered species include *Acacia* spp., *Bursera simaruba, Coccoloba* spp., *Crysophila stauracantha, Cupania* sp., *Guettarda combsii, Lonchocarpus castilloi, Manilkara zapota, Pouteria* sp., *Sabal mauritiiformis, Simarouba glauca, Swietenia macrophylla* and *Vitex gaumeri.*
Faunistic comments	
References	Wright et al. 1959: 1, 1a, Iremonger and Brokaw 1995: I.2.2.1.2. Picture top: Old Northern Higway. Belize district. J. Meerman Bottom: Western Higway. Belize district. J. Meerman

Legend Code	**26**
UNESCO Classification code	**I.A.2.a.(1).(b).CW**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Central-western Variant**
Altitude	< 100 m.
Geology and soil	Over calcareous rock.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description 	Forest to 25 m tall on mostly well drained limestone soils.
Frequent plant species 	Common species in the section of this forest near Lamanai include *Allophylus campostachys, Aspidosperma megalocarpon, Attalea cohune, Brosimum alicastrum, Bucida buceras, Bursera simaruba, Capparis frondosa, Castilla elastica, Cedrela odorata, Ceiba pentandra, Chamaeodorea pinnatifrons, Crysophila stauracantha, Coccoloba belizensis, Cojoba arborea, Crataeva tapia, Cupania belizensis, Dendropanax arboreus, Desmoncus orthacanthos, Enterolobium cyclocarpum, Forchhammeria trifoliata, Guarea glabra, Guazuma ulmifolia, Hirtella americana, Licaria peckii, Lonchocarpus castilloi, Lonchocarpus guatemalensis, Maranta arundinaceae, Metopium brownei, Pimenta dioica, Piper amalgo, Piscidia piscipula, Protium copal, Sabal mauritiiformis, Sapindus saponaria, Schizolobium parahybum, Spondias mombin, Swartzia cubensis, Talisia oliviformis, Trichilia havanensis* and *Vitex gaumeri.*
Faunistic comments	
References	Lundell 1940, Lambert and Arnason 1978, Brokaw 1992, Wright et al. 1959: 2, 2a, 2b, 2c; Iremonger and Brokaw 1995: I.2.2.1.4. Picture top: Lamanai, Orange Walk district. J. Meerman Bottom: *Lonchocarpus guatemalensis.* Cayo district. J. Meerman

Legend Code	**27**
UNESCO Classification code	**I.A.2.a.(1).(b).BR**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcareous soils: Belize River Variant**
Altitude	< 50 m.
Geology and soil	Soils are either deep gray clays, dark brown sandy loams or sandy clay loams over limestone at 50-75 cm. Generally there is a distinctive “hog wallow” relief with standing water in the cracks.
Water regime	Ill drained
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	These forests are found along the Belize River on recent alluvial deposits over limestone. Canopy height is generally below 20 m and mostly dense but in some patches there is enough light on the forest floor to allow the development of a fairly dense herb layer in which cut grass can proliferate.
Frequent plant species 	Some tree species present are *Ampelocera hottlei, Attalea cohune, Bactris mexicana, Bucida buceras, Calophyllum brasiliense, Cedrella odorata, Ceiba pentandra, Cojoba arborea, Davilla kunthii, Enterolobium cyclocarpum, Ficus insipida, Guazuma ulmifolia, Pachira aquatica, Pouteria campechiana, Roystonea regia, Schizolobium parahybum, Scleria bracteata, Spondias mombin, Swartzia cubensis, Swietenia macrophylla, Terminalia amazonia, Vatairea lundellii, Vochysia hondurensis, Xylopia frutescens, Zanthoxylum* sp. and occasional Melastomataceae. Small epiphytic orchids are frequent.
Faunistic comments	This habitat type appears to be a favored habitat for the endangered Central American Tapir *Tapirus bairdii.*
References	Smith 1945a, 1945b, Furley & Newey 1979, Wright et al. 1959: 10, 10a, Iremonger and Brokaw 1995: I.2.2.1.5 Picture: Male inflorescence of *Attalea cohune*. Cayo district. J. Meerman

Legend Code	**28**
UNESCO Classification code	**I.A.2.a.(1).(b).K**
Name	**Tropical evergreen seasonal broadleaf lowland forest over calcium-rich alluvium**
Altitude	< 50 m.
Geology and soil	Soils are deep, calcium rich and usually sandy.
Water regime	Moderately well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	This very mixed assemblage is found on the middle terraces of many rivers and streams draining from the Maya Mountains.
Frequent plant species 	Frequently encountered species are: *Acoelorrhaphe wrightii, Atalea cohune, Bactris major, Bactris mexicana, Belotia campbellii, Calathea lutea, Calophylum brasiliense, Ceiba pentandra, Chrysophyllum oliviforme, Coccoloba belizensis, Coccoloba schiedeana, Costus guanaiensis, Cupania belizensis, Desmoncus orthacanthos, Ficus* sp.*, Guarea* sp.*, Hampea trilobata, Heliconia latispatha, Luhea speciosa, Lysiloma bahamense, Manilkara* sp.*, Maranta arundinaceae, Pimenta dioica, Pouteria* sp.*, Pterocarpus rohrii, Sabal mauritiiformis, Samanea saman, Schizolobium parahybum, Simarouba glauca, Spondias mombin, Stemmadenia donnell-smithii, Swietenia macrophylla, Tabebuia rosea, Tabernaemontana arborea, Virola koschnyi, Vitex gaumeri, Vochysia hondurensis*, *Zanthoxylum* sp.*, Zuleania guidonia.* The species are a mixture of lowland, moist dependent and somewhat more drought tolerant species.
Faunistic comments	This ecosystem appears to be a favored habitat for the Yucatan Black Howler Monkey *Alouatta pigra.*
References	Meerman 1999c, Wright et al. 1959: 7; Iremonger and Brokaw 1995: I.2.2.2. Picture: *Ceiba pentandra*. Macal River, Cayo District. J. Meerman

Legend Code	**29**
UNESCO Classification code	**I.A.2.a.(1).(b).S**
Name	**Tropical evergreen seasonal broadleaf lowland forest over poor or sandy soils**
Altitude	< 100 m.
Geology and soil	Nutrient poor, acidic soils
Water regime	Moderately well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Fire is of at least occasional occurrence in this ecosystem
Description	Medium high forests
Frequent plant species 	Characterized by low *Attalea cohune, Acosmium panamense Calophyllum brasiliense, Miconia* spp*., Terminalia amazonia, Virola koschnyi, Vochysia hondurensis* and *Xylopia frutescens*. Other, frequently encountered species include: *Aspidosperma* sp*., Bactris major, Bactris mexicana, Belotia campbellii, Bucida buceras, Byrsonima crassifolia, Chrysobalanus icaco, Chrysophyllum mexicanum, Clidemia* sp*., Coccoloba* sp*., Desmoncus orthacanthos, Guettarda combsii, Hampea trilobata, Hirtella racemosa, Licania hypoleuca, Luhea speciosa, Metopium brownei, Miconia* spp*., Mouriri exilis, Ouratea* sp*., Pachira aquatica, Pinus caribaea, Pouteria* sp*., Psychotria poeppigiana, Roupala montana, Scleria bracteata, Simarouba glauca, Spondias mombin, Tabernaemontana arborea, Tetracera volubilis* and *Trichospermum campbellii.*
Faunistic comments	
References	Meerman 1999c, Wright et al. 1959: 1, 11a, 11c, 11d, 11e, 11g, Iremonger and Brokaw 1995: I.2.2.4. Picture: *Xylopia frutescens.* Toledo district. J. Meerman

Legend Code	**30**
UNESCO Classification code	**I.A.2.a.(1/2).(a)**
Name	**Tropical evergreen seasonal mixed needle and broadleaf lowland hill forest**
Altitude	< 500 m.
Geology and soil	Over non-calcareous rocks.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	This ecosystem is the result of a frequent fire influence.
Description 	As for type IA2a(2)(a) but with a somewhat greater abundance of broadleaf trees in the canopy particularly on the lower hillslopes.
Frequent plant species 	*Pinus caribaea* is the dominant species. Typical broadleaf species include *Agarista* sp., *Byrsonima crassifolia, Clethra occidentalis, Clusia massoniana, Curatella americana*, *Schippia concolor, Terminalia amazonia* and various *Quercus* spp. The herbaceous understory is often dominated by *Dicranopteris* sp., sedges and grasses including *Tripsacum latifolium.*
Faunistic comments	
References	Means, 1997, Wright et al. 1959: 18, 18a, Iremonger and Brokaw 1995: I.2.3.5. Picture top: Mountain Pine Ridge. Cayo district. J. Meerman Bottom: *Schippia concolor*, White Ridge Farm, Belize district. J. Meerman

Legend Code	**31**
UNESCO Classification code	**I.A.2.a.(2).(b)**
Name	**Tropical evergreen seasonal needle-leaf lowland dense forest**
Altitude	< 100 m.
Geology and soil	A number of soil types support this ecosystem, their common characteristic being that they are all leached and gleyed. They are also prone to droughtyness, which put a severe stress on the ecosystem during the dry season.
Water regime	Ill drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	This ecosystem is the result of a frequent fire influence.
Description 	Forests dominated by *Pinus caribaea* with a distinctive but variable content of broadleaved species.
Frequent plant species	Distinctive species include *Pinus caribaea, Acoelorraphe wrightii*, *Aspidosperma cruenta*, *Byrsonima crassifolia*, *Cassia emarginata*, *Chrysophyllum oliviforme*, *Pithecellobium* sp., *Quercus oleoides*, *Vitex gaumeri*, *Vochysia hondurensis, Xylopia frutescens*, and a number of Melastomes are present. Patches with *Dicranopteris* sp. and *Scleria bracteata* are frequent.
Faunistic comments	
References	Wright et al. 1959: 16, 16a, 16b, 17, Iremonger and Brokaw 1995: I.2.2.6. Picture: Western Higway near Belize Zoo. Belize district. J. Meerman

Legend Code	**32**
UNESCO Classification code	**I.A.2.a.(2).(a)**
Name	**Tropical evergreen seasonal needle-leaf lowland hill forest**
Altitude	0-500 m.
Geology and soil	Soils are pale reddish or pinkish brown over sandy clay.
Water regime	Well drained. Drought in the dry season is an important stress factor.
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Although much of this ecosystem is being managed for timber production, it is caused and maintained by fires. Occasionally, small patches with old pine are encountered in broadleaf forest along the Maya Mountain divide and these probably indicate patches of this forest type that have regenerated to broadleaf in the absence of fire.
Description 	These forests are characterized by a dominance of *Pinus caribaea* but with a fair amount of broadleaf species. It occurs in two main localities--the uplands of the Mountain Pine Ridge and one patch further south in the Chiquebull area. Small isolated patches occur in the Maya Mountain foothills.
Frequent plant species	*Pinus caribaea* is a distinctive element. Typical broadleaf trees in this ecosystem include *Agarista* sp., *Byrsonima crassifolia, Clethra occidentalis, Clusia massoniana, Schippia concolor, Terminalia amazonia* and various *Quercus* spp. The herbaceous understory is often dominated by sedges and grasses including *Tripsacum latifolium.* Often a *Dicranopteris* sp. is abundant.
Faunistic comments	
References	Means, 1997, Wright et al. 1959: 18, 18a; Iremonger and Brokaw 1995: I.2.3.4. Picture: Mountain Pine Ridge. Cayo district. J. Meerman

Legend Code	**33**
UNESCO Classification code	**I.A.2.b.(1).K-r**
Name	**Tropical evergreen seasonal broadleaf submontane forest over rolling calcareous hills**
Altitude	500-1000 m.
Geology and soil	Over calcareous rock.
Water regime	Mostly well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Unknown
Description	This forest type is the medium altitude (>500 m) version of type IA2a(1)(a)K-r.
Frequent plant species	Little information is available on this forest type but since it is restricted to southern Belize, there will be more species that require high humidity.
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Wright et al. 1959: 3, 3a, 3b, 4, 4a, 4b, Iremonger and Brokaw 1995: I.2.3.1.

Legend Code	**34**
UNESCO Classification code	**I.A.2.b.(1).K-s**
Name	**Tropical evergreen seasonal broadleaf submontane forest over steep calcareous hills**
Altitude	500-1000 m.
Geology and soil	Over calcareous rock.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Unknown
Description	This forest type is the medium altitude (>500 m) version of type IA2a(1)(a)K-s.
Frequent plant species	Little information is available of this forest type but since it is restricted to southern Belize, there will be more species that require high humidity.
Faunistic comments	
References	Brokaw & Lloyd-Evans 1987, Iremonger & Sayre 1994, Wright et al. 1959: 2d, 2e; Iremonger and Brokaw 1995: I.2.3.2.

Legend Code	**35**
UNESCO Classification code	**I.A.2.b.(1).(b).VT**
Name	**Tropical evergreen seasonal broadleaf submontane forest: *Virola-Terminalia* variant**
Altitude	500-1000 m.
Geology and soil	Over non-calcareous rock. Soils are shallow, dull gray brown and stony, and the terrain is steep to moderately steep.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Occasionally exposed to fires caused by lightning strike. Impact usually minimal. Isolated Pine trees in the otherwise broadleaf forest are probably indicators of past fire influence.
Description	Canopy height is low (13-20 m).
Frequent plant species	*Cyathea* sp., *Euterpe precatoria, Podocarpus guatemalensis, Symphonia globulifera, Terminalia amazonia,* and *Virola brachycarpa* are frequent.
Faunistic comments	
References	Wright et al. 1959: 11b; Iremonger and Brokaw 1995: I.2.3.3.1.

Legend Code	**36**
UNESCO Classification code	**I.A.2.b.(1).ST**
Name	**Tropical evergreen seasonal broadleaf submontane forest: *Simarouba* - *Terminalia* variant**
Altitude	500-1000 m.
Geology and soil	The soils are reddish brown or gray sandy clays with stones, overlying quartzite or shale hills.
Water regime	Mostly well drained.
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Occasionally exposed to fires caused by lightning strike. Impact usually minimal. Isolated Pine trees in the otherwise broadleaf forest are probably indicators of past fire influence.
Description	They extend over large areas of the Maya Mountain massif.
Frequent plant species 	Frequently encountered tree species in these forests are *Castilla elastica, Chrysophyllum cainito, Dendropanax arboreus, Dialium guianense, Euterpe precatoria, Ficus* sp., *Guarea* spp., *Licania platypus, Nectandra* sp., *Attalea cohune, Podocarpus guatemalensis, Protium schippii, Pterocarpus rohrii, Quararibea* sp., *Pourouma aspera, Rheedia* sp., *Schizolobium parahybum, Simarouba glauca, Stemmadenia donnell-smithii, Swietenia macrophylla, Terminalia amazonia, Virola brachycarpa, Vismia ferruginea, Vochysia hondurensis, Xylopia frutescens,* and *Zanthoxylum* sp., with *Astrocaryum mexicanum* and Melastomes in the understory. *Cyathea* tree ferns occur and some ground ferns.
Faunistic comments	
References	Stevenson 1942, Brokaw 1991, Wright et al. 1959: 9, 9a, 9b, 9c, 9d, 9e; Iremonger and Brokaw 1995: I.2.3.3.4 Picture: *Astrocaryum mexicanum.* Cayo district. J. Meerman

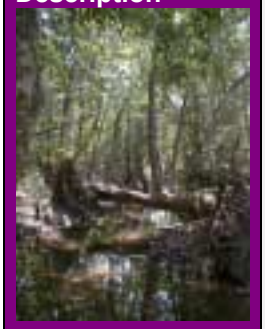
Legend Code	**37**
UNESCO Classification code	**I.A.2.b.(1).(d).L**
Name	**Tropical evergreen seasonal submontane low forest over non-calcareous rocks.**
Altitude	500-1000 m.
Geology and soil	Soil is a sandy loam.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Herb layer is dominated in parts by *Rhynchospora exaltata* and/or *Dicranopteris flexuosa*, which may indicate that their present state is the result of fire.
Description	Canopy height 5-10 m, with no distinct understory, a shrub layer at 1.5-2 m and a herb layer 30-60 cm.
Frequent plant species	Dominant tree species are *Ilex guianensis, Myrcia leptoclada, Ormosia velutina, Pinus caribaea, Purdiaea belizensis, Quercus sapotifolia*, and *Roupala montana*.
Faunistic comments	
References	Wright et al. 1959: 12c; Iremonger and Brokaw 1995: I.2.4.3.

Legend Code	**38**
UNESCO Classification code	**I.A.2.b.(1/2).**
Name	**Tropical evergreen seasonal mixed needle and broadleaf submontane forest**
Altitude	500-1000 m.
Geology and soil	Over non-calcareous rock
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	This ecosystem is the result of a frequent fire influence.
Description 	As for type IA2a(1/2)(a) but at greater altitude in the Mountain Pine Ridge and with a somewhat greater abundance of broadleaf trees in the canopy particularly on the lower hillslopes.
Frequent plant species	*Pinus caribaea* is accompanied by *P. oocarpa.* Typical broadleaf species include *Agarista* sp., *Byrsonima crassifolia, Clethra occidentalis, Clusia massoniana, Curatella americana*, *Schippia concolor, Terminalia amazonia* and various *Quercus* spp. The herbaceous understory is often dominated by sedges and grasses including *Tripsacum latifolium.* Often *Hypericum terrae-firmae* and a *Dicranopteris* sp. are abundant.
Faunistic comments	
References	Means, 1997, Wright et al. 1959: 18, 18a, Iremonger and Brokaw 1995: I.2.3.5. Picture: Mountain Pine Ridge. Cayo district. J. Meerman

Legend Code	**39**
UNESCO Classification code	**I.A.2.b.(2).**
Name	**Tropical evergreen seasonal needle-leaf submontane forest**
Altitude	500-1000 m.
Geology and soil	Soils are pale reddish or pinkish brown over sandy clay.
Water regime	Well drained
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	This ecosystem is caused and maintained by fires. Occasionally, small patches with old pine are encountered in broadleaf forest along the Maya Mountain divide and these probably indicate patches of this forest type that have regenerated to broadleaf in the absence of fire.
Description 	These forests are the > 500 m extension of type IA2a(2)(a) and similarly they are characterized by a strong dominance of *Pinus caribaea* but with a fair amount of broadleaf species. It occurs in the uplands of the Mountain Pine Ridge. Small isolated patches occur in the Maya Mountains.
Frequent plant species	Characterized by a strong dominance of *Pinus caribaea*. Typical broadleaf trees in this ecosystem include *Agarista* sp., *Byrsonima crassifolia, Clethra occidentalis, Clusia massoniana, Schippia concolor, Terminalia amazonia* and various *Quercus* spp. The herbaceous understory is often dominated by sedges and grasses including *Tripsacum latifolium.* Often a *Dicranopteris* sp. is abundant.
Faunistic comments	
References	Means, 1997, Wright et al. 1959: 18, 18a; Iremonger and Brokaw 1995: I.2.3.4. Picture: Mountain Pine Ridge. Cayo district. J. Meerman

Legend Code	**40**
UNESCO Classification code	**I.A.2.c.(1)**
Name	**Tropical evergreen seasonal broad-leaved lower montane elfin shrubland**
Altitude	> 1000 m.
Geology and soil	Over non-calcareous rock.
Water regime	Well drained
Rainfall	Windswept and often cloud covered
Fire exposure	Probably occasionally exposed to fire caused by lightning strikes.
Description 	This ecosystem has only been recognized on the peaks of the Cockscomb range including Victoria peak (1120 m). The stunted status of this ecosystem is probably the results of hurricane damage (Hurricane Hattie, 1961) followed by fire.
Frequent plant species 	*Clusia* sp. and *Myrica cerifera* form dense stands of only 1 - 2 m tall. These shrubs are often covered with "beard lichen". Orchids and Bromeliads and it is the only known Belizean location of the orange flowering orchid *Epidendrum ibaguense.*
Faunistic comments	
References	Kamstra et. Al. [1996] Pictures: Victoria peak, Jeanna Hyde.

Legend Code	**41**
UNESCO Classification code	**I.A.2.f.(1).(a).**
Name	**Tropical evergreen seasonal broadleaf alluvial forest**
Altitude	< 200 m.
Geology and soil	Soils are fairly heavy in texture and mainly gray. A broad but shallow hog-wallow micro-relief develops in some places.
Water regime	River flooding occurs almost every year
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	Seasonally flooded forests along riverbanks and lagoons, about 20-25 m high.
Frequent plant species 	Characterized locally by *Aristolochia grandiflora, Bactris major, Bactris mexicana, Belotia campbellii, Bucida buceras, Cassia grandis, Cecropia peltata, Cordia gerescanthus, Balizia leucocalyx, Costus pulverulentus, Enterolobium cyclocarpum, Ficus insipida, Guazuma ulmifolia, Heliconia latispatha, Inga vera, Licania platypus, Lonchocarpus guatemalensis, Mutingia calabura, Ouratea nitida, Pachira aquatica, Pterocarpus officinalis, Pterocarpus rohrii, Rinorea* sp., *Roystonea regia, Samanea saman, Schizolobium parahybum, Tabebuia rosea, Trophis racemosa* and *Zygia peckii*. *Attalea cohune, Guadua longifolia* and the introduced *Bambusa vulgaris* form dense patches while *Inga affinis* frequently dominates the vegetation at the high-water mark. The large aroid *Montricardia arborescens* is locally abundant. Towards the sea riparian forest gives way to mangrove vegetation, including *Avicennia germinans* and *Rhizophora mangle*.
Faunistic comments	
References	Brokaw and Mallory 1993, Meerman 1999a, 1999c, Wright et al. 1959: 20, Iremonger and Brokaw 1995: I.1.1.1.3.; Cabrera and Sanchez, 1994. Picture: *Pterocarpus officinalis*. Stann Creek District. J. Meerman

Legend Code	**42**
UNESCO Classification code	**I.A.2.g.(1).(a).T**
Name	**Tropical evergreen seasonal broadleaf lowland swamp forest: High variant.**
Altitude	< 250 m.
Geology and soil	Over calcareous rock.
Water regime	Ill drained
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description 	This forest type is low in stature with a broken canopy with a distinctive deciduous element. Where the canopy is open there is a distinctive herbaceous layer dominated by sedges sometimes including *Scleria bracteata.*
Frequent plant species	Frequently encountered trees include *Amyris elemifera, Bactris spp., Bucida buceras, Calophyllum brasiliense, Croton pyramidalis, Croton reflexiflora, Dracaena americana, Metopium brownei, Coccoloba reflexiflora, Coccoloba acapulcensis, Coccoloba cozumelensis, Manilkara zapota, Gliricidia sepium, Ouratea nitida, Sabal mauritiiformis, Simarouba glauca, Swietenia macrophylla* and *Zygia* sp. Thick woody vines are sometimes present. Includes some areas that are locally called "bajos". Logwood *Haematoxylon campechianum*, typically occurs in the wetter, more open sections.
Faunistic comments	
References	Schultze & Whitacre 1999, Wright et al. 1959: 21, 21a, 22, Iremonger and Brokaw 1995: I,1,1,1,1,1 Picture: New River, Orange Walk district, J. Meerman.

Legend Code	**43**
UNESCO Classification code	**I.A.2.g.(1).(a).L**
Name	**Tropical evergreen seasonal broadleaf lowland swamp forest: Low variant.**
Altitude	< 100 m.
Geology and soil	Generally over calcareous rock. Some hog-wallow micro-relief exists as a result of repeated wetting and drying of the soil.
Water regime	Ill drained, often waterlogged for part of the year.
Rainfall	Average rainfall less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description 	Swampy stands of low, thin stemmed trees and shrubs without emergents. Usually associated with 1A2g(1)(a)T and closely related to IIIA1bL.There is a distinctive deciduous element.
Frequent plant species	Frequently encountered trees include *Acacia* sp*., Acoelorraphe wrightii (usually occurring in dense clumps), Bucida buceras, Calliandra* sp*., Calyptranthes* sp*., Cameraria latifolia, Chrysobalanus icaco, Clidemia* sp*., Crescentia cujete, Erythroxylum guatemalense, Haematoxylon campechianum, Hampea trilobata, Helicteres guazumifolia, Hirtella racemosa, Hymenocalis littoralis, Licania hypoleuca, Miconia* spp*., Mimosa hemendieta, Mouriri exilis, Rinorea* sp., *Xylopia frutescens* and *Zygia* sp*.*
Faunistic comments	
References	Meerman 1999c, Wright et al. 1959: 15, 23; Iremonger and Brokaw 1995: I.1.1.1.1.2. Picture: Old Northern Highway. J. Meerman

Legend Code	**44**
UNESCO Classification code	**I.A.2.g.(1).(a).SC**
Name	**Tropical evergreen seasonal broadleaf lowland swamp forest: Stann Creek variant.**
Altitude	< 50 m.
Geology and soil	Mostly over calcium-poor soils. Some hog-wallow micro-relief exists.
Water regime	Ill drained, often waterlogged for part of the year.
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description	Swampy stands of thin stemmed, partly deciduous trees and shrubs without emergents in the Stann Creek district.
Frequent plant species 	Frequently encountered plants in these forests are *Acosmium panamense, Aspidosperma cruenta, Astrocaryum mexicanum, Attalea cohune, Bactris* spp*., Bucida buceras, Calyptranthes chytraculia, Clidemia* sp., *Coccoloba* sp., *Crysophila stauracantha, Dialium guianense, Dracaena americana, Guettarda combsii, Heliconia vaginalis, Hirtella racemosa, Inga* sp*., Jacquinia paludicola, Miconia* sp*., Mouriri exilis, Mouriri myrtilloides, Pachira aquatica, Psychotria glomerulata, Psychotria poeppigiana, Scleria bracteata, Swietenia macrophylla, Symphonia globulifera, Tabebuia chrysantha, Terminalia amazonia, Virola koschnyi, Vismia ferruginea, Vochysia hondurensis* and *Xylopia frutescens.* On richer soils *Pterocarpus officinalis* is found; on poorer soils more Melastomataceae and *Acoelorraphe wrightii*. Where this ecosystem comes close to the coast, *Anacaridum officinale* and *Byrsonyma crassifolia* can be found.
Faunistic comments	
References	Meerman 1999a, Wright et al. 1959: 14,14a, 14b, 14c; Iremonger and Brokaw 1995: I.1.1.1.2.1. Picture: *Bucida buceras*. Stann Creek District. J. Meerman

Legend Code	**45**
UNESCO Classification code	**I.A.2.g.(1).(a).AC**
Name	**Tropical evergreen seasonal broadleaf lowland swamp forest: Aguacaliente variant.**
Altitude	< 50 m.
Geology and soil	
Water regime	Seasonally inundated
Rainfall	High average rainfall of near 4000 mm per year with a dry season from February through May.
Fire exposure	Unknown
Description 	This variant is found around the Lu Ha or Aguacaliente lagoon in the Toledo district.
Frequent plant species 	Dominated by the Myrtaceae *Eugenia aeruginea.* Other species include *Acoelorrhaphe wrightii, Alibertia edulis, Bactris* sp., *Calyptranthes chytraculia, Chrysobalanus icaco, Clidemia* sp., *Connarus lambertii, Guadua longifolia, Lonchocarpus castilloi, Lonchocarpus rugosus, Pachira aquatica, Randia* sp. and *Zygia* sp. The field layer is mainly composed of graminoids including *Scleria* spp. Epiphytes such as *Aechmea tillandsioides, Anthurium scandens, Epidendrum nocturnum, Epiphyllum* sp., *Tillandsia balbisiana, T. limbata, T. streptophylla, T. utriculata, Vittaria* sp. and *Vriesea* sp. are abundant.
Faunistic comments	
References	Meerman 1999a, Iremonger and Brokaw 1995: I.1.1.1.2.2. Picture top: Aguacaliente Lagoon. Toledo district. J. Meerman Bottom. *Eugenia aeruginea.* Aguacaliente Lagoon. Toledo district. J.Meerman

Legend Code	**46**
UNESCO Classification code	**I.A.3.a.(1).(a).**
Name	**Tropical semi-deciduous broadleaf lowland forest**
Altitude	< 50 m.
Geology and soil	Shallow soils over calcareous rock.
Water regime	Well drained
Rainfall	Average rainfall less than 1500 mm per year with a pronounced dry season from February through May.
Fire exposure	Limited to areas with slash and burn cultivation.
Description 	This is a distinctive forest type, which has only been described from the Sarteneja area in the Corozal district. It has a low canopy (8 -12 m) with a more deciduous aspect than most other forest type in Belize. Could be considered a "stressed" variant of I.A.2.a.(1).(b).K-Y
Frequent plant species	Leguminous trees such as *Lysiloma latisiliquum* and *Acacia* sp. are frequent. Other characteristic species include *Bauhinia jennigsii, Bursera simaruba, Caesalpina gaumeri, Ceiba aesculifolia*, *Gymnopodium floribundum, Jatropha gaumeri, Lonchocarpus rugosus, Manilkara zapota, Metopium brownei, Piscidia piscipula, Simarouba glauca, Thevetia gaumeri, Thrinax radiata* and *Vitex gaumeri.*
Faunistic comments	Typical habitat for Yucatan endemics such as the Yucatan Jay *Cyanocorax yucatanicus* and the Orange Oriole *Icterus auratus*
References	Meerman 1993, Bijleveld 1998, Iremonger & Brokaw I.2.2.5; Cabrera and Sanchez, 1994. Picture: Sarteneja. Corozal district. J. Meerman

Legend Code	**47**
UNESCO Classification code	**I.A.5.b.(1).(a).**
Name	**Dwarf mangrove scrub**
Altitude	Sealevel
Geology and soil	
Water regime	Mostly waterlogged.
Rainfall	NA
Fire exposure	None
Description 	Coastal mudflats with a vegetation dominated by stunted *Rhizophora mangle*, the individuals forming an open layer at 1-1.5 m. This community is very dependent on topography, and where there are slight differences, patches of other communities occur, particularly “Marine salt marsh with many succulent species” VE1a(1).
Frequent plant species	Dominated by stunted *Rhizophora mangle*. Few other species are in this community, and then only graminoid herbs or the vine *Rhabdadenia biflora.*
Faunistic comments	
References	Furley & Ratter 1992, Gray *et al*. 1990, Wright et al. 1959: 30, Iremonger and Brokaw 1995: II.1.2.1. Picture: Sapodilla Lagoon. Stann Creek district. J. Meerman

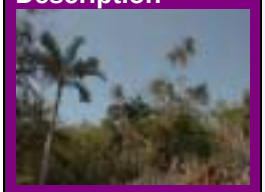
Legend Code	**48**
UNESCO Classification code	**I.A.5.b.(1).(b).**
Name	**Permanently waterlogged freshwater mangrove scrubs**
Altitude	< 50 m.
Geology and soil	
Water regime	Waterlogged.
Rainfall	NA
Fire exposure	None
Description 	An inland freshwater mangrove community occurs in patches in the interior of Belize, particularly around the south end of Booth's River Marsh, probably a remnant from a past geological age. This community type mixes with and extends into type VIIB1a(2) (Tall herbaceous swamp).
Frequent plant species	These are dominated by *Rhizophora mangle*. Where the ecosystem merges with VIIB1a(2) (Tall herbaceous swamp), the species composition becomes one of tall reeds and sedges with occasional *Rhizophora mangle* groups or individuals.
Faunistic comments	
References	Brokaw & Mallory 1992, Zisman 1992, Iremonger and Brokaw 1995: II.1.1.1. Picture: Sapodilla Lagoon, Stann Creek district. J. Meerman

Legend Code	**49**
UNESCO Classification code	**I.A.5.b.(1).(c).**
Name	**Mixed mangrove scrub**
Altitude	Sealevel
Geology and soil	
Water regime	Not permanently inundated.
Rainfall	NA
Fire exposure	None
Description	Mixed mangrove communities.
Frequent plant species 	All three mangrove species occur: *Avicennia germinans*, *Laguncularia racemosa*, and *Rhizophora mangle*. Other frequent species include *Acoelorraphe wrightii, Acrostichum aureum, Conocarpus erectus, Eragrostis prolifera, Myrica cerifera* and *Rhabdadenia biflora.*
Faunistic comments	
References	Furley & Ratter 1992, Gray *et al*. 1990, Wright et al. 1959: 29, 31, Iremonger and Brokaw 1995: II.1.2.2 Picture: *Avicennia germinans*. Dangriga. J. Meerman

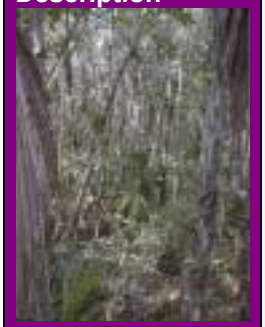
Legend Code	**50**
UNESCO Classification code	**I.A.5.b.(1).(d).**
Name	**Coastal fringe *Rhizophora mangle*-dominated forest**
Altitude	Sealevel
Geology and soil	
Water regime	Develops in conditions of permanent inundation.
Rainfall	NA
Fire exposure	None
Description 	Narrow fringe of scrub to high mangrove with a height of 2-14 m located along beaches and river mouths.
Frequent plant species	*Rhizophora mangle* is characteristically dominant in these communities.
Faunistic comments	
References	Furley & Ratter 1992, Gray *et al*. 1990,Iremonger and Brokaw 1995: I.1.2.1. Picture: *Rhizophora mangle*. Belize City. J. Meerman

Legend Code	**51**
UNESCO Classification code	**I.A.5.b.(1).(e).**
Name	**Riverine mangrove forest**
Altitude	< 50 m.
Geology and soil	The systems are nutrient-rich from river deposited alluvium.
Water regime	Mostly waterlogged.
Rainfall	NA
Fire exposure	None
Description 	Canopy height from 10 to 30 m;
Frequent plant species	*Rhizophora mangle* is the dominant species. Along artificial canals *Laguncularia racemosa* can dominate, as at the southern exit of Jones Lagoon on the Burdon Canal.
Faunistic comments	
References	Furley & Ratter 1992, Gray et al. 1990 Picture: New River, Orange Walk. J. Meerman

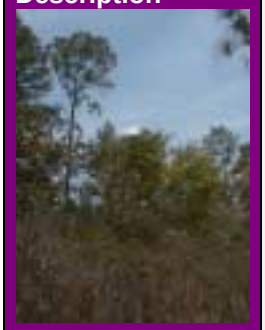
Legend Code	**52**
UNESCO Classification code	**I.A.5.b.(1).(f).**
Name	**Basin mangrove forest**
Altitude	Sealevel
Geology and soil	
Water regime	Mostly waterlogged.
Rainfall	NA
Fire exposure	None
Description 	Found along coastal lagoons and in land-locked coastal depressions. Species composition and structure in these communities are highly variable depending on frequency and depth of inundation, nutrient exchange and water salinity levels.
Frequent plant species	*Rhizophora mangle* 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 % *Avicennia germinans* dominates. In addition to being highly saline the soils may be very reduced (anaerobic), giving the *Avicennia* an ecological advantage through its pneumatophores. Where salinity is about 30-40 %, dominant species include *Avicennia germinans*, *Laguncularia racemosa*, and *Rhizophora mangle*. When disturbed the fern *Acrostichum aureum* becomes the dominant species.
Faunistic comments	
References	Furley & Ratter 1992, Gray *et al*. 1990, Iremonger and Brokaw 1995: I.21.2.3. Picture: Gra-Gra Lagoon, Dangriga. J. Meerman

Legend Code	**53**
UNESCO Classification code	**I.B.1.a.(2).**
Name	**Tropical drought-deciduous microphyllous lowland forest**
Altitude	< 50 m.
Geology and soil	Over exposed calcareous rock
Water regime	Well drained but subject to infrequent flooding
Rainfall	Average rainfall less than 1500 mm per year with a pronounced dry season from February through May.
Fire exposure	Some evidence of past fire disturbance.
Description 	This is a very distinctive forest type, which is confined in Belize to dry, shallow soils in the Shipstern Nature Reserve area in the eastern Corozal district and to the Baccalar Chico National Park in Northern Ambergris Caye. It has a low canopy (7-8 m) and the trees are generally of narrow girth, resulting in a forest with a "scrubby" appearance.
Frequent plant species 	Notable species in this type of forest include *Agave angustifolia, Amyris elemifera, Beaucarnea pliabilis, Caesalpinia violaceae, Croton glandulosepalus, Eugenia* spp. *Gymnopodium floribundum, Hyperbaena winzerlingii, Manilkara zapota,* and *Pseudophoenix sargentii,* When disturbed this forest type becomes dominated by *Lysiloma latisiliquum.*
Faunistic comments	
References	Meerman 1993; Bijleveld 1998, Iremonger and Brokaw 1995: I.2.2.5; Cabrera and Sanchez, 1994. Pictures: Top(with *Pseudophoenix sargentii*): Shipstern Nature Reserve Corozal. J. Meerman Bottom: *Beaucarnea pliabilis*, Shipstern Nature Reserve. J. Meerman

Legend Code	**54**
UNESCO Classification code	**III.A.1.b.(1).(a).K-s**
Name	**Tropical evergreen broadleaf scrub forest in calcareous crags**
Altitude	0-500 m.
Geology and soil	Found in steep terrain over calcareous rocks, often where there is more non-vegetated ground surface, particularly bare 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.
Water regime	Well drained
Rainfall	Found in the 2500 - 4000 mm annual rainfall areas of southern Belize with a dry season from February through May.
Fire exposure	Unknown
Description	A low scrub forest known from limestone crags in the Maya Mountains but not yet properly described.
Frequent plant species	Some species are *Amyris rhomboides*, *Byrsonima bucidaefolia*, *Clusia massoniana*, and *Glossostipula concinna*. Vascular epiphytes are abundant.
Faunistic comments	
References	Iremonger & Sayre 1994; Iremonger and Brokaw 1995: I.2.4.2.

Legend Code	**55**
UNESCO Classification code	**III.A.1.b.(a).L**
Name	**Broad-leaved lowland shrubland: Leguminous variant**
Altitude	< 250 m.
Geology and soil	Soil is a pale gray brown leached layer overlying a gray layer with manganese concretions. A hog-wallow micro-relief occurs.
Water regime	A "perched" water table develops seasonally.
Rainfall	Average rainfall mostly less than 2000 mm per year with a pronounced dry season from February through May.
Fire exposure	Unknown
Description 	This type undergoes extremes of wetting and drying in the course of the year and has a significant complement of deciduous species. The canopy is very level with few or no emergents and only 4-6 m. high. Usually found in association with the IA2g(1)(a) types (Tropical evergreen seasonal broadleaf lowland swamp forest).
Frequent plant species	Frequently encountered species include *Acoelorraphe wrightii*, *Ardisia* sp., *Bucida buceras*, *Byrsonima bucidaefolia*, *Caesalpinia gaumeri*, *Cameraria latifolia*, *Calophyllum brasiliense*, *Chrysobalanus icaco*, *Coccoloba reflexiflora*, *Croton* spp., *Erythroxylum guatemalense*, *Eugenia rhombea*, *Gliricidia sepium*, *Gymnopodium floribundum*, *Haematoxylon campechianum*, *Krguidendron ferreum*, *Manilkara zapota*, *Margaritaria nobilis*, *Metopium brownei*, *Myrica cerifera*, *Ouratea* sp., *Pithecellobium albicans*, *Plumeria obtusa*, *Rapanea guianensis*, and *Swietenia macrophylla*. Epiphytes are abundant. This forest is known locally as “akalche” or “tintal”.
Faunistic comments	It appears that this is the preferential habitat for the rare and only recently discovered Gray Brocket Deer *Mazama pandora*.
References	Zimmerman & Olmsted 1992, Olmsted & Duran 1986, Brokaw & Mallory 1992, Wright et al. 1959: 23, Iremonger and Brokaw 1995: II.1.1.2.1. Picture: Orange Walk District. J. Meerman

Legend Code	**56**
UNESCO Classification code	**III.A.1.b.(a).Mi**
Name	**Broad-leaved lowland shrubland: *Miconia* variant.**
Altitude	< 100 m.
Geology and soil	Soil has a "hog-wallow" micro-relief, and is gray sandy clay, fairly well mottled below.
Water regime	Ill drained, frequently inundated.
Rainfall	Average rainfall less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	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.
Description 	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,
Frequent plant species	Frequently encountered species include *Acoelorrhaphe wrightii, Aspidosperma cruenta, Bucida buceras, Calyptranthes* sp., *Chrysobalanus icaco, Clidemia* sp., *Haematoxylon campechianum, Miconia* spp., *Mimosa hemendieta, Rinorea* sp., *Tetragastis stevensonii*, and *Xylopia frutescens.*
Faunistic comments	
References	Meerman 1999c, Wright et al. 1959: 15, Iremonger and Brokaw 1995: II.1.1.2.2. Picture: Runaway Creek, Belize District. J. Meerman

Legend Code	**57**
UNESCO Classification code	**III.B.1.b.(a).**
Name	**Deciduous broadleaf lowland well drained shrubland over poor soils**
Altitude	< 500 m.
Geology and soil	Land generally slopes gently and the soils are nutrient poor sands resting on sandy clay or gravelly sandy clay.
Water regime	Well drained
Rainfall	Average rainfall mostly around 2000 mm per year.
Fire exposure	Frequently exposed to fire.
Description 	Sparse, fire induced scrubland with grass in the Mountain Pine Ridge area. This ecosystem is related to VF1c(1)L (Fire-induced lowland fern thicket), but probably older and more established. In some places there is still a cap of limestone and consequently, localized islands with a lime-loving ecosystem IA2a(1)(a)K-r (Tropical evergreen seasonal broadleaf lowland forest over rolling calcareous hills) can be found.
Frequent plant species	Woody species include *Agarista* sp., *Clusia* sp., *Curatella americana*, *Byrsonima crassifolia*, *Pinus caribaea*, *Quercus* sp. Herbs are *Andropogon* spp., *Cyperus* spp, *Dichanthelium aciculare*, *Eragrostis maypurensis*, *Panicum laxum*, *P. pilosum*, *Setaria tenax*, *S. parviflora*, *Scleria ciliata*, *Sporobolus indicus*, and *Trachypogon plumosus*. On hills with remnants of a limestone cap, there is usually an abundance of orchids. Another typical species for these limestone caps is *Beaucarnea pliabilis*.
Faunistic comments	
References	Wright et al. 1959: 18b, 19, Iremonger and Brokaw 1995: II.2.1 Picture: Mountain Pine Ridge Forest Reserve, Cayo district. J. Meerman

Legend Code	**58**
UNESCO Classification code	**III.B.1.b.(a).2.**
Name	**Deciduous broad-leaved lowland disturbed shrubland**
Altitude	< 500 m.
Geology and soil	
Water regime	Mostly well drained
Rainfall	NA
Fire exposure	Frequently exposed to human induced fires.
Description	This community varies much according to its topographic position and. Disturbance may be natural, such as the displacement by a river after flooding, or it may be anthropogenic as when land is cleared and left fallow or disturbed by fire.
Frequent plant species	Variable. Mostly "weedy" species
Faunistic comments	
References	Iremonger and Brokaw 1995: II.2.3.

Legend Code	**59**
UNESCO Classification code	**III.B.1.b.(b).**
Name	**Deciduous broadleaf submontane well drained shrubland over poor soils**
Altitude	500-1000 m.
Geology and soil	Land generally slopes gently and the soils are nutrient poor sands resting on sandy clay or gravelly sandy clay.
Water regime	Well drained.
Rainfall	Average rainfall mostly around 2000 mm per year.
Fire exposure	Frequently exposed to fire.
Description 	Sparse, fire induced scrubland with grass in the Mountain Pine Ridge area. This ecosystem is related to VF1c(1)SM (Fire-induced submontane fern thicket), but probably older and more established.
Frequent plant species	Woody species include *Agarista* sp., *Clusia* sp., *Curatella americana*, *Byrsonima crassifolia*, *Pinus caribaea*, *Quercus* sp. Herbs are *Andropogon* spp., *Cyperus* spp, *Dichanthelium aciculare*, *Eragrostis maypurensis*, *Panicum laxum*, *P. pilosum*, *Setaria tenax*, *S. parviflora*, *Scleria ciliata*, *Sporobolus indicus*, and *Trachypogon plumosus*.
Faunistic comments	
References	Wright et al. 1959: 18b, 19, Iremonger and Brokaw 1995: II.2.1 Picture: Mountain Pine Ridge Forest Reserve, Cayo district. J. Meerman

Legend Code	**60**
UNESCO Classification code	**III.B.1.b.(f).P**
Name	**Deciduous broadleaf lowland riparian shrubland of the plains**
Altitude	< 50 m.
Geology and soil	On alluvial deposits. Outcrops of calcareous rock occur, but generally the alluvial deposits are deep and there is no bedrock visible.
Water regime	Mostly well drained
Rainfall	NA
Fire exposure	Frequently exposed to human induced fires.
Description	Found along riversides where disturbance may be natural, such as the displacement by a river after flooding, or it may be anthropogenic as when land is cleared and left fallow.
Frequent plant species	Tall graminoids (reeds, rushes, and sedges) mix with shrubs, and many types of ruderal communities.
Faunistic comments	
References	Iremonger and Brokaw 1995: II.2.3.

Legend Code	**61**
UNESCO Classification code	**III.B.1.b.(f).H**
Name	**Deciduous broadleaf lowland riparian shrubland in hills**
Altitude	50 - 500 m.
Geology and soil	Over non-calcareous rock but alluvial deposit moderately rich in calcium.
Water regime	Well drained, but subject to submergence during flash floods.
Rainfall	Average rainfall mostly between 2000 and 3000 mm per year.
Fire exposure	None
Description 	This community is found along fast flowing mountain streams of the Maya Mountains. Typically the vegetation is a mixture of vines, graminoid, herbaceous and shrubby species adapted to annual disturbance caused by sudden flash floods. Tree species have difficulty to get established in this highly dynamic habitat but isolated trees occur.
Frequent plant species 	The trees are usually fast growing and short-lived species such as *Ceiba pentandra* and *Schizolobium parahybum*. Other characteristic species include: *Acalypha* spp., *Byttneria* sp., *Calathea* sp., *Calliandra emarginata, Canna indica, Casearia* sp., *Castilia elastica, Cecropia obtusifolia, Cedrela odorata, Cestrum racemosum, Cordia aliodora, Critonia morifolia, Croton* sp., *Crysophila stauracantha, Ficus insipida, Gouania* sp., *Guazuma ulmifolia, Hamelia patens, Heliconia latispatha, Helicteres guazumifolia, Inga affinis, Ipomoea* spp., *Lonchocarpus guatemalensis, Maranta arundinaceae, Mimosa hondurana, Mucuna* sp., *Pleuranthodendron lindenii, Quararibea* sp., *Solanum americanum, Spondias mombin, Tripsacum latifolium, Waltheria indica* and *Xanthosoma* sp.
Faunistic comments	This habitat type appears to be a favored habitat for the endangered Central American Tapir *Tapirus bairdii* and critical breeding habitat for the even more endangered local subspecies of the Scarlet Macaw *Ara macao cyanopteris*.
References	Meerman 1999c, 1999d, Wright et al. 1959: 7;Iremonger and Brokaw 1995: I.2.2.2; II.2.3. Picture Top: Upper Macal River, Cayo district. J. Meerman Lower: *Tripsacum latifolium*. Upper Macal River, Cayo district. J. Meerman

Legend Code	**62**
UNESCO Classification code	**V.A.2.a.(1).(2).**
Name	**Short-grass savanna with needle-leaved trees**
Altitude	< 50 m.
Geology and soil	The soils all have in common that they have a pale colored, course 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).
Water regime	This and related forest types are often waterlogged during the rainy season but show drought stress during the dry season, especially in the understory.
Rainfall	Average rainfall generally less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	With increased fire regime this forest type quickly degenerates to open short-grass savanna.
Description 	This ecosystem is transitional from Short-grass savannas VA2b(2) to Tropical evergreen seasonal needle-leaf lowland dense forest IA2a(2)(b).
Frequent plant species	P*inus caribaea* is dominating but rather sparse. Other common trees and shrubs are *Acoelorrhaphe wrightii, Byrsonima crassifolia, Chrysobalanus icaco, Hirtella racemosa, Quercus oleoides* and *Xylopia frutescens.* Generally there is a graminoid herbaceous layer dominated by sedges but with other herbs such as *Cassytha filiformis, Passiflora urbaniana, Turnera odorata* and sometimes *Gynerium sagittatum.* Some low shrubs such as *Clidemia* sp. and *Curatela americana* complete the understory.
Faunistic comments	This ecosystem appears to be an important breeding habitat for the Yellow-headed Parrot *Amazona oratrix.*
References	Meerman 1999c, Wright et al. 1959: 17, Iremonger and Brokaw 1995: I.2.2.7.; Cabrera and Sanchez, 1994. Picture: Southern Highway. Stann Creek District. J. Meerman

Legend Code	**63**
UNESCO Classification code	**V.A.2.b.(2).**
Name	**Short-grass savanna with shrubs**
Altitude	< 50 m.
Geology and soil	The soils all have in common that they have a pale colored, course 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).
Water regime	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.
Rainfall	Average rainfall generally less than 2500 mm per year with a pronounced dry season from February through May.
Fire exposure	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).
Description 	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.
Frequent plant species 	The graminoid vegetation is usually being dominated by sedges. Frequent woody species are *Acoelorraphe wrightii, Calyptranthus* sp.*, Cameraria latifolia, Chrysobalanus icaco, Clidemia* sp.*, Crescentia cujete, Curatela americana, Erythroxylum guatemalense, Gliricidia sepium, Hippocratea excelsa, Metopium brownei, Miconia* sp.*, Mimosa albicans, Pinus caribaea, Quercus oleoides and Roupala montana. There is a strong herbaceous component with typically: Bletia purpurea, Borreria* sp.*, Casytha filliformis, Chamaecrista* spp.*, Cipura campanulata, Coutoubea spicata, Drosera cappilaris, Eriocaulon* sp.*, Passiflora urbaniana, Xyris* sp*. and Zamia polymorpha. Grasses reported from this ecosystem include: Aristida appressa, Axonopus poiophyllus, Eragrostis maypurensis, E. acutifolia, E. elliottii, Gymnopogon spicatus, Leptocoryphium lanatum, Mesosetum filifolium, Panicum rudgei, Paspalum peckii, P. pulchellum, Sporobolus cubensis and Trachypogon plumosus.* Sedges include mostly *Rhynchospora* spp., but also *Bulbostylis paradoxa* and *Fimbristylis vahlii.* Wet places usually have *Eleocharis* spp. and *Cyperus ligularis*. The latter mostly near the coast.
Faunistic comments	The short-grass savannas are characteristic habitat for a number of bird species such as the Fork-tailed Flycatcher *Tyrannus savanna,* the Grasshopper Sparrow *Ammodramus savannarum* and the Aplomado falcon *Falco femoralis.*
References	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: *Passiflora urbaniana*. Belize district. J. Meerman

Legend Code	**64**
UNESCO Classification code	**V.A.2.c.(g).**
Name	**Swamp grassland without trees or shrubs**
Altitude	< 50 m.
Geology and soil	On alluvial deposits
Water regime	Seasonally inundated
Rainfall	High average rainfall of near 4000 mm per year with a dry season from February through May.
Fire exposure	Unknown
Description	It has only been observed in the Aguacaliente Swamp in the Toledo District. The area is a seasonally flooded basin bordered by forest.
Frequent plant species	Dominated by an unidentified grass, which forms a sward at about 15-20 cm, with occasional Brassicaceae forbs.
Faunistic comments	
References	Iremonger and Brokaw 1995: III.1.1.2.2

Legend Code	**65**
UNESCO Classification code	**V.D.1.a.(1)**
Name	***Eleocharis* marsh**
Altitude	< 50 m.
Geology and soil	On alluvial deposits. Soils often peaty over clay.
Water regime	Mostly inundated, frequently with water of a somewhat higher salinity
Rainfall	Variable
Fire exposure	In savanna areas potentially exposed to fires.
Description 	These almost monospecific marshes may be found in waterlogged plains, fringed with shrubs. The height of the herb layer is about 50 cm. Common in small patches in short-grass savannas but mostly too small to be mapped. A good example of this ecosystem can be found along the Hopkins road in the Stann Creek district.
Frequent plant species	The dominant species is an *Eleocharis* sp. Additional plant species commonly found here include *Blechnum serrulatum, Centrosema* sp.*, Crinum erubescens, Hyptis* sp.*, Ludwigia* spp.*, Mimosa pigra, Sagittaria lancifolia* and *Thalia geniculata.*
Faunistic comments	
References	Meerman 1999a, Meerman and Boomsma 1995a, Rejmánková et al. 1996, Iremonger & Brokaw III.1.1.2.1. Picture: Hopkins, Stann Creek District. J. Meerman

Legend Code	**66**
UNESCO Classification code	**V.E.1.a.(1)**
Name	**Marine salt marsh with many succulent species**
Altitude	Sealevel
Geology and soil	Over calcareous rock.
Water regime	Partially inundated with brackish water during the rainy season. Salinity increases as water evaporates.
Rainfall	Variable
Fire exposure	Very rare
Description 	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. Good examples occur in the Shipstern Nature Reserve.
Frequent plant species	Common dominants in the vegetation are *Batis maritima*, *Distichlis spicata*, *Fimbristylis spadicea*, *Fuirena* sp., *Juncus* spp., *Salicornia perennis*, *Solanum donianum* and *Spartina cynosuroides*. Flats with these principally herbaceous species may contain stunted *Conocarpus erecta* and dwarf *Rhizophora mangle*. Slightly elevated areas in this type of marsh contain forest species such as *Bravaisa tubiflora*, *Metopium brownei*, *Manilkara zapota* and *Thrinax radiata.* In the Shipstern Nature Reserve, a characteristic plant along small creeks through this ecosystem is *Bucida spinosa.* These small shrubs are often covered with *Tillandsia* epiphytes.
Faunistic comments	
References	Davis 1943, Gray *et al*. 1990, Meerman 1993, Bijleveld 1998, Iremonger & Brokaw III.1.2.1 Picture: Gales Point, Belize District. J. Meerman

Legend Code	**67**
UNESCO Classification code	**V.F.1.c.(1).L**
Name	**Fire-induced lowland fern thicket**
Altitude	< 500 m.
Geology and soil	Variable
Water regime	Well drained
Rainfall	NA
Fire exposure	This ecosystem results after repeated burning of the forest on hills. In some cases, on isolated hilltops, this ecosystem appears natural and resulting from repeated lightning strikes. But in most cases the ecosystem is directly or indirect anthropogenic and resulting from careless slash and burn agriculture activities or deliberately started savanna fires (Meerman 1999a). Dramatic examples of this ecosystem can be found on the Cabbage Haul Range in the Stann Creek District. This location was identified by Wright et al (1959) as covered with IA2a(1)(a)ST (Tropical evergreen seasonal broadleaf lowland hill forest Simarouba - Terminalia variant) but, as a result of an increased fire influence, is now degenerating to IIIB1b(a) (Deciduous broadleaf lowland well drained shrubland over poor soils).
Description	Usually hilltops of which the natural vegetation has been destroyed by frequent (generally human induced) fires. Mostly found in areas with slash-and-burn cultivation.
Frequent plant species 	On non-calcareous hills the dominant species is “Tiger bush” (*Dicranopteris*) while on calcareous hills, *Pteridium caudatum* dominates. Additional species frequently include *Calea* sp, *Senecio* sp., *Clethra occidentalis, Clusia* sp., *Scleria bracteata, Chamaecrista* sp., *Quercus sp., Citharexylum caudatum, Coutoubea spicata, Cassytha filiformis, Lycopodiella* sp., *Byrsonima bucidafolia, Melastomataceae, Tococca* sp., *Myrica cerifera, Psidium guajava, Sobralia macrantha, Pinus caribaea* and *Coccocypselum* sp.
Faunistic comments	
References	Iremonger & Sayre 1994, Meerman 1999a, Wright et al. 1959: 18b, Iremonger & Brokaw III.2.1. Picture: *Pteridium caudatum*. Cayo district. J. Meerman

Legend Code	**68**
UNESCO Classification code	**V.F.1.c.(1).SM**
Name	**Fire-induced submontane fern thicket**
Altitude	500-1000 m.
Geology and soil	Variable
Water regime	Well drained
Rainfall	NA
Fire exposure	This ecosystem results after repeated burning of the forest on non-calcareous hills. In many cases, on isolated hilltops, this ecosystem appears natural and resulting from repeated lightning strikes. But increasingly this ecosystem is indirect anthropogenic and resulting from careless slash and burn agriculture activities or deliberately started savanna fires. These fires may have started much lower on the slopes and crept up under the forest canopy gaining strength near the summit (Meerman, 1999a). Pine will regenerate when given fire protection but mostly this ecosystem is degenerative with fewer trees surviving after every subsequent fire.
Description 	Usually hilltops of which the natural vegetation has been destroyed by frequent (generally human induced) fires. Mostly found in areas with slash-and-burn cultivation.
Frequent plant species 	The dominant species is “Tiger bush” (*Dicranopteris*).
Faunistic comments	
References	Iremonger & Sayre 1994, Iremonger & Brokaw III.2.1, Wright et al. 1959: 18b Picture top: Cabbage Haul, Stann Creek District. J. Meerman Bottom: *Dicranopteris* sp., Stann Creek District. J. Meerman

Legend Code	**69**
UNESCO Classification code	**VI.B.3.a.**
Name	**Tropical Littoral forest and beach communities**
Altitude	0 - 5 m.
Geology and soil	Littoral forests are found in a narrow coastal strip on recent dune sands.
Water regime	Well drained
Rainfall	NA
Fire exposure	Unknown
Description 	Typically they are bordered on the seaward side by low herbaceous beach vegetation with species such as *Argusia gnaphalodes, Canavalia rosea*, *Euphorbia trichotoma* and *Surania maritima*. On the inland side this ecosystem is typically bordered by Mixed mangrove scrub IA5b(1)(c), with mostly *Rhizophora mangle* and *Myrica cerifera*. 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.
Frequent plant species 	The littoral forest itself varies in composition but usually contains the following species: *Brassavola nodosa, Bursera simaruba, Cassytha filiformis, Chrysobalanus icaco*, *Coccoloba uvifera, Cordia sebestena, Hymenocalis latifolia, Metopium brownei*, *Myrmecophylla tibicinis, Passiflora suberosa, Pouteria campechiana, Sophora tomentosa* and *Thrinax radiata.* The introduced *Cocos nucifera* now forms an integral part of this community.
Faunistic comments	Important habitat for migratory birds and breeding habitat for marine turtles and American Crocodiles *Crocodylus acutus.*
References	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

Legend Code	**70**
UNESCO Classification code	**VII.B.1.a.**
Name	**Tropical lowland reed-swamp**
Altitude	< 50 m.
Geology and soil	Variable. Soils usually peat
Water regime	Inundated through much of the year, increasing salinity will favor the development of *Cladium jamaicense*, while increasing nutrient availability will favor the development of *Typha dominguensis.*
Rainfall	NA
Fire exposure	Fire is of at least occasional occurrence in this ecosystem
Description 	Good examples are found near Hopkins village.
Frequent plant species	Graminoid species such as *Typha domingensis, Phragmites australis* and/or *Cladium jamaicense* dominate. In the Stann Creek district, the sedge *Cyperus giganteus* is common. Locally the Maranthaceae *Thalia geniculata* is the dominant species. The latter probably indicates a transition to Predominantly tall herbaceous reedland.
Faunistic comments	
References	Picture: Commerce Bight Lagoon, Stann Creek District. J. Meerman

Legend Code	**71**
UNESCO Classification code	**VII.B.1.a.(2)**
Name	**Tropical lowland tall herbaceous swamp**
Altitude	< 200 m.
Geology and soil	Variable
Water regime	Inundated during the rainy season but water level is shallow.
Rainfall	NA
Fire exposure	Fire is of at least occasional occurrence in this ecosystem
Description 	This assemblage usually merges with the higher “savannas”. Where they occur in forested areas and have no drainage channel, they are locally known as “sibals”
Frequent plant species	A graminoid ecosystem often with *Phragmites australis* and/or *Cladium jamaicense, Ludwigia* spp. and a variety of herbaceous species occurs. There is a noticeable shrub component with *Bucida buceras*, *Crescentia cujete*, and *Acoelorrhaphe wrightii*.
Faunistic comments	
References	Rejmánková et al. 1996, Iremonger and Brokaw 1995: III.1.1.1. Picture: Commerce Bight Lagoon, Stann Creek District. J. Meerman

Legend Code	**72**
UNESCO Classification code	**VII.C.1.**
Name	**Rooted floating leaf communities of fresh water lakes**
Altitude	< 100 m.
Geology and soil	Variable
Water regime	Inundated year through but water level may fluctuate strongly. Some lakes my occasionally dry up during the dry season.
Rainfall	NA
Fire exposure	None
Description 	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.
Frequent plant species	Typical species include *Nymphaea ampla*, free floating *Utricularia* spp. and blue green algae The shores are often rimmed with *Eleocharis* spp.
Faunistic comments	
References	Rejmánková et al. 1996 Picture: New River Lagoon, Orange Walk District. J. Meerman

Legend Code	**73**
UNESCO Classification code	**VII.D.1.**
Name	**Rooted underwater communities of fresh water lakes**
Altitude	0-500 m.
Geology and soil	Variable
Water regime	Inundated year through but water level may fluctuate strongly. Some lakes my occasionally dry up during the dry season.
Rainfall	NA
Fire exposure	None
Description	Not mapped. Related to VIIC1: Rooted floating leaf communities of fresh water lakes, but without the floating leaf component. Little researched in Belize and mostly too limited in extend to be mapped.
Frequent plant species	No data available
Faunistic comments	
References	Cabrera & Sanchez, 1994.

Legend Code	**74**
UNESCO Classification code	**VII.D.2.**
Name	**Rooted underwater communities of flowing water**
Altitude	< 100 m.
Geology and soil	Variable
Water regime	Inundated year through but water level may fluctuate strongly.
Rainfall	NA
Fire exposure	None
Description	Related to VIIC1: Rooted floating leaf communities of fresh water lakes, but in flowing water and without the floating leaf component. Little researched in Belize and mostly too limited in extend to be mapped.
Frequent plant species	Not mapped Common species in the New River include V*allisneria americana* and *Cabomba palaeformis.*
Faunistic comments	Habitat of the endangered Central American River Turtle *Dermatemys mawi.*
References	Cabrera & Sanchez, 1994.

Legend Code	**75**
UNESCO Classification code	**VIII.A.**
Name	**Seagrass beds**
Altitude	Below sealevel.
Geology and soil	Marine deposits
Water regime	Inundated through the year. Tidal fluctuations limited to < 30 cm.
Rainfall	NA
Fire exposure	None
Description	Seagrass beds are found mainly in the shallow lagoon between mainland Belize and the barrier reef. But are also found near the offshore atolls.
Frequent plant species	Turtle grass *Thalassia testudinum* is the dominant species. Other species are *Syringodium filiforme, Halodule wrightii* and *Halophila baillonis.*
Faunistic comments	Seagrass beds are of critical importance to the West Indian Manatee *Trichechus manatus*.
References	Wantland and Pusey, 1975; Burke, 1982

Legend Code	**76**
UNESCO Classification code	**S.A.**
Name	**Waterbodies**
Altitude	NA
Geology and soil	Variable
Water regime	Mostly permanently inundated.
Rainfall	NA
Fire exposure	None
Description	This ecosystem grouping contains a variety of aquatic habitats. Depending on location, the water may be saline, brackish or fresh.
Frequent plant species	Variable, according to the water type
Faunistic comments	The Morelet's Crocodile *Crocodylus moreletii* is just one of the many species that inhabit this variable ecosystem
References	

Legend Code	**77**
UNESCO Classification code	**S.A.1.a.**
Name	**River**
Altitude	NA
Geology and soil	Variable
Water regime	Flowing fresh water
Rainfall	NA
Fire exposure	NA
Description	See also VIID2 (Rooted underwater communities of flowing water)
Frequent plant species	See also VIID2 (Rooted underwater communities of flowing water)
Faunistic comments	
References	

Legend Code	**78**
UNESCO Classification code	**S.A.1.d.(2).**
Name	**Caribbean Coral Reefs**
Altitude	Below sealevel.
Geology and soil	NA
Water regime	Below sealevel.
Rainfall	NA
Fire exposure	None
Description	The Belize Barrier Reef is the largest in the Western Hemisphere. It extends for approximately 220 -250 km. To the east of the barrier reef, lie three coral atolls separated from the barrier reef by water 360 - 1100 m deep. Fringing reefs are restricted to the coastal area of the South of Belize. Although vegetation is not the main component of the reef, the reef is a very important ecosystem in Belize.
Frequent plant species	NA
Faunistic comments	A total of 65 coral species have been identified for Belize including 53 reef-building species.
References	

Legend Code	**79**
UNESCO Classification code	**SPA.**
Name	**Agro-productive systems**
Altitude	NA
Geology and soil	Variable. Mechanized agriculture is usually practiced in the, heavier, lowland clays while shifting cultivation focusses on the better drained hillslopes
Water regime	Variable
Rainfall	NA
Fire exposure	
Description	Agro-productive systems include all forms of agriculture. Different agricultural practices are not always easy to classify on the basis of satellite imagery alone, and most areas under agriculture have been lumped under this common denominator.
Frequent plant species	Depending on agricultural system. Mostly "weedy" species.
Faunistic comments	
References	

Legend Code	**80**
UNESCO Classification code	**SPA.(1).**
Name	**Shifting cultivation including unimproved pasture**
Altitude	NA
Geology and soil	Variable. Shifting cultivation is concentrated on better drained hillslopes
Water regime	Mostly where natural drainage is good.
Rainfall	NA
Fire exposure	Frequent. Fire is an integral part of the agricultural practice in smallholder agriculture.
Description	Shifting cultivation called "milpa" in Belize is a system by which a parcel of forest is cut, burned and manually farmed for one or rarely more seasons. The following season another piece of forest is cut. Milpa farmers prefer old-growth forest for this activity for the ease of felling and the lack of weed seeds stored in the soil. Technically, the farmers would move on through the forest and allow the old cleared fields to regenerate, leaving the ecological functions of the area more or less intact. But due to increasing population pressure, most farmers are now forced to return to the original field (which is now in dense secondary growth or "guamil") within 6 years or even less. As a result, areas with shifting cultivation are seeing an intensivation of felling and burning and large areas now exist with barely any older growth forest left. Such areas quickly become ecologically degraded although their ecological value remains higher than in mechanized agriculture systems. The main disadvantage of the shifting cultivation system is the use of fire, which is typically ill-contained and tends to unintentionally burn large areas of old-growth forest, especially in hilly areas. Unimproved pasture is technically a shifting cultivation system by which land is cleared for pasture. Usually the pasture degrades after a few years and is then abandoned. Due to the longer period of use and the compacting activity of the livestock, the resulting secondary forest is usually slower to regenerate and poorer in species composition.
Frequent plant species	Typical components of extensively used pastures include fire-resistant species such as *Guazuma ulmifolia*, *Thevetia ahouai* and the palm *Acrocomia aculeata*.
Faunistic comments	
References	

Legend Code	**81**
UNESCO Classification code	**SPA.(2).**
Name	**Mechanized agriculture**
Altitude	NA
Geology and soil	Variable. Mechanized agriculture is usually practiced in the, heavier, lowland clays.
Water regime	Variable
Rainfall	NA
Fire exposure	None
Description	Extensive areas of mechanized agriculture are found in Little Belize, Blue Creek (Corozal), Shipyard and Spanish Lookout. Major crops include Corn, Beans and Rice.
Frequent plant species	Little or no natural vegetation remains in areas with mechanized agriculture.
Faunistic comments	
References	

Legend Code	**82**
UNESCO Classification code	**SPA.(2).b.**
Name	**Semi-woody perennial crops (e.g. banana and papaya)**
Altitude	NA
Geology and soil	Bananas as an export crop are usually cultivated on alluvial soils
Water regime	Often irrigated
Rainfall	NA
Fire exposure	None
Description	Not mapped Bananas as an export crop are cultivated mostly in the South of Belize. Banana fields are typically constructed in floodplains and are dependent on irrigation. Papaya's as an export crop are usually grown on a smaller scale than Banana's
Frequent plant species	Due to the intensive nature of the crop production, which involves large amounts of herbicides, fungicides and fertilizers, virtually no natural vegetation remains in Banana areas.
Faunistic comments	
References	

Legend Code	**83**
UNESCO Classification code	**SPA.(2).c.**
Name	**Woody perennial crops (e.g. mango, citrus)**
Altitude	NA
Geology and soil	Variable
Water regime	Variable
Rainfall	NA
Fire exposure	None
Description	Citrus is an expanding crop in Belize. Both Mango and Citrus provide a form of "canopy" and are thus probably less disruptive for wildlife than other forms of agriculture.
Frequent plant species	In spite of herbicide applications, some natural vegetation elements can be surprisingly resilient in this system.
Faunistic comments	
References	

Legend Code	**84**
UNESCO Classification code	**SPA.(2).d.**
Name	**Improved pasture**
Altitude	NA
Geology and soil	Variable
Water regime	Variable
Rainfall	NA
Fire exposure	None
Description	Not mapped Improved pasture is often associated with complete removal of the original vegetation with subsequent planting of exotic grass species.
Frequent plant species	Some tall survivors of the original vegetation may remain. Notable are *Ceiba pentandra, Attalea cohune* and *Roystonea regia*. In the western part of the Cayo district the “Bong” palm *Sabal mexicana* is a noticeable component.
Faunistic comments	
References	

Legend Code	**85**
UNESCO Classification code	**SPA.(3).**
Name	**Forest plantations**
Altitude	NA
Geology and soil	Variable
Water regime	Variable
Rainfall	NA
Fire exposure	Fire is an unwanted but frequent phenomenon in most forest plantations.
Description	Forest plantations have never become popular in Belize. The continuous threat of hurricanes creates a great risk to this type of long-term investment. The most important forest plantations involve Caribbean Pine *Pinus caribaea*. Some experiments have taken place with mahogany *Swietenia macrophylla*, gmelina *Gmelina arborea* and teak *Tectona grandis*. Most of these hardwood plantations are now abandoned and many of them have been cleared for agriculture. Near Dolores in the Toledo district, the remnants of a more than 100-year-old para rubber *Hevea brasiliensis* plantation can be found.
Frequent plant species	*Pinus caribaea* is the most commonly cultivated tree. Some small plantations with *Gmelina arborea* and/or *Tectona grandis* exist. Most of these plantations have an understory of plants similar to the more natural forests in the same area.
Faunistic comments	
References	

Legend Code	**86**
UNESCO Classification code	**SPC.1.**
Name	**Aquaculture: Fish ponds and shrimp farms**
Altitude	< 50 m
Geology and soil	Usually constructed near the sea on "savanna" soils. Consequently often in short-grass savanna habitats
Water regime	Artificial
Rainfall	NA
Fire exposure	None
Description	Most of the aquatic farming systems refer to Shrimp farms. Shrimp farms are typically constructed in coastal regions with short grass savanna VA2b(2).
Frequent plant species	
Faunistic comments	Shrimpfarms are often actrative to a variety of shorebirds
References	

Legend Code	**87**
UNESCO Classification code	**U**
Name	**Urban**
Altitude	NA
Geology and soil	NA
Water regime	NA
Rainfall	NA
Fire exposure	NA
Description	
Frequent plant species	
Faunistic comments	
References	