

6. VEGETATION OF LITTLE CAYMAN

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Although the vegetation of Little Cayman has not been previously described, the island belongs to the class of low, dry, limestone islands in the Caribbean which has attracted much attention. Beard (1944, 1949, 1955) provides a classification of the vegetation and descriptions of the Windward and Leeward Islands which many subsequent workers have used as a model. Similar treatments have been provided for limestone areas in Jamaica (Asprey and Robbins 1953, Loveless and Asprey 1957, Asprey and Loveless 1958), Cuba (Seifrizz 1943, Howard and Briggs 1953), Antigua (Loveless 1960, Harris 1965), Barbuda (Harris 1965, Stoddart, *in litt.*), Anguilla (Harris 1965), and Anegada (D'Arcy 1971, 1975). Coastal strand vegetation similar to that of Little Cayman has been widely described in the Caribbean and the Gulf of Mexico (Sauer 1959, 1967, Poggie 1962). Dr J.D. Sauer has included three Little Cayman transects in a study of coastal vegetation of the Cayman Islands which he began in 1962 and which will in due course lead to a major publication.

This chapter is divided into four parts on a largely empirical basis. The first treats inland vegetation communities on limestone, the second coastal communities, and the third mangrove communities. Beard's scheme is followed for the limestone areas, though it seems less appropriate for coastal vegetation and covers mangrove communities only in broad outline. The fourth section outlines a classification of terrestrial habitats of broad ecological significance on Little Cayman (Figure 21).

A. Inland communities on limestone

The vegetation of Little Cayman, other than the coastal and swamp communities, falls within the general class of Dry Evergreen Formations recognised by Beard (1944), extended and defined by Beard (1949), and revised by Beard (1955). Dry Rain Forest, originally termed Xerophytic Rain Forest (Beard 1944), is not found in the Cayman Islands. Four other types can, however be recognised: Dry Evergreen Forest, Dry

Evergreen Woodland, Dry Evergreen Thicket, and Evergreen Bushland. In a continually varying and also little known and generally inaccessible vegetation such as that of Little Cayman, where communities are floristically diverse but where many species are represented in different vegetation types, it is difficult to assign limits to these categories. Harris (1965) found a similar difficulty in Antigua, Anguilla and Barbuda (though all these islands have vegetation much modified by man), and combined the Dry Evergreen Woodland and Evergreen Bushland in a single category of Evergreen Woodland. Some confusion also arises from the fact that Asprey and Robbins (1953, 380-383) describe a Dry Limestone Scrub Forest with *Bursera* as an emergent, which clearly has parallels in Little Cayman, but equate it with Beard's Semi-Evergreen Seasonal Forest, one of his Seasonal rather than Dry Evergreen Formations. A variant of their category of Dry Limestone Scrub Forest is an Arid Limestone Scrub Forest on dissected coastal limestone (1953, 383-384), which also has Cayman counterparts.

1. Dry Evergreen Forest

Beard (1949, 80) did not originally describe this type in detail because "the bulk of the woodland which appears to belong to this type is very heavily damaged and it is not possible to form any reliable conception of the original structure"; he associated it with mean annual rainfalls of 1270-2000 mm, higher than those of Little Cayman. Tall woodland in the interior of Little Cayman, south of Sparrowhawk Hill (Plate 37), meets Beard's (1955, 92) diagnosis of "crowded, slender trees reaching 12 to 20 metres in height above which an occasional emergent reaches 30 metres. Leaves are simple and evergreen, the majority being stiff and fleshy, a high proportion with latex or essential oil. Bark-shedding may be a conspicuous feature. The shrub and herb layers are poorly represented." The forest occurs on a flat-lying limestone area about 4-5 m above sea-level. The ground surface is undissected, and has a considerable soil and litter cover. The dominant big trees are *Bumelia salicifolia*, *Calypttranthes pallens* and *Chionanthus* sp., forming a canopy at 8-10 m. In spite of their height, most of the trees are slender and closely-spaced. A number of shrubby species are present, but the forest is relatively open and easy to walk through. The following species were noted:

| | | |
|---------|-------------------------------|-----------------------------------|
| Trees: | <i>Bumelia salicifolia</i> | <i>Croton nitens</i> |
| | <i>Bursera simaruba</i> | <i>Erythroxylum rotundifolium</i> |
| | <i>Calypttranthes pallens</i> | <i>Hypelate trifoliata</i> |
| | <i>Canella winterana</i> | <i>Myrcianthes fragrans</i> |
| | <i>Chionanthus</i> sp. | <i>Tabebuia heterophylla</i> |
| Shrubs: | <i>Allophylus cominia</i> | <i>Croton lucidus</i> |
| | <i>Amyris elemifera</i> | <i>Jacquinia berterii</i> |
| | <i>Argythamnia proctorii</i> | <i>Malvaviscus arboreus</i> |
| | <i>Chiococca alba</i> | <i>Maytenus buxifolia</i> |
| | <i>Colubrina elliptica</i> | <i>Randia aculeata</i> |
| Herbs: | <i>Lasiacis divaricata</i> | <i>Paspalum blodgettii</i> |

Succulent: *Agave sobolifera*

Epiphytes: *Schomburgkia brysiانا* *Tillandsia* spp.

The *Agave* is rare, and cacti are apparently absent, as are ferns. The limits of the forest are conjectural, but probably coincide with the 20 ft contour south of Sparrowhawk Hill on the 1:25,000 map. Northwards the forest ends in a limestone ridge covered with Dry Evergreen Thicket; to the south and east it passes into dissected low-lying limestone terrain with *Conocarpus* and *Laguncularia* scrub.

2. Dry Evergreen Woodland

This is described by Beard (1955) as a two-storey woodland of densely packed attenuated trees forming a canopy at 6-12 m, with emergents reaching 20 m; it is not very clearly distinguished from Dry Evergreen Forest. In 1955 Beard equated it with Littoral Woodland, but it is more useful here to maintain the latter as a separate component of coastal vegetation.

Dry Evergreen Woodland is used here to denote a more open and lower woodland than Dry Evergreen Forest, characteristically found on gently sloping terrain associated with the Marl Facies of the Ironshore Formation (Plate 39). Much of the surface is bare rock, but it is relatively undissected, and where the Marl Formation gives way to dissected Bluff Limestone there is an abrupt transition from Dry Evergreen Woodland to Dry Evergreen Thicket. The woodland is also found in more protected situations, such as northwest, west and south-facing slopes. The woodland is found on terrain rising to 6.5 m above sea-level at Paradise End (O45781), to 12.5 m inland from Jackson's Bay (977767), and to 13 m inland from Salt Rocks (944749). The most conspicuous tree species is *Bursera simaruba*. Characteristic species of Dry Evergreen Thicket, such as *Plumeria obtusa*, *Cephalocereus* and *Agave*, are inconspicuous in the woodland. Inland from Salt Rocks, the woodland extends down to the coast (in most areas it is separated from the coast by a zone of lagoon, swamp and beach ridge), and the following species were noted:

| | | |
|---------|---------------------------------|----------------------------------|
| Trees: | <i>Bursera simaruba</i> | <i>Ficus aurea</i> |
| | <i>Canella winterana</i> | <i>Guapira discolor</i> |
| | <i>Citharexylum fruticosum</i> | <i>Metopium toxiferum</i> |
| | <i>Coccoloba uvifera</i> | <i>Picrodendron baccatum</i> |
| | <i>Cordia gerascanthus</i> | <i>Tabebuia heterophylla</i> |
| | <i>Cordia sebestena</i> | <i>Trichilia glabra</i> |
| | <i>Croton nitens</i> | <i>Swietenia mahagoni</i> |
| Shrubs: | <i>Adelia ricinella</i> | <i>Jacquinia berterii</i> |
| | <i>Argythamnia proctori</i> | <i>Malvaviscus arboreus</i> var. |
| | <i>Ateramnus lucidus</i> | <i>cubensis</i> |
| | <i>Calypttranthes pallens</i> | <i>Maytenus buxifolia</i> |
| | <i>Capparis flexuosa</i> | <i>Phyllanthus angustifolius</i> |
| | <i>Coccothrinax jamaicensis</i> | <i>Savia erythroxyloides</i> |
| | <i>Colubrina elliptica</i> | |

Vines: *Capparis flexuosa* *Ipomoea macrantha*
 Ipomoea acuminata

Grass: *Lasiacis divaricata*

Many of the tree species are identical with those of the Dry Evergreen Forest; some, notably *Coccoloba uvifera* and *Cordia sebestena*, are present only because of the coastal situation of this locality and are not present elsewhere in Dry Evergreen Woodland.

3. Dry Evergreen Thicket

This vegetation type, one of the most common on Bluff Limestone of Little Cayman, did not appear in Beard's earlier classifications and was first recognised by him in 1955; in that paper, however, he did equate it with his earlier categories (1944) of Littoral Thicket and Littoral Hedge, though it is more convenient in the case of Little Cayman to treat these latter separately as component of coastal vegetation. Beard described Dry Evergreen Thicket as a two-storey thicket "with a low, open, or dense canopy and a dense or sparse undergrowth". The canopy is at 6-12 m, with occasional emergents, and the trees are slender. Dry Evergreen Thicket has been further described from south Jamaica, with a canopy at 5-11 m and emergents to 16 m (Loveless and Asprey 1957, 813-815), and from Antigua, where it comprises "a dense shrub layer about 2-4 m (7-13 ft) high, overtopped by scattered but more or less uniformly distributed trees reaching a height of 7-8 m (23-26 ft)", with *Agave*, *Opuntia* and *Cephalocereus* (Loveless 1960, 511-513). In Antigua it occurs in areas with a mean annual rainfall of less than 900 mm.

Dry Evergreen Thicket as previously recognised is thus a rather variable entity, and on Little Cayman it also varies in height, density and composition, at least partly in response to aspect and exposure (Plate 38).

(a) Seaward slopes of Bluff Limestone ridges

Along much of the north-facing coast of Little Cayman there is a flat terrace or gently slope of dissected Bluff Limestone 150-200 m wide and rising up to 5 m above sea-level, situated between the coastal swamp and the Bluff Limestone ridge, covered with open Dry Evergreen Thicket. Trees are only 3-4 m tall, and as in the case of *Bursera simaruba* may be severely deformed above this level. Three other very characteristic taller species are *Plumeria obtusa*, *Cephalocereus swartzii* and *Agave sobolifera* (Plate 40). *Guapira discolor* is a very common tree, and *Savia erythroxyloides* the most abundant shrub. This open thicket is very similar to that described from the northern Lesser Antilles, e.g. Barbuda, except that the spherical cacti *Melocactus intortus* and *Mammillaria nivosa* are absent from the Cayman Islands.

The following species were noted in this habitat on the northern side of Sparrowhawk Hill (003781):

| | | |
|-------------|------------------------------|-------------------------------|
| Trees: | <i>Guapira discolor</i> | <i>Plumeria obtusa</i> |
| | <i>Guettarda elliptica</i> | <i>Tabebuia heterophylla</i> |
| | <i>Myrcianthes fragrans</i> | |
| Shrubs: | <i>Amyris elemifera</i> | <i>Evolvulus arbuscula</i> |
| | <i>Bauhinia divaricata</i> | <i>Jacquinia berterii</i> |
| | <i>Calyptranthes pallens</i> | <i>Phyllanthus nutans</i> |
| | <i>Croton linearis</i> | <i>Randia aculeata</i> |
| | <i>Croton lucidus</i> | <i>Savia erythroxyloides</i> |
| | <i>Erithalis fruticosa</i> | <i>Strumpfia maritima</i> |
| Succulents: | <i>Agave sobolifera</i> | <i>Cephalocereus swartzii</i> |

(b) Dissected Bluff Limestone ridge

The Bluff Limestone ridge is a linear feature, parallel to the north coast, reaching its greatest elevations of 6-13 m about 200-400 m inland. It is deeply dissected, with many depressions more than 2 m deep, and with cliff faces of the same amplitude. The thicket is more dense than on the seaward slopes, and there are more tree species identical with those of Dry Evergreen Forest and Dry Evergreen Woodland. The littoral shrub *Strumpfia maritima* disappears, but *Bursera*, *Plumeria*, *Cephalocereus* and *Agave* remain characteristic. The following species were noted at Sparrowhawk Hill (004780):

| | | |
|-------------|------------------------------|-----------------------------------|
| Trees: | <i>Bursera simaruba</i> | <i>Hypelate trifoliata</i> |
| | <i>Canella winterana</i> | <i>Myrcianthes fragrans</i> |
| | <i>Cordia gerascanthus</i> | <i>Plumeria obtusa</i> |
| | <i>Cordia sebestena</i> | <i>Schoepfia chrysophylloides</i> |
| | <i>Guapira discolor</i> | <i>Tabebuia heterophylla</i> |
| | <i>Guettarda elliptica</i> | |
| Shrubs: | <i>Bauhinia divaricata</i> | <i>Phyllanthus angustifolius</i> |
| | <i>Calyptranthes pallens</i> | <i>Savia erythroxyloides</i> |
| | <i>Erithalis fruticosa</i> | <i>Tournefortia volubilis</i> |
| | <i>Jacquinia berterii</i> | |
| Succulents: | <i>Agave sobolifera</i> | <i>Cephalocereus swartzii</i> |
| Epiphytes: | <i>Schomburgkia brysiata</i> | <i>Tillandsia</i> spp. |

(c) Inland slopes of Bluff Limestone ridge

The inland slopes of the Bluff Limestone ridge are of variable steepness and height, and in places cliffy. Their main characteristic, however, is that they are much more protected than seaward-facing slopes, and this results in taller, denser thicket with many more epiphytes. The vegetation of this habitat at Sparrowhawk Hill is adjacent to the Dry Evergreen Forest of the centre of the island and it includes tall trees of species common to that woodland (*Bumelia*, *Amyris*, *Chionanthus*). Species present include:

| | | |
|-------------|--------------------------------|------------------------------|
| Trees: | <i>Allophylus cominia</i> | <i>Bumelia glomerata</i> |
| | <i>Amyris elemifera</i> | <i>Bumelia salicifolia</i> |
| | <i>Antirhea lucida</i> | <i>Chionanthus</i> sp. |
| | <i>Ficus aurea</i> | <i>Plumeria obtusa</i> |
| | <i>Guapira discolor</i> | <i>Tabebuia heterophylla</i> |
| | <i>Guettarda elliptica</i> | <i>Zuelania quidonia</i> |
| | <i>Myrcianthes fragrans</i> | |
| Shrubs: | <i>Bauhinia divaricata</i> | <i>Gyminda latifolia</i> |
| | <i>Bourreria venosa</i> | <i>Jacquinia berterii</i> |
| | <i>Colubrina asiatica</i> | <i>Phyllanthus nutans</i> |
| | <i>Croton linearis</i> | <i>Randia aculeata</i> |
| Herbs: | <i>Paspalum blodgettii</i> | <i>Salvia occidentalis</i> |
| Succulents: | <i>Agave sobolifera</i> (rare) | |
| Epiphytes: | <i>Schomburgkia brysiana</i> | <i>Tillandsia</i> spp. |

4. Evergreen Bushland

This category was introduced by Beard in 1949 (82-84), taking the vegetation of Barbuda as a type example. Beard quoted Warming's (1909) description of "a grey, desolate, useless and scorching bushland between whose thorny tangled shrubs and low trees one cannot penetrate without the use of an axe" (a description which also applies to much of the Dry Evergreen Thicket). Evergreen Bushland forms a low woodland, 3-9 m tall, consisting of a "dense impenetrable growth of gnarled, little trees and bushes with hard evergreen leaves". On Barbuda the trees include *Tabebuia pallida*, *Buceras bucida* and *Guettarda scabra*, with bromeliads (though no mosses or ferns), *Agave* and cacti. D'Arcy (1975) assigns the vegetation of Anegada to this category, though it has been heavily disturbed by grazing; according to Beard (1949) the sub-climaxes resulting from disturbance of Evergreen Bushland are various thorny thickets. Evergreen Bushland is also described by Loveless and Asprey (1957, 809-813) from south Jamaica, where it has a uniform height of 4 m, with emergents (mainly *Bursera*) reaching 7-8 m, and by Loveless (1960) from Antigua.

Evergreen Bushland covers much of the western end of Little Cayman, on undulating but generally low and moderately dissected terrain; very low and heavily dissected limestone in contrast is covered with *Conocarpus* scrub. It is well seen along the trans-island track north of Blossom Village, where the land lies at 2-3 m above sea-level. This area has certainly been much modified by grazing and cultivation, but it is not possible to estimate the effect of this on the vegetation. *Plumeria*, *Agave* and *Bursera* are present but much less conspicuous than elsewhere. Shrubs include *Jacquemontia berterii*, *Evolvulus arbuscula* and *Strumpfia maritima*, together with many weedy species. Clumps of the leather fern *Acrostichum aureum* nestle in solution holes (Plate 41) in the limestone in exactly the same way as Fosberg (1971) has described for Aldabra Atoll; usually this fern (which is the only one recorded for Little Cayman) is associated with sea-level mangrove swamps.

B. Coastal vegetation

In addition to swamp vegetation, mainly mangrove, in coastal situations, Beard (1949, 84-87) distinguished as one of his Dry Evergreen Formations the category of Littoral Woodland as "a series of closely associated formations", including Littoral Hedge, with several sub-climaxes (sand dune, salt flats, rock pavements, rocky slopes). Subsequently he equated (1955) Littoral Woodland with Dry Evergreen Woodland, and Littoral Thicket and Littoral Hedge with Dry Evergreen Thicket. Asprey and Loveless (1958) in north Jamaica separated coastal rock from coastal sand communities, within the general category of Littoral Woodland. This division was broadly followed by Loveless (1960), in Antigua, who, however, considered strand communities to be edaphic climaxes rather than seral stages of the kind envisaged by Davis (1942), Asprey and Robbins (1953) and Beard (1949). The Asprey and Loveless scheme included:

On sandy substrates:

- Herbaceous pioneer
- Strand scrub
- Strand woodland

On rocky substrates:

- Littoral rock pavement
- Littoral hedge
- Littoral evergreen bushland
- Littoral palm thicket

The distinction between Littoral Hedge and Strand Scrub is not a clear one on Little Cayman; and a single category for Littoral Rock Pavement vegetation, though adopted by Howard (1950) in variable terrain, cannot properly encompass the topographic and vegetational variation found in rocky coastal situations. Here we use a purely empirical scheme specific to Little Cayman:

- Strand community on sandy beach
- Strand community on cobble beach
- Coastal sand flats
- Rock pavement community
- Steep rocky coast community

1. Strand community on sandy beach

Beaches on Little Cayman are variable in width and height, but most are protected by offshore reef and are low and narrow. Offshore beachrock indicates limited beach retreat in recent years round much of the coast. Ten sand beach areas were studied (Figure 3), and the following species were represented:

| | | |
|-------------|---------------------------------------|--------------------------------|
| Trees: | <i>Avicennia germinans</i> | <i>Laguncularia racemosa</i> |
| | <i>Casuarina equisetifolia</i> | <i>Morinda citrifolia</i> |
| | <i>Coccoloba uvifera</i> | <i>Rhizophora mangle</i> |
| | <i>Cocos nucifera</i> | <i>Terminalia catappa</i> |
| | <i>Cordia sebestena</i> | <i>Thrinax radiata</i> |
| Shrubs: | <i>Borrchia arborescens</i> | <i>Scaevola plumieri</i> |
| | <i>Caesalpina</i> sp. | <i>Suriana maritima</i> |
| | <i>Colubrina asiatica</i> | <i>Mallotonia gnaphalodes</i> |
| | <i>Conocarpus erecta</i> | |
| Herbs: | <i>Ambrosia hispida</i> | <i>Ipomoea macrantha</i> |
| | <i>Cakile lanceolata</i> | <i>Ipomoea pes-caprae</i> |
| | <i>Canavalia rosea</i> | <i>Philoxerus vermicularis</i> |
| | <i>Cassiytha filiformis</i> | <i>Salicornia bigelovii</i> |
| | <i>Euphorbia mesembrianthemifolia</i> | |
| | <i>Hymenocallis latifolia</i> | <i>Sesuvium portulacastrum</i> |
| Grasses and | <i>Cenchrus echinatus</i> | <i>Spartina patens</i> |
| sedges: | <i>Cyperus</i> spp. | <i>Sporobolus virginicus</i> |

Where the natural vegetation has not been cleared, the beach crest is typically occupied by a 'Littoral Hedge', which as defined by Beard (1949, 84) "consists of a dense matted, and interlaced, woody growth of gnarled bushes usually of distorted form. Their height is variable, from a few inches to several feet, depending upon the force of the wind and available soil depth". As used by Asprey and Loveless (1958) in north Jamaica, the term is confined to rocky shores, where the hedge comprises many species, is 60 cm to 2 m tall, is wind-sheared in profile, and cut into windrows in plan. 'Littoral hedge', however, describes perfectly the appearance of the zone of *Coccoloba uvifera* at the beach crest, reaching 5 m in height but usually less than 50 m wide. It is wind-sheared in profile but not cut into windrows (Plate 42). It forms a dense and impenetrable scrub, with the ground surface devoid of other plants but covered with drying *Coccoloba* leaves. It corresponds to and in appearance closely resembles the *Scaevola taccada* hedge described from many Indo-Pacific atolls (e.g. Stoddart 1971, 135; 1975, 98). Trees of *Terminalia catappa*, *Cordia sebestena* and *Cocos* are occasionally found in the *Coccoloba*, but the hedge is essentially monospecific, in contrast to the array of species originally described from this community by Beard (1949, 85); some of Beard's species (*Chrysobalanus icaco*, *Erithalis fruticosa*) are present in Little Cayman, but not as a component of the littoral hedge.

Between the *Coccoloba* hedge and the sea there may be a shrub zone of variable width, dominated by *Suriana maritima*; this may be only the width of a single shrub, or in protected situations (as at West Point) it forms a scrub 2 m tall and 50-100 m wide. *Tournefortia* (*Mallotonia*) and *Scaevola plumieri* are occasionally present as scattered shrubs 1-2 m tall, but *Sophora tomentosa* has yet to be recorded on the island, though present on Grand Cayman.

Where undisturbed, the *Coccoloba* woodland and *Suriana* scrub reach down to the swash line, and pioneer herbaceous species are absent. At Sandy Point in the southeast (086785), however, the beach is aggrading and there is a more open mosaic of shrubs (*Scaevola*, *Tournefortia*, *Suriana*, *Caesalpinia*), occasional *Cordia*, and a patchy ground cover of pioneer *Cakile lanceolata*, *Sesuvium portulacastrum* and *Sporobolus virginicus*, with, inland, *Ipomoea macrantha*, *Euphorbia mesembrianthemifolia*, *Hymenocallis litorea*, and *Cenchrus* (Plate 43). Where the *Coccoloba* hedge has been cleared, a similar diverse mosaic of shrubs, herbs and grasses is developed. Common species are *Sesuvium*, *Ipomoea pes-caprae*, *Spartina patens* and *Sporobolus* at the beach crest, and, on the berm, *Sesuvium*, *Philoxerus*, *Ambrosia*, *Ipomoea macrantha*, *Cenchrus*, *Hymenocallis*, and the following shrubs: *Suriana*, *Scaevola*, *Tournefortia*, *Borrchia arborescens*, *Conocarpus erecta*, and low *Coccoloba*. There are young trees of *Casuarina equisetifolia* along the beach at Wearis Bay, but no mature groves of these trees on Little Cayman, in contrast to Grand Cayman where it forms a distinctive though restricted coastal woodland.

Notable variants of the above patterns occur at two main localities, round Bloody Bay on the north coast, and both east and west of Diggary's Point on the south, as well as occasionally elsewhere. Here, in protected situations, the coast is formed of alternating small low projections, consisting of rubble or rocky outcrops, and intervening bays with narrow low sandy beaches. The promontories support small patches of scrub of *Conocarpus* and *Laguncularia*, with occasional *Avicennia* and *Rhizophora*, and a herb mat of *Sesuvium*, *Philoxerus* and *Salicornia*. The sandy intervening bays have an irregular scrub of *Borrchia*, *Conocarpus* and *Suriana*, with *Sesuvium* and *Spartina patens*. Similar vegetation is found in the eastern part of South Hole Sound where the coast is not fringed by mangroves.

2. Strand community on cobble beach

This is difficult in many places to distinguish from the sand beach community, because in many places a modern sand beach fronts an older cobble and rubble ridge, so that frequently there is a zonation of sandy communities closest to the sea and of cobbles a few metres inland. *Suriana maritima* is often associated with the sandy strips or pocket beaches, and *Coccoloba* with the cobble ridges. Greatest diversity is found on the sand patches, which carry *Ambrosia*, *Ipomoea*, *Sesuvium*, *Hymenocallis* and *Borrchia*. Associated with *Coccoloba* on cobbles are *Morinda*, *Thespesia* and *Hymenocallis*. Where the scrub has been cleared from this rough terrain, the vegetation usually consists of thick deceptive mats of *Sesuvium*, *Ambrosia* and *Cassytha*.

3. Coastal sand flats

These form a laterally continuous zone (except for the Bluff Limestone outcrop at East End and the Salt Rocks Ironshore at the west end) round the entire island. The surface slopes gradually inland from the beach-ridge crest, and may be irregular because of the presence of either blown sand or rubble lobes. The flats are usually 50-100 m wide,

and never more than 200 m, and they are usually less than 2.5 m above sea-level. Except for a section of tall woodland at Spot Bay (950757), all the coastal flats have been cleared at some stage and are now occupied by secondary scrub, coconut plantation, or newly cleared ground. The Spot Bay woodland is probably the last surviving remnant of Littoral Woodland on any of the three Cayman Islands, and is thus of considerable interest. It includes tall trees of *Swietenia mahagoni* (reaching 15 m), and *Bursera simaruba*, with *Dalbergia ecastaphyllum*, *Cordia sebestena*, *Terminalia*, *Coccoloba uvifera*, and *Jacquinia berterii*. *Coccoloba* forms a hedge along the seaward side.

The secondary scrub consists of strand shrubs and trees (*Suriana*, *Tournefortia*, *Coccoloba*, *Cordia*, *Chrysobalanus*, *Conocarpus*), together with abundant *Lantana*, *Colubrina asiatica*, *Gossypium*, *Caesalpinia*, and some *Comocladia dentata*. At Jackson's Bay (976771) *Conocarpus* reaches a height of 5 m, *Suriana* and *Coccoloba* 3-4 m, and *Caesalpinia* 2 m. In places this secondary scrub is extremely dense. Elsewhere it is interrupted by more open ground, where strand herbs and grasses (*Euphorbia mesembrianthemifolia*, *Ipomoea pes-caprae*, *Cyperus* spp., *Ambrosia*, *Ernodea littoralis*, *Cassyttha*, *Canavalia*, *Sporobolus*) are joined by weedy species such as *Bryophyllum*, *Abrus*, *Portulaca* and *Stachytarpheta*. *Rhynchelytrum repens* is conspicuous along roadsides, especially in the northeast, and is evidently a recent coloniser since it was not recorded by the Oxford Expedition in 1938.

Coconut plantations are limited to the west of Blossom Village, to Crawl Bay, to Owen Island, and to a few groves in other localities. Bud-rot disease has been present on Little Cayman since 1913, and many trees are dead and decapitated, especially near Blossom Village and on Owen Island (Plates 44 and 45). Owen Island itself (Figure 22) is covered partly by coconut plantation, partly by a dense scrub of discrete patches of *Coccoloba* (up to 8 m tall), *Laguncularia* and *Cordia*, with *Conocarpus* and *Thespesia* and scattered *Thrinax*. Areas near the shores have a low scrub of *Borrchia*, *Tournefortia*, *Conocarpus* and *Colubrina*, and there are small groves of *Rhizophora* and *Avicennia* on sheltered beaches. The herbaceous ground cover in the coconut plantation is diverse. *Melanthera aspera* and *Wedelia trilobata* are very common, as are the following species:

| | |
|---------------------------------------|--------------------------------|
| <i>Ambrosia hispida</i> | <i>Ipomoea macrantha</i> |
| <i>Boerhavia erecta</i> | <i>Ipomoea pes-caprae</i> |
| <i>Canavalia rosea</i> | <i>Melanthera aspera</i> |
| <i>Cenchrus</i> sp. | <i>Philoxerus vermicularis</i> |
| <i>Cyperus</i> sp. | <i>Portulaca oleracea</i> |
| <i>Euphorbia mesembrianthemifolia</i> | <i>Sesuvium portulacastrum</i> |
| <i>Hymenocallis litorea</i> | <i>Wedelia trilobata</i> |

Recently cleared ground is extensive along the shores of Bloody Bay, from Bloody Bay Point to Jackson's Bay, and of Wearis Bay. The ground is being colonised by weedy species; clearing of trees and shrubs has been complete, except for mature trees of *Swietenia mahagoni* which have been left standing.

All human settlements on Little Cayman are located on the coastal sand flats, and with a very few exceptions the houses are grouped in Blossom Village. There is a common assemblage of introduced decorative plants around the houses, including *Crinum*, *Zephyranthes*, *Bougainvillea* and *Catharanthus*, with tall trees of *Terminalia*, *Cocos* and *Casuarina*.

4. Rock pavement (Ironshore outcrop)

"Littoral rock pavement" vegetation was described by Beard (1955) and subsequently by Asprey and Loveless (1958) in north Jamaica and by Loveless (1960) in Antigua. Somewhat inappropriately, however, they applied the term "rock pavement" to steep rocky slopes, ledges and terraces, often forming cliffs or ramps, rather than horizontal rock platforms. The term is much more suitable for the two main areas of flat Ironshore pavement which outcrop on the Little Cayman coast: one south of the airstrip, the other at Salt Rocks. There is also a less conspicuous narrow pavement east of Mary's Bay on the northeast coast. The maximum width of the two main pavements is about 50 m, and the height about 2.5 m. Similar pavements are much more widespread on both Grand Cayman and Cayman Brac.

The outer 15-20 m of the pavement has no macroscopic vegetation other than scattered patches of *Sesuvium*, *Philoxerus*, *Cenchrus* and *Sporobolus* in depressions. The inner part of the pavement is covered by the following zones, from sea to land:

- (a) a fleshy mat of *Sesuvium*;
- (b) a zone of dwarfed and prostrate shrubs, including *Conocarpus*, *Borrchia*, *Rhachicallis americana* and *Strumpfia maritima*;
- (c) a transitional zone with these dwarf shrubs and scattered *Suriana maritima*;
- (d) an inner zone of thick bushy *Suriana*, 3-4 m tall;
- (e) a hedge of dense *Coccoloba* at the inner edge of the pavement, where it passes beneath a sand or cobble beach.

This description applies to the pavement at West End Point; Sauer (1976, 5) has published a transect diagram for the same pavement somewhat further north.

The southern platform is similar except that *Laguncularia* and tall *Conocarpus* are also present and the *Coccoloba* woodland is less developed. The zonation may be compared with that described on higher and less regular coastal rocks in Antigua, where *Strumpfia* is dominant (Loveless 1960), and north Jamaica (where *Rhachicallis* is dominant (Asprey and Loveless 1958)).

5. Steep rocky coast

Bluff Limestone outcrops for a distance of 1.25 km along the coast at the east end of the island, between Snipe Point and East Point; the surface rises to a height of 6-7 m within 50 m of the shore, and the rock is deeply dissected, with many potholes 3-4 m deep. The offshore reef is narrow and gives little protection, and the lower slopes are in the splash zone. This is the kind of dissected coastal limestone described as *Soboruco* or *diente de perro* by Howard and Briggs (1953) in Cuba and by a variety of other vernacular names (*makatea*, *feo*, *champignon*) in other parts of the world; it is also the same as the Littoral Rock Pavement of Beard (1955) and Asprey and Loveless (1958).

On Little Cayman the lower splash zone is devoid of plants except for patches of *Sesuvium* in potholes. At 2-3 m above sea-level there is a prostrate scrub of dwarf shrubs, including *Conocarpus*, *Borrchia* and *Strumpfia maritima*. At rather higher levels *Suriana* becomes extensive, together with *Capparis flexuosa*, *Erithalis fruticosa*, and *Phyllanthus angustifolius*. Low *Coccoloba* becomes dominant about 30 m from the sea, forming a continuous zone 40-50 m wide, except for deeper potholes, many of which have trees of *Ficus aureus* growing in them. Further inland, away from the sea, *Bursera*, *Thespesia*, *Cordia*, *Plumeria*, *Thrinax* and *Cephalocereus* become conspicuous. Taller trees of *Bursera* are commonly deformed into a L-shape where they are emergent. This vegetation is very similar to that originally described by Beard (1955) for Barbuda, where the scrub on similar terrain consists of *Conocarpus*, *Coccoloba*, *Suriana*, *Ernodea*, *Erithalis*, *Strumpfia*, *Croton*, *Opuntia* and spherical cacti.

Sandy patches along the rocky shore at East End carry mats of *Sesuvium* and *Philoxerus*, with *Ipomoea pes-caprae*, *I. macrantha* and *Hymenocallis*, and occasional isolated trees of *Conocarpus* up to 8 m tall.

C. Mangrove communities

This category mainly comprises swamp communities dominated by mangroves. Some mangrove areas are not swampy, however, and not all Little Cayman swamps include mangroves; for convenience herbaceous swamps dominated by *Sesuvium* are included here. Little Cayman has no counterpart to the *Typha* swamps of Grand Cayman. We distinguish coastal mangroves; mangroves of coastal ponds and salt flats; inland mangroves; and herbaceous swamps.

1. Coastal mangroves

Apart from scattered beach-foot trees of *Avicennia*, *Laguncularia* and *Rhizophora* on rock and cobble headlands in Bloody Bay and Wearis Bay, coastal mangroves are restricted to a strip a few metres wide along the north shore of The Bight in South Hole Sound and on the nearby leeward shore of Owen Island. This consists of trees of *Rhizophora* and *Avicennia* 5-8 m tall; the mangrove is not sufficiently well-developed to exhibit zonation. Bare ground on the landward margin of these

mangroves is colonised by *Sesuvium*. *Batis maritima* is present but is very rare, in contrast to its luxuriant development in *Avicennia* swamp on Grand Cayman.

2. Mangroves of coastal ponds and sand flats

Extensive linear ponds are frequent between the coastal sand ridge and the limestone uplands on Little Cayman; they are shallow and rock-floored, with a variable sediment cover. The ponds vary greatly in the extent of mangroves on their shores. Some, such as those at Blossom Village and Pirate's Point, have marginal *Avicennia*, *Laguncularia* and *Conocarpus*; others, notably Tarpon Lake, have tall mature *Rhizophora* woodland (Plate 46). In the Blossom Village pond, dwarf *Avicennia* is extensive, especially at the west end, where bleached stumps indicate an even greater former extent, presumably interrupted by hurricane damage. In the Pirate's Point pond there is also a pure stand of *Acrostichum aureum* 2 m tall. This pond also contained a mat of *Ruppia maritima* in 1975, in addition to marginal mats of *Sesuvium* and *Salicornia*.

The mangrove at Tarpon Lake is the most extensive on the island, occupying an area 2.5 km long (east-west) and about 1 km wide; it has a maximum height of about 25 m. The tallest woodland consists of *Rhizophora mangle* and *Laguncularia racemosa*, with *Avicennia* and *Conocarpus* marginal on the beach-ridge side and *Avicennia* also forming part of the lake shore (Plates 47-49). There are no ferns, but on the landward side many of the trees are festooned with *Rhabdadenia biflora*. The mangrove is continuous behind the beach ridge for 2-3 km to the east of the lake, but the width of the swamp narrows to 50-200 m and the height of the tallest trees declines to only 6-8 m.

3. Inland mangroves

Mangroves are also found within some of the larger inland ponds within the Bluff Limestone. One such un-named pond (063786) at the east end is fringed with a narrow zone of *Laguncularia*, and there is a wide zone of twisted *Conocarpus* on roughly dissected limestone marginal to the pool.

The most extensive inland mangroves, however, are not directly associated with open standing water. There are three such extensive areas in the western part of the island (at 957752, 975761 and 988766). The second of these is enclosed to north and south by Bluff Limestone ridges rising to 6-13 m above sea-level, but its surface lies close to sea-level. The centre of the mangrove comprises dwarf *Rhizophora*, varying in height from 1.5-1.9 m, with lowest foliage 65-90 cm above the ground (Plate 50). These mangroves are distinguished by dense root systems and small leaves. Root densities average about 80 per sq m, with a mean root diameter 50 cm above the ground of 2.3 cm. The mean length and breadth of 50 leaves measured 10.1 and 3.8 cm, respectively, and the maxima 12.2 and 4.6 cm.

On the southern side of the dwarf *Rhizophora* there is a zone of slightly taller *Rhizophora* intermixed with *Laguncularia* and *Acrostichum*. Mean tree height in this zone is about 2 m, and the height of the lowest foliage above the ground is 0.8-1.15 m. Root density is about 55 per sq m, and mean root diameter 50 cm above the ground is 2.6 cm.

These very uniform inland *Rhizophora* swamps resemble but are much more extensive than the inland dwarf mangroves described from southern Barbuda (Stoddart, Bryan and Gibbs 1973).

Large areas of low-lying dissected Bluff Limestone in the interior of Little Cayman are also covered with dense, twisted *Conocarpus* and *Laguncularia*. The terrain is rugged, with sand-filled depressions inhabited by *Cardisoma*. Both *Erithalis* and *Strumpfia* are found in some localities marginal to these *Conocarpus* thickets.

4. Herbaceous swamp

A further type of inland marsh, also at sea-level, is found about 500 m from the sea at the east end of the island (O75795), surrounded by deeply dissected Bluff Limestone ridges 2-4 m high. It consists of a thick mat of succulent *Sesuvium*, with occasional ridges and pinnacles of the underlying Bluff Limestone emerging through it. In August 1975 the whole of this marsh was waterlogged (Plate 51), and there were some small pools of standing water.

D. Classification of habitats

Johnston (1975) defined a number of "ecological formations" in the Cayman Islands, based on "major and minor plant associations, distinctive topographic features, and pertinent geologic, edaphic, and hydrologic conditions" (1975, 243). These formations were largely defined in terms of the habitat requirements of birds, both terrestrial and aquatic. The main units recognised were:

- (1) Fringing reefs and laggons.
- (2) Sand-coral beach.
- (3) Sea Grape-Almond Woodland.
- (4) Mangrove Swamp.
- (5) Pastures and cultivated areas.
- (6) Logwood Forest or scrub woodland (secondary).
- (7) Limestone Forest.
- (8) Inland lagoons and ponds.
- (9) Town and house sites.

The categories adopted have in some cases (e.g. types 6 and 9) greater relevance for Grand Cayman than for the other two islands, and in other cases, notably type 7, a single unit covers a wide variety of topographic and vegetational forms, especially on Little Cayman.

It is therefore, appropriate to conclude this chapter with a summary of the main habitats that can be recognised on Little Cayman. It is based on topography, geology and vegetation, and is intended as a framework for discussion of other aspects of the terrestrial ecology and also for consideration of conservation and management procedures. As it stands the classification is empirical and is not necessarily appropriate for the other Cayman Islands.

1. Coastal habitats

A. Sand and cobble strands.

- (a) Sand beaches with *Suriana* scrub and *Coccoloba* littoral hedge and pioneer heraceous vegetation.
- (b) Cobble beaches with *Coccoloba* littoral hedge.
- (c) Littoral woodland of coastal sand flats (almost entirely cleared).
- (d) Strand scrub, secondary scrub, and cleared and cultivated land of coastal sand flats.

B. Rocky shores.

- (a) Dwarf scrub of horizontal Ironshore pavements.
- (b) Dwarf scrub of coastal bluffs and cliffs.

C. Marine mangroves.

- (a) *Rhizophora* and *Avicennia* coastal fringes.

2. Non-marine Mangroves

A. Mangrove woodland.

- (a) Tall *Rhizophora* woodland (Tarpon Lake).
- (b) Low *Rhizophora* woodland on salt-pond margins.
- (c) *Conocarpus* and herbaceous vegetation of rock flats round salt ponds (*Sesuvium* sward, *Salicornia* sward, *Acrostichum* clumps).

B. Mangrove scrub.

- (a) Dwarf inland *Rhizophora* scrub in enclosed basins.
- (b) *Conocarpus-Laguncularia* scrub of low dissected interior Bluff Limestone.

C. Herbaceous marsh.

- (a) *Sesuvium* marsh of interior basins in Bluff Limestone.

3. Interior limestone areas

A. Bluff Limestone.

- (a) Dry Evergreen Thicket on dissected limestone ridges.
- (b) Evergreen Bushland on low dissected limestone.
- (c) See category 2.B.b.

B. Ironshore Formation.

- (a) Dry Evergreen Forest on low undissected Marl Facies.
- (b) Dry Evergreen Woodland on gentle slopes of low undissected Marl Facies ridges.
- (c) Evergreen Bushland on low undissected Marl Facies (disturbed?).

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Figure 21. Habitats and geology of Little Cayman

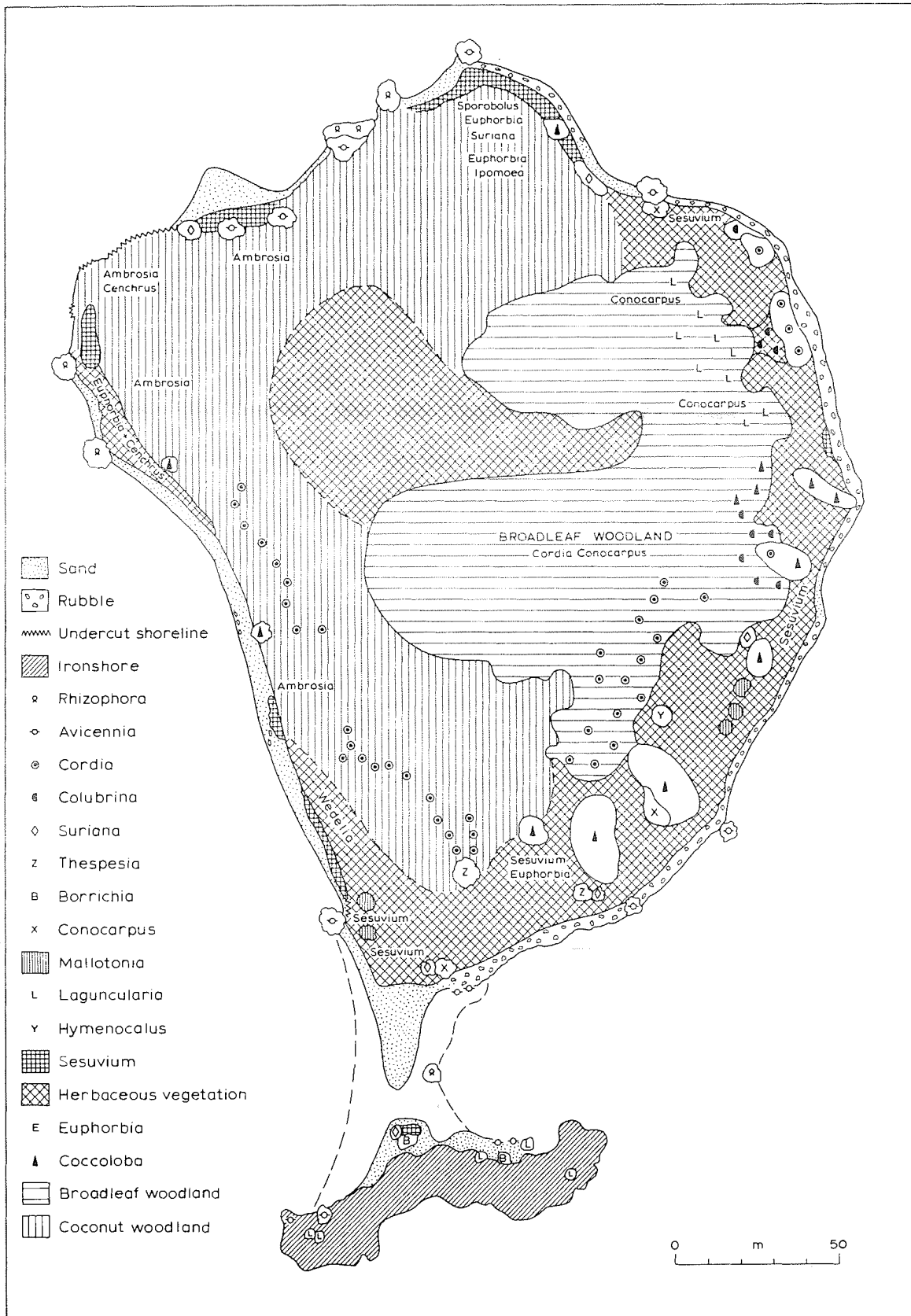


Figure 22. Vegetation and topography of Owen Island



Plate 37. Dry evergreen forest south of Sparrowhawk Hill; note the human figure in the centre of the picture (6003 1775)



Plate 38. Dry evergreen thicket on Sparrowhawk Hill (6004 1780)



Plate 39. Dry evergreen woodland inland from Jackson's Bay
(5977 1768)



Plate 40. Open dry evergreen thicket on the northern slopes of
Sparrowhawk Hill (6003 1781)



Plate 41. *Acrostichum aureum* in limestone solution holes north of Blossom Village (5953 1750)



Plate 42. Wind-sheared coastal hedge of *Coccoloba uvifera*, Owen Island

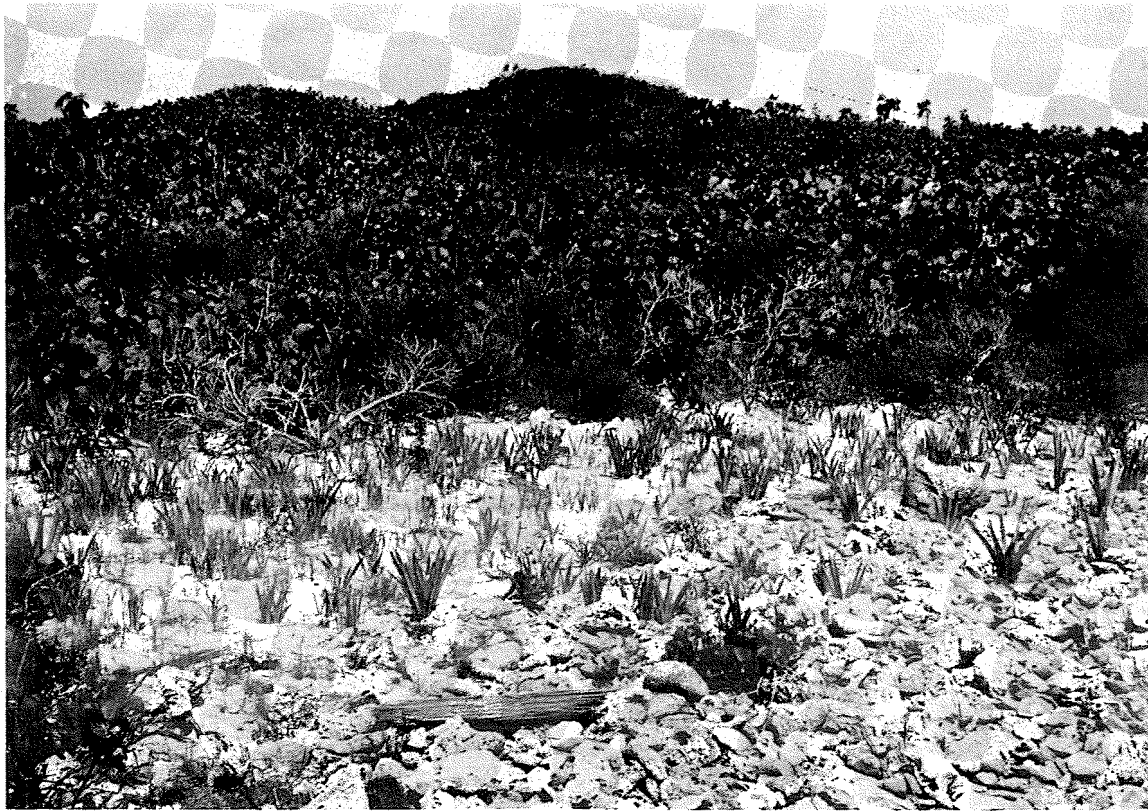


Plate 43. Pioneer *Hymenocallis litorea* and other herbaceous pioneers at Sandy Point



Plate 44. Decapitated coconuts on the coastal beach ridge near West Point



Plate 45. Coconut plantation with many dead trees on Owen Island

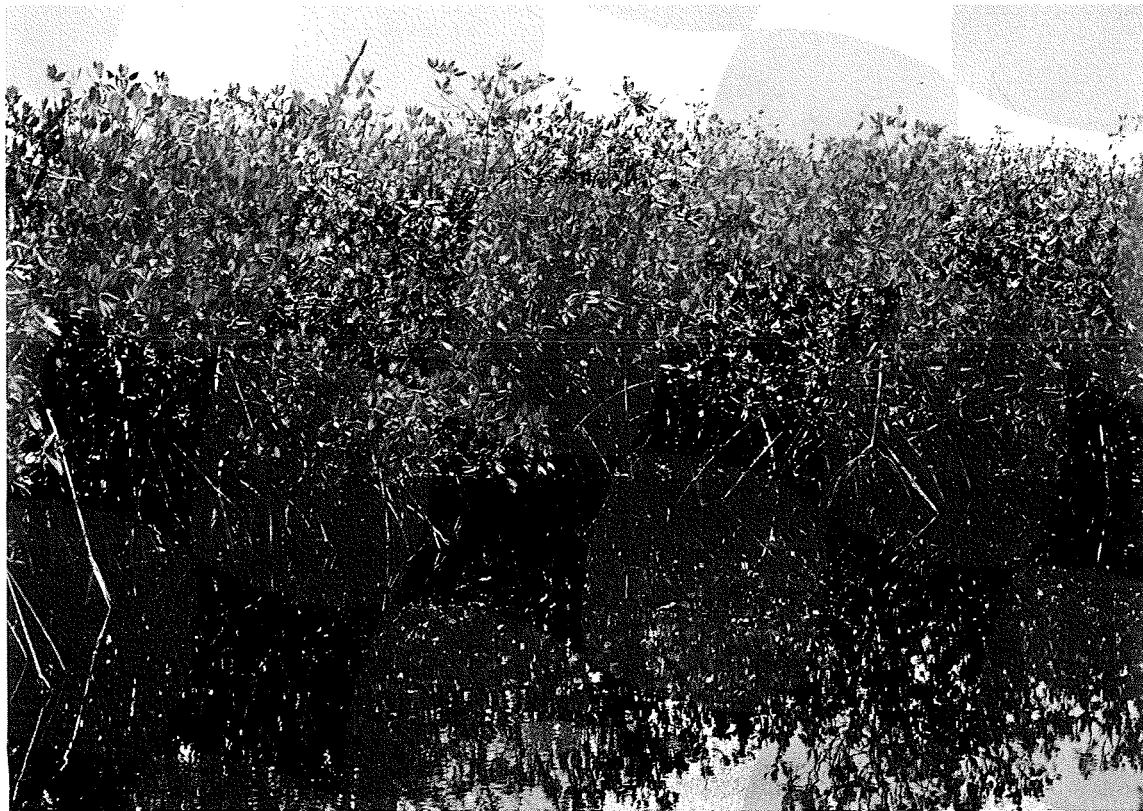


Plate 46. Low *Rhizophora* in the coastal lagoon east of Diggary's Point (6030 1773)



Plate 47. Tall *Avicennia* woodland in Tarpon Lake



Plate 48. Tall *Rhizophora* woodland in Tarpon Lake



Plate 49. Interior of tall *Rhizophora* woodland at Tarpon Lake



Plate 50. Dwarf inland *Rhizophora* in an interior depression (5975 1761)



Plate 51. Inland *Sesuvium* marsh with open pools at the east end of the island (6074 1795)