

1. SCIENTIFIC SURVEY OF LITTLE CAYMAN

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Introduction

Little Cayman (Plate 1) is the smallest of the three Cayman Islands, emergent sections of the Cayman Ridge along the northern margin of the Cayman Trench between the Sierra Maestra of Cuba and the coast of Belize. The Trench itself is 1700 km long, and has maximum depths south of the Cayman Islands of more than 6000 m. Little Cayman lies 230 km from Cabo Cruz, Cuba; the same distance from the nearest point of Jamaica; and 740 km from the mainland of Yucatan. The Caymans themselves are well separated from each other: Little Cayman is 117 km ENE from Grand Cayman, though only 7.5 km from Cayman Brac (Figure 1).

The island itself is 16.3 km long and 1.1-2.9 km wide. It has a total land area of 28.5 sq km (compared with 197 sq km for Grand Cayman and 38 sq km for Cayman Brac). It is also the lowest. Its highest point is 14 m, but only 3.7 sq km or 13 per cent rises above 6 m (compared with 21 per cent for Grand Cayman and 76 per cent for Cayman Brac).

Rainfall records have only been maintained on Little Cayman since the end of 1970, as part of the Mosquito Research and Control Unit Cayman Islands network. The two stations are both at the west end of the island (963738, 945754). The records (Table 1 and Figure 2) show considerable year-to-year variation in totals (from 800 to nearly 1900 mm), though the long-term mean is probably about 1400 mm. There is a dry season from November to April, and a wet season from June to October, though the records show considerable variability. The low, seasonal and uncertain rainfall combined with the dissected limestone terrain and predominantly scrubby vegetation gives an impression of an arid and inhospitable environment.

Table 1. Rainfall records at Little Cayman (mm)

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>
<u>Blossom Village (963738)</u>													
1970	-	-	-	-	-	-	-	-	-	-	135.9	8.1	-
1971	25.4	107.4	16.0	0	69.6	160.5	131.8	222.3	105.9	315.2	677.2	41.4	1872.7
1972	36.3	30.0	32.0	39.1	71.9	260.6	71.9	99.6	237.5	173.7	47.8	220.2	1320.5
1973	14.0	3.6	12.5	9.4	54.1	163.8	93.2	176.0	95.3	185.4	63.0	28.4	898.7
1974	25.4	0	8.2	27.7	151.1	42.9	54.1	88.9	208.8	326.9	22.8	32.3	989.3
1975	27.4	34.5	23.1	28.4	55.1	55.9	143.8	63.0	192.8	86.9	70.9	24.9	806.7
1976	77.7	32.3	25.4	61.5	99.8	418.1	20.6	52.3	97.5	127.5	102.1	-	-
Mean	34.4	34.6	19.5	27.7	83.6	183.6	85.9	117.0	156.3	202.6	160.0	25.9	1177.6
<u>Spot Bay (945754)</u>													
1975	-	-	-	40.4	70.4	46.5	162.8	7.4*	175.8*	68.3	99.1	21.6	-
1976	37.6	11.7	9.4	-	80.3	557.8	2.0*	22.9	-	152.7	66.0	-	-

*two weeks only

No other climatic data are available for Little Cayman, but conditions are probably similar to those of Grand Cayman (Darbyshire, Bellamy and Jones, 1976). Highest temperatures on the larger island occur during the wet season (with mean daily temperatures in August reaching 29.5°C) and lowest in the dry (mean daily temperatures in January 26°C); diurnal temperature range is about 5.5°C.

Winds are dominated by the Northeast Trades. About 71 per cent of observations are in the sectors 030-090°. This dominance is most marked during the winter; in the summer, southeasterlies may occur. On occasion during the winter months 'Northwesters' of several days' duration bring stormy weather, rainfall, and reduced temperatures, with north and northwesterly winds commonly reaching 13 m/sec (25 knots). Modal wind speeds during normal conditions are approximately 5m/sec (about 10 knots).

The Cayman Islands lie within the zone of catastrophic hurricanes. There are few records of their occurrence at Little Cayman itself, but more than 40 have been recorded in the group since 1751 (Williams 1970; Woodroffe, *in litt.*). The variable frequency over this period is only partly attributable to gaps in the historical record, and it appears that storms were most numerous during 1895-1903, 1909-1917, and 1932-1944. From the records at Cayman Brac, Little Cayman probably experienced major hurricanes in 1912, 1915, 1932 and 1935; the great storms recorded at Grand Cayman in 1785, 1837, 1838, 1846, 1876, 1903, 1909, 1915 and 1917 may or may not have been equally damaging in the Lesser Caymans. The effects of such storms include: torrential rainfall (up to 30.5 cm/24 hours on Grand Cayman); wind damage to vegetation, especially mangroves; inundation by storm surge; mechanical damage to coral reefs and other marine communities; and construction of beach ridges and deposition of coral boulders and rubble in nearshore areas. Hurricanes have probably also been important agents in bringing plant and animal colonists to the islands from the Greater Antilles.

Ocean currents in the Cayman area are mainly from the southeast. Evidence collated during the Cayman Islands Natural Resources Study, however, suggested the possibility of variable currents in the area between the Caymans, Cuba and Jamaica, giving intermittent surface flows from west to east and possibly from the north as well. Velocities of the dominant easterly currents near Grand Cayman averaged 30 cm/sec during this Study, and exceeded 35 cm/sec for nearly 20 per cent of monitoring time (Darbyshire et al., 1976). With such velocities drifting propagules would take some 210 hours (approximately 9 days) for the journey between Little Cayman and either Cuba or Jamaica.

Little Cayman shares many characteristics in common with other similar small limestone islands in the Caribbean, some of which have been more fully studied and are better known. These include Barbuda, Anguilla and especially Anegada. Anegada is very nearly the same size as Little Cayman: it is 16 km long and 3.6 km wide, and has an area of 33 sq km; its maximum height is 4.5 m. Both islands have a flora of about 240 species (D'Arcy 1975; Proctor, this volume). Anguilla and Barbuda have areas of 90 and 160 sq km, and annual rainfalls of 1143 and

990 mm, respectively (Harris 1965).

Scientific studies

Little Cayman was discovered on 10 May 1503 by Columbus; it was not permanently settled until 1833, and the population (which was 23 at the 1960 census and 20 in 1970) has always been small. Scientific knowledge began when the island was charted by H.M.S. *Sparrowhawk* in 1880. This chart, with revisions, is still current (Admiralty Chart 462: 1:72,630). Many existing placenames were established during this survey.

Attention was first directed to birds. C.J. Maynard collected there in 1888, and a list of Little Cayman birds was published by Cory (1889). Other ornithological visitors included P.R. Lowe on the *Emerald* in January 1904, and M.J. Nicholl on the *Valhalla* in March the same year. Lowe (1911) subsequently included many Little Cayman records in his list of Cayman Islands birds. Other ornithological collections on Little Cayman have been made in 1911 by W.W. Brown (Bangs 1916), in 1938 by C.B. Lewis, in 1956 and 1958 by C.H. Blake, in 1961 by A. Schwartz (Schwartz and Klinikowski 1963), during 1965-1971 by D.W. Johnston, and in 1969 by R. Pulliam. These records were included in the listing of birds of the Cayman Islands by Johnston, Blake and Buden (1971) and in the ecological account by Johnston (1975).

Maynard also collected the first Little Cayman reptiles, which were reported by Garman (1888). New records were added by English (1912). P. Bartsch made a collection in 1930 (Conant 1934), while working on the land molluscs, and A. Carpenter added a further record (Conant 1937). These were the only reptile collections before 1938.

C.A. Matley spent two days on the island in 1924, studying the geology, producing a remarkable paper (Matley 1926). Many other investigators who collected or observed on the two larger Cayman Islands in these earlier years, failed, however, to reach Little Cayman (bibliography in Stoddart, in press).

Our main source of information on the fauna and flora of Little Cayman, as indeed of the group as a whole, remains the work of the Oxford University Expedition to the Cayman Islands in 1938, led by W.G. Alexander. This Expedition spent the period 28 May to 10 June on the island, and large collections were made under what must have been very difficult conditions before any roads had been made. The reptiles were reported by Grant (1940) (reviewed by Williams 1969), the land Mollusca by Pilsbry (1942), and the marine Mollusca by Salisbury (1953). W.W. Kings collected plants, and though no list was published his specimens have been incorporated in G.R. Proctor's *Flora of the Cayman Islands*, now in press. Large insect collections were made, and the literature on these is keyed in Table 2.

Table 2. Publications on insects of Little Cayman arising from the Oxford University Expedition to the Cayman Islands in 1938

Odonata	Fraser 1943
Hemiptera	Hungerford 1940
Neuroptera	Banks 1941
Lepidoptera	Jordan 1940; Carpenter and Lewis 1943
Coleoptera	
Carabidae	Darlington 1947
Cerambycidae	Fisher 1941, 1948
Scarabidae	Sanderson 1939
Staphylinidae	Blackwelder 1947
Homoptera	Davis

Subsequently, though individual workers made brief visits, there has been no comparable general survey. The present study, which formed the Royal Society and Cayman Islands Government Expedition to Little Cayman, extended from 11 July to 11 August 1975, and included the following personnel:

D.R. Stoddart (Cambridge): geomorphology, leader
R.R. Askew (Manchester): entomology
A.W. Diamond (Nairobi): ornithology
G. Giglioli (Georgetown): marine studies and liaison
M.V. Hounscome (Manchester): land fauna other than insects
G.W. Potts (Plymouth): marine ecology
G.R. Proctor (Kingston): botany
C. Woodroffe (Cambridge): mangroves (part-time).

The Expedition was sponsored jointly by the Royal Society of London and the Cayman Islands Government, and was planned jointly by Stoddart and Dr M.E.C. Giglioli, Director, Mosquito Research and Control Unit, Grand Cayman. It arose from the work of the Natural Resources Study initiated on Grand Cayman, and can be regarded as part of a continuing natural resources survey programme in the Cayman Islands. The field party was joined from time to time by staff members of the Mosquito Research and Control Unit, notably E. Parsons and R. Todd.

The purpose of the Expedition was to define and characterise the major terrestrial and shallow marine habitats of the islands, and to describe the major features of the marine and terrestrial biota in relation to them, thus providing data which could form the background for management decisions in the event of any proposals for major

industrial and commercial development. The period of investigation was only one month, and appeared to coincide with unprecedented mosquito activity. Accessibility was largely limited to tracks and to traces cut in 1974 by the Cadastral Survey of the Cayman Islands. Large areas remained unvisited, though aerial photograph interpretation suggests that all major habitats were sampled. The present series of papers summarises the main work of the Expedition.

Acknowledgements

This Expedition was made possible in the first instance by the initiative of the Government of the Cayman Islands, and we are indebted to successive Governors, Mr K.R. Crook and Mr T. Russell, and many members of the Administration, notably Mr W. Conolly, for their support. The programme was organised and partly funded by the Royal Society of London, through its Southern Zone Research Committee under its chairman, Sir Maurice Yonge. The investigation forms part of an enquiry into the natural resources of the Cayman Islands organised by Dr J.H. Wickstead and Dr M.E.C. Giglioli. Scientific studies in the Cayman Islands in general, and this project in particular, owe an enormous debt to the enthusiasm and expertise of the Mosquito Research and Control Unit, whose Director, Dr Marco Giglioli, with Mrs Giglioli, did so much on scientific, logistic, and social levels to ensure the success of the Expedition. We are also grateful to Dr Wickstead and to Mr Martin Brunt of the Land Resources Division, Ministry of Overseas Development, for much assistance in planning and organisation.

The study of Little Cayman was ultimately made possible by the great generosity of Dr Logan Robertson, of Asheville, North Carolina, who made his home at Pirate's Point available as the Expedition's headquarters in 1975. We owe a great debt to him and to all the people of Little Cayman for their assistance. The Mosquito Research and Control Unit made available vehicles, boats, and supplies to supplement those brought from London, and we acknowledge the consideration of the Cayman Islands Government in allowing us to import our cargo free of customs duty.

Lastly, I thank the members of the Expedition for their tolerance and good humour under often trying conditions in the field, and for their patience during the completion of this report.

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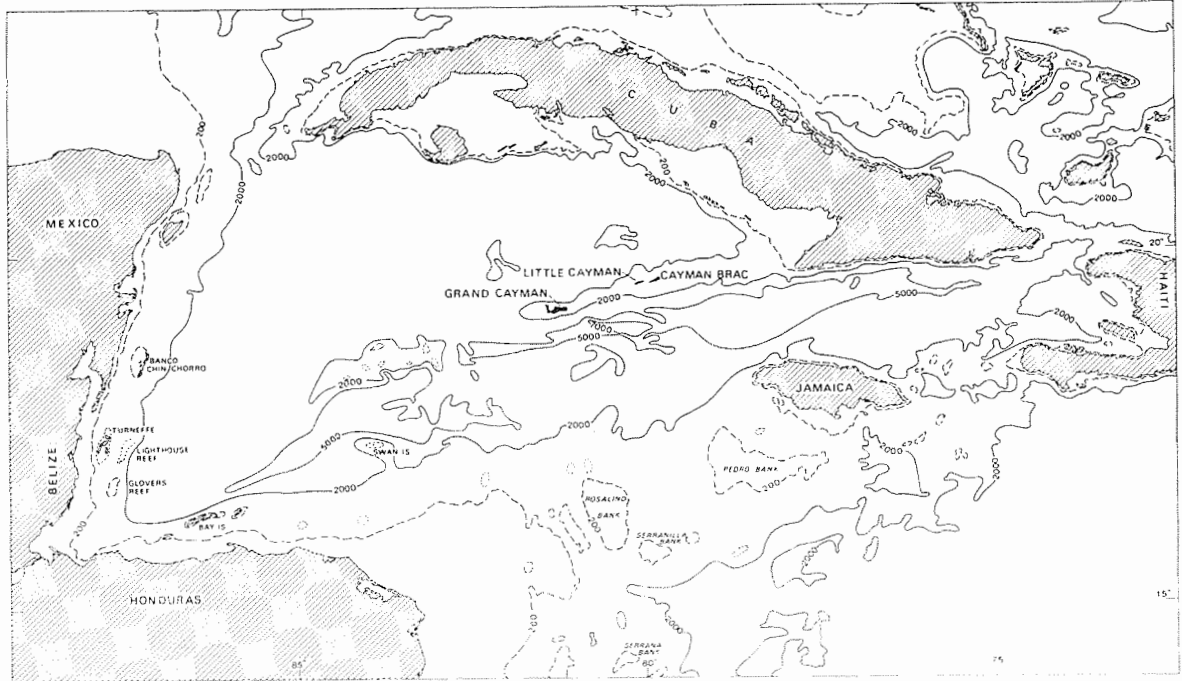


Figure 1. Location of the Cayman Islands

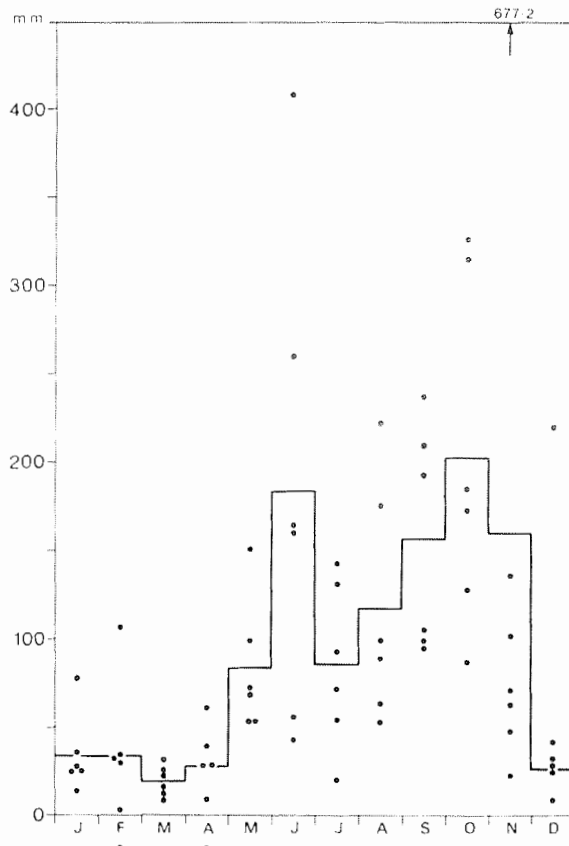


Figure 2. Monthly rainfall at Little Cayman