

3.14 SIERRA LEONE

Introduction

Sierra Leone is situated on the Atlantic Coast of West Africa, bounded by Guinea on the north and east and by Liberia in the south. It has an area of 72 325 km², a population of 3 627 000 (1982), and thus a mean population density of 50.8 persons/km². The mainland extends approximately 352 km from N-S between latitudes 6°55'N and 10°00'N, and 323 km from E-W between longitudes 10°14'W and 13°17'W, while the highly indented coast measures some 825 km, excluding offshore islands. The coastal half of the country lies below the 200 m contour, while the interior half is mostly above 500 m. The coastal lowlands are 50 km wide in the south and 125 km wide in the north, but are interrupted by a mountainous block near Freetown (8°30'N/13°17'W), which rises steeply from the sea to the summit of Picket Hill (888 m asl). In passing inland the coastal plain is sandy, swampy and often flooded for the first 30-50 km. Thereafter, the land rises to a gently undulating plateau which continues inland to the foothills of the Guinean Dorsale crossing the interior from NW-SE. Bintimani Peak (9°13'N/11°08'W) at 1948 m asl in the Loma Mountains, and Sankanbiriwa Peak (8°57'N/10°44'W) at 1853 m asl in the Tingi Mountains, are the highest points in the country. Both are situated a few kilometres distant from the Guinean border.

Drainage is directly to the sea by a series of rivers which rise on the dorsal. From north to south these are the Kolente or Great Scarcies River, which forms the border with Guinea for 52 km in its middle reaches, followed by the Little Scarcies, Rokel, Jong, Sewa, Moa and Mano Rivers. The latter forms the border with Liberia. Other streams rise in the lowlands, and the most important of these are the Ribi, Kukuli, Gbangbaia and Waanje Rivers. In the south, the Gbangbaia, Jong, Sewa and Waanje Rivers discharge into a long coastal lagoon system.

Climate

Mean annual rainfall varies between 3000-5000 mm at the coast, decreasing inland to 2000-2500 mm on the eastern border. There is a long wet season, but the dry season is severe with virtually no rain and hot desiccating winds. On the coast, e.g. at Freetown, where mean annual precipitation is 3639 mm, January and February are dry and December is moderately dry. The situation is similar at Bo (7°58'N/11°45'W) on the lowland plateau, but rainfall is lower, c. 2900 mm, and at Kabala (9°40'N/11°36'W) in the mountains of the north it persists for 4 months, from December-March inclusive.

Vegetation

Both the coastal lowlands and mountain slopes were once entirely covered by high Guinean forests, with grasslands on northern parts of the interior lowland plateau and wooded Guineo-Soudanian transitional savanna on other parts in the south. However, the

primary rain forest has almost disappeared, the only surviving pockets being in forest reserves. Over 97% of the primary forest in the country has been destroyed. Some has been replaced by secondary forest, and some by herbaceous associations.

Wetlands

Mangrove swamps used to occlude most of the coast, but there have been great clearances for rice cultivation which began in the late 1940s. Freshwater swamp forests and *Raphia* swamps back the mangroves in the lowlands, and an extensive lagoon system stretches along the southern coast. Inland pockets of swamp forest dot some river valleys and there are large areas of swamp grassland, much of which is secondary. Other grasslands occur in the north, on the lowland plateau below the mountains. They are flat featureless areas which are flooded during the rains, but which dry into hard cracking soils in the dry season. Forests subject to seasonal inundation form narrow strips on some of the montane rivers.

List of Wetlands Described

1. Coastal Wetlands
2. Riverine Wetlands
3. Lake Confon or Sonfon
4. Artificial Impoundments

1. Coastal Wetlands

Country: Sierra Leone

General: Much of the northern coast is deltaic, and was at one time entirely cloaked by mangrove forests, which extended far up rivers and distributaries, and then gave way to *Pandanus* and *Raphia* swamps, and these in turn to freshwater swamp forests along the river sides. Much of this forest has been cleared or is heavily disturbed, and much has been replaced by secondary herb swamps. The deltaic coast is interrupted by the Freetown Peninsula, but continues again to the south end of Sherbro Island, from which point the nature of the coast changes and it becomes sandy, with swamps between old beach ridges and along the courses of streams which have been deflected alongshore.

Littoral Swamps: From the northern border mangrove forest extends 17.5 km along the coast to the mouth of the Great Scarcies River. It reaches 8-10 km inland and 15 km up Sasiyek Creek. Yellibuya and Kortimaw Islands are entirely covered by mangrove forest. There are 14 800 ha of mangrove forest here, with trees reaching 25 m in height locally, and to landward there are 9 isolated patches of swamp forest covering about 1900 ha in total.

There are few mangroves on the estuaries of the two Scarcies Rivers, and between their mouths (8°24'N/13°11'W) and Tagrin Point (8°01'N/13°09'W) the coast is sandy/rocky and exposed, and comprises open beaches. However, small areas of swamp forest and large areas of grass swamp land occurs between the two Scarcies rivers and along the

south bank of the Little Scarcies. Between the rivers there are 7000 ha of grass swamp, and a further 30 000 ha on the south bank of the Little Scarcies River in a discontinuous strip 42 km long and 10 km deep.

Mangroves are again well developed at the mouths of the Rokel River, behind Tagrin Point, and several islands in the estuary, e.g. Yema and Tasso Islands are mangrove covered. The mangrove belt extends southwards to the Bunce River and along the landward side of the mountainous Freetown Peninsula. The mangrove swamps are 0.5-3 km wide and are broken by numerous creeks, up which, behind the mangroves, there are strips of freshwater swamp forest. To the south of Freetown, mangroves fringe Yawri Bay almost completely, in a strip 37 km long and 1-5 km deep. Three small rivers reach the sea here, the Ribi, Kukuli and Kagboro. Mangroves extend up these for 20km, 10km and 17 km respectively, in all cases giving way to freshwater swamps which then ascend the rivers for a further 20-22 km. A strip of sandy coast then continues south from Shenge Point, at the mouth of the Kagboro, for 20 km to the Sherbro River mouth.

Here Sherbro Island shelters a broad waterway 60 km long and 3-7.5 km wide, known as the Sherbro River, into which the Bagru, Jong and Kittam Rivers discharge, together with a number of minor streams. Both banks of this waterway are cloaked by mangroves up to 10 km deep, and in total there are about 39 000 ha of tidal forest in this locality.

Sherbro Island is at the end of a long sandspit, Turner's Peninsula, which has been built up by the powerful northwestward flowing longshore drift. The island exists because the waters of the Jong and Kittam Rivers have breached the spit, cutting off the tip as an island. The sandspit is 112 km long, reaching southeast to the mouth of the Moa River (6°58'N/11°35'W), and behind it, the Sewa and Waanje Rivers unite to form the Kittam River which has been diverted northwestwards alongshore. This river is separated from the sea by dune ridges, in the swales of which, towards Sherbro Island, swamp grasslands and swampy forests occur, the latter rich in *Pandanus* and *Raphia* spp. Inland, the entire area between the Jong and Sewa Rivers is swampy, with great patches of herb, palm or tree swamps covering a total of 71 000 ha in a mosaic with dry land. Southeast of the Sewa River, behind the sandspit, mangrove swamps, palm swamps, grass swamps, lagoons and dry land are interspersed in a belt 60 km long and 25 km deep, as far as the right bank of the Moa River. Wetlands occupy most of the 150 000 ha tract of low lying sandy land. The mangroves are situated in the southeast on Keree Creek (7°01'N/11°38'W), on the shores of Lake Mape (7°10'N/11°49'W), and around Masa Island in the Waanje River (7°13'N/11°58'W).

There are a number of lakes and lagoons in the littoral belt, e.g. Lakes Kenema (7°19'N/12°17'W), Kwako (7°18'N/11°59'W), Kamason (7°19'N/11°58'W), Baiama (7°17'N/11°57'W), Masatoi (7°12'N/11°50'W), Mape (7°06'-7°11'N/11°42'-11°51'W) and Mabesi (7°10'-7°13'N/11°41'-11°45'W). Other littoral lakes occur immediately behind the coastal barrier spit on Sherbro Island, centred on a point 7°30'N/12°05'W. These lakes vary between 1-6 m asl and are more saline and alkaline than the riverine lakes described in the next section, having pH values approaching 8.5.

Flora & Fauna: In their pristine state these lakes were fringed by pandans, *Raphia* palms,

swamp forest trees, and by sedges, reeds and littoral grasses such as *Anadelphia*, *Paspalum*, *Phragmites* and *Sporobolus* spp., which can tolerate salinity and varying degrees of inundation. On Lakes Masatoi, Mape and Mabesi there are trees typical of mangrove forest, e.g. *Avicennia africana*, *Laguncularia racemosa* and *Rhizophora* spp., even although these lakes are not normally tidal. The mangrove, palm and freshwater swamp forest floras are as described in the regional introduction. The area provides a wider range of habitats than is apparent in the littoral zones of neighbouring countries and the avifauna is particularly rich, with virtually all the coastal West African species, and most of the inland aquatic species, present within 10 km of the coast. Mona monkeys are common in the mangroves.

Human Impact & Utilisation: A great deal of mangrove and freshwater swamp forest has been cleared for agriculture, particularly rice culture. The mangroves have otherwise been used quite extensively for fuel wood and building timber, and for materials for making fish traps. The mangroves yield crabs, prawns, oysters and fish, and the mangrove creeks are fished intensively. Many are overfished.

Conservation Status: Unprotected.

2. Riverine Wetlands

Country: Sierra Leone

General: Because of the marked seasonality of rainfall the rivers become very swollen in the wet season and may flood extensive areas. However, water levels fall by as much as 8 m in the dry season when the rivers may be reduced to shallow streams, meandering in broad watercourses. All the riparian trees tend to be inundated during the rainy season. In the mountains the flooded strips are narrow, but become broader and less deeply inundated towards the coast.

In the lowlands of the Moa Valley, in the southeast, there are more than 140 discrete swamps, most of which are forested or partly forested. They are situated at altitudes below 200 m between the Kambui Hills and Gola Hills, while another 120 swamps lie between the Kambui Hills and the Sewa River. Most of these swamps are on affluents of the principal rivers, but some are in shallow depressions which are filled each year by the rains, and which overflow at the surface only at times of high water.

In the central northwestern districts there are extensive areas of seasonally inundated grassland on the lowland plateau. No less than 150 such areas occur in a belt 30 km wide and 190 km long, oriented NNW-SSE, from the Great Scarcies River in the NW corner of the country (9°45'N/12°45'W) to the town of Mano (8°00'N/12°05'W). Some of these treeless grasslands are small, c. 100 ha, but others cover 4000 ha. Again some are associated with minor streams, but others are in depressions which are essentially endorheic.

In the coastal lowlands, lagoons and ponds are common on riversides, and innumerable swampy patches occur in depressions on the floodplains, often quite far distant from the rivers. Many of the lakes are in continuity with the river during the floods but are isolated during the dry seasons. Small ponds are too numerous to discuss in detail, but Lakes Fula (7°33'N/11°58'W), Gambia (7°31'N/11°58'W), Kpoli (7°30'N/12°05'W), Poepi (7°28'N/12°00'W) and Tibi (7°25'N/11°58'W) along the Sewa River are good examples. They are all situated about 30-40

m asl, and are shallow water bodies, probably not exceeding 2 m in depth at any place.

The largest of these lakes, Lake Poepi, is 2.5 km long, up to 1.3 km wide and has an open water surface of 285 ha. It is 1.7 km distant from the banks of the Sewa River at its nearest point. All the riverine lakes exhibit pH values close to that of river water, acid in reaction, c. 5.2. Although Lake Poepi is entirely isolated from tidal ebb and flow (at least for the greater part of the year), there are stands of *Rhizophora* at the southeastern and southwestern extremities, while the rest of the lake is enclosed by tree, palm, pandan and *Typha* swamps, and such swamps cover the land between the lake and the river. All the other lowland riverine lakes are fringed by similar swamp associations, and have beds of floating and submerged aquatic macrophytes. Their fish faunas are similar to those of the rivers with which they are associated, but they are otherwise faunistically similar to the littoral wetlands already discussed.

Flora & Fauna: The aquatic vegetation is typical of West African riverine lakes as described in the regional introduction. The 'mangroves' on these lakes are situated well above tidal influence and grow in freshwater. All the small obligate aquatic species are present, but crocodiles, terrapins and turtles are scarce having been hunted intensively for decades. Due to the secondary nature of most of the surrounding vegetation, and the loss of a great deal of the natural swamp forest, large mammals normally associated with these habitats are also uncommon. However, *Hippopotamus amphibius* and *Syncerus caffer nanus* occur locally and *Cercocebus torquatus*, *Cercopithecus aethiops*, *C. mona*, *C. petaurista* and *Colobus badius* are widespread in the trees. The avifauna of the coastal lowland section is rich, with most of the West African aquatic species being present.

Human Impact & Utilisation: Population density is high in the lowlands, as high as it is anywhere else in West Africa except for parts of Nigeria. As a consequence the rivers and lakes are fished intensively, and indeed are overfished in most places. There have been extensive clearances of riverine vegetation throughout the country, both for agriculture and for other developments.

Conservation Status: No wetland system is protected in the coastal lowlands. Areas of seasonally inundated grassland are protected in the Outamba-Kilimi National Park in the northwest, and another substantial swamp area is likely to be protected in the Mamunta-Mayoso Swamp Nature Reserve (8°40'N/11°55'W) near Makeni. This latter reserve has not yet been ratified by central government, but was given protection by the local tribal chiefs in 1981.

3. Lake Confon or Sonfon

Country: Sierra Leone

Coordinates: 9°15'N/11°30'W

Area: 820 ha

Altitude: 549 m asl

Nearest Town: Freetown (205 km SW)

General: Lake Confon is the only permanent lake on the interior plateau of Sierra Leone and is situated in the Sula Mountains. It appears to have been formed by the collapse of the land

surface after deep weathering of lower layers. The maximum depth recorded is 8 m. The lake is exorheic, receiving water from 7 small streams and draining from the southern end. Studies of the lake are reported in Gerrath & Denny (1979), Green (1979) and Gerrath & Denny (1980a,b).

Flora & Fauna: The entire lake is covered by emergent vegetation during the dry season, with *Colocasia* sp., *Eleocharis dulcis*, *Polygonum senegalense* and *Thalia welwitchii* the dominant species. *Nymphaea lotus* and *Utricularia* spp. are prominent in the areas of open water. Among the fish *Aphyosemion guineense*, a small *Barbus* sp., *Epi platys fasciolatus* and a species of *Kribia* have been identified. The avifauna appears typical of well vegetated permanent West African lakes, with *Actophilornis africana*, *Anhinga rufa*, *Bubulcus ibis*, *Casmerodius albus*, *Ceryle rudis* and *Plectropterus gambensis* in evidence, among many others.

Human Impact & Utilisation: The lake is isolated and rarely visited, although hunters may operate around its shores sporadically. It is not utilised.

Conservation Status: Unprotected.

4. Artificial Impoundments

Country: Sierra Leone

General: There are several small dams, e.g. at Sefadu (8°39'N/10°58'W), but they are not important as wetlands.