

# MANGROVE RESERVES IN FIVE WEST AFRICAN COUNTRIES

## BACKGROUND BRIEF

Mangrove ecosystems are crucial for maintaining and sequestering carbon stocks, and preserving biodiversity. They can provide sustainable natural resources and protection from natural disasters to the people living in and around them. The Forest Carbon, Markets and Communities program is organizing a workshop on REDD+ and Mangroves in West Africa to be held in Ghana. This document provides background on protected areas containing significant mangrove stands within the five focal countries (Cote d'Ivoire, Ghana, Guinea, Liberia, and Sierra Leone) for the workshop. These five countries lie contiguously on the coast of West Africa. There are mangrove stands in all five countries (figure 1), but these stands have declined since 1980 (table 1).

**Figure 1: Extent of Mangrove Forests in West Africa (Giri *et al.* 2011a)**



This document focuses on protected areas that contain significant mangroves stands, and are listed on the World Database on Protected Areas. This database includes designated UNESCO-MAB Biosphere Reserves, World Heritage Sites, Ramsar Sites, and IUCN Protected Areas. Other legal designations for the sites discussed are given in parentheses after the site name. All sites discussed are Ramsar Sites, that is, they are included on The Ramsar List of Wetlands of International Importance. This regularly updated list was originally compiled as a result of the Convention on Wetlands, signed in Ramsar, Iran in 1971, in which member countries committed to “stem the progressive encroachment on and loss of wetlands”(The Convention on Wetlands 1971).

The list of areas described in this document is not exhaustive, but is intended to give readers an overview of existing mangrove reserves within the countries.

**Table 1: Key Statistics on Mangroves in West Africa (World Bank 2014)<sup>+</sup>, (UNEP2007)<sup>++</sup>, (Giri et al. 2011b)<sup>+++</sup>**

	Cote d'Ivoire	Ghana	Guinea	Liberia	Sierra Leone
Population ('000) in 2012 <sup>+</sup>	19,840	25,366	11,451	4,190	5,979
Land Area (km <sup>2</sup> ) <sup>++</sup>	318,000	227,540	245,720	96,320	71,620
Coastline (km) <sup>++</sup>	7,997.3	757.8	1,614.5	842	1,677.1
Mangrove Area (km <sup>2</sup> ) in 1980 <sup>++</sup>	302	181	2,992	193	1,677
Mangrove Area (km <sup>2</sup> ) in 2012 <sup>+++</sup>	32	76	1889	189	955

## COTE D'IVOIRE

Mangroves of Côte d'Ivoire occupy a very restricted zone with two principal groups within the characteristically constant coastal climate. They are found between Fresco and the Liberian border, along the Cavally River, consisting of a deltaic river system. Another group lies in the region between Assinie and Fresco, characterized by rivers flowing into wide lagoons. The mangroves of the lagoons tend to be smaller, although in the Grand Bassam region they have been found to reach up to 20m high (UNEP 2007).

*Complexe Sassandra* (Ramsar Site) is located at the estuary of the Sassandra River. It also includes temporary estuaries, brackish marshes, freshwater swamp forests, alluvial forests, lagoons and mangroves. The site is rare in that it contains red, grey, and white mangroves types. The site hosts species ranging from primates to reptiles, tortoises and sea turtles, some of the great mammals, bats and more than 208 species of birds. Fishing and tourism are the main activities, followed by livestock raising, wood collection and agriculture. The main threats to the area include mammal and bird hunting, over-fishing and pollution from untreated waste from the urban areas. The Buyo dam upstream has also affected the water level in the wetland ("Annotated Ramsar List" 2013).

*Grand Bassam* (Ramsar Site) consists of a mosaic of ecosystems near the estuary of the Comoé River providing refuge for different, often endangered species. The mangroves are an important habitat for chimpanzees, lesser white-nosed monkeys, and sooty mangabeys, as well as a spawning and nursery site for different mollusks, fish and crustaceans. Many birds use the area as a nesting and breeding ground. Although artisanal fishing is the main activity carried out, tourism is also noteworthy, as Grand Bassam was the country's old colonial capital. The main threat includes invasive plant species like water hyacinth and *Salvinia molesta*, while outside the site sand extraction, over-exploitation of natural resources, and the discovery of oil pose growing threats ("Annotated Ramsar List" 2013).

*N'Ganda N'Ganda* (Ramsar Site) is a complex of well-conserved forests, coastal savanna, mangroves and temporary and permanent pools. Numerous plant species present important habitats for terrestrial and aquatic species, many of which are granivorous or frugivorous and contribute to the dispersal and maintenance of several euphorb and other plant species in the area. The site is crucial to maintaining the area's hydrological balance. The site is also culturally significant to its inhabitants, the Ehotilé, who believe they are the children of the lagoon, who originally lived at the bottom of the water, and emerged to explore the terrestrial world. Local people hunt and fish in the site, and collect many plants for medicinal and building purposes. Large-scale pineapple, oil palm, rubber, and coconut plantations outside the site pose one of the main threats due to pollution and habitat destruction ("Annotated Ramsar List" 2013).

*Parc national d'Azagny* (Ramsar Site, National Park) lies on a low plateau consisting of coastal and lagoon ecosystems of forest, savanna, swamp and mangroves, located in Cote d'Ivoire's lagoon region. Many endangered, vulnerable, rare or endemic large-mammal species are found here, having benefited from the

protection this site has afforded them since 1960. The diverse birdlife includes numerous migratory species and large concentrations of several heron species. The mangroves are important spawning and nursery sites for diverse fish species, and play a role in flood control and sediment trapping. Within the site only tourism, research, education and cultural/ spiritual activities are allowed, while outside it subsistence and commercial farming, fishing, wood exploitation, and a conservation education programme are the main activities. Poaching, bush-fires, and invasive species are the main threats to the site ("Annotated Ramsar List" 2013).

## GHANA

In Ghana, mangrove swamps are very restricted in area and distribution and rarely develop beyond the thicket stage. The most developed mangroves are found in the west of the country along the low-lying coastal belt between Côte d'Ivoire and Cape Three Points. These lagoons are enclosed for part of the year by sediments, when rainfall is lower and freshwater outflow is not sufficient to counteract the ocean swells. A secondary region of mangrove growth can be found bordering the lower reaches and delta of the Volta River (UNEP 2007).



*Densu delta* (Ramsar Site) is a delta estuary containing sand dunes, scattered mangrove stands, lagoons, salt pans, marsh, and scrub. Mangroves make up the main vegetation in the salt marsh, with several fish species in the area, too. Local people depend upon the lagoon for fish resources, fuel wood, and salt production ("Annotated Ramsar List" 2013).

*Muni Lagoon* (Ramsar Site) is a coastal lagoon with sand dunes, an open saline lagoon, areas of marshland subject to tidal and seasonal inundation, and degraded forest and scrubland. Eastern fringes of the lagoon are marginally covered with mangroves, while the area has several small and mammal species, and the site supports an estimated population of 23,000 water birds. Fishing is one of the

main activities in the lagoon area, as well as collection of fuel wood, while part of the grassland is used for cattle and sheep grazing ("Annotated Ramsar List" 2013).

*Sakumo Lagoon* (Ramsar Site) is comprised of a coastal brackish-saline lagoon whose main habitats are open lagoon, surrounding floodplains, freshwater marsh, and coastal savanna grassland, with a narrow connection to the sea. The site receives rare and endangered migratory species and several fish species. Fishing is the main livelihood around the lagoon, but some industrial activities occur near the site ("Annotated Ramsar List" 2013).

*Songor Lagoon* (Ramsar Site, UNESCO MAB Biosphere Reserve) is a closed lagoon with inundated mudflats that form the main habitat within the site. There is quite some notable fauna in the area that includes leatherback, olive ridley and green turtles; some migratory birds, including avocet, terns and green shanks, are also present. Local communities depend on the site for fish resources, farming, and salt mining ("Annotated Ramsar List" 2013).

*Anlo-Keta lagoon complex* (Ramsar Site) is part of the Volta estuary comprising several small islands and a complex of lagoons with varying salinity. The dominant vegetation in the area is coastal savanna, and the area is abundant with bird, fish and butterfly species, and the endangered waterbuck. The site is used for its fish resources, salt mining, charcoal production, and hunting ("Annotated Ramsar List" 2013).

## GUINEA

Mangroves are found along the length of the Guinean coast except for Cape Verga and Kaloum Island. The coastal topography facilitates the deposition of sediment and submersion of the mouths of the rivers. There is a long tidal

reach up the estuaries, which causes flooding of the rivers, leaving raised bars. It is here that the mangroves can develop, within the bay of the estuary. Mangroves extend more than 10km inland and, for the widest rivers, even up to 40km inland (UNEP 2007).

*Iles Tristao* (Ramsar Site) is an estuarine complex of extensive mangrove forests and sandy intertidal zones. The site contains several villages where activities include traditional fishing, rice cultivation, and small-scale horticulture. The area supports nesting and wintering birds and hippopotamuses ("Annotated Ramsar List" 2013).

*Konkouré* (Ramsar Site) is an estuarine complex, forming part of the Konkouré River Delta, with extensive intertidal mud/sand flats, mangrove forests and adjoining marsh. Primary human activities include subsistence fishing and rice cultivation. Mangroves provide nesting sites for several rare bird species. Mudflats support large numbers of wintering Palearctic shorebirds ("Annotated Ramsar List" 2013).

*Rio Kapatchez* (Ramsar Site) is a complex of mangrove forests, intertidal mud/sand flats, and freshwater marshes supporting various nesting waterbirds (two rare species), flamingos, and wintering shorebirds. The site includes marshy coastal plains bordered by a stabilized dune cordon. A small island is important as a high tide roost for shorebirds. Human activities include traditional fishing and subsistence rice cultivation. Intensive rice cultivation occurs in surrounding areas ("Annotated Ramsar List" 2013).

*Rio Pongo* (Ramsar Site) is an extensive estuarine complex dominated by mangroves. Several small villages found on stabilized dune ridges within the site depend on traditional fishing and subsistence rice growing. Other human activities include woodcutting by outsiders, poaching, and disturbance of nesting birds ("Annotated Ramsar List" 2013).

## LIBERIA

Except for few places, primary mangrove forest has been replaced by secondary mangrove forest. These mangroves characterize the wetlands of Liberia and cover a small area along the coast, from Cape Mesurado to Cape Palmas, at the edges of lagoons, swamps and along the banks and estuaries of six rivers (UNEP 2007).

*Lake Piso* (Ramsar Site) is an open coastal lagoon near Robertsport, fed by a number of creeks and rivers that these drain a series of swamps above the lagoon, the lower ones of which are tidal and support mangroves. Other mangrove swamps occur behind the dune ridge on the west side of the lake mouth and at other creek mouths. The site is an important nursery and spawning ground for fish and sea turtles and a feeding and roosting place for shore and sea birds. Antelopes, duikers, monkeys, bushbucks, and a few crocodiles are also found in the area. Around 38 communities depend upon Piso for transportation, fishing, and sand for construction. Farm-to-market infrastructure was developed prior to the civil crisis of the 1990s ("Annotated Ramsar List" 2013).

*Marshall Wetlands* (Ramsar Site), comprised of three small rivers, have sandy and rocky shores, and further inland a population of secondary forests and savannah woodland. The wetland is chiefly a mangrove type with mature trees reaching up to 30m. The Red Colobus monkey, the Glossy Ibis, Lesser Kestrel and Common Pratincole are found in the area. The site provides flood control, and underground water recharge, and is a sediment trap. The three rivers are navigable and are used for transport. Harvesting of mangrove forest and dynamiting of fish by local people are serious threats to the site, as is pollution from rubber production. The presence of *Chromolaena odorata*, an invasive alien species that is host to harmful agricultural insects, is a serious problem for farmers ("Annotated Ramsar List" 2013).

*Mesurado Wetlands* (Ramsar Site) is located in Monrovia and Montserrado County. The site is important for the protection of three mangrove species (*Rhizophora harrisonii*, *R. mangle* and *Avicennia africana*) threatened by intense charcoal burning and fuel wood collection. It provides a favorable habitat and feeding ground for several species of birds and crocodile, and plays an important role in shoreline stabilization and sediment trapping. The site is currently used for fuel wood collection, as a dumping site, for car washing, and fishing. Other threats come from unregulated fishing and industrial pollution ("Annotated Ramsar List" 2013).

## SIERRA LEONE

Mangroves, some reaching up to 35m, are found along the length of the coastal area, usually on tidal flats at the river mouths. The mudflats between creeks have a low mangrove cover and are usually less dense. The most extensive stands are located in the northern part of the country (UNEP 2007).

*Sierra Leone River Estuary* (Ramsar Site) near Freetown is dominated by mangrove systems. As it enters the ocean, the estuary widens to about 11km and deepens to form a natural harbor. More than 20,000 individuals have been recorded for some water bird species. The estuary is threatened by vegetation clearance and unsustainable fishing although vast areas of untouched mangrove forest still exist. Fine beaches and the presence of a historic slave castle on Bunce Island are sources of ecotourism ("Annotated Ramsar List" 2013).

## REFERENCES

Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.

Fatoyinbo, T. E., & Simard, M. (2013). Height and biomass of mangroves in Africa from ICESat/GLAS and SRTM. *International Journal of Remote Sensing*, 34(2), 668-681.

Giri C, Ochieng E, Tieszen LL, Zhu Z, Singh A, Loveland T, Masek J, Duke N (2011a). Global distribution of mangroves forests of the world using earth observation satellite data. In Supplement to: Giri et al. (2011b). Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: [data.unep-wcmc.org/datasets/21](http://data.unep-wcmc.org/datasets/21)

Giri C, Ochieng E, Tieszen LL, Zhu Z, Singh A, Loveland T, Masek J, Duke N (2011b). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography* 20: 154-159

The Annotated Ramsar List (2013). Retrieved February 25, 2014, from [http://www.ramsar.org/cda/en/ramsar-documents-list-anno-list-index/main/ramsar/1-31-218%5E23851\\_4000\\_0\\_\\_](http://www.ramsar.org/cda/en/ramsar-documents-list-anno-list-index/main/ramsar/1-31-218%5E23851_4000_0__)

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC.

World Bank. (2014). Population (Total). Data retrieved February 25, 2014, from World DataBank: World Development Indicators database.

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