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Mangroves of the Gulf of Guinea - North LC

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Abstract
Mangroves of the Gulf of Guinea - North is a regional ecosystem subgroup (level 4 unit of the IUCN Global Ecosystem Typology). It includes the marine ecoregions of Gulf of Guinea Central, Gulf of Guinea Upwelling, Gulf of Guinea West. The Gulf of Guinea - North mangrove province mapped extent in 2020 was 6961.2 km^2 across, representing 4.7% of the global mangrove area. The biota is characterized by 5 species of true mangroves.

Although the province's mangroves provide several key ecosystem services they have undergone drastic reduction in their natural range. The mangroves of the Gulf of Guinea – North province are threatened by logging for fuel and charcoal production, conversion for agriculture or aquaculture, and industrial, urban, and tourism development.

The mangrove net area change has been -2.9% since 1996. If this trend continues an overall change of -4.3% is projected over the next 50 years. Furthermore, under a high sea level rise scenario (IPCC RCP 8.5) -9.5% of the Gulf of Guinea - North mangroves would be submerged by 2060. Moreover, 2.8% of the province's mangrove ecosystem is undergoing degradation, with the potential to increase to 6.4% within a 50-year period, based on a vegetation index decay analysis. Overall, the Gulf of Guinea - North mangrove ecosystem is assessed as **Least Concern** (**LC**).

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Keywords:
Mangroves; Red List of ecosystems; ecosystem collapse; threats.

Ecosystem classification:
MFT1.2 Intertidal forests and shrublands

Assessment's distribution:
Gulf of Guinea - North province

Summary of the assessment:

Criterion	A	B	C	D	E	Overall
Subcriterion 1	**LC**	**LC**	**DD**	**DD**	**NE**	**LC**
Subcriterion 2	**LC**	**LC**	**LC**	**LC**		
Subcriterion 3	**DD**	**LC**	**DD**	**DD**		

CR: Critically Endangered, EN: Endangered, VU: Vulnerable, NT: NearThreatened, LC: Least Concern, DD Data Deficient, NE: Not Evaluated

Mangroves of The Gulf of Guinea - North LC

1. Ecosystem Classification

IUCN Global Ecosystem Typology (version 2.1, Keith *et al.* 2022):

Transitional Marine-Freshwater-Terrestrial realm

MFT1 Brackish tidal biome

MFT1.2 Intertidal forests and shrublands

MFT1.2_4_MP_17a Mangroves of the Gulf of Guinea - North

IUCN Habitats Classification Scheme (version 3.1, IUCN 2012):

1 Forest

1.7 Forest – Subtropical/tropical mangrove vegetation above high tide level

12 Marine Intertidal

12.7 Mangrove Submerged Roots

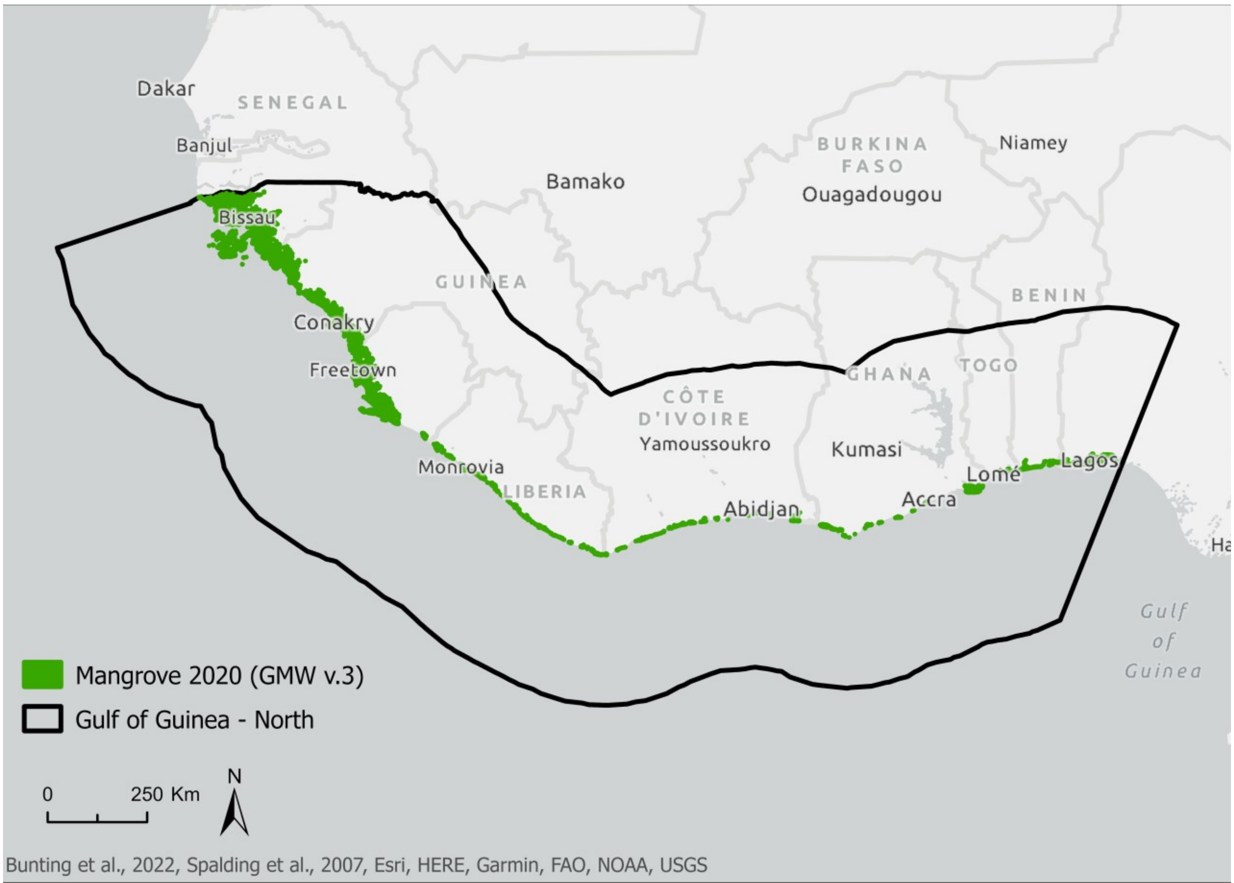

Figure 1. The mangroves of Gulf of Guinea - North.

2. Ecosystem Description

Spatial distribution

The Mangroves of Gulf of Guinea - North includes intertidal forest and shrublands of the marine ecoregions of Gulf of Guinea Central, Gulf of Guinea Upwelling, Gulf of Guinea West, that extent across Benin, Côte d'Ivoire, Ghana, Guinea, Guinea-Bissau, Liberia, Nigeria, Sierra Leone and, Togo (figure 1).

The estimated extent of mangroves in this province is of 6961.2 km^2 in 2020, representing about 4.7% of the global mangrove area. There has been a -2.9 % net area change since 1996 (Bunting *et al.,* 2022). The mangroves are extensive in the northern-most part of this province occupying the entirety of the shorelines of Guinea-Bissau, Guinea and Sierra Leone. The extent of mangroves in this region is associated with the high concentration of tidal flats upon which mangroves develop and significant numbers of estuaries, along which mangroves extend a significant distance inland (up to 40 km in Guinea). Rounding the coastline from Liberia through to Benin the mangroves become increasingly restricted in their distribution. This is likely owing to poorer soil composition and fewer estuaries and where they do occur, they are usually associated with lagoons that form in coastal depressions behind otherwise sandy shorelines (UNEP, 2007; Johnson *et al*. 2001). The southern-most reach of this province then overlaps with the western-most shoreline of Nigeria and the relatively small mangroves of Lagos and Odun.

Biotic components of the ecosystem (characteristic native biota)

The mangroves of the Gulf of Guinea - North province typically consist of 5 or fewer true mangrove plant species (IUCN, 2022). *Avicennia germinans, Conocarpus erectus* and *Rhizophora racemosa* are present in mangrove assemblages within each country of this province. *Acrostichum aureum* and *Laguncularia racemosa* are also common, though absent in some regions. The hybrid species *Rhizophora harrisonii* (Cornejo, 2013) also occurs throughout the province, except in Togo. The invasive species, *Nypa fruticans*, is present in Nigeria, and now Ghana (J-Hude *et al.*, 2019) after its original introduction to Nigeria in 1906. These species are listed as Least Concern (LC) on the IUCN Red List of Threatened Species (IUCN, 2022) except for *Rhizophora harrisonii* which has yet to be evaluated. Despite the relatively low number of mangrove plant species, these ecosystems support a rich diversity of fauna; including nesting waterbirds, wintering Palearctic migrants, crustaceans, and Indo-Pacific fish species such as the mudskipper (UNEP, 2007; John & Lawson, 1990; Ramsar, 2000; Lee *et al.* 2009).

Among the mangrove-associated species in this province, 11 are classified as Near Threatened (NT), 12 as Vulnerable (VU), including the flagship West African manatee (*Trichechus senegalensis*), 7 as Endangered (EN), and 3 as Critically Endangered (CR) (see appendix 2). Endangered species include the plant *Strombosiopsis nana*, two parrots (*Psittacus erithacus* – Grey Parrot, and *Psittacus timneh* – Timneh Parrot), and three primates (*Cercocebus lunulatus* – White-naped Mangabey, *Cercopithecus erythrogaster* – Red-bellied Monkey, and *Colobus polykomos* – King Colobus). Critically Endangered species are the *smalltooth sawfish* (*Pristis pectinata*), *largetooth sawfish* (*Pristis pristis*), and *hawksbill turtle* (*Eretmochelys imbricata*).

Natural stands of Rhizophora racemosa, found throughout the Gulf of Guinea – North province (Photo credit: Valère K. Salako)

All primate species in this province that are highly dependent on mangrove ecosystems are globally threatened — ranging from Vulnerable to Endangered — and are endemic to this region (IUCN, 2002).

The West African shorelines are a vital habitat for several turtle species, providing food and nesting (Fretey & Triplet, 2021). Poilão, an island in the Bijagós Archipelago of Guinea-Bissau, hosts one of the most important Green Turtle nesting sites in the world, with up to 7,400 green turtle clutches laid annually, as well as sporadic nesting of Hawksbill Turtles (Catry *et al.* 2002), and the mangroves in this region are important habitat for development and feeding (IUCN, 2002). Nonetheless, poaching and trafficking of turtles is a substantial threat in West Africa and habitat degradation, light pollution, bushmeat predation, and bycatch all contribute to the continued decline of all species of turtle (Akani *et al.* 2001; Fretey 2001; Witherington, 1992; Witherington & Bjorndal, 1990; George, 1997; IUCN, 2002)

Abiotic Components of the Ecosystem

Many mangrove soils are low in nutrients, especially nitrogen and phosphorus. Regional distributions are influenced by interactions among landscape position, rainfall, hydrology, sea level, sediment dynamics, subsidence, storm-driven processes, and disturbance by pests and predators. Rainfall and sediment supply from rivers and currents promote mangrove establishment and persistence, while waves and large tidal currents destabilise and erode mangrove substrates, mediating local-scale dynamics in ecosystem distributions. High rainfall reduces salinity stress and increases nutrient loading from adjacent catchments, while tidal flushing also regulates salinity.

The mangrove ecosystem of the Gulf of Guinea North province is characterised by a high number of estuaries. The region also contains numerous coastal lagoons and hydromorphic soils. These sandy soils contain a high content of quartz, clay, and various sesquioxide of iron and aluminium resulting from the high frequency of ferralitic processes (Marius & Lucas, 1991; Adam & Boko, 1993). There is also a high concentration of sulphur in the form of various compounds such as iron sulphate and sea salts, which result in particularly high soil acidity, in addition to the high salinity present from sea water. This acidic soil is particularly prevalent under mangrove flats containing *Rhizophora*, with the long, tangled roots easy accumulate pyrites and the decomposition materials from these sulphur compounds, amongst the organic matter and iron that is effectively trapped (Marius & Lucas, 1991).

An unusual feature of the West African shorelines is the presence of saline or hyper-saline flats (or "tannes") where salinity is extremely high. These tannes may either be barren or colonized by a variety of herbaceous plants. The presence of these features is a consequence of extended drought from 1969 – 1993 (Sakho *et al.* 2011) and are often found intermingled amongst mangrove flats (Lebigre & Marius, 1986; Viellefon, 1977). This process of tanne formation appears particularly marked in the Yawri Bay region of Guinea, where increased salinity of water aquifers has resulted in the formation of a considerable number of herbaceous tannes.

In the northern part of the province, from Guinea-Bissau to Sierra Leone, the climate is Tropical, with a wet and a dry season with average annual rainfall along the shoreline averages around 2000 mm/year in most countries in this part of the province. From Liberia to the western shoreline of Nigeria, the climate is equatorial with two wet and two dry seasons with Liberia being the country in this province with the highest annual rainfall (Co *et al.* 2014; Alahacoon *et al.* 2022). In countries with high rainfall, humidity can approach 100% in the wet seasons, however, from Côte d'Ivoire until the westernmost shoreline of Nigeria, annual rainfall and overall humidity decreases, dropping to 1000 mm/year in Ghana and Togo, and with the lowest rainfall recorded in Benin.

Key processes and interactions

Mangroves act as structural engineers, possessing traits such as pneumatophores, salt excretion glands, vivipary, and propagule buoyancy that promote survival and recruitment in poorly aerated, saline, mobile, and tidally inundated substrates (Tomlinson, 1986). They exhibit high efficiency in nitrogen use and nutrient resorption. Mangroves produce large amounts of detritus (e.g., leaves, twigs, and bark), which is either buried in waterlogged sediments, consumed by crabs and gastropods, or more commonly decomposed by fungi and bacteria (Adame *et al.,* 2024), thus mobilising carbon and nutrients to higher trophic levels. These ecosystems also serve as major blue carbon sinks, incorporating organic matter into sediments and living biomass.

Within the Gulf of Guinea North province, mangroves trap substantial amounts of sediment and organic matter. This stabilizes soils and supplies essential nutrients and shelter for many marine species, especially juvenile fish and crustaceans (John & Lawson, 1990; Shumway, 1999). These nutrient inputs often support high fisheries yields in waters adjacent to mangroves (UNEP-WCMC, 2006a) and serve as important breeding grounds for key species such as the West African mangrove oyster (*Crassostrea tulipa*) and the Southern pink shrimp (*Farfantepenaeus notialis*).

Mangroves provide shoreline protection, regulate climate and atmospheric conditions, support water purification, and reduce flood and erosion impacts. A 200-meter-wide mangrove stand can absorb up to 75% of wind-generated wave energy (McIvor et al., 2012). The estimated annual value of ecosystem services provided by one kilometre of mangrove habitat ranges from US$200,000 to 900,000 (UNEP-WCMC, 2006a).

3. Ecosystem Threats and vulnerabilities

Main threatening process and pathways to degradation

Mangrove deforestation arises from various factors, including aquaculture, urbanization, coastal development, over-harvesting (notably firewood harvesting in Guinea; Samoura & Diallo, 2023, but also widespread across the region; UNEP, 2007), and pollution from domestic, industrial, and agricultural land use. Their location within intertidal zones renders mangrove forests particularly vulnerable to sea-level rise driven by climate change. Tropical storms damage mangrove forests through direct defoliation, tree destruction, and mass mortality of associated animal communities.

Population growth and demographic changes are serious threats to the mangrove ecosystems of the Gulf of Guinea North. This is most apparent in countries such as Guinea-Bissau, where 60% of the population lives in the coastal zone. In Ghana, rapid population growth has led to urban expansion along the coast, resulting in widespread mangrove destruction (UNEP, 2007; Boateng et al., 2017; Asante et al., 2017). The city of Accra, for example, has lost more than 50% of its mangrove cover (GIWA, 2006). Coastal development in Togo has had equally destructive effects on mangroves (Johnson et al., 2001; Fousseni et al., 2017). Demographic changes, such as those resulting from political instability, have led to population migration toward the coast in both Sierra Leone and Liberia, resulting in unsustainable utilisation of the mangroves for building construction, materials, food and firewood. Population growth is typically accompanied by increased pollution levels. In Côte d'Ivoire, significant mangrove loss has occurred in areas such as the Ebwe Lagoon and around Abidjan (Dufour & Slepoukha 1975; Arfi *et al.* 1981) and a similar effect was also observed in Togo (Johnson et al, 2001, Kodjo, 2006).

Throughout the province, the conversion of land to rice plantations is common, and has been shown to be highly detrimental to mangroves (e.g. Cacheu region of Guinea-Bissau; Sidibe *et al.* 2014). In addition to conventional agriculture and aquaculture, the traditional fish farming technique “Acadja”, practiced in Benin, involves harvesting mangrove branches to build fish traps. Its widespread expansion now constitutes a significant additional threat to mangrove ecosystems.

Mangroves in Benin adjacent to various anthropogenic activities (Photo credit: Valère K. Salako)

A range of mineral extraction and mining activities also contribute to the degradation of mangrove ecosystems. Solar salt production and sand mining and is commonplace throughout West Africa (e.g. Sierra Leone; Mondal *et al.* 2017) but also gold mines, and illegal mining activities in Ghana (Asante *et al.* 2017; Effah *et al.* 2021), Phosphate mining in Togo (Johnson *et al.* 2001) and Bauxite mining in Guinea (which hosts 25 – 30% of the worlds reserves of bauxite) all contribute in varying degrees to pollution of the mangroves.

Another increasing issue for the preservation of the mangroves is the construction of dams such as the Nagbeto dam in Togo (Guelly *et al.* 2020), the Mono River Dam on the shared boundary between Togo and Benin, and the Akassombo Dam on the Volta in Ghana (Aheto *et al.* 2016). Usually constructed as part of hydroelectric power initiatives, these dams alter the physiochemical parameters of water bodies and is an increasingly widespread problem affecting mangroves in this province (Aheto *et al.* 2016; Mangabay, 2006; Guelly *et al.* 2020).

Harvested mangrove timber Sierra Leone (left) and prepared for charcoal production in Liberia (right). (Photo credit: Valère K. Salako)

Definition of the collapsed state of the ecosystem

Mangroves, acting as structural engineers, possess specialized traits that facilitate high nitrogen use efficiency and nutrient resorption, influencing critical processes and functions within their ecosystem. Ecosystem collapse is recognized when the tree cover of diagnostic true mangrove species dwindles to zero, indicating complete loss (100%).

These ecosystems exhibit remarkable dynamism, with species distributions adapting to local shifts in sediment distribution, tidal patterns, and variations in local inundation and salinity gradients. Disruptive processes can trigger shifts in this dynamism, potentially leading to ecosystem collapse. Ecosystem collapse may manifest through the following mechanisms: a) restricted recruitment and survival of diagnostic true mangroves due to adverse climatic conditions (e.g., low temperatures); b) alterations in rainfall, river inputs, waves, and tidal currents that destabilize and erode substrates, hindering recruitment and growth; c) shifts in rainfall patterns and tidal flushing altering salinity stress and nutrient loadings, impacting overall survival.

Threat Classification

IUCN Threat Classification (version 3.3, IUCN 2022) relevant to mangroves of the Gulf of Guinea - North province:

1. Residential & commercial development
- 1.1 Housing & urban areas
- 1.2 Commercial & industrial areas
- 1.3 Tourism & recreation areas

2. Agriculture & aquaculture
- 2.1 Annual & perennial non-timber crops
    - 2.1.2 Small-holder farming
- 2.4 Marine & freshwater aquaculture
    - 2.4.1 Subsistence/artisanal aquaculture

3. Energy production & mining
- 3.1 Oil & gas drilling
- 3.2 Mining & quarrying
- 3.3 Renewable energy

4. Transportation & service corridors
- 4.1 Roads & railroads
- 4.2 Utility & service lines
- 4.3 Shipping lanes

5. Biological resource use
- 5.1 Hunting & collecting terrestrial animals
    - 5.1.1 Intentional use (species being assessed is the target)
- 5.2 Gathering terrestrial plants
    - 5.2.1 Intentional use (species being assessed is the target)
- 5.3 Logging & wood harvesting
    - 5.3.1 Intentional use: subsistence/small scale (species being assessed is the target [harvest]
    - 5.3.2 Intentional use: large scale (species being assessed is the target) [harvest]
- 5.4 Fishing & harvesting aquatic resources
    - 5.4.1 Intentional use: subsistence/small scale (species being assessed is the target) [harvest]
    - 5.4.2 Intentional use: large scale (species being assessed is the target) [harvest]

7. Natural system modifications

- 7.2 Dams & water management/use
    - 7.2.9 Small dams
    - 7.2.10 Large dams

8. Invasive & other problematic species, genes & diseases

- 8.1 Invasive non-native/alien species/diseases
    - 8.1.2 Named species

9. Pollution

- 9.1 Domestic & urban waste water
    - 9.1.1 Sewage
    - 9.1.2 Run-off
- 9.2 Industrial & military effluents
    - 9.2.2 Seepage from mining
- 9.3 Agricultural & forestry effluents
    - 9.3.1 Nutrient loads
    - 9.3.2 Soil erosion, sedimentation
    - 9.3.3 Herbicides & pesticides
- 9.4 Garbage & solid waste

11. Climate change & severe weather

- 11.1 Habitat shifting & alteration
- 11.2 Droughts
- 11.4 Storms & flooding

4. Ecosystem Assessment

Criterion A: Reduction in Geographic Distribution

Subcriterion A1 measures the trend in ecosystem extent during the last 50-year time window. Unfortunately, there is currently no common regional dataset that provides information for the entire target area in 1970. Therefore, the West African Transition mangrove ecosystem is classified as **Data Deficient (DD)** for this subcriterion.

Subcriterion A2 measures the change in ecosystem extent in any 50-year period, including from the present to the future. To estimate the Gulf of Guinea - North mangrove area from 1996 to 2020, we used the most recent version of the Global Mangrove Watch (GMW v3.0) spatial dataset. The mangrove area in the province (and in the corresponding countries) was corrected for both omission and commission errors, utilizing the equations in Bunting *et al.* (2022).

The Gulf of Guinea - North province mangroves show a net area change of -2.9% (1996-2020) based on the Global Mangrove Watch time series (Bunting *et al.,* 2022). This value reflects the offset between areas gained (+ 0.1%/year) and lost (- 0.2%/year. Applying a linear regression to the area estimations between 1996 and 2020 we obtained a rate of change of -0.1%/year (figure 2). Assuming this trend continues in the future, it is predicted that the extent of mangroves in the Gulf of Guinea - North province will change by -4.7% from 1996 to 2046; by -7.0% from 1996 to 2070; but by -4.3% from 2020 to 2070. Given that these predicted changes in mangrove extent are below the 30% risk threshold, the Gulf of Guinea - North mangrove ecosystem is assessed as **Least Concern** (**LC**) under subcriterion A2.

Subcriterion A3 measures changes in mangrove area since 1750. Unfortunately, there are no reliable data on the mangrove extent for the entire province during this period, and therefore the Gulf of Guinea - North mangrove ecosystem is classified as **Data Deficient** (**DD**) for this subcriterion.

Overall, the ecosystem is assessed as **Least concern** (**LC**) under criterion A.

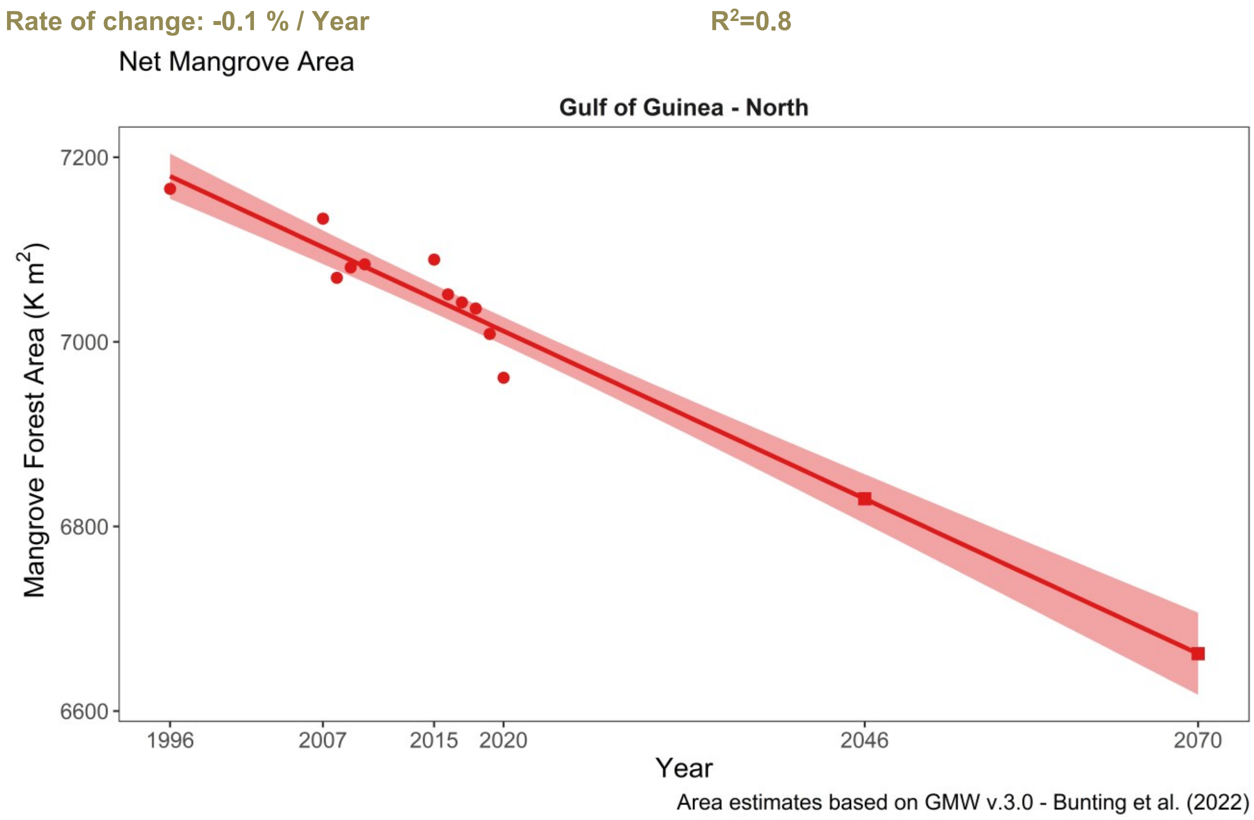

Figure 2. Projected extent of the Gulf of Guinea - North mangrove ecosystem to 2070. Circles represent the province mangrove area between 1996 and 2020 based on the GMW v3.0 dataset and equation(s in Bunting *et al*., (2022). The solid line and shaded area are the linear regression and 95% confidence intervals. Squares show the Gulf of Guinea - North province predicted mangrove area for 2046 and 2070. It is important to note that an exponential model (proportional rate of decline) did not give a better fit to the data (R^2 = 0.8).

Criterion B: Restricted Geographic Distribution

Criterion B measures the risk of ecosystem collapse associated with restricted geographical distribution, based on standard metrics (Extent of Occurrence EOO, Area of Occupancy AOO, and Threat-defined locations). These parameters were calculated based on the 2020 Gulf of Guinea - North province mangrove extent (GMW v.3).

Province	Extent of Occurrence EOO (Km^2)	Area of Occupancy (AOO)	Criterion B
The Gulf of Guinea - North	916930.0	457	**LC**

For 2020, AOO and EOO were measured as 715 grid cells 10 x 10 km and 916930.0 km^2, respectively (figure 3). Excluding from the AOO those grid cells that contain patches of mangrove forest that account for less than 1% of the grid cell area, (< 1 Km^2), the AOO is measured as **457, 10 x 10 km grid cells** (Figure 3, red grids).

Considering the very high number of threat-defined-locations, there is no evidence of plausible catastrophic threats leading to potential disappearance of mangroves across their extent. As a result, the Gulf of Guinea - North mangrove ecosystem is assessed as **Least Concern** (**LC**) under criterion B.

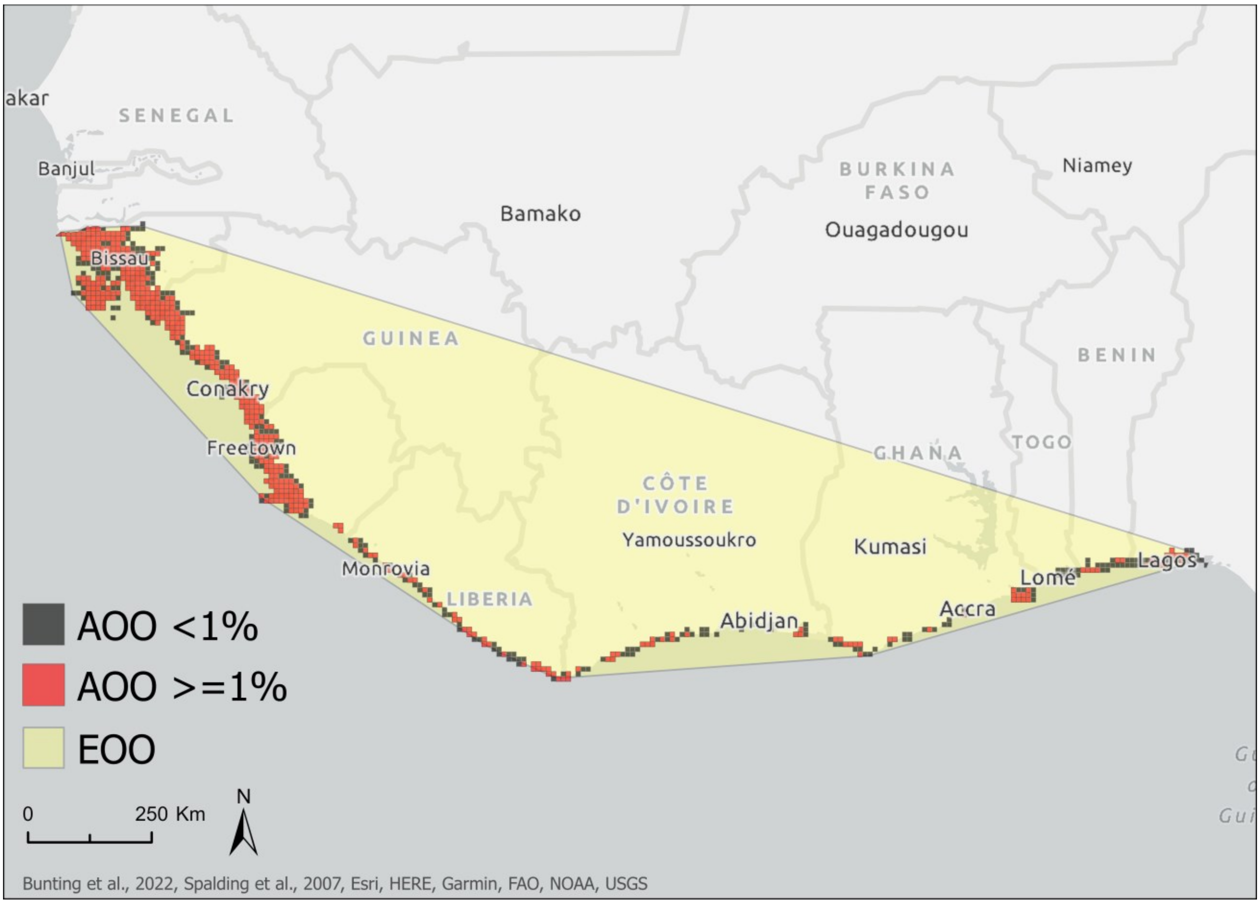

Figure 3. The Gulf of Guinea - North mangrove Extent Of Occurrence (EOO) and Area Of Occupancy (AOO) in 2020. Estimates based on 2020 GMW v3.0 spatial layer (Bunting *et al.*, 2022). The red 10 x 10 km grids (n=457.) are more than 1% covered by the ecosystem, and the black grids <1% (n= 258).

Criterion C: Environmental Degradation

Criterion C measures the environmental degradation of abiotic variables necessary to support the ecosystem.

Subcriterion C1 measures environmental degradation over the past 50 years: There are no reliable data to evaluate this subcriterion for the entire province, and therefore the Gulf of Guinea - North mangrove ecosystem is classified as **Data Deficient** (**DD**) for subcriterion C1.

Subcriterion C2 measures environmental degradation in the future, or over any 50-year period, including from the present. In this context, the impact of future sea level rise (SLR) on mangrove ecosystems was assessed by adopting the methodology presented by Schuerch *et al.* (2018). The published model was designed to calculate both absolute and relative change in the extent of wetland ecosystems under various regional SLR scenarios (i.e medium: RCP 4.5 and high: RCP 8.5), with consideration for sediment accretion. Therefore, Schuerch *et al*. (2018) model was applied to the Gulf of Guinea - North mangrove ecosystem boundary, using the spatial extent in 2010 (Giri et al. (2011) and assuming mangrove landward migration was not possible.

According to the results, under an extreme sea-level rise scenario of a 1.1 meter rise by 2100, the projected submerged area is ~ -9.5% by 2060, which remains below the 30% risk threshold. Therefore, considering that no mangrove recruitment can occur in a submerged system (100% relative severity), but that -9.5% of the ecosystem extent will be affected by SLR, the Gulf of Guinea - North mangrove ecosystem is assessed as **Least Concern** (**LC**) for subcriterion C2.

Subcriterion C3 measures change in abiotic variables since 1750. There is a lack of reliable historic data on environmental degradation covering the entire province, and therefore the Gulf of Guinea - North province is classified as Data Deficient (DD) for this subcriterion.

Overall, the ecosystem is assessed as **Least Concern** (**LC**) under criterion C.

Criterion D: Disruption of biotic processes or interactions

The global mangrove degradation map developed by Worthington and Spalding (2018) was used to assess the level of biotic degradation in the Gulf of Guinea - North province. This map is based on degradation metrics calculated from vegetation indices (NDVI, EVI, SAVI, NDMI) using Landsat time series (≈2000 and 2017). These indices represent vegetation greenness and moisture condition.

Mangrove degradation was calculated at a pixel scale (30m resolution), on areas intersecting with the 2017 mangrove extent map (GMW v2). Mangrove pixels were classified as degraded if two conditions were met: 1) at least 10 out of 12 degradation indices showed a decrease of more than 40% compared to the previous period; and 2) all twelve indices did not recover to within 20% of their pre-2000 value (detailed methods and data are available at: maps.oceanwealth.org/mangrove-restoration/)). The decay in vegetation indices has been used to identify mangrove degradation and abrupt changes, including mangrove die-back events, clear-cutting, fire damage, and logging; as well as to track mangrove regeneration (Lovelock *et al.,* 2017; Santana *et al.,* 2018; Murray *et al.,* 2020; Aljahdali *et al.,* 2021; Lee *et al.,* 2021). However, it is important to consider that changes observed in the vegetation indices can also be influenced by data artifacts (Akbar *et al.,* 2020). Therefore, a relative severity level of more than 50%, but less than 80%, was assumed.

The results from this analysis show that over a period of 17 years (~2000 to 2017), 2.2% of the Gulf of Guinea - North mangrove area is classified as degraded, resulting in an average annual rate of degradation of 0.13%. Assuming this trend remains constant, +6.4% of the Gulf of Guinea - North mangrove area will be classified as degraded over a 50-year period. Since less than 30% of the ecosystem will meet the category thresholds for criterion D, the Gulf of Guinea - North mangrove province is assessed as **Least Concern** (**LC**) under subcriterion D2b.

No data were found to assess the disruption of biotic processes and degradation over the past 50 years (subcriterion D1) or since 1750 (subcriterion D3). Thus, both subcriteria are classified as **Data Deficient** (**DD**).

Overall, the Gulf of Guinea - North ecosystem remains **Least Concern** (**LC**) under criterion D.

Criterion E: Quantitative Risk

No model was used to quantitatively assess the risk of ecosystem collapse for this ecosystem; hence criterion E was **Not Evaluated** (**NE**).

5. Summary of the Assessment

CRITERION			
A. Reduction in Geographic Distribution	**A1** Past 50 years	**A2** Future or any 50y period	**A3** Historical (1750)
	DD	**LC**	**DD**
B. Restricted Geo. Distribution	**B1** Extent of Occurrence	**B2** Area of Occupancy	**B3** # Threat-defined Locations < 5
	LC	**LC**	**LC**
C. Environmental Degradation	**C1** Past 50 years (1970)	**C2** Future or any 50y period	**C3** Historical (1750)
	DD	**LC**	**DD**
D. Disruption of biotic processes	**D1** Past 50 years (1970)	**D2** Future or Any 50y period	**D3** Historical (1750)
	DD	**LC**	**DD**
E. Quantitative Risk analysis	**NE**		
OVERALL RISK CATEGORY	**LC**		

DD = Data Deficient; LC = Least Concern; NE = Not Evaluated

Overall, the status of the Gulf of Guinea - North mangrove ecosystem is assessed as **Least Concern** (**LC**).

6. References

Adam, K. S., & Boko, M. (1993). Le Benin. *Les Editions du Flamboyant*. Cotonou, 97 pp.

Aheto, D. W., Kankam, S., Okyere, I., Mensah, E., Osman, A., Jonah, F. E., & Mensah, J. C. (2016). Community-based mangrove forest management: Implications for local livelihoods and coastal resource conservation along the Volta estuary catchment area of Ghana. *Ocean & coastal management, 127*, 43-54. https://doi.org/10.1016/j.ocecoaman.2016.04.006

Akani, G.C., Capizzi, D. & Luiselli, L. (2001). Diet of the softshell turtle, *Trionyx triunguis*, in an Afrotropical forested region. *Chelonian Conservation and Biology, 4*: 200-201.

Akbar, M.R. Akbar, M R, P A A Arisanto, B A Sukirno, P H Merdeka, M M Priadhi, and S Zallesa. (2020) 'Mangrove vegetation health index analysis by implementing NDVI (normalized difference vegetation index) classification method on sentinel-2 image data case study: Segara Anakan, Kabupaten Cilacap', *IOP Conference Series: Earth and Environmental Science*, 584(1), p. 012069.: https://doi.org/10.1088/1755-1315/584/1/012069.

Aljahdali, M. O., Munawar, S., & Khan, W. R. (2021). Monitoring Mangrove Forest Degradation and Regeneration: Landsat Time Series Analysis of Moisture and Vegetation Indices at Rabigh Lagoon, Red Sea. *Forests*, *12*(1), 52. https://doi.org/10.3390/f12010052

Arfi, R., Dufour P. and Maurer, D. (1981). Phytoplancton et pollution. Premières études en baie de Biétri (Côte d'Ivoire). Traitement mathématique des données. *Oceanologica Acta 4*: 319-329. https://archimer.ifremer.fr/doc/00131/24200/

Asante, W. A., Acheampong, E., Boateng, K., & Adda, J. (2017). The implications of land tenure and ownership regimes on sustainable mangrove management and conservation in two Ramsar sites in Ghana. Forest Policy and Economics, 85, 65-75. https://doi.org/10.1016/j.forpol.2017.08.018

Boateng, I., Wiafe, G., & Jayson-Quashigah, P. N. (2017). Mapping vulnerability and risk of Ghana's coastline to sea level rise. Marine Geodesy, 40(1), 23-39 https://doi.org/10.1080/01490419.2016.1261745

Bunting, P., Rosenqvist, A., Hilarides, L., Lucas, R. M., Thomas, N., Tadono, T., Worthington, T. A., Spalding, M.D., Murray, N. J., & Rebelo, L.-M. (2022). Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0. *Remote Sensing*, *14*(15), 3657. https://doi.org/10.3390/rs14153657

Catry, P., Barbosa, C., Indjai, B., Almeida, A., Godley, B., & Vié, J-C. (2002). First census of the green turtle at Poilifilo, Bijagos Archipelago, Guinea-Bissau: the most important nesting colony on the Atlantic coast of Africa. *Oryx. 36*, 400-403. 10.1017/S0030605302000765

Cornejo, X. (2013). Lectotypification and a New Status for Rhizophora X Harrisonii (Rhizophoraceae), a Natural Hybrid Between *R. Mangle* and *R. Racemosa*. *Harvard Papers in Botany, 18*(1), 37. https://doi.org/10.3100/025.018.0106

Dufour, P. and Slepoukha, M. (1975). L'oxygène dissous en lagune Ebrié: influence de l'hydroclimat et des pollutions. Doc. Sci. Cent. Rech.Océanogr. Abidjan *ORSTOM 6*: 75–118. http://hdl.handle.net/1834/24783

Effah, E., Aheto, D. W., Acheampong, E., Tulashie, S. K., & Adotey, J. (2021). Human health risk assessment from heavy metals in three dominant fish species of the Ankobra river, Ghana. *Toxicology reports, 8*, 1081-1086. https://doi.org/10.1016/j.toxrep.2021.05.010

Fousseni, F., Andrianamenoso, R., Kperkouma, W., Agbelessessi, W., Madjouma, K., Hodabalo, P., ... & Koffi, A. (2017). *Écologie et dynamique spatio-temporelle des mangroves au Togo*. VertigO: la revue électronique en sciences de l'environnement, 17(3). https://id.erudit.org/iderudit/1058386ar

Fretey, J. (2001). Biogeography and conservation of marine turtles of the Atlantic Coast of Africa. CMS Technical Series Publication No 6. UNEP/CMS Secretariat, Bonn, Germany.

Fretey & Triplet, (2021). RAMSAR sites and marine turtles an overview. https://www.ramsar.org/sites/default/files/documents/library/tortues_marines_ramsar_dec21_e.pdf

George, R.H. (1997). Health problems and diseases of sea turtles. In: P.L. Lutz & J.A. Musick (eds) *The Biology of Sea Turtles*, pp. 363-409. CRC Press, Boca Raton, Florida. ISBN 9780203737088

Giri, C. et al. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Glob. Ecol. Biogeogr. 20*(54–159).

GIWA. (2006). Freshwater Shortages, Engineering of River Flows, Pollution and Overfishing Highlighted in Final Global International Waters Assessment. http://www.unep.org/Documents.Multilingual/Default.Print.asp?DocumentID=471&ArticleID=5234&l=en (accessed 30 June 2006).

Guelly, K., Hodabalo, P., & Oyétoundé, D. (2020). Des acteurs et des écosystèmes de mangrove du littoral togolais. https://doi.org/10.4060/ca8640fr

IUCN (2012). *IUCN Habitats classification scheme* (3.1). [Data set]. https://www.iucnredlist.org/resources/habitat-classification-scheme.

IUCN (2022). *The IUCN Red List of Threatened Species.* (Version 2022-2) [Data set]. https://www.iucnredlist.org

IUCN-CMP (2022). *Unified Classification of Direct Threats* (3.3) [Data set]. https://www.iucnredlist.org/resources/threat-classification-scheme.

John, D.M., & Lawson, G.W. (1990). A review of mangrove and coastal ecosystems in West African and their possible relationships. *Estuarine, Coastal and Shelf Science, 31*(5): 505-518. https://doi.org/10.1016/0272-7714(90)90009-G

Johnson, D., Blivi, A., Houedakor, K., Kwassi, A., Sena, N. (2001). Le littoral du Togo: données et gestion intégrée. *Centre de Gestion Intégrée du Littoral et de l'Environnement*. Université de Lomé, Togo, Guinea. http://www.coastgis.org/01pdfs/johnson.pdf

Keith, D. A., Ferrer-Paris, J. R., Nicholson, E., & Kingsford, R. T. (Eds.) (2020). *IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups*. IUCN, International Union for Conservation of Nature. https://doi.org/10.2305/IUCN.CH.2020.13.en

Kodjo, E.A. 2006. The Mangroves of Togo Are Disappearing. Topic #48. Available at http://www.africanconservation.org/dcforum/DCForumID29/48.html

Lebigre, J. M. & Marlus, C. (1986). Etude phytopédologique des mangroves et tannes de la Mondah (Gabon). CEGET. *Etudes de géographie tropicale, série Géogr. Physique*, *6*: 44 p

Lee, V., Tobey, J., Castro, K., Crawford, B., Dia, I.M., Drammeh, O., & Tanvi, V. (2009). Marine Biodiversity Assets and Threats Assessment for WAMER. Gambia-Senegal Sustainable Fisheries Project, Banjul, The Gambia, 47 p. https://www.crc.uri.edu/download/Gambia_Biodiversity_Threats_Assessment.pdf

Lee, C. K. F., Duncan, C., Nicholson, E., Fatoyinbo, T. E., Lagomasino, D., Thomas, N., Worthington, T. A., & Murray, N. J. (2021). Mapping the Extent of Mangrove Ecosystem Degradation by Integrating an Ecological Conceptual Model with Satellite Data. *Remote Sensing*, *13*(11), 2047. https://doi.org/10.3390/rs13112047

Lovelock, C. E., Feller, I. C., Reef, R., Hickey, S., & Ball, M. C. (2017). Mangrove dieback during fluctuating sea levels. *Scientific Reports*, *7*(1), 1680. https://doi.org/10.1038/s41598-017-01927-6

Marius, C., & Lucas, J. (1991). Holocene Mangrove Swamps of West Africa Sedimentology and Soils. *Journal of African Earth Sciences. 12*(1):41-54. https://doi.org/10.1016/0899-5362(91)90056-5

McIvor, A., Spencer, T., Möller, I., & Spalding, M. (2012) Storm surge reduction by mangroves. *NCP Report* 2012-02

Mondal, P., Trzaska, S., & De Sherbinin, A. (2017). Landsat-derived estimates of mangrove extents in the Sierra Leone coastal landscape complex during 1990–2016. *Sensors, 18*(1), 12. https://doi.org/10.3390/s18010012

Mongabay. 2006. Guinea Bissau. In: Tropical Rainforests. Available at http://rainforests.mongabay.com/20guineabissau.htm

Moudingo, J-H., Ajonina, G & Siegfried Didier, D. (2019). Introduction, Distribution and Drivers of Non-native Mangrove Palm Nypa fruticans Van Wurmb (Arecaceae). *Advances in Ecological and Environmental Research (ISSN 2517-9454, USA),* 1-20

Murray, N. J., Keith, D. A., Tizard, R., Duncan, A., Htut, W. T., Oo, A. H., Ya, K. Z., & Grantham, M. (2020). *Threatened ecosystems of Myanmar: An IUCN Red List of Ecosystems Assessment. Version 1*. Wildlife Conservation Society. https://doi.org/10.19121/2019.Report.37457

Ramsar (2000). La Convention Ramsar sur les zones humides. What's New @ Ramsar. Benin becomes the Convention's 119th Contracting Party. http://www.ramsar.org/ wn/w.n.benin_119th.

Sakho, I., Mesnage, V., Deloffre, J., Lafite, R., Niang, I. & Faye, G. (2011). The influence of natural and anthropogenic factors on mangrove dynamics over 60 years: The Somone Estuary, Senegal. *Estuarine Coastal and Shelf Science, 94*: 93-101. https://doi.org/10.1016/j.ecss.2011.05.032

Samoura, K. & Diallo, L. (2003). Environmental issues associated with the main sectors of energy production in Guinea *AJEAM-RAGEE 5*: 28–38.

Santana, N. (2018). Fire Recurrence and Normalized Difference Vegetation Index (NDVI) Dynamics in Brazilian Savanna. *Fire*, *2*(1), 1. https://doi.org/10.3390/fire2010001

Schuerch, M., Spencer, T., Temmerman, S., Kirwan, M. L., Wolff, C., Lincke, D., McOwen, C. J., Pickering, M. D., Reef, R., Vafeidis, A. T., Hinkel, J., Nicholls, R. J., & Brown, S. (2018). Future response of global coastal wetlands to sea-level rise. *Nature*, *561*(7722), 231–234. https://doi.org/10.1038/s41586-018-0476-5

Sidibe, D., Lazar, G., & Darraz, C. (2014). Application of digital mapping (GIS) to delineate floodplains in lower Guinea, Republic of Guinea. Environmental Engineering & Management Journal (EEMJ), 13(7). https://doi.org/10.30638/eemj.2014.190

Spalding, M. D., Fox, H. E., Allen, G. R., Davidson, N., Ferdaña, Z. A., Finlayson, M., Halpern, B. S., Jorge, M. A., Lombana, A., Lourie, S. A., Martin, K. D., McManus, E., Molnar, J., Recchia, C. A., & Robertson, J. (2007). Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. *BioScience*, *57*(7), 573–583. https://doi.org/10.1641/B570707

Tweh, C.G., Lormie, M.M., Kouakou, C.Y., Hillers, A., Kuhl, H.S. & Junker, J. (2015). Conservation status of chimpanzees Pan troglodytes verus and other large mammals in Liberia: a nationwide survey. Oryx. 49, 710–718. https://doi.org/ 10.1017/S0030605313001191

UNEP (2007). Mangroves of Western and Central Africa. UNEP-Regional Seas Programme/UNEP-WCMC. https://resources.unep-wcmc.org/products/WCMC_RT149

UNEP-WCMC. (2006). In the Front Line: Shoreline Protection and Other Ecosystem Services from Mangroves and Coral Reefs. Cambridge, UK.

Viellefon, J. (1977). Les sols des mangroves et des tannes de basse Casamance (Sénégal) : importance du comportement géochimique du soufre dans leur pédogenèse. *Mémoires ORSTOM, 83*: 298 p. ISBN 2-7099-0446-2

Witherington, B.E. (1992). Behavioral responses of nesting sea turtles to artificial lighting. Herpetologica 48: 31-39. https://doi.org/10.1071/ZO13028

Witherington, B.E. & Bjorndal, K A. (1990). Influences of artificial lighting on the seaward orientation of hatchling loggerhead turtles, Caretta caretta. *Biological Conservation 53*: 139-149. https://doi.org/10.1016/0006-3207(91)90053-C

Worthington, T.A., & Spalding, M. D. (2018). *Mangrove Restoration Potential: A global map highlighting a critical opportunity*. Apollo - University of Cambridge Repository. https://doi.org/10.17863/CAM.39153

Worthington, T. A., Zu Ermgassen, P. S. E., Friess, D. A., Krauss, K. W., Lovelock, C. E., Thorley, J., Tingey, R., Woodroffe, C. D., Bunting, P., Cormier, N., Lagomasino, D., Lucas, R., Murray, N. J., Sutherland, W. J., & Spalding, M.D. (2020). A global biophysical typology of mangroves and its relevance for ecosystem structure and deforestation. *Scientific Reports*, *10*(1), 14652. https://doi.org/10.1038/s41598-020-71194-5

Authors:

Salako, K. V; McGregor, S. G. & Suárez, E. L., (2023). 'IUCN Red List of Ecosystems, Mangroves of the Gulf of Guinea - North'. EcoEvoRxiv.

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7. Appendices

1. List of Key Mangrove Species

List of plant species considered true mangroves according to Red List of Threatened Species (RLTS) spatial data (IUCN, 2022). We included species whose range maps intersected with the boundary of the marine provinces/ecoregions described in the distribution section.

Class	Order	Family	Scientific name	RLTS category
Magnoliopsida	Lamiales	Acanthaceae	*Avicennia germinans*	LC
Magnoliopsida	Malpighiales	Rhizophoraceae	*Rhizophora mangle*	LC
Magnoliopsida	Malpighiales	Rhizophoraceae	*Rhizophora racemosa*	LC
Magnoliopsida	Myrtales	Combretaceae	*Laguncularia racemosa*	LC
Polypodiopsida	Polypodiales	Pteridaceae	*Acrostichum aureum*	LC

2. List of Associated Species

List of taxa that are associated with mangrove habitats in the Red List of Threatened Species (RLTS) database (IUCN, 2022). We included only species with entries for Habitat 1.7: "Forest - Subtropical/Tropical Mangrove Vegetation Above High Tide Level" or Habitat 12.7 for "Marine Intertidal - Mangrove Submerged Roots", and with suitability recorded as "Suitable", with "Major Importance" recorded as "Yes", and any value of seasonality except "Passage". The common names are those shown in the RLTS, except common names in brackets, which are from other sources.

Class	Order	Family	Scientific name	RLTS category	Common name
Actinopterygii	Anguilliformes	Ophichthidae	*Dalophis cephalopeltis*	LC	
Actinopterygii	Anguilliformes	Ophichthidae	*Myrophis plumbeus*	LC	Leaden Worm Eel
Actinopterygii	Cyprinodontiformes	Nothobranchiidae	*Epiplatys dageti*	LC	Redchin Panchax
Actinopterygii	Cyprinodontiformes	Poeciliidae	*Aplocheilichthys spilauchen*	LC	Banded Lampeye
Actinopterygii	Elopiformes	Elopidae	*Elops lacerta*	LC	
Actinopterygii	Gobiiformes	Eleotridae	*Bostrychus africanus*	LC	
Actinopterygii	Gobiiformes	Eleotridae	*Dormitator lebretonis*	LC	
Actinopterygii	Gobiiformes	Gobiidae	*Bathygobius soporator*	LC	Frillfin Goby
Actinopterygii	Gobiiformes	Gobiidae	*Psammogobius biocellatus*	LC	Sleepy Goby
Actinopterygii	Perciformes	Carangidae	*Caranx bartholomaei*	LC	Yellow Jack
Actinopterygii	Perciformes	Carangidae	*Caranx hippos*	LC	Crevalle Jack
Actinopterygii	Perciformes	Carangidae	*Chloroscombrus chrysurus*	LC	Atlantic Bumper
Actinopterygii	Perciformes	Cichlidae	*Sarotherodon melanotheron*	LC	Blackchin Tilapia
Actinopterygii	Perciformes	Epinephelidae	*Epinephelus itajara*	VU	Atlantic Goliath Grouper

Class	Order	Family	Scientific name	RLTS category	Common name
Actinopterygii	Perciformes	Haemulidae	*Plectorhinchus gibbosus*	LC	Brown Sweetlips
Actinopterygii	Perciformes	Leiognathidae	*Gazza minuta*	LC	Toothed Ponyfish
Actinopterygii	Perciformes	Lutjanidae	*Lutjanus dentatus*	DD	
Actinopterygii	Perciformes	Sciaenidae	*Pseudotolithus elongatus*	LC	
Actinopterygii	Pleuronectiformes	Bothidae	*Bothus lunatus*	LC	Plate Fish
Actinopterygii	Syngnathiformes	Syngnathidae	*Enneacampus kaupi*	LC	
Actinopterygii	Tetraodontiformes	Tetraodontidae	*Lagocephalus laevigatus*	LC	Smooth Puffer
Aves	Accipitriformes	Accipitridae	*Accipiter toussenelii*	LC	Red-chested Goshawk
Aves	Accipitriformes	Accipitridae	*Gypohierax angolensis*	LC	Palm-nut Vulture
Aves	Accipitriformes	Accipitridae	*Haliaeetus vocifer*	LC	African Fish-eagle
Aves	Accipitriformes	Pandionidae	*Pandion haliaetus*	LC	Osprey
Aves	Bucerotiformes	Bucerotidae	*Bycanistes fistulator*	LC	Western Piping Hornbill
Aves	Bucerotiformes	Bucerotidae	*Bycanistes sharpii*	LC	Eastern Piping Hornbill
Aves	Caprimulgiformes	Apodidae	*Apus affinis*	LC	Little Swift
Aves	Caprimulgiformes	Apodidae	*Apus caffer*	LC	White-rumped Swift
Aves	Caprimulgiformes	Apodidae	*Rhaphidura sabini*	LC	Sabine's Spinetail
Aves	Charadriiformes	Burhinidae	*Burhinus senegalensis*	LC	Senegal Thick-knee
Aves	Charadriiformes	Burhinidae	*Burhinus vermiculatus*	LC	Water Thick-knee
Aves	Charadriiformes	Charadriidae	*Charadrius dubius*	LC	Little Ringed Plover
Aves	Charadriiformes	Glareolidae	*Glareola cinerea*	LC	Grey Pratincole
Aves	Charadriiformes	Scolopacidae	*Actitis hypoleucos*	LC	Common Sandpiper
Aves	Charadriiformes	Scolopacidae	*Numenius arquata*	NT	Eurasian Curlew
Aves	Charadriiformes	Scolopacidae	*Numenius phaeopus*	LC	Whimbrel
Aves	Charadriiformes	Scolopacidae	*Tringa nebularia*	LC	Common Greenshank
Aves	Ciconiiformes	Ciconiidae	*Ciconia microscelis*	LC	African Woollyneck
Aves	Columbiformes	Columbidae	*Streptopelia semitorquata*	LC	Red-eyed Dove
Aves	Columbiformes	Columbidae	*Turtur afer*	LC	Blue-spotted Wood-dove

Class	Order	Family	Scientific name	RLTS category	Common name
Aves	Coraciiformes	Alcedinidae	*Alcedo quadribrachys*	LC	Shining-blue Kingfisher
Aves	Coraciiformes	Alcedinidae	*Ceryle rudis*	LC	Pied Kingfisher
Aves	Coraciiformes	Alcedinidae	*Corythornis cristatus*	LC	Malachite Kingfisher
Aves	Coraciiformes	Alcedinidae	*Corythornis leucogaster*	LC	White-bellied Kingfisher
Aves	Coraciiformes	Alcedinidae	*Halcyon malimbica*	LC	Blue-breasted Kingfisher
Aves	Coraciiformes	Alcedinidae	*Megaceryle maxima*	LC	Giant Kingfisher
Aves	Coraciiformes	Coraciidae	*Eurystomus glaucurus*	LC	Broad-billed Roller
Aves	Coraciiformes	Meropidae	*Merops nubicus*	LC	Northern Carmine Bee-eater
Aves	Coraciiformes	Meropidae	*Merops persicus*	LC	Blue-cheeked Bee-eater
Aves	Gruiformes	Heliornithidae	*Podica senegalensis*	LC	African Finfoot
Aves	Gruiformes	Rallidae	*Himantornis haematopus*	LC	Nkulengu Rail
Aves	Passeriformes	Cisticolidae	*Apalis flavida*	LC	Yellow-breasted Apalis
Aves	Passeriformes	Cisticolidae	*Camaroptera brachyura*	LC	Bleating Camaroptera
Aves	Passeriformes	Cisticolidae	*Eremomela pusilla*	LC	Senegal Eremomela
Aves	Passeriformes	Cisticolidae	*Hypergerus atriceps*	LC	Oriole Warbler
Aves	Passeriformes	Cisticolidae	*Prinia subflava*	LC	Tawny-flanked Prinia
Aves	Passeriformes	Estrildidae	*Nigrita bicolor*	LC	Chestnut-breasted Nigrita
Aves	Passeriformes	Hirundinidae	*Cecropis abyssinica*	LC	Lesser Striped Swallow
Aves	Passeriformes	Hirundinidae	*Hirundo nigrita*	LC	White-bibbed Swallow
Aves	Passeriformes	Macrosphenidae	*Sylvietta brachyura*	LC	Northern Crombec
Aves	Passeriformes	Malaconotidae	*Dryoscopus gambensis*	LC	Northern Puffback
Aves	Passeriformes	Malaconotidae	*Laniarius barbarus*	LC	Yellow-crowned Gonolek
Aves	Passeriformes	Monarchidae	*Terpsiphone rufiventer*	LC	Red-bellied Paradise-flycatcher
Aves	Passeriformes	Muscicapidae	*Artomyias ussheri*	LC	Ussher's Flycatcher

Class	Order	Family	Scientific name	RLTS category	Common name
Aves	Passeriformes	Muscicapidae	*Cossypha niveicapilla*	LC	Snowy-crowned Robin-chat
Aves	Passeriformes	Nectariniidae	*Anabathmis reichenbachii*	LC	Reichenbach's Sunbird
Aves	Passeriformes	Nectariniidae	*Anthreptes gabonicus*	LC	Mouse-brown Sunbird
Aves	Passeriformes	Nectariniidae	*Anthreptes longuemarei*	LC	Western Violet-backed Sunbird
Aves	Passeriformes	Nectariniidae	*Chalcomitra fuliginosa*	LC	Carmelite Sunbird
Aves	Passeriformes	Nectariniidae	*Cinnyris chloropygius*	LC	Olive-bellied Sunbird
Aves	Passeriformes	Nectariniidae	*Cinnyris cupreus*	LC	Copper Sunbird
Aves	Passeriformes	Nectariniidae	*Cinnyris pulchellus*	LC	Beautiful Sunbird
Aves	Passeriformes	Nectariniidae	*Cinnyris superbus*	LC	Superb Sunbird
Aves	Passeriformes	Nectariniidae	*Cinnyris venustus*	LC	Variable Sunbird
Aves	Passeriformes	Nectariniidae	*Cyanomitra olivacea*	LC	Olive Sunbird
Aves	Passeriformes	Nectariniidae	*Cyanomitra verticalis*	LC	Green-headed Sunbird
Aves	Passeriformes	Oriolidae	*Oriolus nigripennis*	LC	Black-winged Oriole
Aves	Passeriformes	Phylloscopidae	*Phylloscopus collybita*	LC	Common Chiffchaff
Aves	Passeriformes	Phylloscopidae	*Phylloscopus trochilus*	LC	Willow Warbler
Aves	Passeriformes	Platysteiridae	*Platysteira cyanea*	LC	Brown-throated Wattle-eye
Aves	Passeriformes	Ploceidae	*Ploceus brachypterus*	LC	Olive-naped Weaver
Aves	Passeriformes	Ploceidae	*Ploceus pelzelni*	LC	Slender-billed Weaver
Aves	Passeriformes	Pycnonotidae	*Eurillas virens*	LC	Little Greenbul
Aves	Passeriformes	Stenostiridae	*Elminia longicauda*	LC	African Blue-flycatcher
Aves	Passeriformes	Sturnidae	*Lamprotornis splendidus*	LC	Splendid Starling
Aves	Passeriformes	Sylviidae	*Sylvia atricapilla*	LC	Eurasian Blackcap
Aves	Pelecaniformes	Ardeidae	*Ardea brachyrhyncha*	LC	Yellow-billed Egret
Aves	Pelecaniformes	Ardeidae	*Ardea cinerea*	LC	Grey Heron
Aves	Pelecaniformes	Ardeidae	*Ardea goliath*	LC	Goliath Heron
Aves	Pelecaniformes	Ardeidae	*Ardea purpurea*	LC	Purple Heron

Class	Order	Family	Scientific name	RLTS category	Common name
Aves	Pelecaniformes	Ardeidae	*Butorides striata*	LC	Green-backed Heron
Aves	Pelecaniformes	Ardeidae	*Calherodius leuconotus*	LC	White-backed Night-heron
Aves	Pelecaniformes	Ardeidae	*Egretta ardesiaca*	LC	Black Heron
Aves	Pelecaniformes	Ardeidae	*Egretta garzetta*	LC	Little Egret
Aves	Pelecaniformes	Ardeidae	*Egretta gularis*	LC	Western Reef-egret
Aves	Pelecaniformes	Ardeidae	*Ixobrychus minutus*	LC	Common Little Bittern
Aves	Pelecaniformes	Ardeidae	*Ixobrychus sturmii*	LC	Dwarf Bittern
Aves	Pelecaniformes	Ardeidae	*Nycticorax nycticorax*	LC	Black-crowned Night-heron
Aves	Pelecaniformes	Ardeidae	*Tigriornis leucolopha*	LC	White-crested Tiger-heron
Aves	Pelecaniformes	Pelecanidae	*Pelecanus rufescens*	LC	Pink-backed Pelican
Aves	Pelecaniformes	Threskiornithidae	*Bostrychia hagedash*	LC	Hadada Ibis
Aves	Pelecaniformes	Threskiornithidae	*Bostrychia olivacea*	LC	Olive Ibis
Aves	Pelecaniformes	Threskiornithidae	*Platalea leucorodia*	LC	Eurasian Spoonbill
Aves	Pelecaniformes	Threskiornithidae	*Threskiornis aethiopicus*	LC	African Sacred Ibis
Aves	Piciformes	Lybiidae	*Pogoniulus atroflavus*	LC	Red-rumped Tinkerbird
Aves	Piciformes	Picidae	*Campethera maculosa*	LC	Little Green Woodpecker
Aves	Piciformes	Picidae	*Dendropicos fuscescens*	LC	Cardinal Woodpecker
Aves	Piciformes	Picidae	*Dendropicos goertae*	LC	Grey Woodpecker
Aves	Piciformes	Picidae	*Pardipicus nivosus*	LC	Buff-spotted Woodpecker
Aves	Psittaciformes	Psittacidae	*Alexandrinus krameri*	LC	Rose-ringed Parakeet
Aves	Psittaciformes	Psittacidae	*Poicephalus fuscicollis*	LC	Brown-necked Parrot
Aves	Psittaciformes	Psittacidae	*Psittacus erithacus*	EN	Grey Parrot
Aves	Psittaciformes	Psittacidae	*Psittacus timneh*	EN	Timneh Parrot
Aves	Strigiformes	Strigidae	*Otus senegalensis*	LC	African Scops-owl
Aves	Strigiformes	Strigidae	*Scotopelia ussheri*	VU	Rufous Fishing-owl
Aves	Suliformes	Anhingidae	*Anhinga rufa*	LC	African Darter

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Aves	Suliformes	Phalacrocoracidae	*Microcarbo africanus*	LC	Long-tailed Cormorant
Bivalvia	Ostreida	Ostreidae	*Crassostrea tulipa*	LC	
Chondrichthyes	Carcharhiniformes	Carcharhinidae	*Negaprion brevirostris*	VU	Lemon Shark
Chondrichthyes	Rhinopristiformes	Pristidae	*Pristis pectinata*	CR	Smalltooth Sawfish
Chondrichthyes	Rhinopristiformes	Pristidae	*Pristis pristis*	CR	Largetooth Sawfish
Gastropoda	Cycloneritida	Neritidae	*Vitta adansoniana*	LC	
Gastropoda	Cycloneritida	Neritidae	*Vitta rubricata*	NT	
Gastropoda	Ellobiida	Ellobiidae	*Melampus liberianus*	LC	
Gastropoda	Littorinimorpha	Littorinidae	*Littoraria angulifera*	LC	Mangrove Periwinkle
Gastropoda	Littorinimorpha	Tateidae	*Potamopyrgus ciliatus*	LC	
Gastropoda	Neogastropoda	Muricidae	*Thais nodosa*	LC	
Gastropoda	Sorbeoconcha	Hemisinidae	*Pachymelania aurita*	LC	
Gastropoda	Sorbeoconcha	Hemisinidae	*Pachymelania byronensis*	LC	
Gastropoda	Sorbeoconcha	Potamididae	*Tympanotonos fuscatus*	LC	
Insecta	Odonata	Coenagrionidae	*Agriocnemis angustirami*	LC	Liberian Wisp
Liliopsida	Alismatales	Araceae	*Lasimorpha senegalensis*	LC	Swamp Arum
Liliopsida	Alismatales	Cymodoceaceae	*Halodule wrightii*	LC	
Liliopsida	Arecales	Arecaceae	*Raphia vinifera*	LC	Raphia Palm
Liliopsida	Zingiberales	Zingiberaceae	*Aframomum rostratum*	LC	
Magnoliopsida	Caryophyllales	Cactaceae	*Rhipsalis baccifera*	LC	Mistletoe Cactus
Magnoliopsida	Ericales	Ebenaceae	*Diospyros heudelotii*	LC	Ngavi Ã petites feuilles
Magnoliopsida	Fabales	Fabaceae	*Dalbergia ecastaphyllum*	LC	
Magnoliopsida	Fabales	Fabaceae	*Guibourtia copallifera*	VU	Kobo Tree
Magnoliopsida	Fabales	Fabaceae	*Millettia pallens*	LC	
Magnoliopsida	Fabales	Fabaceae	*Millettia rhodantha*	LC	
Magnoliopsida	Gentianales	Rubiaceae	*Psychotria bidentata*	LC	
Magnoliopsida	Gentianales	Rubiaceae	*Tarenna thomasii*	LC	
Magnoliopsida	Malpighiales	Chrysobalanaceae	*Maranthes robusta*	LC	Mahogany nut

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Magnoliopsida	Malpighiales	Clusiaceae	*Symphonia globulifera*	LC	Boarwood
Magnoliopsida	Malpighiales	Euphorbiaceae	*Cavacoa baldwinii*	NT	
Magnoliopsida	Malpighiales	Malpighiaceae	*Heteropterys leona*	LC	
Magnoliopsida	Malpighiales	Violaceae	*Rinorea aylmeri*	LC	
Magnoliopsida	Malvales	Malvaceae	*Hibiscus sterculiifolius*	LC	
Magnoliopsida	Malvales	Malvaceae	*Hibiscus tiliaceus*	LC	Coast Cottonwood
Magnoliopsida	Malvales	Malvaceae	*Sterculia rhinopetala*	LC	
Magnoliopsida	Malvales	Malvaceae	*Thespesia populnea*	LC	Portia Tree
Magnoliopsida	Malvales	Thymelaeaceae	*Dicranolepis persei*	LC	Gbachuluweh
Magnoliopsida	Myrtales	Combretaceae	*Conocarpus erectus*	LC	Silver-leaved Buttonwood
Magnoliopsida	Myrtales	Combretaceae	*Terminalia scutifera*	NT	
Magnoliopsida	Myrtales	Myrtaceae	*Syzygium guineense*	LC	
Magnoliopsida	Santalales	Strombosiaceae	*Strombosiopsis nana*	EN	
Magnoliopsida	Sapindales	Anacardiaceae	*Fegimanra acuminatissima*	VU	
Mammalia	Carnivora	Felidae	*Caracal aurata*	VU	African Golden Cat
Mammalia	Carnivora	Mustelidae	*Aonyx capensis*	NT	African Clawless Otter
Mammalia	Carnivora	Mustelidae	*Hydrictis maculicollis*	NT	Spotted-necked Otter
Mammalia	Chiroptera	Pteropodidae	*Eidolon helvum*	NT	African Straw-coloured Fruit-bat
Mammalia	Chiroptera	Pteropodidae	*Epomops buettikoferi*	LC	Buettikofer's Epauletted Fruit Bat
Mammalia	Chiroptera	Pteropodidae	*Hypsignathus monstrosus*	LC	Hammer-headed Fruit Bat
Mammalia	Chiroptera	Pteropodidae	*Nanonycteris veldkampii*	LC	
Mammalia	Chiroptera	Pteropodidae	*Rousettus aegyptiacus*	LC	Egyptian Fruit Bat
Mammalia	Chiroptera	Vespertilionidae	*Neoromicia brunnea*	NT	Dark-brown Serotine
Mammalia	Pholidota	Manidae	*Phataginus tetradactyla*	VU	Black-bellied Pangolin
Mammalia	Primates	Cercopithecidae	*Cercocebus atys*	VU	Sooty Mangabey

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Mammalia	Primates	Cercopithecidae	*Cercocebus lunulatus*	EN	White-naped Mangabey
Mammalia	Primates	Cercopithecidae	*Cercocebus torquatus*	EN	Red-capped Mangabey
Mammalia	Primates	Cercopithecidae	*Cercopithecus erythrogaster*	EN	Red-bellied Monkey
Mammalia	Primates	Cercopithecidae	*Cercopithecus lowei*	VU	Lowe's Monkey
Mammalia	Primates	Cercopithecidae	*Cercopithecus mona*	NT	Mona Monkey
Mammalia	Primates	Cercopithecidae	*Chlorocebus sabaeus*	LC	Green Monkey
Mammalia	Primates	Cercopithecidae	*Colobus polykomos*	EN	King Colobus
Mammalia	Rodentia	Muridae	*Rattus rattus*	LC	House Rat
Mammalia	Rodentia	Sciuridae	*Heliosciurus rufobrachium*	LC	Red-legged Sun Squirrel
Mammalia	Sirenia	Trichechidae	*Trichechus senegalensis*	VU	African Manatee
Polypodiopsida	Polypodiales	Pteridaceae	*Acrostichum danaeifolium*	LC	
Reptilia	Squamata	Atractaspididae	*Aparallactus modestus*	LC	Western Forest Centipede-eater
Reptilia	Squamata	Colubridae	*Crotaphopeltis hotamboeia*	LC	Red-lipped Snake
Reptilia	Squamata	Colubridae	*Hapsidophrys lineatus*	LC	Black-lined Green Snake
Reptilia	Squamata	Colubridae	*Hapsidophrys smaragdinus*	LC	Emerald Snake
Reptilia	Squamata	Colubridae	*Philothamnus nitidus*	LC	Green Bush Snake
Reptilia	Squamata	Colubridae	*Rhamnophis aethiopissa*	LC	Large-eyed Green Treesnake
Reptilia	Squamata	Colubridae	*Thelotornis kirtlandii*	LC	Forest Vine Snake
Reptilia	Squamata	Colubridae	*Toxicodryas blandingii*	LC	Blandings Tree Snake
Reptilia	Squamata	Elapidae	*Dendroaspis viridis*	LC	Western Green Mamba
Reptilia	Squamata	Elapidae	*Naja melanoleuca*	LC	
Reptilia	Squamata	Elapidae	*Pseudohaje goldii*	LC	African Tree Cobra
Reptilia	Squamata	Gekkonidae	*Hemidactylus albivertebralis*	DD	
Reptilia	Squamata	Grayiidae	*Grayia smithii*	LC	Smith's African Water Snake
Reptilia	Squamata	Lamprophiidae	*Boaedon lineatus*	LC	Striped House Snake

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Reptilia	Squamata	Natricidae	*Natriciteres olivacea*	LC	Olive Marsh Snake
Reptilia	Squamata	Psammophiidae	*Psammophis phillipsi*	LC	Olive Grass Racer
Reptilia	Squamata	Pythonidae	*Python regius*	NT	Ball Python
Reptilia	Squamata	Pythonidae	*Python sebae*	NT	Central African Rock Python
Reptilia	Squamata	Varanidae	*Varanus niloticus*	LC	Nile Monitor
Reptilia	Squamata	Viperidae	*Bitis arietans*	LC	Puff Adder
Reptilia	Squamata	Viperidae	*Bitis gabonica*	VU	Gaboon Viper
Reptilia	Testudines	Cheloniidae	*Eretmochelys imbricata*	CR	Hawksbill Turtle
Reptilia	Testudines	Trionychidae	*Trionyx triunguis*	VU	African Softshell Turtle