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Sahelian Acacia savanna

Spanning the entire African continent, the Sahelian Acacia Savanna stretches in a continuous band from the Atlantic Ocean to the Red Sea. Although not particularly rich biologically, these savannas once supported a large and diverse ungulate community. The first European explorers to visit the region found vast herds of game, even larger in number than those of eastern and southern Africa. Sadly, these herds have been reduced to mere remnants due to nearly a century of unregulated over-hunting with modern firearms and vehicles, coupled with habitat loss. This ecoregion includes some of the world's poorest countries, which have scarce resources for conservation. Existing conservation efforts are therefore inadequate and the biological values of the ecoregion remain highly threatened.

Scientific Code
(AT0713)
Ecoregion Category
Afrotropical
Size
1,178,800 square miles
Status
Vulnerable
Habitats

Description
Location and General Description
The Sahelian Acacia Savanna stretches across Africa from northern Senegal and Mauritania on the Atlantic coast to Sudan on the Red Sea, varying in width from several hundred to over a thousand kilometers. The word "sahel" means "shore" in Arabic and refers to the transition zone between the wooded savannas of the south and the true Sahara Desert. The ecoregion thus lies south of the Southern Saharan Steppe and Woodland Ecoregion and north of the West and East Sudanian Savanna Ecoregions.

The topography is mainly flat and the majority of the ecoregion lies between 200 m to 400 m in elevation. The few isolated mountain massifs rising from this plateau, some over 3,000 m high, have been assigned to other ecoregions due to their distinctive fauna and flora. The climate is tropical, hot, and strongly seasonal. The monthly mean maximum temperatures vary from 33° to 36°C and monthly mean minimum temperatures are between 18° to 21°C. The annual rainfall is around 600 mm in the south of the ecoregion, but declines rapidly to the north to around 200 mm. Most rain falls in the summer months of May to September, followed by a 6 to 8 month dry season, during which time the woody vegetation loses its leaves and the grasses dry up and may burn. The movements of the Intertropical Convergence Zone (ITCZ) determine the quantity of rainfall in a particular year - if it penetrates far to the north there will be a long rainy season and good rains; if it does not move sufficiently far north, then the rains may fail totally. During the winter, hot dry winds (known in much of West Africa as the "Harmattan") blow from the north, often bringing dust and sand from the Sahara with them.

Geologically, the ecoregion mainly overlies a number of post-Jurassic sedimentary basins, but the higher land found between the Central African Republic and Sudan is made up of Precambrian basement materials. There are also recent deposits from huge lakes, which were present during the pluvial periods of a few thousand years ago, centered on present day Lake Chad and the Inner Niger Delta (see ecoregion accounts for Lake Chad and Inner Niger Delta Flooded Savannas). These lakes have been drying for thousands of years and today cover only fractions of their former extent, although the region might have been even dryer between 12,000 and 20,000 years BP. Other smaller lakes would have been present in the past. The soils of the ecoregion are mainly entisols, with some aridisols found towards the north and alfisols on the highest land. Throughout much of the region the soils are highly permeable and permanent surface water points or watercourses are rare.

The human population density is low, ranging from 1 to 5 persons/km2 in the north, to 50 to 100 persons/km2 in the south and around some water sources, including the Nile in Sudan. Away from the permanent lakes, rivers and wetlands, the dominant form of land use is pastoral nomadism, with cattle as the main livestock.

Phytogeographically this ecoregion falls mainly within the Sahelian regional transition zone, although part of the southern margin lies within the Sudanian regional center of endemism (White 1983). The vegetation was mapped by White (1983) as Sahel Acacia wooded grassland and deciduous bushland. The wooded grassland is the most widespread vegetation type on sandy soils in the southern Sahel, where annual rainfall ranges from 250 mm to 500 mm per year. Typical woody species include Acacia tortilis, which is most common, as well as A. laeta, Commiphora africana, Balanites aegyptiaca and Boscia senegalensis. Grass cover is continuous, with annual species such as Cenchrus biflorus, Schoenefeldia gracilis, and Aristida stipoides well-represented. In the northern Sahel, grasslands grow on deep, sandy soils, with some woody species. Typical species include Acacia spp., and Boscia senegalensis. Perennial desert species, such as Panicum turgidum and Aristida sieberana, alternate with typical Sahelian grassland (MH/E, WWF and IUCN 1996).

Biodiversity Features

This ecoregion is not especially rich in species. However, it does possess some endemics, mainly small, arid adapted rodents, especially four species within the genus Gerbillus (Gerbillus bottai, G. muriculus, G. nancillus and G. stigmonyx). These are associated with the area of higher land in western Sudan, which forms a small center of endemism for gerbils. Endemic mammals also include one bat species, Eptesicus floweri, a zebra mouse species, Lemniscomys hoogstraali (DD), and two more gerbils from the genus Taterillus, T. petteri and T. pygargus. Most other animal groups show little or no narrow endemism within this ecoregion. Only two bird species are considered endemic, the rusty lark (Mirafra rufa) and the sennar penduline-tit (Anthoscopus punctifrons). Endemism is more pronounded in the reptiles with 10 species regarded as strictly endemic. There are more endemic plants than animals, partially because this ecoregion contains part of the Sudanian regional center of endemism, and also because it occupies such a large area.

The pronounced dry season and permeable soils mean that even temporary surface water provides a very important draw for wildlife when it is available. The annual migration of birds along the Afrotropical-Palaearctic flyway, as well as the intra-African migration associated with seasonal weather changes, utilizes these ephemeral wetland areas to a great extent. The wetlands are also very important for seasonal agriculture and migratory cattle herders, and are therefore often places where wildlife and human needs conflict. The larger wetlands of Lake Chad and the Inner Niger Delta have been separated into their own ecoregions, but there are many smaller wetland areas embedded within this ecoregion.

The scimitar-horned oryx (Oryx dammah), now presumed to be extinct in the wild, dama gazelle (Gazella dama, EN), dorcas gazelle (Gazella dorcas, VU) and red-fronted gazelle (Gazella rufifrons, VU) were all formerly abundant and widespread, as was the now extinct sub-species of the common hartebeest, the bubal hartebeest (Alcelaphus busephalus buselaphus) (East 1999). Endangered predators such as wild dog (Lycaon pictus), cheetah (Acinonyx jubatus) and lion (Panthera leo) were all also present and common, but have now been extirpated over most of the ecoregion. The elimination of wildlife over such a large area was facilitated by modern hunting methods – rifles and four-wheel drive vehicles – and exacerbated by civil disturbance, poor law enforcement and competition for grazing and waterpoint access with large herds of domestic livestock (Newby 1988).

Current Status

The original Acacia bushland of this ecoregion has been greatly altered over thousands of years, through long-term climatic changes and also through anthropogenic effects. In the past there were substantial populations of large mammalian herbivores, which would have grazed and browsed the vegetation. The remaining blocks of intact habitat are found mainly in the protected areas. In other areas the habitat is often degraded, but extensive and relatively continuous in sparsely populated areas.

The total area of protected land is around 224,825 km2. This is a large total area, but because the ecoregion is so vast, the actual percentage protected is quite low (approximately 5 percent). Parks found in this area include the Chad Basin National Park in Nigeria, the Aïr and Ténéré National Nature Reserve in Niger, Diawling N.P. in Mauritania, Djoudj N.P. in Senegal, Sahel Partial Faunal Reserve in Burkina Faso, and the Waza and Kalamaloue N.P.s in Cameroon. Djoudj National Bird Sanctuary in Senegal is a World Heritage Site, and four Ramsar sites fall in this ecoregion, the largest of which is Lac Fitri in Chad.

Types and Severity of Threats

The shift in biomass from native wild animals to introduced cattle and goats may not have extensively impacted the vegetation, except around waterholes, where habitat use is intensive. Other human activities, such as dry land agriculture, collection of wood for fuel and setting of fires, are likely to have had more effect. The main changes are a loss of larger mature trees, and the potential threat of the loss of all vegetation from an area, leading to the spread of the Sahara southwards, or desertification.

The principal threats are tied to agriculture, which is a marginal activity because the area is arid (particularly in the northern parts). However, the poverty of the increasing human population forces people to attempt growing rain fed crops such as millet and sorghum well north of the isohyet limit where these crops will regularly succeed. In dry years, crops in such arid areas fail completely, leading to increased soil erosion and desertification. Climatic desiccation is also a long-term threat to the ecoregion, and where combined with inappropriate land use, it can result in the total loss of vegetation cover and the partial, although perhaps temporary, conversion of the affected area to desert or near-desert. Such effects have been seen during a run or dry years, but the habitat has proven able to recover when there is a run of wetter years.

Over-hunting for food and sport has removed many of the large mammal species across the Sahelian acacia savanna. In the past, there were good sized populations of many of the typical African mammals such as lion, cheetah and giraffe, but these are now largely absent outside protected areas. Even within managed protected areas poaching is still rife. A more recent and disturbing threat is from large visiting motorized Arab hunting parties, which, while primarily targeting bustards with falcons, will also shoot any game animals they encounter.

Justification of Ecoregion Delineation
The Sahelian Acacia Savanna ecoregion follows two of White's vegetation units: the 'Sahel Acacia wooded grassland and deciduous bushland' and the 'Northern Sahel semi-desert grassland and shrubland' (White 1983). Two small modifications to White's linework include moving the Adrar de Iforas from this ecoregion to the West Saharan Montane Xeric Woodland, and extending the eastern boundary of the ecoregion to the Ethiopian Highlands (WWF 1998). Udvardy (1975) splits this region into the Western and Eastern Sahel biogeographical provinces.

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