

1.6 WESTERN SAHARA

Introduction

Western Sahara has an area of 266 000 km². The population, determined by census in 1982, was 163 868, and the mean population density is thus amongst the lowest in Africa at 0.6 persons/km². The country extends 730 km from north to south between latitudes 20°21' and 27°37'N, and over 800 km from east to west between longitudes 8°39' and 17°06'W. It is bounded by Mauritania in the south and west, by Algeria in the northwest, by Morocco in the north, and by the Atlantic Ocean in the west. The Atlantic coastline is close to 1100 km long. There is a narrow coastal plain, below the 100 m contour, which contracts from 50 km wide in the south to little more than 5 km in the north. Towards the east the coastal plain rises to a low hinterland, less than 200 m in height, but with inselbergs rising to over 400 m. This interior plain stretches right across the country in the south, but a higher plateau intrudes across the eastern border of the country in central and northern districts. The highest point, 688 m asl, is reached on this plateau some 40 km north of Galtat Zemmour (24°10'N/12°20'W).

There are no perennial streams in Western Sahara and drainage lines are marked by watercourses which are almost permanently dry. A number of these dry wadis run northwestwards from the low hinterland to disappear in the sand dunes along the coastal strip, but the longest and largest reaches the sea in a zone of moist sands north of Laayoune (27°10'N/13°11'W).

Climate

Western Sahara is extremely arid. Mean annual rainfall is unreliable and most of the country receives less than 50 mm/yr, and there are extreme annual variations. The country is also extremely hot, but the cold Canary Current modifies coastal temperatures and produces morning fogs which penetrate several kilometres inland. These lead to lower morning temperatures than might otherwise be expected. NE Trade Winds from the Sahara Desert prevail over the country for most of the year. The SW monsoon which brings rain to southern Mauritania does not reach Western Sahara, but in summer, during June-August, winds generated by the Azores anti-cyclone, sweep across the Atlantic from the NW. They may later veer and blow southwestwards parallel with the coast. The influence of these winds extends some kilometres inland and they may bring light rain to the coastal strip at this time, together with a reduction in temperatures.

In passing up the coast, mean annual precipitation rises from 26 mm at Cape Doubouchage (20°51'N/17°06'W) to 76 mm at Ad-Dakhla (23°43'N/15°57'W), but falls again to 48 mm at Tarfaya (27°58'N/12°55'W), recently ceded to Morocco and now just across the northern border. Ad Dakhla is perhaps the wettest place in Western Sahara, and may receive 35 mm of rain in September. The interior is drier than the coast and potential evaporation is everywhere very high, except on canyon floors, and mostly ranges from 4000 - 4500 mm/yr.

Wetlands

Ephemeral rains over the country may produce run-off which collects into saline pans (sebkhet) which are scattered throughout the interior and along the coastal strip. There are about 75 major sebkhet in the country, marked on most national maps, and a host of minor ones which are not marked. Some of the major ones have been known to support a few centimetres of standing water for short periods, but they are usually dry for years on end, and are saline, and generally devoid of vegetation. In the coastal strip there are other sebkhet which contain little temporary lakes. These are also saline, but they have vegetated margins which remain moist throughout the year, and some are surrounded by extensive marshes.

In addition there are gueltas (semi-permanent pools) in the upper parts of gorge-like watercourses which are common in the interior. Gorges, being deep and narrow, preclude excessive evaporation, and the gueltas receive water from springs in the canyon floors and walls, and from occasional floods which rush down the watercourses. Typical oasis vegetation is found around the gueltas, as described in the regional introduction.

List of Wetlands Described

1. Tidal Wetlands
2. Coastal Wetlands
3. Interior Wetlands - Pans & Oases.
 - (a) The Saguiat el Hamra
 - (b) The Springs of Messeit
 - (c) The Oued el Jat
 - (d) Interior Sebkhet

1. Tidal Wetlands

General: Tidal salt-marshes occur on the coast, but they are small and the coast is generally of high relief. Vegetation is confined to a seaward and a landward fringe, the middle portion being a barren salina. All the vegetation is strongly halophytic comprising species of *Salicornia*, *Sarcocornia* and *Suaeda*. Little is known of the resident or visiting fauna, but several endangered species of turtles visit the beaches including *Caretta caretta* and *Derinochelys coriacea*. The avifauna is typical of that described for North West African wetlands in the regional introduction.

Salt-marshes also occur at the few sites where the mouths of intermittent watercourses reach the sea instead of disappearing in the dunes. Examples of oued mouths which occasionally discharge to the sea, albeit rarely, are at 24°47'N/14°51'W, where an unnamed watercourse reaches the beach, and at 27°20'N/13°18'W, where the Saguiat el Hamra reaches the sea north of Laiyoune. Although the tidal marsh at the mouth of this oued is comparatively small, the system has been known to carry running water to the sea, and when not flowing at the surface, there remains a subterranean discharge. The spectrum of plants found in the tidal zone at the river mouth therefore has brackish estuarine affinities, as described in the regional introduction.

2. Coastal Wetlands

General: As in the interior, ephemeral rains and seepage often lead to the temporary collection of water in large flat pans variously called sabkhets, sebjets or sebkhet. Along the coastal strip, water from the interior may seep into these fairly continuously, so that even when it has not rained for long periods, the soils of the pans and their surroundings may be moist. Thus saline, non-tidal, coastal marshes arise. In a few cases, where seepage is great, or where a watercourse directly channels the run-off, these coastal pans may support temporary saline lakes.

In moving up the coast from south to north, Sebkhet Edjolla (21°48'N/16°56'W), Tenmud (21°53'N/16°49'W), Lemheiris (22°07'N/16°48'W) and El Mahariat (22°13'N/16°35'W), all lie on the coastal plain between Cape Blanc and Cape Barbas. Between this latter place and the Gulf of Cintra there are three more pans, Sebkhet Fares (22°30'N/16°22'W), Sebkhet Tentaurelet (22°44'N/16°17'W) and Sebkhet Ain el Beida (22°53'N/16°17'W), while an un-named pan is situated north of the gulf and some 15 km inland (23°14'N/15°56'W).

The next 340 km of coast is devoid of pans, but five large pans occur in a cluster in the El Hasian District, just inland of Cape Bojador. These tend to be more humid than the southern pans. Their names and locations are Sebkhet El Greier (25°40'25°49'N/ 13°38'-13°46'W), Sebkhet Udel el Wilier (25°46'-25°55'N/13°46'-13°48'W), Sebkhet Ulad Salem (26°00'-26°05'N/13°26'-13°31'W), Sebkhet Aarred (25°55'-26°01'N/ 14°04' -14°13'W) and Sebkhet Arridal (26°04'-26°16'N/13°54'-14°10'W). Both Sebkhet Arridal and Aarred contain semi-permanent ponds, and both are fed directly by small intermittent streams as well by underground seepage.

The last major group of coastal pans lies along the northern border with Morocco. Here the Sebkhet Tah (27°41'27°48'N/12°29'-12°56'W) is 28 km long and up to 6 km wide and subject to more frequent, though still irregular inundation. The entire pan, with an area of 10 400 ha may become temporarily wet at the surface. In the vicinity there are other smaller pans, notably Sebkhet Um Deboaa to the south (27°28'-27°35'N/ 12°55'W-13°03'W); Sebkhet Tiefurin (27°46'N/12°51'W) and Sebkhet Lehmera (27°48'N/12°56'W) to the northwest; Sebkhet Huisi Elgal (27°47'N/12°25'W) to the east; and Sebkhet Tasya (27°57'N/12°19'W) and an un-named pan (28°00'N/12°20'W) to the northeast. These are all situated on land recently ceded to Morocco, but Sebkhet Tah straddles the new border.

Flora & Fauna: Many of the pans, especially in the south, are barren and encrusted by salts. The plants they support, where they are vegetated, are halophytes. Species of Chenopodiaceae and Salicorniaceae are common, and the vegetation is as described in the regional introduction. Semi-permanent ponds support fringes containing species of *Cyperus*, *Juncus* and *Scirpus*, with *Phragmites australis* and *Typha capensis* near points of fresh water entry.

Human Impact & Utilisation: The pans are little utilised and many are undisturbed.

Conservation Status: Unprotected.

3. Interior Wetlands - Pans & Oases

(a) The Saguiat el Hamra

Country: Morocco

Coordinates: 26°47 'N/10°15 'W

Area: c. 62 000 ha (sandy bed)

Altitude: 0-300 m asl

Nearest Town: Lafiyoune (2 km S)

General: The longest and largest intermittent watercourse in Western Sahara runs roughly from east to west across the north of the country, reaching the sea approximately 30 km west of Lafiyoune. Over its upper reaches, tributaries from the highlands in the northeast converge upon the main watercourse, which becomes deeply entrenched in the Saguiat el Hamra (= Red Canyon). The floor of this canyon, which in places is bounded by walls over a hundred metres high, is several kilometres wide, flat, sandy and locally moist over a distance of 160 km. Hereafter the watercourse traverses a rocky, and relatively open, middle section for some 75 km. Below this the canyon reappears, and the watercourse is again deeply entrenched, finally cutting through the Draa Afrafir, a line of flat-topped hills 20-50 km inland and parallel to the coast. The oued reaches the sea and humid sands stretch inland, up into the canyon, in a belt 1-3 km wide, for a distance of 126 km from the mouth. There is a permanent discharge of fresh water to the sea, but this is seldom seen at the surface. Over the entire lower section the oued receives numerous fossil affluents.

Flora & Fauna: Some areas of moist sand in the canyon support *Acacia nilotica*, *A. tortilis*, *Balanites aegyptiaca*, *Hyphaene thebaica* and *Tamarix* spp., and marshy areas and gueltas (ponds) support *Juncus*, *Phragmites* and *Typha*. However, in the lower canyon, some of this vegetation has been replaced by small *Phoenix dactylifera* plantations.

(b) The Springs of Messeit

Country: Morocco

Coordinates: 27°04'N/13°09'W

Area: a few tens of ha under irrigation

Altitude: c. 10 m asl

Nearest Towns: Lafiyoune (12 km NE); Tarfaya (113 km NNE)

General: Perennial springs occur in the walls of the lowest part of the Saguiat el Hamra, at Messeit. Some flow out from shallow caves, but most now collect into concrete tanks to provide water for the irrigation of *Phoenix dactylifera* plantations. The water is saline, containing high concentrations of sodium, sulphate and chloride.

Flora & Fauna: The springs support no macrophytes but sedges grow in the concrete storage tanks. The areas of moist sand on which the date palm plantations have been established probably once supported *Acacia nilotica*, *A. tortilis*, *Balanites aegyptiaca*, *Hyphaene thebaica* and *Tamarix* spp. Dumont & Van de Velde (1975) describe the invertebrate fauna. We have no information regarding the vertebrate fauna.

Human Activity & Utilisation: The oasis is uninhabited, yet the canyon floor is exploited for date growing and for small scale horticulture. A surfaced road runs from Lafiyoune to Semara, which until 1976, was used to bring tourists from the Canary Islands to visit the oasis. However, this practice has ceased in recent years.

Conservation Status: Unprotected.

(c) The Oued el Jat

General: The Saguiat el Hamra cuts through the Drafi Afrafir below the Springs of Messeit, and is joined by the Oued el Jat almost immediately to the east of these hills. This oued flows from south to north, parallel with the line of the hills, joining the Saguiat el Hamra at Edchera (27°02'N/13°05'W). On the floor of this watercourse too, there is a series of marshy areas with moist sands and small gueltas. The most important are in the Ugranat District and are, from south to north, the Sebkhet Ugranat (26° 11 '-26°16'N/ 13°10'W) and El Jat (26°27'-26°38'N/13°07'W). These sandy pans are saline and subject to fairly frequent, albeit irregular, inundation, and there are some fresh water springs in the gorge walls.

Flora & Fauna: Some trees grow along the oued, including *Hyphaene thebaica* and *Tamarix africana*, and marshy patches support grasses, sedges, rushes and reeds. We have no details of the fauna.

Human Impact & Utilisation: We have no information.

Conservation Status: Unprotected.

(d) Interior Sebkhet

General: There are 37 major sebkhet on the central and eastern parts of the interior plateau, south of the Saguiat el Hamra system. They are very largely barren, but are poorly investigated. We have little information about them, other than their locations, and have no knowledge regarding the frequency with which they receive surface run-off. So far as we are aware they are not regularly utilised and are virtually undisturbed. The Sebkhet Aghzoumal (24°10'-24°29'N/12°41'-12°58'W) is the largest and among the easternmost. It is the sink for half a dozen intermittent watercourses.

Flora & Fauna: Mostly barren.

Human Impact & Utilisation: Seldom if ever utilised.

Conservation Status: Unprotected.