

Ramsar Information Sheet

Published on 31 March 2021 Update version, previously published on : 1 January 2007

BotswanaOkavango Delta System



Designation date 9 December 1996 Site number 879

Coordinates 19°17'24"S 22°54'58"E

Area 5 537 400,00 ha

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Three main features characterise the region, the Okavango, the Kwando and Linyanti River System connected to the Okavango through the Selinda spillway and the intervening and surrounding dry land areas. These features are located within the Okavango rift, a geological structure subject to tectonics control and infilled with Kalahari Group sediments, primarily sand, up to 300 metres thick. The Delta is the most important of the above-mentioned features. It is an inland delta in a semi – arid region in which inflow fluctuations result in large fluctuations in flooded area (10,000 – 16,000 km²), which is comprised of permanent swamp, seasonal swamp and intermittently flooded areas. Similar flooding takes place in the Kwando/Linyanti river system. This leads to high seasonal concentrations of birdlife and wildlife, giving the area very high tourism potential.

2 - Data & location

2.1 - Formal data

2.1.1 - Name and	address of the	compiler of	this RIS
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Responsible compile

Department of Environmental Affairs Ministry of Environment, Natural Resources Conservation and Tourism

Postal address

Department of Environmental Affairs Ministry of Environment, Wildlife and Tourism, P. O. Box 35 Maun

National Ramsar Administrative Authority

Department of Environmental Affairs, Ministry of Environment, Natural Resources Conservation and Tourism

Department of Environmental Affairs

Postal address
Private Bag 0068
Gaborone

2.1.2 - Period of collection of data and information used to compile the RIS

From year 2006

To year 2020

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)
Okavango Delta System

2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

(Update) A Changes to Site boundary Yes No No O
^(Update) The boundary has been delineated more accurately. ✓
(Update) The boundary has been extended
(Update) The boundary has been restricted
(Update) B. Changes to Site area the area has increased
(Update) The Site area has been calculated more accurately.
^(Update) The Site has been delineated more accurately. ✓
(Update) The Site area has increased because of a boundary extension
(Update) The Site area has decreased because of a boundary restriction
(Update) For secretariat only. This update is an extension

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<3 file(s) uploaded>

Former maps	0		

Boundaries description

The site boundary follows administrative boundaries of Controlled Hunting Areas (CHAs). Ngamiland District where the Okavango Delta Ramsar site (ODRS) falls has been divided into numerous CHAs which are used for management of wildlife, the boundaries of these areas have been used to form part of the site boundary. In the north the site follows the

international boundary between Botswana and Namibia while the boundary in the east follows the District boundary with Chobe District and Central District. In the south it follows the boundary of cattle ranches called Hyena Veldt.

2.2.2 - General location

a) In which large administrative region does the site lie?

Northwest District

b) What is the nearest town or population Maun

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries? Yes \odot No \circ

centre?

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party? Yes O No \odot

2.2.4 - Area of the Site

Official area, in hectares (ha): 5537400

Area, in hectares (ha) as calculated from 5538512.24

GIS boundaries

2.2.5 - Biogeography

Biogeographic regions

- 1	Regionalisation scheme(s)	Biogeographic region
	Freshwater Ecoregions of the World (FEOW)	Zambezi Bioregion

Other biogeographic regionalisation scheme

Inland deltas and flooded grasslands fresh water ecoregions of Africa

The Okavango Delta System falls under the Afrotropical Region (AT) as per the World's Major Biogeographic Regions.

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

Criterion 1: Representative, rare or unique natural or near-natural wetland types

The area described is a unique inland wetland providing a haven for many endangered species of flora and fauna. The multiplicity of habitats between the extremes of perennial swamp and semi-arid scrubland allows a substantial biodiversity among all life forms to

Other ecosystem services provided compensate for the vagaries of a mainly dry, low-rainfall, drought-prone and very variable climate. It is this juxtaposition of these contrasting landscapes and waterscapes, with their attendant biota in a wilderness setting, which provides the appeal for tourism as well as the rationale for the inclusion in the Ramsar List.

- ☑ Criterion 2 : Rare species and threatened ecological communities
- Criterion 3 : Biological diversity

The Okavango Delta is located in the Zambesian Phytochoria which is one of 16 such areas in Africa defined as having more than 50% endemic plant species and more than 1000 such species in total. This area predominantly includes the Okavango and Zambezi river basins. The Okavango Delta and the Kwando-Linyanti River systems sustain a wide variety of mammalian fauna with perhaps the exception of small mammals in the Okavango largely due to the shortage of certain niches that occurs as a result of seasonal flooding. A broad spectrum of interlocking habitat types within the wetland systems of Northern Botswana contribute to the diversity of mammalian species ranging from those that are almost or completely aquatic to animals that are by and large independent of surface water.

Of the total number of taxa present in the Okavango Delta, a significant proportion of about 60% occur in dry land settings on islands or sandveld tongues. However, despite their terrestrial character many of these taxa are absent in the surrounding savannah habitats as they require a different air humidity or soil moisture regime or higher ground water table. Thus they are intimately associated with the wetland Justification environments of the Okavango Delta (Ellery and Tacheba 2003).

Thirteen out of the 17 water bird species of the Zambezian biome that occur in Botswana have been recorded in this site. These include:

The dicksons's Kestrel (Falco dickinsoni), the coppery-tailed coucal (Centropus cupreicaudus), the Racket-tailed Roller (Coracias spatulatus), the Bradfield's Hornbill, (Tockus bradfieldi), the Black-lored Babbler (Turdoides melanops), the Angola Babbler (Turdoides hartlaubii), the Kurrichane Thrush (Turdus libonyana), the white-headed black chat (Pentholaea arnotti), the Chirping Cisticola (Cisticola pipiens), the Sharp-tailed Glossy- Starling (Lamprotornis acuticaudus), the White-breasted Sunbird (Cinnyris talatala) and the Brown Firefinch (Lagonosticta nitidula).

Four of the six bird species of the Kalahari-Highveld biome that occur in Botswana have been recorded in this site as well and these include: the Burchell's Sandgrouse (Pterocles burchelli), the Kalahari Scrubrobin (Erythropygia paena), the Barred Wren Warbler (Calamonastes fasciolatus) and the Burchell's Glossy-starling (Lamprotornis australis).

- Criterion 4 : Support during critical life cycle stage or in adverse conditions
- ☑ Criterion 6:>1% waterbird population

3.2 - Plant species whose presence relates to the international importance of the site

Phylum	Scientific name	Criterion 2	Criterion 3	Criterion 4	IUCN Red List	CITES Appendix I	Other status	Justification			
Plantae											
TRACHEOPHYTA/ MAGNOLIOPSIDA	Aldrovanda vesiculosa				EN		considered WLNERABLE at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ LILIOPSIDA	Ansellia africana	V			W		CITES App. II				
TRACHEOPHYTA/ LILIOPSIDA	Eragrostis subglandulosa	\checkmark					considered VULNERABLE at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ MAGNOLIOPSIDA	Erlangea remifolia	V					considered VULNERABLE at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ LILIOPSIDA	Eulophia angolensis	Ø					considered ENDANGERED at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ LILIOPSIDA	Habenaria pasmithii	Ø					considered ENDANGERED at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ MAGNOLIOPSIDA	Vachellia hebeclada chobiensis	Ø					considered VULNERABLE at local level in the Southern African Plants Red Data List				
TRACHEOPHYTA/ LILIOPSIDA	Zeuxine africana						considered CRITICALLY ENDANGERED at local level in the Southern African Plants Red Data List				

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies unde criterion 2 4 6 9	Species contributes under criterion 3 5 7 8	Pop. Size	Period of pop. Est.	% occurrence	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
Others											
CHORDATA / MAMMALIA	Acinonyx jubatus	2 000					W		2		
CHORDATA / MAMMALIA	Aepyceros melampus						LC				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Connochaetes taurinus						LC				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges and particularly during the migration cycle
CHORDATA / MAMMALIA	Damaliscus Iunatus						LC			CITES App. III	The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Equus quagga burchellii										The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges and particularly during the migration cycle

Phylum	Scientific name	Spec qualifies crite	under rion	co unde	ipecies ntribute er criter	ion Size	Period	of pop. Est.	% occurrence	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
CHORDATA / MAMMALIA	Giraffa camelopardalis	2 4							,	LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	amphibius	2 🗆								W				
CHORDATA / MAMMALIA	Hippotragus equinus									LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	Hippotragus niger									LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMIWALIA	Kobus ellipsiprymnus									LC				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Kobus leche	\square								LC			CITES App. II	
CHORDATA / MAMMALIA	Kobus vardonii									NT				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Loxodonta africana	y y								W	V			site is an important refuge and particularly during the migration cycle
MAMMALIA	Lycaon pictus									EN				
CHORDATA CHORDATA / MAMMALIA	Mammalia Oryx gazella									LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	Panthera leo	\square								W				
CHORDATA / MAMMALIA	Panthera pardus									VU	V			
CHORDATA / MAMMALIA	Phacochoerus aethiopicus									LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	Raphicerus campestris									LC				site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	Redunca arundinum									LC				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA														
CHORDATA / MAMMALIA	Sylvicapra grimmia									LC				site is an important refuge

Phylum	Scientific name	Species contributes criterion 2 4 6 9 3 5 7 8	Pop. Size Period of pop. Est. o	% pccurrence 1)	d Appendix	CMS Appendix	Other Status	Justification
CHORDATA / MAMMALIA	Syncerus caffer			L				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Taurotragus oryx							site is an important refuge, utilize surface water to varying degrees
CHORDATA / MAMMALIA	Tragelaphus scriptus			L				The higher dry land masses found within the Okavango Delta and the riverfronts of the Linyanti and Kwando are important refuges
CHORDATA / MAMMALIA	Tragelaphus spekii	Ø000000		L			CITES App. III	
CHORDATA / MAMMALIA	Tragelaphus strepsiceros			L				site is an important refuge, utilize surface water to varying degrees
Birds								
CHORDATA / AVES	Ardeola ralloides		10000	6.7 L				
CHORDATA								
AVES	carunculatus		2000	12.5 V	n 🗆			breeding site
AV/ES	fasciolatus							
AVES	Centropus cupreicaudus			L				
AVES	Cinnyris talatala							
AVES	Cisticola pipiens			L				
AVES	Coracias spatulatus			L				
AVES	Crex crex			L				no threatened status anymore for criteria 2
AVES	DICOIOF		4500	1.8 L				
AVES	Egretta ardesiaca		2000	2 L				
AVES	Egretta garzetta		4000	2.3 L				
AVES	Egretta vinaceigula			V	n 🗆			major breeding site
CHORDATA / AVES	Ephippiorhynchus senegalensis		2000	8 L				

Phylum	Scientific name	Species contributes criterion under criterion 2 4 6 9 3 5 7 8	Period of pop. Est.	% occurrence	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
CHORDATA / AVES	Erythropygia paena				LC				
CHORDATA / AVES	Falco dickinsoni				LC				
CHORDATA / AVES	Falco naumanni	Ø000000			LC		v		
CHORDATA / AVES	nordinani		00	5.4	NT				near threatened status do not justify for criteria 2
AVFS	nitidula				LC				
CHORDATA / AVES	acuticaudus				LC				
Δ\/ES	australis				LC				
AVES	crumeniterus	000000050	00	2.5	LC				
AVES	Nettapus auritus	0 0 0 0 0 0 0 40	000	22.9	LC				
CHORDATA / AVES	Pelecanus onocrotalus		00	10	LC		/		
AVES	Pentholaea arnotti								
AVES	Platalea alba	0020000 5	00	1	LC				
CHORDATA / AVES	Pterocles burchelli				LC				
CHORDATA / AVES	Rynchops flavirostris		00	2	NT				
CHORDATA / AVES	Struthio camelus				LC	V			site is an important refuge, utilize surface water to varying degrees
CHORDATA / AVES	Thalassornis leuconotus		50	2.2	LC				
CHORDATA / AVES	Tockus bradfieldi				LC				
CHORDATA / AVES	Turdoides hartlaubii				LC				

Phylum	Scientific name		Pop. Size Period of pop. E	% occurrence	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
AVES	Turdoides melanops	2 000			LC				
CHORDATA / AVES	Turdus libonyana	2 000							

¹⁾ Percentage of the total biogeographic population at the site

Specific waterbirds species and overall numbers for criterion 5 are missing.

Wattled Crane, Bugeranus carunculatus breeds in the Okavango (several hundred pairs). The Delta also serves as a major breeding site for the Slaty Egret (Egretta vinaceigula) and other species of herons and storks. The Slaty Egret is a very restricted species: a breeding colony of hundreds has been reported there and there was a colony of 50 to 60 pairs mixed with the Rufous-bellied Heron (Ardeola rufiventris) in reed beds north of Xaxaba on the Boro river during the early 1990's (Fishpool and Evans, 2001).

This site is known to hold on a regular basis at least 1% of the biogeographic population of the following species: the near threatened African Skimmer, Rynchops flavirostris (with up

to 100 breeding pairs and 200 non-breeding individuals representing 2% of the biogeographic population), the vulnerable Wattled crane, Bugeranus carunculatus (100 to 500 breeding pairs and 1000 to 2000 individual birds representing 2.5% to 12.5% of the biogeographic population), the Black-winged pratincole, Glareola nordmanni (an average of 2000 birds, representing 5.4% of the biogeographic population), the Green pygmy-goose, Nettapus auritus (with 6200 to 15 000 breeding pairs and up to 40 000 individual birds, representing between 7% to 22.9% of the biogeographic population), the white-backed duck, Thalassornis leuconotus (with 200 breeding pairs and 350 individual birds, representing between 1.9 to 2.2 % of the biogeographic population), the Fulvous whistling duck, Dendrocygna bicolor (with an average of 4500 individual birds, representing about 1.8% of the biogeographic population), the African spoonbill, Platalea alba (with an average of 500 breeding pairs, giving 1% of the biogeographic population), the Marabou, Leptoptilos crumeniferus (which has 300 to 400 breeding pairs and up to 5000 individual birds, giving up to 2.5% of the biogeographic population), the Saddle-billed Stork, Ephippiorhynchus senegalensis (with 1500 to 2000 individual birds, representing 6 to 8% of the biogeographic population), the Squacco Heron, Ardeola ralloides (up to 10 000 breeding pairs, representing 6.7% of the biogeographic population), the black heron, Egretta ardesiaca (with 100 to 1000 breeding pairs, representing up to 2% of the biogeographic population), the little egret, Egretta garzetta (with up to 4000 breeding pairs, representing 2.3% of the biogeographic population).

3.4 - Ecological communities whose presence relates to the international importance of the site

Name of ecological community	Community qualifies under Criterion 2?	Description	Justification
Dryfloodplain grasslands			
Seasonally flooded grasslands			
Seasonal aquatic communities			
Perennially flooded communities			
Seasonally flooded sedgelands		The Delta's habitats are species rich with 1061 plants (belonging to 134 families and 530 genera), 89 fish, 64 reptiles, 482 species of birds and 130 species of mammals.	

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

The primary ecological determinant is flooding duration, flood extent and depth. This maintains the open floodplain grassland by preventing woody encroachment. Most vegetation communities in the flooded areas consist of sedges, grasses and aquatic plants. Woody species are restricted to the dryland areas and the islands, with the exception of the water fig.

Permanent and seasonal floodplains form critical habitats for many species of wildlife and birdlife that are at their southern limits of distribution in the region. The maximum flooding occurs in the winter (dry) months and thus provides important dry season forage and water for wildlife. Conversely, the dryland areas form important grazing areas in the rainy season. Fluctuations in flooded areas are very important for productivity, both primary and secondary.

The interactions between plants, birds and insects operate to keep the Delta a freshwater system. Even though the Okavango River is a very low salt and nutrient system, very large amounts of salts have been brought into the area over thousands of years and with high evaporation of surface water being a major factor in "outflow", one might logically expect the area to be a salt, rather than a freshwater, marsh system. It is generally considered to be the actions of termites, birds and trees combined that help maintain the freshwater nature of the area. Termites build up termite mounds, rich in nutrients, in the floodplains and then birds and the wind bring seeds to these mounds thereby colonising them with trees and other vegetation. As they transpire, trees draw water into these islands, concentrating the salts in the island themselves and keeping the water in the channels and floodplains fresh. This process is clearly demonstrated by the white salty patches, devoid of vegetation, visible in the middle of most islands; signifying that salts have indeed concentrated to high levels in the islands, so high that no vegetation can survive them. Termites, birds and trees are thus also important "ecological engineers" in the Delta's structure and function.

4.2 - What wetland type(s) are in the site?

Inland wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
Fresh water > Flowing water >> L: Permanent inland deltas		1		Unique
Fresh water > Flowing water >> Mt Permanent rivers/ streams/ creeks		2		
Fresh water > Flowing water >> N: Seasonal/ intermittent/ irregular rivers/ streams/ creeks		0		
Fresh water > Lakes and pools >> P: Seasonal/ intermittent freshwater lakes		3		
Fresh water > Lakes and pools >> Tp: Permanent freshwater marshes/ pools		4		
Fresh water > Marshes on inorganic soils >> Ts: Seasonal/ intermittent freshwater marshes/ pools on inorganic soils				

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/LILIOPSIDA	Aristida stipitata spicata	is thought to be of LEAST CONCERN
TRACHEOPHYTA/WAGNOLIOPSIDA	Boscia matabelensis	is thought to be of LEAST CONCERN
TRACHEOPHYTA/LILIOPSIDA	Eragrostis leptotricha	
TRACHEOPHYTA/LILIOPSIDA	Eulophia latilabris	is thought to be NEAR THREATENED
TRACHEOPHYTA/MAGNOLIOPSIDA	Ficus verruculosa	
TRACHEOPHYTA/MAGNOLIOPSIDA	Harpagophytum procumbens procumbens	is thought to be of LEAST CONCERN
TRACHEOPHYTA/MAGNOLIOPSIDA	Harpagophytum zeyheri sublobatum	
TRACHEOPHYTA/MAGNOLIOPSIDA	Orbea knobelii	is thought to be of LEAST CONCERN
TRACHEOPHYTA/LILIOPSIDA	Oryzidium barnardii	is thought to be of LEAST CONCERN
TRACHEOPHYTA/LILIOPSIDA	Panicum gilvum	is thought to be of LEAST CONCERN
TRACHEOPHYTA/LILIOPSIDA	Phoenix reclinata	
TRACHEOPHYTA/MAGNOLIOPSIDA	Syzygium guineense	

4.3.2 - Animal species

Other noteworthy animal species

Phylum	Scientific name	Pop. size	Period of pop. est.	%occurrence	Position in range /endemism/other
CHORDATA/MAMMALIA	Crocuta crocuta				
CHORDATAMAMMALIA	Papio ursinus				are conspicuous residents of the ecotonal areas of these wetland systems
CHORDATA/AVES	Anas erythrorhyncha				
CHORDATA/AVES	Anas hottentota				
CHORDATA/AVES	Anastomus lamelligerus				
CHORDATA/AVES	Anhinga melanogaster				
CHORDATA/AVES	Ardea alba				
CHORDATA/AVES	Ardea goliath				
CHORDATA/AVES	Ardea purpurea				
CHORDATA/AVES	Ardeola rufiventris				
CHORDATA/AVES	Bubulcus ibis				
CHORDATA/AVES	Chlidonias hybrida				
CHORDATA/AVES	Ciconia episcopus				
CHORDATA/AVES	Glareola pratincola				
CHORDATA/AVES	Gorsachius leuconotus				
CHORDATA/AVES	Himantopus himantopus				
CHORDATA/AVES	Netta erythrophthalma				
CHORDATA/AVES	Nycticorax nycticorax				
CHORDATA/AVES	Sarkidiornis melanotos				
CHORDATA/AVES	Scotopelia peli				
CHORDATA/AVES	Tachybaptus ruficollis				
CHORDATA/AVES	Vanellus armatus				

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
B: Dry climate	BSh: Subtropical steppe (Low-latitude drv)

The climate of the ODRS is semi-arid with rainfall (in Maun) ranging between 195 and 940 mm per annum. Rainfall occurs in the summer months (November to March), with a mean annual amount of 455 in Maun and 480 mm over the Delta. Characteristic of a semi-arid environment, the rainfall is highly variable, with a coefficient of variation of annual rainfall of 35%. The monthly mean temperature ranges from 16 to 26°C in June and October respectively. The winds are generally light easterlies. Annual potential evapotranspiration, (class A pan with appropriate, seasonally varying pan coefficient), is high at nearly 1850 mm.

4.4.2 - Geo	morp	hic	setting
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a) Mnimum elevation above sea level (in metres)	930	
a) Maximum elevation above sea level (in metres)	1000	
	Entire rive	erbasin 🗆
	Upper part of rive	er basin 🗆

Middle part of river basin ☐
Lower part of river basin 🗹
More than one river basin \square
Not in river basin \square
Coastal

Please name the river basin or basins. If the site lies in a sub-basin, please also name the larger river basin. For a coastal/marine site, please name the sea or ocean.

The Okavango alluvial fan is situated among dune sediments within the down faulted MOZ

(Makgadikgadi-Okavango-Zambezi) basin of north-west Botswana. The surface of the down-faulted area comprises washed longitudinal dunes, present day and relict alluvial fan deposits and salt pans which overlie up to 300 m of predominantly sandy sediment.

The Okavango Delta is in reality the wetter part of an alluvial fan – fan shaped

conditions (e.g., increased salinity or acidification)?

and slightly conical - which disburses south of the Panhandle after flowing over 1000 km

through Angola, Namibia and Botswana.

In terms of gross fluvial sub-environments, the quasi level Okavango alluvial fan comprises a

mosaic of meandering watercourses, floodplains and islands, and is subject to low velocity

flooding with significant lateral groundwater discharge under the islands. The present Delta consists of seven active and intermittently active distributaries floodplain systems.

4.4.3 - Soil

Mineral 🗹 (Update) Changes at RIS update No change Increase O Decrease O Unknown O No available information \square Are soil types subject to change as a result of changing hydrological Yes O No Yes O No

Please provide further information on the soil (optional)

The soils of the Okavango Delta are mainly arenosols (i.e. sand based) as a result of the sediment infill into the east African Rift basin. However the local geomorphology and the effects of weathering, change the nature of the sands' surface conditions such that the original arenosols are modified.

Typically the arenosols have very low water-holding capacities because the sand in the soil is not graded so that sands of varying coarseness are constantly mixed right through the soil.

In the Delta dryland farming takes place on haplic arenosols while the more productive flood recession agriculture takes place on gleyic arenosols. In areas where intermittent clay has been deposited as a result of former water ponding or vegetation induced surface processes (e.g. under tallmopane) some clay like structures are found in the soil leading to the development of luvic arenosols. Some ferralic arenosols occur in the dune areas, peripheral to the Delta.

4.4.4 - Water regime

Water permanence

Presence?	Changes at RIS update
Usually seasonal, ephemeral or intermittent water present	No change
Usually permanent water present	No change

Source of water that maintains character of the site

Presence?	Predominant water source	Changes at RIS update
Water inputs from surface water	/	No change
Water inputs from precipitation	2	No change

Water destination

Presence?	Changes at RIS update
Feeds groundwater	No change

Stability of water regime

Presence?	Changes at RIS update
Water levels fluctuating (including tidal)	No change

Please add any comments on the water regime and its determinants (if relevant). Use this box to explain sites with complex hydrology.

The Okavango is an endorheic basin. The Okavango River rises in Angola, flows through Namibia and enters Botswana where it flows in a broad, well-defined channel with a clearly defined floodplain for a distance of about 90 km. This broad well-defined channel is known as the panhandle. It then spreads out to form the delta. The permanent swamp covers approximately 6000 km², while the seasonal swamp varies between 4000 and 10,000 km² in size. The variations in inflow have profound effects on the processes of river flow, water distribution and sediment distribution. All ecological dynamics are directly controlled by these processes, which are critical in understanding water balance processes in (semi) arid environments. The annual inflow ranges between 5,000 and 15,000 million cubic meters with average 9391 million cubic meters (1933 to 2017). Of this almost 97% is lost to evapotranspiration and seepage leaving only 3% to exit past Maun.

The water balance within the Delta reveals that the infiltration to groundwater is very large.

What is the Site like?, S4 - Page 5

Total Dissolved Solids = 48mg/L

(ECD) Redox potential of water and

sediments

(ECD) Water conductivity mean EC 77mS/m

(ECD) Dissolved organic carbon The mean DOC at Mohembo from 2008-2010 was 4.2mg/L

This is not routinely measured in the Delta - GAP

4.4.9 - Features of the surrounding area which may affect the Site

i) broadly similar O ii) significantly different 🤨	Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the site itself:
t 🗷	Surrounding area has greater urbanisation or development
/□	Surrounding area has higher human population density
· 🗹	Surrounding area has more intensive agricultural use

Please describe other ways in which the surrounding area is different:

Surrounding area has significantly different land cover or habitat types

Current land use has several facets. The Moremi Game Reserve is wholly utilized for nonconsumptive (photographic) tourism. The Reserve is zoned into a medium density tourism zone, a low-density tourism zone and a wilderness zone, in which there is a progressively decreasing amount of human activity. Traditional resource use e.g. grasses and reed cutting takes place on the fringes of the Reserve. The surrounding Wildlife Management Areas are subdivided into areas for commercial and community management and are either zoned for non-consumptive utilization (the areas immediately bordering the Reserve) or as multipurpose areas in which both non-consumptive utilization and consumptive utilization are allowed.

The land use in the surrounding areas is mainly agriculture (grable farming and livestock rearing). The main source of water in these areas is

The land use in the surrounding areas is mainly agriculture (arable farming and livestock rearing). The main source of water in these areas is ground water though the quality is not that good. The aquifers are characterised by high salinity. There has been establishment of other high impact activities including mining industries, okavango river crossing bridge and water reticulation infrastructure

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Provisioning Services

Ecosystem service	Examples	Importance/Extent/Significance
Food for humans	Sustenance for humans (e.g., fish, molluscs, grains)	Medium
Fresh water	Drinking water for humans and/or livestock	High
Wetland non-food products	Reeds and fibre	Medium
Wetland non-food products	Livestock fodder	High

Regulating Services

Ecosystem service	Examples	Importance/Extent/Significance
Maintenance of hydrological regimes	Groundwater recharge and discharge	High
Erosion protection	Soil, sediment and nutrient retention	High
Climate regulation	Regulation of greenhouse gases, temperature, precipitation and other climactic processes	High
Hazard reduction	Flood control, flood storage	Medium

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	High
Recreation and tourism	Water sports and activities	Low
Recreation and tourism	Picnics, outings, touring	Medium
Recreation and tourism	Recreational hunting and fishing	Medium
Spiritual and inspirational	Cultural heritage (historical and archaeological)	Medium
Spiritual and inspirational	Spiritual and religious values	Medium
Spiritual and inspirational	Aesthetic and sense of place values	High
Spiritual and inspirational	Contemporary cultural significance, including for arts and creative inspiration, and including existence values	Medium
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High
Scientific and educational	Long-term monitoring site	High
Scientific and educational	Type location for a taxon	High
Scientific and educational	Major scientific study site	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High
Soil formation	Sediment retention	Medium
Soil formation	Accumulation of organic matter	High
Nutrient cycling	Storage, recycling, processing and acquisition of nutrients	High
Nutrient cycling	Carbon storage/sequestration	High
Pollination	Support for pollinators	High

Other ecosystem service(s) not included above:

Provisioning Services: Wild-meat Regulating Services: Wildfires facilitate nutrient cycling (indirect service), influences forage quality for herbivores (indirect service) Within the site: 200 000 Outside the site: 2.2 Million

ecosystem services provided by this Ramsar Site? Yes

No O Unknown O Where economic studies or assessments of economic valuation have been undertaken at the site, it would be helpful to provide information on where the results of such studies

may be located (e.g. website links, citation of published literature):

https://www.car.org.bw/wp-content/uploads/2016/06/Final-ODMP-Economic-Valuation-Report.pdf

4.5.2 - Social and cultural values

i) the site provides a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and $\ensuremath{\checkmark}$ use that maintain the ecological character of the wetland

Have studies or assessments been made of the economic valuation of

The ethnic groups have considerable traditional knowledge of the flora and fauna in the Delta region, including plants used for medicinal purposes. This ethno-botanical knowledge provides an important resource base for cultural tourism and possible genetic extraction for pharmaceutical and other causes.

ii) the site has exceptional cultural traditions or records of former $_{\boxed{\hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm} \hspace{-0.1cm}$ civilizations that have influenced the ecological character of the wetland

Description if applicable

The Bayei, the Batawana, the Hambukushu, the Herero and the Banoka (River Bushmen) ethnic groups are of notable significance as traditionally their lifestyles are based on rivers and flood plains. They are ethnically distinct from other groups in Botswana, having different languages (save for Batawana), social structures and relationships. The Bayei are responsible for bringing to the Delta the "mokoro" (dug-out canoe), which has become symbolic of travel in the Delta. The

Hambukushu, who are also concentrated in the Delta region, are the original makers of the baskets that have made Botswana famous for the craft. All these people rely on the goods and services of the Delta for much of their livelihood.

iii) the ecological character of the wetland depends on its interaction $\hfill\Box$ with local communities or indigenous peoples

iv) relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland

Description if applicable

There are a few cultural sites within the Okavango Delta which are significant for the various tribal groups found within the ODRS. The various islands and lagoons have been over millennia of years been used for settlements, fishing and harvesting of

resources by inhabitants of the Delta. The cultural and spiritual attachment to these areas by the local communities cannot be over-emphasized.

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

Public ownership

Category	Within the Ramsar Site	In the surrounding area
Local authority, municipality, (sub)district, etc.	V	2
National/Federal government	2	

Other

Other						
Category	Within the Ramsar Site	In the surrounding area				
Commoners/customary rights	2	2				

Provide further information on the land tenure / ownership regime (optional):

Jurisdiction over the area is divided among;

Ministry of Land Management, Water and Sanitation Services through Tawana Land Board, Department of Water and Sanitation and Department of Lands is responsible for the allocation and management of tribal land, manages state land (NG41) manages water issues;

Ministry of Local Government and Rural Development through North West District Council is the political authority responsible for all developments within the district;

The Ministry of Environment, Natural Resources Conservation and Tourism is responsible for managing the natural resources as well as promoting the Okavango as a tourist destination

Department of Environmental Affairs, which is under MENT are charged with coordinating issues relating to the environment including being the Administrative Authority and Focal organisation for the Ramsar Convention

The Ministry of Agricultural Development and Food Security manages arable and pastoral practices

5.1.2 - Management authority

	The Department of Environmental Affairs responsible for overall coordinating of activities of ODRS through the Okavango Delta Management Plan (ODMP) .
	Other institutions includes ;
	Ministry of Land Management Water and Sanitation Services (Tawana Land Board , Department of Water and Sanitation, Department of Lands)
Please list the local office / offices of any agency or organization responsible for managing the site:	Ministry of Environment Natural Resources Conservation and Tourism (Department of Wildlife and National Parks, Department of Environmental Affairs, Department of Tourism and Botswana Tourism Organisation)
	Department of Mines
	Okavango Research Institute
	Okavango River Basin Commission (OKACOM)
	Kavango Zambezi Transfrontier Conservation Area (KAZA -TFCA)
Provide the name and/or title of the person or people with responsibility for the wetland:	Mr Charles K. Mojalemotho , Director
	The Department of Environmental Affairs Private Bag 0068

5.2 - Ecological character threats and responses (Management)

E-mail address: cmojalemotho@gov.bw

Postal address:

Gaborone. Botswana.

Tel: 00267 3902050

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified development	Low impact	Medium impact	V	unknown	✓	unknown
Commercial and industrial areas	Medium impact	High impact		No change	2	increase
Tourism and recreation areas	Low impact	Medium impact	V	increase	✓	unknown
Housing and urban areas	Medium impact	High impact	V	increase	✓	No change
later regulation						
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Drainage	Low impact	Medium impact	⊘	No change	2	No change
Water abstraction	Low impact	Medium impact	 ✓	No change	✓	No change
griculture and aquaculture						
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Annual and perennial non-timber crops	Low impact	Low impact	✓	No change	2	No change
Livestock farming and ranching	Low impact	Low impact	✓	increase	V	No change
Marine and freshwater aquaculture	Low impact	Low impact	✓	No change	✓	No change
nergy production and mini	ng					
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified	Low impact	Low impact		No change	2	No change
Mining and quarrying	Low impact	Low impact	Ø.	increase	2	No change
Renewable energy	Low impact	Low impact	✓	No change	✓	No change
ransportation and service	corridors					
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Roads and railroads	Low impact	Low impact	✓	No change	✓	No change
Utility and service lines (e.g., pipelines)	Low impact	Low impact	V	increase	2	No change
Aircraft flight paths	unknown impact	unknown impact	✓	increase	✓	No change
iological resource use						
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Hunting and collecting terrestrial animals	Low impact	Low impact	✓	increase	V	increase
Gathering terrestrial plants	Low impact	Low impact	✓	No change	V	No change
Logging and wood harvesting	Low impact	Low impact	✓	No change	✓	No change
Fishing and harvesting aquatic resources	Medium impact	Medium impact	2	increase	2	No change
		<u> </u>	<u> </u>			
luman intrusions and distu Factors adversely		Potential threat	Within the site	Changes	In the currounding area	Charges
affecting site Recreational and	Actual threat			Changes	In the surrounding area	Changes
tourism activities	Low impact	Medium impact	✓	increase	✓	No change
latural system modification	ns					
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Unspecified/others	Low impact	Medium impact	✓	No change	✓	No change
Dams and water management/use	Low impact	Low impact	2	No change	>	No change
	Low impact	Low impact	2	increase		No change
Vegetation clearance/ land conversion		Lawimanaat	✓	No change	✓	No change
Vegetation clearance/	Low impact	Low impact				
Vegetation clearance/ land conversion Fire and fire suppression		LowImpact	4553			
Vegetation clearance/ land conversion		Potential threat	Within the site	Changes	In the surrounding area	Changes

Pollution

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Household sewage, urban waste water	Medium impact	High impact	✓	increase	✓	increase
Industrial and military effluents	Low impact	Medium impact	✓	increase	✓	No change
Agricultural and forestry effluents	Low impact	Medium impact	2	No change	V	No change
Garbage and solid waste	Low impact	Medium impact	/	increase	V	No change
Air-borne pollutants	Low impact	Medium impact	✓	increase	✓	No change
Excess heat, sound, light	Low impact	Low impact	2	increase	2	No change

Climate change and severe weather

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Habitat shifting and alteration	Low impact	Low impact	✓	No change	✓	No change
Droughts	Medium impact	High impact	✓	increase	✓	increase
Temperature extremes	Low impact	Low impact	✓	No change	✓	No change
Storms and flooding	Low impact	Low impact	✓	No change	✓	No change

Please describe any other threats (optional):

The Okavango River basin is jointly managed through a tri-partite agreement between Botswana, Namibia and Angola known as the Permanent Okavango River Basin Commission (OKACOM). OKACOM was established to oversee the management and use of the system on a sustainable basis. There is however the ever-present possibility that one or other of the states may decide to extract water for one reason or the other in pursuant of their developmental needs beyond sustainable levels.

Climate Variability - hydrological extremes

Pollution - solids, wastewater, air pollution, noise, new waste streams (oils, e-waste, Polychlorinated biphenyls PCBs, construction waste)

Developments - agro-ecosystem developments, mining, illegal dumping, infrastructure development

Population

5.2.2 - Legal conservation status

Global legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
World Heritage site	Okavango Delta		partly

Regional (international) legal designations

Designation type	Designation type Name of area Online information url			
Other international designation	Kavango Zambezi Trans- frontier Conservation Area	https://kavangozambezi.org/en/	whole	
Other international designation	Okavango River Basin	https://www.okacom.org/	whole	

National legal designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
game Reserve	The Moremi Game Reserve		partly
Wildlife Management Areas	the Kwando and the Okavango Wildlife Management Areas		partly

Non-statutory designations

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Important Bird Area			

5.2.3 - IUCN	protected	areas	categories	(2008)
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la Strict Nature Reserve
Ib Wilderness Area: protected area managed mainly for wilderness protection
Il National Park: protected area managed mainly for ecosystem protection and recreation
III Natural Monument: protected area managed mainly for conservation of specific natural features

- IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention

 V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation

 VI Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems
- 5.2.4 Key conservation measures

Human Activities

Measures	Status
Regulation/management of recreational activities	Implemented
Research	Implemented
Communication, education, and participation and awareness activities	Implemented

Other:

The Government of Botswana has just concluded the development of an integrated management plan for the Okavango Delta. The plan will provide a framework for sustainable use through which all sector plans and programmes will operate. The plan is known as the Okavango Delta Management Plan (ODMP). The plan sets out strategic goals, objectives and operational objectives which when realised will contribute to the sustainability of the Okavango system. The ODMP emphasizes the sustainable utilization of resources and as such encourages the management and use of the system to be on a sustainable basis for all concerned. The ODMP is has a six year planning horizon commencing in November 2006.

5.2.5 - Management planning

Is there a site-specific management plan for the site? Yes

Has a management effectiveness assessment been undertaken for the site?

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning Yes O No

processes with another Contracting Party?

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? Please select a value

5.2.7 - Monitoring implemented or proposed

<no data available>

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

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Field, D.J. 1976 A Handbook of common grasses in Botswana, Ministry of Agriculture, Gaborone, Botswana

Fishpool and Evans (2001) Important Bird Areas in Africa and associated islands: Priority sites for conservation. Newbury and Cambridge, UK: Pisces Publications and BirdLife International (BirdLife Conservation Series No. 11)

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Mendelsson J. and el Obeid S. 2004 Okavango River Flow of a Lifeline. Struik Publishers, South Africa.

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Ramberg L, et al 2006 Species diversity of the Okavango Delta, Botswana. Aquat. Sci. 68 (2006) 310 - 337

Roodt, V. Undated The shell Field Guide to the common Trees of the Okavango Delta and Moremi Game Reserve, Printed by Dando and Van Wyk. South Africa

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(McCarthy et al., 2003; see also Burg, 2007; Wolski and Murray-Hudson, 2008)

McCarthy, J.M., Gumbricht, T., McCarthy, T., Frost, P., Wessels, K. and Seidel, F. (2003) 'Flooding patterns of the Okavango wetland in Botswana between 1972 and 2000', Ambio, Vol. 32, No. 7, pp.453–457.

Burg, V. (2007) Climate Change Affecting the Okavango Delta, Unpublished Diploma thesis, Institute of Environmental Engineering, Swiss Federal Institute of Technology, Zurich, Switzerland, Available at: http://e-collection.library.ethz.ch/eserv/eth:29826/eth-29826-01.pdf (Accessed 3 February 2011)

Wolski, P. and Murray-Hudson, M. (2008))) 'Alternative futures' of the Okavango Delta simulated by a suite of global climate and hydroecological models', Water SA, Vol. 34, No. 5, pp.605–610, [online], Available at: http://www.scielo.org.za/pdf/wsa/v34n5/a10v34n5.

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)

<no file available>

iii. a description of the site in a national or regional wetland inventory

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<2 file(s) uploaded>

vi. other published literature

<3 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:



Underwater sand bars near Xo Flats, central Okavango (Lin Cassidy, 19-05-2020)



White - faced ducks in the floodplains of the southern Okavango (Lin Cassidy , 16-11-2012)



Peak flood near Duba, where the Okavango Panhandle first fans out (



the Boteti River receiving new floods at Samedupi. (Jobe Manga, 20-06-2020

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation 1996-12-09