

Information Sheet on Ramsar Wetlands (RIS) – 2006-2008 version

Available for download from http://www.ramsar.org/ris/key_ris_index.htm.

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

18th April 2006

3. Country:

Zambia

4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Kafue Flats

5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or
b) Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

If the site boundary has changed:

- i) the boundary has been delineated more accurately ; or
ii) the boundary has been extended ; or
iii) the boundary has been restricted**

and/or

If the site area has changed:

- i) the area has been measured more accurately ; or
ii) the area has been extended ; or
iii) the area has been reduced**

** **Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

Notable changes however include reduction in the Kafue Lechwe (*Kobus leche kafuensis*) to 38,000. The figure was previously fluctuating around 45,000. There is also an encroachment of woody vegetation into the flats as seen from the latest aerial survey (ZAWA and WWF Survey, 2005) and this could be a result of reduced flooding induced by dam operation. *Mimosa pigra* has also surfaced in the Lochnivar National Park and has started to spread but is still within manageable levels if interventions are implemented quickly.

7. Map of site:

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) a hard copy (required for inclusion of site in the Ramsar List): ;
ii) an electronic format (e.g. a JPEG or ArcView image) ;
iii) a GIS file providing geo-referenced site boundary vectors and attribute tables .

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundary that has been employed follows the northern and southern edges of the wetland to the north and south of the Kafue River. To the west it cuts across the wetland through Maala area and to the East it avoids the sugar plantations in Mazabuka area and then crosses the river to join the northern bank. The Lochnivar and Blue Lagoon National parks are wholly within the site.

8. Geographical coordinates (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

15° 18' S, 26° 44' E and 16°05 S, 27°48'E

9. General location:

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Flats cover parts of the Southern and Central provinces of Zambia. The area includes the Lochnivar National Park on the south bank of the Kafue River, the Blue Lagoon National Park on the north bank of the Kafue River and the Kafue Flats GMA number 11. The area is about 60 km from Lusaka town to the north-east and the Kafue River passes through the site midway. The Two national parks are administered in two small towns called Monze to the south and Mumbwa to the North.

10. Elevation: (in metres: average and/or maximum & minimum)

914 – 1218m

11. Area: (in hectares)

600,500ha (original size was 83,000 ha)

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The site consists of marsh and floodplains, termitaria (grasslands), woodland zones and geothermal areas, and has two National Parks (Blue Lagoon and Lochinvar) and a Game Management Area called Kafue Flats Game Management Area. The site is a conservation area for indigenous and endemic flora and fauna including the second largest African population of the globally threatened Wattled Crane (*Grus carunculatus*). The Flats are famous for their Kafue Lechwe (*Kobus leche kafuensis*); a semi-aquatic antelope found nowhere else in the world.

13. Ramsar Criteria:

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 •

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Criterion 2:

The site hosts a number of endangered species, particularly the Kafue lechwe (*Kobus leche kafuensis*, VU) which is endemic to the area. The area supports more than 450 species of indigenous, threatened, endangered and migratory bird species. Of importance are the Wattled Crane (*Grus carunculatus*, VU) and Crowned crane. Because of its conservation status, the crane played a pivotal role in declaring the Kafue flats a RAMSAR Site. Lochinvar National Park has one of the highest numbers of endangered Wattled crane in Africa (Draft General Management Plan, Lochinvar National Park). One also finds Hippo (*Hippopotamus amphibius*), which is listed on CITES Appendix II and *Tragelaphus spekei* (Sitatunga), listed on CITES Appendix III (also in IUCN Red List (LR/nt)). Other endangered water birds registered on the Kafue flats include: the vulnerable Slaty Egret *Egretta vinaceigula*, vulnerable Lesser Kestrel *Falco naumanni* (Fishpool and Evans, 2001).

Criterion 3:

The site has very high biodiversity.

It has large concentrations of the endemic Kafue Lechwe (*Kobus leche kafuensis*) which now stand at around 38,000 (2006 Census by ZAWA and WWF Partners for Wetlands Project). Lechwe is a keystone species in the Kafue flats. Grazing and trampling by lechwe as the flood rises alters structure and floristic composition of the vegetation, benefiting fish and waterbirds. The area also has the Common Zebra (*Equus burchelli*), Wildebeest (*Connochaetes taurinus*), Oribi (*Ourebia ourebi*), Sitatunga (*Tragelaphus spekei*) and the African Buffalo (*Syncerus caffer*) (Leonard, 2005).

Over 450 species of birds are listed and notable among them are the resident and migratory birds. The species spectrum varies according to season and the water level but species often found in significant numbers include white pelican, Common Squacco Heron, Cattle Egret, Black Egret, Openbill stork, Glossy ibis, Fulvous Whistling duck, White faced Whistling duck, Egyptian Goose, Spur-winged Goose, Knob-billed duck, Red Billed Teal, Southern Pochard, Red Knobbed Coot, Common Pratincole, Kittlitz's Plover, Caspian Plover, Blacksmith Plover and Ruff (Leonard 2005). Fifteen of the 56 species of water birds of the Zambezian biome that occur in Zambia have been recorded at the Kafue flats which thus contributes towards maintaining the biodiversity of the region.

Criterion 4:

The site supports migratory avian species. The combination of wetlands and wetland habitat offer a unique habitat for many resident and migratory birds and serves as an important habitat for palaeartic migrants as well as resident water birds (*see list of species in Annex D*). Some of the species found in significant numbers include White Pelican (*Pelecanus onocrotalus*), Common Squacco Heron, Cattle Egret (*Bubulcus ibis*), Black Egret (*Egretta ardesiaca*), Openbill Stork (*Anastomus lamelligerus*), Glossy Ibis (*Plegadis falcinellus*), Fulvous Whistling Duck (*Dendrocygna bicolor*), White-faced Whistling Duck (*Dendrocygna viduata*), Knob-billed Duck (*Sarkidiornis melanotos*), Red-billed Teal (*Anas erythrorhyncha*), and Caspian Plover (*Charadrius asiaticus*). The site also hosts the only population of the endemic Kafue Lechwe (*Kobus leche kafuensis*) in the world, and is the site at which the second highest African population of the Wattled Crane (*Grus carunculatus*) is found. Species and population specific information is not present at the moment, but may be included in future planned inventories.

Criterion 5.

The area supports more than 20,000 water birds as evidenced from the bird count below done in 2002. Also Peter Leonard, 2005 confirms that the site regularly holds more than 20,000 water birds (page 214 in Peter Leonard, 2005).

Estimated numbers of selected water birds observed on the Kafue Flats (Kamweneshe and Beifuss 2002, with WWF, Crane Foundation and Endangered Wildlife Trust support)

Species common name	Scientific name	Estimated number
Eastern white pelican	<i>Pelecanus onocrotalus</i>	<100
Pinkbacked pelican	<i>Pelecanus rufescens</i>	<20
Whitebreasted cormorant	<i>Phalacrocorax carbo</i>	>50
Reed cormorant	<i>Phalacrocorax africanus</i>	100s
Grey heron	<i>Ardea cinerea</i>	>20
Goliath heron	<i>Ardea goliath</i>	>40
Purple heron	<i>Ardea purpurea</i>	>20
Great egret	<i>Casmerodius albus</i>	100s
Intermediate egret	<i>Egretta intermedia</i>	>5000
Little egret	<i>Egretta garzetta</i>	1000s
Cattle egret	<i>Bubulcus ibis</i>	1000s
Yellowbilled stork	<i>Mycteria ibis</i>	>20
African openbilled stork	<i>Anastomus lamelligerus</i>	>10,000
Abdim/s stork	<i>Ciconia abdimii</i>	<20
Saddlebilled stork	<i>Ephippiorhynchus senegalensis</i>	<20
Marabou stork	<i>Leptoptilos crumeniferus</i>	>20
Sacred ibis	<i>Threskiornis aethiopicus</i>	100s
African spoonbill	<i>Platalea alba</i>	>20
Fulvours whistling -duck	<i>Dendrocygna bicolor</i>	1000s
Whitefaced whistling -duck	<i>Dendrocygna viduata</i>	1000s
Spur winged goose	<i>Plectropterus gambensis</i>	>20,000s
Knob-billed duck	<i>Sarkidiornis melanotos</i>	<100
Egyptian goose	<i>Alopochen aegyptiacus</i>	<100
Grey crowned crane	<i>Balearica regulorum</i>	<20
Wattled crane	<i>Bugeranus carunculatus</i>	<1000

Criterion 6

The Kafue Flats hold greater than 1% of the biogeographic population of congregatory water birds listed below:

No.	Common Name	Scientific name
	Reed Cormorant	<i>Phalacrocorax africanus</i>
	White Pelican	<i>Pelecanus onocrotalus</i>
	Black Egret	<i>Egretta ardesiaca</i>
	Openbill Stock	<i>Anastomus lamelligerus</i>

	African Spoonbill	<i>Platalea alba</i>
	Fulvous Whistling Duck	<i>Dendrocygna bicolor</i>
	White-Faced Whistling Duck	<i>Dendrocygna viduata</i>
	White-Backed Duck	<i>Thalassornis leuconotus</i>
	Egyptian Goose	<i>Alopochen aegyptiacus</i>
	Spur-winged Goose	<i>Plectropterus gambensis</i>
	Knob-billed Duck	<i>Sarkidiornis melanotos</i>
	African Pygmy Goose	<i>Nettapus auritus</i>
	Red-billed teal	<i>Anas erythrorhyncha</i>
	Hottentot teal	<i>Anas hottentota</i>
	Southern Pochard	<i>Netta erythrophthalma</i>
	Wattled Crane	<i>Buggeranus carunculatus</i>
	Common Pratincole	<i>Glareola pratincola</i>
	Black winged Pratincole	<i>Glareola nordmanni</i>
	African Skimmer	<i>Rynchops flavirostris</i>
	Whiskered Tern	<i>Chlidonias hybridus</i>

Source: Peter Leonard 2005.

Criterion 7

The Kafue Flats lie between the Itzhi-tezhi dam and the Kafue gorge (a distance of 240km). The Kafue Flats' area is about 13, 986 sq km and only about 6,604 sq km is liable to flooding.

The Kafue Flats has sixty seven species of fish that are known. Some of the fish are of commercial importance and significant as a wetland benefit. Key among them are:

Sarotherodon andersonii, *S. macrochir*, *Tilapia rendalli*, *T. sparrmanii*, *Labeo molybdinus*, *Clarias gariepinus*, *C. ngamensis*, *Serranochromis angusticeps*, *Schilbe mystus* and *Hepsetus odoe*.

Species of less commercial importance include: *Serranochromis robustus*, *S. thumbergi*, *S. macrocephalus*, *Haplochromis carlottae*, *H. codringtoni*, *H. giardi*, *Synodontis macrostigma*, *Alestes lateralis*, *Marcusenius macrolepidotus*, *Petrocephalus catostoma*, *Mormyrus lacerda*.

In 1976 fish catch in the Kafue fishery represented 17.89 % of the National catch.

(*Proceedings of the National Seminar on Environment and Change: The consequences of hydroelectric power development on the utilization of the Kafue Flats. Lusaka. April 1978. Kafue Basin Research Committee. University of Zambia. 1982. Edited by GW Howard and G.J. Williams.*)

Criterion 9

The site supports 100% of *Kobus leche kafuensis* as this antelope is only found here. Loss of this wetland may mean loss of this sub species. The current numbers stand at 38,000.

(*WWF Partners for wetlands & ZAWA Census of 2005, Kafue Flats*).

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) **biogeographic region:** Kafue Freshwater Ecoregion of Africa

b) **biogeographic regionalisation scheme** (include reference citation): WWF classification of Ecoregions of Africa

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The Kafue Flats are believed to have once been a buried lake. The meandering Kafue River generally intersects the area, and its variable micro relief presents a complex pattern of lagoons, ox-bow lakes, abandoning river channels, marshes and levees. The Kafue Flats were formed due to shallow rifts partly filled with Kalahari sands.

The geology of the Kafue Flats represents one of the ancient landmasses of the African Continent. The underlying rock materials over much of the area are the complex Katanga sediments of the upper Precambrian age. Most of the area is carpeted by a layer of recent alluvium dating back to the tertiary and underlined with grits, shales, and sandstone of the Karoo formation.

The flats and most of its drainage form most of the lower Kafue Basin. It includes the catchment areas between Itezhi-tezhi and Kafue Gorge dam that cover 587 420 ha. They are an open savanna wetland .The sub-catchment is located within the Kafue River Basin, a major tributary of the Zambezi River.

In general, the parent Karoo and Katanga rocks do not affect the soil. They are often neutral to alkaline throughout, but some have strongly acidic topsoil. They are predominantly alluvial clays, mainly Montmorillonite (Anon. 1968; Perera, 1980). Rainfall has a profound effect on the soils of the Kafue flats; there tends to be a translation between the soil structures depending of the local relief and the substrate or parent material. The peripheral soils are largely clays and loams, while the central parts of the area consist of largely clay soils of the darker black colour which are rich in carbon and large quantities of water as they are impervious and poorly drained.

The soils of the Flats are heavy in texture and tend to crack widely when dry, becoming very sticky and plastic when wet (vertisols). There are large amounts of calcium and magnesium, and some soils contain gypsum as well. They are mainly black or dark gray, but some are yellowish-brown. Many contain lime nodules at a variable depth in the soil. They are poorly drained and become very wet during the wet season. Some parts of the flats become flooded to the depth of 1-3 meters by the end of the rainy season.

Another feature of the black clays is their irregular surface relief known as galgai. The swelling and contraction of vertisoils with montmorillonitic particles give rise to gilgais. This consists of a series of small ridges standing 20-60 cm above circular depressions about 2-7 meters in diameter. The soils in the galgai depressions are usually black and have no lime nodules down to a meter or more.

On the ridges, lime nodules usually occur within a meter of the ground surface. The soils on the ridges also dry out more quickly than in the depressions. Chemically, these soils are very rich. Their clay has a large capacity to hold nutrients.

There is a tendency for the water on the Kafue flats to back up thereby causing flooding. This has been attributed to water from direct rainfall, the inflow from tributary streams and the overflow of the Kafue River due to the construction of two hydroelectric dams upstream and downstream. The flood normally begins to rise with the onset of the rains in mid November. The area experiences three main types of season: wet, cool dry and hot dry seasons. The wet season is from December to March (average rainfall between 700 and 800 mm). Mean annual temperature is 20.6 degrees Celsius while the total evaporation is about 2032 mm/annum.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The Kafue Flats is part of the Kafue Basin Catchment. The Kafue river basin forms the largest sub-basin of the Zambezi (156,995 km sq) and entirely lies within Zambia. The Kafue River's 1,300 km drops from an elevation of 1,395 m at source to 359 m at its confluence with the Zambezi. Within the Kafue basin important tributaries join the main river some of which are Lunga, Kafubu, Luswishi, Lufupa, Kafulafuta, Kaleya, Mwembeshi.

Geomorphologically the area is part of the first order unit called the Central African Plateau, the second order landform called the degraded plateau and the third order landform that includes the floodplains, lakes and dambos in the south and dissected plateau, hills ridges and minor escarpments in the northern side. Geologically the area is of late Precambrian to lower Paleozoic era and the northern side of the catchment comprises Lower roan with basal conglomerate, which is the main copper bearing unit. It also includes quartzites, conglomerates, argillites, arkose and some dolomite (JICA 2005).

The main soils in the upper catchment are Acrisols and in the Lukanga we have the Lukanga swamps which have soils high in organic matter clays and silt. In the Kafue Flats area we have soils that are high in Montmorillonite (cotton clay soils).

The area experiences three main types of season: wet, cool dry and hot dry seasons. The wet season is from October to March, ranging from 600mm to 1400, increasing towards the source. Average temperatures in the wet season range from 20 to 22.5 degrees Celsius, cold dry is normally 15 degrees Celsius and the hot season ranges from 22.5 to 27.5 degrees Celsius.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The natural filtering and storage of water by this wetland provide clean plentiful water for many uses. The flats are also important for their function as a natural sink for nutrients and/or elements (micro-particles).

19. Wetland Types

a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

M-P-Tp-R-Zg

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The Kafue Flats have a variety of habitats ranging from Miombo/ Mopane woodlands in the south and changing into *Acacia polyacantha*/ termitaria (*Albizia harvey*) in the north and *Combretum* woodland in the drier areas. Nevertheless, the main vegetation types have been identified as woodland, termitaria, grassy floodplains, permanent swamps and the levees.

The principle vegetation zones of the Kafue Flats and its surrounding include:

1. Levees and Lagoons: these are along abandoned river channels. Grass cover of *Echinochloa sp.*, *Vossia cuspidata*, *Sorghum verticilliflorum*, *Phragmites mauritiana*, and scattered trees such as *Acacia albida* and *Borassus aethiopum* dominates this zone. Inside, lagoon plant species include *Nymphaea lotus*, *N. caerulea*, *Oryza sp.*, and *Aeschynomene flutans*.
2. Floodplain grasslands: This occupies the largest part of the Kafue Flats. They are represented by *Vossia cuspidata* and *Oryza sp.*
3. Water meadows: This vegetation type is found along the edges of the floodplain and is inundated for short periods. Water meadows are a short grass species including species like *Panicum repens*, *Acroceras macrum* and *Leersia sp.*
4. Termitaria grasslands: these are found immediately above the high flood line. They are characterised by scattered termite mounds that are usually flooded by local rains. Floodwater can only reach this zone in exceptionally wet years. The main plant species include, *Setaria sphacelata*, *Panicum maximum* and woody species of *Acacia*, *Dicrostachys cinerea*, *Mimosa pigra* and *Albizia harvey*.
5. Woodlands : These are several types; the Munga vegetation borders the termitaria zone and is dominated by *Acacia polyacantha* and *Albizia harvey*. *Combretum* woodland occurs in drier areas.

The Kafue Lechwe (*Kobus leche kafuensis*) and Zebras (*Equus burchelli*) are the dominant species of fauna that are found in the flats. Wildebeest (*Connochaetes taurinus*), Buffalo (*Syncerus caffer*), Roan (*Hippotragus equinus*), Kudu (*Tragelaphus strepsiceros*) and Hippo (*Hippopotamus amphibius*) are present in limited numbers. Small mammals also have a wide occurrence (Shepe, 1972) and the bird life is common (Douthwaite, 1982).

Fourteen species of fish have been recorded in the Flats. Of these, the *Tilapia*, *Barbus* and Catfish are the most exploited.

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

- *Typha latifolia* (Cattail) - many stretches of the Kafue River, particularly under the railway bridge.
- *Cyperus papyrus* (common reed) - found under the Railway Bridge
- *Aeschynomene fluitans* - found extensively in the Lochinvar Area
- *Eichornia crassipes* (Water hyacinth) - perennial, mat-forming aquatic plant of wide distribution in the tropics. Has heavily infested much of the Kafue Gorge dam (abundant) and is an invasive plant

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

- *Kobus leche kafuensis* (Kafue Lechwe) - unique to the flats and are found nowhere else in the world (abundant & threatened).
- *Tragelaphus spekei* (Sitatunga) - restricted to the dense reed-beds and adjacent grasslands in the wetland (rare)
- *Equus burchelli* (Burchell's Zebra) - found in the open woodland, scrub and grasslands, strictly dependent on water and rarely moves more than 12 Km from it.
- *Kobus leche* (Red Lechwe) - always near the permanent and seasonal water bodies of the flats (endangered). The same population of Red Lechwe is suspected to migrate between the flats and Lukanga swamps (~400 animals)

At least 316 bird species have been recorded within the region (Brooke, 1996; Dorset, 1966; UNFAO, 1968).

Unlike the mammals, the birds may cover several areas within a day. Thus the region in this context refers to the Kafue Flats, Kafue National Park, Busanga Plains, Lunga Luwishi Game Management Area and the Lukanga swamp itself. No data on the abundance and distribution of the birds was collected.

1) CRANES:

- *Grus carunculatus* (Wattled Crane) - ~140 birds
- *Balearica regulorum* (Crowned/ Crested Crane) - occurs in small numbers in suitable habitats particularly in the northeast of the swamp in the Mufukushi River area.

2) STORKS:

Anastomis lamelligerus (Open billed stork), *Ephippiorhynchus senegalensis* (Saddle billed stork) and *Leptoptilos crumeniferus* (Marabou stork) are all common in the area. (Specific information on the storks in the Lukanga Swamp is limited, though general indications are that a number of the species occur).

3) DUCKS AND GEESE:

- *Dendrocygna bicolor* (Fulvous duck) - occurs in large numbers in the *Nymphaea* plant community, and at the edge of the *Typha* and *Phragmites* communities (Threatened).
- *Dendrocygna viduata* (White faced duck) - observed particularly in the lagoons and marshes. Has extensive distribution and may breed within the swamp in areas of fewer disturbances (Abundant).
- *Plectropterus gambensis* (Spur winged goose) - although rarely gregarious, it occurs in small flocks in the Lukanga swamp. Though the possible nesting grounds could be between Chilwa Island and Kafue River, it is highly unlikely that the geese breed in the swamp (abundant).
- *Alopochen aegyptiacus* (Egyptian goose)- the species utilizes the areas along the Kafue River, upper Lukanga River and the delta of Mafukushi River and is therefore quite common (Abundance not known).

4) PELICANS:

- *Pelecanus onocrotalus* (White pelican) - rare
- *Pelecanus rufescens* (Pink backed pelican) – rare

5) HERONS, EGRETS AND BITTERNES:

Ardea cinerea (Grey Heron), *Ardea melanocephala* (Black headed Heron), *Ardea goliath* (Goliath Heron) and *Ardea ralloides* (Squacco Heron) - common.

Egretta intermedia (yellow billed egret), *Egretta garzetta* (Little Egret) and *Bubulcus ibis* (Cattle Egret) - common

The Little Bitternes are quite common in the *Typha* plant community and reed beds.

6) BIRDS OF PREY/ SCAVENGERS:

Most of the large birds inhabit the woodland and termitaria zones. Among the birds of prey and/ or scavengers frequently seen are *Haliaeetus vocifer* (African Fish Eagle) mostly occurring along the Kafue River, *Sagittarius serpentarius* (Secretary Bird), *Torgos tracheliotus* (Lappet Faced Vulture) and *Milvus migrans* (Black Kite).

Other animal species include:

- **Mollusca:** *Bulinus globosus*, *Coelatura sp.*, *Cleopatra sp.*, *Biomphalaria sp.*, *Pila sp.*, *Limnaea natalensis*, *Physopsis sp.*, *Planorbis sp.*, *Melanoides sp.*, *Lanistes sp.*
- **Arthropoda:** Insecta: *Ephemeroptera* nymphs (*Lestidae*, *Caenidae*); *Odonata*, *Zygoptera* nymphs, *Hemiptera*, *Coleoptera* and *Diptera*

In terms of ecological interactions, at the bottom end of the food web we have algae (*Spyrogyra sp.*, *Zygnema sp.*, and *Mougeotia sp.*), Sedges (*Cyperus spp.*, *Eleocharis sp.*), Water lilies (*Nymphaea spp.*) and Grasses (more than 50 spp.). From there are linkages to fish, fungi, antelope, water birds and molluscs. These are then linked at a higher level to birds, fish (eg cat fish, banded bream), termites, and otters. At the top end of the food web we have the fish eagle (*Haliaeetus vocifer*), Nile Crocodile (*Crocodylus niloticus*), and Aardvark. (Kafue Basin Research Committee. University of Zambia. 1982.)

23. Social and cultural values:

a) Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The vast resources of the flats are a storehouse. The local communities gain a living from fishing and pastoral grazing for their livestock on these flats.

Nakeenda is a cultural heritage building previously used by the Government as a military installation for national security.

The flats are host to the "Semunenga" traditional ceremony of the Ila people of the Central Province in the month of September. This ceremony is held on the weekend of the full moon and is an expression of their devotion to their ancestors. This ceremony is held at a place called Maala.

The Gwisho Hot Springs and Sebanzi Hill is a site of archeological and / or historical interest. It is located in the Lochinvar National Park.

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where 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:

24. Land tenure/ownership:

a) within the Ramsar site:

b) in the surrounding area:

In colonial times, the Flats were a rural economical hinterland. But after independence all land in Zambia is under the President.

There is state land, that is the National Parks and the Privately owned farms and the customary land that encompasses the Game Management Areas (GMAs) and land that is outside the jurisdiction of the State.

25. Current land (including water) use:

a) within the Ramsar site:

1. Subsistent fisheries, and water abstraction (for purposes of irrigation)
2. Subsistent cultivation (especially growing rice), wildlife conservation settlement and presence of mining (gypsum and coal). Grazing of cattle (and wildlife) on the grasslands during the dry months of September to November.

b) in the surroundings/catchment:

The Kafue Flats have a very complex land use system. They also have a vast potential for tourism.

1. Power generation at Kafue Gorge Station as well a dam at the upper catchment at Itezhi-tezhi.
2. Subsistent fisheries, and water abstraction (for purposes of irrigation)
3. Subsistent cultivation

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

a) Within the Ramsar site:

1. Fishing

Over fishing, expansion of weeds, and the impact of hydroelectric projects have had a detrimental effect on the flats.

2. Poor Management

The hydrology of the flats has changed since the construction of the Itezhi-tezhi and the Kafue Gorge Dams for hydroelectric requirements. This has impacted on the flooding regime of the flats and consequently on the natural habitats of some birds and animal species that have always lived on the flats. Water at the two dams can be released during the dry periods to minimize the head of water at the Kafue Gorge Dam. The result is that peak floods and extreme drought no longer occur, disrupting fish reproductive cycles, affecting birds and local population depending on these fish. Species have been lost, as the wetland habitat has degraded.

3. Mining

Mining (metallic concentrates carried by the River from the mines in the Copperbelt), soil erosion, over grazing and human settlements.

4. Poaching

There has been severe poaching, especially of the Kafue Lechwe: With the poachers having a variety of methods, coupled with the limited human and financial resources, it has been difficult for the wildlife authorities to contain the situation. The lechwe is now threatened with extinction, and officials fear that numbers are currently below 50,000 and still declining. Unfortunately, developments affecting the Kafue Flats are not directly compatible with the social needs of the people who live there. Developments along the line of rail, and particularly the two hydroelectric dams at Kafue Gorge (1972) and Itezhi-tezhi dam (1977) have instead inflicted considerable social costs on the inhabitants.

The local attitude towards resources (particularly wildlife and fisheries) is one of resignation; that the resources belong to outsiders. This frustration is understandable, because fishermen are predominantly immigrants, and Safari or urban hunters do the hunting.

The inhabitants have been neglected, discriminated against, and there are no provisions to allow them to participate (directly or indirectly) in resource administration, or at least to share the benefits of such exploitation; yet these are the indigenous people of the area

5. Weed invasion

In addition there is the problem of the invasive weed, *Mimosa pigra*. This is a major threat which is mostly found in the Lochnivar area but spreading to other areas within site as well.

b) In the surrounding area:

1. Farming

- Chemicals and fertilizers (from the commercial farming estates along the shores) washing into the river cause eutrophication. This leads to proliferation of floating weeds (i.e. water hyacinth, *Eichhornia crassipes*, the Kariba weed/ water fern- *Salvinia molesta* etc.), which can impair the water quality and increase disease vectors and water loss (through evapo-transpiration)
- The problem of irrigation and/ or water abstraction may lead to the drying up of the Flats. This leads to a change in downstream hydrology, which can impair ecosystems dependant on seasonal flooding, including areas that may be important for fisheries or for traditional flood- recession agriculture.
- There is also the problem of siltation in the dam areas of the Kafue River, which causes a reduction in the silt carried by the river, consequently leading to impoverishment of the soils downstream of the impoundments.

2. Fishing

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3. Poor Management

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27. Conservation measures taken:

- a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

Site is a National park and Game Management Area. The boundary coincides with the Game Management Areas as well as the National Parks of Blue Lagoon and Lochnivar.

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

- b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

- c) Does an officially approved management plan exist; and is it being implemented?:

The Kafue Partners for Wetlands Project is spearheading the preparation of a management plan for the Blue Lagoon. This project has also spearheaded the initiative to involve the local communities in the conservation of the natural resources in their vicinity. This is being done in the conjunction with the Government/ ministerial projects such as the Environmental Support Program (ESP) and Non- Government Organizations (NGOs) such as CONASA (Community Based Natural Resources Management and Sustainable Agriculture), Netherlands Development Cooperation (SNV), etc.

A draft management plan has been formulated. The process was participatory, and included tour operators, local communities, government departments and NGOs.

- d) Describe any other current management practices:

The Zambia Wildlife Authority (ZAWA) has an anti-poaching/ law enforcement unit that deals with issues of poaching in the flats. It also, to this effect, introduced the concept of 'honorary rangers' where people with interest in protecting the wildlife of the flat are given the mandate to arrest poachers in the area. They also have community resource boards (CRBs)/ wetlands management units that consist of local community members that help implement 'wise use' of the natural resources in the area.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Draft management plans for Blue lagoon and Lochnivar National parks have been formulated. The process was participatory, and included tour operators, local communities, government departments and NGOs. Future plans are to include Blue Lagoon and Lochinvar National Parks in the ecosystem approach. The management plans are intended to provide a framework for the partnership between the local community and all the other stakeholders in the region.

An effort to increase water availability for the environment included in the process is the re-establishment of the extent of grazing grounds upstream of Itezhi-tezhi. An effort should be put to try and control siltation in the Kafue River.

The WWF Partners for Wetlands Project is initiating important coalitions with various partners to implement important conservation measures to rehabilitate and forestall further deterioration of the flats. There has been a noticeable decline of poaching as night patrols have intensified in recent months.

The National Wetlands Steering Committee (NWSC) has proposed three ways in which to tackle the conservation of the wetlands:

- i) The National Wetlands Training Workshop was held in Monze from 1st to 3rd December 2004 with financial support from IUCNROSA. This was the initiative of the SADC Regional Wetlands Conservation Project that planned to conduct short training on wetlands at national level in SADC member states.
- ii) The Environmental Council of Zambia in conjunction with Worldwide Fund for Nature has proposed the inventory of all the Wetlands of Zambia in an effort to identify the priority course of action in conservation of the wetlands.
- iii) Preparation of a national policy (Zambia Wetlands Policy- ZWP). This document has the Government's support and has consequently led to the National Action Plan for the management of wetlands.

The Zambia Electrical Supply Corporation (ZESCO), the national electricity utility, and WWF have agreed to work in partnership on a project that will seek to implement an integrated water management system in the flats.

Zambia Sugar Plc., Ceres Farms Ltd. and Nanga Farms Plc. (private farms) have all made available land on which they are working together with WWF Partners for Wetlands and the people of Chief Mwanachingwala (Southern Province), to establish a conservation zone (The Mwanachingwala conservation Area- MCA). The wetland strip of land that lies between the sugar plantations of the three farms and the Kafue River will be returned to the wildlife sanctuary status that it once enjoyed.

The nature conservation zone will see the reintroduction of the wildlife species that were once prominent in this area, particularly the Lechwe and Sitatunga. The cooperating partners of this project intend to establish a fence that will clearly define the perimeters of the conservation zones.

Two sugar cane producing farms based in Mazabuka (Ceres and Nanga) are working with the Partner for wetlands Project to consider establishing artificial wetlands that would purify the water flowing from their farms into the Kafue River in the Mazabuka area.

The artificial wetlands will take the form of reed-beds or ponds with floating plants, through which wastewater and nitrites & phosphates (residual fertilizers) rich irrigation water will pass for purification before flowing back into the river. The area will serve as a final purification stage for the pre-treated effluent and run-off from the farms.

29. Current scientific research and facilities:

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Lochinvar National Park -

There is a bird-ringing program that is supervised by a biologist at the site.

Earth Watch, an international NGO, has a program with National Parks that sends Game Scouts for training on issues pertaining to resource bio-diversity and inventory. These programs are undertaken in Kenya and South Africa.

Zambia Ornithological Society has a memorandum of understanding with Zambia Wildlife Authority to undertake programmes on the welfare of birds.

Mimosa pigra an invasive weed has been described as obnoxious and choking water ways of the Kafue Flats. Currently, a pilot project is being carried out to generate information that will aid researchers understand the weeds reaction to manual removal (cut, uproot and burn). This is being done to find the best removal options in an integrated management approach.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

- WWF/ZEP has developed closer links with the Ministry of Tourism Environment and Natural Resources and co-facilitated the formation of the Community Resource Boards in Chiawa Game Management Area (GMA), Blue Lagoon and Mazabuka's Mwanachingwala Conservation Area. The CRBs were formed under the auspices of the Zambia Wildlife Authority (ZAWA) as provided for by the Zambia Wildlife Act No. 12 Of 1998.
- Other areas of advocacy have included the sensitisation of the grassroots communities to participate in community based natural resource management as enshrined in the fisheries, wildlife and forestry acts.
- There is a resource/ visitor's center at the entrance to the national park on all information on Lochinvar National Park, but this is still at proposal level for the Blue Lagoon.
- Other proposals include the 'reviving' of the information booklets that used to be funded by 'well wishers' and have since discontinued, and the building of hides to facilitate the easier viewing of the two parks.
- The Lochinvar National Park is utilised in school visits as far as higher educational institutions, for example the University of Zambia (UNZA- main campus) and Evelyn Hone College (Lusaka). But it must be stressed that this is done only on request by the institution and it is of general consensus that instead of waiting for these requests, the key stakeholders should be more pro-active in this regard.

- The Environment Support Program's (ESP) 'Environment News'- a World Bank funded segment that is aired at prime time on the main news. Recently, this program featured the Kafue Flats and therefore accorded the WWF Partners for Wetlands Project a chance to educate a nationwide audience with visual information on how they are approaching the wetland conservation and management.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The Zambia Wildlife Authority (ZAWA) is actively considering private sector tourism investors who can be licensed to carry out tourism activities in the two parks (Lochinvar and Blue Lagoon- Nakeenda Lodge).

Lochinvar National Park, because of its strategic location from Monze, Mazabuka and Lusaka, is generating high tourism turnover, especially for the day visitors. Most of the tourism activities are concentrated around Chunga Tented Camp owned by Star of Africa. A number of land and water-based recreational activities such as bird watching and canoeing can easily be exploited.

WWF Partners for Wetlands Project is looking forward to working with investors with innovative ideas to turn the two national parks into bastions of eco-tourism complete with wildlife and well-preserved eco-systems.

The southern part of Kafue National Park is in the flats and the following are some of the recreational facilities available in the Park:

Nanzhila Camp- in the Ngoma Section of the Kafue National Park

David Shepard Camp- in the Blue Lagoon National Park

Lochinvar Camp- in the Lochinvar National Park

A new facility was recently opened in Lochinvar National Park that facilitates the viewing of game and birds from a slightly elevated vantage point. This structure is a few meters off the ground and can be compared to the hides at Kasanka National Park (south of the Bangweulu National Park).

The Mwanachingwala Conservation Area, MCA presently looks like a not so useful piece of land between the big sugar plantations of Mazabuka and the Kafue River, which will soon transform into a tourist destination.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

The flats have a complexity of jurisdiction and fall under three main categories:

The private farms.

The State land which has a focal point at Zambia Wildlife Authority (ZAWA), with other institutions taking up different roles in the management of the flats such as Zambia Electricity Supply Corporation, Zambia Sugar Plc, WWF, ECZ, Department of Water Affairs, Department of Forestry, Ministry of Agriculture and Cooperatives and Ministry of Tourism, Environment and Natural Resources.

Traditional/ customary land that is under the chiefdoms of the area.

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Zambia Wildlife Authority,
Private Bag 1
Chilanga, Zambia
Email: zawaorg@zamnet.zm
Tel: 260-01-278365 or 278335
Fax: 260-01-278299 or 278365

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

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Southern Book Publishers (Pty) Ltd.- Western Cape, South Africa

WWF Partners for wetlands & ZAWA Census of 2005, Kafue Flats

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Annex I

Some water birds (based on the Wetlands International list of sub-Saharan African water bird species) observed during both ground and aerial surveys in September and November 2001.

Common Name	Scientific Name
Little grebe	<i>Tachybaptus ruficollis</i>
Blackheaded heron	<i>Ardea melanocephala</i>
Slaty egret	<i>Egretta vinaceigula</i>
Black egret	<i>Egretta ardesiaca</i>
Squacco heron	<i>Ardeola ralloides</i>
Rufousbellied heron	<i>Butorides rufiventris</i>
Striated heron	<i>Butorides striatus</i>
Glossy ibis	<i>Plegadis falcinellus</i>
Hammerkop	<i>Scopus umbretta</i>
African pygmy goose	<i>Nettapus auritus</i>
Yellowbilled duck	<i>Anas undulate</i>
Redbilled teal	<i>Anas erythrorhyncha</i>
Hottentot teal	<i>Anas hottentota</i>
African crake	<i>Crex egregia</i>
Black crake	<i>Amaurornis flavirostris</i>
Common moorhen	<i>Gallinula chloropus</i>
Lesser morhen	<i>Gallinula angulata</i>
Purple gallinule	<i>Porphyrio porphyrio</i>
Lesser gallinule	<i>Porphyryla alleni</i>
Redbilled coot	<i>Fulica cristata</i>
African jacana	<i>Actophilornis africanus</i>
Lesser jacana	<i>Micropara capensis</i>
Blackwinged stilt	<i>Himantopus himantopus</i>
Pied avocet	<i>Recurvirostra avosetta</i>
Redwinged pratincole	<i>Glareola pratincola</i>
Long-toed plover	<i>Vanellus crassirostris</i>
Blacksmith plover	<i>Vanellus amartus</i>
Senegal wattled plover	<i>Vanellus senegallus</i>
Crowned plover	<i>Vanellus coronatus</i>
Ringed plover	<i>Charadrius hiaticula</i>
Kittlitz's plover	<i>Charadrius pecuarius</i>
Three banded plover	<i>Charadrius tricollaris</i>
Marsh sandpiper	<i>Tringa stagnatillis</i>
Greenshank	<i>Tringa nebularia</i>
Common sandpiper	<i>Actitis hypoleucos</i>
Wood sandpiper	<i>Tringa glareola</i>
Little stint	<i>Calidris minuta</i>
Ruff	<i>Philomachus pugnax</i>
Painted snipe	<i>Rostratula benghalensis</i>
Greyheaded gull	<i>Larus cirrocephalus</i>
Caspian tern	<i>Sterna caspia</i>
Whiskered tern	<i>Chlidonias hybridus</i>
African fish eagle	<i>Haliaeetus vocifer</i>
African marsh harrier	<i>Circus ranivorus</i>