Conserv. Plan Lukanga Zm Workshop2 Kitwe V3

Conservation Plan for Lukanga Swamp and Upper Kafue Basin

Stakeholder consultation workshop (W2 – Kitwe)

1st November 2019

nemus empowering sustainability

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CONTENT

1. Introduction; objectives and scope
2. Assignment components and stakeholders
3. Background
4. Methodology
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1 – Introduction; objectives and scope

INTRODUCTION

Assignment: development of a **Conservation Plan for Lukanga Swamp**, considering the impacts that may arise from its catchment and from the Upper Kafue Basin

It aims to answer the following questions:

What are the most significant ecosystem services provided by the Lukanga Swamp?	What are the potential drivers of ecosystem change?
How can the impacts be mitigated?	How can these areas be managed in a sustainable manner?

ASSIGNMENT FRAMEWORK

- With the support of the World Bank
- Under Component 2 of **Zambia Mining and Environmental Remediation and Improvement Programme** (**ZMERIP**)

ZMERIP's **overall objective**: *Reduce environmental health risks to the local population associated with the mining sector in critically polluted areas in Kabwe and Copperbelt provinces through improved capacity of key institutions*
Under the **Ministry of Mines and Minerals Development**
Launched on 13th January 2015
Duration: five (5) years
Budget: of USD 50 million

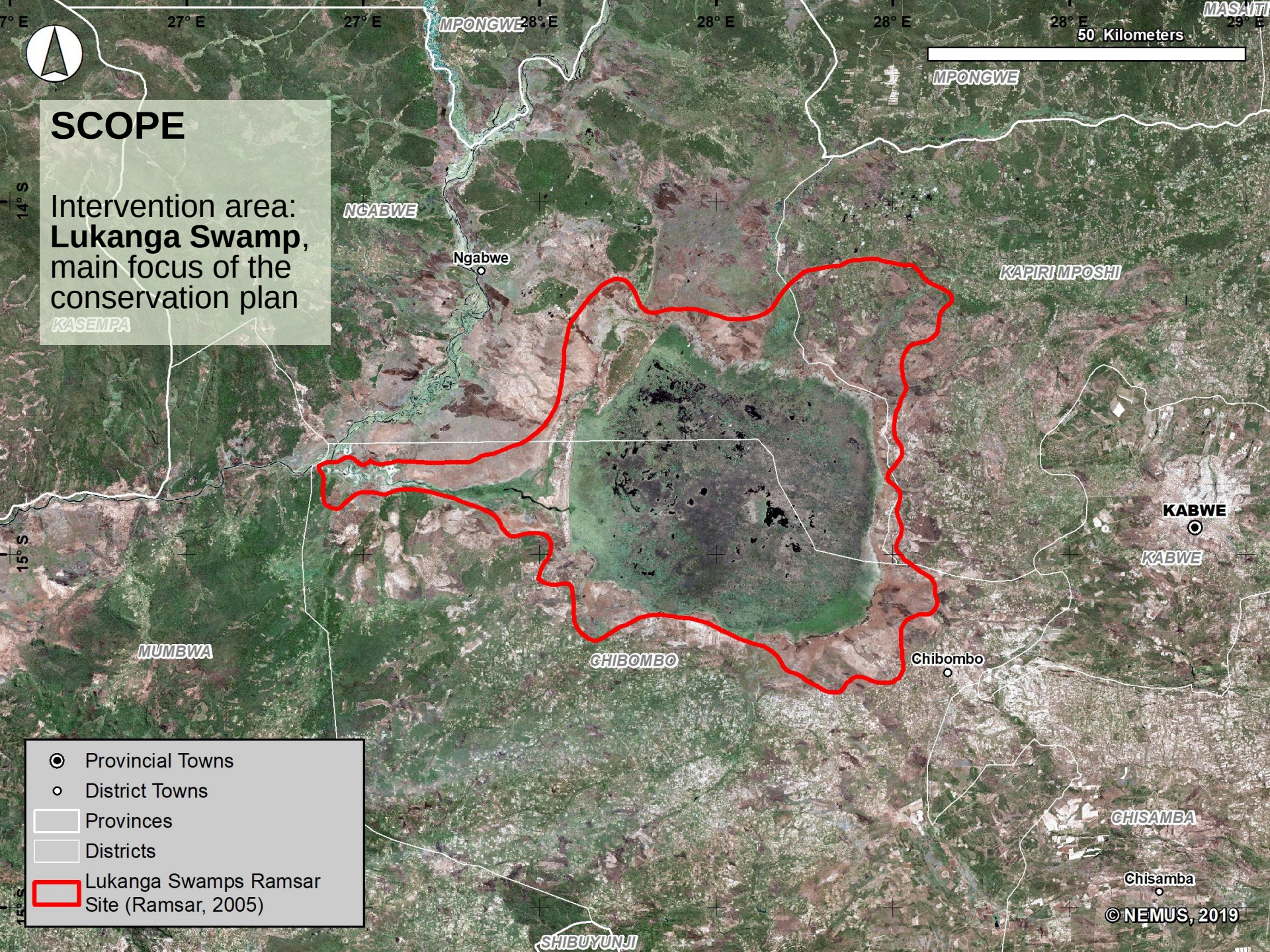
- ZMERIP's Component 2: *Enhancing Institutional Capacity for Environmental Governance and Compliance*

GENERAL OBJECTIVES

1	Generate qualitative and quantitative data and tools to support the participatory management of the area
2	Integrated approach to evaluate the upstream-downstream interactions and the impacts on Lukanga Swamp and its catchment
3	Assessment of the ecosystem services and livelihoods of the communities
4	Generate one ecosystems-based approach to conservation planning

SPECIFIC OBJECTIVES

1. Enhance sustainable, integrated planning of **water, energy, food security and ecosystems**
2. Provide data and tools to **support decision making**
3. Develop feasible incentives and enforcement mechanisms to **support sustainable ecosystem management**
4. Investigate projects for synergies, lessons and cost-efficiencies
5. **Raise stakeholder awareness** and empower them to design and implement ecosystem management solutions

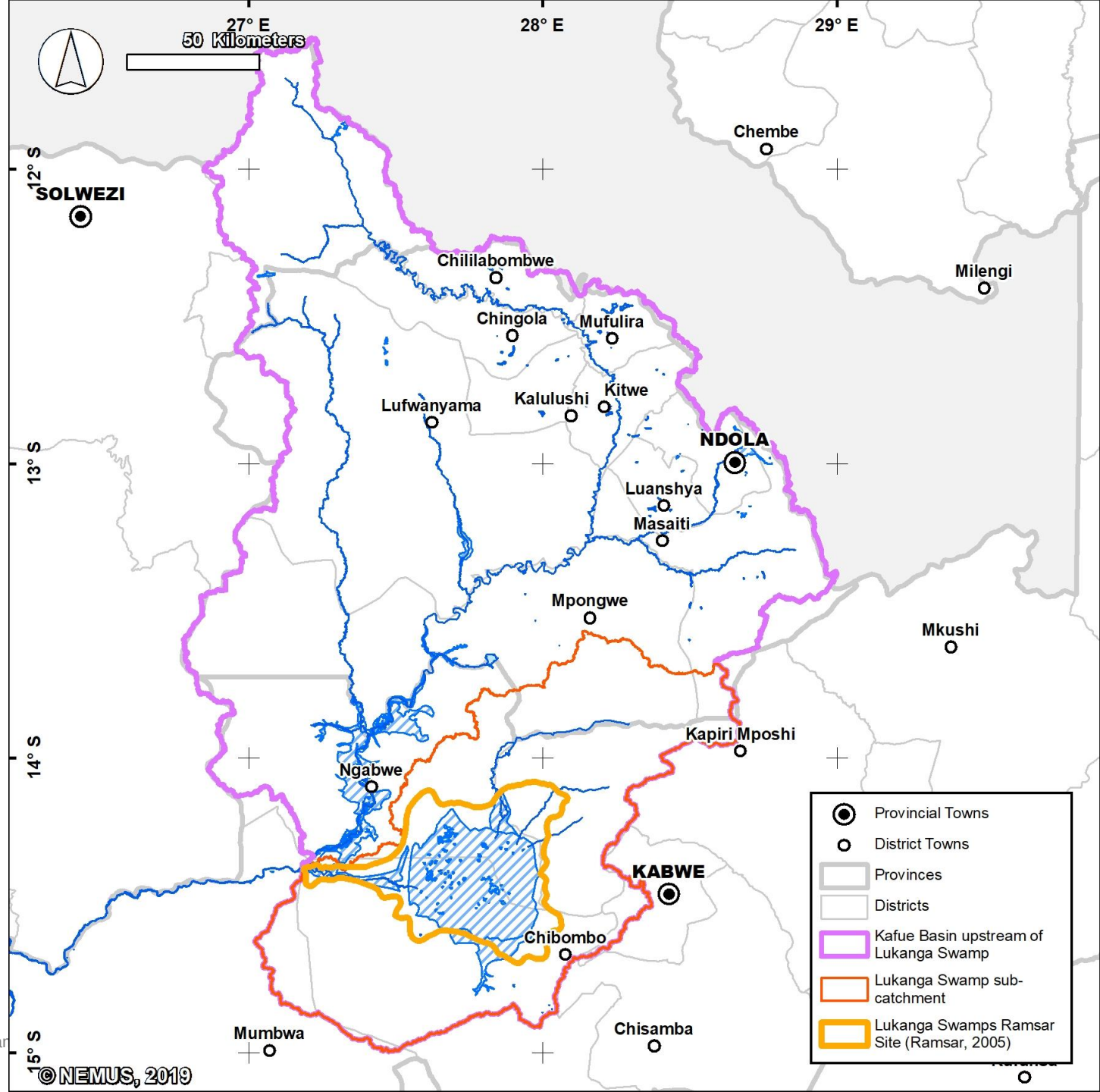

SCOPE
Intervention area: **Lukanga Swamp**, main focus of the conservation plan
KASEMPA
NGABWE
Ngabwe
MPONGWE
KAPIRI MPOSHI
KABWE
KABWE
MUMBWA
CHIBOMBO
Chibombo
CHISAMBA
Chisamba
SHIBUYUNJI
MASAITI
50 Kilometers
27° E
28° E
29° E
14° S
15° S
Provincial Towns
District Towns
Provinces
Districts
Lukanga Swamps Ramsar Site (Ramsar, 2005)
© NEMUS, 2019

STUDY AREAS

Lukanga Swamp
-> Represented by “Lukanga Swamps Ramsar Site”

Location of potential sources of impacts on Lukanga:

- **Lukanga Swamp sub-catchment**
- **Kafue River Basin upstream**



2 – Assignment components and stakeholders

LUKANGA SWAMP CONSERVATION PLAN

1 – Biophysical assessment; conservation status

2 – Evaluation of ecossystem services

3 – Development scenarios

4 – Cost-benefit analysis

5 – Integrated Management Plan for Lukanga Swamp Conservation

INDICATORS-BASED ECOSYSTEM SERVICES ASSESSMENT

1) Definition of ecosystem types and ecosystem assessment

2) Assessment of ecosystem services

3) Ecosystem service valuation

4) Analysis of future scenarios

KEY STAKEHOLDERS

Government institutions

Ministry of Mines and Minerals Development; Geological Survey Department; Mines Development Department; Mines Safety Department	Ministry of Water Development, Sanitation and Environmental Protection; Department of Water Resources Development	Ministry of Lands and Natural Resources; Department of Climate Change and Natural Resources; Forestry Department	Ministry of National Development and Planning
Ministry of Agriculture; Extension Services for Kafue; Office for Central Zambia	Ministry of Fisheries and Livestock	Ministry of Community Development and Social Welfare	Ministry of Chiefs and Traditional Affairs
Department of National Parks and Wildlife (DNPW) of the Ministry of Tourism and Arts	Ministry of Health; Radiation Protection Authority	Other national, provincial and district administrative authorities	

KEY STAKEHOLDERS

Regulators

- Zambia Environmental Management Agency (ZEMA)
- Water Resources Management Authority (WARMA)

Industry

- Mining operators
- Representatives from the agro-industry sector in UKRB
- Zambia National Farmers Union

Traditional authorities and/or community representatives

- Village Management Committees, traditional authorities and other community representatives
- Fishers and fisheries management committees
- Farmers and farmer associations' representatives
- Water users' associations, Joint Forest Management Committees and Community Resources Boards

KEY STAKEHOLDERS

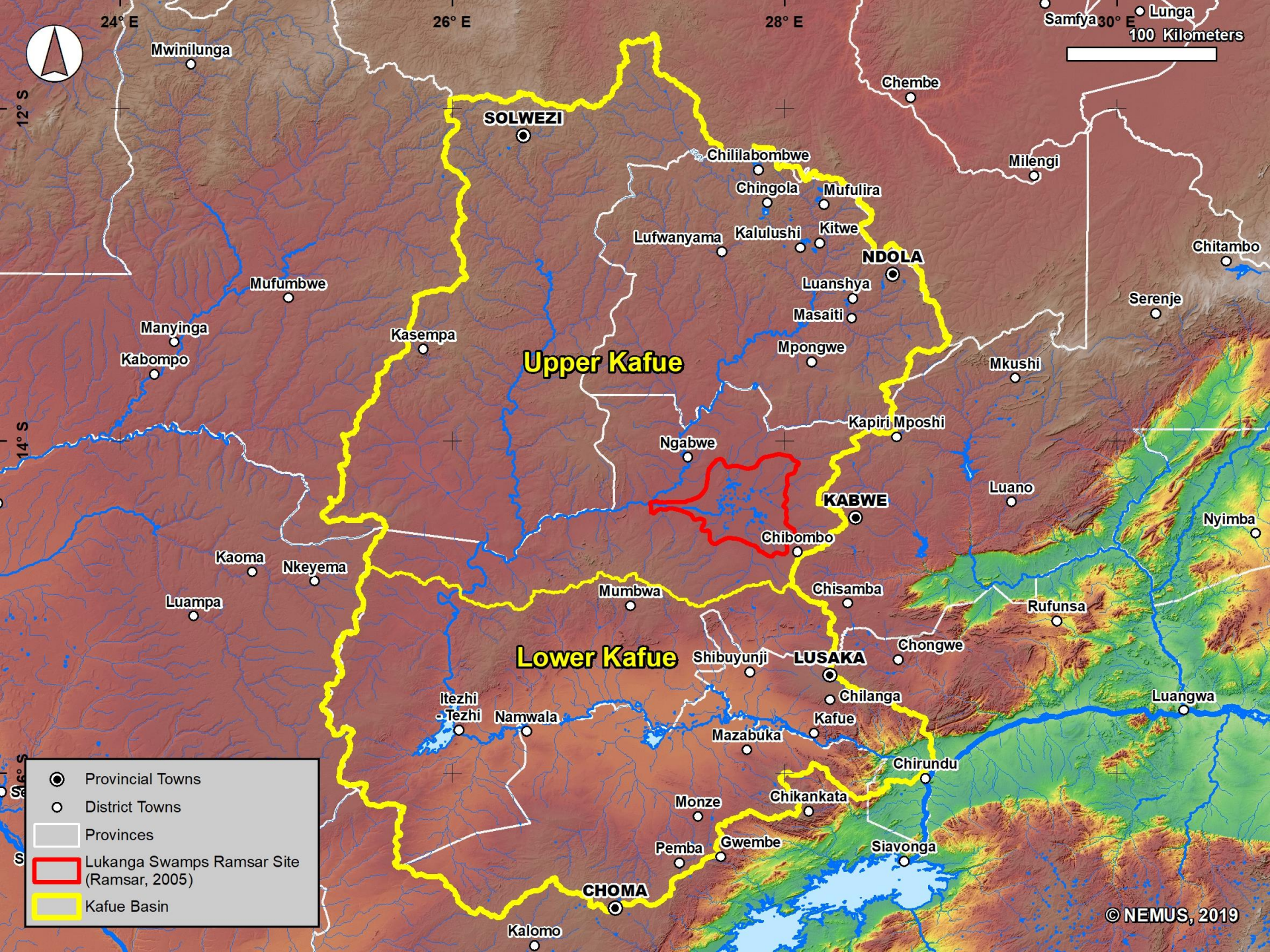
Civil society in general, NGOs, academic and research institutions

The Nature Conservancy (TNC)	WWF Zambia	Action Aid Zambia	Zambia Climate Change Network
Zambia Land Alliance	Agricultural Consultative Forum (ACF)	University of Zambia; Institute of Economic and Social Research; School of Mines	Zambia Institute for Policy Analysis and Research
Zambia Community Based Natural Resource Management (CBNRM) Forum	BirdWatch Zambia	Copperbelt university	Mulungushi University (Kabwe)

3 – Background

KAFUE RIVER BASIN

- Longest and largest river that flows entirely within Zambian territory
- One of Zambia's six major catchments
- 6,6 million people (~50% Zambia population)
- Plays a central role in Zambia's economy: most of the commercial and domestic water use activities
- Water uses: industrial, mining, hydropower, agriculture (irrigation and aquaculture), environmental and recreation
- Subdivided into 2 collective basins:
  - **Upper Kafue River Basin**
  - Lower Kafue River Basin


24° E
26° E
28° E
30° E
12° S
14° S
16° S
100 Kilometers
Mwinilunga
Samfya
Lunga
Chembe
SOLWEZI
Chililabombwe
Milengi
Chingola
Mufulira
Lufwanyama
Kalulushi
Kitwe
NDOLA
Chitambo
Mufumbwe
Luanshya
Serenje
Manyinga
Masaiti
Kasempa
Kabompo
Upper Kafue
Mpongwe
Mkushi
Kapiri Mposhi
Ngabwe
Luano
KABWE
Nyimba
Chibombo
Kaoma
Nkeyema
Chisamba
Mumbwa
Luampa
Rufunsa
Chongwe
Lower Kafue
Shibuyunji
LUSAKA
Chilanga
Itezhi - Tezhi
Namwala
Kafue
Luangwa
Mazabuka
Chirundu
Chikankata
Monze
Pemba
Gwembe
Siavonga
CHOMA
Kalomo
Provincial Towns
District Towns
Provinces
Lukanga Swamps Ramsar Site (Ramsar, 2005)
Kafue Basin
© NEMUS, 2019

LUKANGA SWAMP

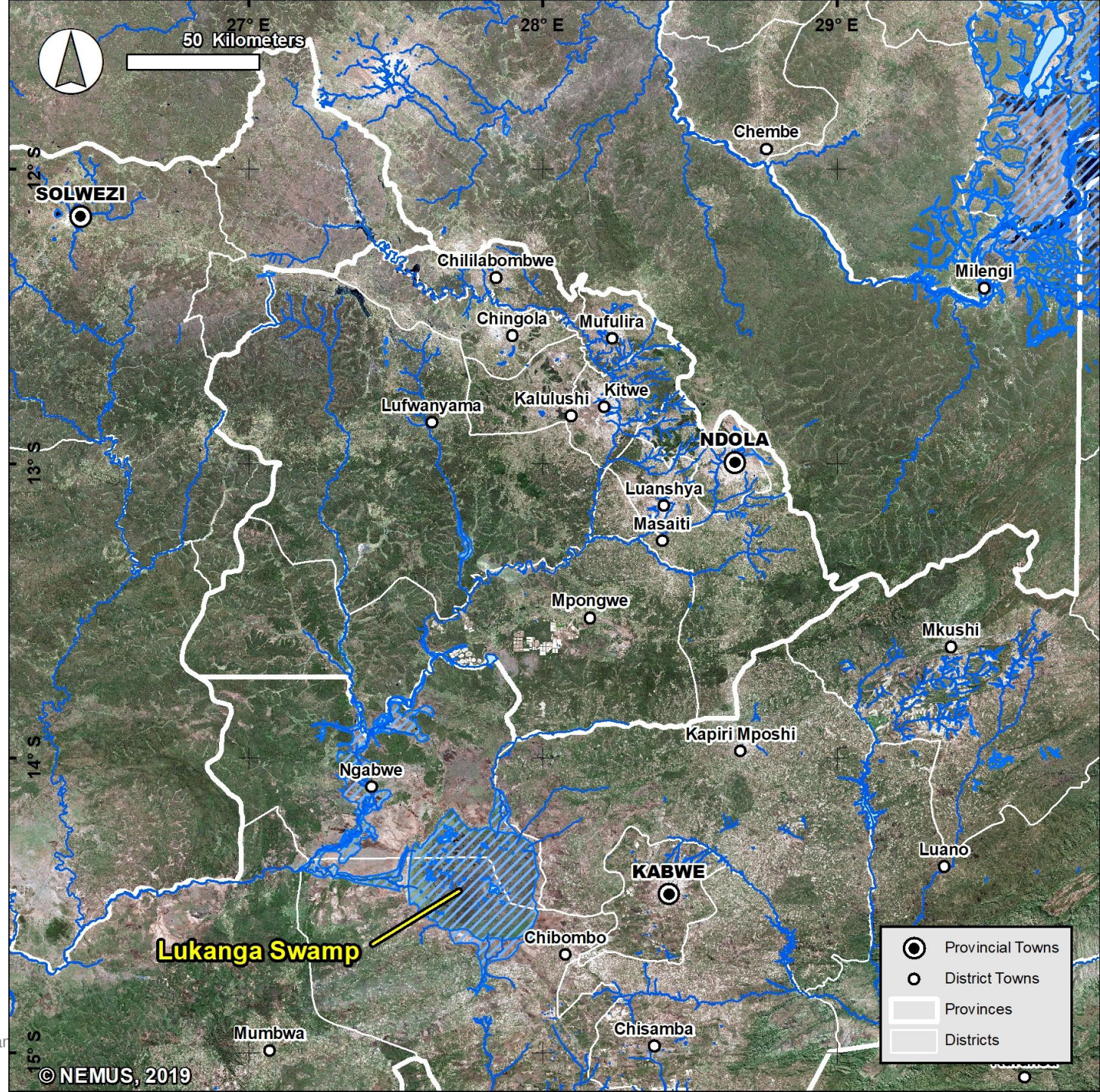
Lukanga Swamp develops in a shallow circular depression:

- 1.5 m average depth
- max. 6.1 m of water depth

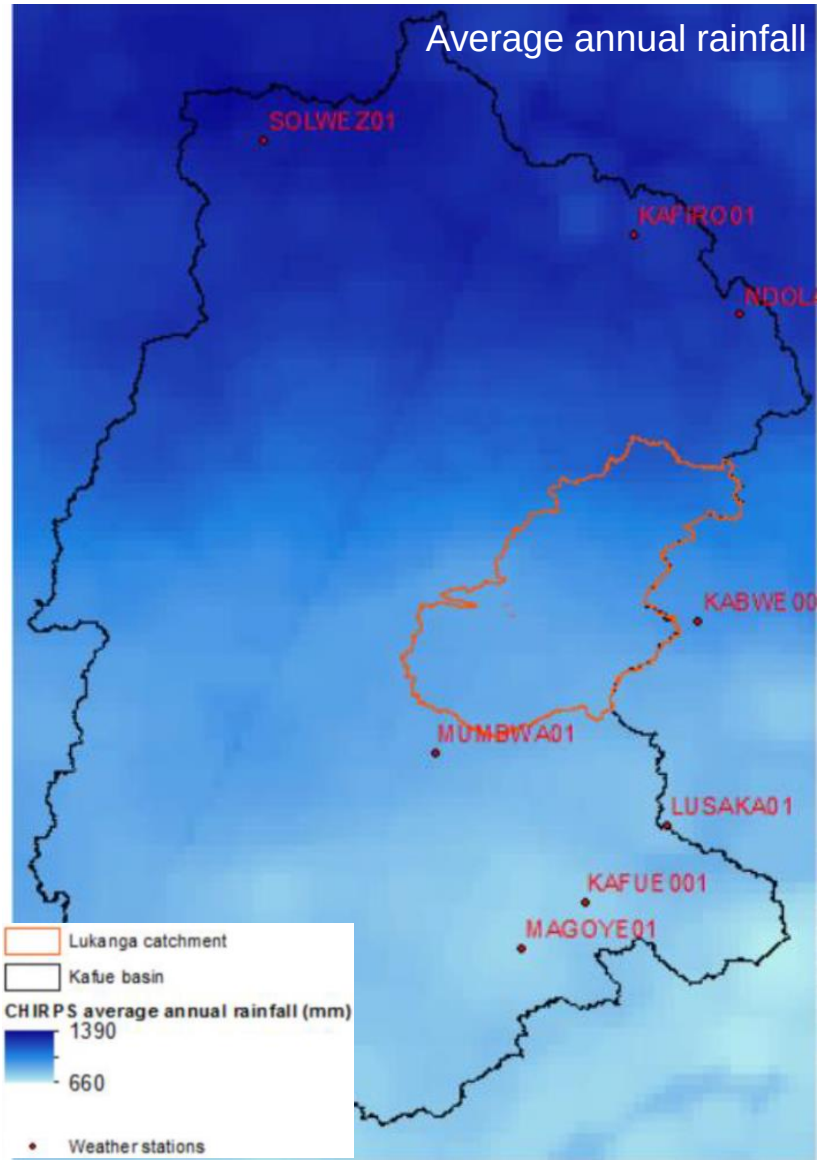
Largest permanent water body of the basin

Diameter: 40-50 m

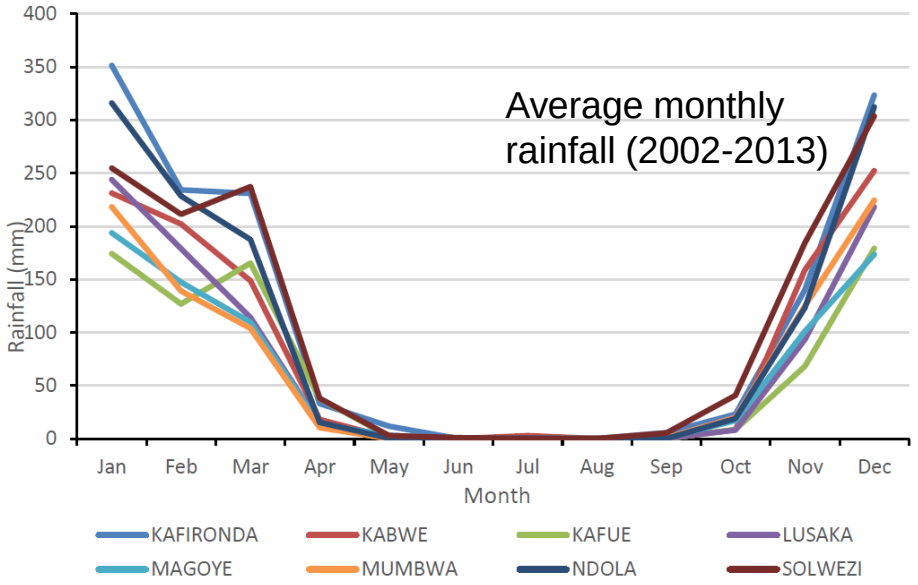
Area: 2,500 (low water) to 2,600km^2 (high flood level)



CLIMATE AND HYDROLOGY
Rainfall



Very pronounced dry and wet seasons



Source: *Hidrologycal evaluation and ecosystem valuation of the Lukanga Swamps; Final Report Jan.2017*

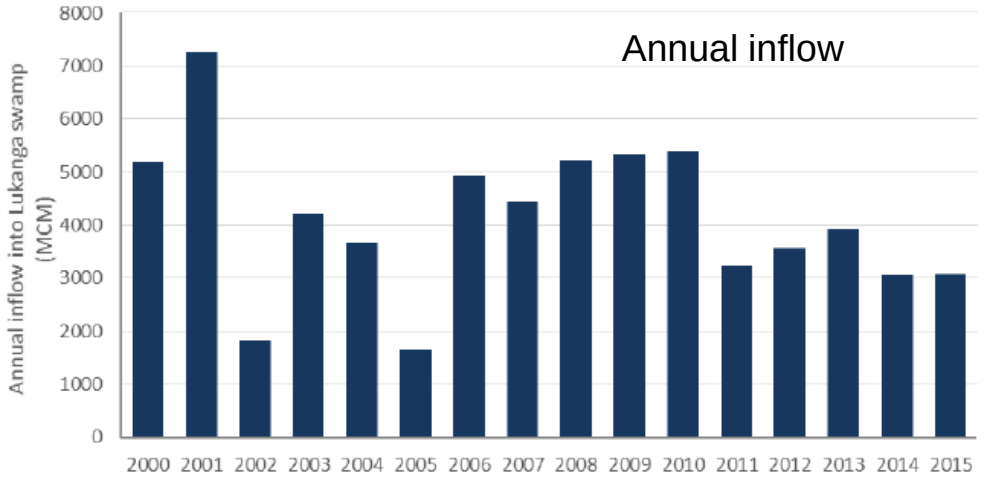
CLIMATE AND HYDROLOGY
Average inflow

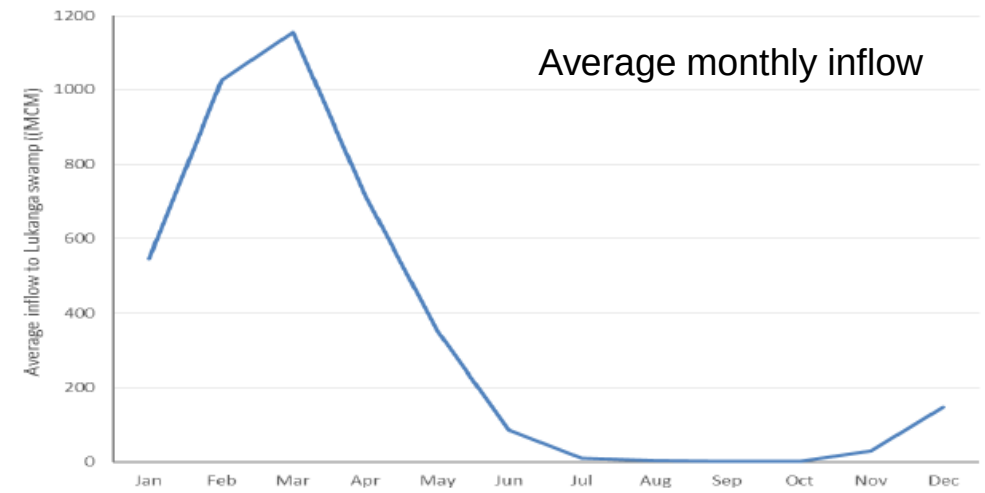
→ High annual inflow variability

The Lukanga Swamp acts as a nature-based reservoir in the Kafue river basin

- Retains water in wet periods
- Releases it slowly during the dry season and dry years

<u>Very important for downstream water users in the Kafue River Basin</u> (Lusaka water supply, hydropower, Kafue Flats)

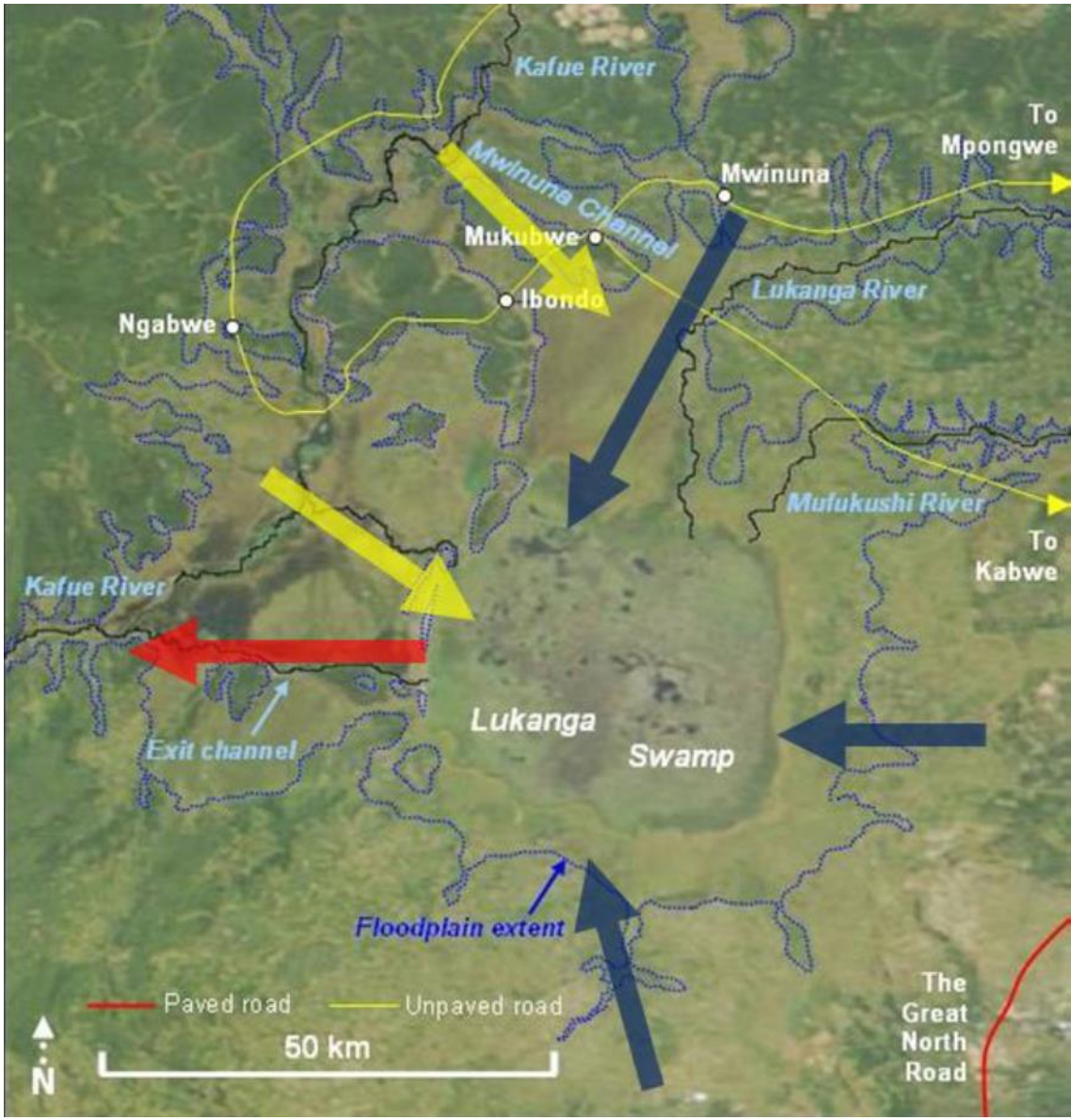




Source: *Hidrologycal evaluation and ecosystem valuation of the Lukanga Swamps; Final Report Jan.2017*

CLIMATE AND HYDROLOGY
Water Balance

←	Streamflow	Water inflow from the Lukanga watershed
←	Overflow	Occasional surface overflow from Kafue during flood events, and subsurface flow from the Kafue river floodplain to the Lukanga swamps
←	Outflow	Flow leaving swamp through exit channel to Kafue and subsurface flow between Kafue alluvial subsurface and swamp subsurface

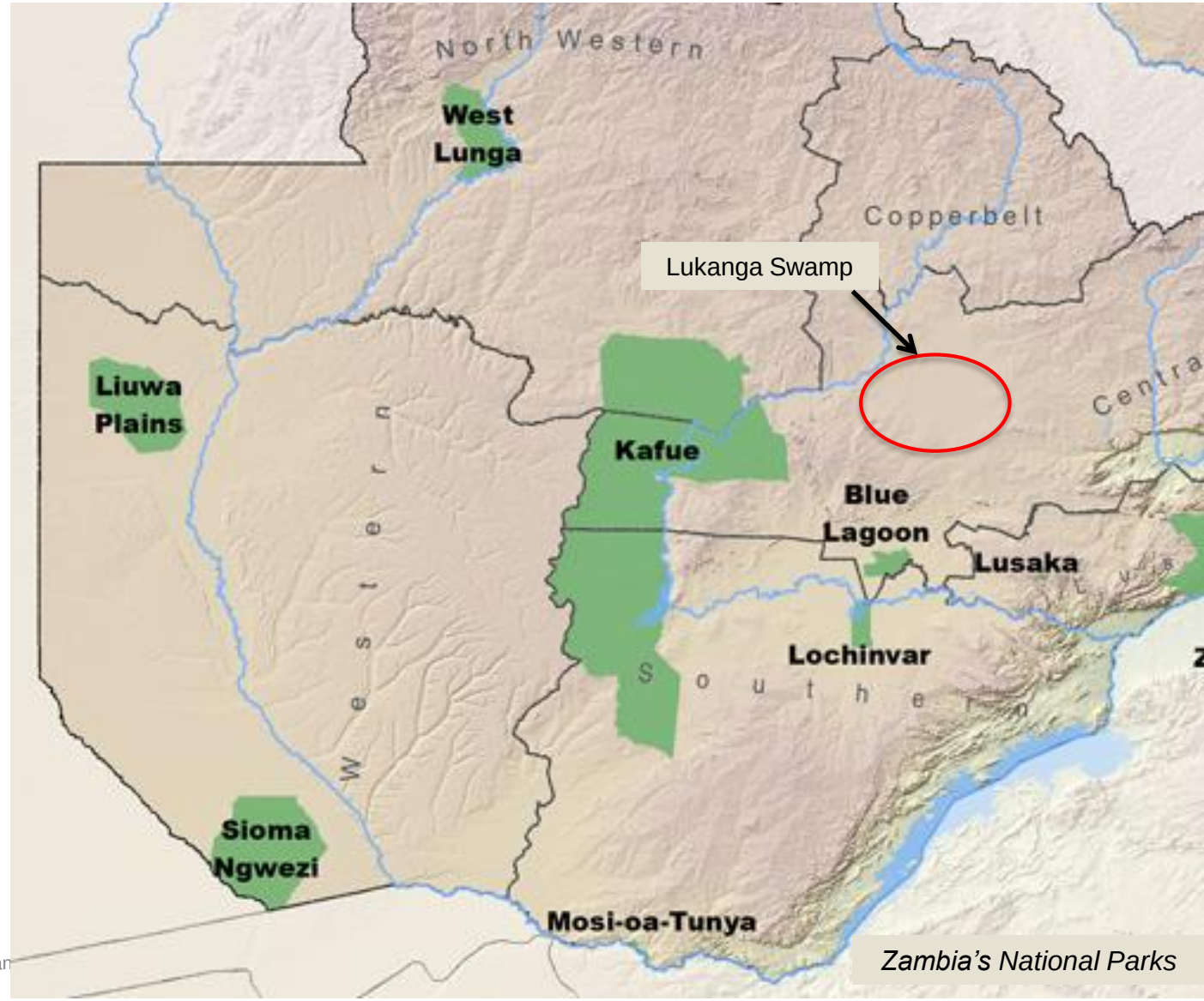


BIODIVERSITY
Ecological value

Ramsar site since 2005 (Ramsar Convention on Wetlands)

Important Bird Area (by BirdLife International)

100km East of <u>Kafue National Park</u>



Zambia's National Parks

BIODIVERSITY
Wetland ecosystems

Two major ecological types:

- **Palustrine (marsh): 95%**
  - permanent swamp, termitaria grasslands, and dambos
- **Lacustrine (open water): ~5%**
  - permanently inundated

Ecological status:
<u>potentially threatened</u>

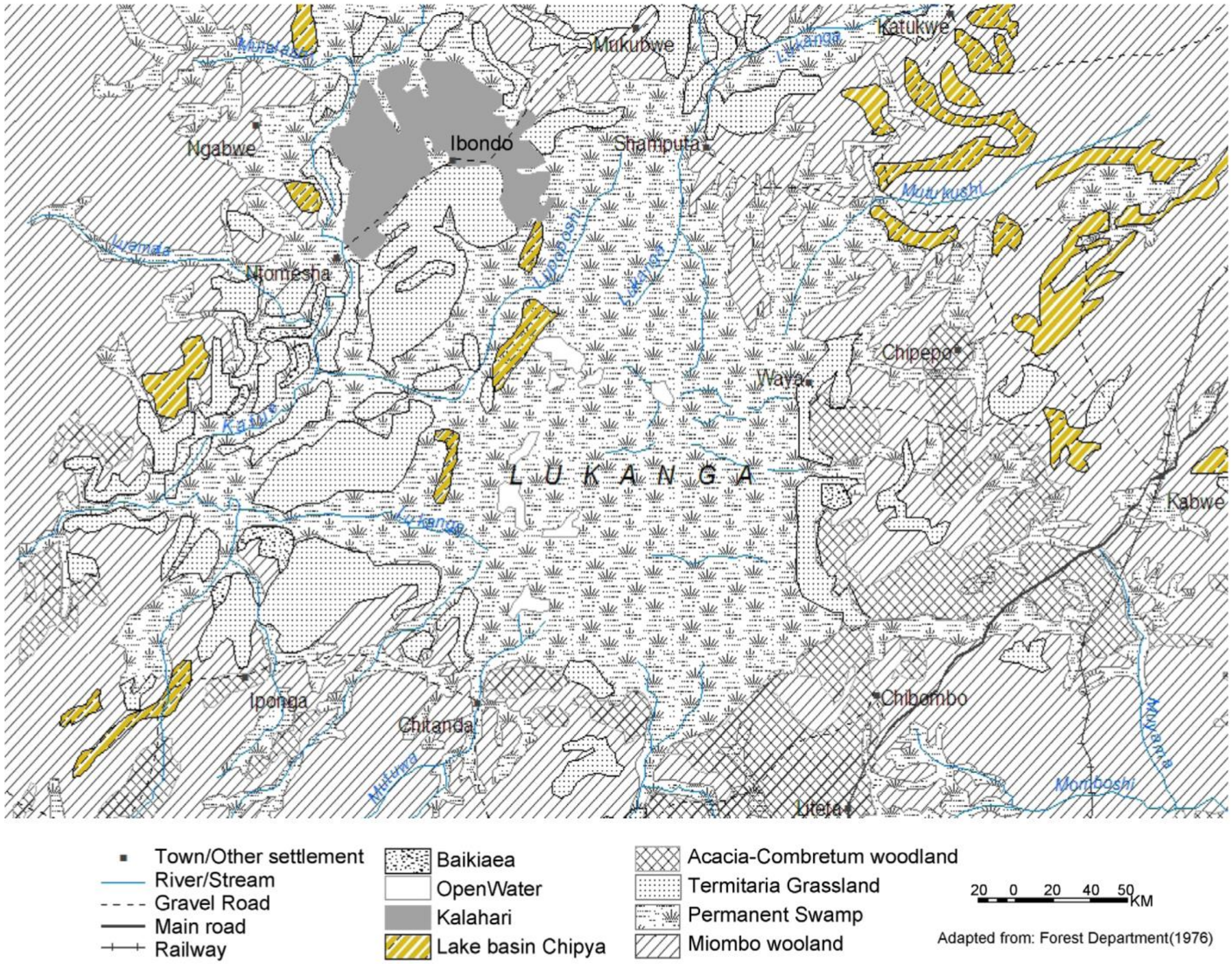
Example of a palustrine wetland in Lukanga Swamp

Arrival at a lacustrine environment of Lukanga Swamp

BIODIVERSITY
Habitat types

Eight habitat types:

1. Miombo woodland (main habitat)
2. *Acacia-Combretum* woodland
3. *Baikea* woodland
4. Kalahari
5. Lake basin Chipya
6. Termitaria grassland
7. Permanent swamp
8. Open water



Source: *The Habitat Structure of Lukanga Ramsar Site in Central Zambia: An Understanding of Wetland Ecological Condition* (Chabwela *et al.*, 2017)

BIODIVERSITY
Fauna

Reptiles:
- *Crocodylus niloticus* (Nile crocodile)
- *Python sebae* (African python)

Amphibians:
- *Bufo lemairi* (yellow swamp frog)
- *Bufo regularis* (square marked toad)
- *Xenopus laevis* (clawed frog)
- *Pyxicephalus adspersus* (African bullfrog)

Birds (at least 316 species)*:*
- *Grus carunculatus* (Wattled crane)
- *Balearica regulorum (*Crowned/ Crested Crane)
- *Anastomus lamelligerus* (Openbilled stork)
- *Ephippiorhynchus senegalensis (*Saddle billed stork), etc.


Nile Crocodile


Crowned/ Crested Crane

Source: *Information Sheet on Ramsar Wetlands (RIS): Lukanga Swamps; 2005*

Note: red marks endangered species

BIODIVERSITY
Fauna

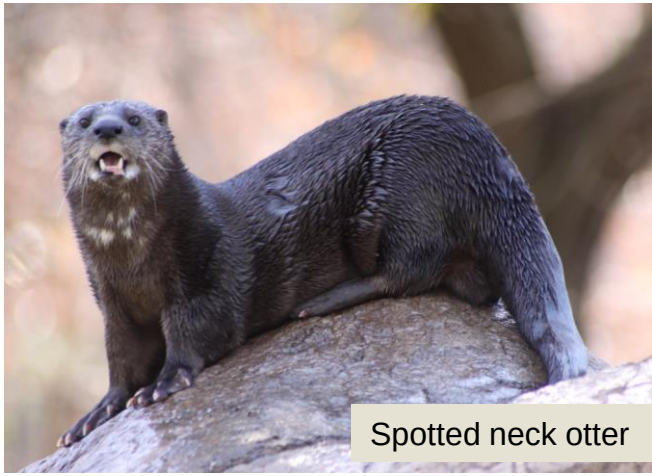
Mammals:

- *Tragelaphus spekei* (sitatunga)
- *Kobus leche* (Red Lechwe)
- *Redunca arundinum* (reedbuck)
- *Ourebia ourebi* (Oribi)
- *Felis caracal* (Caracal)
- *Felis serval* (Serval cat)
- *Lutra maculicollis* (spotted neck otter)
- *Aonyx congicus* (Clawless otter)
- *Atilax paludinosus* (Marsh mongoose)

Fish:

- *Tilapia*
- *Cichlids*
- *Serranochromis*
- *Characidae*
- *Claridae*


Red Lechwe


Spotted neck otter

Source: *Information Sheet on Ramsar Wetlands (RIS): Lukanga Swamps; 2005*

Note: red marks endangered species

BIODIVERSITY
Flora

- *Phragmites spp.*
- *Typha spp.*
- *Vossia cuspidata*
- *Nymphaea spp.*
- *Aeschynomene*
- *Cyperus papyrus*

Phragmites spp.

Nymphaea spp.

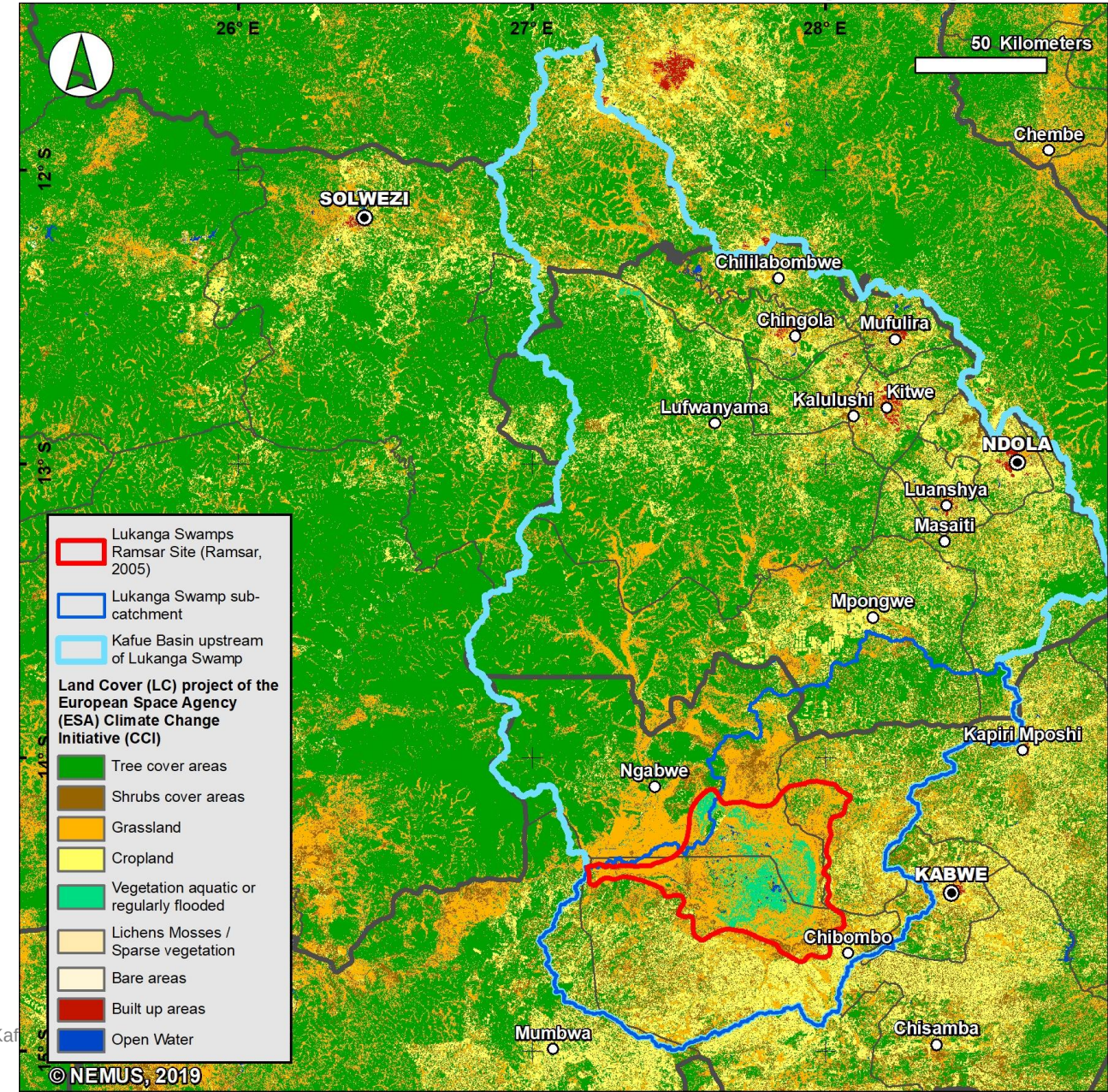
Typha spp.

Source: *Information Sheet on Ramsar Wetlands (RIS): Lukanga Swamps; 2005*

LAND USE AND SOCIOECONOMIC DINAMICS

60,000 people live in the wetland or nearby

Demographic projections show the growing trend will slow down for some districts (Chibombo, Kabwe, Kapiri Mposhi) from 2020 to 2035



LAND USE AND SOCIOECONOMIC DINAMICS

Population projections for Central Province districts crossed by Lukanga Swamp (2011-2035)

Province District	Population			Projected Annual Population Growth Rate	
	2011	2020	2035	2011-2020	2020-2035
Central Province	1,355,775	1,734,601	2,565,450	2.5%	2.5%
Chibombo District	156,708	194,778	271,991	2.2%	2.1%
Kabwe District	101,599	113,993	133,547	1.3%	1.0%
Kapiri Mposhi District	131,088	167,744	245,952	2.5%	2.4%
Mumbwa District	117,658	163,870	275,504	3.3%	3.3%
Ngabwe District	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Adapted from Zambia Population and Demographic Projections 2011-2035 (CSO, 2013).

Ecosystem services

Provisional services:

- Fisheries
- Water for consumption and irrigation
- Livestock grazing grounds
- Fuel wood
- Charcoal

Regulatory services:

- Climate regulation
- Carbon sequestration
- Water purification

Fishermen in the Lukanga Swamp

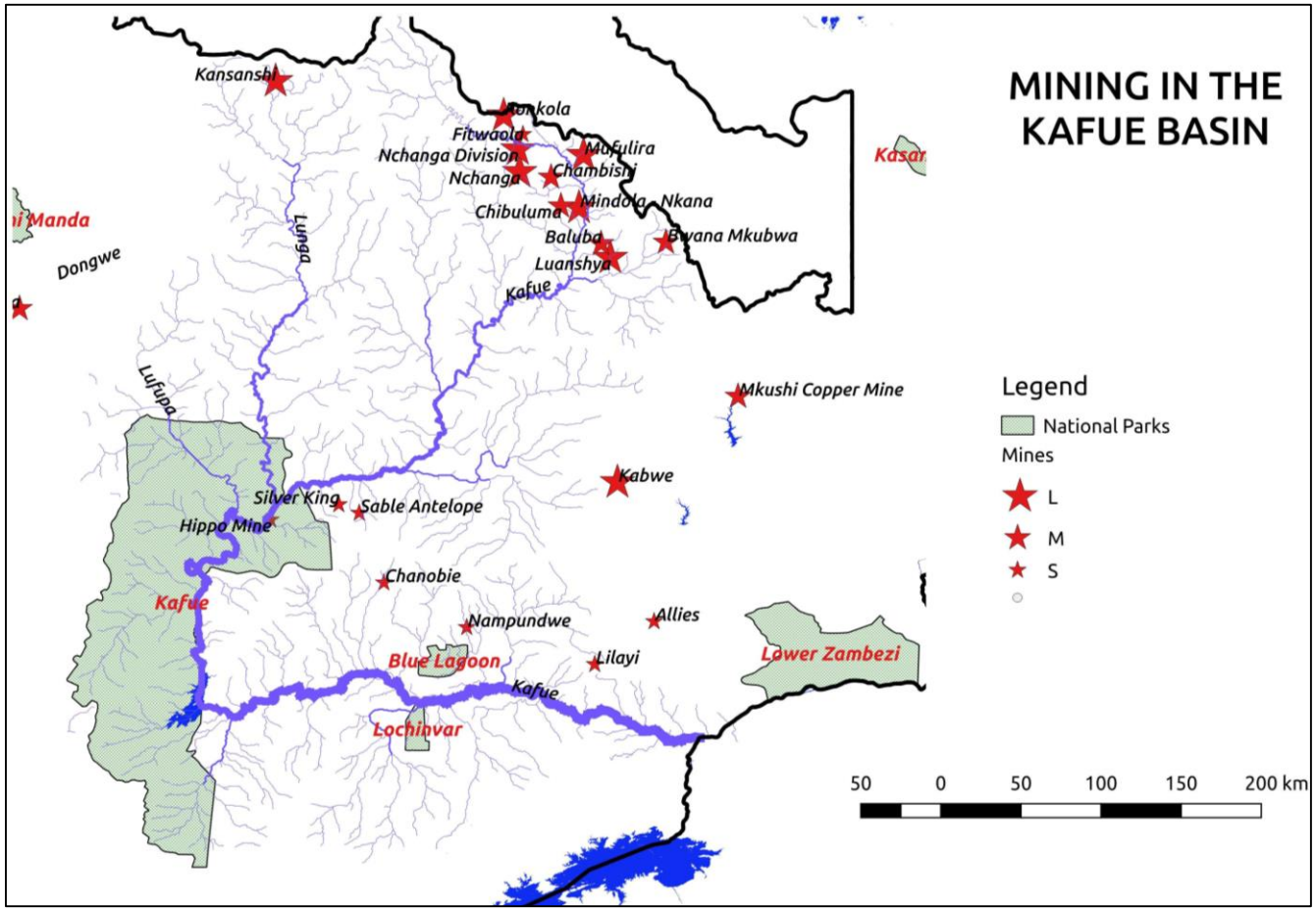
Livestock grazing grounds in the wetland area

Gathering wood for a fish drying camp

ENVIRONMENTAL AND SOCIAL IMPACTS

The **Lukanga Swamp** functions as a major sediment, nutrient and pollutants trap, <u>alleviating degradation of the downstream basin</u>

Most of the mines of the Zambian Copperbelt lie within the <u>headwaters of the Kafue River</u>



Extractive industry in the Copperbelt Province

Mopani Copper Mine, Mufulira

Konkola Copper Mines, Chilabombwe
(1 of the 4 largest mining companies in Zambia)

Extractive industry in Zambia

Zambia is one of the largest producers and exporters of copper in Africa

The mining sector accounted for **73% of national exports** revenue in 2016 (**68%** from **copper mining**)

Production:

Commodity	Unit	2016 Production Quantity	2016 Value (US $ million)[1]
Copper	Mt	774,289.80	3,769.16
Gold	Kg	4,543.85	200.19
Zinc	Tonnes	585.00	1.22
Lead	Tonnes	365.00	0.68
Coal	Tonnes	57,293.00	n/a
Emerald and Berl	Kg	71,878.66	n/a
Limestone	Tonnes	3,319,600.00	n/a
Amythest	Kg	1,349,787.00	n/a
Dolomite	Tonnes	1,201,689.00	n/a
Total of the sector			**3,971.25**

n/a: not available

Exports:

	2016 (US $ million)	2016 % Contribution
Metal exports	**4,738.2**	**72.84%**
Copper	4,399.1	67.63%
Cobalt	112.9	1.74%
Gold	191.2	2.94%
Gemstones	28.4	0.44%
Manganese Ores/Concentrates	6.6	0.10%
Zambia Exports (f.o.b)	**6,504.7**	**100.00%**

Source: *9th Zambia EITI Report. December 2018*

ENVIRONMENTAL AND SOCIAL IMPACTS

Extractive industry's main environmental problems:

- **Air pollution** (>98% of the country's SO_2 emissions; PM_{10})
- **Soil contamination** (accumulation of metals – mainly copper & cobalt)
- **Water pollution and siltation** in the Upper Kafue River
- **Geotechnical issues**
- **Land degradation**

	Kitwe	Mufulira	Chingola	Kalulushi	Chililabombwe	Chambishi
Population *	522 000	161 000	210 000	96 000	90 000	11 000
Mining operations	Nkana & Mindolo	Mufulira	Nchanga & Chingola	Chibuluma	Konkola	Chambishi
As (mg/kg)	>5	>5	3	1	0.5	0.5
Co (mg/kg)	>60	>60	>60	35	9	19
Cr (mg/kg)	36	36	36	16	25	16
Cu (mg/kg)	>2200	>2200	>2200	1800	600	300
Hg(mg/kg)	>0.06	>0.06	0.035	0.02	0.02	0.02
Ni (mg/kg)	12	22	7	5	7	5
Pb (mg/kg)	>60	>60	>60	5	5	5
Zn (mg/kg)	>60	>60	>60	20	40	10

* Zambia Central Statistical Office 2010.

Average element concentrations
Green: higher than international guideline values for soil suitable for residential and agriculture;
Blue: likely to also be higher.

Source: Lindahl (2014). *Environmental impacts of mining in Zambia: Towards better environmental management and sustainable exploitation of mineral resources*

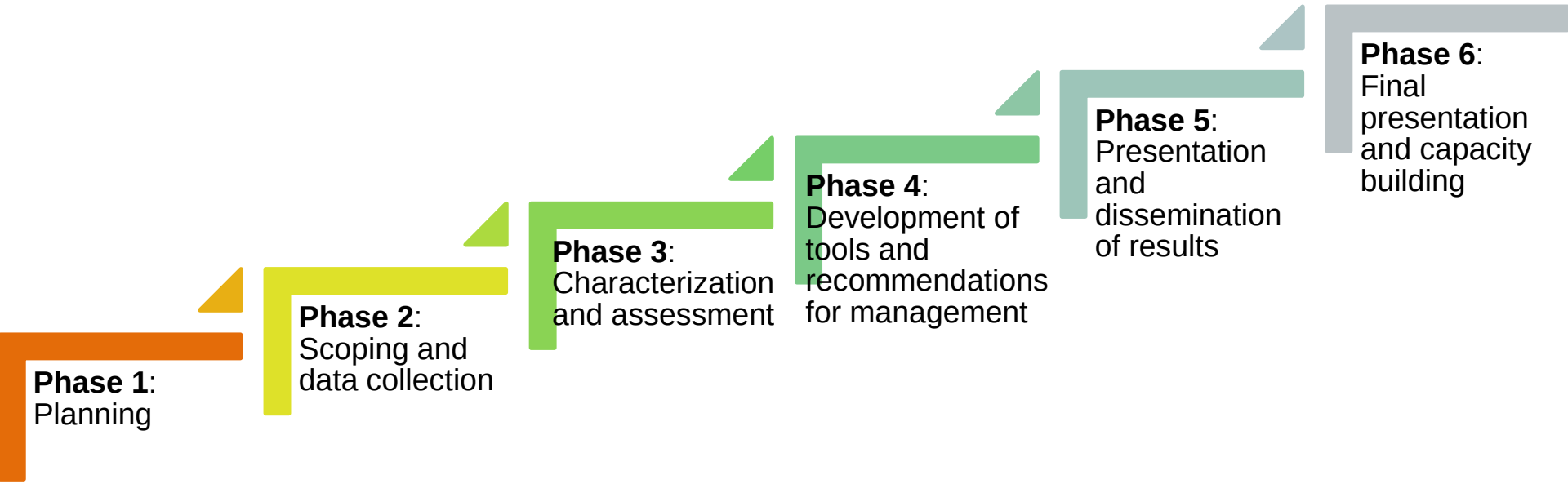
ENVIRONMENTAL AND SOCIAL IMPACTS
Kafue river

Between Chingola and Chilabombwe:

South of Mufulira:

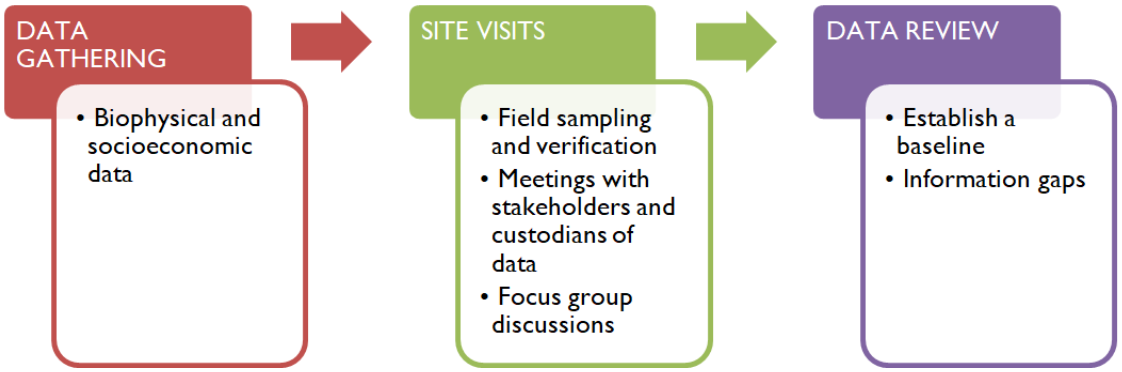
4 – Methodology

CONSERVATION PLAN DEVELOPMENT PHASES



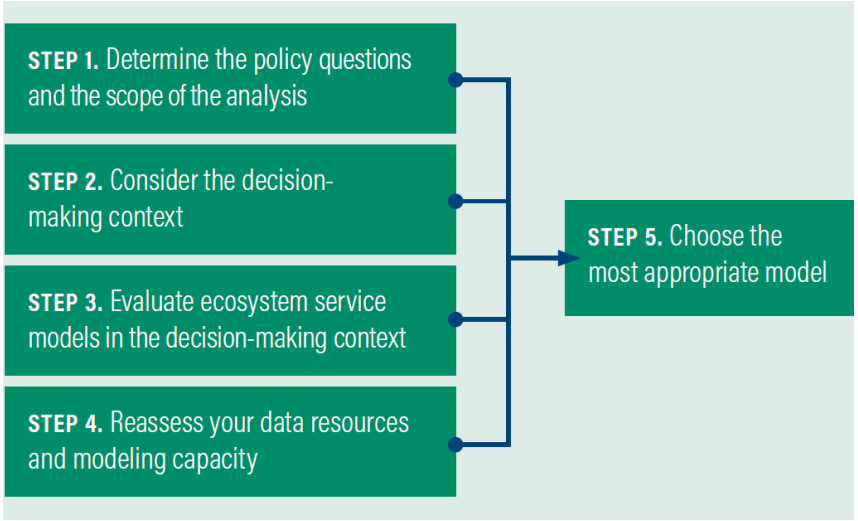
PHASE 2: SCOPING AND DATA COLLECTION

- In-desk data collection
- Assessment of data availability and identification of needs
- Field work
- Stakeholders Consultation Workshop (W1)
- Social surveys
- **Progress report #1 (D2)**
- Definition of ecosystem types and ecosystem assessment
- Selection of ecosystem services, indicators and assessment methods
- **Progress report #2 (D3)**



PHASE 3: CHARACTERIZATION AND ASSESSMENT

- Characterization of the study area's biophysical, socio-economic and governance systems
- Identification of drivers of ecosystem change and impacts
- Ecosystem services assessment (quantification/qualification and valuation), including assessment of future scenarios
- Assessment of the study's progress and further data needs
- **Progress Report #3 (D4)**



Model selection framework (assessment of future scenarios)

PHASE 4: DEVELOPMENT OF TOOLS AND RECOMMENDATIONS FOR MANAGEMENT

- Assessment of future scenarios
- Decision-making framework
- Revision of the Lukanga Swamp Catchment Management Plan
- Preliminary development of recommendations
- Water Monitoring Programme (WMP)
- Capacity Building Action Plan (CBAP)
- **Progress Report #4 (D5)**
- Stakeholders' consultation workshop (W2)
- **Progress Report #5 (D6)**
- **Draft report (D7)**

PHASE 5: PRESENTATION AND DISSEMINATION OF RESULTS

- Transfer of the data collected throughout the assessment
- Stakeholders consultation workshop (W3)
- Integration of commentaries and remarks
- **Final Report (D8)**

PHASE 6: FINAL PRESENTATION AND CAPACITY BUILDING

- (S1) Seminar
- (T1) Course on the application of the modelling tool
- (T2) Course on the implementation of the monitoring programme
- Distribution of awareness raising resources among key stakeholders and managers
- Distribution of capacity building resources among managers

5 – Work Plan

WORK PLAN

	Phase1	Phase 2	Phase 3
Objective	Planning	Scoping and data collection	Characterization and assessment
Duration	One and a half (1,5) months	Four and a half (4,5) months	Three (3) months
Deadline	One and a half (1,5) months	Six (6) months	Nine (9) months
Milestones	(M1) Meeting 1 – kick-off meeting	(W1) Stakeholders consultation workshop (M2) Meeting 2	Characterization of the study area Assessment
Deliverables (and delivery dates)	(**D1**) **Inception Report** (month 2)	(**D2**) **Progress report #1** (month 3) (**D3**) **Progress report #2** (month 6)	(**D4**) **Progress report #3** (month 9)

WORK PLAN

	Phase 4	Phase 5	Phase 6
Objective	Development of tools and recommendations for management (integration)	Presentation and dissemination of results	Final presentation and capacity building
Duration	Eight (8) months	One (1) month	One (1) month
Deadline	Sixteen (16) months	Seventeen (17) months	Eighteen (18) months
Milestones	(W2) Stakeholders consultation workshop (M3) Meeting 3	(W3) Stakeholders consultation workshop (M4) Meeting 4	Milestones: (M5) Meeting 5
Deliverables (and delivery dates)	(**D5**) **Progress Report #4** (month 12) (**D6**) **Progress Report #5** (month 15) (**D7**) **Draft Report** (month 16)	(**D8**) **Final Report** (month 17)	-

WORK SCHEDULE

PHASES	2019		2020		2021	
	OCT	FEB	MAY	DEC	JAN	FEB
Phase 1 – Planning	D1					
Phase 2 – Scoping and data collection		D2 D3				
Phase 3 – Characterization and assessment			D4			
Phase 4 – Integration				D5 D6 D7		
Phase 5 – Presentation					D8	
Phase 6 – Capacity building						

(D1) Inception Report
(D2 to D6) Progress Reports
(D7) Draft Report
(D8) Final Report

STAKEHOLDER ENGAGEMENT

Stakeholder Consultation Workshops	To discuss critical steps of the assignment among key stakeholders and obtain contributions
Interviews	To present the assignment and gather concerns regarding the sustainable development of Lukanga Swamp
Focus group discussions	To get a deeper understanding of the communities living within the catchment area
Seminar	To present the Final Report and inform a broader audience of the assignment's main results

Focus group discussion held by Nemus at Tanganyika's lakeshore community of Chisanza

STAKEHOLDER ENGAGEMENT

Workshop 1-2 Oct.-Nov. 2019	• Presentation of the scope of the assignment; stakeholder engagement for cooperation
Workshop 3 Aug. 2020	• Presentation and discussion of the management recommendations
Workshop 4 Dec. 2020	• Presentation and discussion of the Draft Report

Workshop held by LTDP and Nemus at Mpulungu

THANK YOU!

ZIKOMO!

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Conservation Plan for Lukanga Swamp and Upper Kafue Basin

Workshop 2 – Kitwe, 1st November 2019

Topics for debate

1. Environmental impacts in Lukanga Swamp and Upper Kafue Basin
2. Social and economic impacts in Lukanga Swamp and Upper Kafue Basin
3. Main drivers for change for Lukanga Swamp and Upper Kafue Basin

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