

TERRESTRIAL ECOLOGY UNIT RESEARCH AND MONITORING PROJECTS

OVERVIEW

The Terrestrial Ecology Unit headed by Chief Ecologist - Terrestrial, Mrs Roseline Mandisodza-Chikerema (rmandisodza@zimparks.org.zw) has an oversight role of coordinating, leading and spearheading research and monitoring programs of terrestrial ecosystems or land area within the Parks and Wildlife Estate and wildlife areas outside State Protected Areas. The Unit is headed by the Director Scientific Services, Professor Edson Gandiwa (egandiwa@zimparks.org.zw) who reports to the Director General of Zimbabwe Parks and Wildlife Management Authority.

There are over 62 Protected Areas in 6 categories (National Parks, Safari Areas, Sanctuaries, Recreational Parks, Botanical Gardens and Reserves) under the Parks and Wildlife Estate. Apart from the Chief Ecologist Terrestrial, there are 18 Terrestrial Ecologists and 20 Rangers assigned to the Terrestrial Ecology Unit who spearhead research and monitoring activities in all the Protected Areas.

The team of dedicated Ecologists have diverse expertise in many terrestrial themes such as large mammal monitoring, carnivore research, fire monitoring, vegetation research, impacts of tourism on wildlife, updating and development of Protected Area General Management Plans and Species Specific Management Plans. There is a vibrant culture of exchanging notes and cross pollination of ideas within the section. Our research policy accommodates external researchers to collaborate with ZimParks researchers. Outputs from the section are in the form of publications, reports, and policies.. These recommendations, based on scientific and empirical evidence inform Management and Directorate for decision making.

The following are the currently 73 ongoing research and monitoring projects.

Project 1

Title: Rainfall and surface water status monitoring at Sengwa Research Institute

Objective: To monitor monthly variation in rainfall received at a localized place and changes in surface water, SWRA.

Project 2

Title: Key species population status monitoring in Sengwa Research Wildlife Area

Objective: To monitor key species population trend, dispersal and status in Sengwa Wildlife Research Area.

Project 3

Title: Invasive plant species research and monitoring in Sengwa Research Wildlife Area

Objectives

- To monitor and map areas affected by invasive plant species in Sengwa Wildlife Research Area.
- To recommend best methods to eradicate invasive plant species in Sengwa Wildlife Research Area.

Project 4

Title: Human Wildlife Conflict Research and Monitoring in Sengwa Wildlife Research Area

Objectives

- To ascertain level of damage and determine species involved therefore recommending appropriate mitigation measures.
- To map incidence of human wildlife conflicts in and around Sengwa Wildlife Research Area.

Lead Researcher: Innocent Mahakata

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Project 5

Title: Vegetation monitoring in Chizarira National Park

Objective: To curb the spread of invasive vegetation species

Project 6

Title: Elephant Monitoring in Chizarira National Park

Objective: To monitor the dispersal and movement patterns of the elephants

Project 7

Title: Lion Monitoring in Chizarira National Park

Objective: To monitor the dispersal and home-range of resident lions in Chizarira National Park

Project 8

Title: Monitoring Illegal Activities using SMART Based data collection in Chizarira National Park

Objectives

- To monitor Patrol Efforts in Chizarira per month.
- To improve Ranger Based Data collection for management decisions.

Lead Researcher: Robert Madhlala

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Project 9

Title: Blue swallows (*Hirundo atrocaerulea*) in Nyanga Protected Areas and Lowlands/Honde Valley, Important Bird Areas (IBA): Population status and Habitat Assessment

Objective: To compare habitat extent for the 2-time steps (2014 and 2020)

Project 10

Title: Developing a standardized invasive species control strategy in Nyanga National Park

Objective: To develop an invasive control strategy for Nyanga National Park

Project 11

Title: Altitude effect on plant species distribution and diversity

Objective: To Assess the Catena effect on plant species distribution and diversity using the MIREN standardized protocol

Project 12

Title: Assessment of human settlements encroachment on Rusitu Botanical Reserve of Chimanimani National Park, Zimbabwe

Objective: To establish the trends of human settlements in and around Rusitu botanical reserve in the past ten years

Lead Researcher: Kundai Dube

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Project 13

Title: Elephant monitoring -Spatial-temporal patterns of elephant mortalities in Zambezi-Victoria Falls - Katombora National Park

Objective: To assess the trends and drivers of elephant mortalities in Zambezi - Katombora National Park

Project 14

Title: Invasive alien species monitoring

Objective: To eradicate lantana camara in the rainforest

Project 15

Title: Spatio-temporal change of the upper Zambezi river channel in Zambezi national park

Objectives

- To determine the extent of river erosion on the upper Zambezi River channel in ZNP from 1981 -2022 using remote sensing and GIS
- To determine if upper Zambezi River has changed direction from 1981 -2020 using remote sensing and GIS

Lead Researcher: Amanda Vambe

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Project 16

Title: Species diversity and relative abundance of water birds around Mandavu dam

Objective: To determine relative abundance and species diversity of water birds around Mandavu Dam

Project 17

Title: Rhino monitoring

Objective: To conserve the Black Rhinoceros species in Sinamatella (Intensive Protection Zone) IPZ.

Project 18

Title: Spatial and temporal distribution of Giraffes (*Giraffa Camelopardalis giraffe*) in Sinamatella during the Wet and Dry Season

Objective: To determine the distribution of Giraffes within Sinamatella

Project 19

Title: Vulture nests survey

Objectives

- To identify Vulture nests in Hwange National Park
- To map the distribution of Vulture nests observed
- To determine if the nests are active or non-active during the period of observation

Project 20

Title: Impact of wild animals on vegetation structure around artificial water holes in Sinamatella Hwange Zimbabwe

Objectives

- To compare species diversity and composition on vegetation around artificial pans
- To establish structural changes on vegetation around artificial water pans

Project 21

Title: Monitoring adaptation of reintroduced Captive vervet monkeys

Objective: To compare activity budgets of reintroduced and native monkeys

Project 22

Title: An investigation of the feeding preference of the black rhino (*Diceros birconis*)

Objectives

- To understand the feeding ecology of Black Rhino
- To investigate why they are straying outside the park

Project 23

Title: Effects of COVID19 on wildlife conservation

Objective: To compare poaching levels before and after the pandemic

Project 24

Title: Factors influencing fire frequency

Objective

- To ascertain the spatial distribution of fires
- To find ways to compact fire incidences

Lead Researcher: Maxine Tadyanehondo **Contact Details:** mtadyanehondo@zimparks.org.zw

Project 25

Title: Spatial Distribution of Big Game Hunting in Matetsi Safari Area

Objective: To establish the spatial and temporal distribution of big game off-takes across the land-scape

Project 26

Title: Aging elephants from lower jaw mandible using molar progression

Objectives

- To determine the age-sex of elephants dying from natural cause.
- To determine age at harvest for all trophy hunted elephants.

Project 27

Title: Management of *Melia azederach* (white *Syringa*) in affected areas within Matetsi Safari Area

Objective: To carry out control measures and to provide insight into the most effective tool for management of invasive species

Project 28

Title: Trophy Hunting off-take

Objective: To monitor offtake and trophy quality

Project 29

Title: Fire Management

Objectives

- To control unplanned fires to reduce negative impact on habitat and its wildlife
- To determine how fire can be used to improve veld condition

Project 30

Title: Game water

Objective: To assess and ensure adequate game water supply for wildlife

Project 31

Title: Human wildlife Conflict

Objective: To carry out assessments and monitor human wildlife incidences to provide technical guidance in control and mitigation measures

Lead Researcher: Mukululi Ndlovu

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Project 32

Title: Climate and Weather Monitoring

Objective: To monitor the changes in temperature and rainfall in Hwange National Park

Project 33

Title: Monitoring Illegal Killing of Elephants (MIKE)

Objective: To establish the numbers and causes of illegal killing of elephants in Hwange National Park

Project 34

Title: Spatial Monitoring of Collared Elephants in Hwange, Matetsi and Kazuma Pan.

Objective: To monitor spatial movement patterns of collared elephants.

Project 35

Title: Human and wildlife conflict.

Objective: To monitor and record human and wildlife incidences in Hwange communal areas.

Project 36

Title: Hwange Lion Research

Objective: To monitor spatial movement patterns of collared lions

Project 37

Title: Painted Dog Conservation

Objective: Monitoring of wild dogs' population dynamics and distribution

Project 38

Title: Giraffe population status and habitat selection in Hwange National Park

Objectives

- To establish the population status and distribution of giraffes in Hwange national
- To assess habitat selection of giraffe in Hwange National Parks

Project 39

Title: Spatial monitoring of collared zebra in Hwange National Park

Objective: To monitor spatial movement of collared zebra in Hwange National Park

Project 40

Title: Spatial distribution and population of Southern ground hornbills

Objective: To determine the population and distribution dynamics of the southern ground hornbill in Hwange National Park Main camp area and surrounding areas (Sikumi forest Ngamo)

Lead Researcher: Daphine Madhlamoto **Contact Details:** dmadhlamoto@zimparks.org.zw

Project 41

Title: Development of General Management Plan for Tugwi Mukosi Recreational Park

Objective: To develop a General Management Plan for Tugwi Mukosi Recreational Park incorporating collaborative or community management, tourism management, park operations as well as Biodiversity management components

Project 42

Title: Development of General Management Plans for Chizarira NP, Sengwa RS and Chirisa SA

Objective: To develop General Management Plans for Chizarira NP, Sengwa RS and Chirisa SA incorporating collaborative or community management, tourism management, park operations as well as Biodiversity management components

Project 43

Title: Development and Update of Mana Pools NP, Sapi SA, Dande SA, Doma SA, Charara SA, Hurungwe SA, North and South Chewore SA Integrated Management Plan

Objectives

- To Update PAMP of Mana Pools NP, Sapi SA and Chewore SA World Heritage Site (WHS)
- To Develop and Update Mana Pools NP, Sapi SA, Dande SA, Doma SA, Charara SA, Hurungwe SA and Chewore SA Integrated Management Plan

Project 44:

Title: Development of Victoria Falls, Zambezi and Kazuma Pan NP Protected Area Management Plans

Objective: To Develop Victoria Falls, Zambezi and Kazuma Pan National Parks Protected Area Management Plans

Project 45

Title: Development and Updating of (1) Chimanimani NP including Eland Sanctuary, Haroni and Rusitu Botanical Reserves, (2) Nyanga NP and (3) Lake Kyle RP Protected Area Management Plans

Objective: To Develop and Update (1) Chimanimani National Park including Eland Sanctuary, Haroni and Rusitu Botanical Reserves, (2) Nyanga National Park and (3) Lake Kyle Recreational Park Protected Area Management Plans

Lead Researcher: Courage Mutema

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Project 46

Title: Investigating trends in Human – Crocodile Conflict and livestock predation in areas surrounding Umfurudzi Park: Is conflict escalation real imagined?

Objectives

- To analyze trends in carnivore conflict
- To determine whether cases are on the increase
- To make recommendation for adoption at various levels

Project 47

Title: An assessment of the ecological impacts of the African Elephant (*Loxodonta Africana*) on woody vegetation structure and composition in a fenced area.

Objectives

- To assess the damage elephants have had since reintroduction
- To determine the continued existence of the species within the park

Project 48

Title: Faecal and chemical component analysis as an index of veld quality in the southern parts of Umfurudzi Park

Objective: To determine the veld quality and seasonal condition using chemical means

Lead Researcher: Gregory Chiyangwa

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Project 49

Title: Carnivore Spatio-temporal interactions

Objectives

- To investigate the extent of carnivores kleptoparasitism within Mana Pools national park,
- To determine the Spatio-temporal interaction of carnivores within the PA,
- To determine the lions, leopards and hyena home ranges and
- To find out lions, leopards and hyena prey preferences.

Project 50

Title: Drought impacts biodiversity

Objectives

- To assess the impacts of the 2019 drought on vegetation and wildlife species,
- To monitor climate trends over time and predict the future,
- To monitor feeding as a response to drought, on the environment and species
- To determine future responses to drought

Project 51

Title: African wild dogs habitat utilisation

Objectives

- To determine if habitat use by the African wild dogs varies between the denning and non-denning season in Mana Pools National Park,
- To determine the most preferred habitats by African wild dogs in Mana Pools National Park Zimbabwe
- To determine how the pack size of the African wild dogs affects habitat use.

Project 52

Title: Alien plant species monitoring

Objectives

- To determine the impact of foreign feed within the protected areas
- To monitor and devise means to control invasive and alien plant species within the protected areas

Lead Researcher: Patmore Ngorima

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Project 53

Title: Animal -Vehicle Collision (AVC)

Objectives

- To identify animal species that are being killed through AVC along the Makuti-Chirundu highway
- To map all road accidents hotspot areas along the Makuti-Chirundu highway
- To understand the time and season when AVCs are most frequent
- To identify hot spot zones where mitigation measures should be developed

Project 54

Title: Collared elephant monitoring

Objectives

- To determine the habitat selection of reintroduced matriarch elephants in a novel environment during the (wet and dry seasons),
- To determine the relationship between the reintroduced matriarch elephants' centre of home range and landscape variables (proximity to water, proximity to roads, elevation and human settlement in different seasons) elephants in a novel environment.

Project 55

Title: Vegetation survey

Objective: To assess the ecosystem recovery ability after quarry mining

Project 56

Title: Conservation and community beneficitions?

Objectives

- To determine community perceptions of conservation efforts made in Protected Areas
- To establish socio-economic factors that influence community perceptions of conservation efforts in Protected Areas.

Project 57

Title: Inland aquatic species diversity assessment

Objectives

- To establish species diversity in different inland water bodies in the Mid-Zambezi
- To determine possible reasons for variations in species population and distribution.

Project 58

Title: Impacts of pollution on the protected area's ecosystems.

Objectives

- To identify the type of the chemicals that are split on the road.
- To identify major spots where these spillages occur
- To assess the extent of damage to the environment

Project 59

Title: Impacts of conversion of consumptive areas to non-consumptive areas

Objectives

- To establish the effects on wildlife populations and distribution in Rifa,
- To establish the effects on vegetation changes and composition over time
- To assess specific wildlife behavior change

Project 60

Title: Monitoring the extent of species invasion in protected areas.

Objectives

- To establish the population and distribution of Indian myna in Mid Zambezi protected areas
- To assess possible factors driving their distribution (ii) to model the possible distribution areas.
- To recommend control measures on the management of Indian mynas in protected areas.

Project 61

Title: Pests and diseases prevalence challenges within the protected areas

Objectives

- To assess tsetse fly infestation within Hurungwe Safari Area.
- To model potential distribution areas of tsetse fly within Hurungwe Safari Area.
- To establish zones with a high risk of tsetse fly disease risk (Sleeping sickness/Nagana),
- To establish tsetse species within Hurungwe Safari Area.
- To establish potential breeding zones of the tsetse fly

Project 62

Title: Habitat use by African elephants in the Zambezi valley, Zimbabwe

Objectives

- To model habitat use in elephants in non-hunting core areas as compared to the surrounding safari areas.
- To assess the effectiveness of the TFCA in enhancing game movement between countries.
- To explore factors influencing habitat preferences in elephants in the Zambezi Valley, (4) establish the impacts of multi stressors (hunting, poaching, human presence, resource availability) on elephant movement in the Zambezi Valley

Project 63

Title: Wild dog conservation

Objectives

- To assess African wild dogs distribution in communal areas.
- To assess whether the communities surrounding the protected areas recognize the African wild dogs as a problem animal.

Project 64

Title: Impact of other Carnivores direct competition on African wild dogs

Objectives

- To determine the direct and indirect effects of interspecific competition with larger carnivores on the hunting success of African wild dogs in Mana Pools National Park (MPNP).

- To determine the effect of kleptoparasitism by larger carnivores on food intake and prey selection by African wild dogs in MPNP.
- To determine the direct and indirect effects of interspecific competition with larger carnivores on African wild dogs reproductive success in MPNP.

Project 65

Title: Savanna ecosystem recovery rate after disturbances

Objectives

- To determine the savanna ecosystem resilience after disturbances.
- To establish plant species diversity after disturbances.
- To establish plant species succession disturbed ecosystems

Project 66

Title: Impacts of road construction on plant community

Objectives

- To establish plant succession.
- To establish plant species inventory after a major ecosystem disturbance.

Lead Researcher: Jeremiah Chakuya

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Project 67

Title: Population structure, abundance and distribution of Nyala and Cheetahs.

Objectives

- To determine whether the population structure of Nyala and cheetah differ in Safari areas and a National park.
- Is there a difference in the abundance of Nyala and cheetah between National park and safari areas?
- Is there a difference in the distribution of Nyala and Cheetah between Safari Areas and Mana Pools National Park?

Project 68

Title: SMART and MIKE data collection

Objectives

- To report elephant mortality data from regular patrols.
- To collect elephant mortality data and inform international wildlife trade policy (CITES) and report annually to MIKE offices at regional and global levels.

Project 69

Title: Monitoring illegal activities (elephant poaching, fish poaching, subsistence bush meat hunting, gold panning, livestock encroachment and others.

Objectives

- To record evidence of illegal activity, large animal sightings, water and vegetation.
- To analyze and report processed data into highly visual tables, charts, and maps showing patrol effort, coverage, and results.
- To give feedback and evaluate patrol efforts and results to ensure all stakeholders are kept informed and to demonstrate the value of ranger efforts.

Project 70

Title: Facilitating strategic planning, managers, rangers, and other stakeholders plan adaptive patrol strategies based on analysis of previous results and set new patrol targets.

Objectives

- To update bird species inventory
- To establish species of specially protected species found in Mid Zambezi protected areas.
- To establish the demographic status of specially protected species in Mid Zambezi protected areas.
- To update Mid Zambezi protected areas birds species checklist.
- To establish Mid Zambezi protected areas bird species distribution maps.
- To map other important bird areas in Mid Zambezi protected areas.
- To assess the feed and water availability of important bird areas in Mid Zambezi

Lead Researcher: Jeremiah Chakuya

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Project 71

Title: Effects of illegal mining in protected areas.

Objectives

- To determine the frequently targeted areas using existing records.
- To devise counter measures towards elephant protection

Project 72

Title: Impacts of hunting on wildlife behaviour.

Objectives

- Access the effects of hunting on animals.
- Access flight behaviour of animals in presence of humans and vehicles.

Project 73

Title: Buffalos population structure and movement patterns Establish population growth of the species in Chewore South.

Objectives

- Assess buffalo herds movement patterns.
- Assess buffalo herd sizes.

Lead Researcher: Jeremiah Chakuya

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