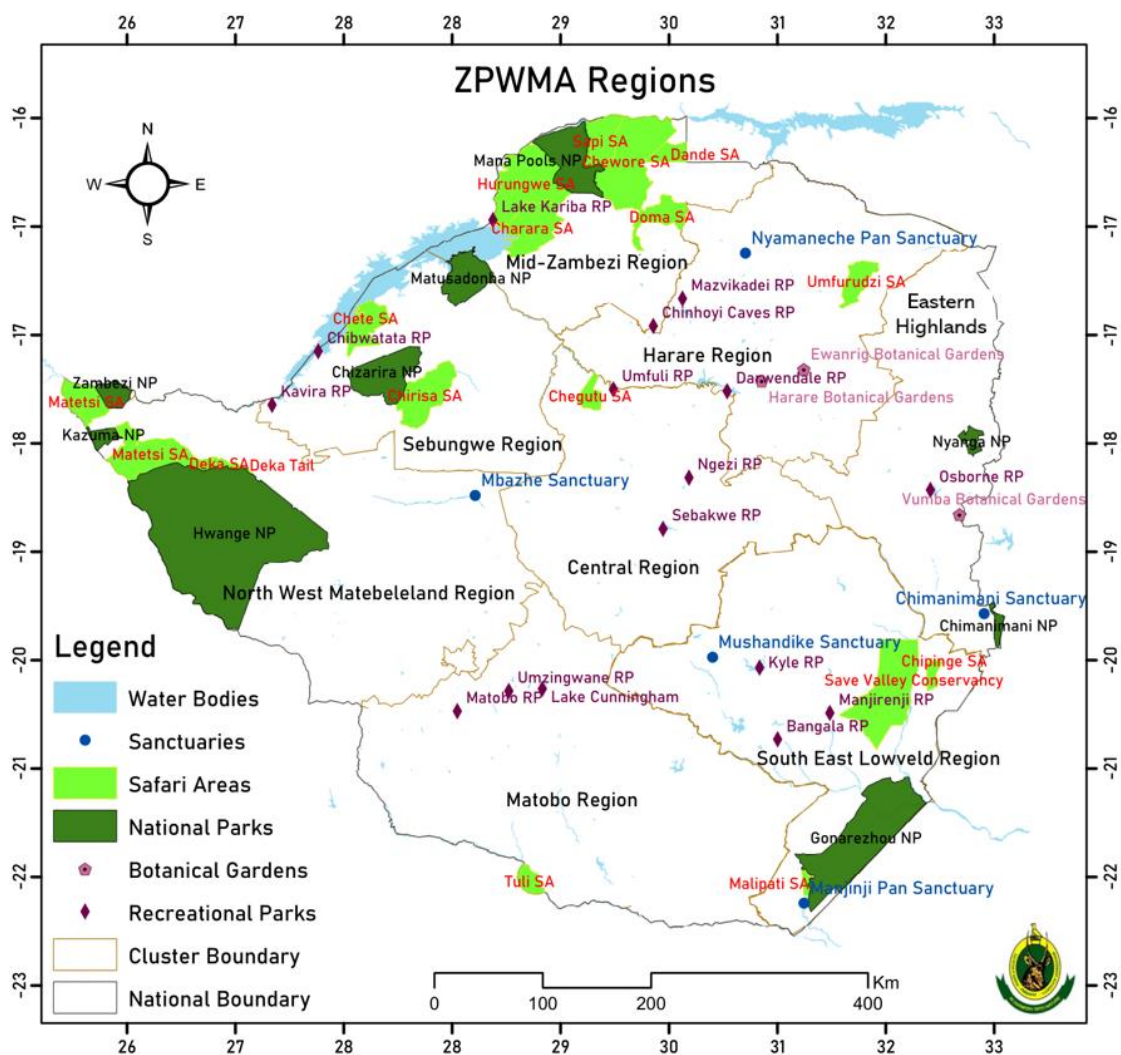


# ZIMBABWE PARKS AND WILDLIFE MANAGEMENT AUTHORITY

## Aquatic and Terrestrial Ecology Units Research Priorities

Research priorities have been identified in the eight (8) administrative regions outlined in the map below. These priorities are in the aquatic and terrestrial ecology areas and also serve as possible areas for research partnerships and collaborations. The priorities are classified as high, medium and low priority areas.



**Fig 1. Zimbabwe Parks and Wildlife Management Authority Administrative Regions**

## 1.0 TERRESTRIAL UNIT

### Harare Region and Park Planning Unit

Priority projects	Background	Stations	Priority		
			H - High	M - Medium	L - Low
			H	M	L
1. Rhino conservation in Chivero	Continuous monitoring and development of conservation status reports, species habitat use and distribution in the Region including Thetford, Imire, Eldorado.	Chivero and private farms			
2. Development of General Park Management Plans and Zonation plans	Produce a benchmark guide to (1) Tourism/ hunting, park operations, community work and biodiversity programmes, (2) Zonation plans and (3) species specific management plans.  Working on Chizarira NP and Chirisa SA Mana pools secured funding Zonation: Umfurudzi, Chivero, Darwendale, Ewanrigg, Bolton and Nyamaneche	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
3. Bioprospecting	Enhance monitoring and identification of species with ethnobotanical value so as to Safe guard against unauthorised bioprospecting for the protection of our genetic resources. Secure partner for chemo pharmaceutical analysis of plants.	Ewanrigg			
4. A baseline study on the current distribution of Invasive Species and their control in protected areas	An invasive plant species protocol needs to be developed for early detection, identification and control of species involved. Invasive species plant maps needs to be developed.	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			

5. Habitat fragmentation due to urbanization and its coherent impacts	There is need for research into habitat fragmentation due to urbanization and its coherent impacts on protected areas close to towns.	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
6. Law Enforcement Monitoring	Very vital for conservation of wildlife resources from illegal harvesting Develop a law enforcement Database for both terrestrial and aquatic ecosystems Harness research to inform law enforcement	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
7. The role of ecosystem services and processes in wildlife conservation.	Investigate into disturbances that occur in the natural ecosystem processes such as interdependences of floral and faunal species triggered by water pollution, urbanization and veld fires And develop mitigatory responses	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
8. Study impact of mining on biodiversity conservation in Umfurudzi.	Ensure that all existing and new players in the mining sphere undergo the EIA process and there is strict adherence to the EIA stipulations There is increasing pressure to mine in protected areas threatening biodiversity conservation and integrity of protected areas	Umfurudzi			
9. Species Recovery Manual	Develop a species recovery manual which will be used as part of an effective conservation strategy, it aims to provide guidance on planning and implementing species recovery projects.	All stations			
10. Research to guide our tourism Industry	Improve tourism receipts, provision of quality service for customer satisfaction based on scientific results i.e. establish and adhere to carrying capacities of our protected areas	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			

	Develop a tourism database that will assist the tourism department into effectively document and retrieve data.				
11. Fire monitoring and assessments	Develop response strategies of unplanned fires  Produce and effect fire management plans, fire mapping and fire assessments Impact of fire on biodiversity	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
12. A study on the Response of Submerged Macrophyte to Ammonia Toxicity	Discharge of untreated effluent into riverine system such as Chivero Toxicity of ammonium is a matter of global ecological concern	Chivero			
13. Vegetation mapping in park estates	Need to update the existing vegetation maps in park estates. This will facilitate vegetation monitoring	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
14. Weather monitoring	Need to renovate and build weather stations in all stations to ensure monitoring of climate/ weather trends	Chivero, Umfurudzi, Ewanrigg, Nyamanechi, Mazvikadei, Darwendale			
15. Impacts of vector Diseases on wildlife populations and the role of communities	Highly concerned with prevention and control of floral and faunal diseases and also disease transfer from and to domestic animals in areas adjacent to protected areas i.e. death cases in Chivero rhinos	Chivero, Ewanrigg, Nyamanechi, Umfurudzi			
16. Science in botanic garden and its role in protected areas.	Need to adopt new methods of propagation in botanic gardens which will feed into our recovery plans for species which have low recruitment and which are hard to propagate using traditional propagation methods.	Ewanrigg			

17. Development of conservation status reports on target species.	Conservation statuses for Giraffe, Rhino, Cycads (Encephalartos spp.), Devil's claw (Harpagophytum spp.) and generate proposals for the inclusion of Devil's claw in broader conservation initiatives.	Ewanrigg, Chivero		
18. EX-SITU conservation	Monitor ex-situ conservation sites and reserves: Generate status reports and develop research priorities and interventions for the sites.			
19. Determining hotspots with high fishing pressure on Inshore fisheries	High concern of increased fishing pressure in many dams raising the need for continuous monitoring of catches from inshore fisheries	Chivero, Darwendale, Mazvikadei		
20. Establishing carrying capacity for dams involved in cage culture and gill netting in Zimbabwe	Increased demand of applicants for cage aquaculture and increased demand of fingerlings and increased demand to do fisheries business e.g. gill netting Need for collection of statistics for aquaculture.			
21. A study on the bio-accumulation of heavy metals in fish and its coherent impacts.	There is growing concerns on bio-accumulation of heavy metals in fish hence a study needs to be carried out to investigate into the different variables that are involved and possible mitigation measures we can adopt to address the challenge.			

## Sebungwe Region

Priority Projects	Background	Station	Priority		
			H	M	L
1. Survey of rhino numbers and distribution	- There is need to establish numbers of remaining rhinos in Matusadona	Matusadona			
2. Develop Park Management Plans for all stations in the Region	<ul style="list-style-type: none"> <li>- Currently there is an on-going management plan in Chirisa and Chizarira</li> <li>- There is need to develop Management Plans for other stations</li> </ul>	All Sebungwe Stations			
3. Monitoring status of off-takes from wildlife populations in the CAMPFIRE Areas	<ul style="list-style-type: none"> <li>- Need for data on trophy hunting in Gokwe North and South and Nyaminyami.</li> <li>- collecting statistics on poaching and PAC data.</li> <li>- Collecting data on other mortalities</li> </ul>	All Sebungwe Stations			
4. Description, classification and mapping of plant communities in various stations in the Sebungwe Region	-Absence of updated vegetation map for the whole landscape.	All Sebungwe Stations			
5. Map and monitor biophysical and environmental variables	<ul style="list-style-type: none"> <li>-limited use of digital data on the biophysical environment.</li> <li>Use geospatial and remote sensing technologies.</li> </ul>	All Sebungwe Stations			

6. Use standard indices to determine effectiveness of law enforcement effort.	-need to measure patrol effectiveness.	All Sebungwe Stations			
7. Estimate population of large cats using camera traps (e.g. leopard, lions and cheetah) and call up surveys.	-nocturnal and cryptic species difficult to monitor through general methods such as aerial surveys.	All Sebungwe Stations			
8. Determine the magnitude and seasonality of movement of elephants across the Sebungwe and North-West Matabeleland Regions.	-a major decline in elephant population and seasonal distribution between Sebungwe and Hwange then Sebungwe and Mid Zambezi.  -there is need to investigate the migration hypothesis.  Two Regions will be involved North-West Matabeleland and Sebungwe.	All Sebungwe Stations.			
Monitoring wildlife mortalities in Elephants, Giraffe, Sables, Buffalo among others	Ascertain causes of mortalities and institute measures to stop or control mortalities				
9. Implementation of the SMART programme in the Sebungwe Region	-on going implementation of African Elephant Fund SMART program.	All Sebungwe Stations			
10. Conduct an assessment for Coal bed methane and Coal mining projects proposal in Chirisa-Sengwa	Proposals to mine Coal bed methane and coal mining were submitted by the proponent.	Sengwa Chirisa			

<p>11. Monitor the drivers and extent of the human wildlife conflict, including number of animals killed, economic significance both to wildlife and crop and livestock production</p>	<p>-need to find effective strategies to minimise human wildlife conflicts.</p> <p>- Major focus will be on the most affected areas like Chirisa Safari Area</p>	<p>All Sebungwe Stations</p> <p>CAMPFIRE areas.</p>	<p style="background-color: red;"></p>	<p></p>	<p></p>
<p>12. Monitoring of tourism impacts on social, ecological and economic spheres in and surrounding the Parks and Wildlife Estates</p>	<p>- There is a need to quantify and evaluate the social, economic and ecological impacts of tourism activities</p>	<p>All Sebungwe Stations</p>	<p style="background-color: red;"></p>	<p></p>	<p></p>
<p>13. Research on feasibility of the development of wildlife based land uses in the Sebungwe Region</p>	<p>- There is need to promote the setting up of Community Conservancies and Private Game Ranches</p>	<p>All Sebungwe Stations</p> <p>CAMPFIRE Areas</p>	<p></p>	<p style="background-color: red;"></p>	<p></p>
<p>14. Establishment and maintenance of a standardised geo-database for monitoring law enforcement effort and illegal activities in the Sebungwe Region</p>	<p>-There is need to harmonise law enforcement data capture, analysis, reporting and presentation.</p>	<p>All Sebungwe Stations</p>	<p style="background-color: red;"></p>	<p></p>	<p></p>
<p>15. Analyse the impacts of timing, intensity, and frequency of fires on vegetation and wildlife population dynamics.</p>	<p>-limited understanding on impact of fires on vegetation and population dynamics of different wildlife species</p> <p>Monitoring and mapping fire scars</p>	<p>All Sebungwe Stations</p>	<p></p>	<p style="background-color: red;"></p>	<p></p>



## North-West Matabeleland Region

Priority Projects	Background	Station	Priority		
			H	M	L
1. Population surveys for Key Species (numbers, distribution and dispersion)	Rhino, giraffe, population decline due to poaching and competition for forage and water	Sinamatella			
	Elephant (e.g. local and regional dispersal across the KAZA landscape)	North-West Matabeleland Region			
	Sable, gemsbok, Sitatunga and Roan Population decline due to predation, utilization, habitat change and competition	North-West Matabeleland Region			
	Brown hyena, Lion, Cheetah, Leopard, wild dog and bat-eared fox population decline due to completion, habitat loss and fragmentation. Utilization (water, vegetation and salt licks).	North-West Matabeleland Region			
	Monitoring of wildlife mortalities on species such as elephants, giraffes and rhinos	North-West Matabeleland Region			
	Giraffe Population decline due to habitat loss	North-West Matabeleland Region			
	Vulture, water-bird, ostrich, ground hornbill, populations inside and outside protected areas	North-West Matabeleland Region			
2. Establishing habitat suitability for wildlife species	Habitat use by various species in light of inter-species and intra-species interactions e.g. for Rhino, Elephant	North-West Matabeleland Region			
3. Invasive species management	<i>Lantana camara</i> alteration of the ecosystem	Victoria Falls National Park			
	White syringa alteration of the ecosystem	Sinamatella, Robins and Matetsi			
	Indian myna alteration of bird species populations including buffalo weaver nests	Hwange			

4. Description, classification and mapping of plant communities in various parts of the Parks and Wildlife Estate	Habitat modification due to: Elephant population growth Climate change Fire	North-West Matabeleland Region			
5. Monitoring head-ward erosion of gullies and changes in extent of sheet-eroded ground	Monitoring and mitigating (where possible) the state of erosion as it alters the ecosystem (landscape modification)	North-West Matabeleland Region			
6. Human-Wildlife Conflicts	Map distribution, species involved, economic impacts Trend analysis Utilize the baseline strategy which was developed in Hwange	North-West Matabeleland Region			
7. CAMPFIRE, in communal areas neighbouring protected areas	Monitor Performance of CAMPFIRE Region-wide Support wildlife based community projects (e.g. stocking) Utilize the baseline data collected for research and analysis	North-West Matabeleland Region			
8. Management of environmental data	Fire management Weather monitoring SMART MIKE Game water, salt licks Leases and developments	North-West Matabeleland Region			
9. Wild life parameters	Mortality, spot hunting and wildlife in captivity	North-West Matabeleland Region			
10. Leases and agreements	Leases and developments	North-West Matabeleland Region			

11. Fire management	Fire management, planning and monitoring. (Fire Management Plans, Mapping and Incidences)	North-West Matabeleland Region			
12. Wildlife Disease Surveillance	Sampling of Internal and external parasites Geo-spatial mapping of disease incidences	North-West Matabeleland Region			
13. Park planning	Mapping Leases and development Environmental Impact Assessments for tourism developments and activities e.g. Sport Hunting, River Usage – Boats, Helicopters Research and Monitoring of mining activities within the Parks	North-West Matabeleland Region			
14. Environmental monitoring (Weather – frost, temperature, wind and rain)	Establish a weather database for research purposes	North-West Matabeleland Region			
15. Monitoring of Wildlife Mortalities (e.g. Natural, Legal and Illegal)	Mapping of poaching hotspots and routes	North-West Matabeleland Region			
16. Monitoring of illegal activities in and around the protected area network	Elephant, Rhino, Pangolin , Devil’s claw etc.	North-West Matabeleland Region			
17. Monitoring of land-use and land cover change	Human and bush encroachment (Recruitment, regeneration, human settlements and Wildlife corridors).	North-West Matabeleland Region			
18. Game water supply	Drought preparedness, water availability (quality, quantity, distribution and impacts) Usage (Waterhole counts) and wildlife interactions at waterholes	North-West Matabeleland Region			

19. Establish tourism carrying capacities	Establish carrying capacities and ecological footprints for tourism activities (e.g. vehicles, river usage, tourist numbers and helicopters)	North-West Matabeleland Region			
20. Monitoring of the Tourism Industry	Tourist demographics Consumptive and non-consumptive	North-West Matabeleland Region			

## Central Region

Project title	Background	Station (s)	Priority		
			H	M	L
Parks planning	There are boundaries conflicts between the Park and Commercial Farmers which are politically affiliated. Therefore need to develop a park plan before taking next step	Sebakwe			

## South East Lowveld Region

Project title	Background	Station (s)	Priority		
			H	M	L
Wildlife introduction into sanctuary(on-going)	There are proposals to introduce plains games in the Sanctuary	Mushandike			
Sable project: monitoring of introduced wildlife species i.e. population dynamics	There is a wealth of data collected on sables that needs analysing There were sables that were introduced to the sanctuary that need constant monitoring Follow individual animals from birth to maturity and death and develop life tables	Mushandike			
Providing GIS and SMART courses	There is a proposal to introduce GIS and SMART courses as part of the curriculum for courses taken at the college	Mushandike			
Assessing impact of mining at Mushandike Sanctuary	Mining has been problem at Mushandike and an impact analysis is necessary.	Mushandike			

Rhino and Buffalo research at Kyle, SVC and Chipinge IPZ	We have populations of Rhinos and Buffalos in the Kyle area that needs constant monitoring. Researches on these species are crucial	Mushandike			
Vegetation species inventory around Tokwe Mukosi	This will guide us in the introduction of wildlife species that will also boost the tourism industry. A manuscript is currently being drafted at the moment	Tokwe Mukosi			

## Eastern Highlands Region

Project title	Background	Station (s)	Priority		
			H	M	L
Invasive species research	<p>Mapping areas invaded by wattle and pine within Nyanga National Park to come up with a prioritization area for control and eradication.</p> <p>On-going research on SDM for <i>V. polyanthes</i> (Bee-bush) in Vumba</p> <p>Research on invasion ecology of <i>V. polyanthes</i> in Vumba – Effect of invasion on edaphic conditions in Vumba</p>	Nyanga Vumba			
Database development in Eastern Highlands	<p>There is need to develop an invasive species database in the Eastern highlands.</p> <p>Species checklists of Flora and Fauna</p>	Nyanga			
Baseline survey of medium to large mammals	Baseline studies for herbivores and carnivores are needed to initiate data collection for species previously unstudied	Nyanga Chimanimani Vumba Haroni Rusitu			



Wildlife properties database and dam audit (Landscape approach)	Need to have a database for all private properties with Game species for management purposes.	Nyanga Vumba Chimanmani			
Human wildlife conflict data collection around park (Leopards, Hyena and crocodiles)	Creating a database for Human Wildlife Incidences for better management and assessment of extent of conflict	Nyanga Eastern Highlands			
Population surveys of Leopards	Initiating a baseline study for leopard populations in Nyanga National park. The Objective is to gather scientific evidence of presence of leopards	Nyanga			
Fire management and research	Research on the impact of fires of vegetation structure and species composition	Nyanga			
Rehabilitation of Vumba Botanical Garden (With Botanist)	Invasion ecology studies are needed to strategically eradicate and rehabilitate Vumba botanical garden.	Vumba			
Anuran amphibian species –Conservation status and	Investigate the ecology of the amphibian species and establishing population statistics , disease threats and effective ways to preserve the species  Taxonomically classify the species	Nyanga			

Baseline research on endemic species in the Eastern Highlands( Blue Duiker and Blue Monkeys)	Blue Monkeys and Blue duikers are endemic species that are uniquely found in the Afromontane Habitat in the eastern highlands. Comprehensive studies will assist in better conservation plans and monitor the status of the species	Nyanga Vumba Chimanimani			
Bird Projects	Chimanimani and Vumba are listed as an IBA	Chimanimani			

## Mid Zambezi Region

Priority projects	Background	Stations	Priority		
			H	M	L
1. Rhino conservation in Mid-Zambezi Region	<ul style="list-style-type: none"> <li>Conduct feasibility study (feed, carrying capacity, security) for the proposed re-introduction of black rhinos in the Zambezi valley.</li> </ul>	Hurungwe Safari area (Rhino Force) Mana-Pools Sapi (Great Plains)			
2. Development of Park Management Plans for all stations in the Mid-Zambezi Region	<ul style="list-style-type: none"> <li>Park plans are critical to make appropriate management decisions at every station</li> <li>Park plans are also critical in sorting funding from NGOs and they are also required when drafting State of Conservation reports for World Heritage Sites (Mana Pools)</li> <li>They are also required in the TFCAs</li> <li>They also help station managers as they establish the purpose of each park</li> <li>They act as a guiding principal/ benchmark (1) Tourism/ hunting, park operations, community work and biodiversity programmes, (2) Zonation plans and (3) species specific management plans.</li> <li>Funding is there from GEF 6.</li> </ul>	Mana Sapi Chewore Dande Doma Charara Hurungwe Chinhoyi Kariba			
Zonation of Kariba and Chinhoyi	Zonation will focus on Chinhoyi and Kariba with the aim to establish land uses for smaller parks.				
3. Mapping of invasive Species	<ul style="list-style-type: none"> <li>The proliferation of alien invasive plants and their inherent control measures is of immense importance in</li> </ul>	Hurungwe Safari Area Mana Pools			

<p>distribution within and outside the parks estate</p>	<p>the management of Parks Estates. Alien invasive species have the capacity to degrade productive terrestrial and aquatic ecosystems. Hence there is need to develop an invasive plant species protocol for early detection, identification and control of species involved.</p>	<p>Sapi Chewore Doma Dande Kariba Chinhoyi (Mid-Zambezi Valley)</p>			
<p>4a) Monitoring of animal connectivity, home ranges and habitat utilisation in the Mid Zambezi valley as well as Wildlife Dispersal Areas</p> <p>4b) Comparative studies of elephant genetics of sub-populations in north west Matabeleland, the Zambezi valley and South East Lowveld</p> <p>4c) Carnivore survey</p> <p>4d) Nyala survey in Sapi &amp; Mana Pools</p>	<p>Elephant monitoring is critical and the use of collars have been adopted to determine the home range and connectivity. Data on elephant is also important during the drafting of the elephant management plans and to guide CITES quota allocation.</p>	<p>(Mid Zambezi Valley)</p>			
<p>5. Monitoring of law enforcement and illegal activities in the Mid Zambezi valley</p>	<ul style="list-style-type: none"> <li>▪ The use of modern technology such as collars, SMART in wildlife monitoring have been vital in today's world. Thus modern technology have proven to be of immense important in wildlife conservation and to reduce illegal harvesting.</li> </ul>	<p>Chinhoyi Hurungwe safari area Mana Pools Charara Safari Area (Mid Zambezi valley)</p>			

6. Monitoring and mapping of fire occurrences and intensity to determine the effects of fire on vegetation and wildlife	<ul style="list-style-type: none"> <li>Fire are a natural process that operates as an integral part of the ecosystem hence there is need to monitor their intensity and occurrence. In this regard, we need to develop response strategies of unplanned fires</li> <li>Produce effect fire management plans as well as to conduct fire mapping and fire assessments</li> </ul>	Mid-Zambezi Valley			
7. Vegetation survey and species inventories in the Mid-Zambezi Valley	<ul style="list-style-type: none"> <li>Most of our vegetation maps are outdated, therefore there is need to update the existing vegetation maps in park estates with special focus to trees and grass.</li> </ul>	Hurungwe SA (Ongoing) Mana Pools NP Sapi Chewore SA Doma Dande			
8. Analysis of trophy quality, hunting off-takes, revenue generated and the long-term biological impact of the spot hunting on the hunted species	<ul style="list-style-type: none"> <li>Hunting is one the important industries in Zimbabwe Wildlife Management. Therefore, conducting research to monitor this industry is critical to ensure that our off-takes are sustainable and being allocated based on solid scientific data from the scientific research unit</li> </ul>	(All stations where hunting is being conducted)			
9. Survey on Zambezi valley bird species and protection of Important Bird Area	<ul style="list-style-type: none"> <li>Mana pools and Kariba are Important Bird Areas (IBAs). Therefore, it is critical to conduct research with aim to understand the impact on habitat change on their conservation within Parks Estate.</li> </ul>	IBAs in the Mid Zambezi valley & Hurungwe SA			
10. Crocodile surveys and investigation of	<ul style="list-style-type: none"> <li>Several companies are involved in the collection of eggs for breeding e.g. Padenga, Chirundu Crocodile</li> </ul>	Kariba Hurungwe SA			

Human Crocodile Conflict	Company etc. Breeders are supposed to release 10% of the population to ensure balances in the ecosystems. There is also need to come up with sustainable Human Crocodile Conflict mitigation				
11. Monitoring and analysis of weather patterns (rainfall, temp, wind speed, humidity) and other environmental factors	<ul style="list-style-type: none"> <li>▪ Need to renovate and build weather stations in all stations in the Zambezi valley to ensure monitoring of climate/ weather trends</li> </ul>	Zambezi Valley			
12. Herbivore impacts on vegetation in proximity to artificial water supply and monitoring of vegetation changes in response to manipulation of water supply.	<ul style="list-style-type: none"> <li>▪ This year (2018) a number of boreholes were drilled in response to address the low rainfall that was received. Therefore, these recently introduced artificial water sources require monitoring and projects to be conducted so that management decisions will be guided accordingly.</li> </ul>	Hurungwe SA Mana Pools NP Sapi Chewore			
13. Investigate the impact of wildlife to communities adjacent to protected areas Analysis of CAMPFIRE performance, benefits and community	-Mid Zambezi faces high HWC and there is need to establish the causes and find solution through CAMPFIRE and community engagement.	Hurungwe safari area Mana Pools Charara Safari area			

perceptions on wildlife conservation.					
14. Re-survey of Doma SA to validate the potential to restore wildlife populations to preferred densities	There is need to implement what was recommended from the feasibility studies which were done for Doma before wildlife is re-introduced.	Doma Safari area			
15. Survey the intensity of tsetse flies outbreak and zoning infested areas  Surveillance of Wildlife Diseases	Pests and diseases outbreak in the Zambezi valley has become a critical challenges to tourist and ZimParks workers (Challenges of tsetse flies out break, sleeping sickness)  Alertness to outbreaks of notifiable diseases and sorting mitigation measures	Mid Zambezi			
16. Analysis of the tourism returns data and available facilities to determine the carrying capacity for sustainable tourism	Improve tourism receipts, provision of quality service for customer satisfaction based on scientific results ie establish and adhere to carrying capacities of our protected areas Develop a tourism database that will assist the tourism department into effectively document and retrieve data.	Mana Pools Chewore and Charara			
17. Spatial analyses of vehicle animal collision along Makuti-Chirundu highway	Road accidents have been an issue of concern in Hurungwe SA. Therefore, in a bid to curb loss of wildlife due to animal-vehicles collision along Makuti-Chirundu highway there is need to conduct a study to map all the accident hotspot areas so as develop appropriate measure based on research	Hurungwe SA			

## 2.0 AQUATIC UNIT

### Sebungwe Region

Priority Projects	Background	Station	Priority		
			H	M	L
16. Monitoring of law enforcement effort and illegal activity on Basin 3 and 4, Lake Kariba	<ul style="list-style-type: none"> <li>- The Sebungwe Region contains the largest portion of Lake Kariba</li> <li>- There is need to strengthen anti-poaching and law enforcement monitoring on the Lake</li> </ul>	Chete Matusadona			



**AQUATIC ECOLOGY (Lake Kariba Fisheries Research Institute)**

KAPENTA	Background	Station (s)	Priority		
			H	M	L
1. Hydro-acoustic assessment of standing stock, distribution and migration of kapenta in Lake Kariba.	There is need to get a time series data of kapenta standing stock over time to assist with management interventions	LKFRI, Binga			
2. An assessment on the establishment of recently introduced Kapenta under the Command Fisheries	In an effort to reduce the pressure in Kariba there is need to see if other dams can be used to ease the demand to fish in Kariba	LKFRI, Tugwi Mukosi - (Tugwi Mukosi) -Mtshabezi (Bulawayo) -Arcadia (Bindura) - Zhove (Beitbridge/ Gwanda)			
3. Monitoring of law enforcement effort and illegal activity along the lake	In order to manage the Lake as a contiguous ecosystem there is need to have concerted monitoring of illegal activities and intervention measures	LKFRI, Binga, Matusadona, Chete			

4. Monitoring of fishing effort (Conduct a lake wide rig survey)	In order to properly manage the kapenta resource and to remove illegal fishers there is need to know exactly how much legal effort is operating on the lake	LKFRI, Binga, Matusadona, Chete			
5. Monitoring of kapenta fishing activities (through the use of VMS for kapenta rigs – to combat Illegal, Unreported and Unregulated activities)	In an effort to reduce the costs of law enforcement, VMS will allow for targeted patrols to those rigs that may be operating in illegal areas.	LKFRI			
6. Environmental Monitoring (lake levels, temp, rainfall) in Lake Kariba and Upper Zambezi	Kapenta reproduction is closely linked to environmental factors, hence there is need to closely monitor environmental parameters that may affect the ecosystem and plan for possible mitigation interventions.	LKFRI, Binga			
7. Study of nutrient turnover and water currents in the lake: these may have an impact on the distribution of plankton, hence kapenta	Understanding the nutrient inflows and vertical mixing into the water column and hydrological trends to assist in predicting changes in fisheries catches and possible mitigation interventions.	LKFRI			
<b>INSHORE FISHERIES</b>					
Pilot study of real time data collection system for the gill-net fisheries	The station is facing a challenge in receiving catch data from the artisanal fishers, making it difficult to carry out analysis.	LKFRI			

Set up a fish disease surveillance protocol on the Upper Zambezi River and Kariba dam	There have been concerns that there are currently no disease monitoring and reporting protocol for wild fish disease.	LKFRI			
Monitor the aquatic and Fishery resource in the Upper Zambezi and Lower Zambezi	There is need to understand the dynamics of the fishery resource as there are three barriers on the Zambezi River namely the Victoria Falls, Kariba dam wall and the Cahora Bassa dam wall.	LKFRI, Binga			
<b>SPORT FISHING</b>					
Continuous monitoring and evaluation of the sport fishing industry	Tiger fish is an important component of the lakes sport fishing industry and there has been an emergence of bream fishing tournaments in the lake	LKFRI			
<b>LIMNOLOGY, AQUATIC WEED AND POLLUTION CONTROL</b>					
Assessment of physical and chemical properties of water bodies to assess pollution and the basis of biological production of Lake Kariba.	In order to reduce the chances of there being local eutrophication there may be need to make predictions on pollution as this will impact on the fish production	LKFRI			
Determine the impacts and possible ways to reduce the proliferation of invasive species (crayfish)	There is need to reduce crayfish densities in the lake as well to investigate the claims that it may be impacting on the catches of the artisanal fishers.	LKFRI			

## Central Region

Project title	Background	Station (s)	Priority		
			H	M	L
Evaluation of indigenous fish species.	There is need to have indigenous aquaculture species to be used in the stocking program. Currently, stocking is only done using <i>O niloticus</i> which is an exotic species	Sebakwe			
Analysis of fish stocks and species diversity in Lake Sebakwe and Ngezi (Commercial gillnet fishery)	Need to generate fisheries independent data as fishery dependent data is known to be biased. To have an appreciation on species composition and distribution for management purpose.	Sebakwe and Ngezi			
Species Checklist: Inventory development for monitoring purposes.	Need to compile a list of all species (Fish, plant, reptile and mammals).	Sebakwe and Ngezi			
Pilot cage culture project in Lake Sebakwe.	There need to boost fish stocks in Dams within Ngezi Region through fingerling production.	Sebakwe			
Distribution and abundance of Crayfish ( <i>Cherax quadrinatus</i> ) in Lake Sebakwe.	An invasive species which has been identified in Lake Sebakwe and assessment of its impacts on species within needs to be assessed.	Sebakwe			
A comparative analysis of species composition within Lake Sebakwe and Sebakwe river.	There is paucity of knowledge of species in Sebakwe river comparing them with those in the Lake.	Sebakwe			

An Ecological Risk Assessment of heavy metals pollution from mining fields.	There is high mining activities along the catchment of Sebakwe therefore there is need to assess the impacts of these heavy metals on fish ecology.	Sebakwe			
Evaluation of impacts of the dam stocking within Midlands province.	There have been some stocking of fish within Dams in Ngezi Region which haven't been assessed its impacts therefore led to development of this project.	Ngezi Region			
Physiochemical limnology of Lake Sebakwe	As a result of high agricultural and mining activities along the catchment there is need to have an appreciation to know the nutrient level within the Lake for Monitoring purposes.	Sebakwe			
Crocodile population surveys within Sebakwe Dam and Ngezi Dam.	There is need to conduct a baseline survey for monitoring purposes and ecological impacts on their population dynamics.	Sebakwe and Ngezi			

## South East Lowveld

Project title	Background	Station (s)	Priority		
			H	M	L
Monitoring of invasive species	Opuatia spp invasion at Kyle dam  Lantana Camara species invasion	Kyle			
Resuscitation of cage culture pilot project and investigations on carrying capacity for guidance in issuing of Co-operatives fishing permits	The project was initiated but the project was abandoned after there were constraints with funding. We hope the project will bring in income that will fund other research projects	Tokwe Mukosi			
Vegetation species inventory around Tokwe Mukosi	This will guide us in the introduction of wildlife species that will also boost the tourism industry. A manuscript is currently being drafted at the moment	Tokwe Mukosi			
Population dynamics and stock assessment of the introduced sardine Kapenta	Kapenta were introduced in the Lake in 2017 but it has not been established if the fish stock has reached harvestable thresholds. This will also guide us in issuing of fish permits.	Tokwe Mukosi			

Database development (Bass tournament data capture and monitoring)	This is meant to guide us in monitoring the reproductive biology and catch rates of the Bass fish that is exploited during the fishing tournament	Tokwe Mukosi			
Fish stock assessment and comprehensive study of the ichthyofauna community in Tugwi Mukosi	After the impoundment of the dam no studies have been done so as to ascertain the population dynamics and composition of fish species that are available in the dam hence this project will be useful in that regard. The project will also guide us in the number of fishing permits to issue	Tokwe Mukosi			
Physiochemical limnology and stratification of Tugwi Mukosi Dam	Water quality is an important factor in the survival of aquatic organisms hence monitoring of water quality and thermal stratification will assist in monitoring fish species composition	Tokwe Mukosi			