HWANGE NATIONAL PARK

GENERAL MANAGEMENT PLAN
PART 2: BACKGROUND
November, 2015

This document provides background information for the Hwange planning process. Rather than being a scientific treatise it makes extensive use of maps and photographs in the belief that this makes it more accessible to the reader and ultimately the users and implementers – the Hwange park managers and staff.

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CHAPTER 1: LEGAL AND ADMINISTRATIVE FRAMEWORK

The management of wildlife both within and outside the Parks and Wildlife Estate in Zimbabwe is governed and guided by the laws of the country. The most important legislation is the Parks and Wildlife Act and its regulations while the Policy for Wildlife is the most important guiding document. In addition, there are a number of other Zimbabwean Acts and policies that must be taken into account when planning. Finally Zimbabwe is signatory to a number international conventions and agreements which can affect management of the Estate and hence planning for it. These are summarised in this chapter.

1.1 POLICY AND ACT FOR NATIONAL PARKS AND WILDLIFE

1.1.1 Policy

The Policy for Wildlife in Zimbabwe was published in 1992. The Statement of Intent is reproduced below.

In accordance with its commitment to conservation and its resolve to promote enhanced sustainable rural prosperity and a more equitable apportionment of the benefits from the proper use of the nation's wild life resources, Government intends to:

A. *Maintain the Parks and Wild Life Estate for the conservation of the nation's wild resources and biological diversity.*

B. *Ensure the adequate protection of major ecosystems or key species and habitats which are not represented in the Estate through various measures including Biosphere Reserves.*

C. *Encourage the conservation of wild animals and their habitats outside the Estate recognising that this is only likely to be successful if wild life can be' used profitably and the primary benefits accrue to people with wildlife on their land.*

D. *Insist upon environmental impact assessments for all developments that threaten to affect wild life arid protected land adversely.*

E. *Use the Estate to promote a rurally based wild life industry,*

F. *Harmonise the management of the Parks and Wild Life Estate with the efforts of neighbouring communities who are developing wild life as a sustainable form of land use.*

G. *Transform land use in the remote communal lands of Zimbabwe through its Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) under which rural people have the authority to manage their wild life and other natural resources and benefit directly from so doing.*

H. *Ensure that wild life is not undervalued to the people living with it by permitting them to use it sustainably for their own gain as they are able to do with other natural resources and agricultural products.*

I. *Promote public awareness of wild life issues.*

J. *Take the necessary legal and enforcement measures to prevent the illegal use of wild life.*

K. *Maintain its commitment to wild life research.*

L. *Participate in those international treaties and conventions which are consistent with Zimbabwe's policies for conservation and sustainable use of wild life.*

M. Examine and develop a cost-effective and adaptive institutional framework for managing wild life and protected areas in terms of this policy.

N. Draw up management plans arising from this policy for approval by the Minister.

The Statement of Policy consists of 10 sections several of which are specific about the Parks and Wildlife Estate. Section 2 deals with the objectives of the Estate, its management, public use and physical developments. The objectives are as follows:

2.1.1. Preserve representative examples of Zimbabwe's aquatic terrestrial flora and fauna and their physical environments;

2.1.2. Protect areas of scenic beauty and special interest;

2.1.3. Preserve rare, endangered and endemic species;

2.1.4. Conserve water catchments;

2.1.5. Provide opportunities for public education and the advancement of scientific knowledge;

and, without prejudice to any of the above

2.1.6 Encourage public use related to the enjoyment and appreciation of these areas; and

2.1.7. Generate economic activity within the Estate and surrounding areas to enhance rural development.

The more important relevant sections are reproduced in Appendix 1.

1.1.2 Act and Regulations

The 1974 Act, consisting of in 17 sections and ten schedules, was revised and reprinted in 1996. Important subsidiary amendments are contained in Act 19 of 2001 and Act 22 of 2001.

For the management of National Parks, Section 23 describes the powers of the Minister in relation to parks. These powers are quite considerable for management, tourism and other utilisation.

Important for the day-today management of the National Parks are the Parks and Wildlife (General) Regulations, 1990 (SI 362 of 1990). This has been amended by the Parks and Wildlife (General) (Amendment) Regulations (SI 114 of 1993).

Section 11 specifies the length of time that a tourism facility may be used continuously. It has been set at three weeks and this has a direct bearing on the development of the tourism industry in the Park.

1.2 OTHER IMPORTANT POLICIES AND ACTS

A brief review of other important Zimbabwean policies and Acts is shown below (Table 1).

Table 1: Summary of important policies and acts relevant for the planning of Hwange National Park

External		**Internal**	
1	National Environmental and Conservation Policy and Strategy	1	HR Policy
2	Forestry Based Land Reform Policy	2	Procurement Policy
3	Environmental Policy	3	Audit Policy
4	State Procurement Policy	4	Reservations Policy
5	Wildlife Based Land Reform Policy	5	Transport Policy
6	Criminal Procedures and Evidence Act 9:10	6	Tour Operators Policy
7	Environmental Management Act 20:27	7	Tariffs Policy
8	Tourism Act 14:20	8	Finance Policy
9	Firearms Act 10:09	9	Refund Policy
10	Official Secrets Act 11:09	10	Filming Policy
11	Indigenisation and Empowerment Act	11	Cancellation Policy
12	SI128 of 2005-Designated and grading of tourist facilities	12	Zimbabwe Policy for Wildlife
13	Public Finance Management Act 22:19 (2009)	13	Zimbabwe Rhino Policy and Management Framework
14	Labour Relations Act 28:01	14	Elephant Management Policy
15	Trapping of Animals Act 20:21	15	Crocodile Policy
16	Bees Act 19:02	16	Research Policy
17	Quelea Control Act 19:10	17	Parks and Wildlife Act 20:14
18	Prevention of Cruelty to Animals Act 19:09	18	ICT Policy
19	Rhodes Estate Act 20:17		
20	Protection of Wildlife (Indemnity) Act 20:15		
21	Risk Management Policy		

Table 2: Important policies and acts relevant for the planning of Hwange National Park	
Policy/Act	**Brief Description**
Wildlife Based Land Reform Policy	The policy aims to facilitate wildlife-based land reform to ensure profitable, equitable and sustainable use of wildlife resources, particularly in areas where agricultural potential is limited.
Mines and Minerals Act	The Mines and Minerals Act defines prospecting rights and mining leases. Rights to minerals are vested in the President. All State Land, which includes the Parks and Wildlife Estate, is open to prospecting.
National Museums and Monuments Act	Through the Act the Minister may declare National Monuments. The discovery of any ancient monument or relic must be declared to the National Museums and Monuments Board by the discoverer or the owner or occupier where the relic occurs. The state can acquire the land on which the monument or relic occurs for its preservation or analysis.
Environmental Management Act	The Act provides for sustainable management of natural resources and protection of the environment; the prevention of the pollution and environmental degradation; the preparation of a National Environmental Plan and other plans for the management and protection of the environment. EIAs are required for specified developments
Communal Land Act	The Act is implemented through the Rural District Councils (RDC), these councils are responsible for the planning and administration of the districts. They are the legal representation of government at grassroots level. RDCs are responsible for the management of all natural resources on behalf of the producer communities applying the Environmental Management Act. It will be relevant for the adjacent communal lands.
Water Act	The Act is for the monitoring and management of all surface and underground water resources. Use of water from designated river systems is controlled through the National Water Authority. This includes underground water.

1.2.1 SPECIES MANAGEMENT POLICIES

A brief review of other important Zimbabwean policies and Acts is shown below (Table 3).

Table 3: Species policy and management documents in force in Zimbabwe	
Policy/Act	**Brief Description**
Elephants	An elephant management policy and plan is currently being drafted
Lions	
Cheetah	National Conservation Action Plan for Cheetahs and African Wild Dogs in Zimbabwe,
Wild Dog	National Conservation Action Plan for Cheetahs and African Wild Dogs in Zimbabwe,
Ostrich	
Crocodile	

1.3 ZIMASSET

The Vision of the Plan is “Towards an Empowered Society and a Growing Economy”. The execution of this Plan will be guided by the following Mission: “To provide an enabling environment for sustainable economic empowerment and social transformation to the people of Zimbabwe”.

Table 4: ZIMASSET Section dealing with the Environment				
Result Area	**Outcomes**	**Outputs**	**Strategies**	**Lead Inst.**
Protection and Conservation	• Increased ecosystem representations in the parks estate; • improved park protection.	• Optimal populations of key species specified; • Updated reports of on ecosystems and preservation produced.	• Capacitate National Parks and Wild Life to combat poaching; • Institute methods of increasing wildlife species, flora and fauna; • Update reports of the ecosystem and its preservation.	• Ministry responsible for Environment

1.4 INTERNATIONAL POLICIES AND AGREEMENTS

Zimbabwe is signatory to a number of international policies and agreements relating to wildlife and the environment and these are briefly outlined below as they need to be considered when planning a protected area.

Table 5: International policies and agreements

Agreement	Comments
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora. Essentially member states regulate trade in endangered or threatened species. Important species include elephant, cheetah, crocodile and leopard. Ratified in 1981.
CBD	Convention on Biological Diversity signed in 1992.
CMS	The Convention on Migratory Species, also known as the Bonn Convention, aims to conserve terrestrial, aquatic and avian migratory species throughout their range.
SADC	The treaty of the Southern African Development Community (SADC) 1992
Sustainable Use of Biodiversity	The Addis Ababa Principles and Guidelines for Sustainable Use of Biodiversity adopted at the 7th Conference of the Parties of the CBD, (Principle 11 and 12)
RAMSAR	The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Ratified by Zimbabwe in 2012

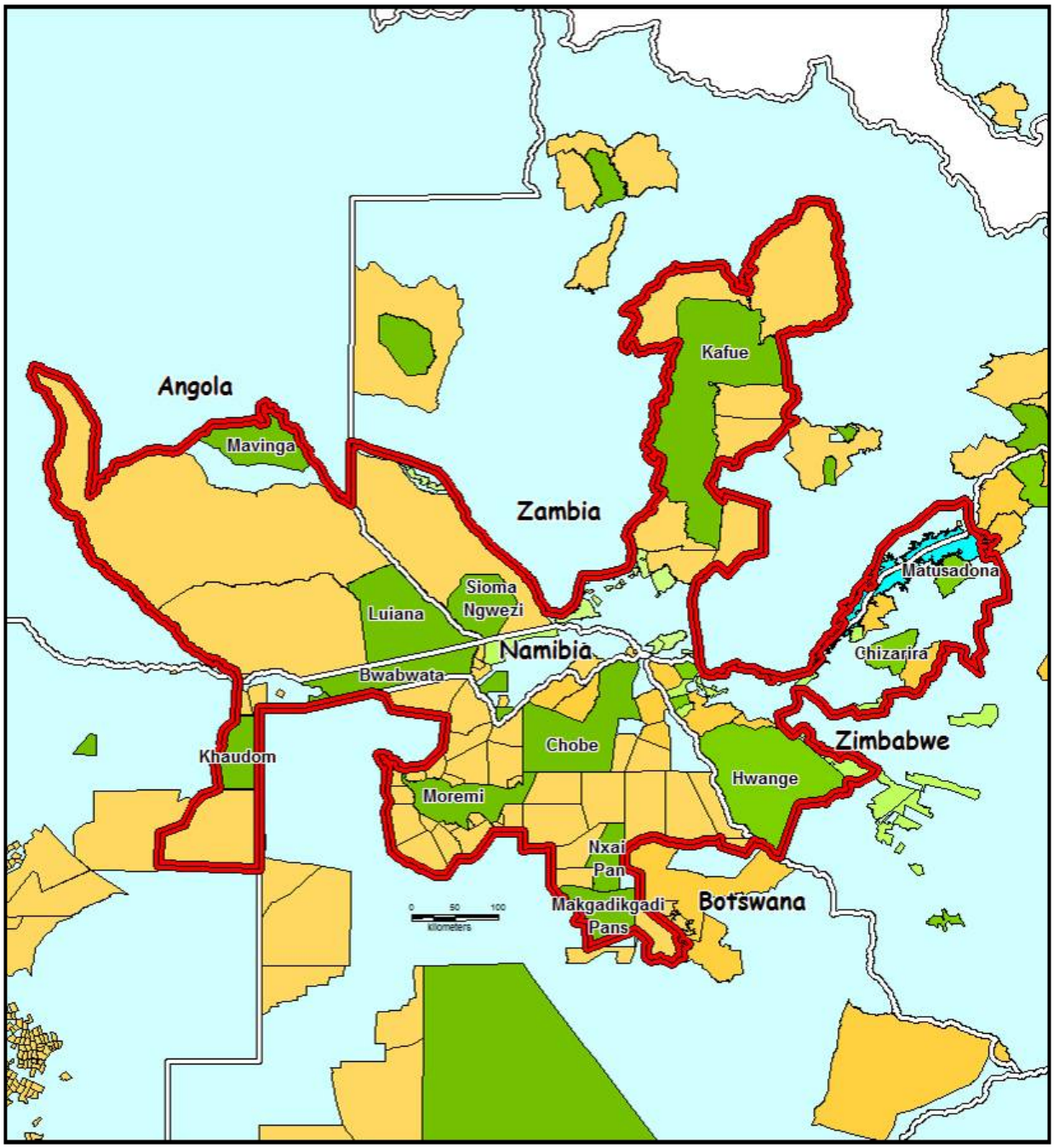
1.5 LARGE-SCALE CONSERVATION INITIATIVES

1.5.1 Kavango-Zambezi Transfrontier Conservation Area

The Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA) covers fiver different SADC countries and the currently defined spatial extent is in excess of 350,000 square kilometres (Figure 4). A wide variety of protected areas are found within its boundaries and these include at least 10 national parks which represent 26% of the KAZA TFCA. These Core Areas represent the heart of the TFCA and they currently host the highest densities of the TFCA flagship species – the elephant.

Hwange National Park is an important part of KAZA (KAZA) and the second largest protected area within the network.

Figure 1: Hwange and its relationship to KAZA



1.3.2 Hwange-Sanyati Biological Corridor

The aim of this component is to improve management of the Hwange National Park and the livelihood of communities involved in stewardship of the natural resources in the buffer area of the HNP. The component will focus primarily on Hwange and Tsholotsho Districts, the only districts in the HSBC that share boundaries with the HNP.

*Subcomponent **1.1:** Improved management of Hwange National Park.* This subcomponent would finance investments for improving park management, improving water and game water supply management, and supporting essential research and monitoring. Specific activities to be supported would include:

a) Updating annually the HNP operational plan, in collaboration with buffer communities and relevant RDCs; substantially involving local communities has not been previously done.

b) Training and better equipping of park rangers (vehicles, field equipment, GPS units, camping equipment, boots, and uniforms), improving the communications infrastructure of the park.

c) Support to anti-poaching initiatives above and beyond general support to park rangers. The project will help support coordination with a range of anti-poaching initiatives both nationally and regionally. The World Bank is currently managing a GEF-financed project to combat elephant poaching in Africa and synergies will be sought with that project, possibly to develop additional projects in Zimbabwe focused on elephant poaching.

d) A comprehensive study on groundwater hydrology in the HNP to assess the sustainability of various extraction regimes and to monitor the ecological effects of artificial water supply. As noted above, it is intended that this study will be carried out jointly with the World Bank SADC groundwater project. The details of this collaboration will be determined in the first months of the project.

e) Strategic drilling of boreholes in the park, if compatible with the results of the groundwater study, to minimize overgrazing and over-abstraction in some areas and begin pumping in other areas; explore alternative means of water abstraction; investigate and put into practice alternative ways of minimizing seepage from existing pans.

f) Vegetation monitoring baseline survey will be done in first year of project, based on analysis of remote satellite imagery. It will be repeated at end of project, to understand ecological changes in the park and to monitor possible impacts from fire or anthropic modification of park areas.

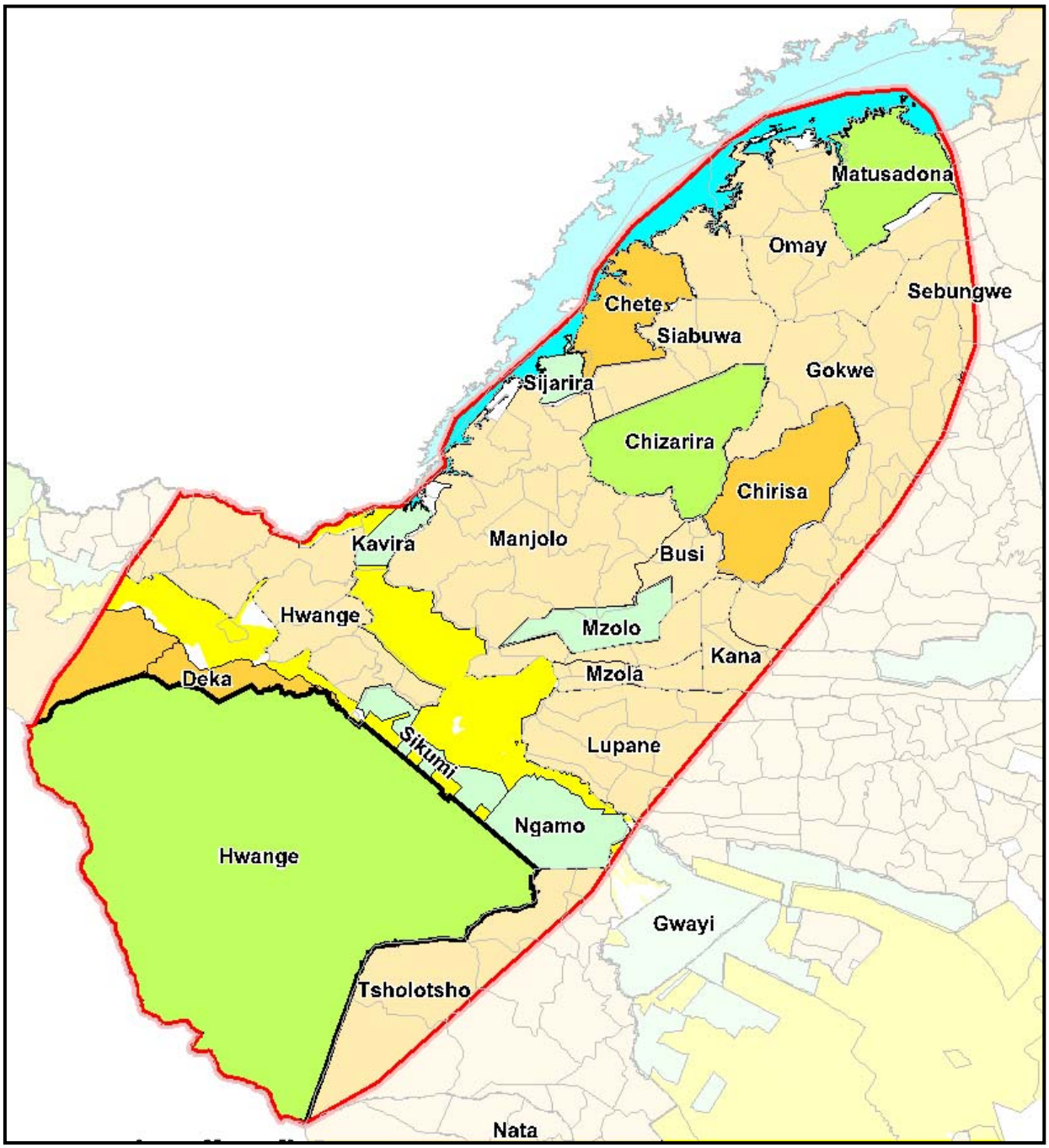
g) A thorough assessment of the fire ecology of the HNP (also to cover forest reserves covered under Component 2). This is intended to be a one-time study. The study will inform a fire management plan which is prepared each year, but without a good understanding of the ecological implications of the current fire management strategy in the park.

h) Conduct wildlife aerial surveys to assess the numbers of indicator species wildlife populations. Surveys will be carried out in 2014 and 2018. The last aerial survey carried out in HNP was in 2014

11. *Subcomponent 1.2: Improved community livelihoods through wildlife management.*

Improved HWC in selected wards of Tsholotsho District. Investments will include: surveillance mechanisms, implementation of mitigation measures, raising of awareness and community capacity, promotion of chili cultivation, and monitoring of changes in HWC and wildlife damage. Lessons learned will be applied to other districts but the limited project funding will not permit major investments in HWC outside of Tsholotsho Distict.

Figure 2: The Hwange-Sanyati Biological Corridor



1.4 MANAGEMENT OF PWMA

1.4.1 Management Structure

The ZPWMA is headed by a Director General and has a number of divisions below the Director General which are headed by Directors. Outside Head Office, the Parks Estate is administered by Regional Managers in four regions namely Southern, Northern, Central and Western where divisional functions are represented. Head Office is the Corporate Centre where the Director General and the Divisional Directors are based. The divisions are

- Conservation
- Research and Planning
- Commercial Services
- Finance, Human Resources and Administration

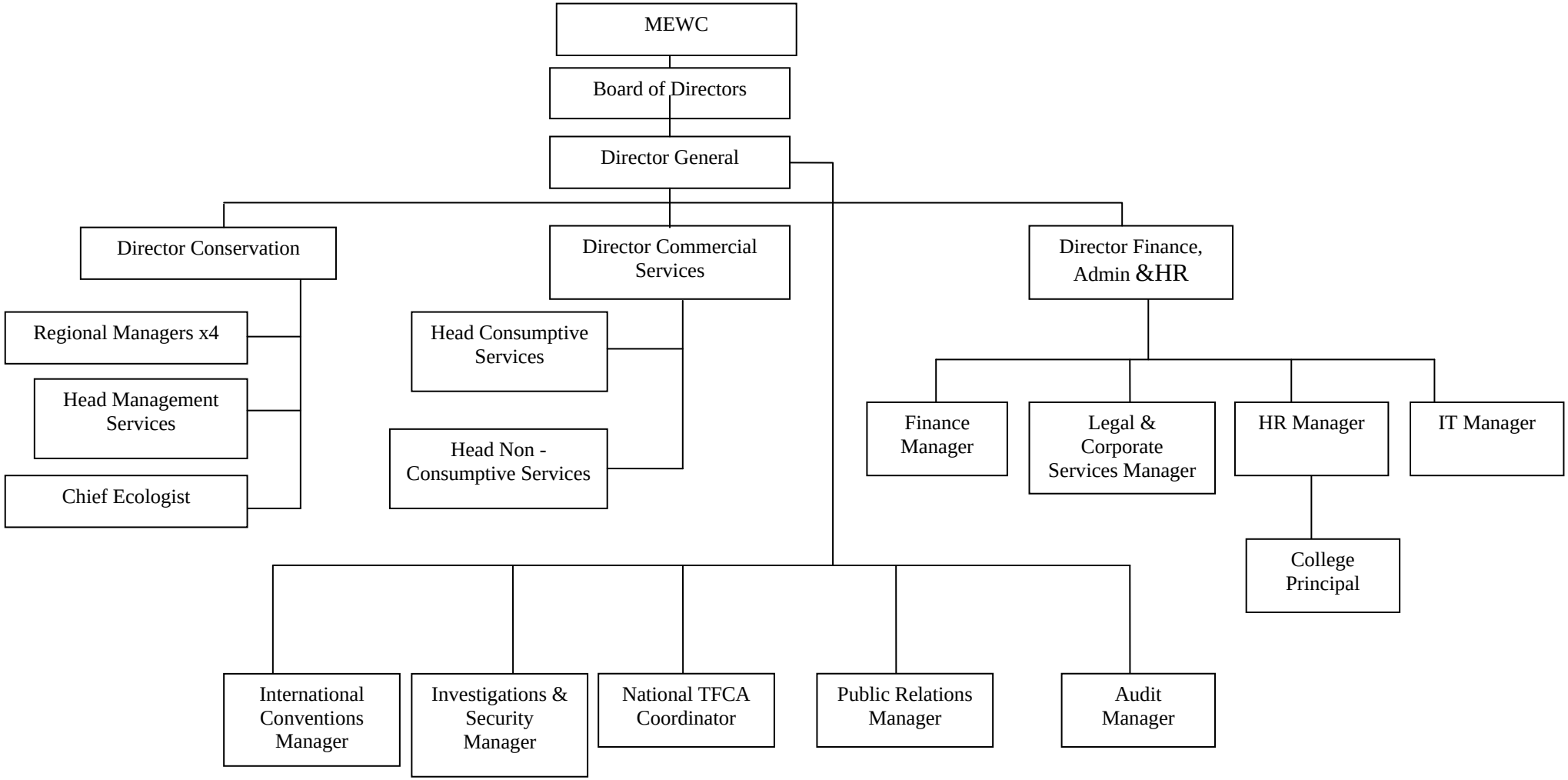
whose functions are as follows:-

Table 6: ZPWMA Organisational Structure and Function

Division	**Functions**
Conservation	The division discharges the Authority's core business that is: management and protection of Parks and Wildlife Estate and wildlife in general. The division serves as the Management Authority on all wildlife matters in the country. The division's core functions include: • Protection and management of Parks and Wildlife Estate and the wildlife and ecosystems therein; • Security functions in the Parks Estate and working with other security agencies to ensure that wildlife is conserved, protected and managed properly; • Enforcement of the Parks and Wildlife Act and all subsidiary legislation on protected, private and communal lands; • Protection and management of specially protected species; • Implementation of wildlife management plans and monitoring of biodiversity status and trends; • Overseeing the hunting industry and other wildlife utilisation aspects; • Enforcement of adaptive management approach and sustainable utilisation; • Licensing of professional hunters and guides; • Resolution of Human Wildlife Conflict Issues
	Scientific Services Unit Directing research activities and making appropriate recommendations thereon to the Board, Director General and Field Managers; • Developing research policies and areas of focus; • Provision of technical services through basic and applied research in wildlife flora and fauna; • Preparation and updating of park plans; • Design and control of park physical developments; • Designing and control of aerial surveys; • Compliance with Multilateral Environmental Agreements as Management or Scientific authority; and • Collaborating with other scientific and research institutions. • Carrying out Extension, Interpretation on Human Wildlife Conflict issues

Table 6: ZPWMA Organisational Structure and Function	
Division	**Functions**
Commercial	As part of transforming the then department into an Authority, various provisions that allow for commercialisation were enacted according to the 11th schedule Section 4(5) of amendment No. 19 of 2001 of the Parks and Wildlife Act. These include: • Subsection 1(relating to leasing and purchasing immovable property) • Subsection 4(relating to dealing/pledging assets read in conjunction with section 23.2 and 2) and • Subsection 10(relating to partnerships) • Section 3(8), Section 5 (23), (1) (k), Section 5(23) (2) (a). • Section 22(10)(relating to the ancillary powers of the Authority With the Authority having been removed from the treasury around mid 90s, and also with dwindling of international funding, it resulted in commercialization of ZWPMA which saw the creation of a Commercial Division to drive this new vision. This policy shift was supported by the school of thought that "conservation should pay for itself." The Commercial Division coordinates business development, marketing and pricing of park products and services as well as the establishment of joint ventures and partnership agreements. Its main aim is to ensure self sustenance of the organization through revenue generation from consumptive and non-consumptive products and services. The division is divided into Consumptive and Non Consumptive sub-divisions. The core functions of the Division include; • Marketing of products • Business development • Pricing of products • Establishing of hunting, fishing, photographic and game farming SBUs • Leasing of buildings, equipment, hunting and photographic concessions • Auctioning of packaged hunts and fishing camps • Selling of game products • Coordinating reservations of accommodation facilities • Ensuring maintenance of tourist facilities • Coordinating licensing and registration of Tour Operators
Finance, Human Resources and Administration	The division's functions are governed by the provisions of various Acts of parliament including the Public Finance Management Act 22:19 (2009), Labour Relations Act 28:01, Procurement Policy *etc*. The Finance, Administration and Human Resources division provides support services to other divisions to ensure that operations of the Authority run smoothly in terms of: • Financial Management • Human Resources Management • Transport Management • Procurement administration • Assets Management • Legal Services • Information Technology Services • Corporate Services

Figure 3: Structure of ZPWMA



1.4.2 Strategic Plan – PWMA Vision, Mission and Values

The PWMA has developed a strategic plan (2014 to 2018) which outlines its direction. The Authority has the following vision, mission and core values.

Vision: To be a world leader in sustainable conservation by 2020

Mission: To conserve Zimbabwe's wildlife heritage through protection and sustainable utilisation of natural resources for the benefit of present and future generations.

Motto: In harmony with nature

Principles and Core Values:

Principles
- Teamwork
- Commitment
- Integrity
- Accountability
- Innovation

Core Values
- Sustainable Utilisation
- Discipline and Caution
- Empowerment and Equity
- Diligence

1.4.3 Strategic Plan - Goals and Strategies

The Authority's goals are consistent with and contribute primarily to the Ministry of Environment and Natural Resources Management's Goal number one(1) which is "improved management and sustainable utilisation of natural resources by 10% by 2015" and Goal number two (2) which is "increased education and awareness on natural resources issues by 50% by 2015"

Four goals and a number of attendant strategies and activities were defined in the strategic plan. The Goals are listed below and then the activities summarised in Table 7.

1. To improve the conservation of biodiversity by 50% by 2018
2. To improve the protection of wildlife by 50% so as to maintain ecological integrity by 2018
3. To be able to finance 100% of the Authority's budget by 2018
4. To improve resource mobilisation and allocation from the current 50% to 100% by 2018

Table 7: Goals and Strategies – ZPNWMA 2014-2018

Goal	Strategy
To improve the conservation of biodiversity by 50% by 2018	1. To reduce area covered by invasive alien species in Parks Estate by 10% by 2018 2. To restore wildlife populations of major species to preferred densities by 20% in the Parks Estate by 2018 3. To reduce woody vegetation cover loss through elephant damage by 10% by 2018 4. Awareness campaigns programmes in surrounding communities and training of communities targeting 10% of the population 5. Provide technical services on wildlife management 6. To reduce areas burnt by unplanned fires by 20% by 2018 7. Training • To train 80% of Parks rangers in field data collection by 2018 • To train all ecologists in the following areas - Aerial surveys, GIS and remote sensing, Pilot training, field research design and data analysis. 8. To increase research capacity by 80% by 2018. 9. To increase collaborative partnerships with other research organisations by 80% by 2018. 10. To restore and conserve 80% of landscapes to their natural state by 2018. 11. To monitor the status of biodiversity

Table 7: Goals and Strategies – ZPNWMA 2014-2018	
Goal	**Strategy**
To improve the protection of wildlife by 50% so as to maintain ecological integrity by 2018	1. To reduce poaching of key species by 50% by 2018. 2. To improve detection and reporting of veldt fire occurrences by 20% by 2018 3. To increase law enforcement efforts – patrols by 50% by 2018. 4. To train 10% of employees in advanced and strategic wildlife based protection programs by 2018. 5. To establish a remote sensing centre- by 2018. 6. To apply joint anti-poaching operation strategies by 2014. 7. To review and implement policy and legal framework, institutions and governance systems by 2014. 8. To improve enforcement of wildlife policy and legislation by 2014.
To be able to finance 100% of the Authority's budget by 2018	1. To conduct annual aggressive marketing and research through website, print and electronic media, shows and exhibitions (domestic, regional and international market) 2. To increase product range by 2016 3. To expedite the processing of joint venture/partnerships/ co-management arrangements 4. To mobilise funds (20% of annual budget) for recapitalisation from Treasury, NGOs/donors and financing institutions by 2018 5. Annual strategic review of tariffs /concession fees/trophy fees. 6. To auction commercial fishing permits for Chivero , Darwendale , Kariba and other dams by 2018 7. To train 90% of Commercial Service staff in the management of tourism products and services by 2018 (Build capacity - Training programmes for staff members, honorary officers, volunteers, communities) 8. To implement 100% reorientation training programs of all staff by 2015 9. To develop competitive pricing strategy annually (Introduce conservation fees nationwide) 10. To increase product range by 2016 11. To upgrade revenue management systems by 2018 (Decentralise booking /reservation system) 12. To introduce retail facilities in all strategic Parks e.g. Rainforest, Mana Pools, Main Camp by 2015. 13. To introduce photographic Safaris run by the Authority- 14. To introduce non-traditional business projects such as, intensive wildlife production projects in small parks, e.g. ostrich and crocodile production, FMD free buffalo, guinea-fowl, sable, eland 2018 15. To engage marketing agencies to assist in marketing and sales of commercial products 16. To Improve road infrastructure

Table 7: Goals and Strategies – ZPNWMA 2014-2018	
Goal	**Strategy**
To improve resource mobilisation and allocation from the current 50% to 100% by 2018	1. To come up with participatory budgetary controls 2. To Equitably allocate strategic resources for the Authority 3. To improve staff training, development, rewarding and motivation. (improve service delivery) 4. To have an improved salary administration process 5. To have a harmonious work environment 6. To have an effective RBM Performance Management System 7. To improve Health, Safety & Staff welfare 8. To have an effective reviewed Human Resources Policies and Procedures Manual 9. To enforce adherence to good corporate governance framework by 2015 (Board Charter) 10. To develop, build and maximise capacity in the acceptance, use and adoption of ICT resources (hardware, software and networking equipment) to more than 50% by 2018 11. Source funding from fiscus and other potential financiers

1.6 AREA DESCRIPTIONS

The following are transcripts from the Schedules and Statutory Instruments.

The park boundaries are shown in Map 1 and the following description is taken from the Land Tenure (Repeal) Act, 1979, as referred to in Part II of the First Schedule of the Parks and Wildlife Act No. 14 of 1975; Revised 1996.

1.6.1 National Parks

FIRST SCHEDULE (Section 22)
National Parks
PART 1
National Parks on Parks and Wildlife Land

Item 7: Hwange Area: 1 465 100 hectares

The area of land bounded by a line drawn from a point on the Rhodesia-Botswana international boundary on the westward prolongation of the northern boundary of the former property Deka, eastwards along that prolongation and boundary to its northernmost beacon; thence proceeding generally north-eastwards along the northwestern boundaries of the former properties Prestwich, Nantwich, Nantwich North and Nantwich East to the north-eastern beacon of the last named; thence northeastwards direct to the northernmost beacon of the former property Bumboosie; thence south-eastwards along a straight line towards the westernmost beacon (beacon Y, as shown on plan BT486, filed in the office of the Surveyor-General, Bulawayo) of the southern section of Wankie Coal Concession to its intersection by the northwestern boundary (L-K) of Wankie Coal Concession; thence south-westwards, southeastwards and north-eastwards along the north-western, south-western and southeastern boundaries of Wankie Coal Concession to the aforementioned line; thence south-eastwards along that line to beacon Y; thence south-eastwards along the southwestern boundary of Wankie Coal Concession to its intersection by the prolongation south-westwards of a straight line drawn from the intersection of the south-eastern boundary of Wankie Coal Concession by the southern boundary of Railway Strip 229 Lukosi to Trigonometrical Station 514/S (Karundu); thence north-eastwards along that prolongation and that line to the south-western boundary of that railway strip; thence generally eastwards along the southern boundaries of Railway Strips 229 Lukosi, 228 Pongoro, 227 Tshontanda, 226 Inyantue, 225 Nchokomela and 224 Mambanje, Railway Strip 196 of Railway Farm 43, Railway Strip 223 of Hope of Railway Farm 43 and Railway Strip 222 Dett to the north-western boundary of Dett Annex; thence along the northern, western and south-western boundaries of Stand 17 Dett Township, and the north-western, south-western and south-eastern boundaries of Dett Annex to the southern boundary of Railway Strip 233 Dett; thence southeastwards along the southern boundaries of Railway Strip 233 Dett, Railway Strip 234 Impofu, Railway Reserve at Malindi Station, Railway Strip 235 Malindi and Railway Strip 232 Isilwana to the north-western boundary of Kennedy Annex; thence along the north-western, south-western and south-eastern boundaries of Kennedy Annex to the north-western beacon of Railway Strip 231 Kennedy; thence southeastwards along the southern boundaries of Railway Strip 231 Kennedy, Railway Strip 230 Mukwa, Railway Strip 248 Intundhla North, Intundhla Siding Reserve, Railway Strip 249 Intundhla South and Railway Strip 250 Ingwe to the northern boundary of Tjolotjo Tribal Trust Land; thence generally south-westwards along the northern and western boundaries of Tjolotjo Tribal Trust Land to the Rhodesia- Botswana international boundary; thence generally north-westwards along that boundary to the starting-point.

Item 6: Kazuma Pan Area: 31 300 hectares

The area of land bounded by a line drawn from boundary-pillar 730 on the Rhodesia- Botswana international boundary, north-eastwards direct to a point at map reference 35KLK380861 on the 1: 50 000 map Stoffels Pan 1825A2, Edition 1; thence proceeding south-eastwards and eastwards along the south-western and southern boundaries of Panda-Masuie Forest Land to a point at map reference 35KLK603870 on the 1: 50 000 map Myila 1825Bl, Edition 1; thence south-eastwards along the western boundary of Riviera to the Kasetsheti River, at map reference 35KLK644788 on the 1: 50 000 map Kazuma Depression 1825B3/ A4, Edition 1; thence down that river to the northern boundary of

Kazuma Forest Land; thence generally southwestwards along the northern and north-western boundaries of Kazuma Forest Land to boundary-pillar 708 on the Rhodesia-Botswana international boundary; thence generally north-westwards along that boundary to the starting-point.
Map references quoted in this description are given to the nearest hundred metres.

1.6.2 Safari Areas

FOURTH SCHEDULE (Section 36)
Safari Areas on Parks and Wildlife Land

Item 15: Deka Area: 51 000 hectares

The area of land bounded by a line drawn from the intersection of the Victoria Falls-Dett game-fence and the Deka River, up that river to the northern boundary of the Wankie National Park; thence proceeding generally eastwards along its northern boundary to the Bulawayo-Victoria Falls railway line; thence eastwards along the railway line to the south-western beacon of Last Hope Estate of Railway Farm No. 43; thence north-eastwards along its western boundary to the Victoria Falls-Dett game-fence; thence generally north-westwards along that game-fence to the starting point.

Item 16: Matetsi Area: 295 500 hectares

The area of land bounded by a line drawn from the intersection of the Victoria Falls- Dett game-fence and the Deka River, north-westwards along that game-fence to a point on the Matetsi River at map reference 35KLK794758 on the 1: 50 000 map Matetsi 1825B4, Edition 1; thence proceeding down that river to a point at map reference LK839790 on that map and generally north-westwards along the Victoria Falls-Dett game-fence to its intersection by the southern boundary of Zambezi National Park; thence westwards and northwards along its southern and western boundaries to the Rhodesia-Zambia international boundary on the Zambezi River and up that river, along the Rhodesia-Zambia international boundary to the Rhodesia- Botswana international boundary; thence generally southwards along the Rhodesia- Botswana international boundary to a point where it is intersected by the prolongation westwards of the northern boundary of the former Deka; thence eastwards along that prolongation to its north-western beacon; thence eastwards along its northern boundary to its north-eastern beacon; thence generally eastwards along the northern boundary of Wankie National Park to the Deka River; thence down that river to the starting-point.
This description excludes—

(a) Matetsi Wild Life Leisure Resort;
(b) Kazuma Pan National Park;
(c) Panda-Masuie Forest Land; and
(d) Kazuma Forest Land.

1.6.3 Forest Estates

Item 16: Ngamo Area: 102 900 hectares

The area of land bounded by a line drawn from the southern beacon of Railway Farm 31, north-eastwards along the south-eastern boundary of that farm to its eastern beacon; thence proceeding direct to the southernmost beacon of Chamankanu; thence generally north-eastwards along its south-eastern boundaries to the westernmost beacon of Sotani; thence generally south-eastwards along the southern boundaries of Sotani, Volunteer Farms 82, 83, 95 and 96 to the north-western beacon of Volunteer Farm 97; thence south-westwards and eastwards along its western and southern boundaries to the Gwai River; thence generally southwards up that river to its confluence with the Insuza River; thence westwards direct to the easternmost beacon of Railway Strip 250 Ingwe; thence north-westwards along the north-eastern boundaries of Railway Strip 250 Ingwe, Ngamo Tanks, Railway Strip 250 Ingwe, Ingwe Siding East, Railway Strip 249 Intundhla South, Intundhla Siding Reserve and Railway Strip 248 Intundhla North to the starting-point.

Item 37: Sikumi Area: 54 400 hectares

The area of land bounded by a line drawn from the intersection of Bulawayo-Victoria Falls road by a game-fence at map reference 35KMK985507 on the 1:50 000 map Dett 1826D2, provisional print dated 1978, south-eastwards along that game-fence to a point at map reference 35KNK075436 on the 1:50 000 map Malindi 1827CI, Edition I; thence proceeding north-eastwards direct to beacon E9 (bn) of Lot 2 of Dett Valley (as shown on Diagram S.G. No. 105/64 filed in the office of the Surveyor-General, Bulawayo); thence along the boundaries of the following properties so as to exclude them: the north-western boundary of Lot 2 of Dett Valley, the western boundaries of Lot 1 of Dett Valley, the south-western boundary of Good Luck Ranch, the southern boundary of Carl Lisa, the western and southern boundaries of Sikumi Estate, the southern boundary of Lugo Ranch and the south-western boundary of Chamankanu to its southern beacon; thence south-westwards direct to the eastern beacon of Railway Farm 31; thence generally north-westwards along its north-eastern and north-western boundaries to the northern boundary of Railway Strip 230 Mukwa; thence north-westwards along the northern boundaries of that property and Railway Strip 231 Kennedy to the northern beacon of Annex Antoinette of Railway Farm 33; thence along its south-eastern and north-eastern boundaries, the north-eastern boundaries of Antoinette and Railway Farm 35 and the north-western boundary of Railway Farm 35 to the northern boundary of Railway Strip 232 Isilwana; thence along the northern boundaries of Railway Strip 232 Isilwana and Railway Strip 235 Malindi to the south-eastern boundary of Railway Farm 37; thence along that boundary and its north-eastern and north-western boundaries to the northern boundary of Railway Strip 235 Malindi; thence along that boundary and the eastern, northern and western boundaries of Railway Reserve at Malindi Station and the northern boundary of Railway Strip 234 Impofu to the southern beacon of Railway Farm 39; thence along its south-eastern and north-eastern boundaries to its northern beacon; thence northwards direct to the southern beacon of Wankie National Park Airport Reserve at map reference 35KMK991389 on the 1:50 000 map Dett 1826D2, Edition 1; thence north-eastwards along the southern boundary of that reserve to a point at map reference 35KNK047411 on the 1:50 000 map Malindi 1827C1, Edition 1; thence north-westwards along the eastern boundary of that reserve direct to a point at map reference NKO42424 on that map; thence south-westwards along a gamefence to the eastern beacon of Railway Farm 41; thence along the north-eastern and north-western boundaries of Railway Farm 41 to the northern boundary of Railway Strip 233 Dett; thence north-westwards along that boundary to the south-eastern boundary of Dett Township Reserve; thence along the south-eastern and north-eastern boundaries of Dett Township Reserve, the north-eastern boundaries of Dett African Township and Dett Township Reserve to the south-eastern boundary of Last Hope Estate; thence north-eastwards along that boundary and the south-eastern boundary of Nazareth Ranch to its intersection by a game-fence at map reference 35KMIC872447 on the 1:50 000 map Dett 1826D2, provisional print dated 1978; thence northeastwards along that game-fence to a point at map reference MK897499 on that map; thence eastwards along that game-fence to the starting-point.

1.6.4 Communal Lands

Part XLII

NYAMANDHLOVU DISTRICT Item 133: Tjolotjo Area: 738 200 hectares

The area of land bounded by a line drawn from the confluence of the Insuza and Gwai rivers generally southwards up the Gwai River to the north-western boundary of Sedgwick Syndicate Extension; thence proceeding along its north-western and south-western boundaries to the western beacon of Zizoomba; thence south-eastwards along the south-western boundaries of Zizoomba, Kalaka and Dhlula to the northern beacon of Burtons Grant; thence along its north-western and south-western boundaries to the northwestern boundary of Mananza; thence south-westwards along that boundary to its western beacon; thence south-westwards direct to the confluence of the Nata (or Manzamnyama) and Natane rivers; thence down the former river to the Zimbabwe-Botswana international boundary; thence northeastwards direct to the junction of the Gwavasabua and Chemuumi valleys and generally eastwards and northwards along the Chemuumi Valley to a point at map reference 35KNJ474888 on the 1 : 50 000 map Ngamo 1927A2, Edition 1; thence south-eastwards direct to the southernmost beacon of Railway Strip 250 Ingwe and along the south-eastern boundary of that railway strip to its easternmost beacon; thence eastwards direct to the starting-point.

Part LIV WANKIE DISTRICT

Item 169: Wankie Area: 397 500 hectares

The area of land bounded by a line drawn from a point on the Zambezi River at map reference 35KLL842115 on the 1:50,000 map Victoria Falls 1725D4, Edit on 2, generally eastwards down the Zambezi River (along the Zimbabwe-Zambia international boundary) to a point at map reference 35KML658022 on the 1:50 000 map Mapeta 1826B1, published 1963; thence proceeding southwards direct to a point at map reference MK654988 on that map; thence eastwards direct to a point at map reference MK700991 on that map; thence north-eastwards direct to a point at map reference 35KML748046 on the 1:50,000 map Boma 1826B2, published 1968; thence south-eastwards direct to a point at map reference ML786034 on that map; thence north-eastwards direct to a point at map reference ML820050 on that map; thence north-eastwards direct to a point on the Gwai River at map reference ML879065 on that map; thence generally southwards up the Gwai and Inyantue rivers to the confluence of the Inyantue and Ilambo rivers; thence south-eastwards direct to a right-angled bend on the Songwa dip road at map reference 35KMK928685 on the 1:50,000 map Kapata 1826B4, published 1959; thence south-eastwards along that road to its junction with the Dete-Kamativi road, at map reference MK954649 on that map; thence south- eastwards direct to the stream-confluence at map reference 35KNK085533 on the 1 : 50 000 map Malindi 1827C1, Ed tion 1; thence south-eastwards direct to a point on the Gwai River at map reference NK166503 on that map; thence generally southwards up that river to the northern boundary of Lot 2 of Dett Valley: thence westwards along that boundary to beacon E9 (bn) of Lot 2 of Dett Valley (as shown on Diagram S.G. 105/64, filed in the office of the Surveyor-General, Bulawayo); thence south-westwards direct to a point on the Bulawayo-Victoria Falls road at map_ reference 35KNK075436 on the 1:50,000 map Maljndi 1827C1, Edition 1; thence north-westwards along a game-fence to a point at map reference 35KMK985507 on the 1:50,000 map Dett 1826D2, provisional print dated 1978; thence westwards along that game-fence to a point on the Dete-Kamativi road at map reference MK897499 on that map; thence south-westwards along that game-fence to its intersection by the southeastern boundary of Nazareth Ranch, at map reference MK872447 on that map; thence north-eastwards and north-westwards along the south-eastern and north-eastern boundaries of Nazareth Ranch to its northernmost beacon; thence north-westwards through beacons 45C and 45B (as shown jn Survey Records 158/61, filed in the office of the Surveyor-General, Bulawayo) to beacon TUE of the surveyed southern boundary of the former Wankie Native Reserve Area A (as shown in Survey Records 158/61); thence generally north-westwards along that surveyed southern boundary to the south-eastern boundary of the Wankie Coal Concession (at beacon Bottom in Survey Records 158/61) and south-westwards along that boundary to the Bongora 1 River; thence westwards direct to trigonometrical station 509/S (Bwasungu) and direct towards beacon ECC of Kamandama Extension (as shown on plan DG803, filed in the office of the Surveyor-General, Bulawayo) to the Chibungo River; thence generally north-eastwards down the Chibungo and Lukozi rivers to a point on the Lukozi River at map reference 35KMK591672 on the 1:50,000 map Wankie East 1826B3, published 1959; thence north-westwards direct to a point at map reference MK587677 on that map; thence north-eastwards direct to a point at map reference MK602693 on that map; thence northwestwards direct to a point on the Bulawayo-Victoria Falls road at map reference MK598697 on that map; thence north-westwards' direct to the beacon Pump of the property Soonga (as shown on General Plan CG143, filed in the office of the Surveyor-General, Bulawayo); thence along the eastern boundary of Soonga, the eastern, northern and western boundaries of Soonga Extension and the north-western boundaries of Soonga to the north-eastern beacon of Wankies Farm Annex; thence generally north-westwards along the northern boundary of Wankies Farm Annex, the eastern, northern and north-western boundaries of Wankie Water Right 1 and the north-eastern boundaries of Manshiri to its northernmost beacon; thence direct to the north-eastern beacon of Deka Bridge Farm and along its north-eastern boundary to its northernmost beacon; thence direct to the north-eastern beacon of Railway Farm 51, north-westwards direct to the confluence of the Matetsi and Mbija rivers and south-westwards up the Matetsi River to its intersection by the northeastern boundary of Railway Farm 55; thence north-westwards along the north-eastern boundary of Railway Farm 55 to its northern beacon; thence northwards direct to the south-eastern beacon of Holfontein and northwards along its eastern boundary to the Mbija River and up that river to its commencement, at map reference 35KMK047933 on the 1:50,000 map Lukunguni 1826A1, published 1965; thence westwards to a point at map reference MK012933 on that map; thence southwards direct to a point at map reference MK008924 on that map; thence south-westwards to a point on a road at map reference LK972905 on that map; thence generally northwestwards along that road to a point at map reference 35KLK936920 on the 1:50,000 map Victoria Falls Airport 1825B2,

Edition 1; thence northeastwards to spot height 3351, at map reference 35KLK951963 on the 1:50,000 map Lukunguni 1826A1, published 1965; thence north-westwards to a point at man reference 35KLK908979 on the 1:50000 map Victoria Falls A rport 1825B2, Edition 1; thence south-westwards to a point on the Bulawayo-Victoria Falls road at map reference LK892937 on that map; thence north-westwards along that road to a point at map reference 35KLL765107 on the 1:50,000 map Victoria Falls 1725D4, Edition 2; thence eastwards to a point at map reference LL783105 on that map; thence eastwards to a point at map reference LL835103 on that map; thence northeastwards direct to the starting-point.

HWANGE NATIONAL PARK

CHAPTER 2: NATURAL RESOURCE BACKGROUND

CHAPTER 2: NATURAL RESOURCE BACKGROUND

2.1 INTRODUCTION

This chapter provides a summary of information pertaining to the natural resources in the Hwange National Park and surrounding areas. The purpose of this document is to be a background information source about the park. It does not attempt to be a scholarly work and is not presented as such. The information is sourced from existing documentation and, in some cases, could be copied verbatim (e.g. from the previous park plans). A list of references is provided as part of this documentation.

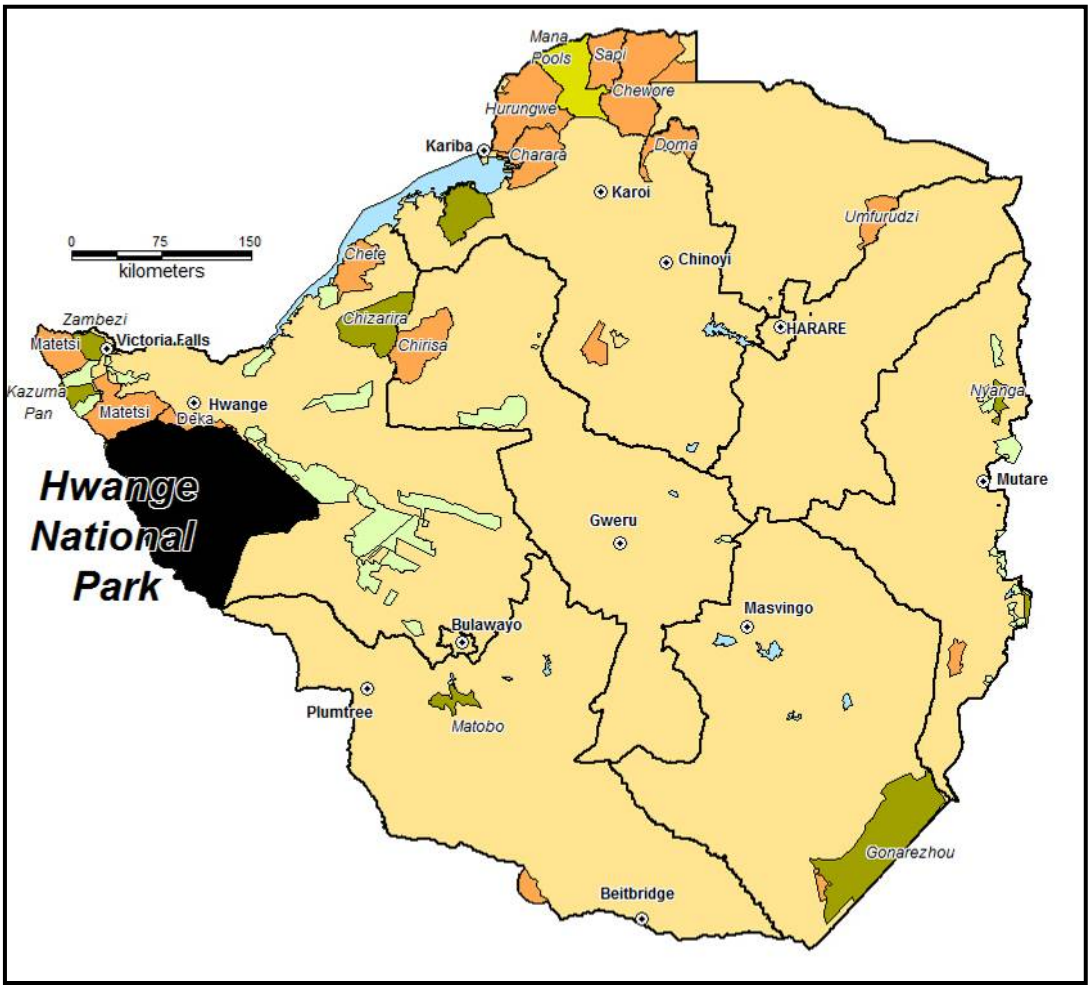
The 2003 plan, which was based on the earlier plan in 1987, provided a lot of information as did the annual reports from the various conservation related NGOs – CIRAD, WildCru, Painted Dog, etc. CIRAD projects have also produced a significant number of reports and scientific publications. These are also included in the reference list.

It should be remembered that this is a work in progress and not a definitive description of the park. It will be updated as new information comes to light. Data sources are many and varied and I thank all those who contributed.

2.2 LOCATION, BOUNDARIES AND AREA

Hwange National Parks is located in the north-west of the country in Matabeleland North Province. The nearest large town is Bulawayo (Figure 1).

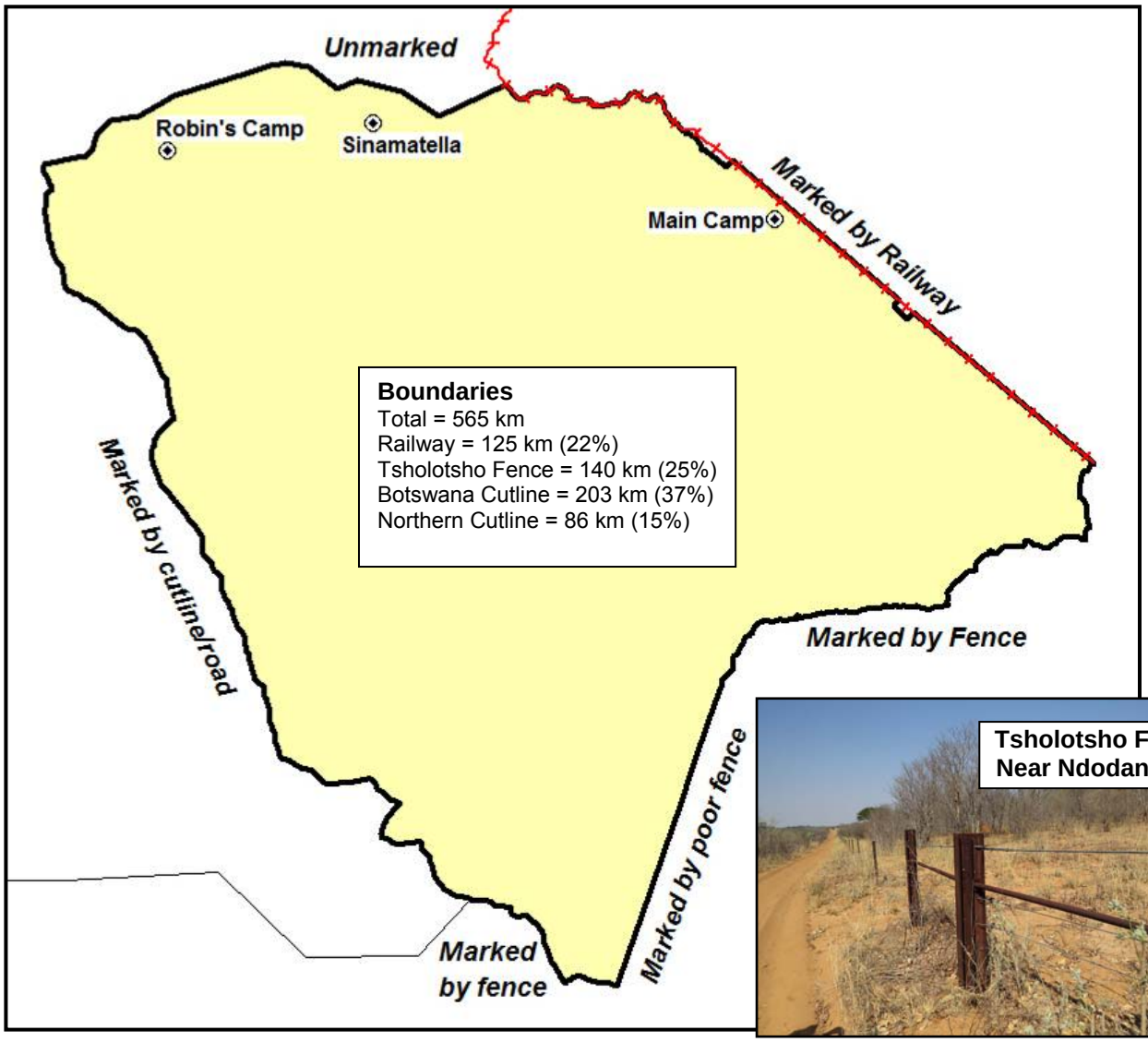
Figure 4: Location of Hwange National Park



2.2.1 Boundaries

The railway line to the Hwange coalfields and the Victoria Falls was built in 1903 and this forms a significant part of the boundary. Parts of the southern boundary with the Tsholotsho Communal Land are marked by a fence of variable quality. Close to Ngamo the fence is in reasonable condition but it deteriorates towards the south and west. Parts of the northern and western boundaries are marked with cutlines. The western boundary is also the international boundary between Zimbabwe and Botswana and consequently is maintained (by Botswana?; Figure 2).

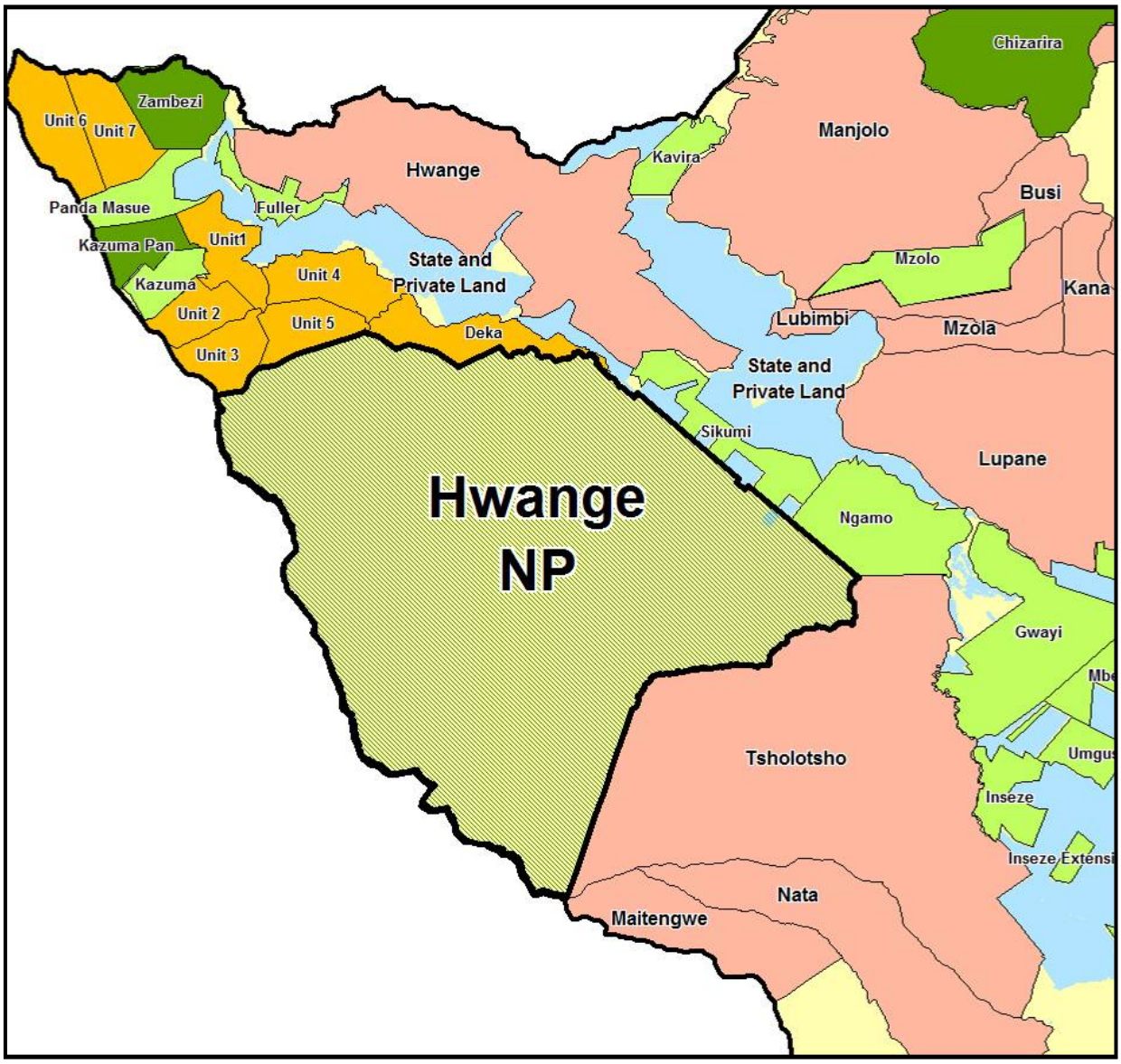
Figure 5: Boundary status of Hwange National Park



2.2.3 Regional Context

Hwange National Park is part of a network of protected areas, both in Zimbabwe and in the wider context. In Zimbabwe the park is fortunate in that its entire northern boundary id buffered by Parks and Wildlife Estate in the form of safari areas (Matetsi and Deka). Parts of eastern boundary are formed by Forestry Commission areas, state and private land. The entire southern boundary is formed by the Tsholotsho Communal land while the Hwange Communal Land is found to the north-east (Figure 3).

Figure 6: Hwange in its regional context in Zimbabwe



2.3 HISTORICAL BACKGROUND

2.3.1 Establishment History

Part of what is now Hwange National Park was first proclaimed a Game Reserve in terms of the Game and Fish Preservation Act under Proclamation No. 8 of 1930. A number of farms including Deka, Mahohoma, Sunnyside, and Sinamatella (Figure 7) were incorporated between 1947 and 1949 when Hwange was proclaimed a National Park under the National Parks Act No. 53 of 1949.. Prestwich and Nantwich were incorporated under Proclamation No. 42 of 1952 and further land was incorporated and proclaimed in Proclamation No. 31 of 1956 published in Government Notice 265 of 1956.

It was designated a Federal National Park under the Federal National Parks (Southern Rhodesia) designation order 1956, in terms of the Southern Rhodesia National Parks Amendment Act of 1957. In 1960, an area of land north of the Deka river between Nantwich and Bumbuzi and a second area between Bumbuzi and Sinamatella were incorporated in exchange for Kazuma Pan National Park which was de-proclaimed. The park then reverted to Rhodesia in terms of the National Parks Act No. 79 of 1964.

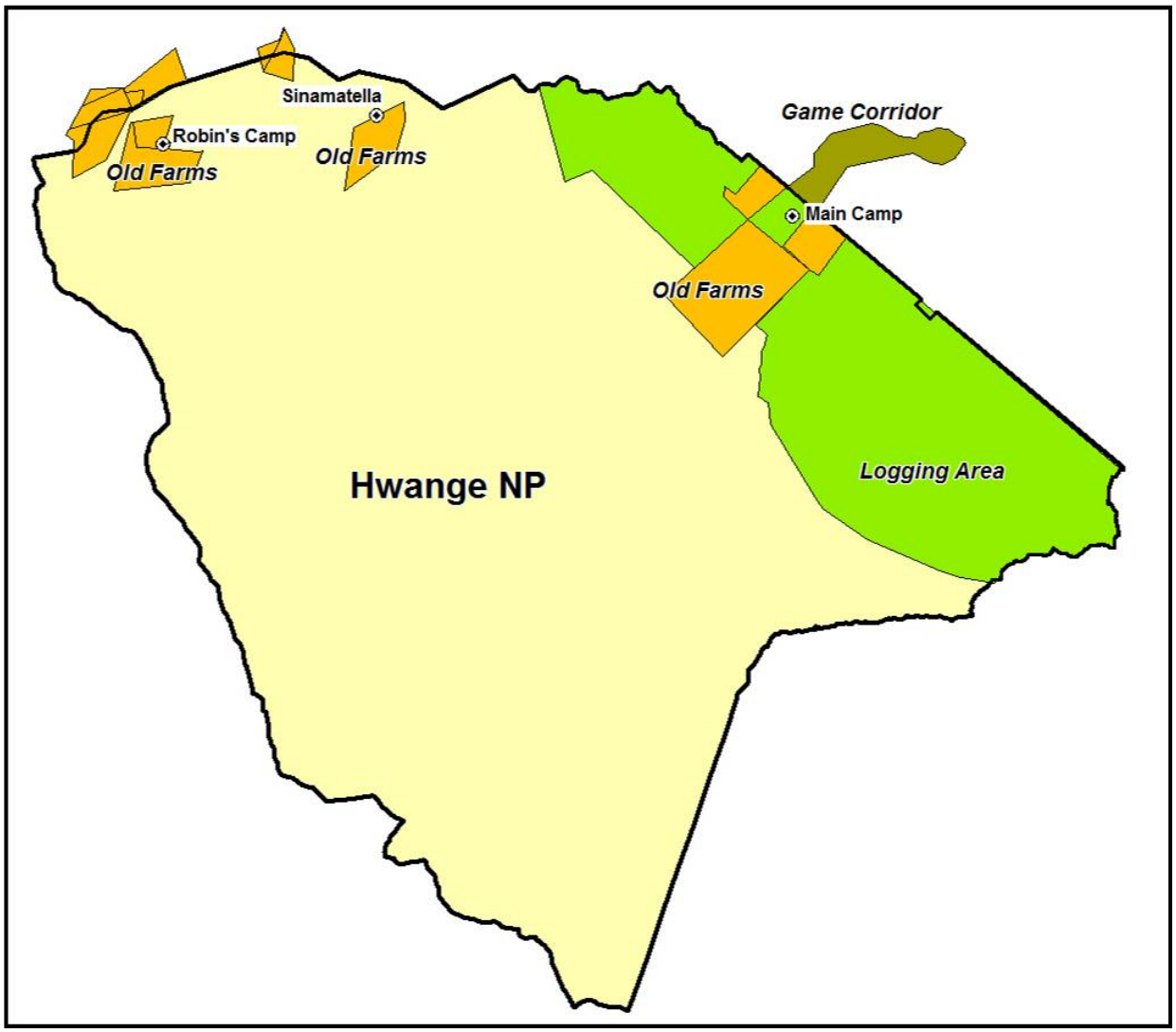
The Robins Game Reserve was bequeathed by H. G. Robins in 1939 and although it was managed as part of Hwange it retained its status as an individual reserve until 1975 and the boundary markers can still be seen on the main road..

In 1953 an attempt was made to have the southern part of the park (defined by a line drawn from the junction of the Sikumi and Linkwasha to Tamafupa) de-proclaimed and added to the Gwaai Special Native Area (now Tsholotsho Communal Land). In 1959 the western boundary was remarked with concrete beacons by a Boundary Commission which in the opinion of the warden did not take into account historical evidence for the original boundary position and led to the loss of Dzivanini Pan to Botswana. Appeals were overruled by the Commission. The first game fence erected between the park and Tsholotsho was incorrectly sited inside the park from the Gwabazabuya to Nata. This was rectified in 1971 when a new fence was constructed.

Between 1950 and 1956 unsuccessful attempts were made to acquire State Land between Dahlia and Sikumi Estate to form a corridor for game movement from the park to the Gwaai river. Prior to the settlement of the Gwaai valley, the Gwaai river formed the northern ecological boundary for the park, this area being the normal dry season range for water dependant species of large herbivores.

The current description of Hwange National Park is contained within Schedule X of the Parks and Wildlife Act (1974) but the park actually achieved national park status in 1959.

Figure 7: Historical land parcels within the Hwange National Park



2.3.2 Human Use Prior to Proclamation

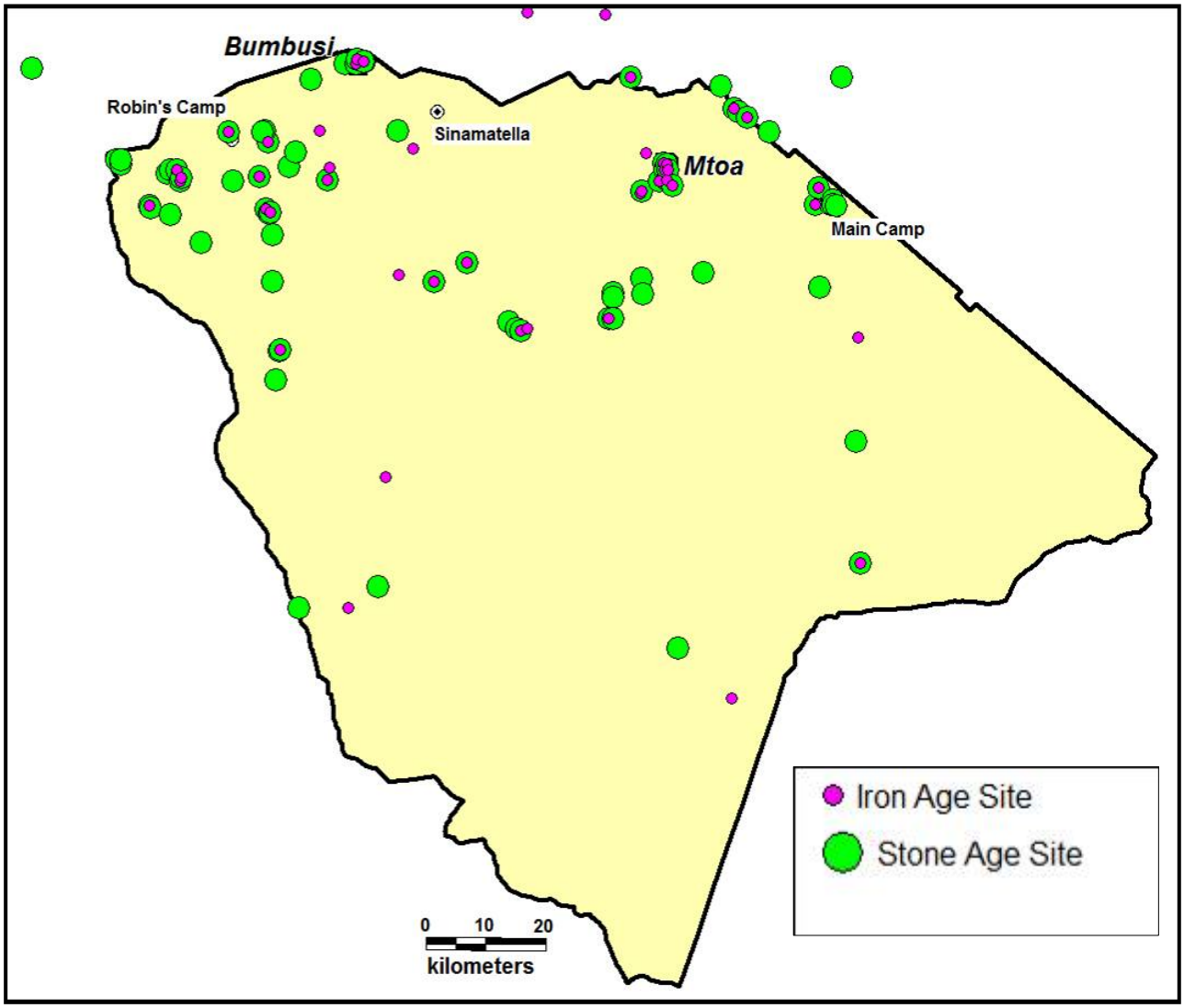
2.3.2.1 Prehistory

People have been living in the Hwange area for many thousands of years. The oldest evidence are Early Stone Age artefacts including some quarry debris and stone tools discovered at the bottom of Giraffe Pan and on the road between Manga and Ngweshla. There is also abundant evidence of Early to Late Stone Age hand axes, flakes and cores in the gravel used to pave other roads in the park. The Early Stone Age period could be roughly classified as the time lying between 2.5 million years ago and as recent as 200 thousand years ago.

From the Middle Stone Age (200 thousand years ago to 30 thousand years ago) there are lots of evidence, both from the Main Camp area and elsewhere, of stone tools, stone cores and flakes. Sites from the Late Stone Age/Early Iron Age (45 thousand years ago to nineteenth century AD) are even more plentiful and spread over a large area in northern Hwange.

Through Middle and Late Iron Age there is considerable evidence of rapidly increased human activity over most of the park and surrounding areas.

Figure 8: Stone age and iron age sites within the Hwange National Park



2.3.2.2 History

(From the 1998-2003 Management Plan)

A comprehensive historical description of the Hwange general area is provided in Annex 7.
Chief Dende, and his followers, a matrilineal people of the Soko (monkey) totem who were later known as Nambya, entered the territory at the early 18lh century via Lower Gwayi, settling in the Bhale area between the Gwayi, Nyantuwe and Lukosi rivers. Here they assimilated some of the Leya people who lived there before.

On top of a strategic hill named Shangano (deriving from the Nambya word shangana meaning "meet") they built a stone-walled enclosure which became the first capital of their state.

The Nambya are believed to have moved from Shangano to the Bumbuzi area in the upper Deka valley during the reign of the fifth Wange, Shana (1834-60). In large measure the move appears to have been dictated by the greater suitability of the wetter soil at Bumbuzi for bulrush millet, sorghum and maize which were Nambya staples.

The new capital was built on a rocky promontory beneath two large baobab trees which still stand. The stone-walled enclosure was about 55 metres long and two metres high and the royal dwellings were located within this complex.

A well organised economic and social structure existed among the Nambya well before the Ndebele raids of the 1850's, the south-wards advance of the tsetse fly which made cattle keeping impossible in the area, the introduction of firearms, the importation of European goods, and the intensive hunting from 1860.

These activities disrupted the Nambya economic and social structure.

Most of the present Park area was unknown until 1928 although it was occupied by hunter gatherers and the southern regions, which border Tsholotsho, were used as a dry season grazing areas by pastoralists. Selous and Tom Saddler were among the first Europeans to explore the area in the late 19th century. Selous hunted in the Linkwasha and Dopi areas and in the hills to the north in 1873 and Tom Saddler hunted in the Robins area in 1875.

Apart from hunting, early land use included a wheat farm at Bembezi Pan which was a front for a trading post dealing in ivory and other illegally obtained wildlife products.

The most outstanding archaeological sites of the Park are the Bumboosi ruins and rock engravings, the fossil forest at Deteema, and the Mtoa ruins.

Although not strictly an archaeological or historical site mention must be made of the fossilised trees that can be found in the Deteema area.

Figure 9: Historical sites within the Hwange National Park

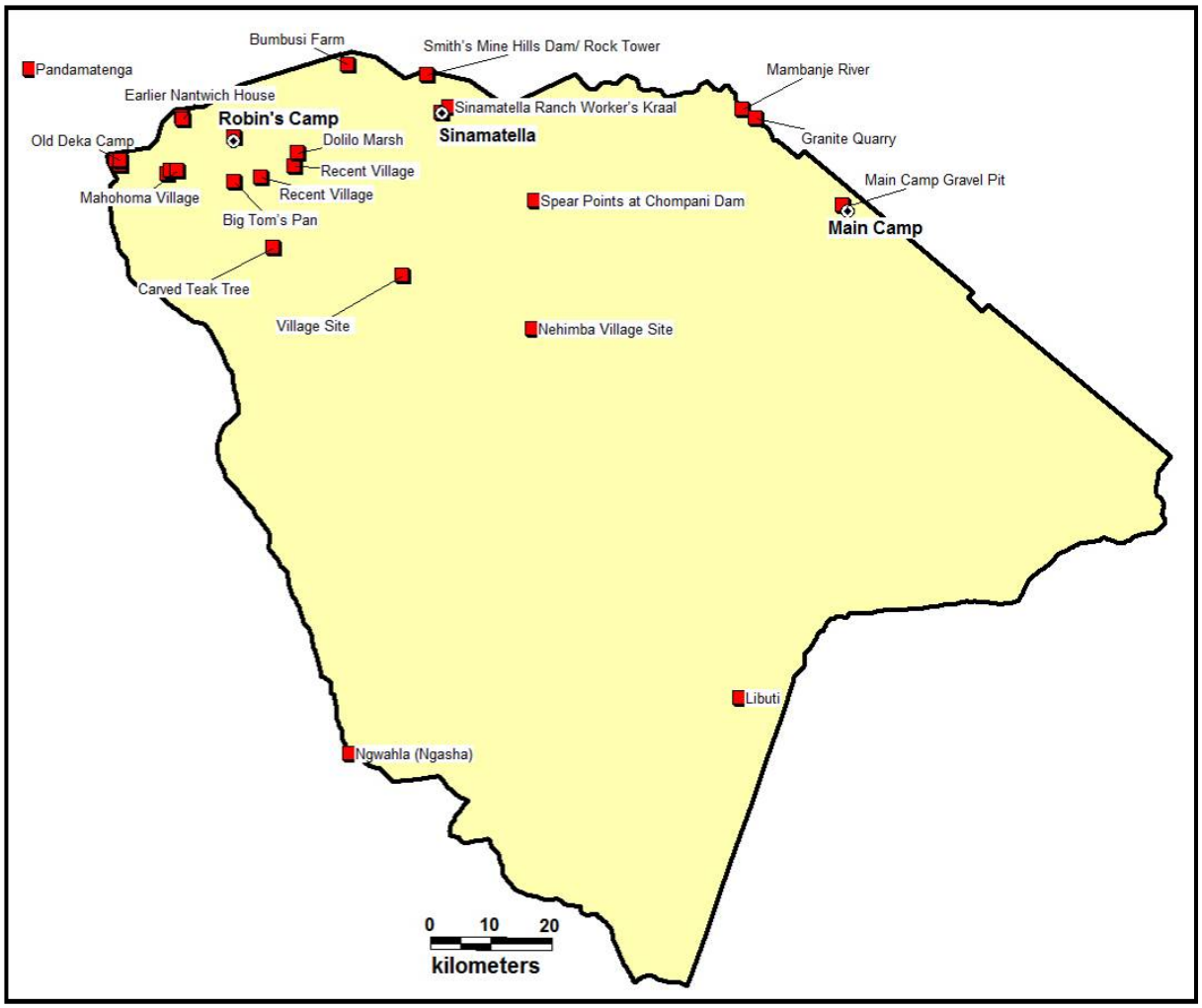
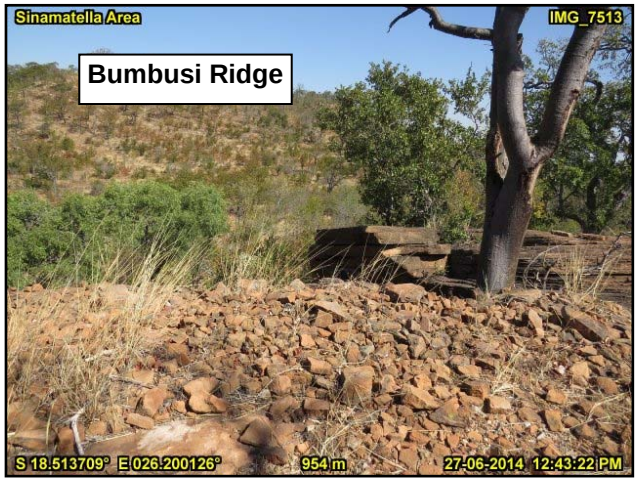
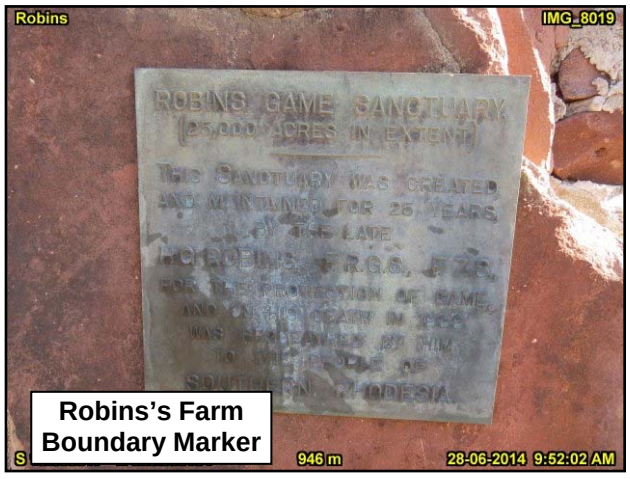
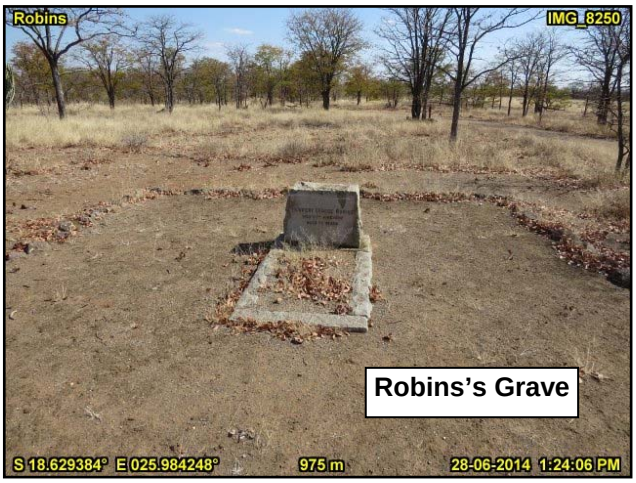
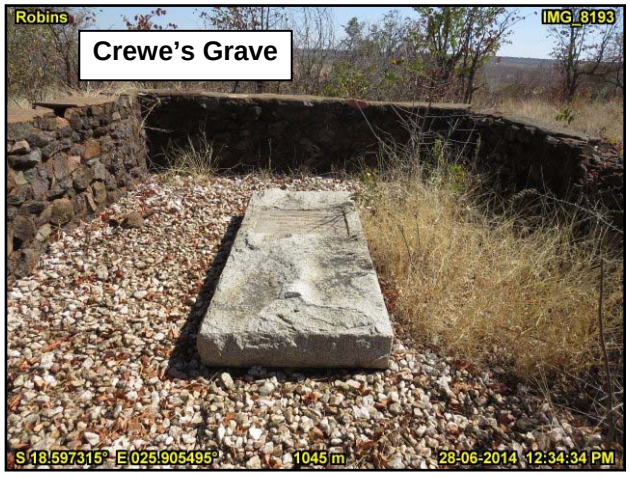


Figure 10: Some pre-historical and historical sites in Hwange



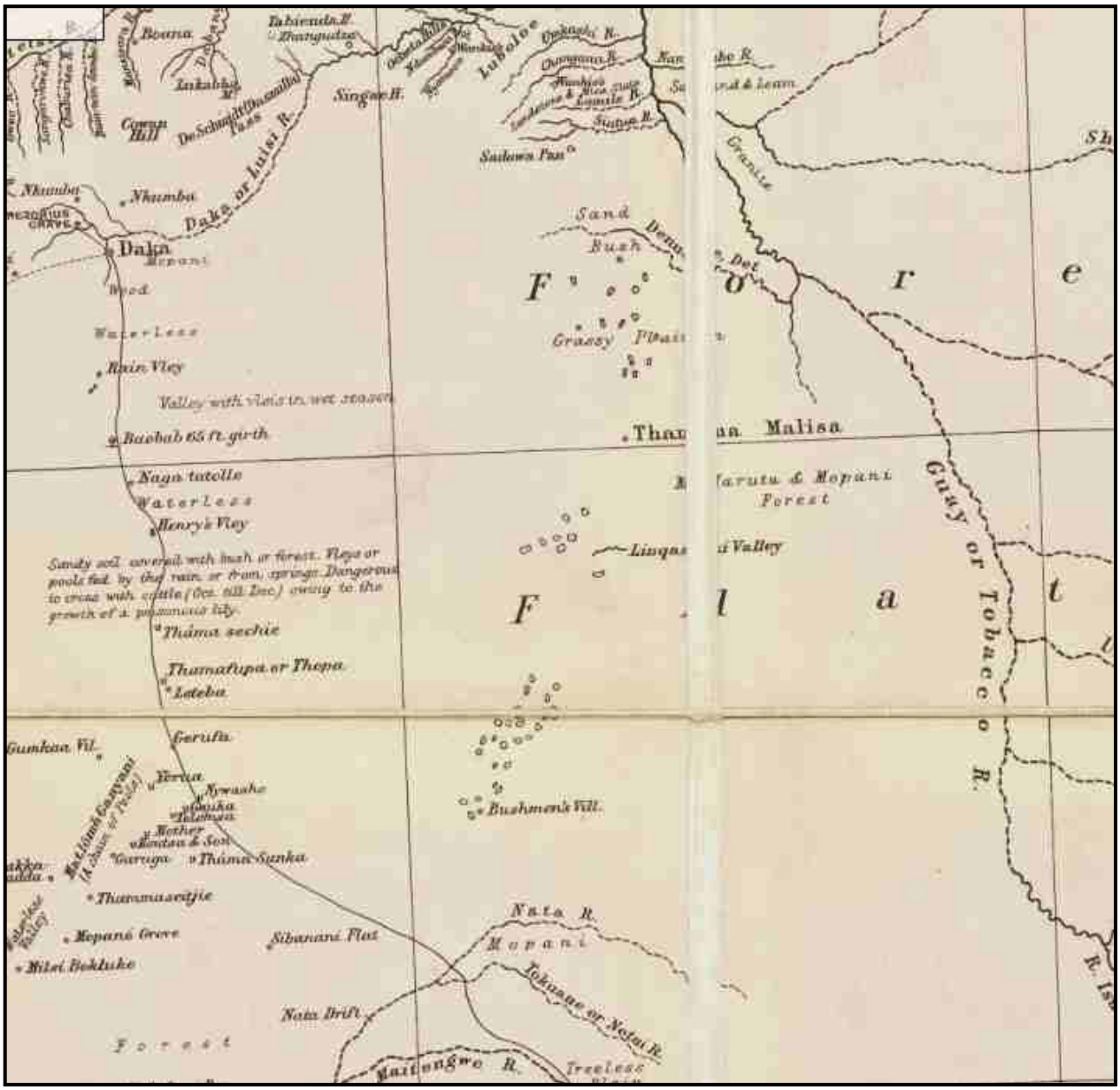






Bumboosie

Figure 11: Map of Hwange area -1893
(Edward Stanford – 1893)



2.4 PHYSICAL FEATURES, DRAINAGE, GEOLOGY AND SOILS

2.4.1 Physical Features

The park varies in altitude between 1,153 m. asl and 835 m. asl. The highest point is Bumbusi Hill overlooking the Deka drainage. However the land approximately 10km directly west of Dete town comes a close second at 1,140 m. asl. The lowest point is the where the Deka river exits from the park.

In the northern areas there are a number of significant escarpments and hills some of which rise over 100 m above the surrounding valleys and plains.

Figure 12: Relief of the Hwange National Park

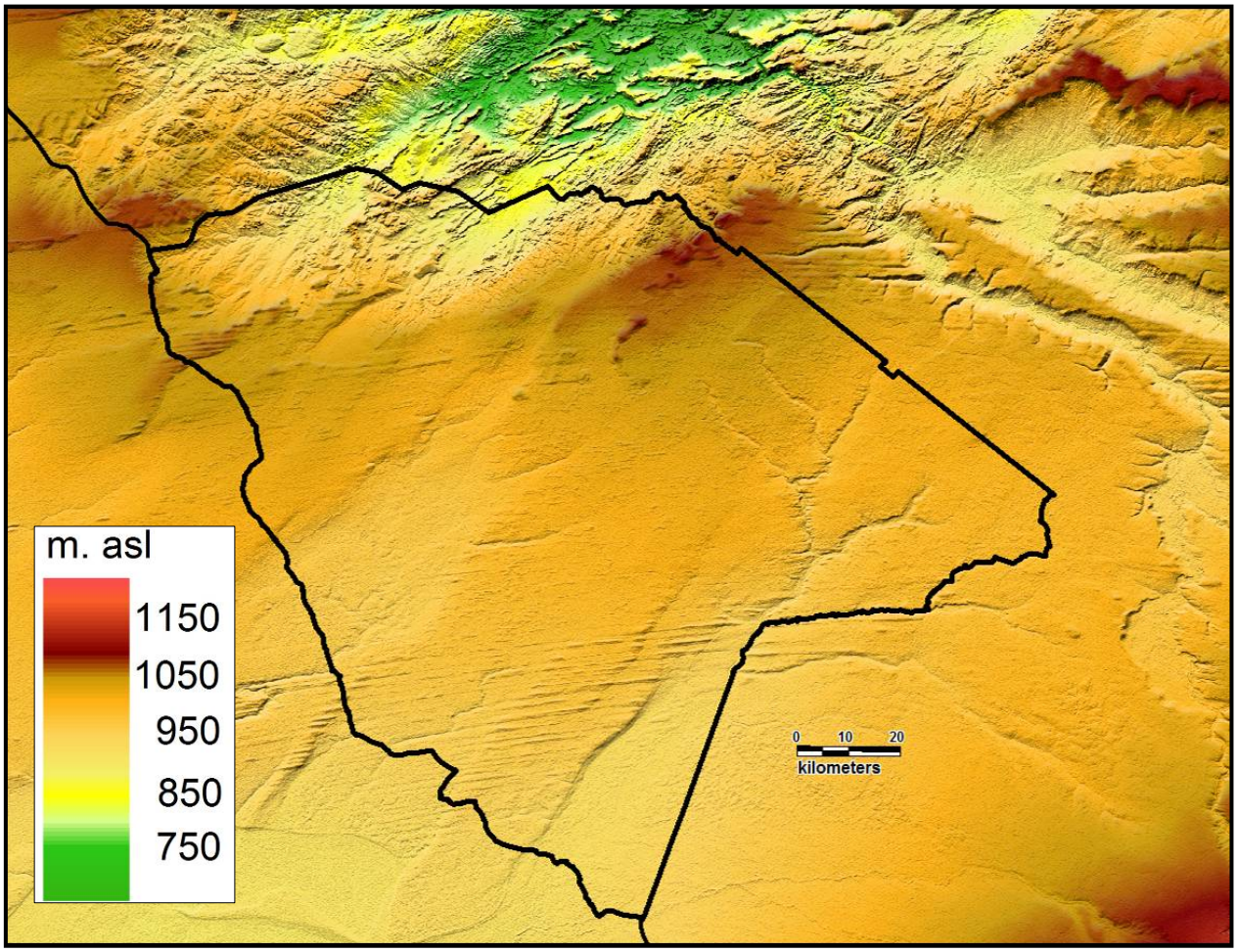
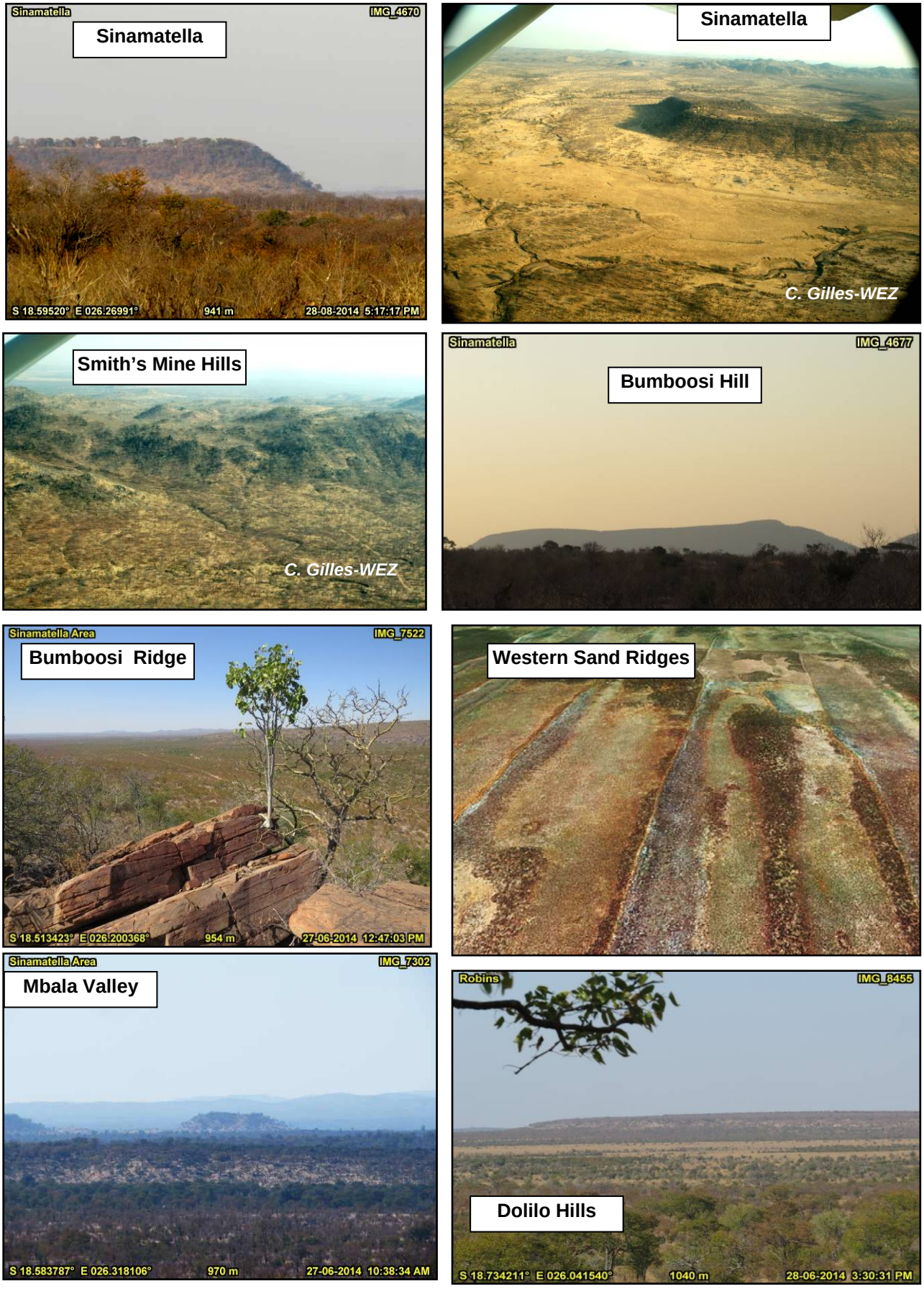


Figure 13: Relief features of the Hwange National Park

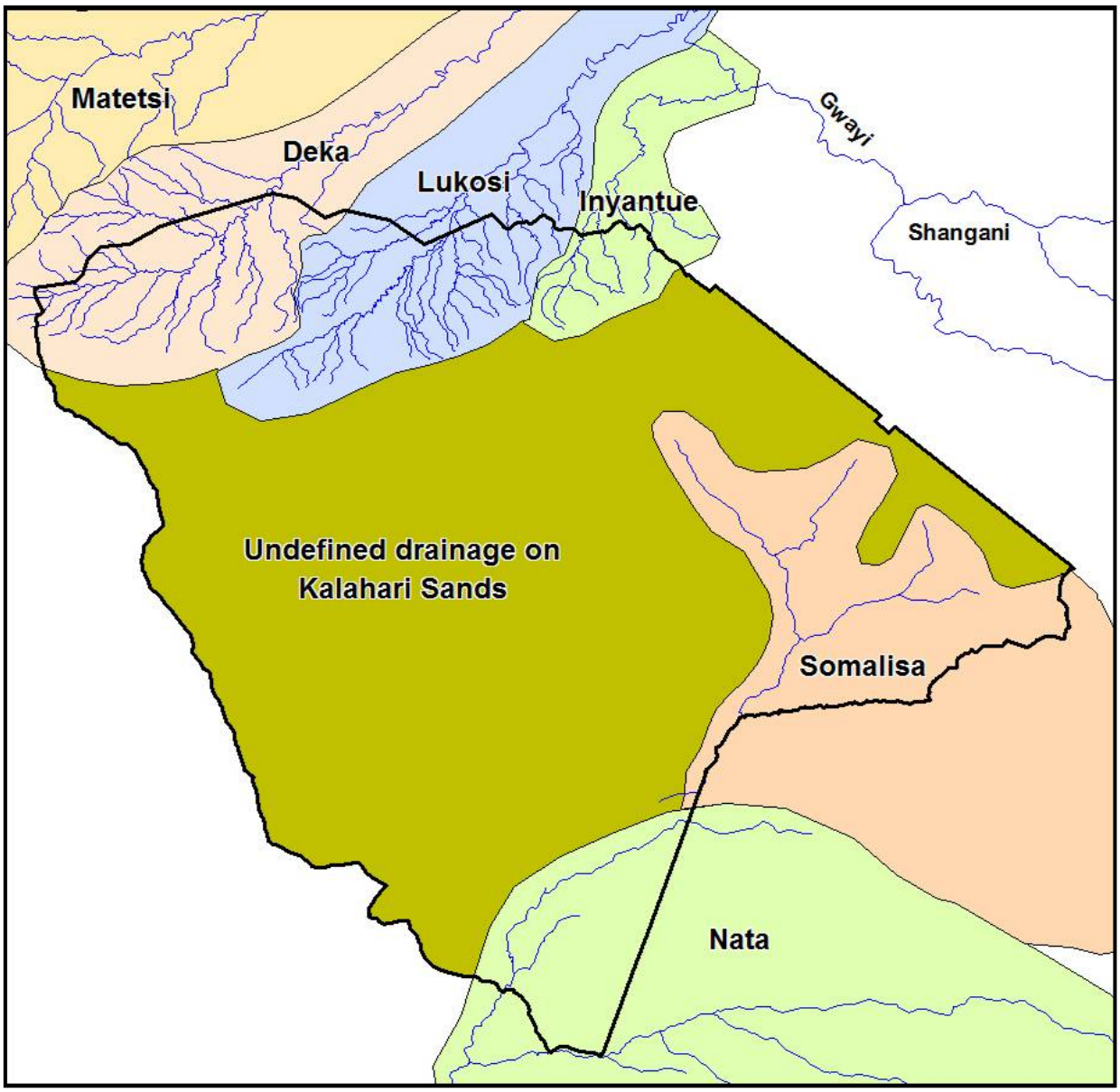


2.4.2 Drainage – Rivers and Natural Pans

2.4.2.1 Rivers

The watershed between the Zambezi and Nata river systems runs through the northern part of Hwange. The Nata is an inland drainage system ending up in the Magadigadi Pan in Botswana. With respect to the Zambezi system there are three main drainage systems, all of which have their sources in the park – the Deka, Lukosi and Inyantue (Figure 12). The Lukosi and Inyantue drain into the Gwaai river while the Deka drains directly into the Zambezi. Much of the central park has a poorly defined drainage system on the Kalahari sands.

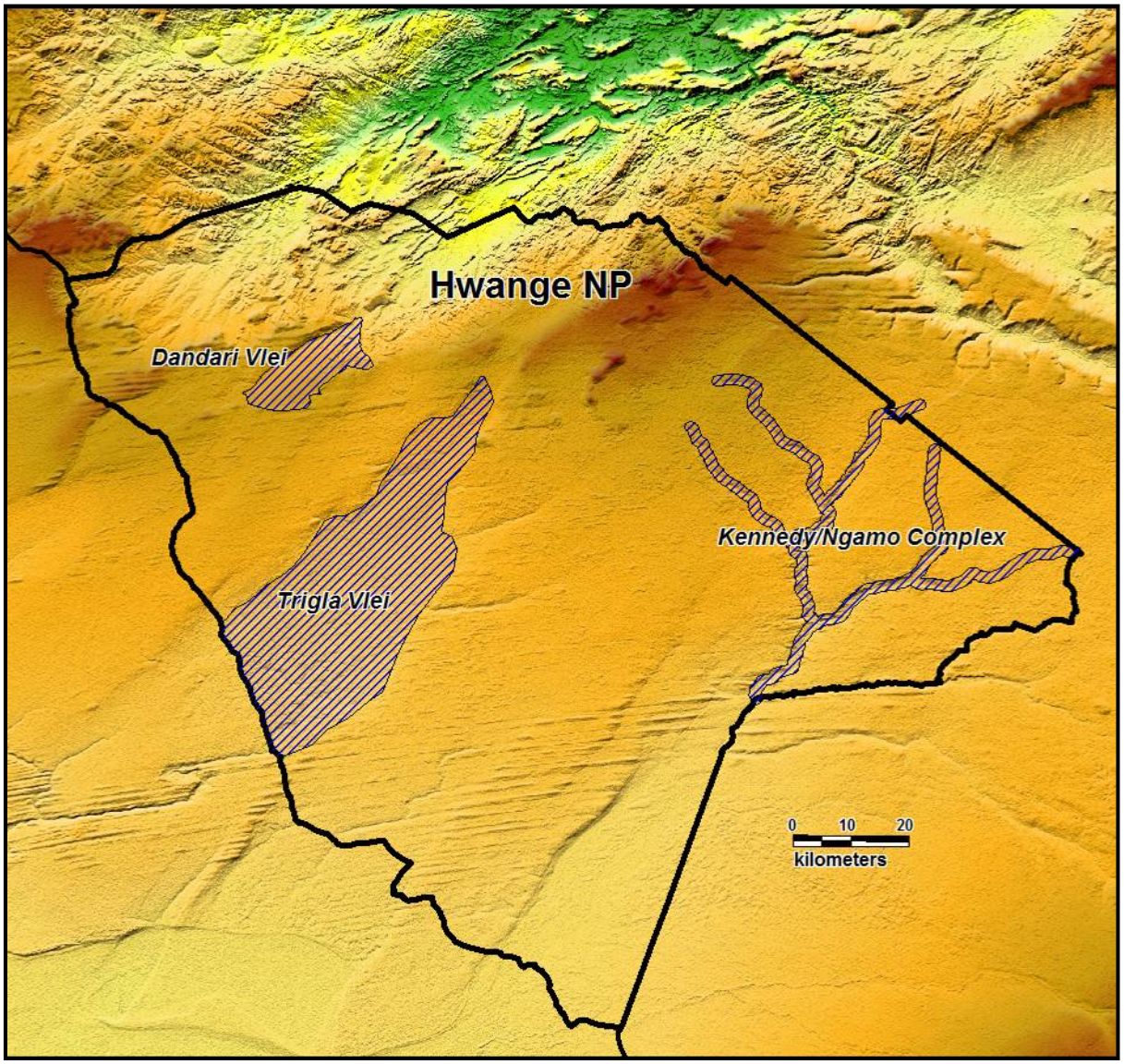
Figure 14: Surface drainage of the Hwange National Park

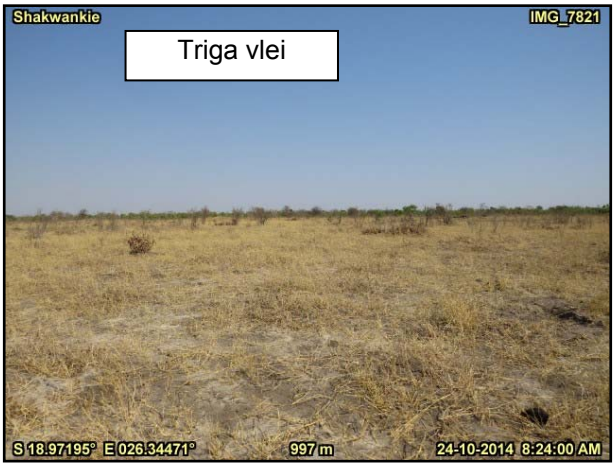


The larger rivers contain pools of water, many of which dry up after the rains. However, the Deka river does contain some perennial pools and these are vital for both terrestrial and aquatic life.

The park has some extensive fossil drainage areas which are remnants of wetter periods in the past. The most important of these are the Triga and Dandari vleis in the north and west and the Kennedy and Musommalsia vlei drainage lines in the south.

Figure 15: Fossil drainage lines in Hwange National Park





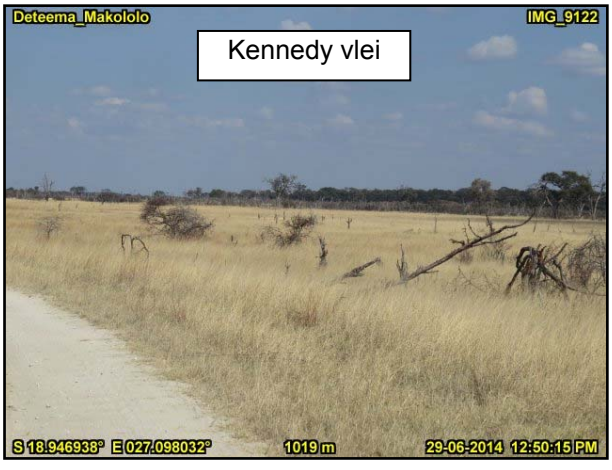
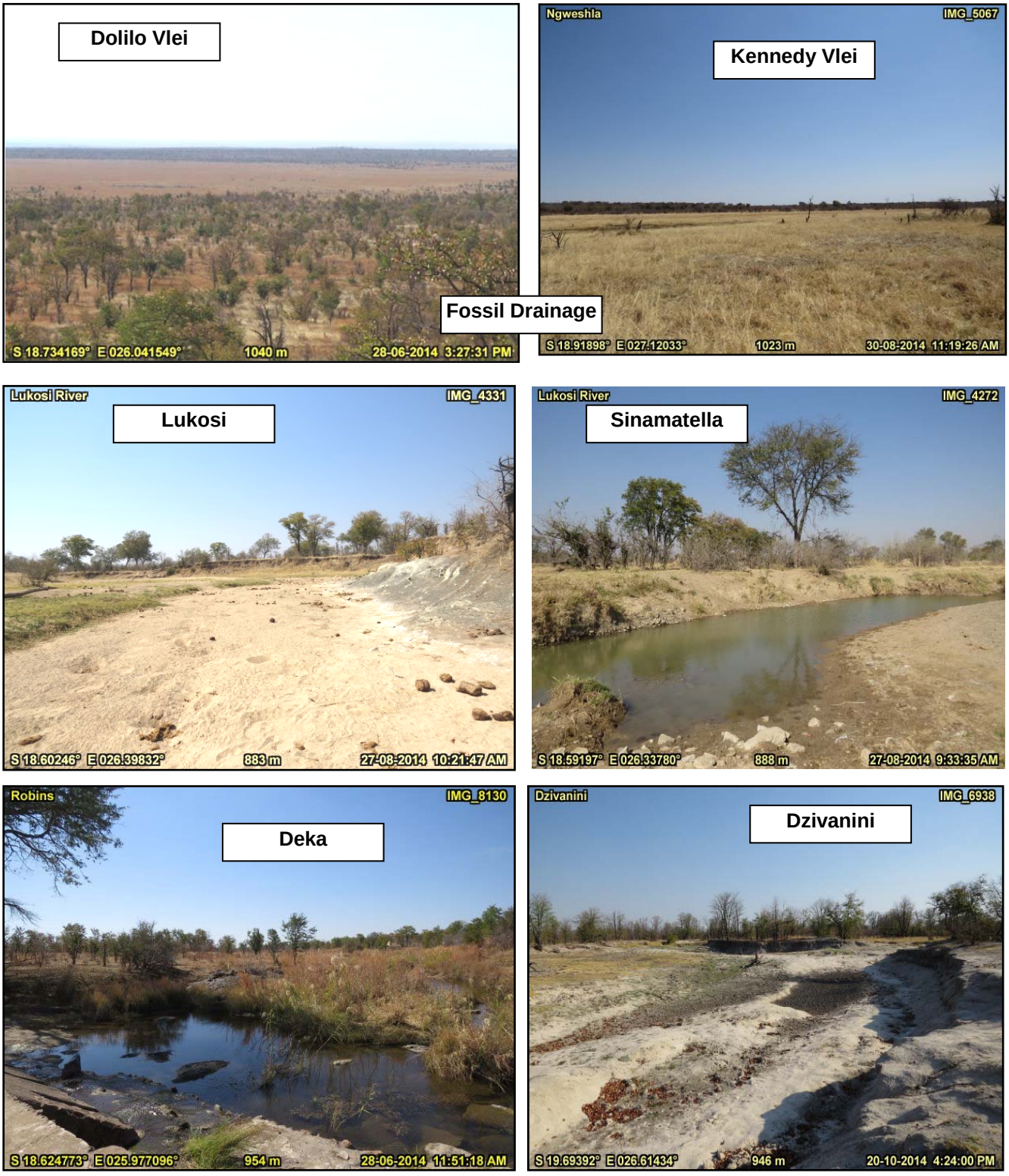


Figure 16: Drainage features of Hwange National Park



2.4.2.2 Pans

A vast number of pans are found throughout the park. All of these are seasonal and will dry up prior to the rains. However, in order to maintain the game populations a significant number of these pans are artificially supplemented. The figure below shows the location of many of the main pans found within the park. It should be remembered that there are probably thousands more small pans throughout the area.

Figure 17: Natural pans in Hwange National Park

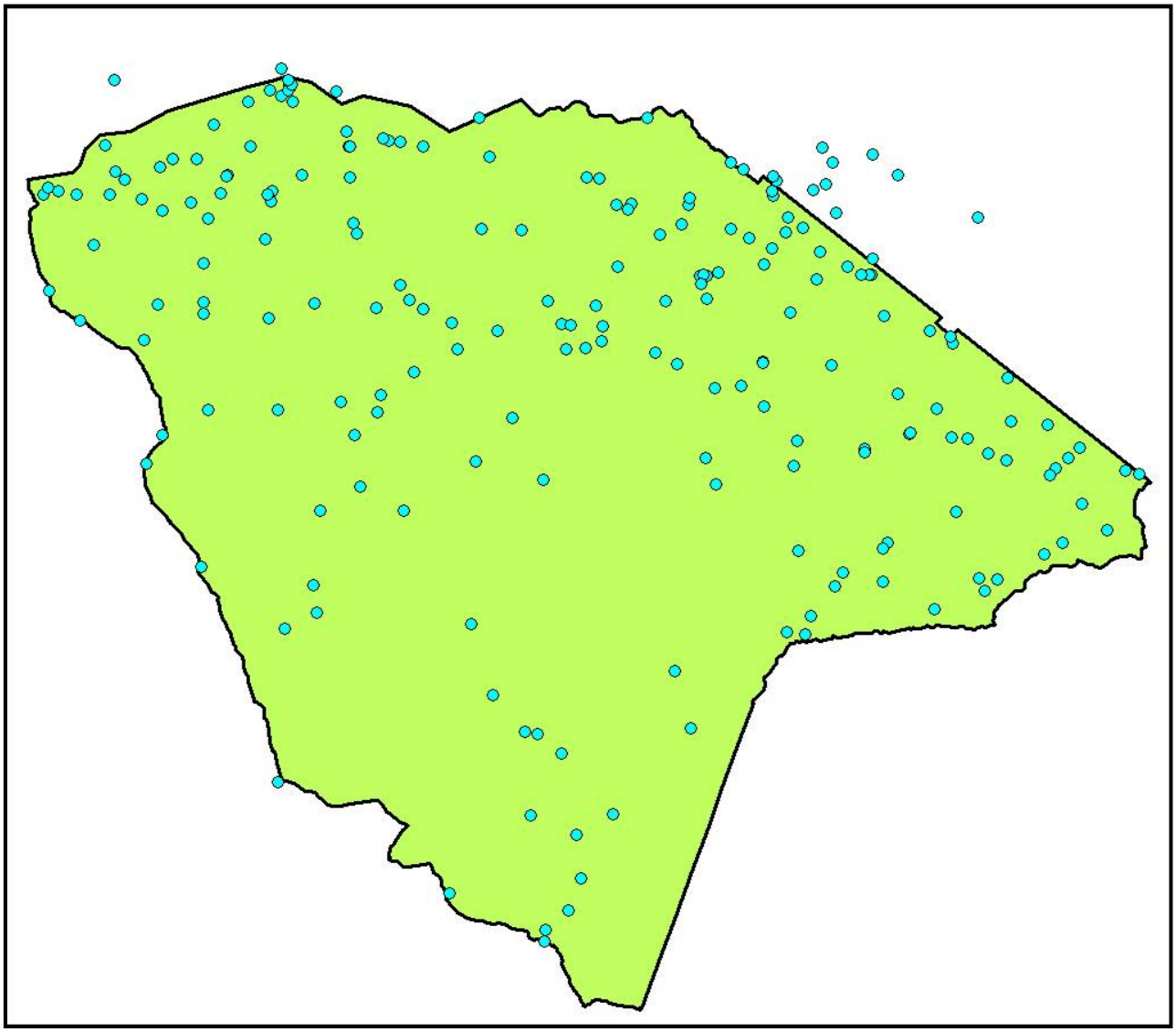
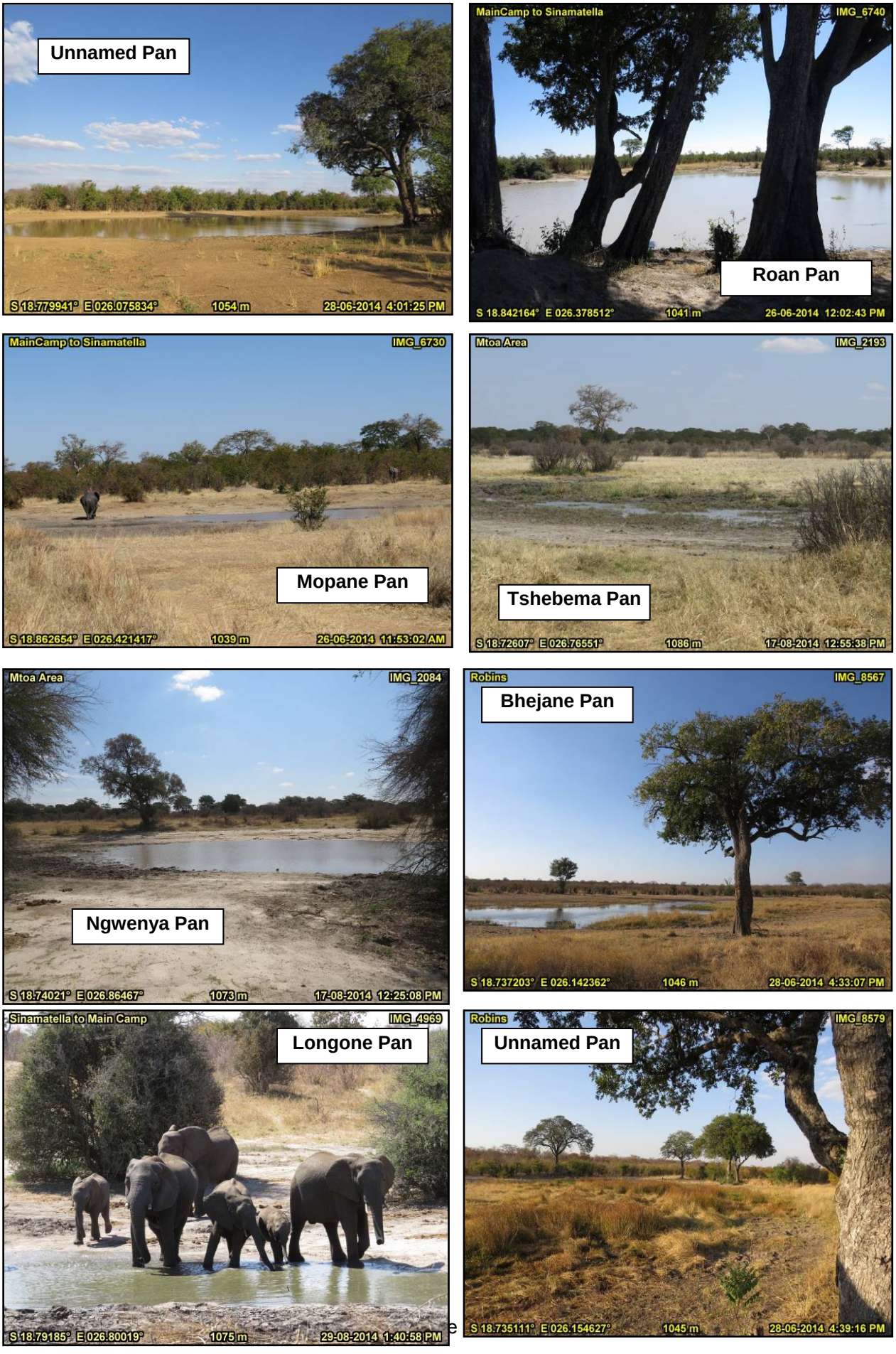


Figure 18: Natural Pans in Hwange National Park



2.4.2.4 Seeps and Springs

Seeps and springs – where water comes to the surface are an important part of Hwange's ecology. Springs emit higher volumes of water than seeps. In Hwange seeps are often exposed by elephants digging for the water.

Natural seeps are found at Nehimba, Shakwanki, Lememba and Shabi Shabi. Previously seeps were found at Tamafupa, Ngwasha and Tamasanka but these are no longer flowing. There may be a possibility that, now there is permanent water at Nehimba Camp and Danga Pan through a photographic camp, the elephants may not use the Nehimba seeps as much and they will no longer be opened up. This points to the possible unintended consequences of opening up new permanent water sources.

Natural springs are found at Dolilo, Salt Springs and Tshabika. . In addition, there are hot springs at Chatawo (Deka Safari Area).

Figure 19: Seeps and springs in Hwange

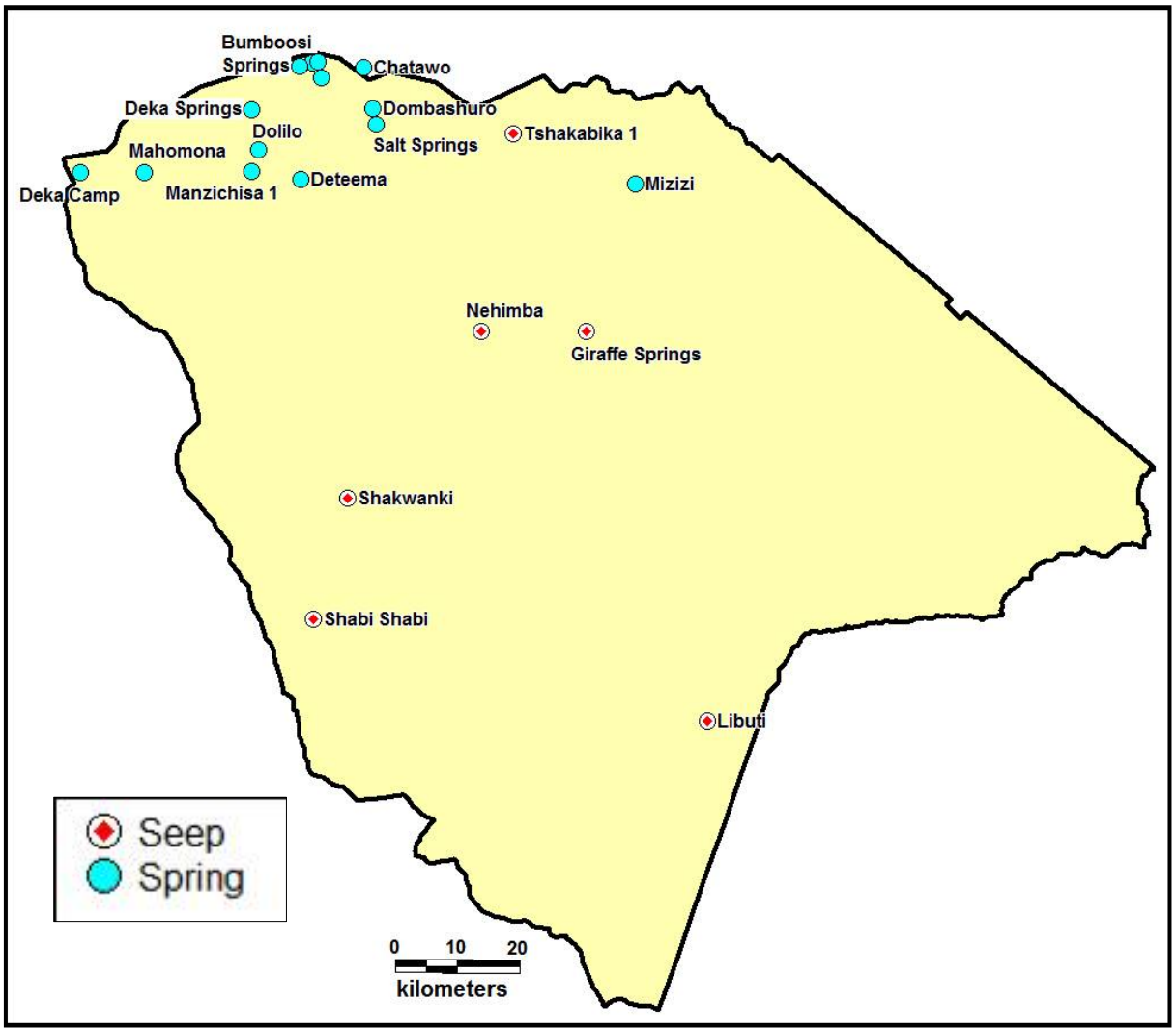
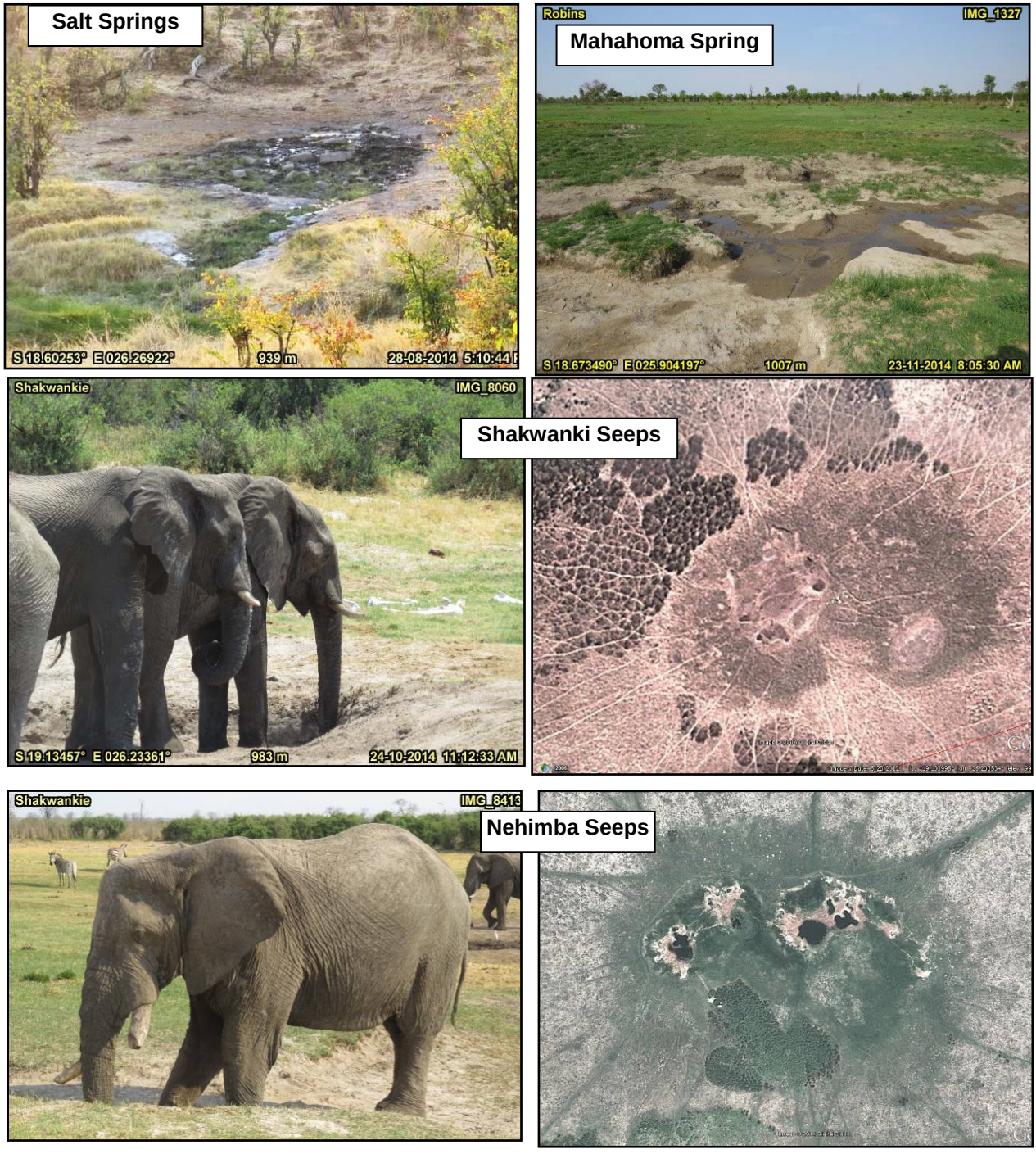


Figure 20: Springs and seeps



2.4.3 Supplemented Water

2.4.3.1 Pans

The first borehole in the park was sunk at Ngweshla Pan in 1935, followed closely by others at Dom, Nyamandlovu, Shumba and Big and Little Toms. Drilling has continued over the decades and an estimated 100 boreholes have been sunk to service 70-80 pans. Several of these are now disused for a number of reasons which include salinity, difficulty of access and maintenance.

The numbers of pans pumped has often fluctuated in response to money, diesel availability and general state of the country. However, in 2014 nearly 60 pans will be pumped. Most of these still have diesel engines but several solar systems have also been established.

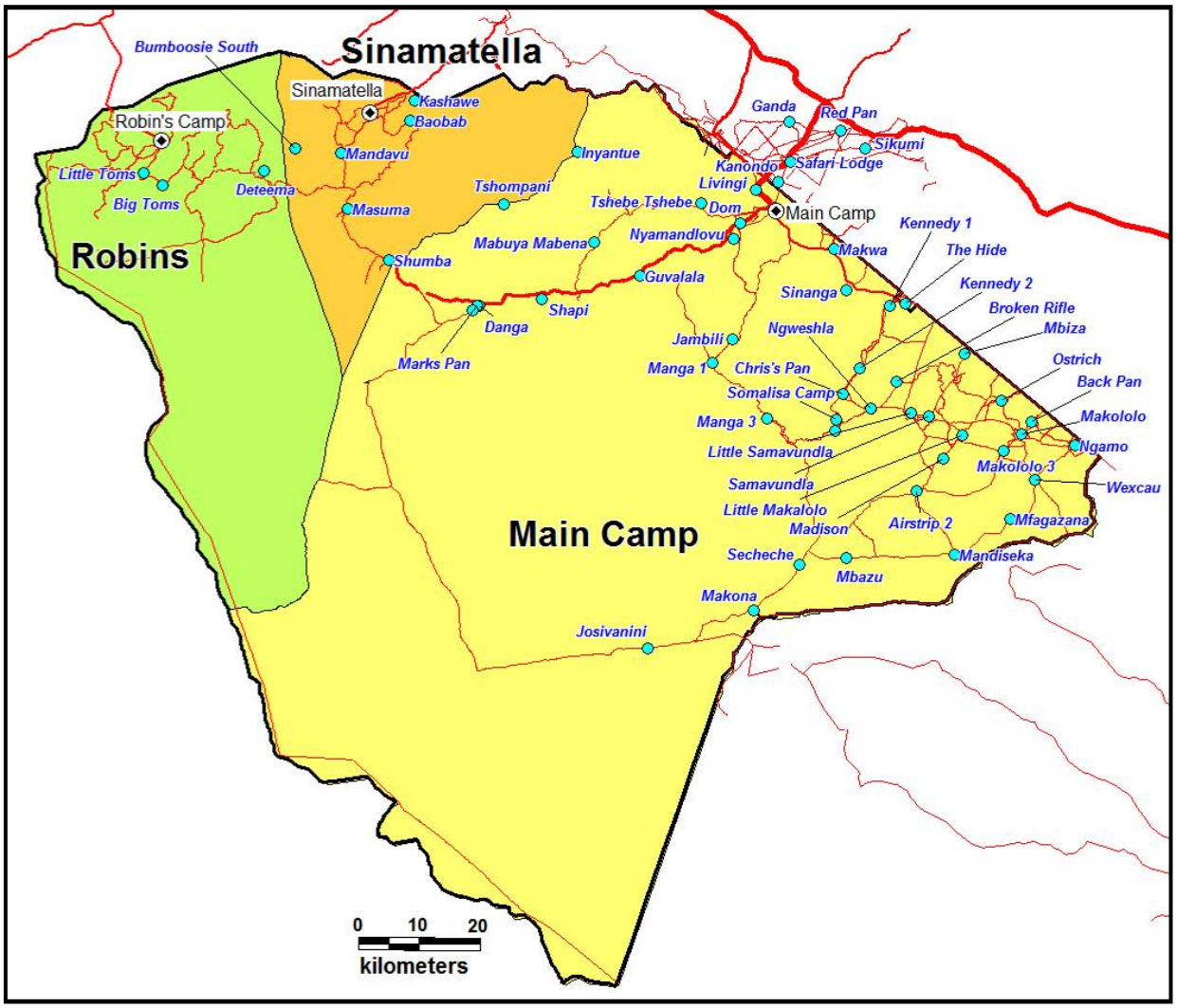
Initially the maintenance of the pumps and water supply systems was the responsibility of the then Ministry of Water Development. However, in 1982, the responsibility for the water systems was ceded to the ZPWMA.

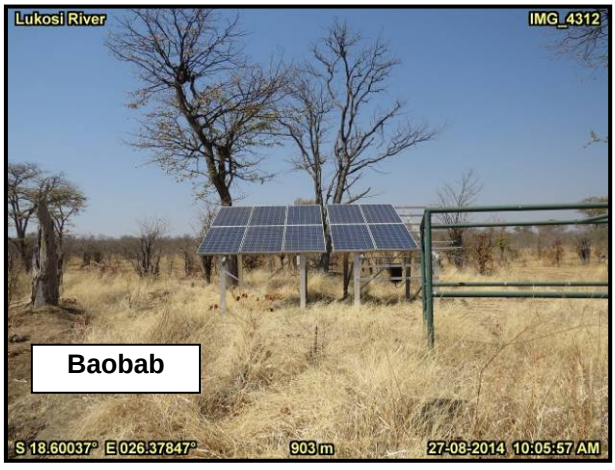
Table 8: Pumped Pans - 2015

Pan	Responsibility	Comments
Baobab	Bhejane	Solar
Bumbumutsa	Bhejane	diesel
Bumbusi South	Bhejane	Solar
Inyantue vlei	Bhejane	solar
Mbala gate	Bhejane	solar
Mashambo	Bhejane	ZESA
Inyantue dam	Bhejane	solar
Masuma	Bhejane	Diesel (Assistance from Makomo)
Tshompani pan	Bhejane	solar
Shumba	Bhejane / FOH	Bhejane Trust solar + Friends of Hwange Windmill
Camp Hwange	Camp Hwange	
Big Shumba	Camp Hwange	
Guvalala	WEZ / Friends of H	Solar + diesel
Kennedy 1	Friends of Hwange	Solar
Kennedy 2	Friends of Hwange	Solar + diesel
Makwa	Friends of Hwange	Solar
Sinanga	Friends of Hwange	Solar
Shapi	Friends of Hwange	Windmill
Ngweshla	Friends of Hwange	Solar x 2 Previously pumped by Wilderness
Mbiza	Friends of Hwange	solar
Jambili	Friends of Hwange	diesel
Livingi	Friends of Hwange	diesel
Manga 1	Friends of Hwange	diesel
Nyamandlovu	Friends of Hwange	diesel
Tshebe Tshebe	Friends of Hwange	diesel
Mabuya Mabena	Friends of Hwange	Solar
Dopi	Friends of Hwange	diesel
Caterpiller	Friends of Hwange	diesel

Table 8: Pumped Pans - 2015		
Pan	**Responsibility**	**Comments**
Tshompani dam	Friends of Hwange	Windmill
Josivanini	Imvelo Safaris	
Madiseka	Imvelo Safaris	
Makona	Imvelo Safaris	
Mbazu	Imvelo Safaris	
Mfagazana	Imvelo Safaris	
Secheche	Imvelo Safaris	
Stoffies	Imvelo Safaris	
Major	Imvelo Safaris	
Danga	Nehimba	
Nehimba	Nehimba	
Chris's Pan	Somalisa	
Manga 3	Somalisa	
Somalisa	Somalisa	
Somalisa Camp	Somalisa	
Umkazaan	Somalisa	Solar. Saline
The Hide	The Hide	
Airstrip 2	Wilderness	
Back Pan	Wilderness	
Broken Rifle	Wilderness	
Kashawe	Wilderness	
Little Makololo	Wilderness	
Little Samavundla	Wilderness	
Madison	Wilderness	
Makololo 3	Wilderness	
Ngamo 1	Wilderness	
Ostrich	Wilderness	
Samavundla	Wilderness	
Wecau	Wilderness	
Big Toms	ZPWMA	
Borehole 5	ZPWMA	ZESA
Deteema	ZPWMA	
Dom	ZPWMA	solar
Little Toms	ZPWMA	
Mandavu	ZPWMA	
Manzimbomvu	ZPWMA	

Figure 21: Supplemented pans in Hwange National Park





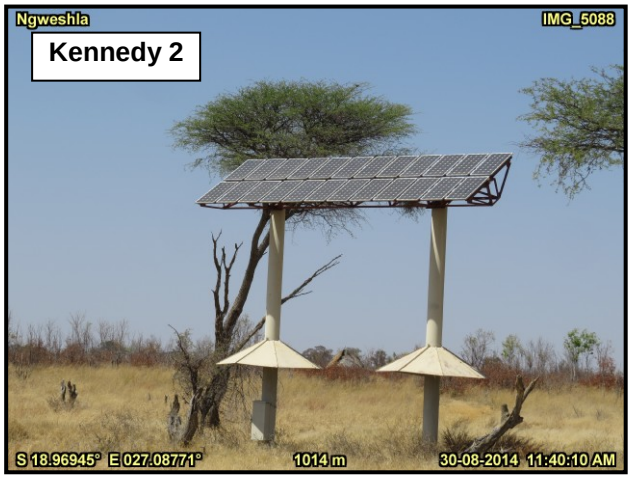


Figure 22: Current pumping responsibility for pans in Hwange National Park

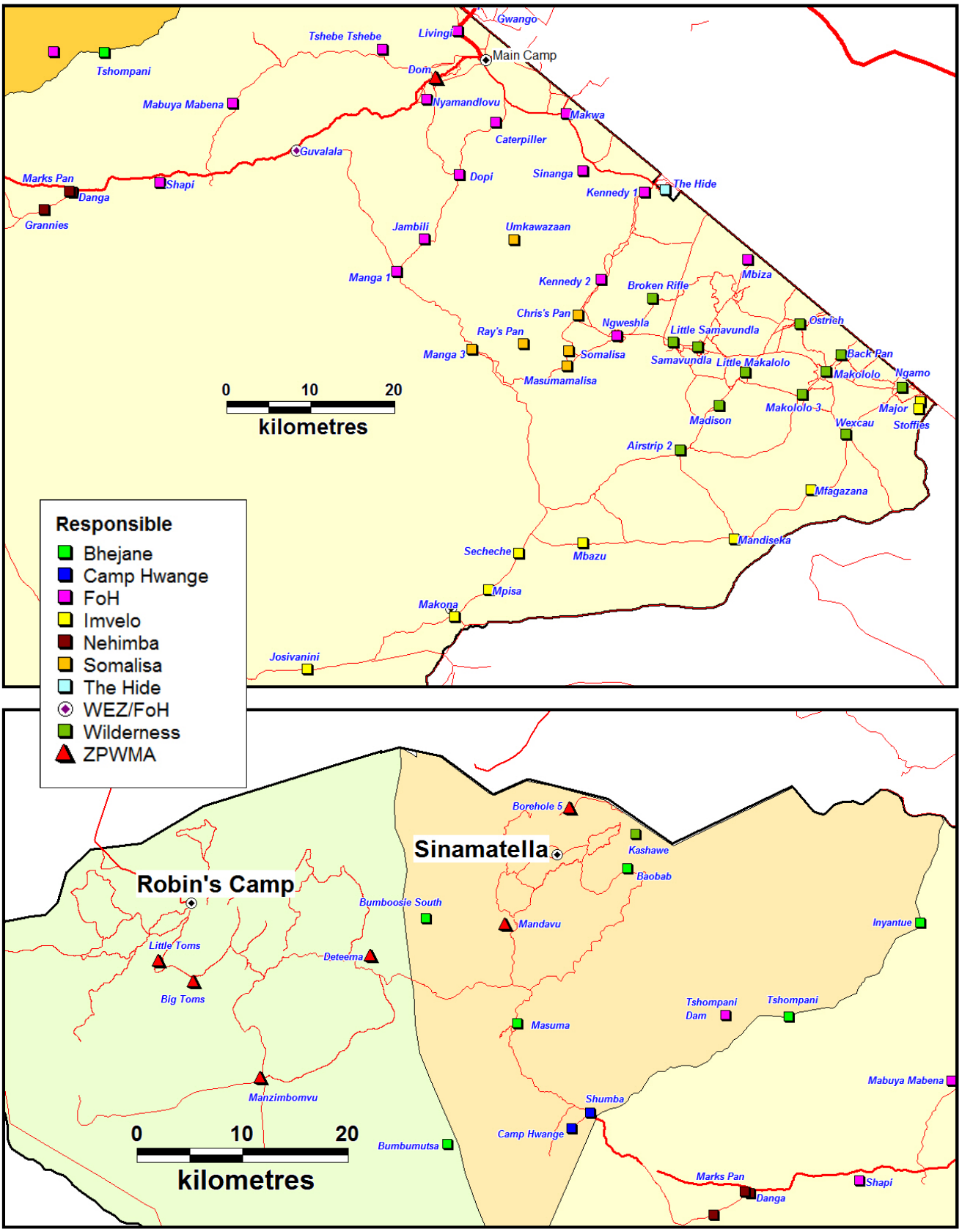


Figure 23: The development of the supplemented water system in Hwange

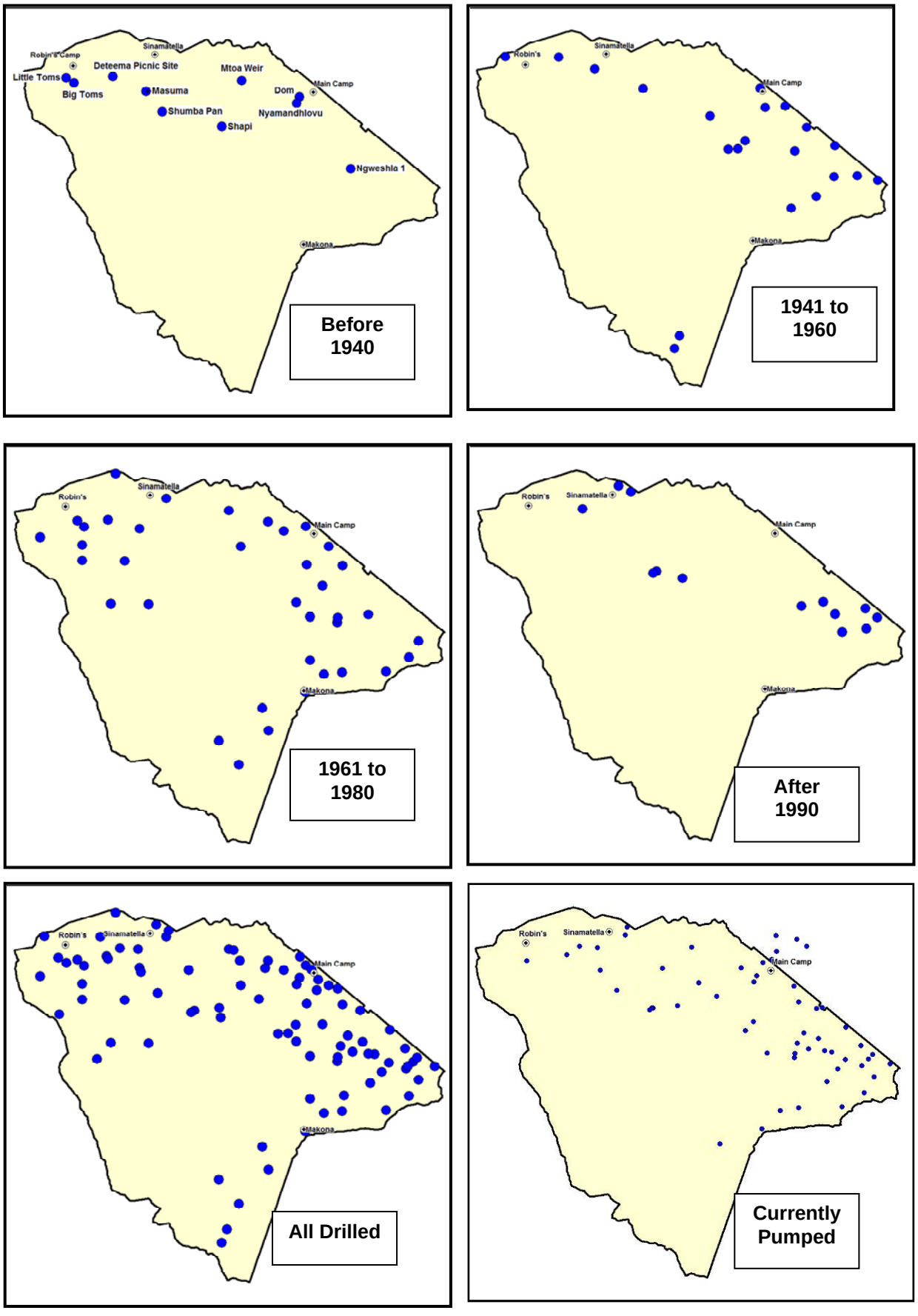
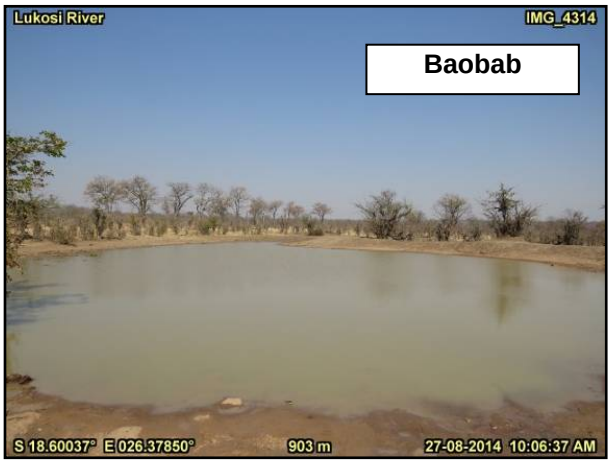
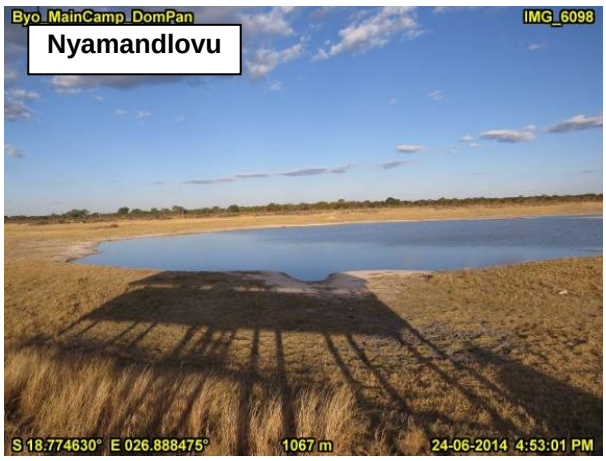
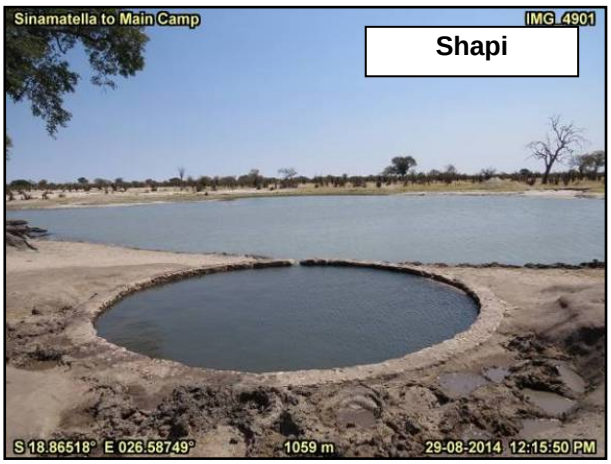
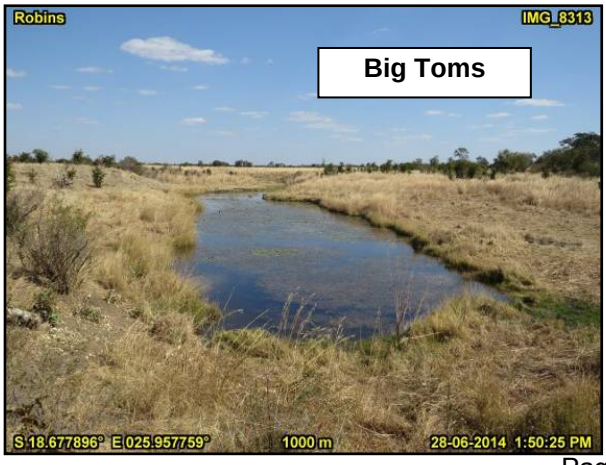


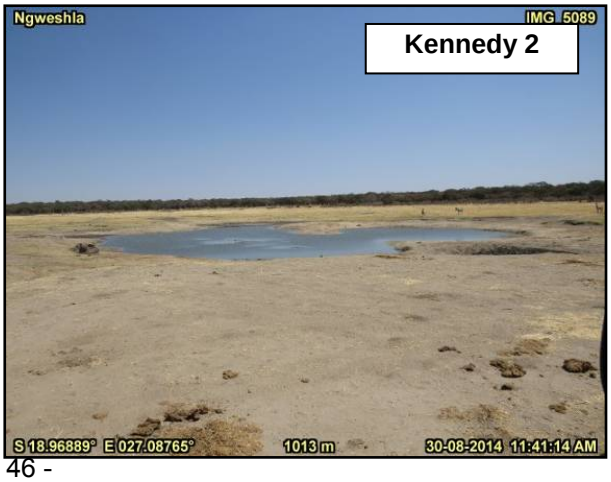
Figure 24: Supplemented pans in Hwange National Park











2.4.3.2 Notes on the Supplemented Water Programme and Elephants

The following is a brief synopsis of supplemented water and elephants

- Around 60 supplemented waterpoints currently pumped
- Most are pumped to supply water during the dry season bottleneck (Sept to Dec). length of period depends on rains
- Elephants maintained around 15,000 to 20,000 before 1986 through culling
- Culling stopped in 1986 and population quickly moved to a new level of 30,000 to 40,000 (an now estimated at 45,000), with most of the increase in the first six years. This indicates a significant in-migration as well as from natural increase
- Given the supplemented water programme the limiting factor for elephants is food and not water. The right climatic conditions (poor rains in preceding year, severe frosts in winter and a late start to the rains in the current year) will probably lead to die-off from starvation. This happened a few years ago (2012?) with at least 2,000 animals perishing
- Opening up new boreholes in areas with available food would initially spread the load but it is likely that it would only propagate the problem allowing a population build-up in the long term.

The supplemented water programme started in Hwange in 1936 with the drilling and pumping the Ngweshla pan. This started a chain of events which has allowed the current situation in Hwange to evolve to what it is today. Essentially the Hwange of today is a giant ecological experiment with an increasing supply of water provided to an increasing number of elephants.

Most of the supplemented pans are surrounded by a large open area caused by the elephants. In addition, elephants are actually responsible for shaping the pans. They remove a considerable amount of material from the pan as silt when drinking and as mud on their bodies. A decision to pump a small pan will eventually see it increasing in size almost continuously.

Elephants were maintained at a level of around 20,000 individuals through a regulated offtake system (culling) but this ceased in 1986 for a number of reasons. Cessation of culling allowed the population to virtually double to somewhere between 30,000 and 40,000 animals (the latest count indicates an even higher number – 45,000) where it seems to have stabilised.

This population is maintained by approximately 60 boreholes which run once the pans have dried up. The period that they run fluctuates annually based on the amount of rain in the previous year and the onset of rains in the current year. The current thinking is that expanding the artificial water supply system will initially spread the elephants to the new sources but then their numbers will expand again to take advantage of the new feeding grounds, taking us back to the same problem, only with more elephants to deal with.

It is of interest to note that when the Matetsi Safari Area was established after the expropriation of land in North-West Matabeleland in 1972 a conscious decision was made to not to create an extensive artificial water system – in the words of the report “to avoid the mistakes that were made in Wankie GR”.

In conclusion it could be stated that the water management system in Hwange is a knee-jerk reaction to the need to supply water, especially for elephants. This is largely in response to tourism “pressure” as there would be significant poor public relations generated if there was a significant die-off of elephants in the park from lack of water.

There does not appear to be any long-term plan for the management of water and to date the system is managed for elephants. However, the water system should be managed for the recharge of the aquifer not to ensure that the burgeoning population of elephants has water. Management of the water for elephants could possibly lead to a future catastrophe of unknown proportions.

So what are the issues associated with supplemented water. These are many and they are summarised below (Table 9)

Table 9: Issues surrounding the supplemented water programme	
Drilling and pumping	Drilling deep boreholes in Kalahari sands is problematic. There is a phenomenon of shifting sands which means that there is slight movement in the sand which can cause a borehole to become non-functional. Drilling in a remote area is expensive. Most drilling rigs are sourced from Bulawayo and there is already a significant charge to bring the rig on-site, even prior to any drilling. In some cases several holes are drilled before a suitable source of water is located, adding to the costs.
Pumping	For practical reason the pumps are usually located close to the pans and are unsightly and noisy. There have been complaints from tourists about the noise at the platforms. In recent years there has been a move towards solar systems which address the noise issue but bring their own set of problems. Pumping systems in use on boreholes include diesel, solar, electrical and windmill pumps. There is considerable variation in the delivery rates form these different systems and the costs of installation and upkeep.
Aquifers	Virtually nothing is known about the aquifers which supply water to Hwange. Many of the holes yield saline water, some of which is approaching levels found in sea water. The age of the water being pumped is virtually unknown. There is very limited data which suggests that the water being pumped is between 30 and 50 years old. This means that it is not part of the annual recharge system and there is a possibility that these aquifers could become impoverished.
Water delivery and Pans	Water delivery systems to the pans have always been a problem and several trough systems have been tried over the years. These troughs were also expected to provide clean water for other animals to drink. Elephants are large animals that not only use the water for drinking but also for bathing. Bathing elephants will hasten the turning of the pan to mud which causes problems for themselves and other users. They will also take large quantities of mud out of the pan on their bodies and it seems likely that many of the enormous pumped pans of today probably started out as small pans but have subsequently become enlarged by the elephants. A significant issue is that the elephants will stop other animals drinking at the pans. Research indicates that many species change their drinking habits as a result with some coming after the elephant peak time (late afternoon and into the evening). The effects of behavioural change with respect to predators and survival rates has yet to be quantified.

Figure 25: Water delivery systems at Hwange pans

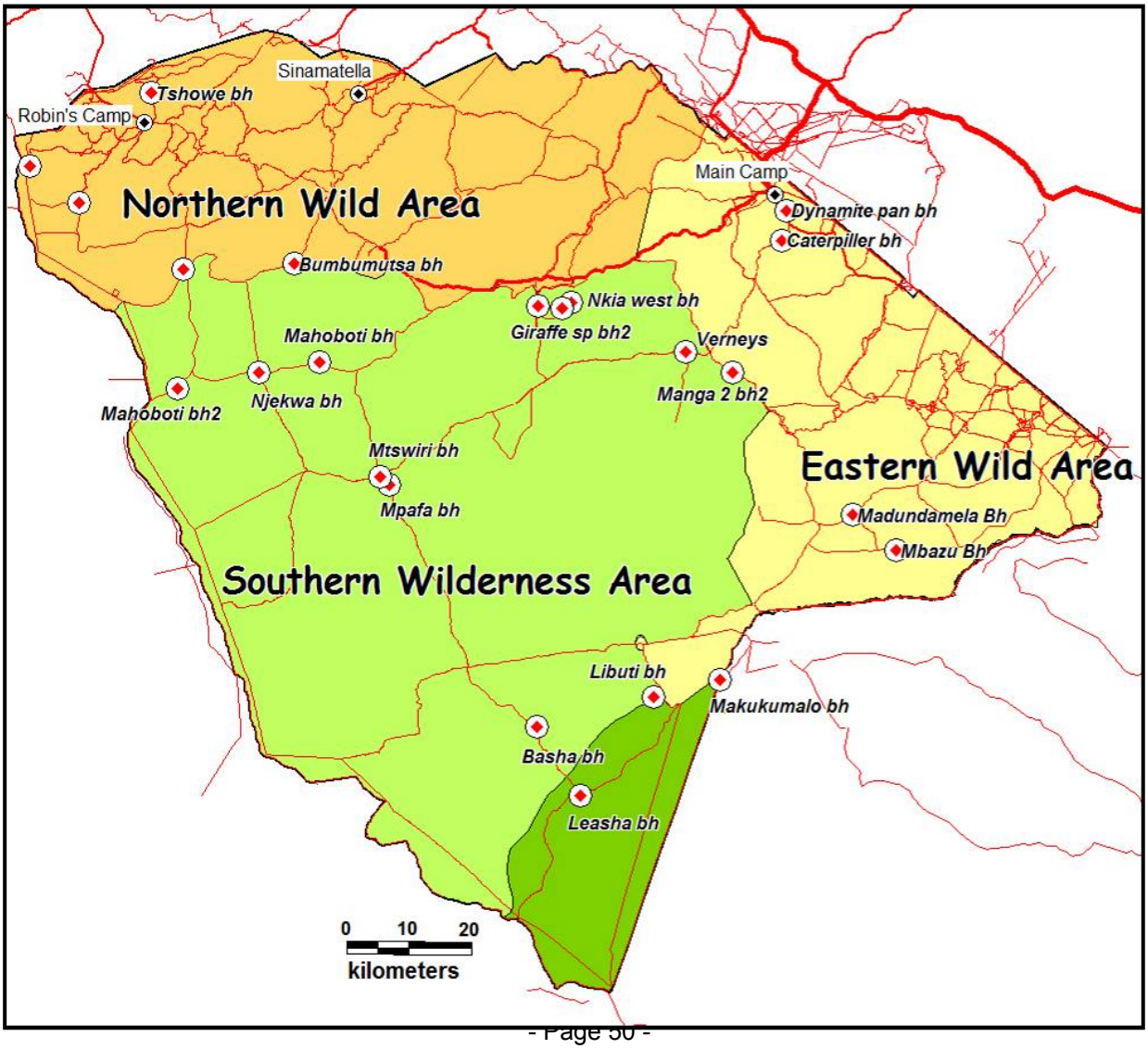
The following table details the types of pumping systems in use in Hwange followed by some notes on the different pumping systems.

Table 10: Pan pumping systems	
Type	**Pan**
Windmill	Shapi, Mbiza, Shumba, Kennedy 1, Tshompani
Solar	Boabab, Bumbusi South, Tshompani, Kennedy 2, Ngweshla
ZESA	Davisons, Borehole 5, Kashawe, The Hide
Diesel	All others

Table 11: Water pumping systems	
Diesel	A diesel mono pump installation can be as much as $19,000. However, they can run 24 hours and deliver between 100 and 120 thousand litres per day. Fuel costs are around $600 per month. Sucking sand through the pumps can cause wear and tear on the pumps. Generally speaking diesel pumps will be used to supply water for elephants.
Solar	A solar installation can costs between 8 and 10 thousand dollars. Usually can rely on a six hour pumping day with an output of around 35,000 litres. Baboon damage is a problem and there can be security problems with installations close to the park boundary. Solar installations usually supply water for tourism.
Windmill	A windmill installation is much the same cost as solar. Not as efficient as Hwange is not a good wind area. These need a shallow water table (around 10 m).
ZESA	Supply problems from the Authority. However, when working is relatively cheap and efficient.

A significant number of the boreholes that have been drilled in the park are used to supply water. Some of these are not used owing to excessive salinity or problems with supply. Some of the records are unclear. For reference the location of all known boreholes that are not currently used are shown below (Figure 26).

Figure 26: Pans where there are unutilised boreholes



2.4.3.3 Dams

At least 16 dams have been constructed in the park, starting in 1936. The largest of these is Mandavu which supports a small fishery! Most of these dams are still functional.

Table 12: Dams constructed in Hwange	
Date	**Dams and Comments**
1936	Masuma, Mtoa lc and Mtoa llc
1938	Deteema
1951	Nantwich, Robins, Tshingahobid, (Nantwich may have been built earlier but Nantwich Estate was only brought into the park in 1950)
1953	Mandavu and Masuma llc
1955	Tshompani, Gomo and Limpande
1958	Inyantue (Masuma II broke and was never repaired)
1965	Leasha (The relevant annual reports are missing but a' borehole was sunk here in 1965)
1971	Salt Pans

Figure 27: Location of dams within the Hwange national Park

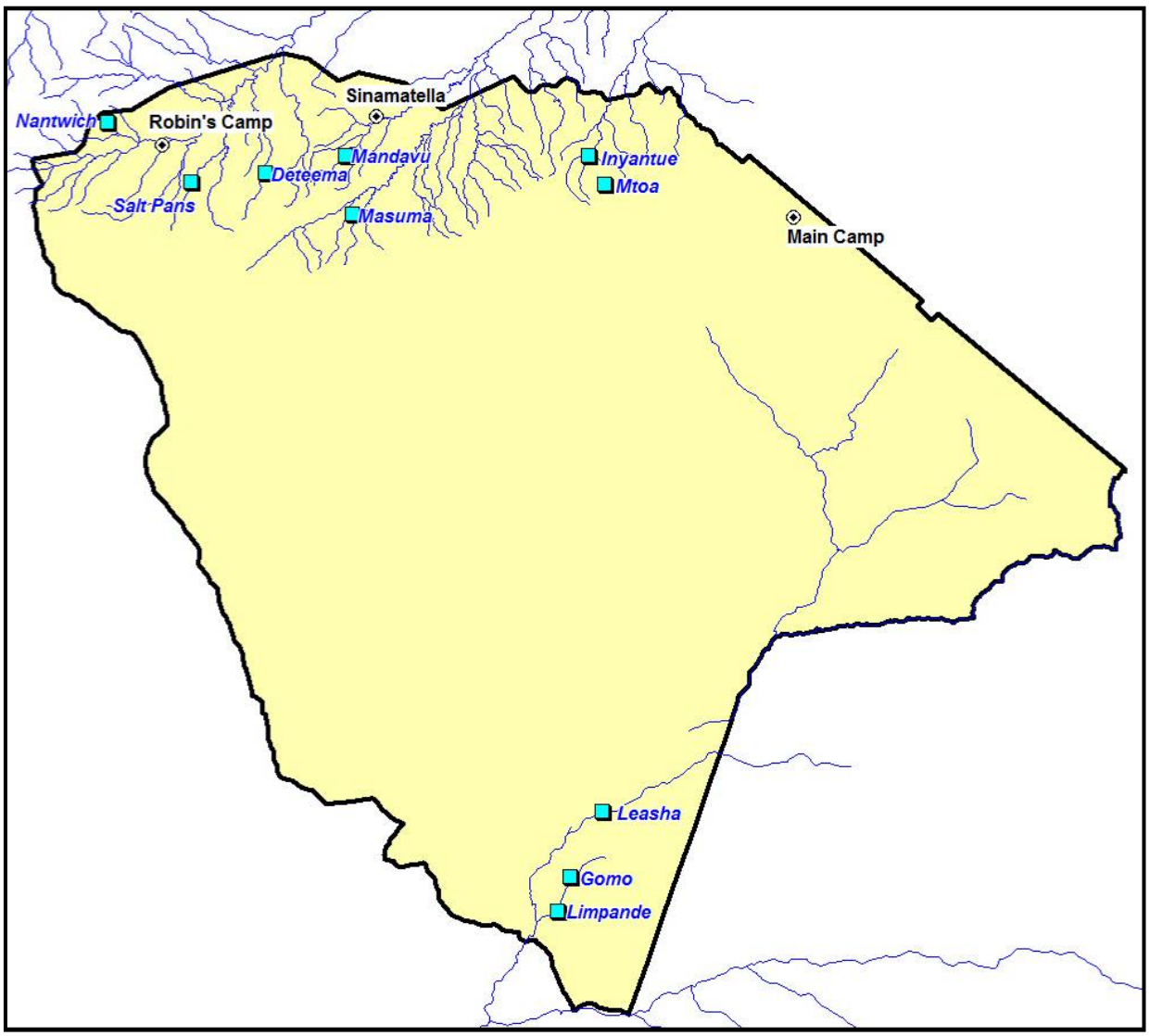
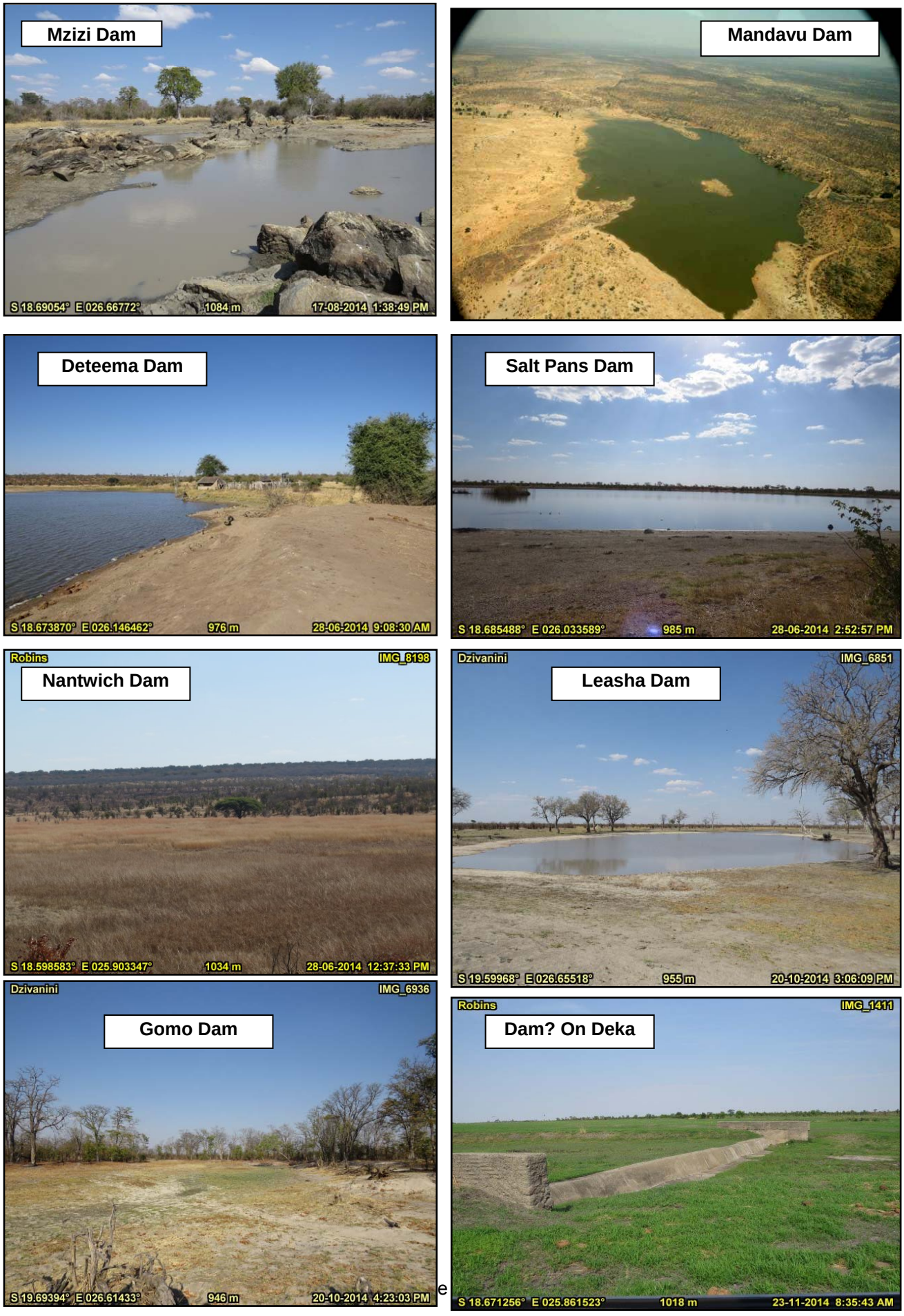
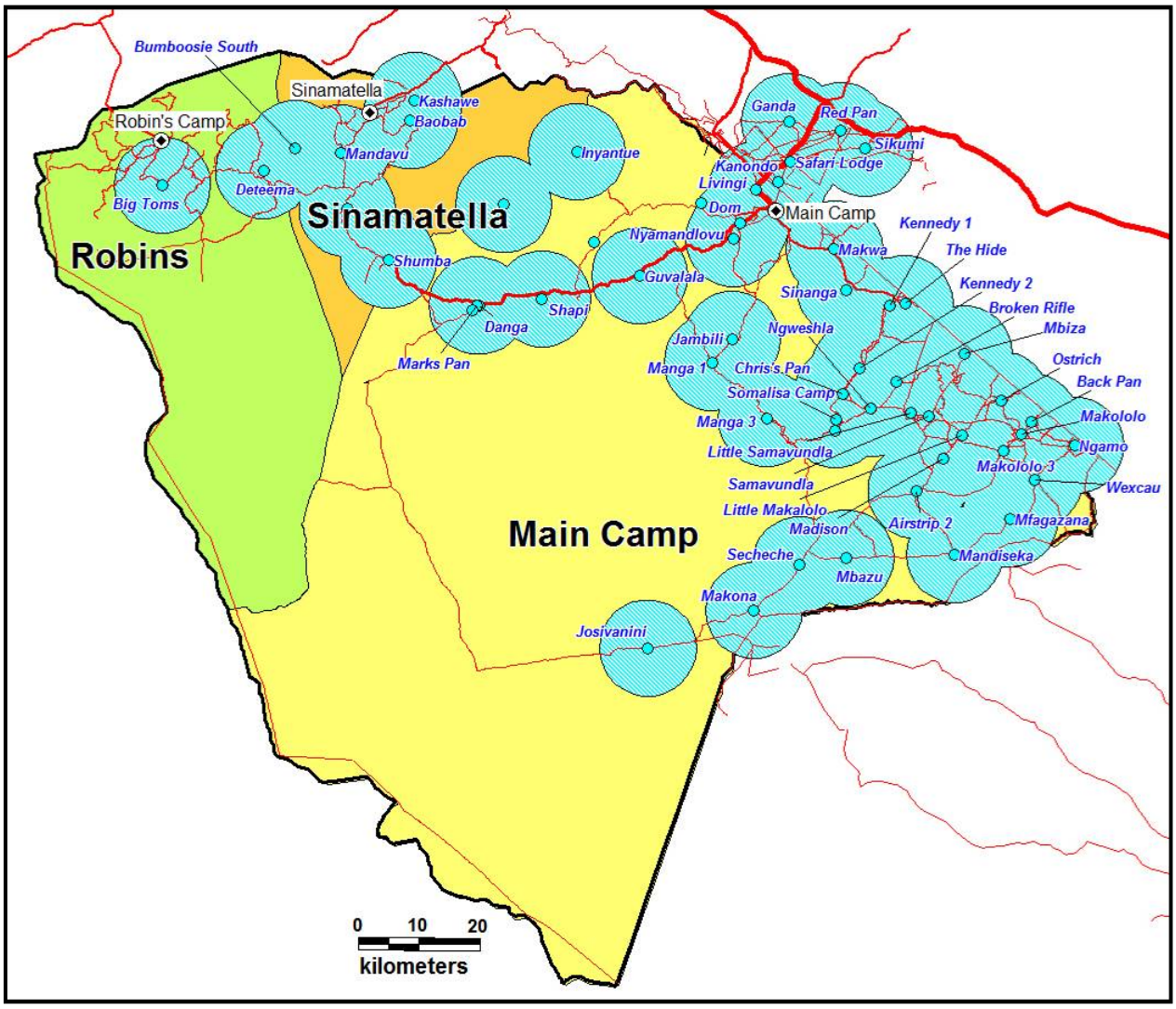


Figure 28: Dams in Hwange National Park



The supplemented water programme means that 35% of Hwange is within 8 km of a permanent water source (Figure 29).

Figure 29: Area of the park that is within 8km of water during the dry season

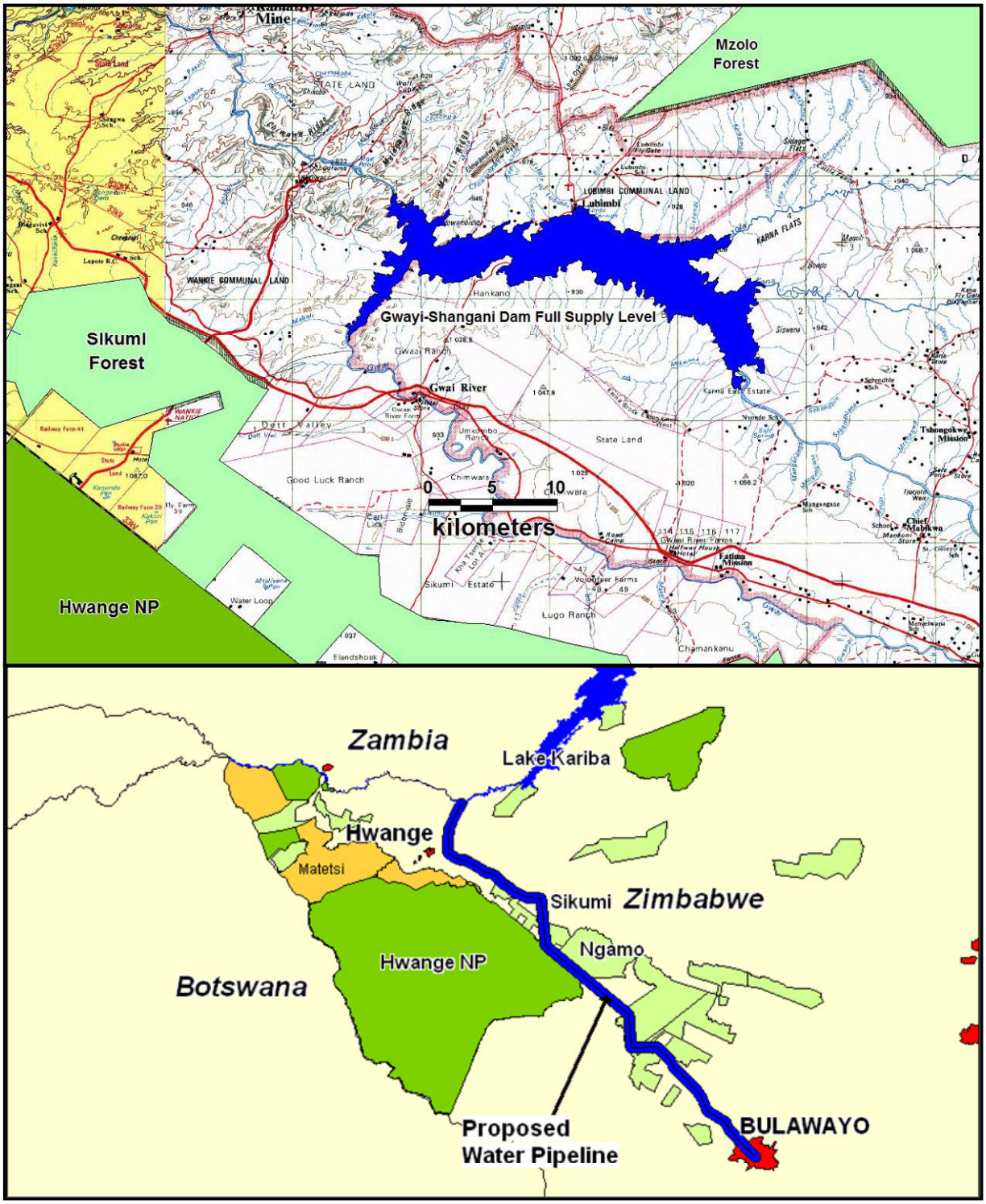


2.4.3.3 The Gwayi-Shangani Dam

This development has been on the cards for several decades and is part of the water supply system for Bulawayo. It now seems quite likely that the funds and political will to construct the dam are in place and a Chinese coal mine developer at Gwayi has pledged funds for the project.

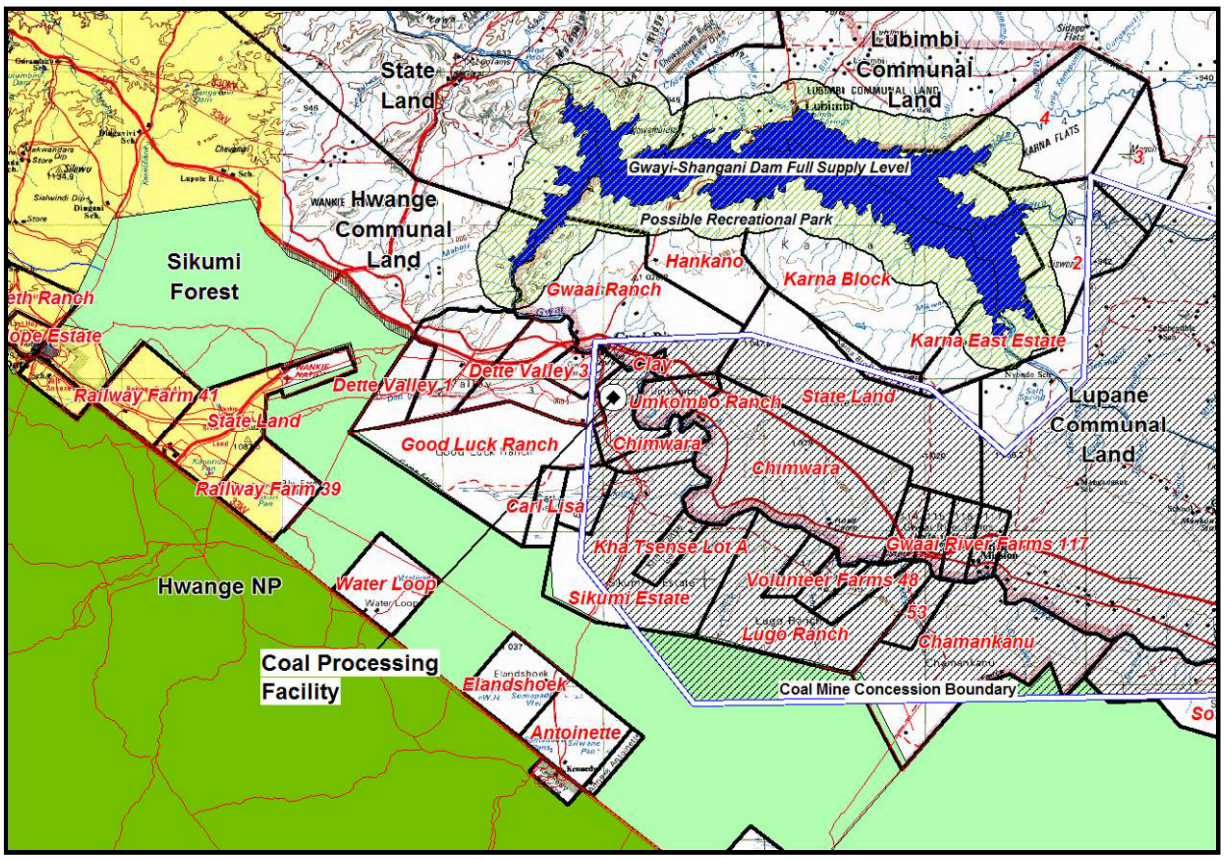
The effect of this large source of permanent water less than 20 km from the Hwange National Park and its herds of thirsty elephants cannot be underestimated and it is likely to have a significant effect on the ecology of Hwange.

Figure 30: Approximate full supply level of the Gwayi-Shangani dam and some associated water infrastructure.



The effect of the Gwayi-Shangani Dam will pose some interesting land use options. In Zimbabwe it is standard procedure for a Recreational Park to be established around any new dam. The boundaries of this have yet to be defined. Then, between the park and the dam is a mix of land which includes State Land, Forestry Estate, Communal Land and Commercial Land (most of this last category is involved in safari hunting as a form of land use).

Figure 31: Land matrix in area between Hwange and the Gwayi-Shangani Dam



Given that the dam is on its way to becoming a reality some serious though needs to be given to the future of the land that includes the Sikumi Forest and the commercial properties between the park and the dam. The situation is further complicated by the fact that permission has been granted for a massive coal mine and processing facility at Gwayi, right in the centre of this area (see section 2.4.5).

2.4.5 Geology and Soils

There are four main geological types that underlie the park. These are

- Kalahari Sand
- Batoka Basalts
- Karoo Sediments
- Basement Complex

The three major camps of the Park are located in different geological areas. Main Camp is situated on the eastern fringe of Zimbabwe's largest Kalahari sand deposit, Robins Camp to the north-west on basalt and Sinamatella in the north-centre on the Karoo sedimentary rocks.

2.4.5.1 Basement Complex

The Precambrian basement rocks are "supra-chrystal" belts separated by expansive granitic gneiss. These rocks were laid down more than 550 million years ago.

2.4.5.2 Karoo Sediments

The geology of this type is complicated but essentially Madumbisa mudstones are lain unconformably under Escarpment grits. These mudstones form the hard caps that give rise to the escarpments in the area, notably Sinamatella hill. In other areas erosion surfaces on this geological type are common, especially in the Sinamatella area and are a cause for concern when managing the park.

2.5.4.3 Batoka Basalts

These are found in the Robins and Dzivinanini areas of the park. Approximately 200 million years ago an inland sea covered western Zimbabwe and eastern Botswana. During this period the Karoo sediments were formed on top of the Basement complex. The swamp vegetation fringing the sea formed coal deposits that are mined in the Hwange town area. The basalt lavas seen in the area are more recent (approx.150 million years ago) and these overlay the Karoo sediments. In the Dzivinanini area the basalts underlie shallow Kalahari Sand in some areas.

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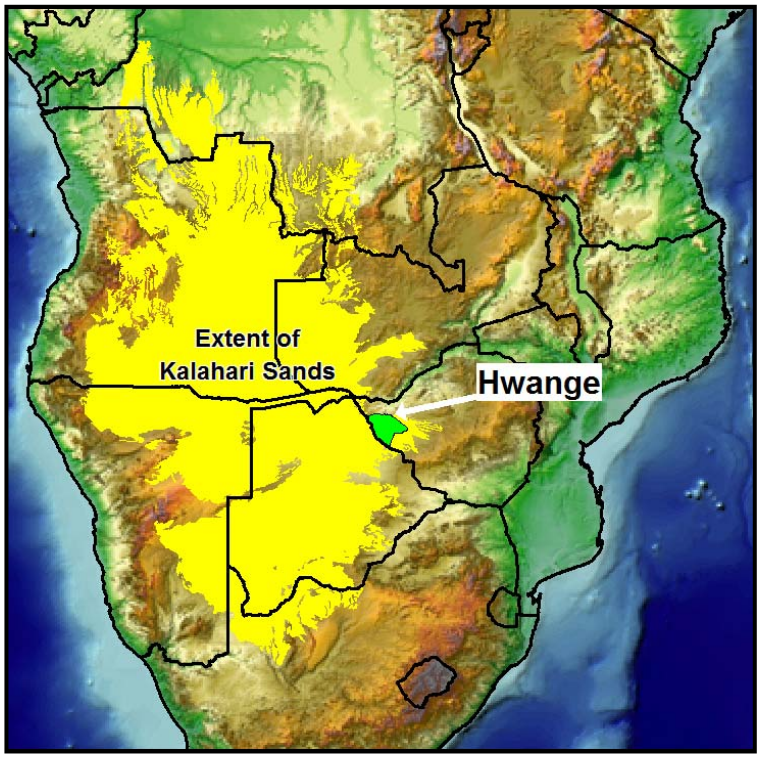
2.5.4.4 Kalahari Sands

The Kalahari sand once covered much of Zimbabwe. The blanket of sand stretched three-quarters of the way across the country and today pockets of it can be found as far east as Mvuma on the Harare-Masvingo road. The sand was blown from Botswana and deposited across Zimbabwe, beginning 12 to 15 million years ago. This process continued until about one million years ago and geologists have estimated that some Hwange dunes were once as high as 80 m. Today, these dunes still exist in the southern part of the Park, but they have eroded down to no more than 10 m in height. Over the last million years the sand has gradually been eroded with pockets of basalt re-emerging as the Kalahari cover diminished.



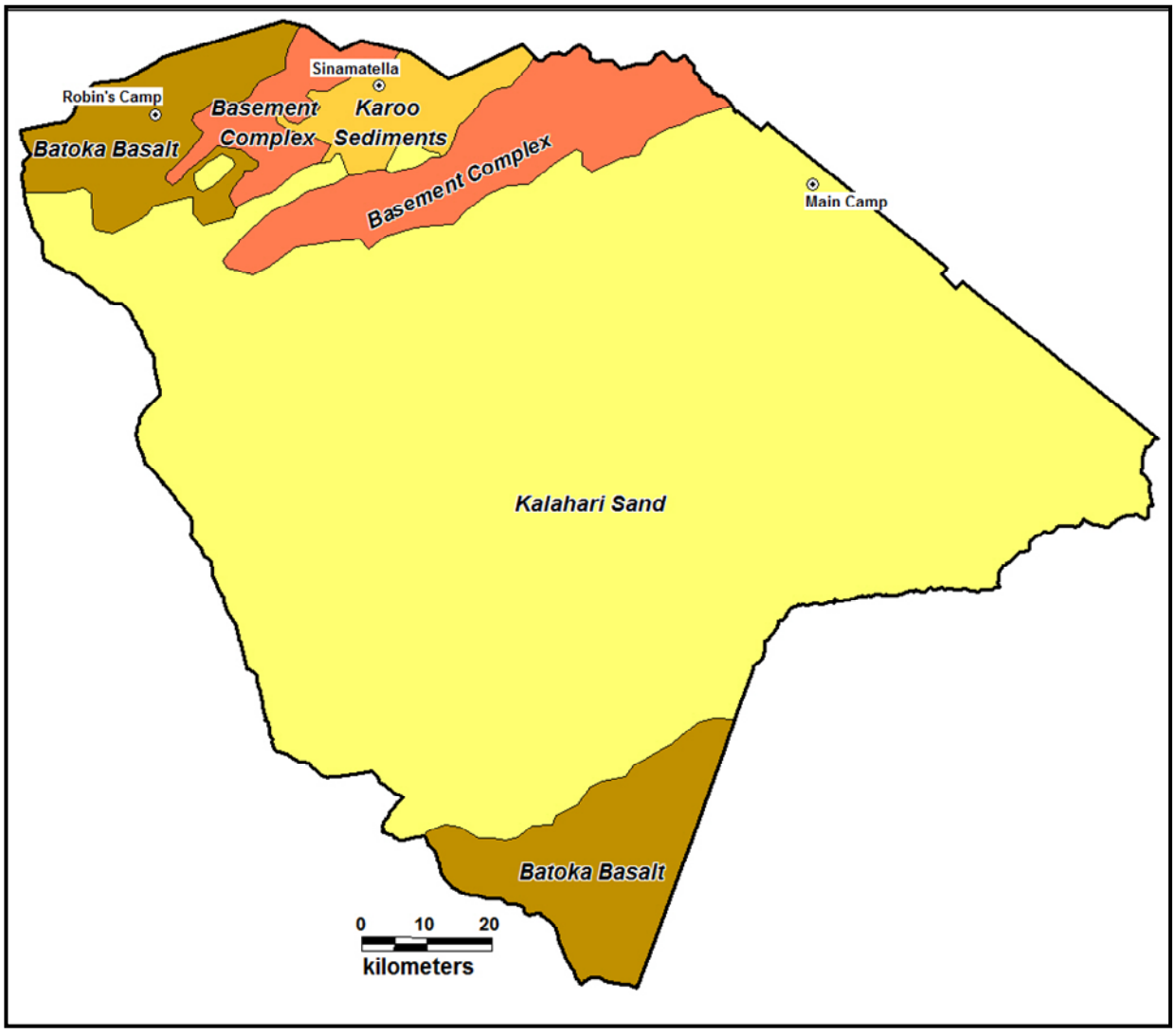
2.5.4.5 Fossil Trees

Hwange is famous for the extensive fossilised forest found in the Deteema area. These are the remains of trees dating back 200 million years.

2.5.4.6 Erosion Surfaces

Erosion has always been a cause for concern on the basement complex and Karoo sediment rocks. This was mentioned in all previous plans. IS THERE A MAP OF AREAS OF CONCERN?

Figure 32: Simplified geology of the Hwange National Park



2.4.5.5 Soils

The most extensive survey of soils in the park which covered all areas north and west of Shumba was conducted by Sweet (1971). The survey was undertaken with the aim of investigating the erosion potential of soils but also includes profile descriptions and an assessment of their fertility. Rushworth (1975) and Childes (1984) provide additional information on Kalahari Sand soils. The occurrence of a hard almost impervious layer at between 1 and 3m in some of these soils, is significant in explaining the physiognomy of woody plant communities (Childes, 1984 & Childes & Walker, 1987).

Soils essentially reflect the underlying geology. In basalt areas red clay lithosols predominate with limited areas of moderately deep to shallow self churning vertisols in drainage lines and some upland situations. Soils on the Karoo sediments are generally shallow clays with some vertisols in limited areas and alluvium along the major water courses. Soils derived from Basement Complex types are predominantly sandy lithosols with some deeper pockets of siallitic soils. In the Kalahari region soils are deep, unstructured fine grained regosols. Redistribution of the original aeolian deposits through the influence of wind and water have led to the accumulation of some clays and silts in inter-dune troughs and drainage lines and calcrete in fossil lake basins have a modifying effect. A variety of sandy and sandy clay soils of various depths occur along the contact between the Kalahari sands and other geological types but these have not been investigated in any detail.

Soil nutrient values range from very high in basalt through average in sediments and alluvial types to very low in types derived from Basement Complex rocks and Kalahari sands. Erodibility values are also very variable being lowest in Kalahari sands and highest in sodic areas and some of the fine grained types derived from Karroo sediments. Gully erosion is a feature of all the deeper soils in the north west and accelerated sheet erosion is widespread in the Lukosi basin.

Figure 33: Soils of the Hwange National Park
(Peace Parks Data)

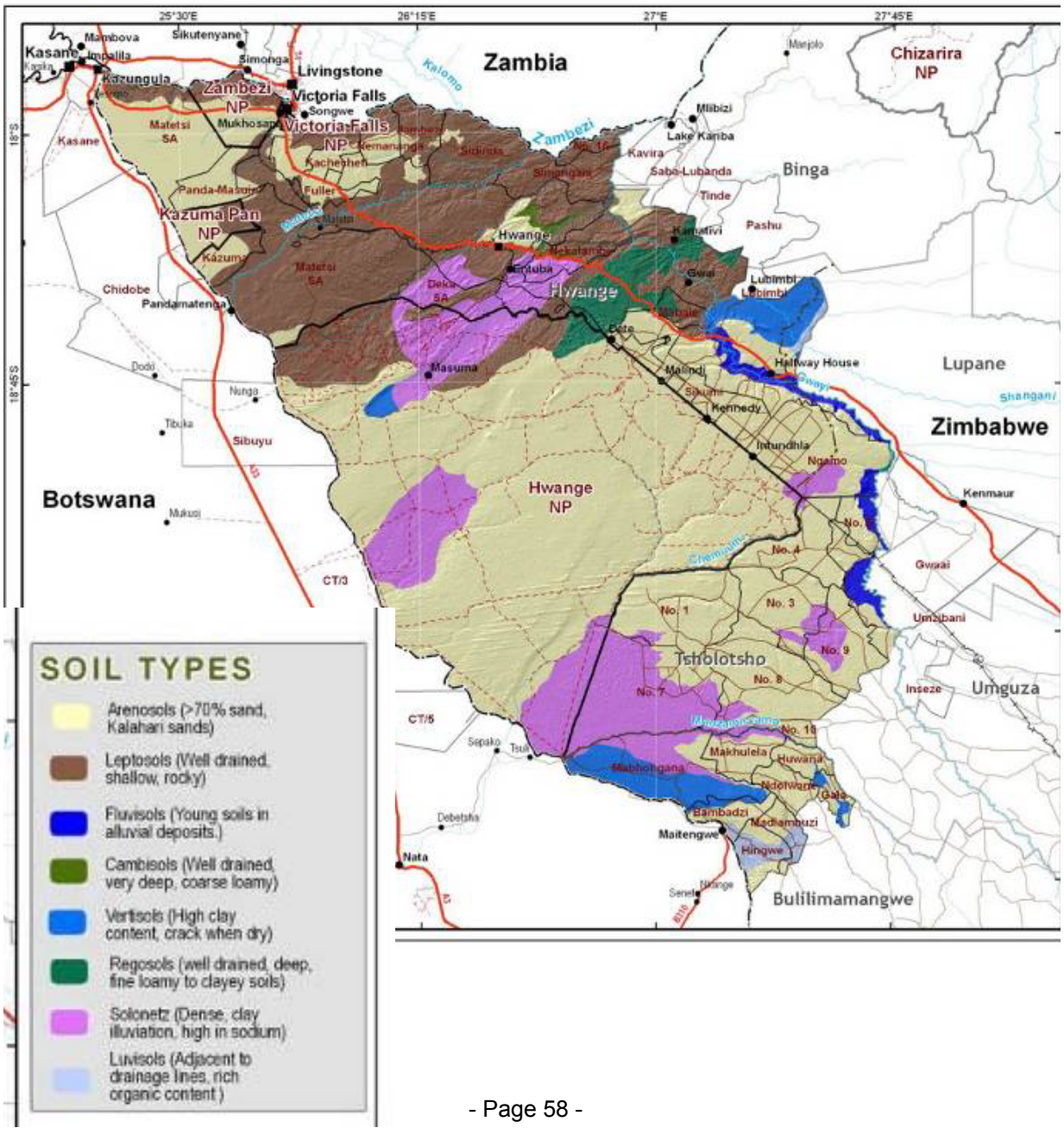
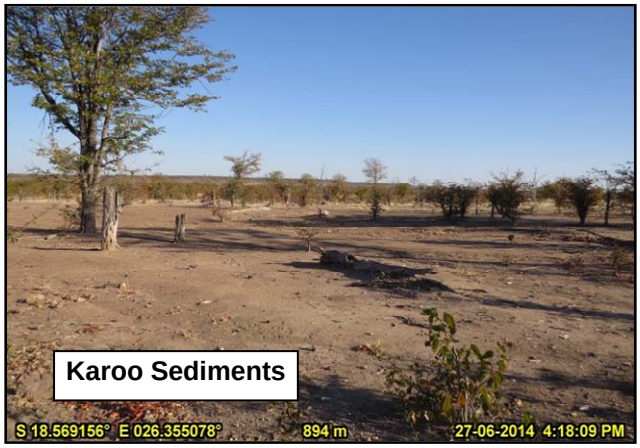
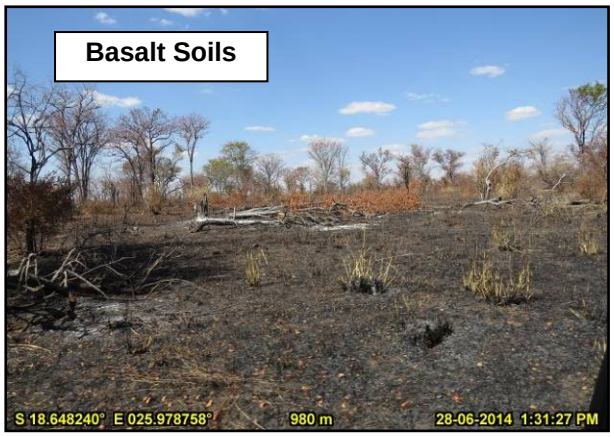
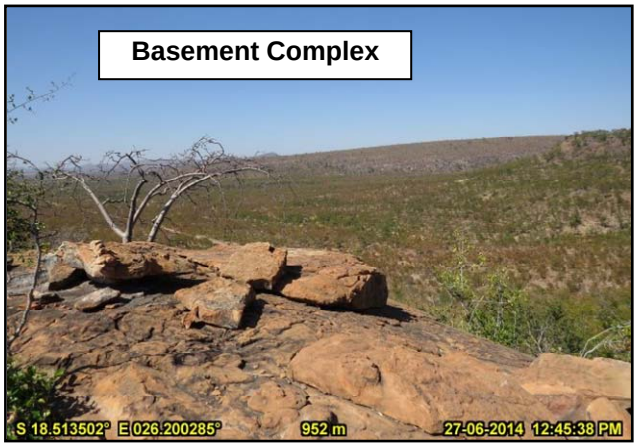
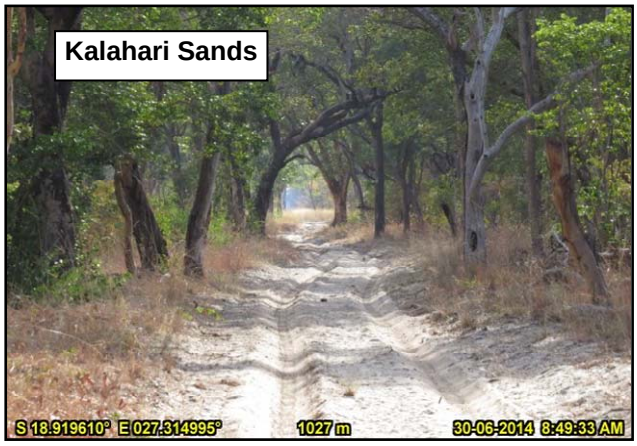


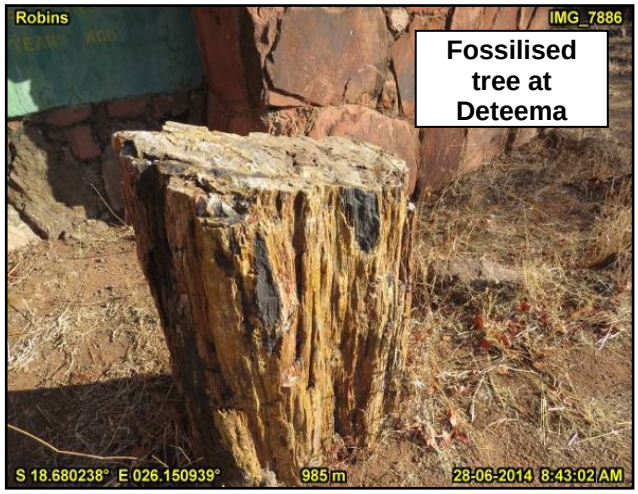
Figure 34: Geological features of Hwange National Park

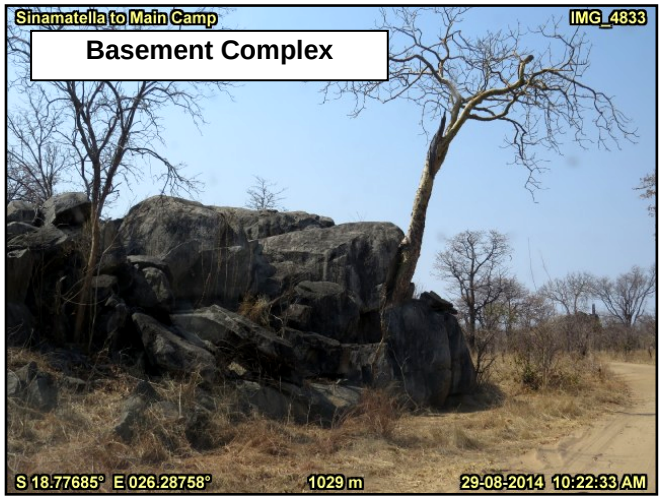










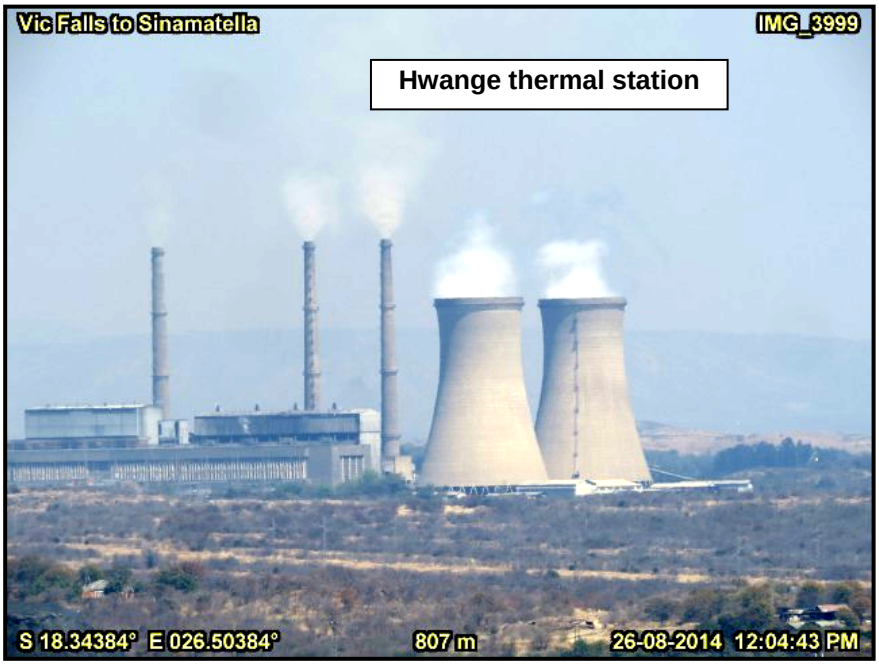


2.4.5 Mining

The geology of parts of north-west Matabeleland means that parts of the park and the surrounding areas are underlain by coal deposits. Some of the deposits are close enough to the surface for open cast mining to occur and others have been investigated for their coal-bed methane potential. These coal deposits have had a significant effect on the National Park. Initially the “Cape to Cairo” railway, a dream of Cecil Rhodes, was to pass via Harare and Lake Tanganyika, but the discovery of the Hwange coal led to the routing being changed to pass via the coal fields. A direct result of this was the exploitation of the teak forests in the area and the railway line boundary for Hwange. As we will see, coal deposits have the potential to significantly alter Hwange 110 years later.

Forty years ago much of the coal mining at the main Hwange site was underground but an accident which claimed the lives of several hundred miners led to a switch to open-cast mining. This is a far more polluting and environmentally damaging way of coal extraction. Unfortunately for tourism in Hwange, new sites are being opened and others investigated.

Figure 35: Coal mining



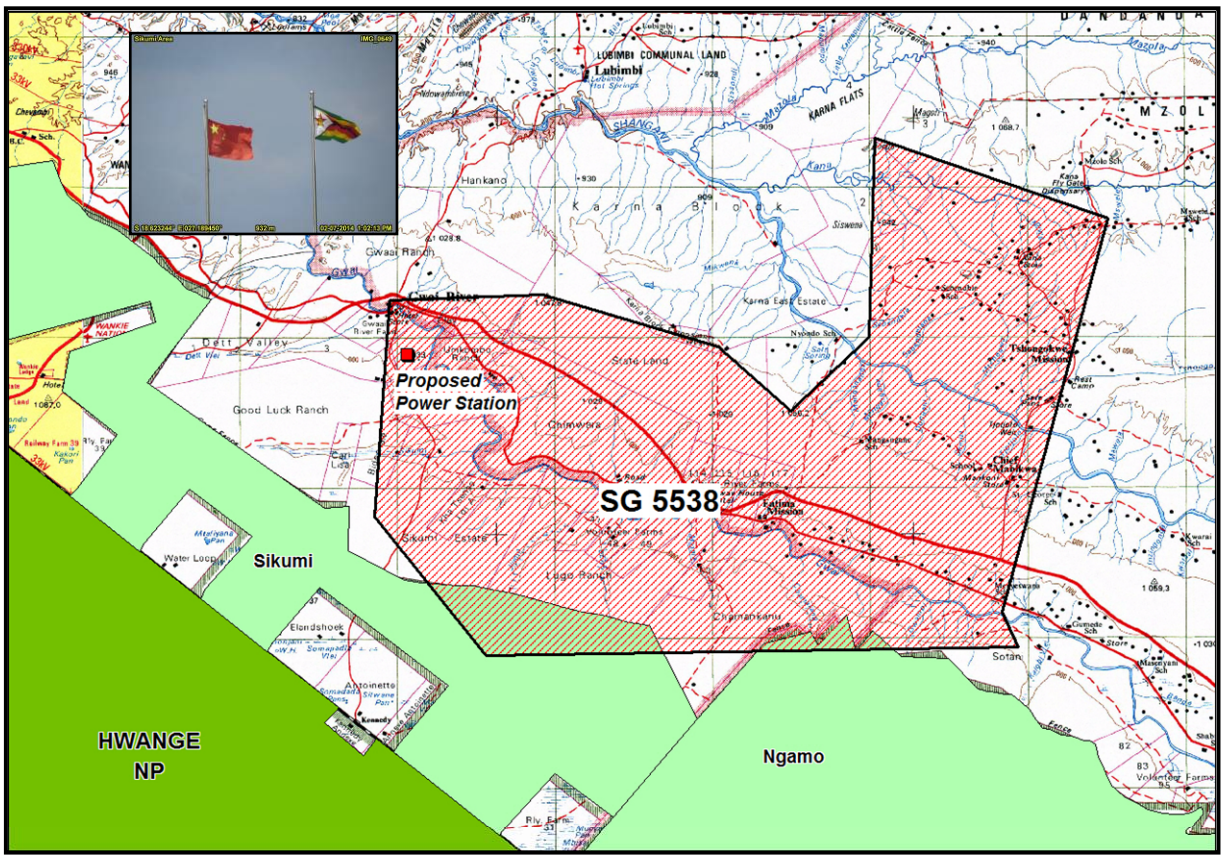
A controversial coal mining project has apparently been the go-ahead to proceed close to the eastern boundary of the park – CASE (China-Africa Sunlight Energy) – a joint venture between Zimbabwe and China. However, it appears that no detailed development and construction plans and maps have been made available by CASE and the Environmental Impact Assessment, on which the Environmental Management Agency issued a permit to proceed with the mining project, provides little insight, and reads more like a promotion for coal mining and power generation than an Impact Assessment. However, the project outline indicates that CASE aims to produce the following (Peddie Assessment, 2014)

Gwayi mine (shaft, west) - 2.4 m tonnes p.a	Gwayi mine (shaft, east) - 3.0 m tonnes p.a!
Coal power station - 1 300 MW!	Coal power station - 2 300 MW
Coal washing plant - 1.0 m tonnes p.a	Coal coking plant - 0.3 m tonnes p.a
Agrochemical plant - 0.2 m tonnes p.a	Agrochemical plant - 0.2 m tonnes p.a
Coal to liquid fuel - 20% Zim demand	Tar plant - 20% Zim demand
Brick moulding - 30 m bricks p.a	Cement grinding plant - 0.3 m tonnes p.a
Coal Bed Methane Gas - Volumes undetermined	

No mention is made of the need for a coal loading terminal, yet the plan calls for much of the coal, coke and chemical by-products to be transported by rail to Bulawayo for onward export. Should this terminal be on the railway line that forms the border of the Hwange National Park, not only will the terminal be intrusive and polluting, but the transporting of the coal to the terminal will need either a high capacity conveyor belt system or heavy vehicle road transport. All of which would create a massive, noisy, well lit and extremely dusty operation and location.

This development is likely to have a significant effect on the environment and tourism in the area

Figure 36: CASE mining concession

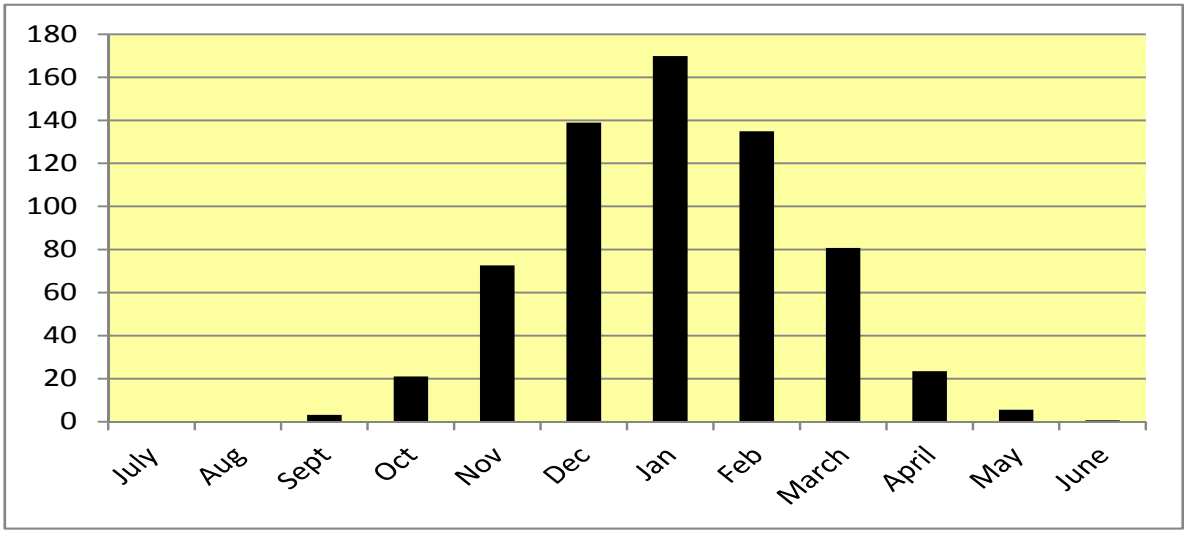


2.5 CLIMATE

2.5.1 Rainfall

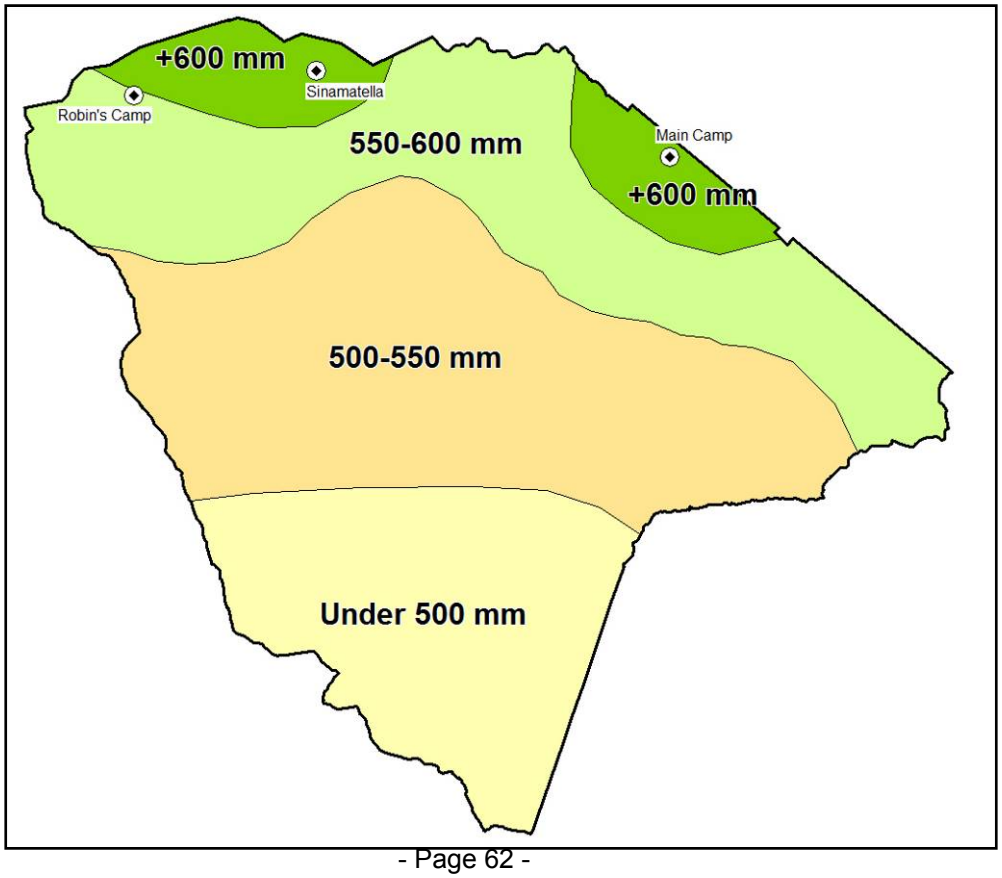
Rainfall records have been collected from the three stations since the 1920s, firstly when they were farms and then later as part of the wildlife authorities monitoring programme. Rainfall follows a monomodal pattern with 70% of the rainfall occurring between December and February.

Figure 37: Average monthly rainfall at Main Camp – 1928 to 2012



The southern parts of the park receive less rainfall, typically below 500 mm per annum while the xx and Main Camp areas receive more than 600 mm per annum (Figure 38).

Figure 38: Rainfall gradient in Hwange



There is a significant variation from the mean and it is one of the features of the climate is its unpredictability and variability. There have been years where there was a 700 mm difference in rainfall from one year to the next and Main Camp (for example) has seen a peak of nearly 1,200 mm and a low of below 400 mm (Figure 39).

Another, very important, facet of the rains is the timing of the onset of the first rains. If these rains are delayed it can have dire consequences for the wildlife.

Figure 39: Long-term rainfall fluctuations at the three Hwange camps

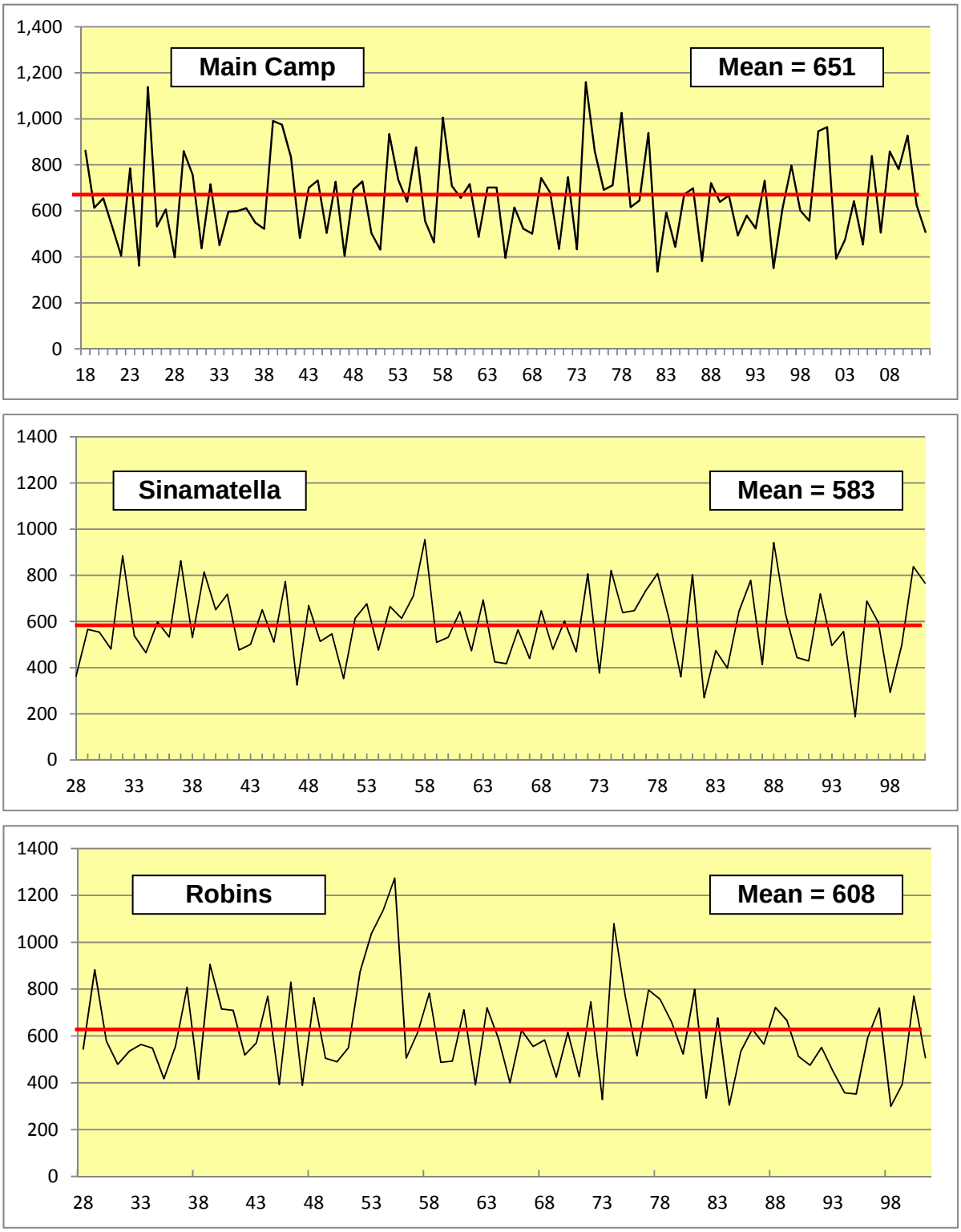
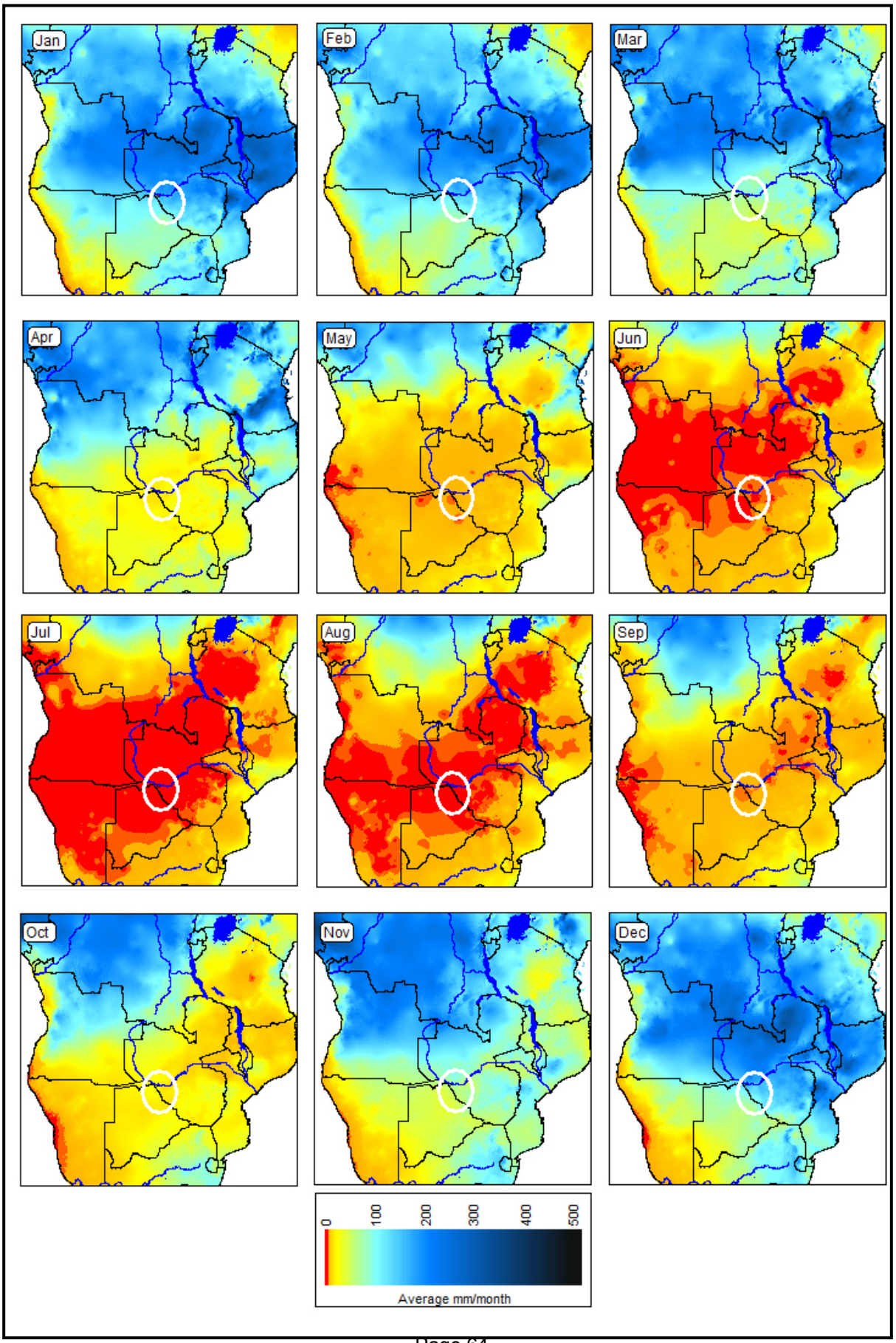


Figure 40: Monthly long-term average rainfall across south central Africa
(data from WorldClim – Hwange circled)

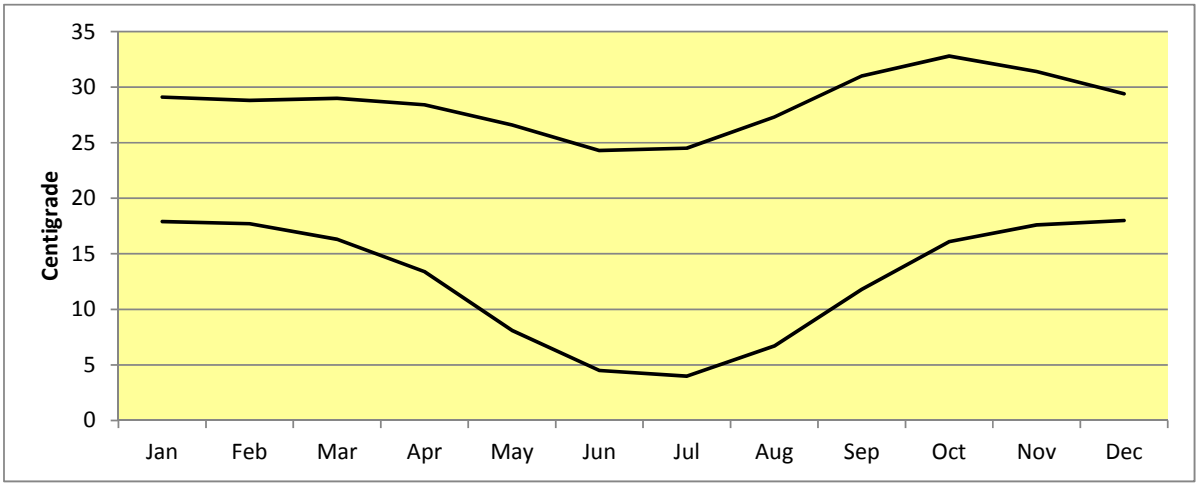


Work carried out by CIRAD/CNRS/ZPWMA using non standard regression analysis indicates that droughts worsened in Hwange during the 20th century. This trend is not easy to detect using standard techniques because of the huge annual variations in rainfall. Increasing drought decreases both forage and surface water availability and it is likely that more water will need to be pumped to compensate. At the same time the effect of the elephants on the now stressed vegetation is likely increase and this will have a knock on negative effect on other herbivores. In summary climate change will threaten the conservation status of Hwange (Chamaille-James et. al., 2007).

2.5.2 Temperatures

The mean monthly temperatures recorded at Main Camp range from 24^{0}C in June to 33^{0}C in October. There is considerable variation in daily temperature with mean fluctuations of about 20^{0}C in winter and 13^{0}C in summer.

Figure 41: Mean Maximum and minimum temperatures at Main Camp

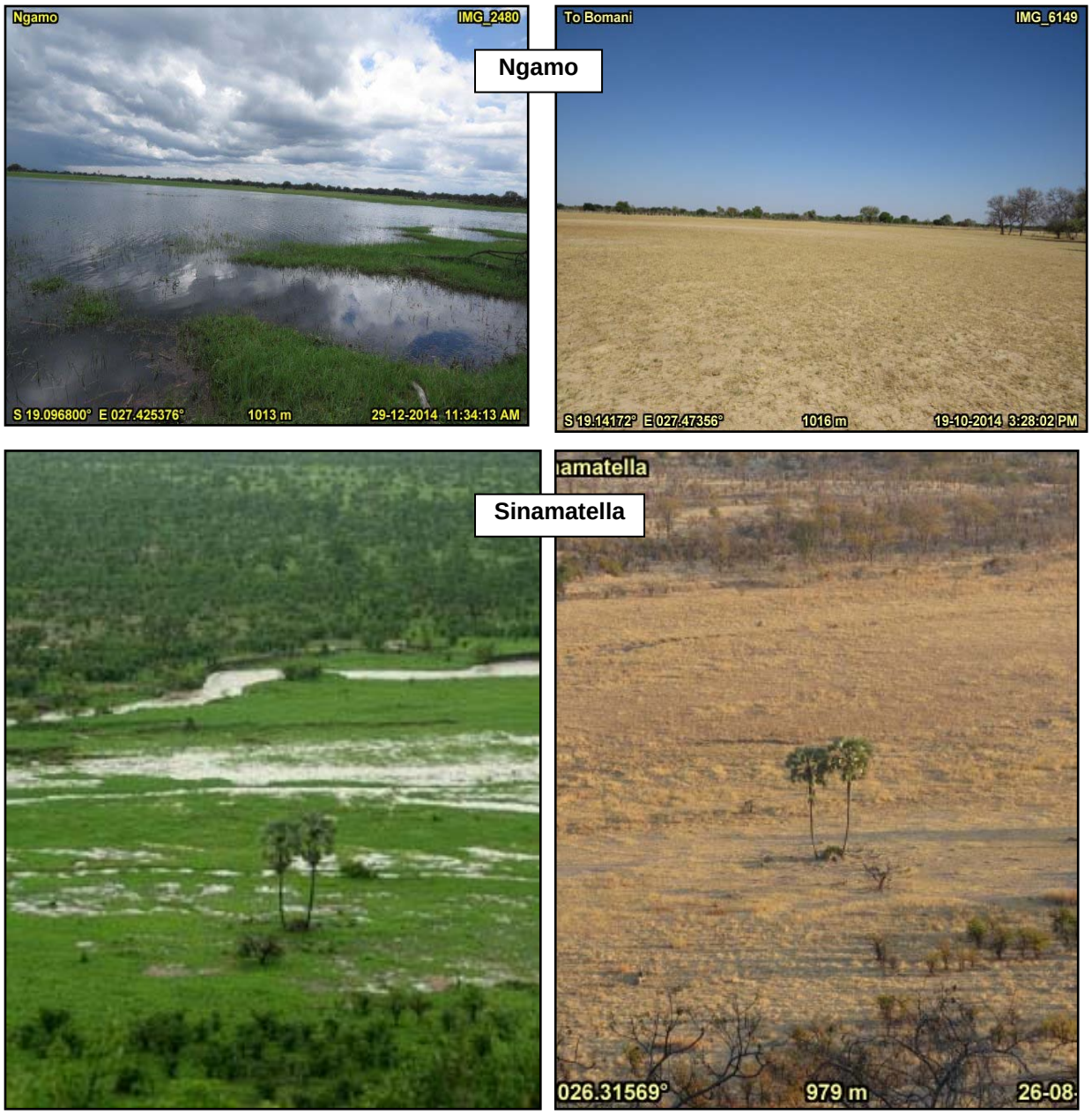


Frost can occur in the park between May and August when temperatures drop to a ground minimum of less than -5^{0}C. Black frosts occur at lower temperatures (less than -7^{0}C and these are thought to happen on average every five years. The number of frost days (when the minimum ground temperature drops to below 0^{0}C or less is about 32 per annum. The lowest ground temperature recorded was -14^{0}C.

Table 13: Ground minimum temperatures recorded at Main Camp

	May	Jun	Jul	Aug	Frost Days	Black Frost Days	Lowest
Mean	4.9	1.1	0.5	3.1	32	0.8	-5.9
SD	1.6	2	1.7	2.2	21.4	2.1	2.6
Min	1.4	-3.2	-3.2	-2.3	7	0	-14.4
Max	8	4	3.5	6.7	91	9	-2
n	16	17	16	16	17	17	17

Figure 42: Seasonal differences in Hwange



2.6 VEGETATION

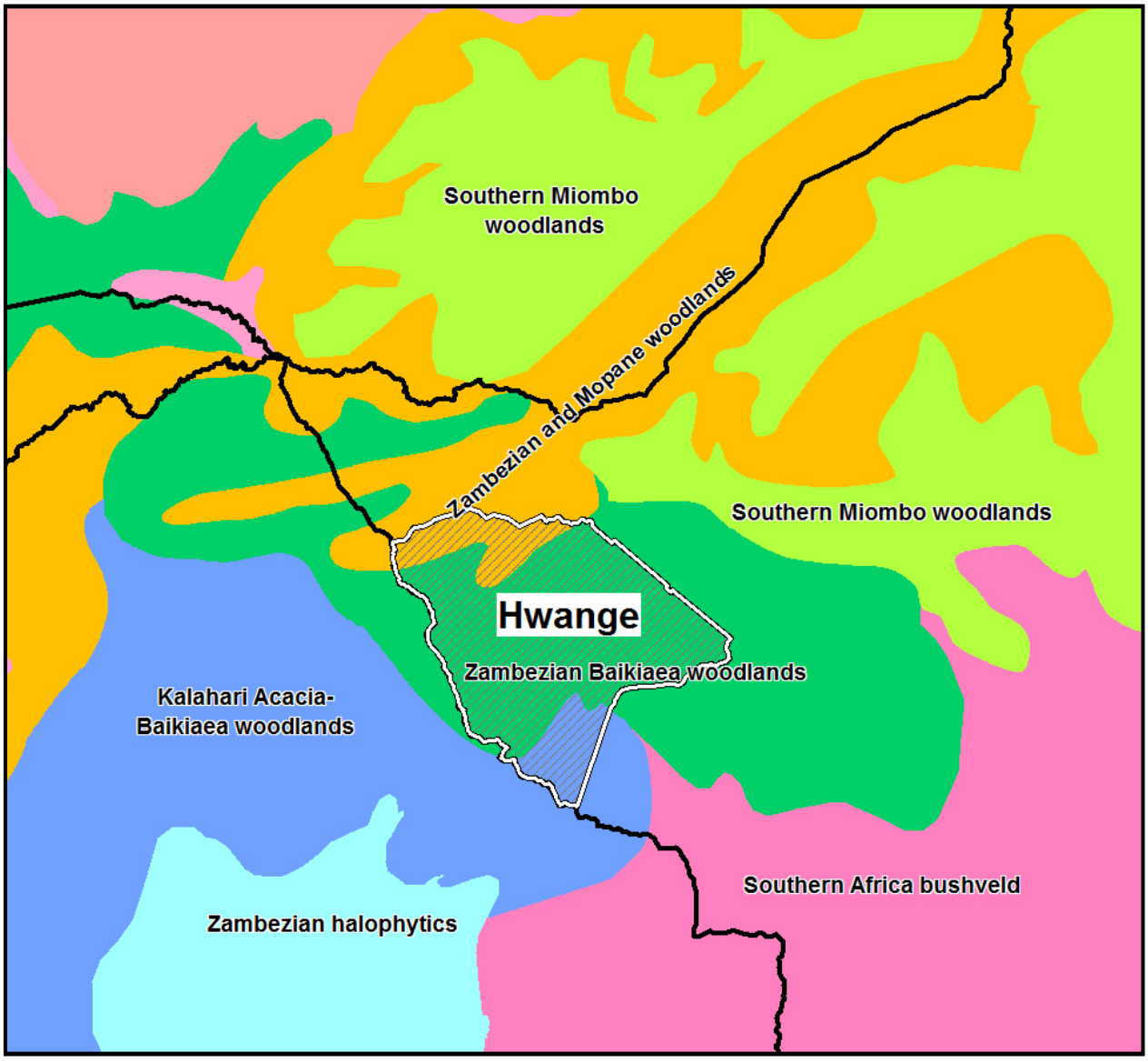
2.6.1 Vegetation Description

(Mainly from 1998-2003 Management Plan)

2.6.1.1 WWF Ecoregions

As defined by WWF an ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region". The definition of the ecoregions in the area surrounding Hwange is shown in Figure 43 and is included here to show the importance of Hwange to the Zambezian Baikiaea Woodlands, especially in Zimbabwe.

Figure 43: WWF Ecoregion classification in relation to Hwange NP



2.6.1.1 Vegetation Mapping History of Hwange

The first description and map of the vegetation Hwange was prepared by the Forestry Commission (Wiltshire, 1964) who surveyed the area for commercially valuable hardwoods. As a result of the bias towards exploitable timber, the description and map were an over simplification of the diversity of vegetation communities which occur.

Conex undertook a brief survey of the north west of the park (Robinson, 1974) and produced a more detailed map and description for that area, but this work was based largely on interpretation of aerial photographs with descriptions of the dominant species in each community based on a few days of field work.

Mitchell (1961), Rushworth (1975), Childes (1984), Childes & Walker (1987) and Conybeare (in prep.) describe various vegetation communities which occur on the Kalahari sands but each used different methods of sampling and sampled different areas of the park, making it difficult to reconcile the descriptions of the communities which they found.

Martin & Tafangenyasha (in prep.) have almost completed a survey of the whole park which will yield a map and description in terms of species composition and physiognomy of approximately 40 woody plant communities.

Apart from the works of Robinson (1974) and Jones (in prep.) who both investigated grasslands in the Robins region of the park, very little attention has been paid to grassland communities.

Rushworth (undated) drew up a check list of vascular plants which included 281 woody species and 829 herbaceous species. The list of woody species was based on Drummond (1975) and the actual presence of all of these in the park has not been confirmed. The checklist is to be updated when the present surveys have been completed.

2.6.1.2 Current Vegetation Map

The most comprehensive vegetation study was completed by Rogers in 1993. The study describes the distribution, structure and floristic composition of the woody communities in the Park. 600 samples were classified into 30 types of woody vegetation, in 11 groups of types. 5 of the groups (16 types) were associated with non- Kalahari sand environments, 6 of the groups (14 types) were located on the Kalahari sand. The material was processed using the TWINSPAN computer program. Aerial photographs were used for the stratification and to prepare a vegetation map.

This vegetation map is available as a digital file and this can be used to represent the vegetation of the park in several ways. These maps are shown on the following pages, along with some explanatory text. A more detailed description of the types is found in the Annexes to this document.

The 1993 survey classified the vegetation into 30 woody vegetation types in eleven groups. These were split into those on non-Kalahari sands (16 types in five groups) and those on Kalahari Sands (14 types in six groups).

Figure 44: Vegetation map of Hwange National Park
(Rodgers, 1993)

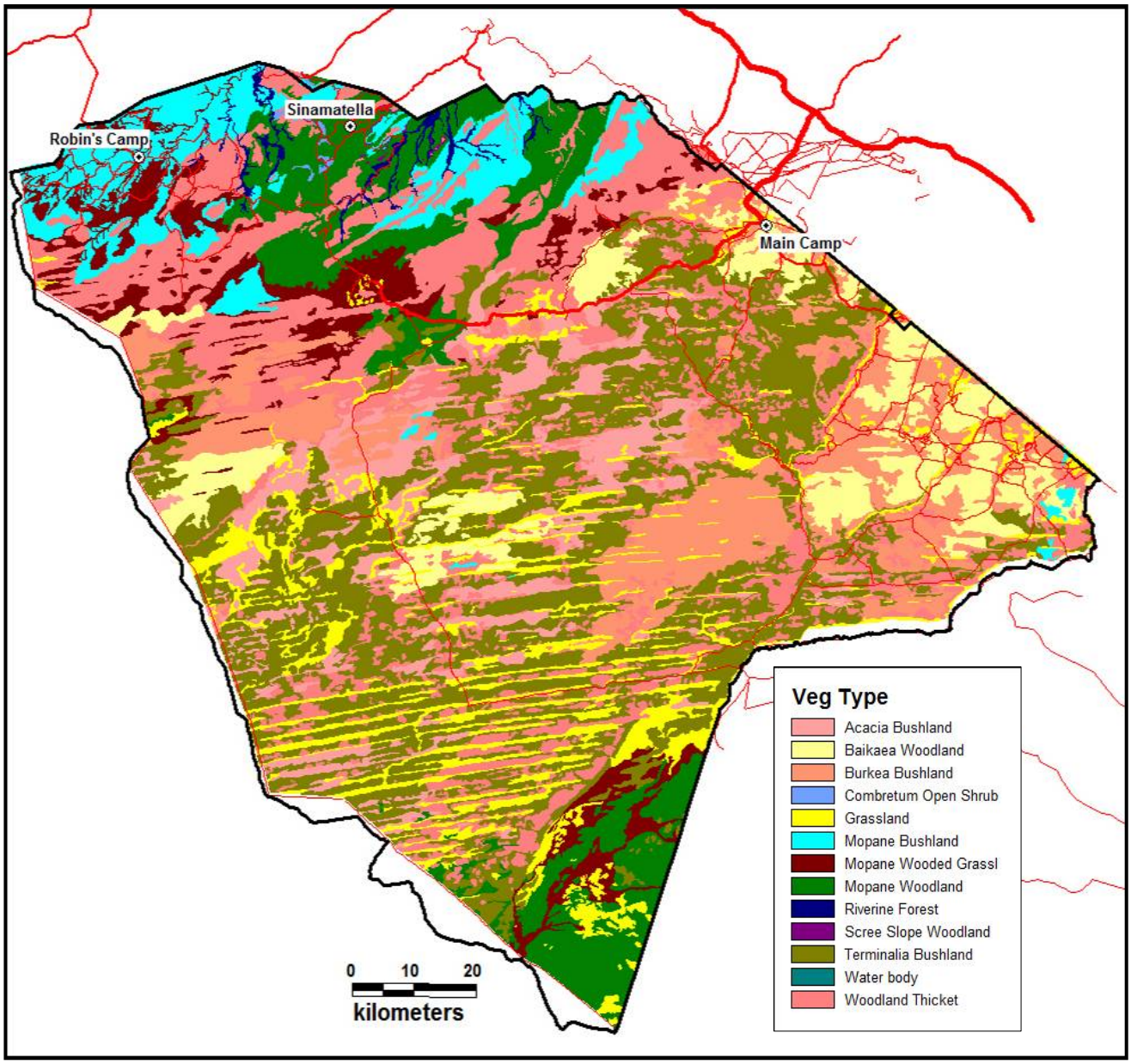
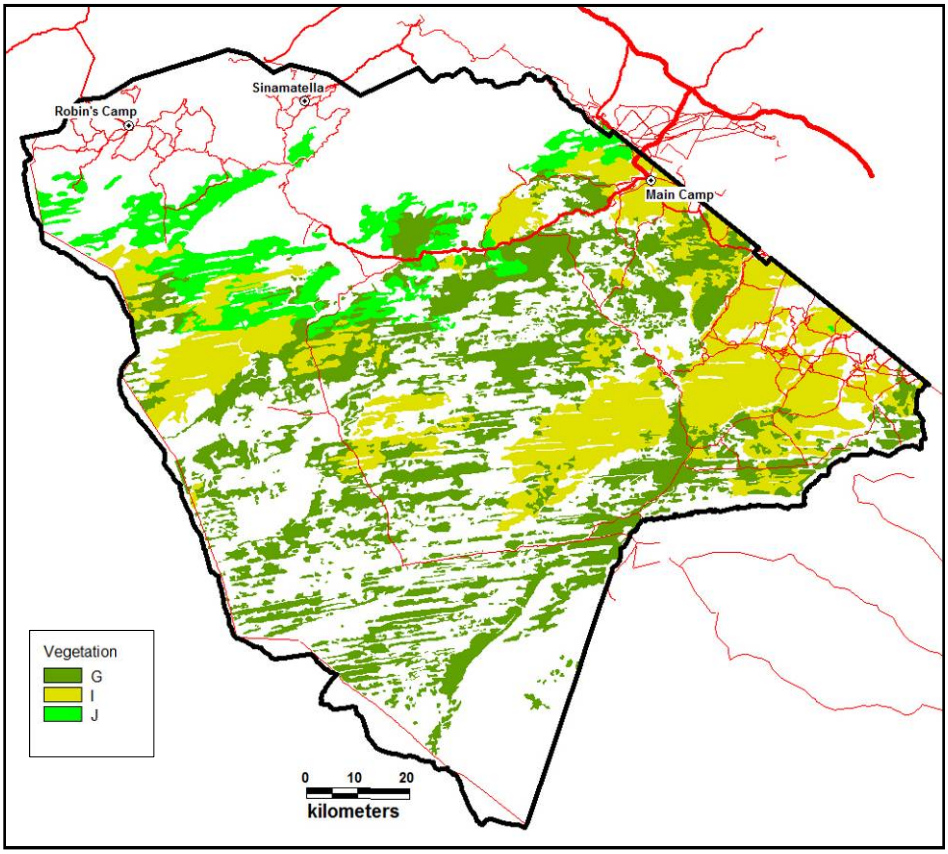


Figure 45: Separation of vegetation groups

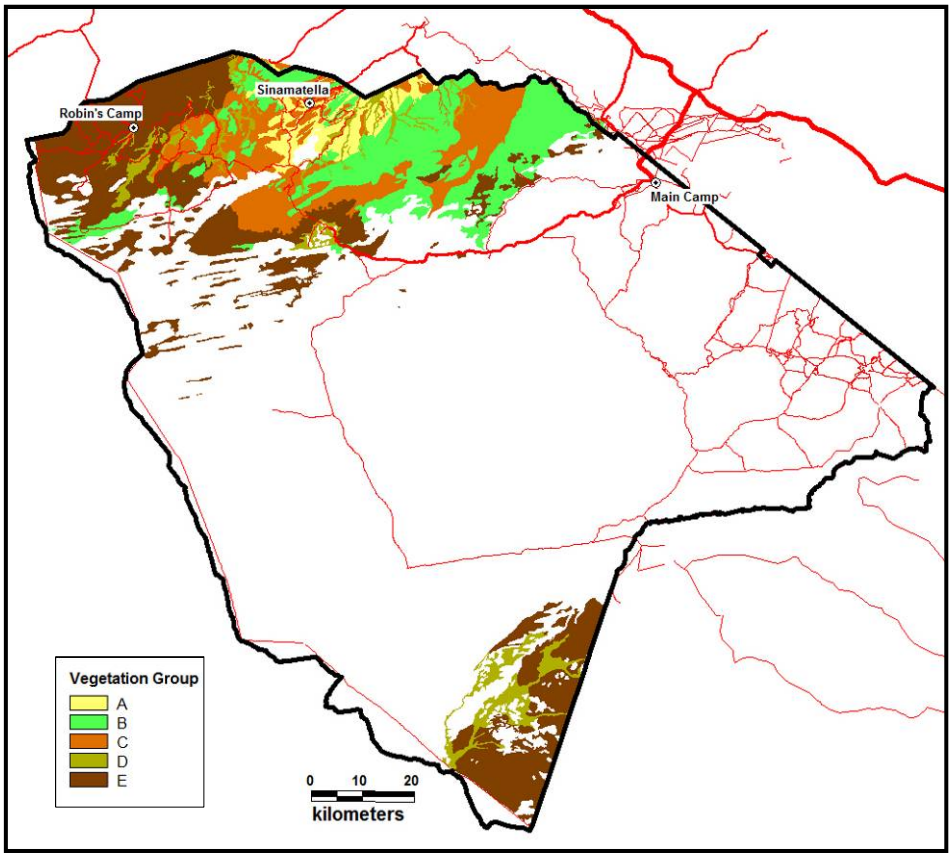


Baikaea Groups

Group G –Acacia-Baikiaea bushland and woodland on Kalahari sands

Group I – Baikiaea woodland and bushland on deep Kalahari sands

Group J – Ecotone Baikiaea woodland and thicket on red Kalahari sands



Mopane Groups

Group A – Woodland thicket types on Lower to Upper Karoo sediments

Group B – Mixed bushland, thicket and woodland on basement complex

Group C – Mopane woodland and thicket on Granitic Gneiss and Madumabisa Mudstones

Group D – Mopane/Imberbe woodland to bushed grassland on seasonally inundated areas

Group E - Mopane bushed grassland to woodland on the watershed, on basalt and karoo formations

Table 13: Summary of vegetation types			
	Type	**Area**	**%**
Non-Kalahari Sands			
A	Woodland Thicket on Lower to Upper Karoo sediments	187	1.3
B	Mixed bushland, thicket and woodland on Basement Complex	854	6.0
C	Mopane woodland and thicket on Gneiss and mudstones	692	4.9
D	Mopane-*C. imberbe* woodland to bushed grassland in seasonally inundated areas	310	2.2
E	Mopane bushed grassland - woodland on watersheds on Basalt and Karoo formations	1,475	10.3
Kalahari Sands			
F	C. *imberbe* bushed grassland on periodically waterlogged soils	1,302	9.1
G	Acacia – *Baikiaea* bushland and woodland on Kalahari Sand	3,107	21.8
H	*Terminalia-Combretum* bushland	2,830	19.9
I	Baikiaea woodland and bushland on deep Kalahari sands	2,352	16.5
J	Ecotone *Baikiaea* woodland and thicket on red Kalahari sands	855	6.0
K	*Burkea* bushland surrounding calcrete areas	222	1.6

Figure 46: Percentage areas of the main vegetation groups in Hwange National Park

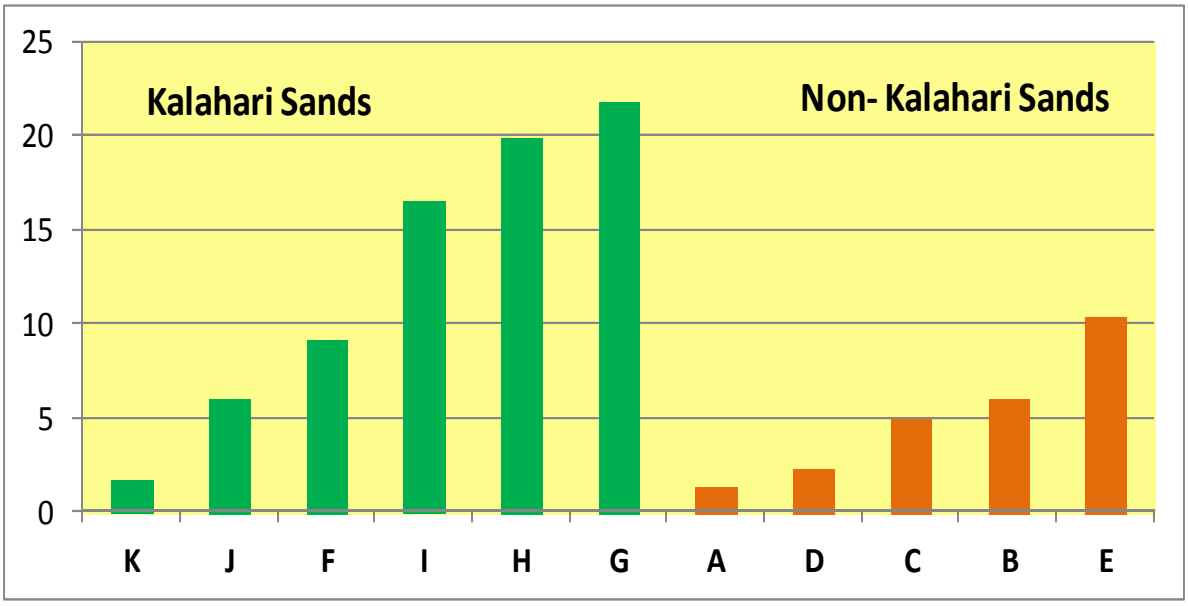
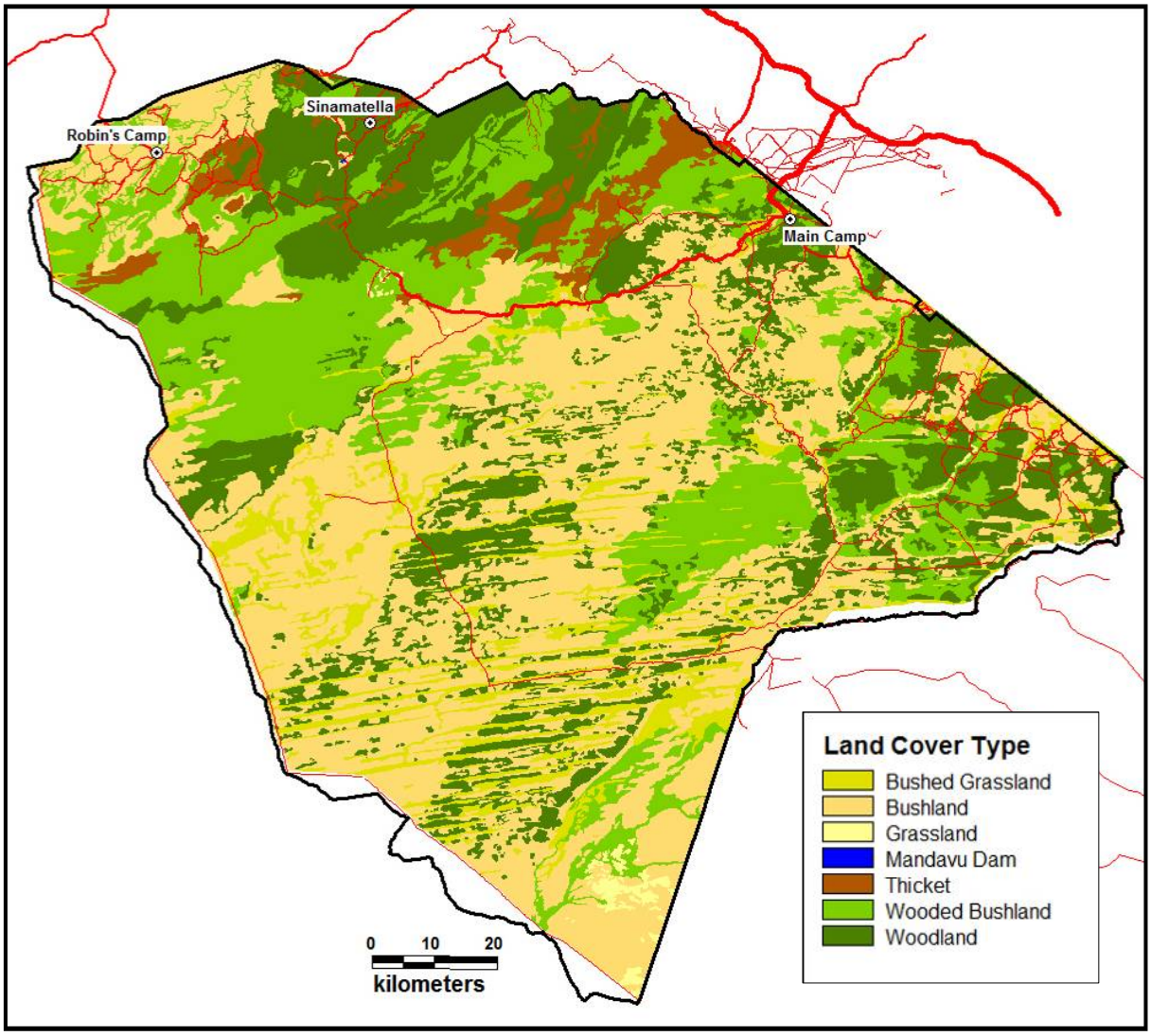
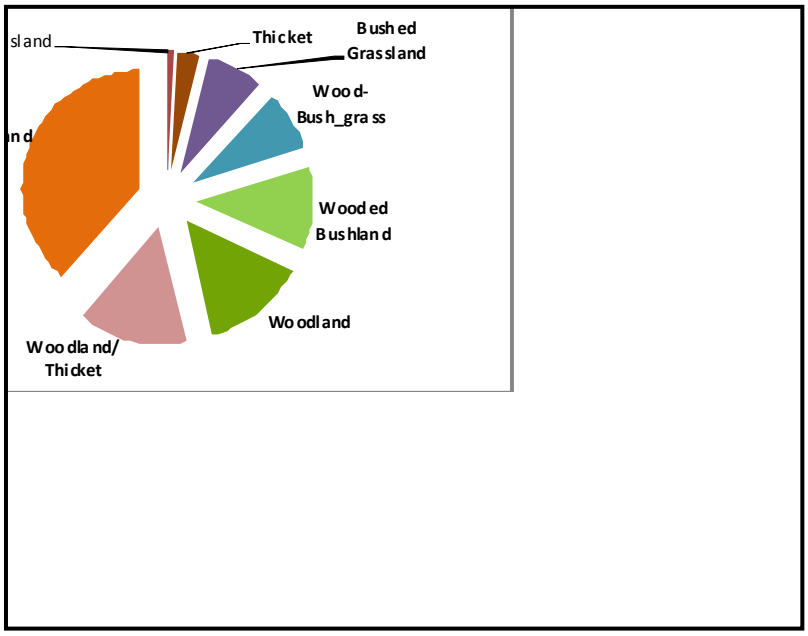


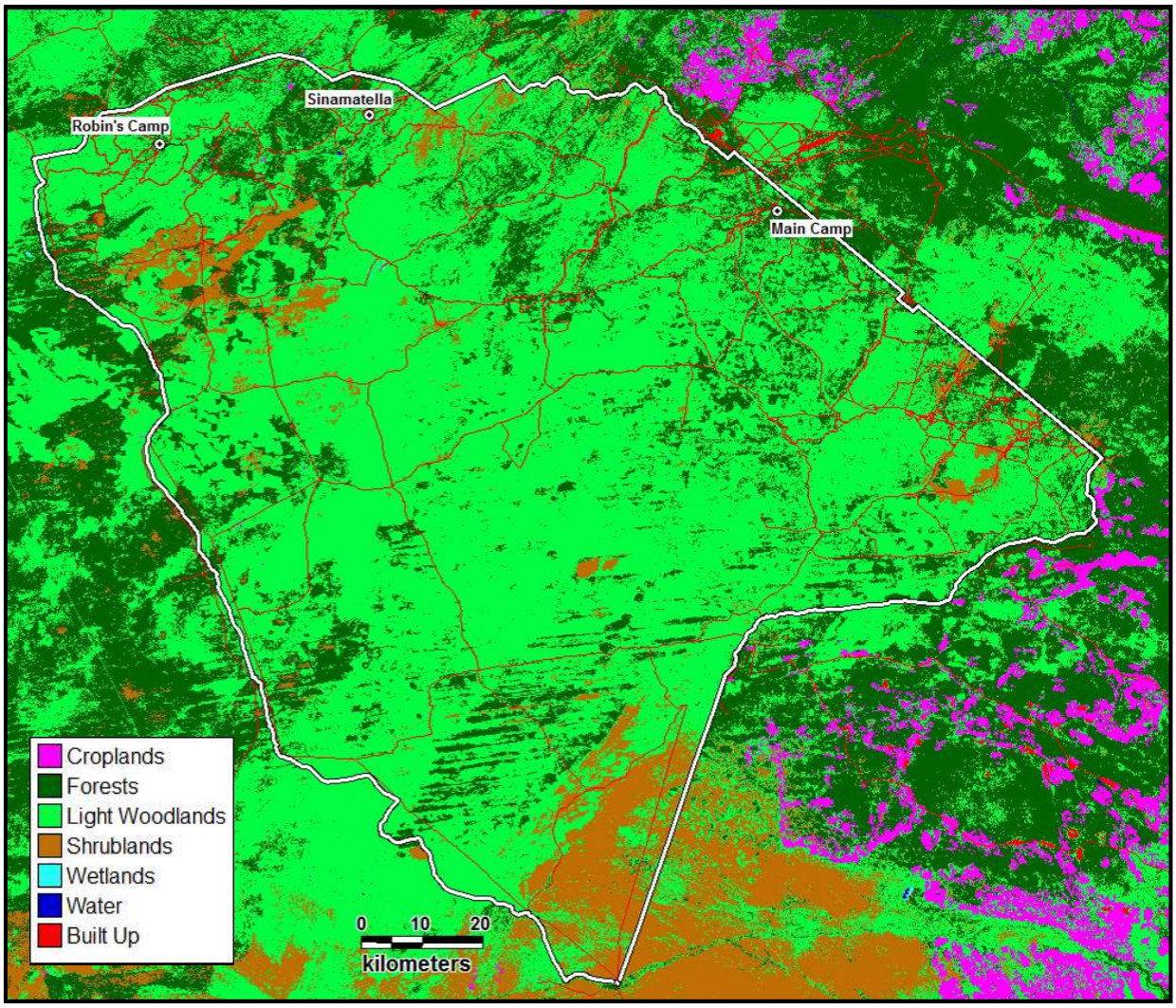
Figure 47: Landcover types of Hwange National Park





A recently released global landcover dataset from China is useful in that cultivated areas stand out quite clearly (Figure 48). Some ground truthing and comparison with Google imagery indicates that it is quite an accurate representation of the situation with regard to cultivated areas.

Figure 48: Landcover 2010
(Global landcover data from China)

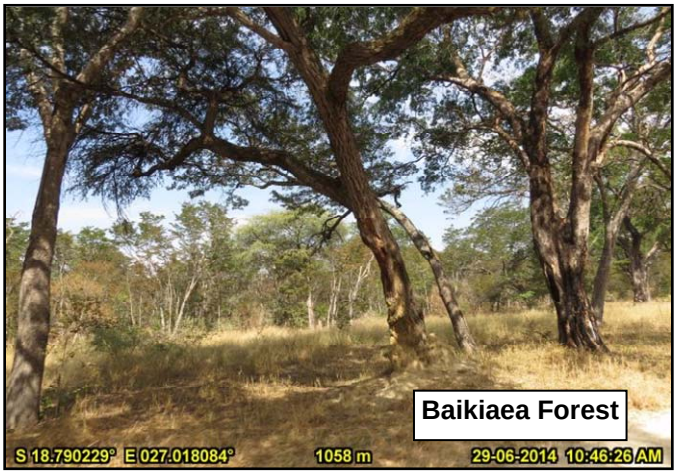


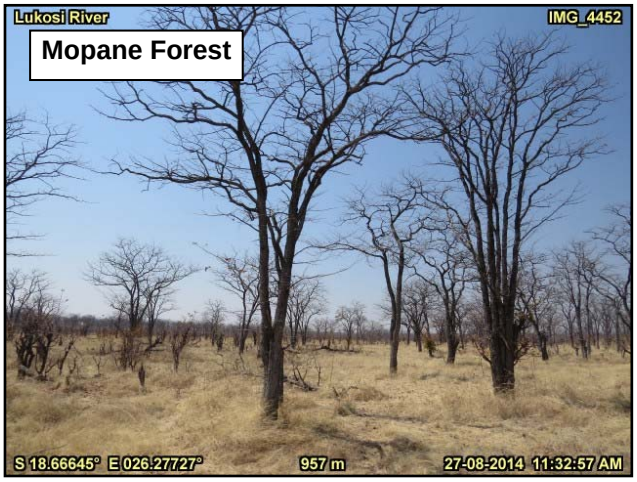
2.6.1.3 Validity of the 1993 Map

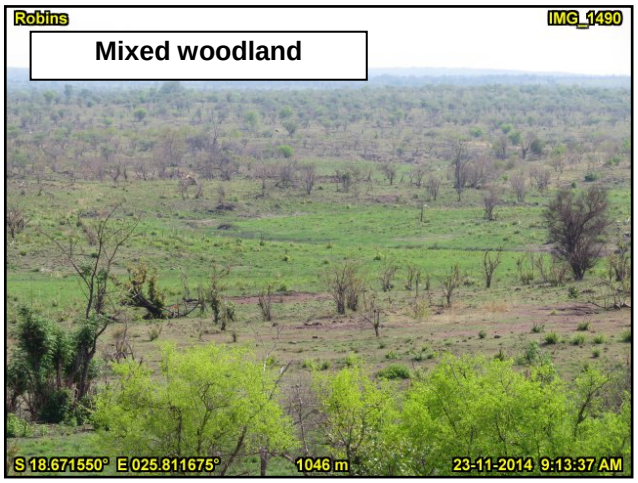
The 1993 map was an exceptional piece of research and a valuable asset for the park. However, we are now over 20 years on and much of the mapping was carried out prior to the doubling of the elephant population after culling stopped. There have been significant changes since the early 1990s and the most obvious is that of the opening up of the habitat. There will also be other changes with regard to species composition but these are less obvious and would need to be researched.

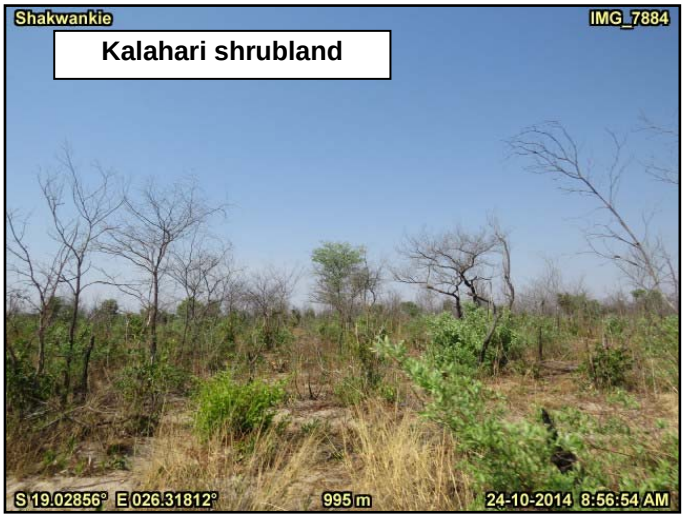
A new vegetation map is being researched and compiled and it is hoped that the methodology used will allow it to be directly compared with the 1990 work. It may be more valuable to regard these two surveys as data points in a continually evolving vegetation change scenario, rather than to perceive them as being "the" vegetation map for the park.

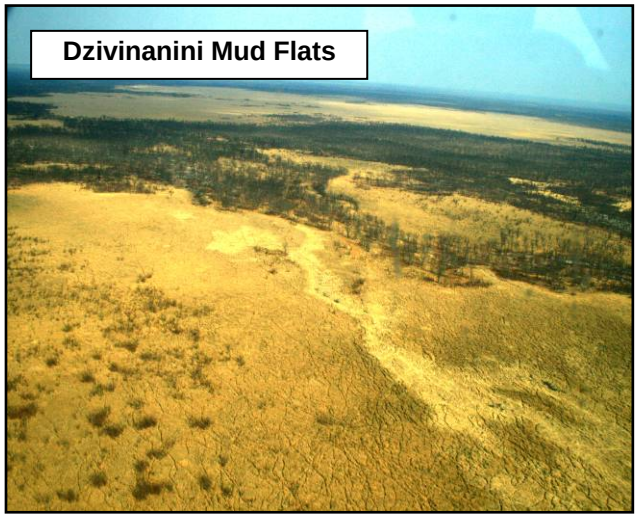
Figure 49: Examples of Hwange vegetation











2.6.1.4 Special Plant Communities

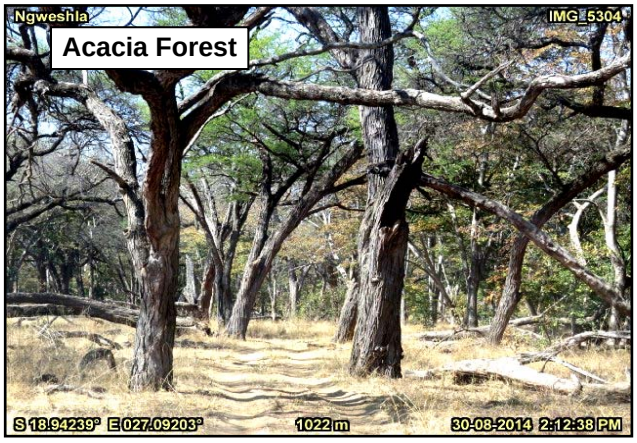
There are some special plant communities in the park that deserve special mention. These are the acacia groves and the palm savannas.

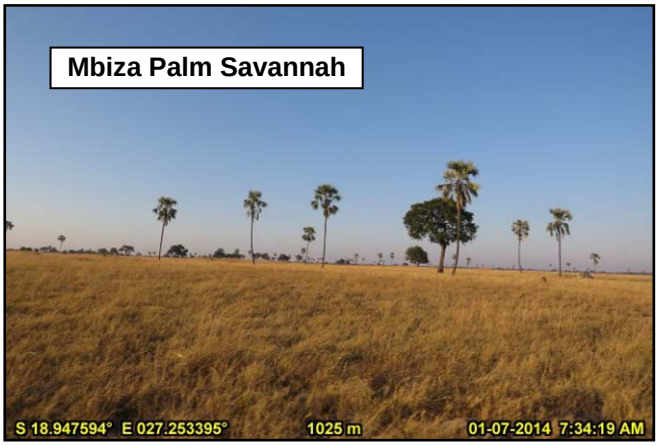
Palm savannahs occupy a very small portion of the park and the biggest is at Mbiza. This is a very open old growth palm stand and there appears to be very little recruitment. However, on the eastern side of the railway line there are some stands of palms in mixed woodland which show palms in various stages of their life cycle. Fires and herbivore damage may be possible reasons. It may be that the Mbiza savannah is a temporal climax stage in the development of this vegetation type and may eventually change into something else.

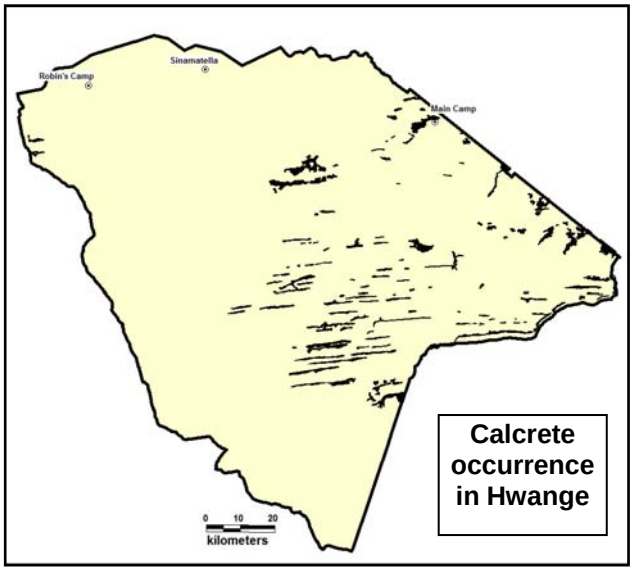
It should be noted that the palm savannas occur on calcrete soils which is important soil type and vegetation community in its own right (Group 19 in Rodgers). This is the most diverse of the Kalahari sand types with 107 species. Pans are common in these areas and an indicator species is *Combretum imberbe.*

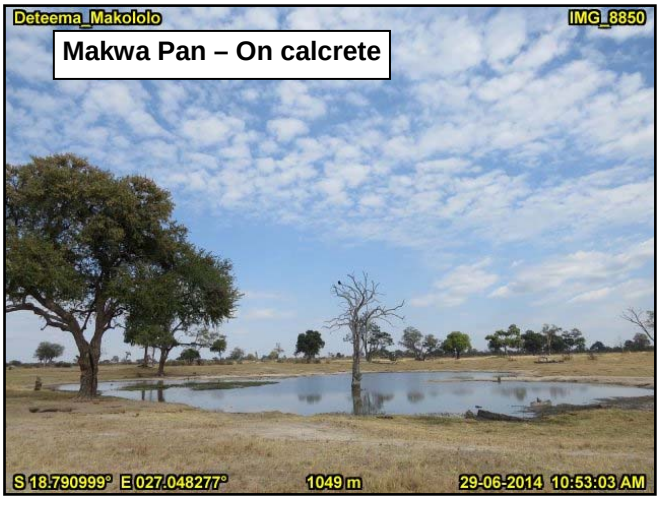
Acacia groves are found in various areas on the Kalahari sand but the most accessible are those on the western side of Kennedy vlei. Again may of these are old growth trees with little evidence of recruitment and they may also be a temporal vegetation type. There are many places where on sees mature Acacia trees standing alone or in small groups in stands of Baikaiea. These could be the remnants of past acacia groves which have been invaded by other species.

Figure 50: Special plant communities in Hwange





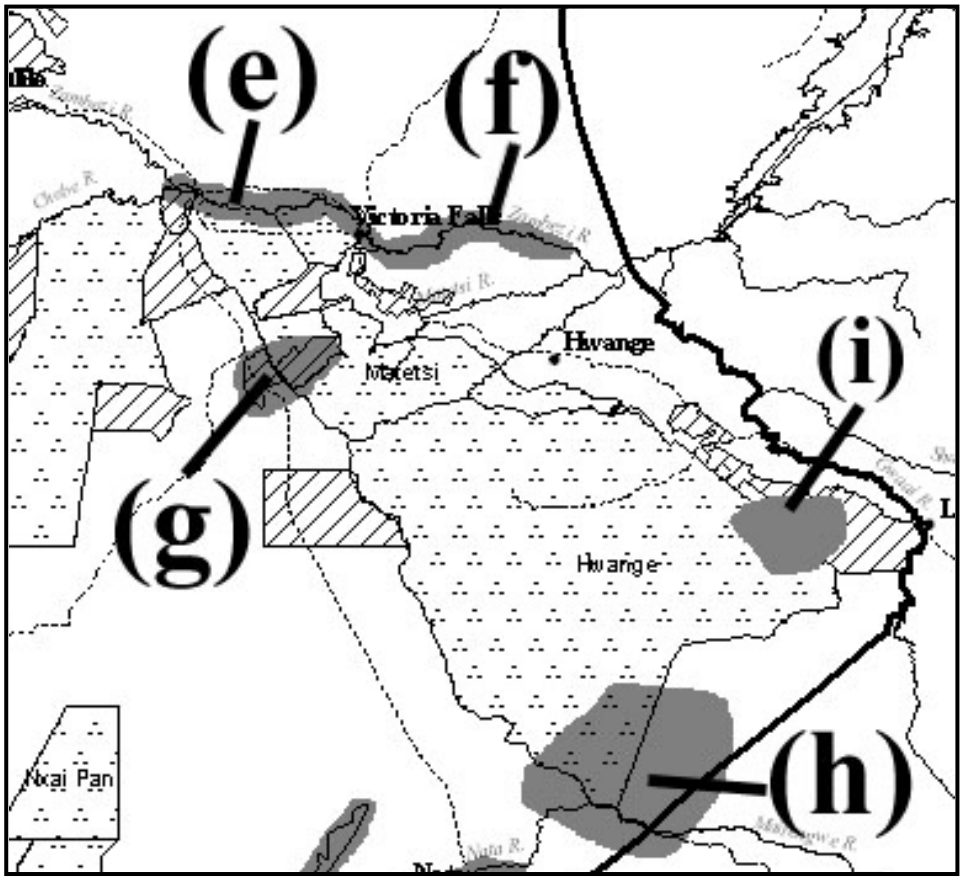




2.6.1.4 Special Areas of Biodiversity Interest

The "Four Corners" project was a pre-cursor to the KAZA project and was coordinated by the African Wildlife Foundation in 2004. This project identified five areas of special bioversity interest in North-West Matabeleland, two of which were in Hwange. These were the "Hwange Mudflats", essentially the Dzivaini section of the park and the area adjacent to it in the Tsholotsho Communal Land, and the Ngamo Pan (Figure 46x).

Figure 51: Special areas of biodiversity interest in North-West Matabeleland
E = Zambezi Riparian; F = Batoka Gorge; G = Kazuma Pan; H = Hwange Mudflats; I = Ngamo Pan
(Four Corners Project, 2004)



Southern Hwange dunes and Nata mudflats: An extensive mosaic, mostly in Zimbabwe although crossing into Botswana, of relatively untouched dense woodland (Zambezi Teak *Baikiaea*, Camelthorn *Acacia erioloba* and Kalahari Sand Acacia *Acacia luederitzii*) on Kalahari sand dunes dating from the Pleistocene period, mudflats with grassland, Acacia and mopane, and shallow sand areas with *Combretum* scrub. Many small seasonal pans with ephemeral species are also present. There is a high habitat diversity with a number of unusual plant species as it is a meeting place of the Zambezian and Kalahari floras. The biodiversity of the area is very poorly known, and is likely to be rich. Much of the area lies within Hwange National Park, although a significant portion lies to the south in Tsholotsho communal land.

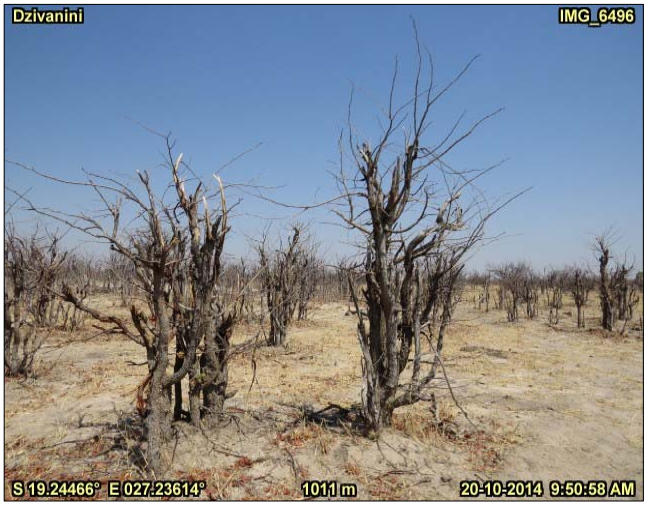
Ngamo Pan and surrounds: A large area straddling Hwange National Park and Ngamo Forest Land in western Zimbabwe with calcareous pans set in Kalahari sand and remnants of old dunes. Many of the surrounding woodlands are open with Zambezi Teak *Baikiaea* and Mukwa *Pterocarpus angolensis*, while the grasslands have a high density of *Hyphaene* palms The pans and grasslands are important for such mammals as gemsbok and wildebeest and for waterbirds. It is protected as either national park or as forest land, although the southern portion lies in communal land with no protection.

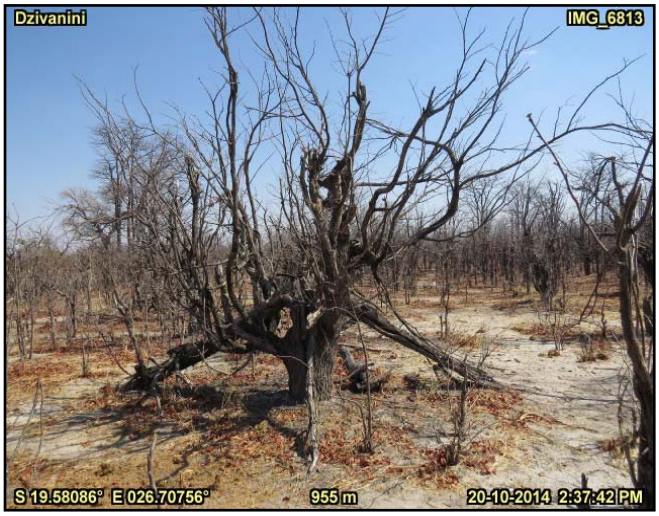
2.6.2 Effect of the Supplemented Water Programme on Vegetation

The supplemented water programme has concentrated wildlife into approximately 20% of the park during the dry season. The main biomass is made up of elephants, notorious for their ability to modify the habitat. So what effect does this seasonal concentration have on the habitat?

The vegetation of Hwange is in a continual state of flux. Change is inevitable and will occur whatever herbivory, fire or rainfall regime is ascending or descending. Previous management regimes called for the reduction of elephants in certain management compartments to protect the vegetation and ultimately the biodiversity. This led to massive culling exercises and some 17,000 elephants were removed (see section 2.7.5.4). The elephant population was constrained to around 15,0000 to 20,000 animals at this time. However, after 1986 culling ceased and this saw a quick doubling of the elephant population (in about 5 years). The elephant population appears to be fluctuating around a new mean of 35,000 animals for the past 25 years and there is no doubt that the increased elephant population has had a marked effect on the vegetation.

Figure 52: Examples of elephant herbivory on mopane at high densities





However, as elephants do not allow the mopane to grow into tall stemmed “cathedral” forests they also keep the leafy part of the plants at a level where they can be utilised by other animals, especially once the rains start.

However, a study carried out by CIRAD compared two contrasting periods in terms of elephant population densities - the early 1980s and the late 1990s. Elephant population density and other ungulate population densities were estimated for a c. 400 km^2 area from road counts (loop Main Camp, Guvalala, Shapi, Kaoshe, Ngwenya, Main Camp). Vegetation structure at the landscape scale was assessed using aerial photographs for the same area. All browsers and grazers declined between the early 1980s and the late 1990s, whereas elephants experienced a 16-fold increase. At the landscape scale, vegetation structure changed little, with no evidence of an opening of the habitats.

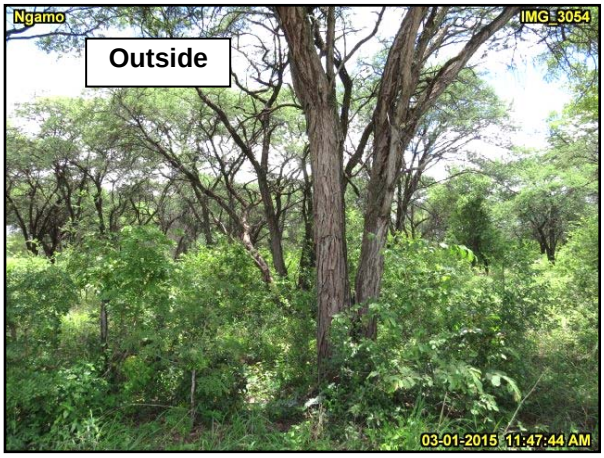
In a five year study on elephants and their effect on vegetation in the Kalahari sands (Conybeare, 1991) it was determined that elephants were the major cause of change in all habitats (forest, bushland etc) but that frost could also have a severe effect in the more open vegetation types. It was concluded that change was reversible if elephant numbers could be reduced. There is also some discussion that the rains will seasonally reduce the vegetation numbers and allow habitat recovery to an extent whereby long-term, wide ranging degradation could be avoided.

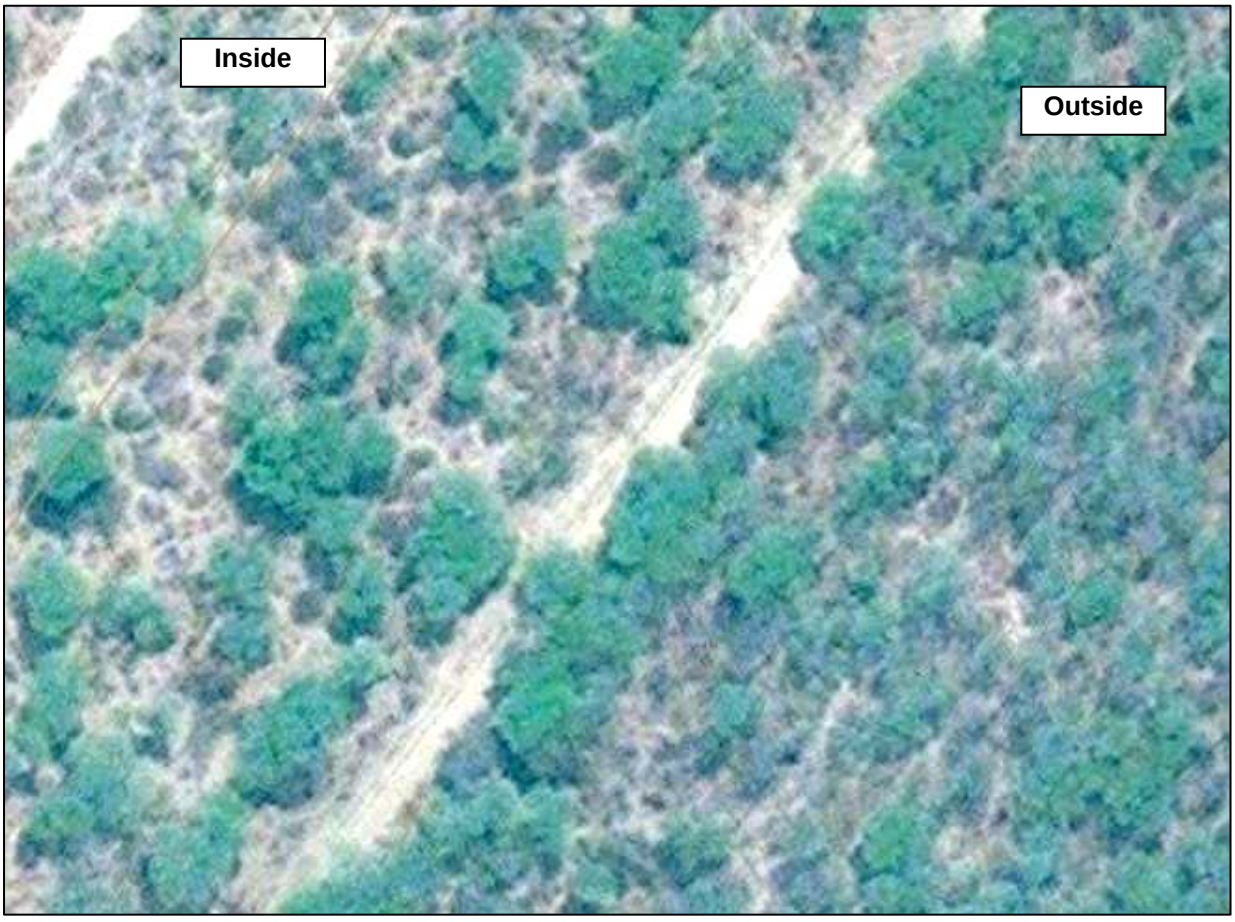
The most obvious effect is the immediate damage to trees, especially in areas close to the waterhole. A less obvious effect is the emergence of non-palatable species such as *Erythrophyllum* in the areas close to the waterholes.

Figure 53: Emergence of *Erthrophyllum* next to a waterhole

A clear example of the effect of different elephant densities on woodland is found on the southern boundary. At Ngamo the boundary fence dissects an old growth Acacia forest and there is a marked difference between the forest density and species composition inside (high herbivory rates) and outside (lower herbivory rates). This example is shown in Figure 54.

Figure 54: Acacia forest on park boundary

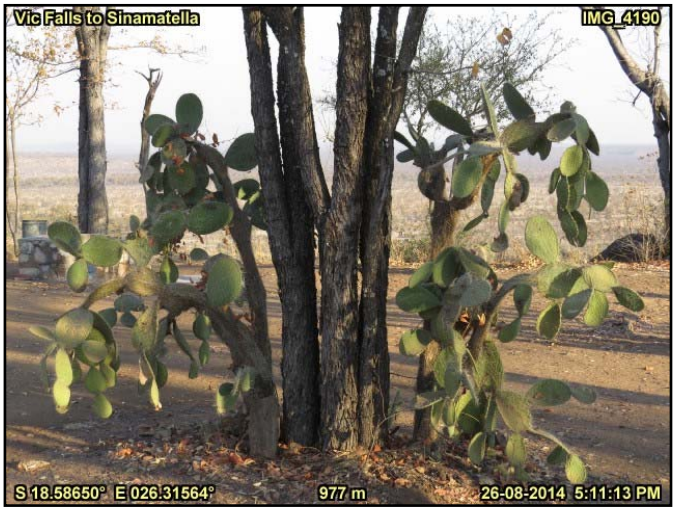




2.6.3 Exotic Plants

Figure 55: Examples of exotic plant infestations

There is a general belief that Hwange does not have an exotic plant problem. However, this may be a mistaken belief and close inspection may indicate that exotic species do occur in the park and do have the potential to become problems in the future. The adjacent photo of *Opuntia*? Is taken at Sinamatella.

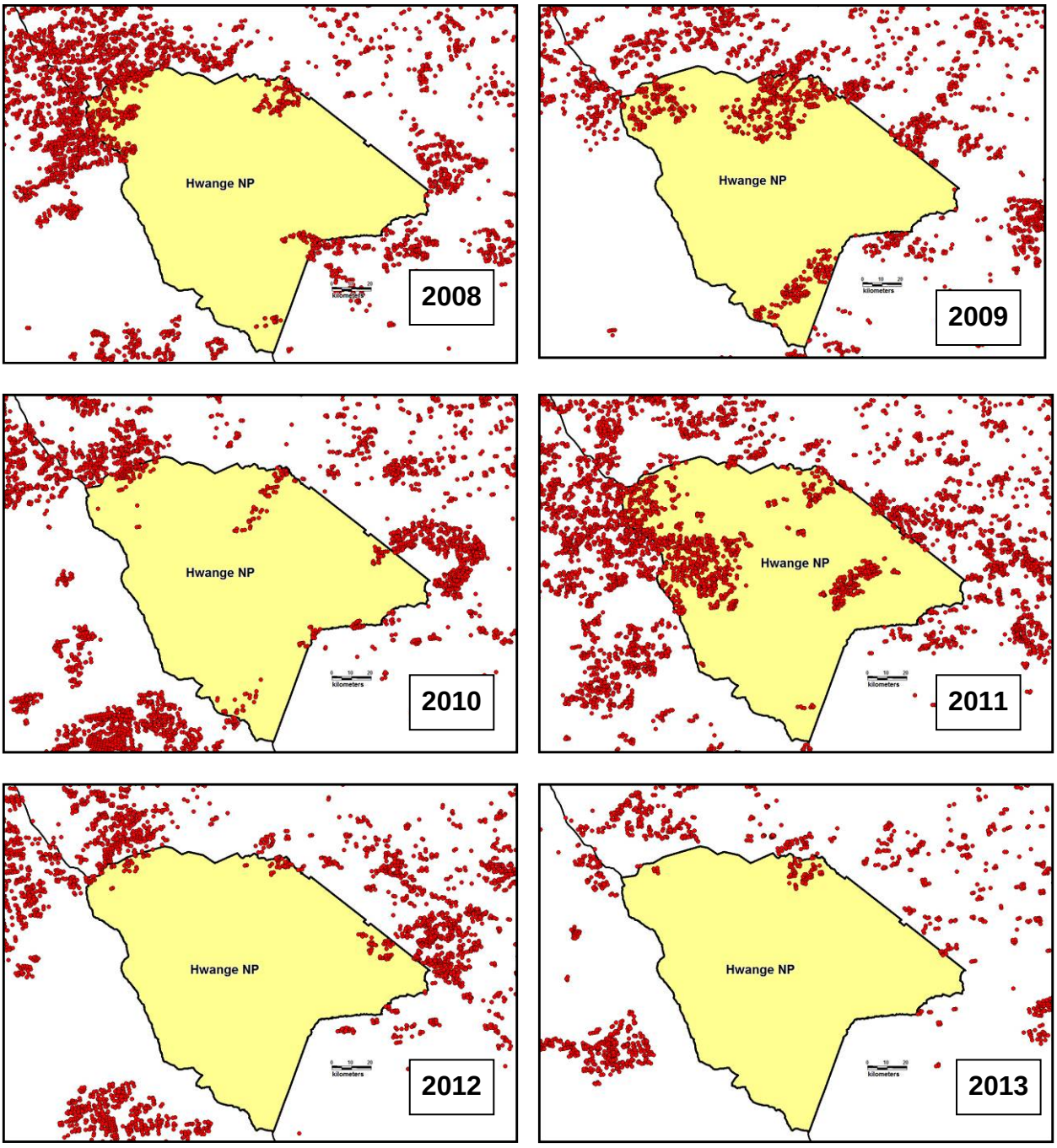


Syringa infestations on the Deka river

2.6.4 Fire

Fires are an important modifier of vegetation and uncontrolled burns have the potential to have a major deleterious effect in Hwange. Modis fire data was collected for 2008 to 2013 and shows that, in most years fires have been prevented from entering many parts of the park.

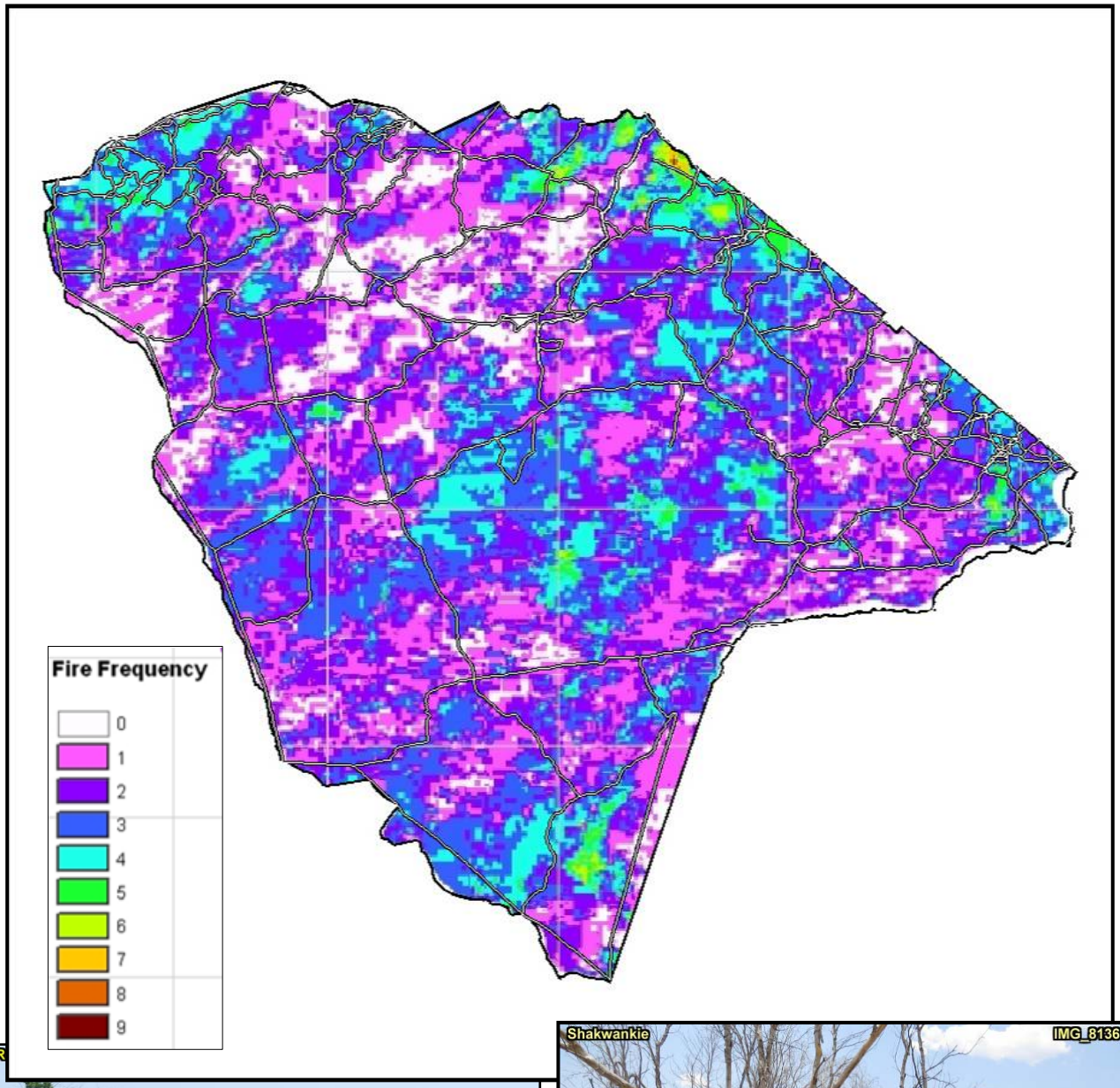
Figure 56: Fire maps of Hwange National Park



Fire as a conservation tool is also something to be considered. Hot, late season burns can be used to control bush encroachment. Early season, cool burns can be used to reduce fire load and stop hot burns in areas where they are not wanted. However, fire as a management tool can also have unintended consequences and also has the potential to covert to an uncontrolled wild fire. There is also disagreement in the literature regarding the desirable, natural frequency of fire.

Using computer simulations and data from the Modis fire satellite it was possible to prepare a fire frequency map of the park for the nine year period between 2000 and 2009, This indicated that fires are more frequent at selected areas around the boundary (e.g. Main Camp, Robins, Ngamo). However there was also a relatively low frequency of fire in the central areas (Figure 57).

Figure 57: Fire frequency map – 2000 to 2009

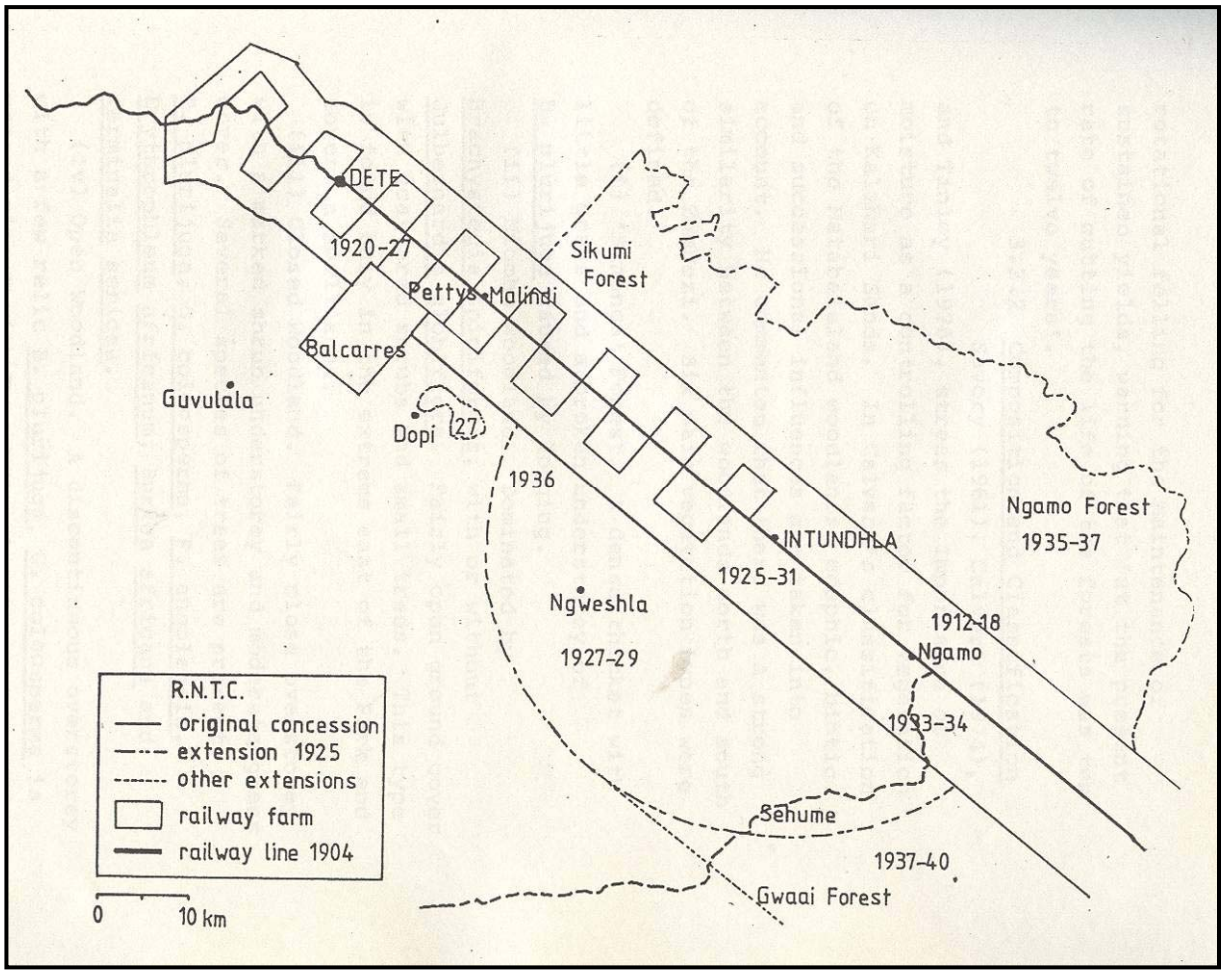


Fire damage

2.6.3 Commercial Utilisation

Logging of the teak forests commenced in 1903 with the constriction of the railway line. A commercial sawmill was opened at Malidi in 1921 and their concessions included a 16km belt on either side of the railway and a 30+km radius from Induthlwa Siding – this extended to Ngwesla in the park (Figure 58). Initially there were no controls on logging and a 1940's survey commented on the erosion of the forests. Logging reduces the fire resistant qualities of the forest by creating large gaps in the canopy which results in decreased soil moisture and the growth of grasses (therefore fuel). The effects of this logging are still noticeable in the forests today with lower densities of mature *Baikiaea* trees (Childes, 1984). Recovery appears to depend on the control of hot fires in these areas.

Figure 58: Historical logging concession in eastern Hwange
(From Childes, 1984)



2.7 WILDLIFE POPULATIONS – NON-MAMMALS

2.7.1 Invertebrates

The invertebrate fauna of the park is poorly known. Are there tsetse??

2.7.2 Fish

Being without any natural permanent water over most of the part the fish fauna is not extensive. However, the pools and rivers in the north have an indigenous fish fauna while several species have been introduced into the pumped pans. Mandavu dam is a popular fishing spot for residents from Hwange town.

2.7.3 Reptiles and Amphibians

A provisional list of reptiles and amphibians in the Zimbabwean Parks and Wildlife Estate was drawn up by Blake (1972) and Broadley and Blake (1979). This indicated that there were 37 species of snakes, 13 lizards, seven gekkos, 1 chameleon, 3 terrapins, two tortoises and five amphisbaenians present in the park, in addition to the Nile Crocodile. The recent discovery of the Kalahari Serrated Tortoise brings the number of tortoises to three. This appears to be an outlier population of tortoises separated from the main known range further to the south and west.

2.7.4 Birds

Several checklists of birds have been published for Hwange with one being produced for sale to tourists in 1974. Currently 411 species of birds have been recorded from the park.

Hwange is probably best known for its huge population of raptors with Bateleur, Martial Eagle, Tawny Eagle, African Hawk-eagle, Brown Snake-eagle and Black-chested Snake-Eagle being common. In summer, Steppe Eagle, Lesser Spotted Eagle, Amur and Red-footed Falcon and Eurasian and African Hobby are frequently seen.

The northern area dams and pans have some interesting birds, including African Skimmer, Greater Flamingo, Lesser Flamingo, Collared Pratincole, Black-winged Pratincole and Whiskered Tern.

Hwange was inscribed onto the list of important bird areas in 2001 and a number of species were listed as being of potential concern (Table 14). In addition a number of specially protected birds are found in the park (Table 15).

Table 14: Important birds for Hwange

Species	Season	Pop. Est.	IBA Criteria	IUCN Category
Dickinson's Kestrel *Falco dickinsoni*	resident	present	A3	Least Concern
Burchell's Sandgrouse *Pterocles burchelli*	resident	present	A3	Least Concern
Racquet-tailed Roller *Coracias spatulatus*	resident	present	A3	Least Concern
Bradfield's Hornbill *Lophoceros bradfieldi*	resident	present	A3	Least Concern
Miombo Wren-warbler *Camaroptera undosa*	resident	present	A3	Least Concern
Barred Wren-warbler *Camaroptera fasciolata*	resident	present	A3	Least Concern

Table 14: Important birds for Hwange				
Species	**Season**	**Pop. Est.**	**IBA Criteria**	**IUCN Category**
Meves's Glossy-starling *Lamprotornis mevesii*	resident	present	A3	Least Concern
Kurrichane Thrush *Turdus libonyanus*	resident	present	A3	Least Concern
Kalahari Scrub-robin *Erythropygia paean*	resident	present	A3	Least Concern
White-headed Black-chat *Myrmecocichla arnoti*	resident	present	A3	Least Concern
Miombo Rock-thrush *Monticola angolensis*	resident	present	A3	Least Concern
White-breasted Sunbird *Nectarinia talatala*	resident	present	A3	Least Concern
Miombo Double-collared Sunbird *Nectarinia manoensis*	resident	present	A3	Least Concern
Broad-tailed Paradise-whydah *Vidua obtuse*	resident	present	A3	Least Concern
Black-eared Seedeater *Serinus mennelli*	resident	present	A3	Least Concern

Table 15: Zimbabwean specially protected birds found in Hwange	
African Hawk Eagle	*Hieraaetus spilogaster*
All the Bustards and Korhaans	Family *Otidae*
All the Cranes	Family *Gruidae*
All the Flamingoes	Family *Phoenicopteridae*
All the Pelicans	Family *Pelecanidae*
All the Storks	Family *Ciconiidae*
All the Vultures	Family *Aegypiidae*
Ayres' Hawk Eagle	*Hieraaetus dubius*
Bataleur	*Terathopius ecaudatus*
Black Eagle	*Aquila verreauxi*
Black-breasted Snake-Eagle	*Circaetus pectoralis*
Black Sparrowhawk	*Accipiter melanoleucus*
Brown Snake-Eagle	*Circaetus cinereus*
Fish Eagle	*Haliaeetus vocifer*
Hamerkop	*Scopus umbretter*
Lanner Falcon	*Falco biarmicus*
Martial Eagle	*Polemaetus bellicosus*
Osprey	*Pandion haliaetus*
Peregrine	*Falco peregrinus*
Secretary Bird	*Sagittarius serpentarius*
Tawny Eagle	*Aquila rapax*.

2.7 WILDLIFE POPULATIONS – MAMMALS

Significant research has been carried out on the larger mammal populations in the Hwange ecosystem, much of it since 2000. So much so, that it was felt necessary to create a separate section in order to present the data. This has been divided into general surveys, then a section on carnivores followed by a section on herbivores.

2.7.1 Species Overview

Two extensive mammal surveys have been carried out in the park. These were by Wilson in 1973 and again by Wilson in 1996.

A concern tabled in the 1996 report was that there was a lack of published data coming out of Hwange, given that at least the Main Camp Station almost always had a resident ecologist. The lack of published data does not mean that no research was carried out, it just was recorded and filed in a format that makes it almost impossible to find 20 years later.

Table 16: Species status of selected herbivores in Hwange

Species	Comments 1996 (Wilson)	Comments 2014
Elephant	Estimated at 10,000 in 1973 and nearly 30,000 in 1996	Survey in 2007 indicated 35,000. Results from 2014 indicate +53,000
Buffalo	Buffalo population halved between 1973 and 1996. In 1996 less than 5,000. Culling and translocation exercises have had an effect on the population	2007 survey indicates 2,250 so decreased again. However, in 2014 the estimate was 2,186
Rhino		8 Individuals in northern park
Eland	Eland numbers declined between 1973 and 1996	
Roan	Roan found in Ngamo and Robins areas. Appear to be less in Ngamo in 1996	
Sable	Main concentration in Ngamo area	
Impala	Range has spread and substantial increases despite culling	
Wildebeest	Main concentration in Ngamo area. Appear to have decreased since 1973 with smaller herd sizes	Main concentration in Ngamo but now seen in north around Main Camp. Founder population from Botswana?
Waterbuck	Low densities concentrated in Makololo area	
Tsessebe	Common in Shumba area in 1973. Numbers very low	
Gemsbok	Present in low numbers. Approx 100	
Zebra	Not mentioned	
Hippo		
Kudu		
Reedbuck		Significant numbers in Robins area

Table 17: Species status of selected carnivores in Hwange	
Species	**Comments 2013**
Aardwolf	Occur in Hwange in low numbers, sightings reported along the northeast boundary of the park
African wild cat	Occur in Hwange, frequently sighted especially along the northeast boundary but also in the southern part of the park
African wild dog	Occur in Hwange, frequently sighted throughout the park
Bat eared fox	Occur in Hwange in medium to low numbers, sightings reported along the northeast boundary of the park
Black backed jackal	Occur in Hwange, frequently sighted especially along the northeast boundary of the park
Side striped jackal	Occur in Hwange, frequently sighted especially along the northeast boundary of the park
Brown hyaena	Occur in Hwange in low numbers, sightings reported in the northeast of the park
Spotted hyaena	Occur all over Hwange National Park
Caracal	Occur in Hwange, in low numbers, sightings reported along the eastern boundary and the northern part of the park
Cheetah	Occur in Hwange, 27 identified adult cheetah, sightings especially in the northern and eastern part of the park, occasionally along the southern boundary
Leopard	Occur all over Hwange National Park
Lion	Occur all over Hwange National Park
Serval	Occur in Hwange, in low numbers, sightings reported in the eastern part of the park, occasionally in the north and south of the park

2.7.1 General Surveys for Large Mammals

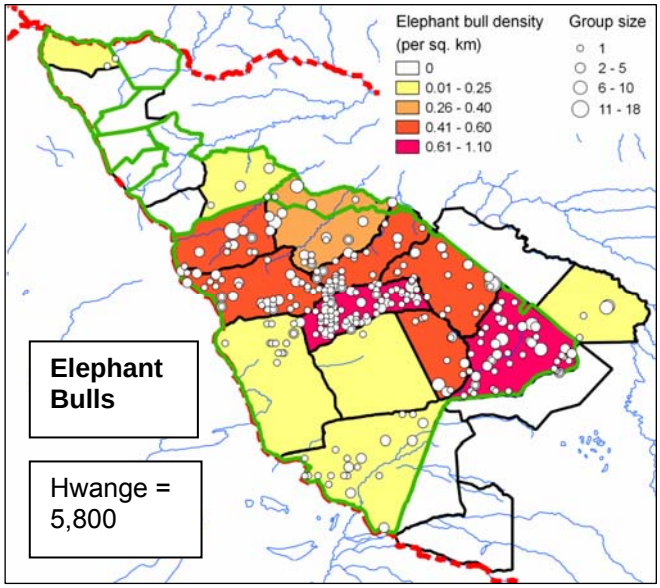
This section covers the general large mammal research that has been carried out in the park and surrounding areas. It includes surveys of animal numbers using different methodologies and presents the results of some of these.

Table 18: General large mammal surveys in the Hwange ecosystem	
Method	**Comments**
Aerial Surveys	Carried out by the management authority. Surveys done in 1993, 1998, 1999, 2001, 2006 and 2007. These usually cover areas outside the park as well (Safari and Forestry Areas and parts of the communal lands). A survey for elephants will be carried out as part of a continent wide survey for elephants towards the end of 2014. In addition, annual surveys carried out since the 19xxs
Strip Counts	Carried out by ZPWMA and other NGOs
Waterhole Counts	Carried out by WEZ in conjunction with ZPWMA.
Camera Trapping	The use of camera traps is becoming increasingly popular as the technology becomes cheaper
Spoor Surveys	Carried out by WildCru and partners. Essentially driving set transects

2.7.1.1 Aerial Surveys

The results of the 2014 aerial survey for selected species are presented below.

Figure 59: Elephant density and distribution in Hwange in 2014.



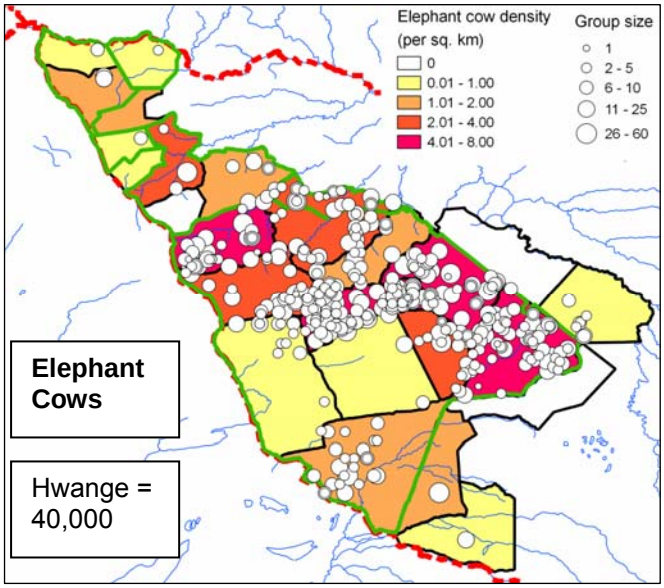


Figure 60: Results of the 2007 aerial survey – Selected species

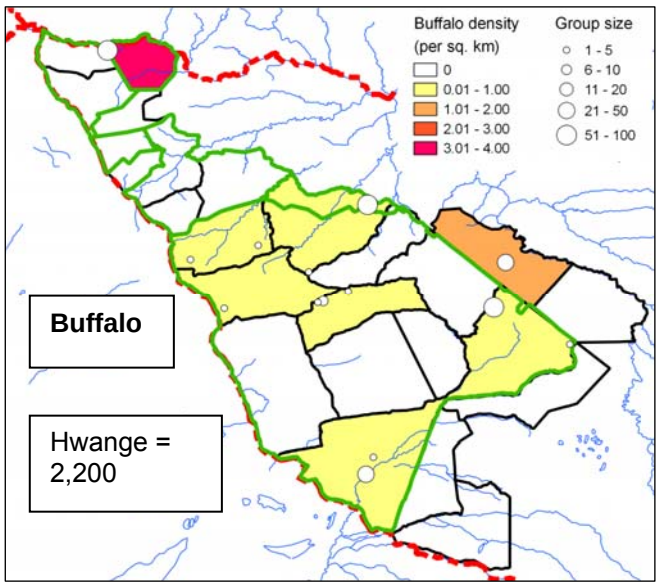
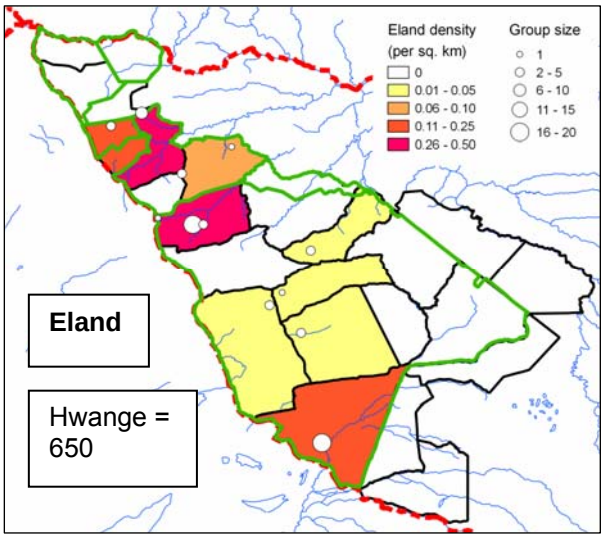
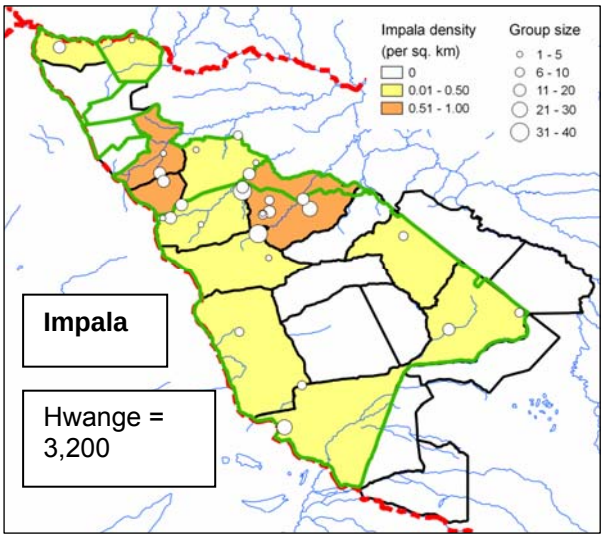
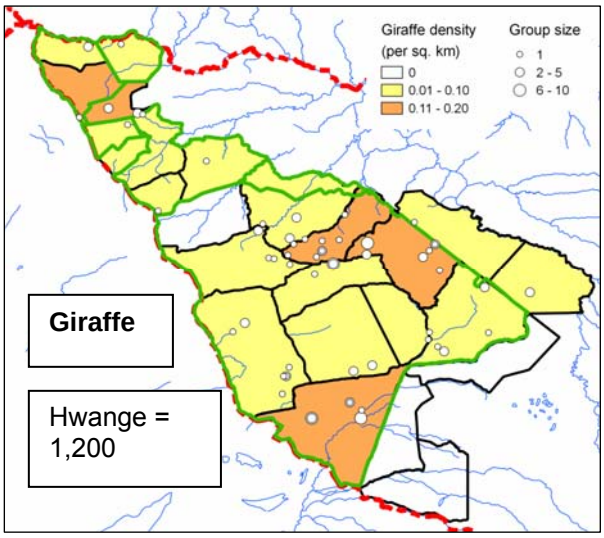
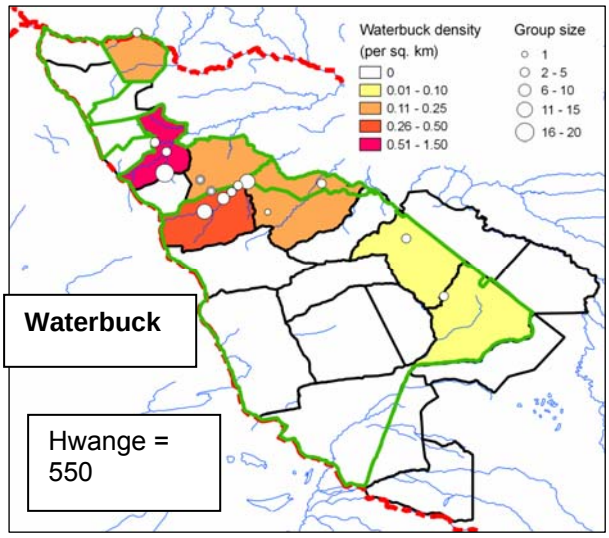


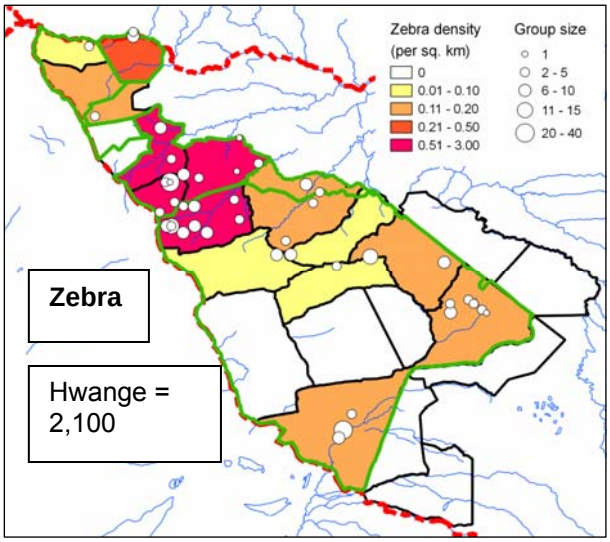
Figure 60: Results of the 2014 aerial survey – Selected species cont…











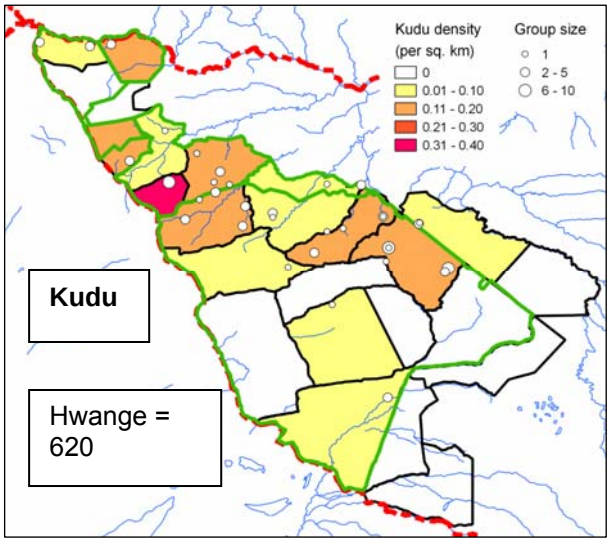
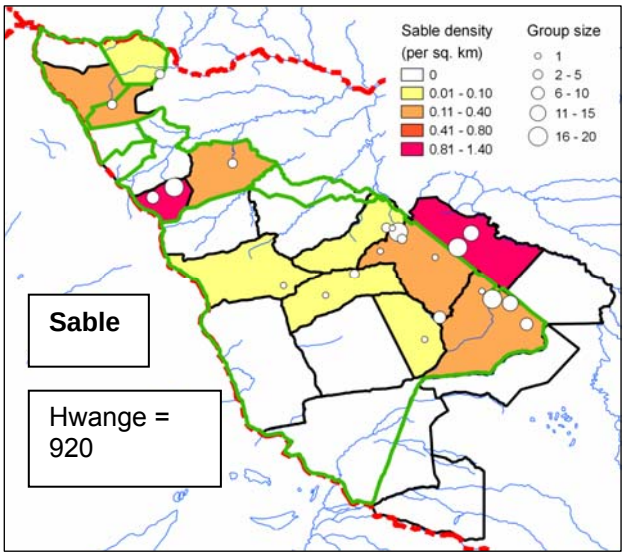
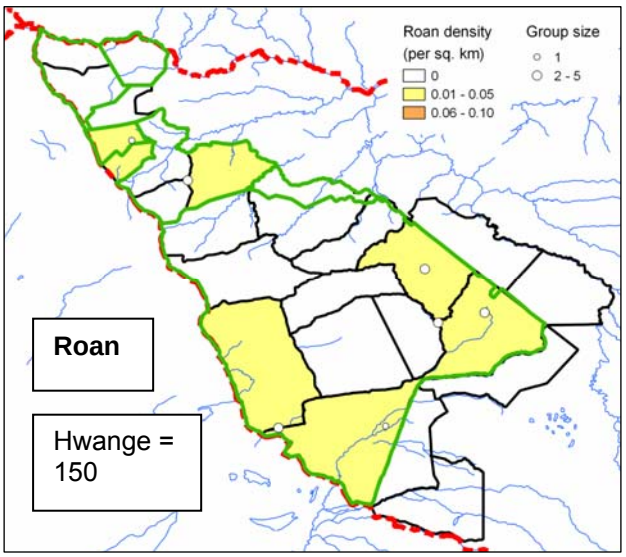
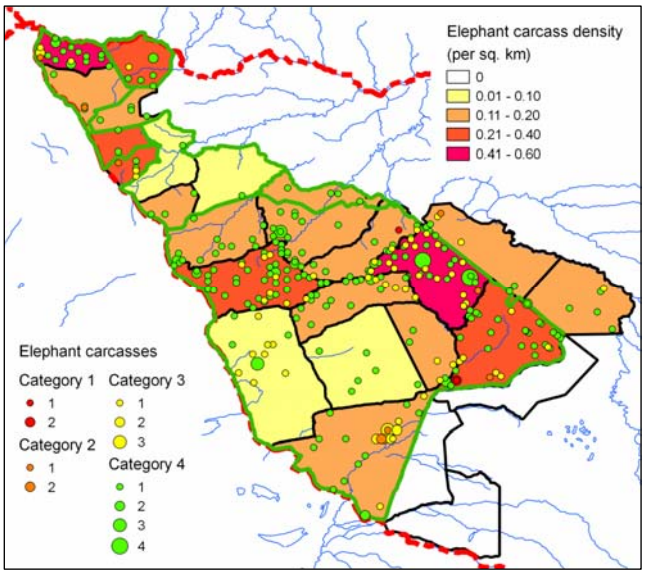
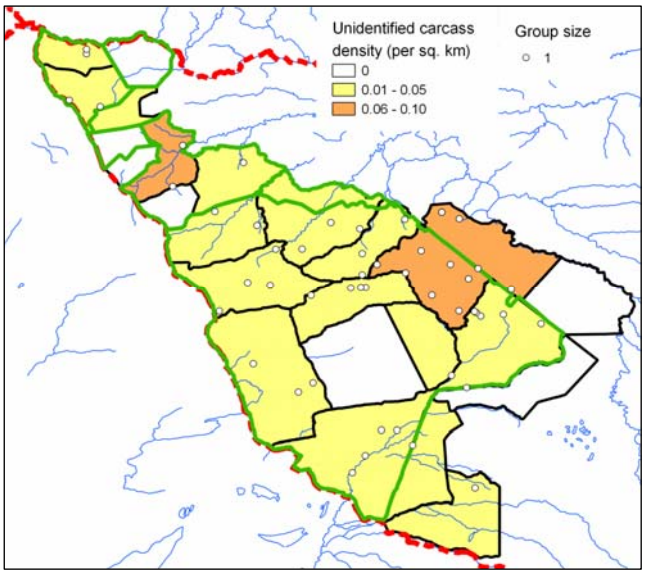


Figure 60: Results of the 2014 aerial survey – Selected species cont…



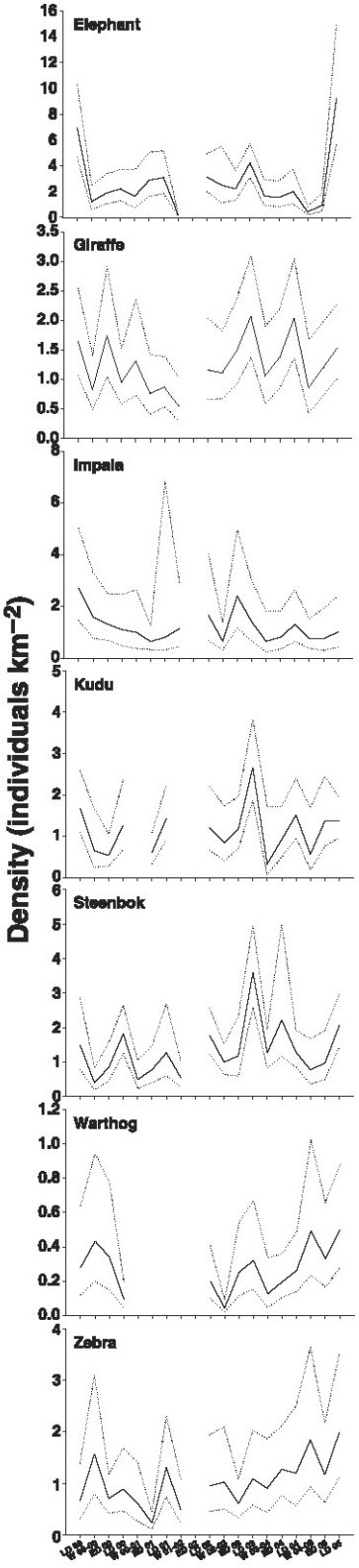


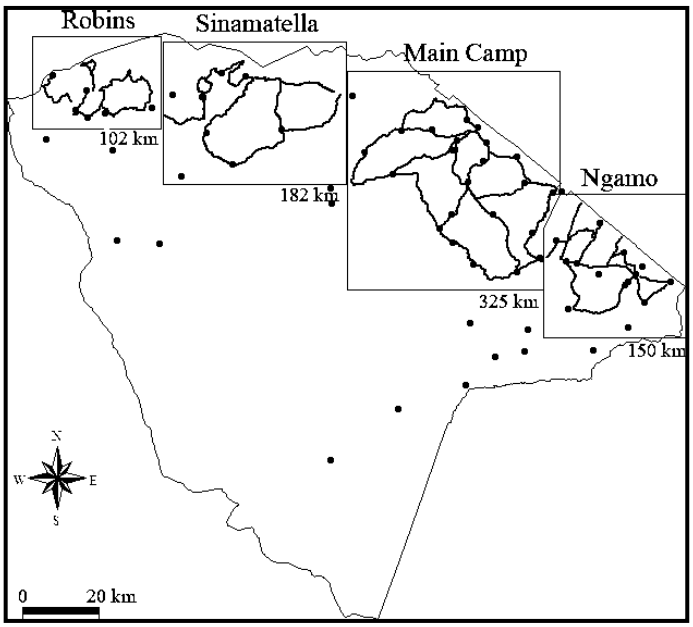




2.7.1.2 Road Strip Counts

Figure 61: Road strip counts in Hwange





The road strip count methodology requires repeated transects along defined routes with a well defined recording methodology. This CNRS study (Chamaille´-Jammes, et. al) was carried over a six year period. Large herbivore communities (excluding elephants) are dominated by browsers and mixed feeders in the more wooded Robins and Sinamatella areas, and by grazers in the more open Main Camp and Ngamo areas. Elephant densities in the late dry season in the Main Camp area are arguably some of the highest in the world.

In the figure on the left the dark line is the estimate with dotted lines representing 95% confidence limits.

2.7.2.2 Water Hole Counts

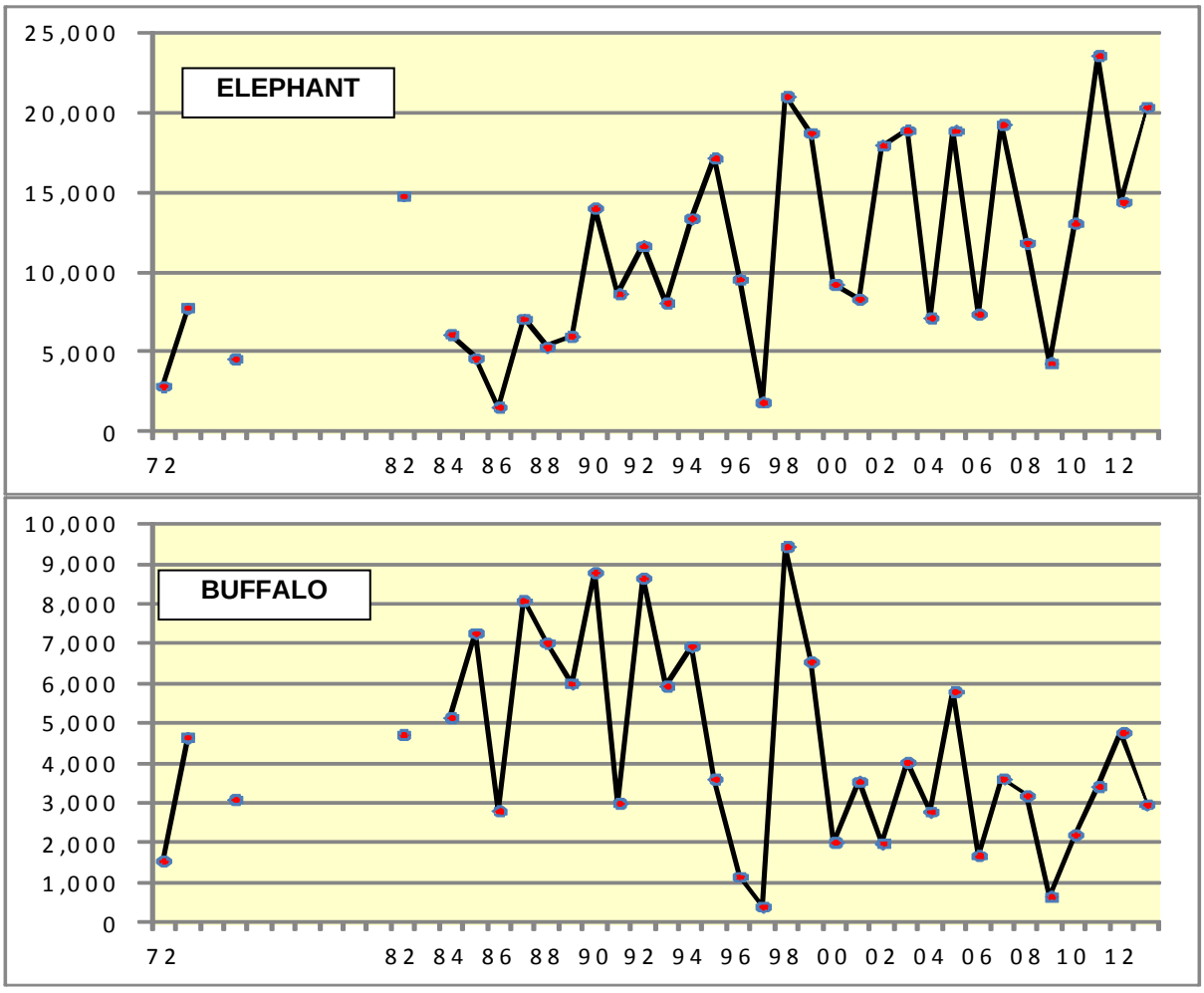
These counts were first carried out in 1972 and have been done almost on an annual basis since then. The methodology is based on the premise that most animals will need to drink on a daily basis and observers base themselves at key pans for a full 24 hour period. In 2013 data was collected from 85 pans. The results indicate a population of over 20,000 elephants, nearly 3,000 buffalo and 3,000 impala. The full results for 2013 are displayed below.

Table 18: Animals seen during the 2013 waterhole count

Elephant	Buffalo	Impala	Giraffe	Zebra	Sable	Roan	Kudu
20,373	2,976	3,021	202	1828	290	222	1172
Waterbuck	**Wildebeest**	**Tsessebe**	**Eland**	**Reedbuck**	**Bushbuck**	**Duiker**	**Steenbok**
112	557	8	29	131	9	39	33
W. Rhino	**B. Rhino**	**Hyaena**	**Jackal**	**Wild Dog**	**Lion**	**Leopard**	**Cheetah**
0	2	261	156	36	112	11	7

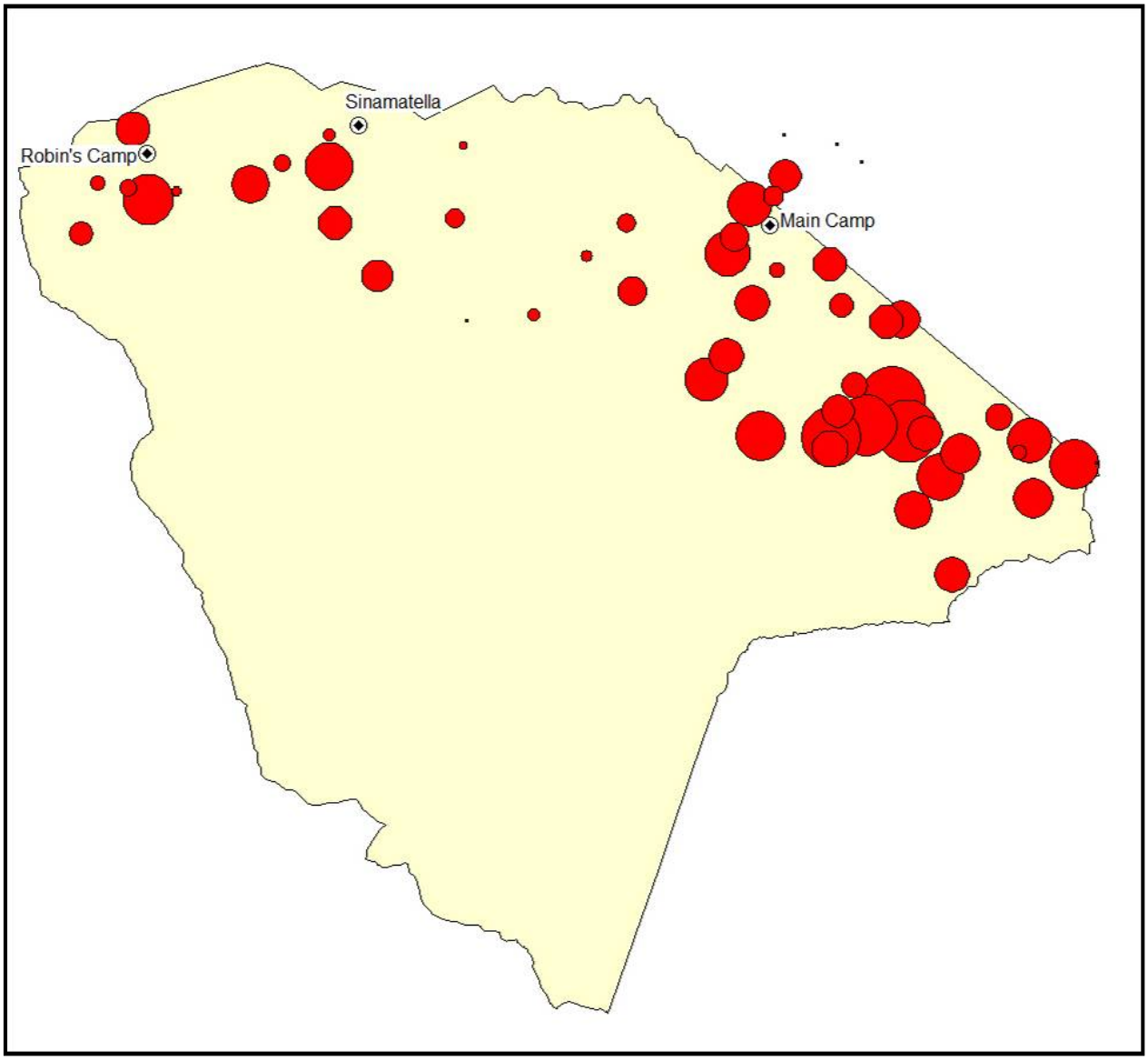
There is considerable annual fluctuation in the numbers seen. In some instances the fluctuation can be related to weather conditions or the climatic variables (e.g. high rainfall in the preceding year) but in others there does not seem to be an immediately apparent reason. The fluctuations for elephant and buffalo are presented in Figure 62.

Figure 62: Elephant counts at water holes – 1972 to 2013



The 2013 data for elephants was also mapped out for most pans and is represented in Figure 63.

Figure 63: 2013 waterhole counts for elephants
(Circle size indicates relative elephant numbers)

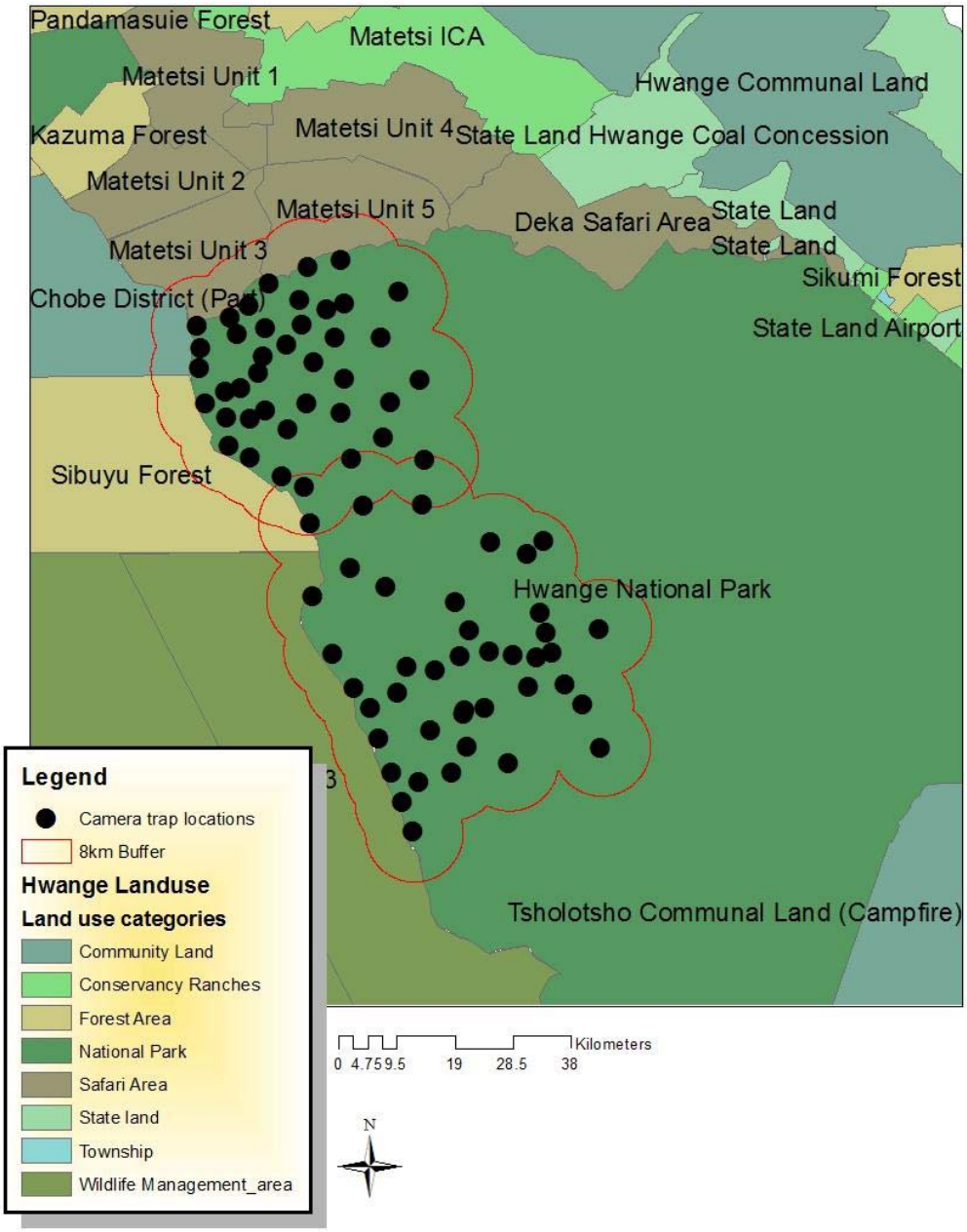


It appears that the main value of these surveys is the fact that they have been running almost continuously for over 40 years. A regression analysis between the population estimates for elephant from the waterhole counts and other methods shows a close correlation. So although the actual numbers may not be accurate the trends are more important.

2.7.1.4 Camera Trapping

As the technology becomes cheaper camera trapping is becoming a more accepted survey technique. The following maps attempt to show the extent of camera trapping that has been carried out in the park recently. We could add the CIRAD/CNRS locations to fill this out? More data needed…...

Figure 64: Locations of camera taps (WildCru data only)



2.7.2 Carnivores - Species Surveys and Research

Long-term research into carnivores has been ongoing for over 20 years, first with the establishment of the Painted Dog project which was closely followed by the establishment of a lion monitoring project in 1999 through the University of Oxford – the WildCru project. Hwange is a well known destination for sightings of carnivores and they are a very important part of the allure of the park to tourists.

Other carnivore research projects are more recent – the DETE leopard research project and the Cheetah Conservation project. The Cheetah Conservation Project also gathers data on a wide variety of carnivores, both small and large.

2.7.2.1 Lions

(Taken from Lion Project Annual Reports)

The Hwange Lion Research Project works in association with the Zimbabwe Parks and Wildlife Management Authority and have a 5,000 km2 study area in the north-east of the park. Since 1999 they have identified over 600 lions and currently monitor around 15 prides and 12 male coalitions. This project is one of the most intensive and long-term lion projects in Africa and key outcomes included changing the way lion trophy hunting is managed by implementing a biologically sustainable system of allocating quotas. In addition, it is expanding its data sets to increase the understanding of human related impacts on lion populations (and vice-versa) along the park boundary.

More recent research is focussed on understanding connectivity between Hwange NP and other areas such as parks in Botswana and in Zimbabwe towards Lake Kariba. A second key focus is to understand the extent of human-lion conflict and work towards mitigating it through programmes such as “long-shields”. A summary of the Hwange Lion Research Project is shown below.

Population Monitoring (Long-term in north and east of the park)

- Pride and individual monitoring
- Radio Tracking
- Abundance surveys (spoor)
- Camera Trapping
- Trophy monitoring

WILDCRU
Wildlife Conservation Research Unit

Transboundary Research

- Radio Tracking
- Corridor identification
- Computer simulation for dispersement

Lion-Human Conflicts

- Conflict and incident recording
- Monitoring of lion movements for early warning
- Improved livestock husbandry and protection
- Abundance surveys (spoor)
- Community Awareness (e.g. comic book)
- Anti-poaching assistance (from Wexcau)

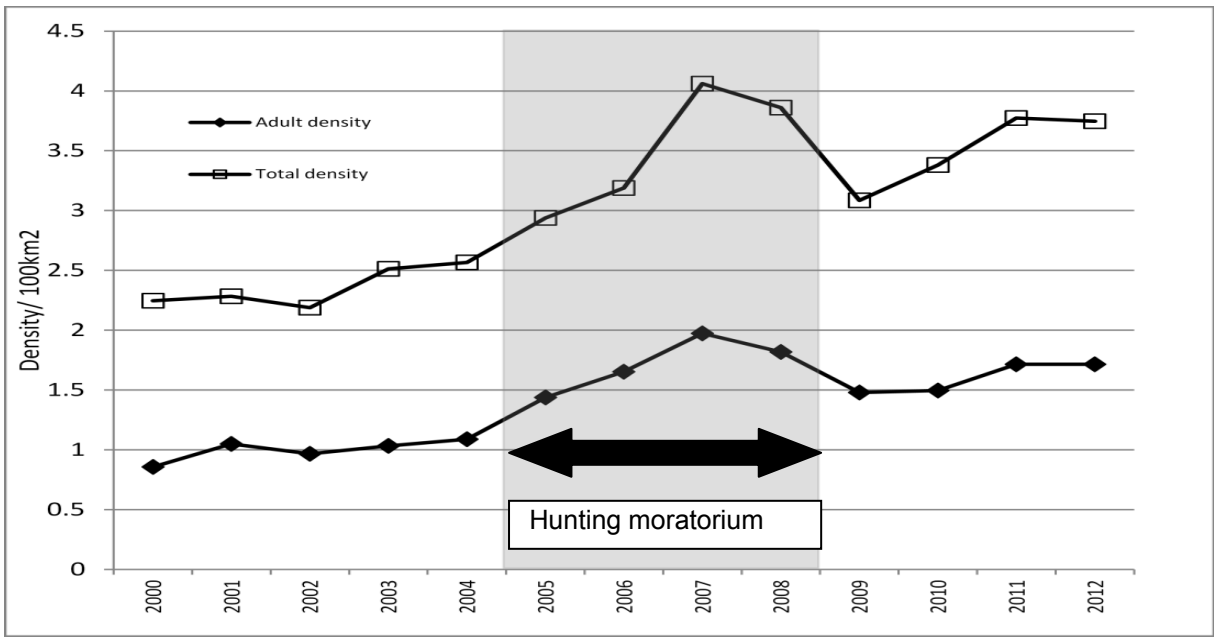
The maps on the following pages illustrate graphically some of the outputs from this project.

Population Monitoring and Sustainable Offtake

This project was initiated because there was a perception that levels of sport hunting of male lions in the hunting concessions surrounding the park were having a negative impact on the conservation of the Park population. Data collected between 1999 and 2004 suggest that this was indeed the case and this contributed to a suspension of sport hunting of lions in the area surrounding the Park between 2005 and 2009. This was a crucial shift in management policy for this species and an important step towards sustainable management and conservation of lions.

Lion densities increased during the hunting moratorium and are at higher levels than before the moratorium (Figure 65).

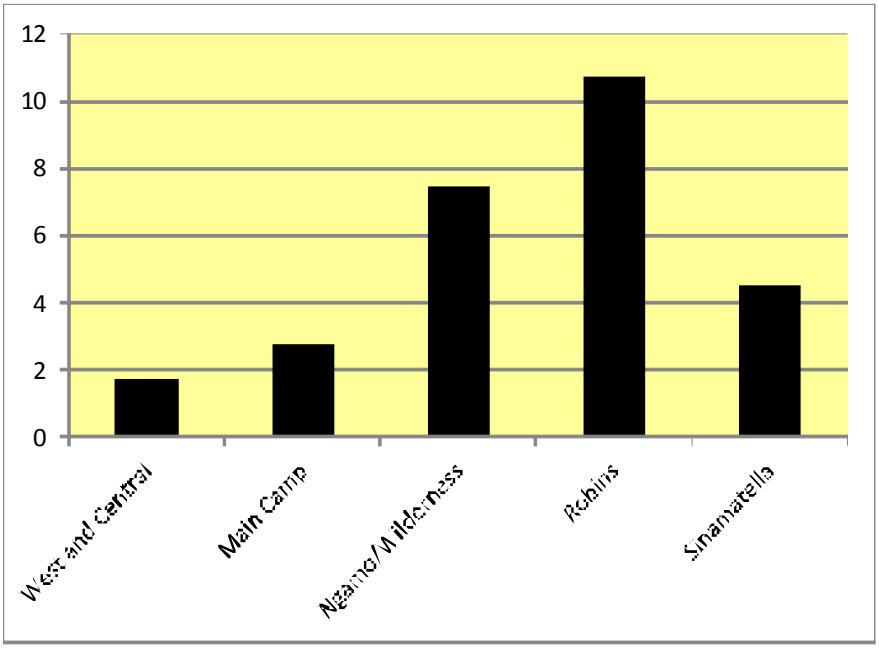
Figure 65: Lion densities in the Hwange area between 2000 and 2012



The project has proposed a feedback system for lion quota setting based on lions shot in the preceding year. This is based on a minimum age for offtake (males over six years). If young lions are shot the quota is reduced, if older lions are shot the quota can be increased. During 2013 all lions shot in the areas surrounding the eastern part of the park (Gwaai ICA and Forestry Areas were animals from the park suggesting that these areas do not have resident lion populations capable of sustaining hunting.

Figure 66: Lion densities in Hwange (lions/100km2)

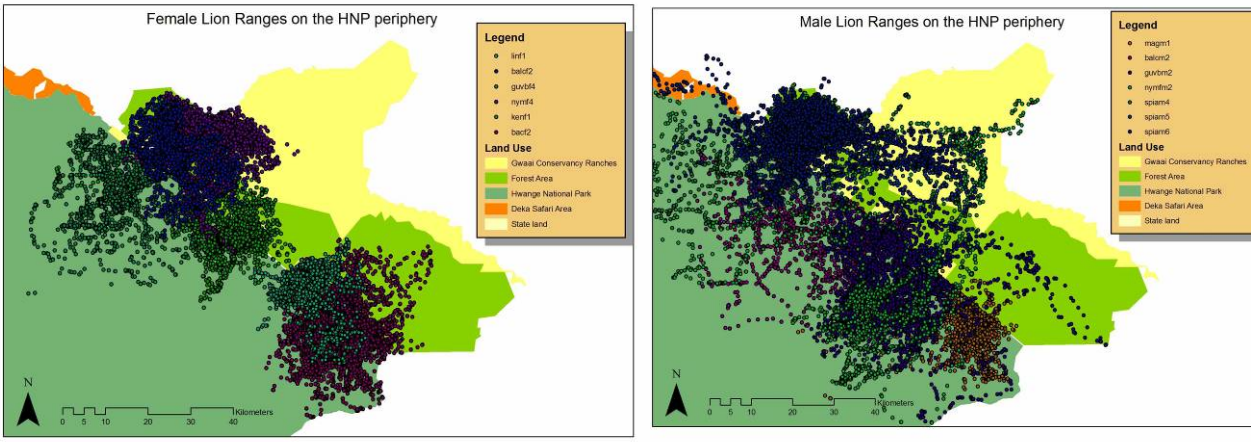
Of five surveyed sites in the park, lion densities are highest in the Robins area and lowest in the west and central areas. This corresponds to higher densities in areas with higher soil nutrients and abundance of water (probably in response to higher prey densities in these areas).



Lion Movements in and around Hwange

The collection of long-term monitoring data has allowed a picture of local and wider range lion movements to be built up. This indicates that some lions have localised movements and tend to stay away from settled areas (Figure 67). It must be stressed that the data in Figure 67 shows only a few individuals – lions occur throughout the park.

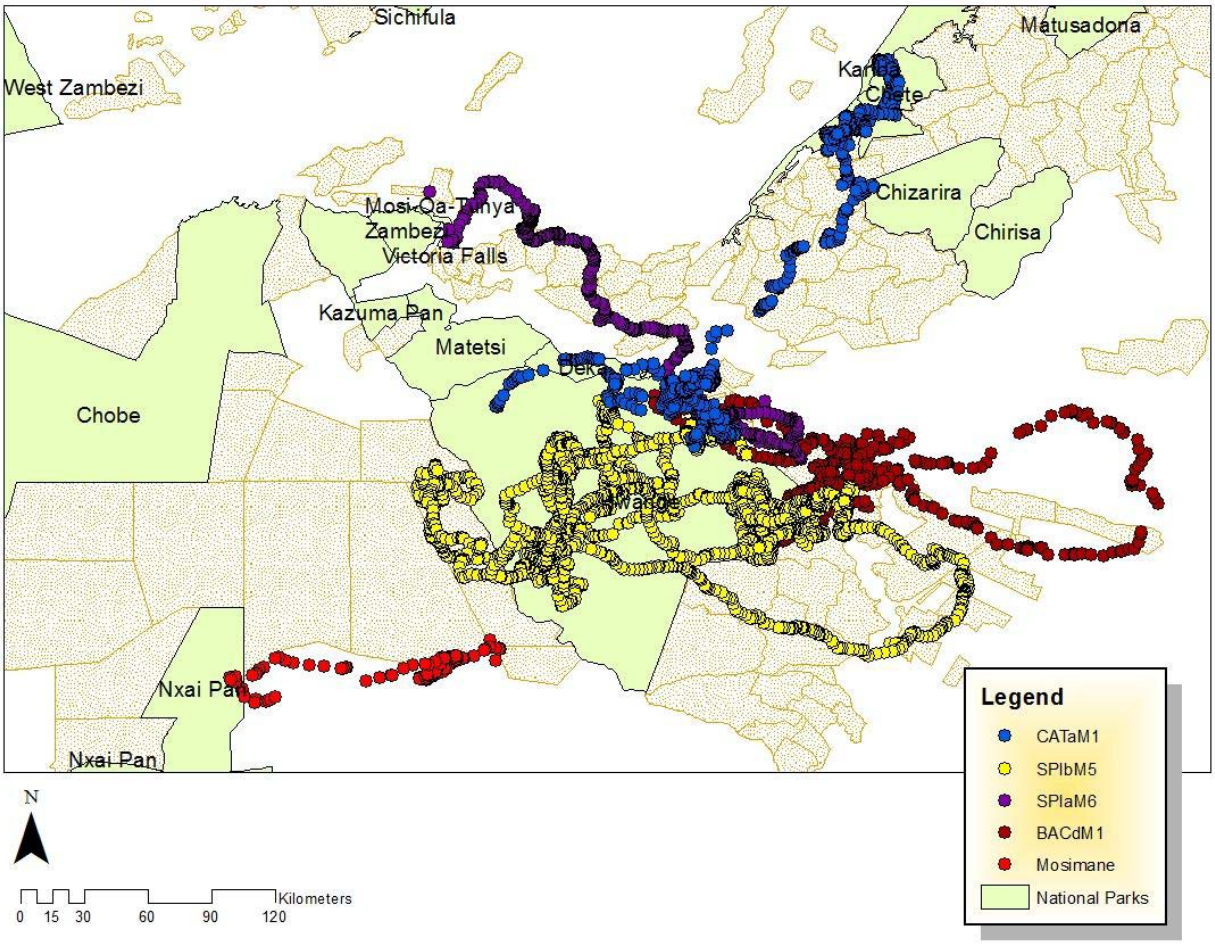
Figure 67: Lion movements in the north-east sector of Hwange



Transboundary Research

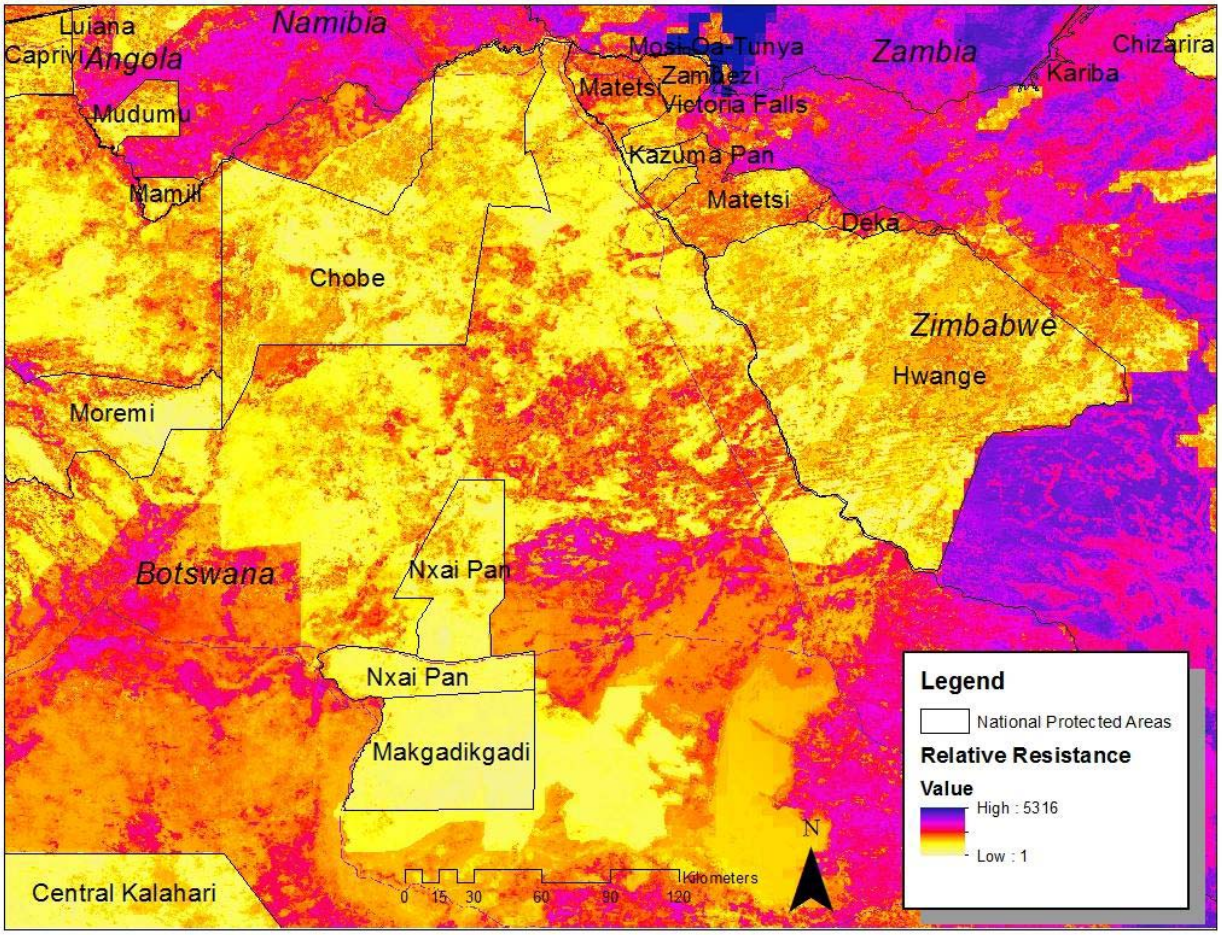
However, other lions, usually sub-adults, undertook some extensive movements (Figure 68). All but one lion in the above map (SPIaM6) were sub-adult dispersers. These movements suggest that, in accordance with predicted landscape connectivity models, habitat corridors exist to the North and West, but not the East of HNP. Lions dispersing East (SPIbM5 and BACdM1) returned to the protected area complex after an exploratory dispersal movement through human dominated agricultural areas.

Figure 68. Map of long range movements of GPS collared male lions in the region surrounding Hwange NP between 2009 and 2013.



Recent work by the project includes modelling lion dispersal through a landscape and the first stage of this model has produced a 'resistance' landscape, calculated from radio-telemetry data and GIS layers (Figure 69). This is a map made up of 'cells' that each predict the relative ease with which a lion can move through the landscape. Cells of 'low' resistance are relatively easy for a lion to move through, while those of 'high' resistance (usually because of difficult terrain or adverse human activity) are more difficult for lions to successfully traverse. Examination of the map suggests that corridors we expect to exist between protected areas to the North and West of HNP are predicted to be composed of relatively low resistance landscape cells and we might predict that, in theory, these are viable corridors for lions.

Figure 69: Resistance landscape for dispersing lions.



Cells (pixels) coloured in yellow and orange shades represent low resistance (i.e. areas lions are easily able to move through. Red, pink, purple and blue shades represent areas lions are likely to find increasingly difficult to traverse (Elliot, Cushman, Macdonald and Loveridge, in review).

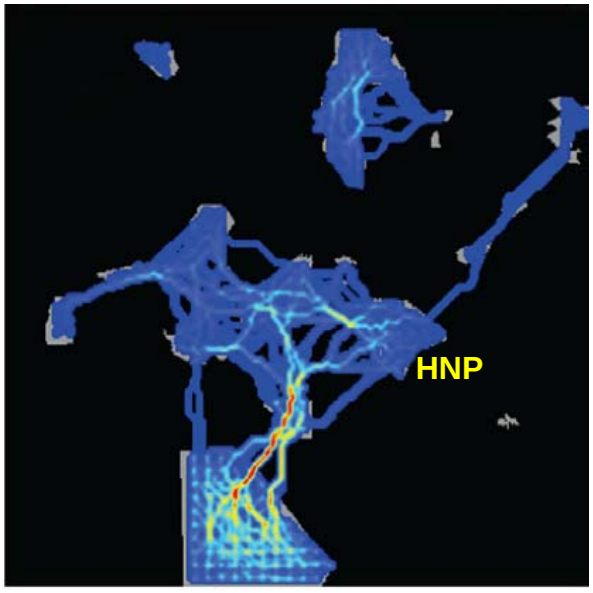


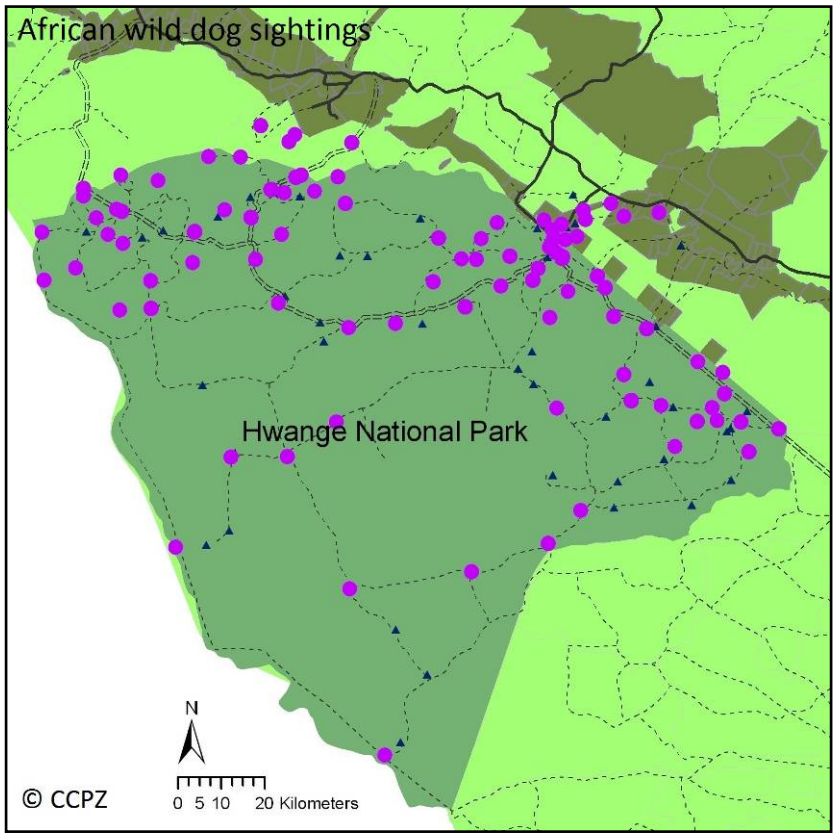
Figure 70: Predicted connectivity for lions.
(Elliot et al, 2014)

2.7.2.2 Painted Dog

The Painted Dog project is the longest running NGO conservation research project in the Hwange area having been initiated in the 1980s. The project has grown substantially and now has an education and rehabilitation centre adjacent to the main Hwange airport. The project is summarised below (Table 19).

Table 19 : The Hwange Painted Dog Project	
Land and Water Management	Anti-poaching in Park, Forestry and other areas Treatment of individual dogs Radio tracking
Species Management	Currently, research into painted dogs is focusing on monitoring the status, distribution, direct and indirect threats to painted dogs in Zimbabwe. These data include standard demographic mortality data and incorporate less understood human factors such as den disturbance, as well as hidden threats such as genetic viability, stress and parasites across Zimbabwe. The estimate for Hwange National Park is 144 dogs in 22 packs (includes estimate of 33 dogs in 8 packs in unsurveyd areas); this puts the HNP population at close to the mean estimate from the 1997 survey. The highest estimate based on information provided by Research places the HNP population at 168, which equals the highest estimate from the 1997 census. The mean pack size is given as 4.2 (adults and yearlings). Matetsi / Victoria Falls is 27 dogs in five packs. No figures for this area were presented in the 1997 census. The mean pack size is given as 5.0
Education and Awareness	Education centre, bush camps, Conservation Clubs, Arts and Crafts Programme, Community Outreach
Law and Policy	Appendix 1 listing, Ration quota reductions (kudu, impala), Road regulations

Figure 71: Painted dog sightings
Cheetah Conservation Project Zimbabwe



According to studies carried out in the early 1990s (Davies, 1993) mean home ranges of four painted dog packs were between 400 and 500 km2. This study was carried out in the main camp area using radio collars (Figure 72).

Figure 72: Home Ranges of four painted dog packs near Main Camp (Davies, 1993)

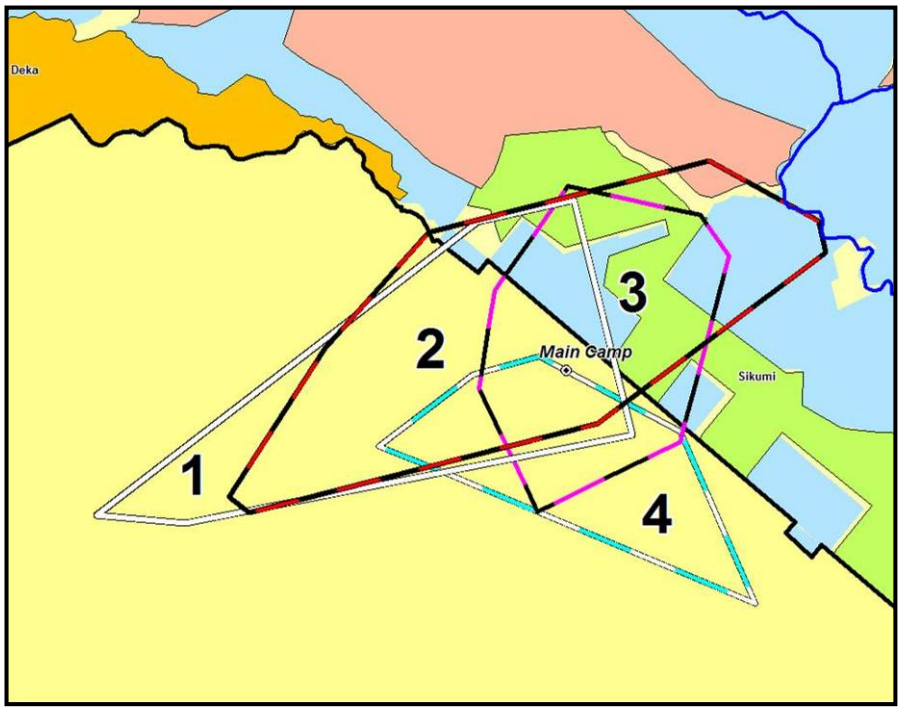
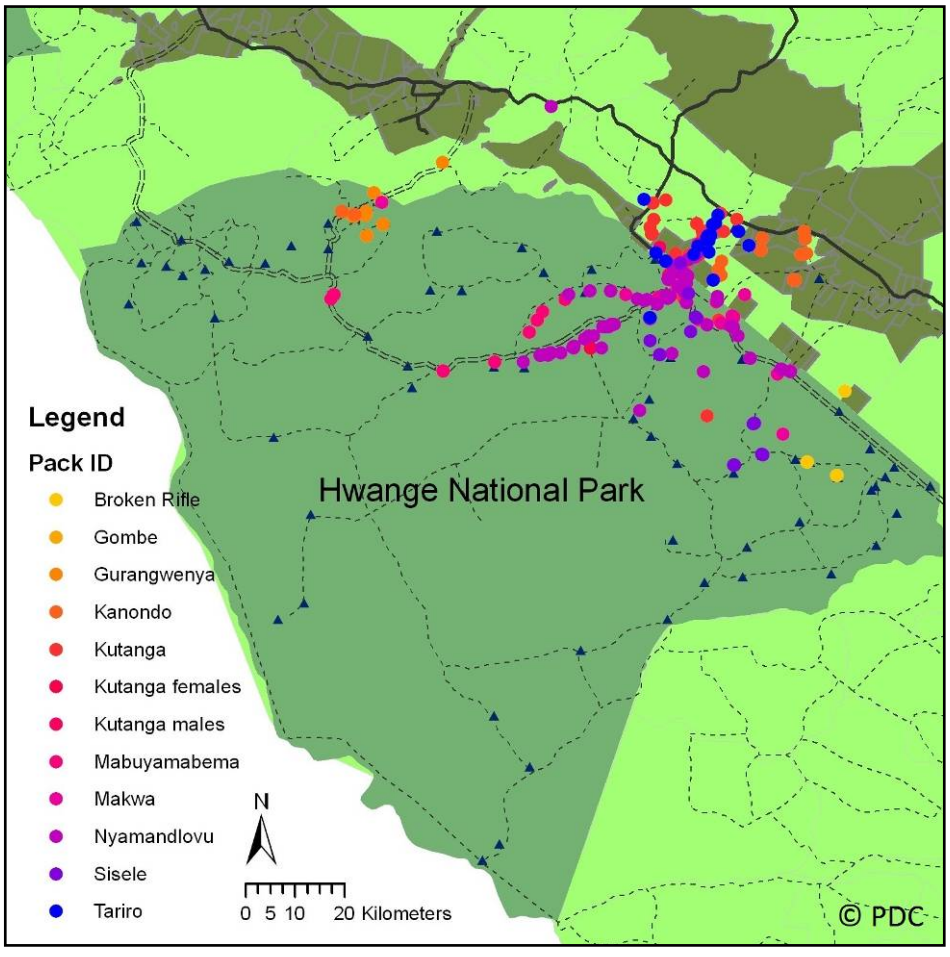


Figure 73: Movement of known wild dog – 2013/2014



2.7.2.3 Leopard

The Dete Animal Rescue Trust has initiated a research project into the status of leopards, both inside and outside Hwange. The research involves radio collars, spoor transects and camera trapping. Results not yet known.

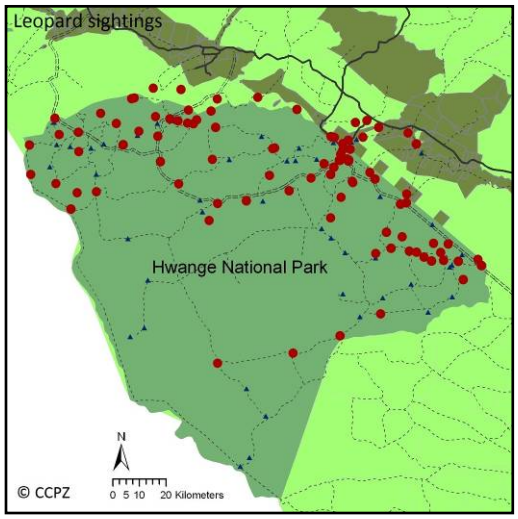


Figure 74: Leopard sightings
Cheetah Conservation Project Zimbabwe

2.7.2.3 Cheetah

The Cheetah Conservation Project Zimbabwe (CCPZ) was established in 2012 with the aim to assist with the conservation of cheetahs through applied research, education, collaboration and capacity building. Over the past two years CCPZ has carried out a country wide questionnaire based cheetah population survey. Although the main focus is cheetah, during this survey, CCPZ has also collected data on the occurrence of twelve other carnivores. In addition to the questionnaire based survey, CCPZ monitors the Zimbabwean cheetah population by collecting sightings and pictures. Within Zimbabwe there are seven main cheetah populations (number of adult cheetah ≥ 10 adults), the largest of which can be found in Hwange National Park. The majority of the received cheetah sightings and pictures come from this park, and CCPZ has so far been able to identify and monitor 29 of 34 known adult cheetahs. In addition CCPZ knows of 8 cubs, which, due to the high mortality rate, will only be added to the identity data base once they reach independence at 18 months old.

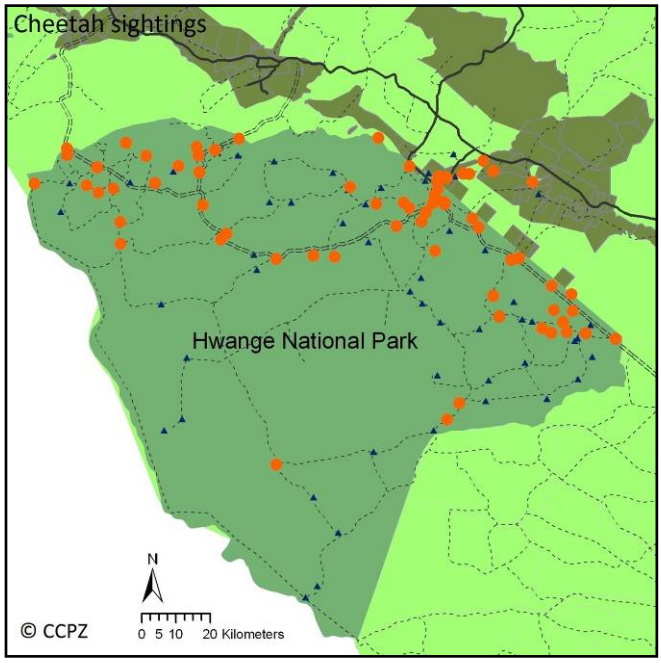
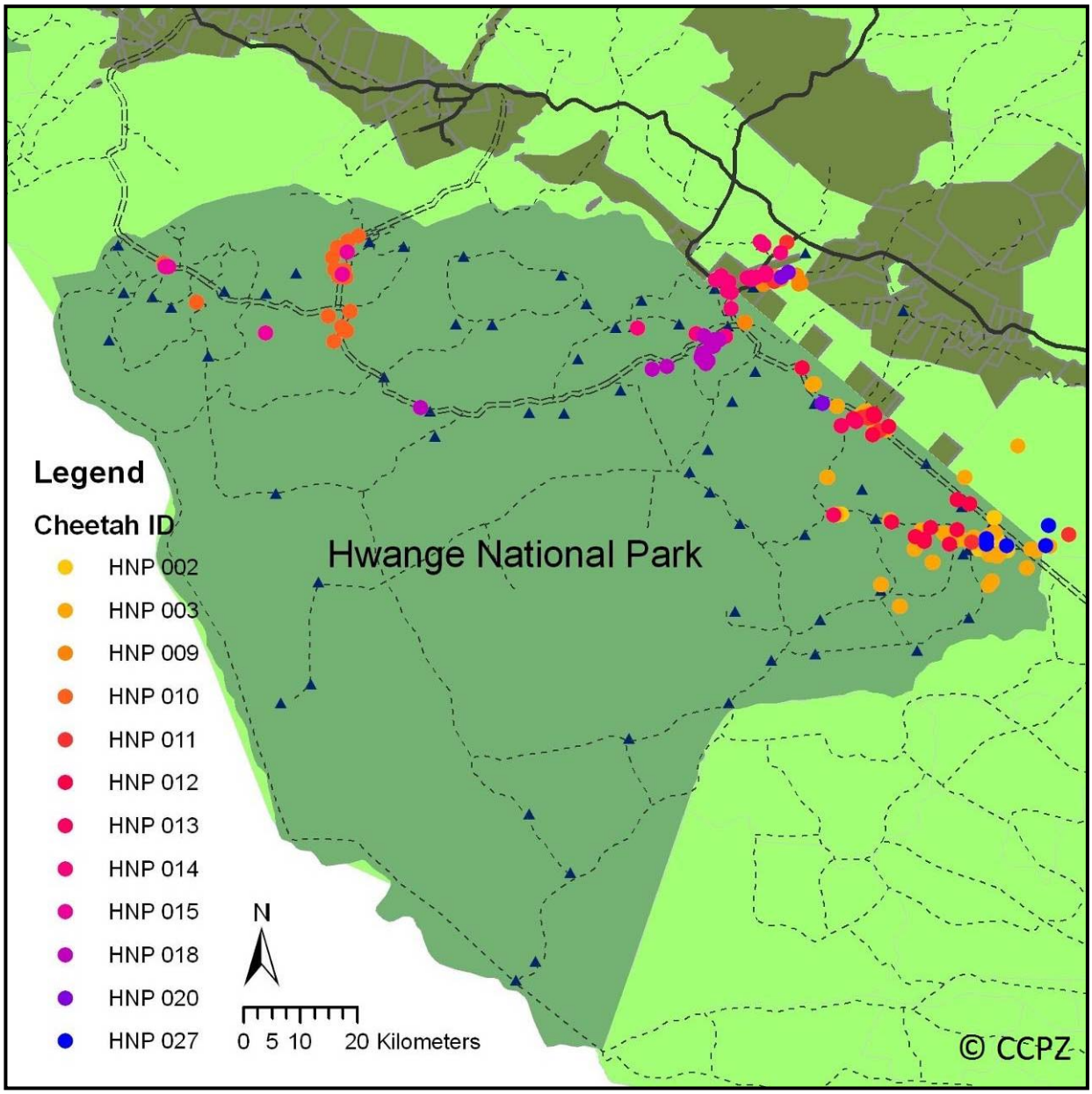


Figure 75: Cheetah sightings
Cheetah Conservation Project Zimbabwe

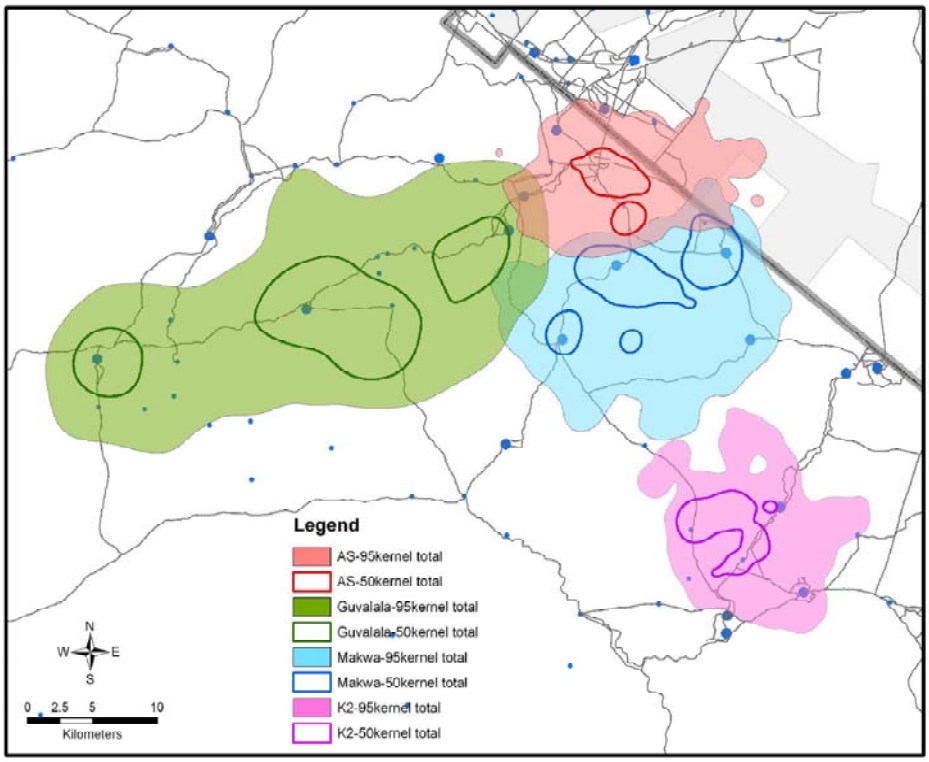
Figure 76: Movements of cheetah in Hwange
(Based on sightings)



2.7.2.3 Hyaena

Research on other carnivores is currently limited to work on spotted hyaena carried out by CIRAD/CNRS in association with the Wilderness WildlifeTrust. Work centres on hyaena behaviour and ecology and tracking studies resulted in definitions of home ranges for several hyaenas (Figure 77).

Figure 77: Hyaena home ranges in Hwange



In HNP, hyaena ecology is largely influenced by the location of artificial waterholes, elephant carcasses (their most important food source) and lions. Hyaenas select for habitats where prey are abundant and locations close to artificial waterholes, with data indicating that they spent about 50% of their time within 2km of these waterpoints. Open grasslands are important habitat types for the animals. Hyaenas only spatially avoid lions in extreme conditions of vulnerability and risk.

Elephant carcasses are a major source of food for hyaenas and their use increased during a period of increased intraguild competition with lions, which led to switch in hyaena foraging strategy from active hunting to scavenging. Even though lions are their main competitors, in some circumstances hyaenas stay in their vicinity, as they can also be a source of food through scavenging and kleptoparatism.

Hyaena density was stable between 1999 and 2012 and average density was in eastern Hwange was 0.09 ± 0.02 individuals/km2 (range 0.07-0.14). Average clan size was 13.9 ± 5.7 individuals (not including dens dependant cubs) ranging from 7 to 27.

Foraging group sizes ranged from 1 to 8 individuals (average 2.1 ± 1.7). Hyaena foraged most of the time alone (58.4%) and in small groups of 2 to 4 individuals (23.4%), followed by medium sized groups (12.6%) and large groups only 5.6% of the time.

2.7.2.4 Other Carnivores

The Cheetah Conservation Project Zimbabwe (CCPZ) maintains a database of carnivore sightings throughout Zimbabwe and the following distribution maps for Hwange are compiled from this database.

Figure 78: Distribution of other carnivores in Hwange
(Data from Cheetah Conservation Project)

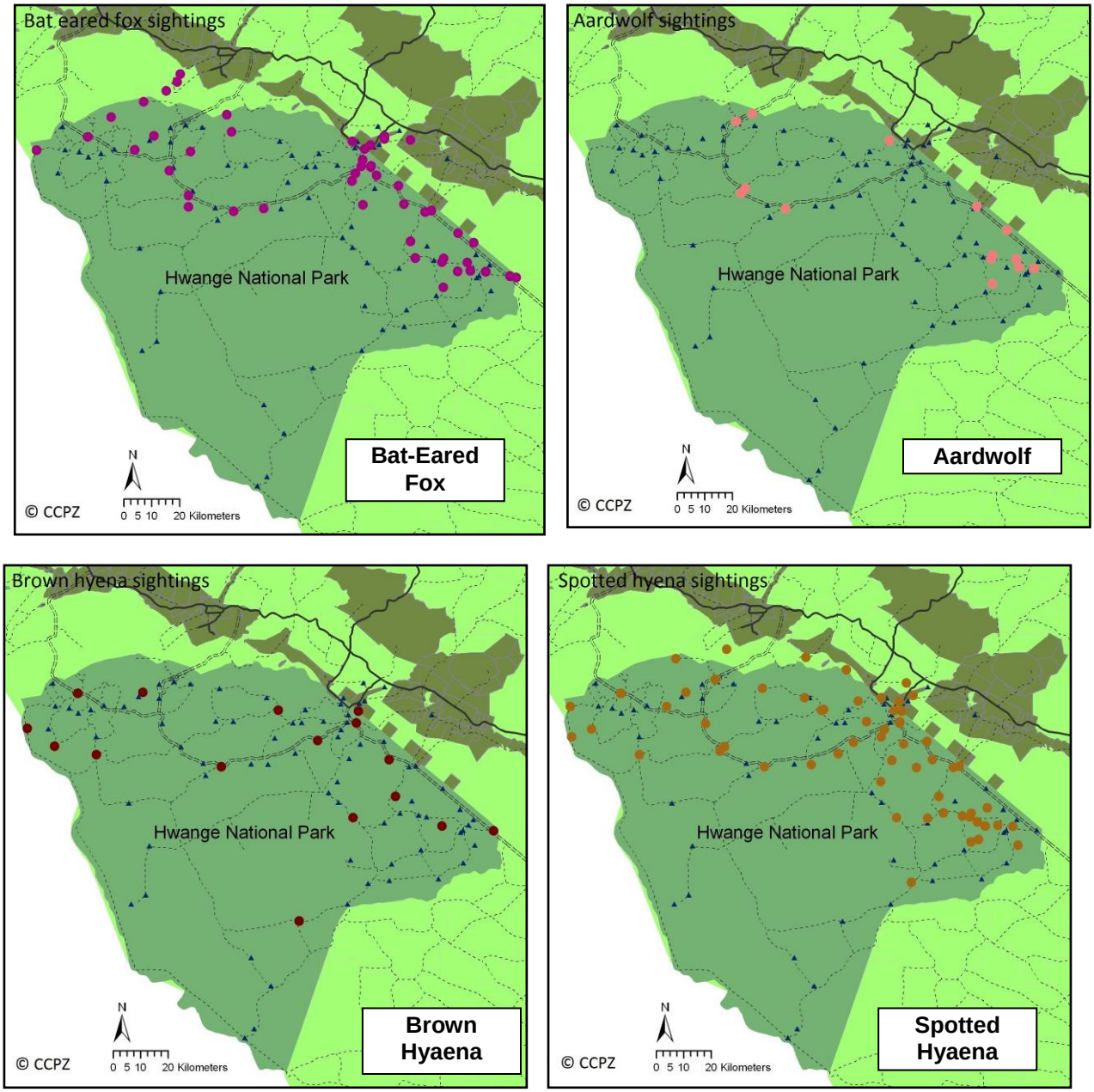
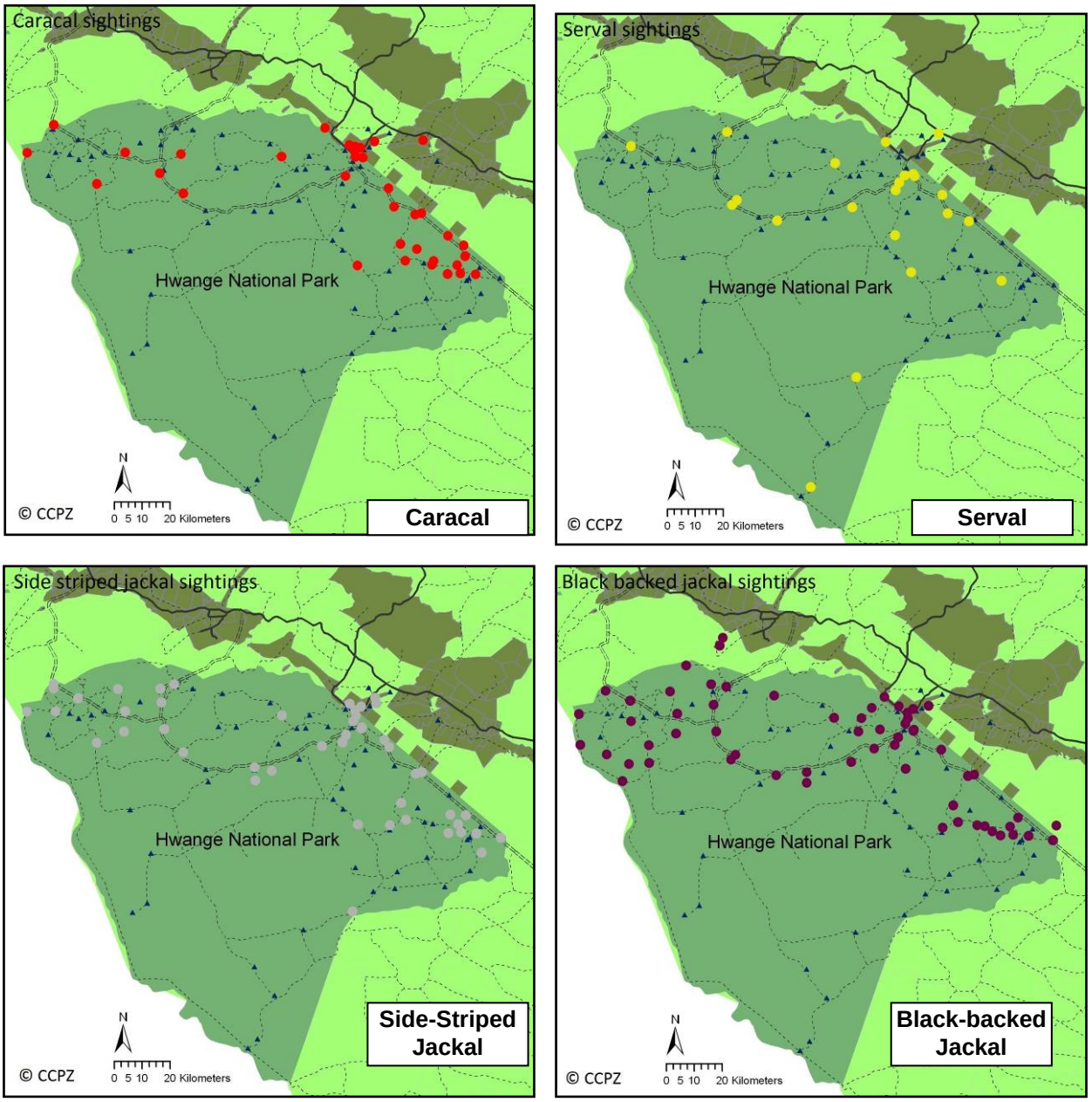


Figure 79: Distribution of other carnivores in Hwange (cont..)



2.7.3 Herbivores - Species Surveys and Research

Numerous studies have been carried out on herbivores by departmental staff since the 1970s. These are briefly summarised below (Table 20).

Table 20: Older studies on herbivores in Hwange
Information from Wilson, 1977

Species	Project Description
General	Status and distribution Road strip counts in Main Camp and Robins areas Aerial surveys Daily occurrence of wildlife at waterholes. Weir and Davison, 1966
Buffalo	Monitoring of buffalo herds in Robins area. Conybeare. 1978 Home range, seasonal movement, habitat selection and utilisation in Sinamatella area. Duckworth, 1980 (Thesis)
Rhino	Dispersal of translocated black rhino. Conybeare, 1984. Not sure where this data is. Past and present distribution. Herbert and Austin, 1972
Elephant	Vegetation succession and elephant use. Conybeare, 1991 Population dynamics. Williamson, B. 1979 Reproductive and nutritional biology. Conybeare
Giraffe	Numbers, distribution, population structure, feeding habits. No-one sure of where this documentation is. Conybeare, A.
Wildebeest	Wildebeest ecology. Not published. Williamson, B.R, 1978
Kudu	Feeding habits. Conybeare, A. 1975
Roan	Notes on roan distribution in Zimbabwe and Hwange. Best, et. al., 1970
Impala	Body growth of impala. Howells and Hanks, 1975

Since 2000, a new wave of herbivore research has been carried out and, as this work is more accessible, it is summarised in the following sections.

2.7.2.1 Elephants

Given that elephants are the major driver of change in the ecosystem relatively little specific research has been carried out on them. However, since 2000, CIRAD and CNRS have been collaring elephants and executing research projects that study their behaviour and impact on the environment, both inside and outside the park.

Research Aspect	Description
Elephant movements	Collars on male and female elephants and tracks monitored via satellite. Some of the results of these studies are shown in the following maps.
Elephant human interaction	Detailed research in Hwange Communal Land though radio-tracking and research at the affected people level.
Elephants at Waterholes	Research into how elephants prevent other animals from drinking. Although this behaviour does occur the temporal separation means that elephants are unlikely to completely stop other species drinking
Vegetation change	Analysis of recent and historical imagery to see if elephants are affecting the vegetation at landscape level. The assessment was that, although there may be local changes, there is little effect at the landscape level. Of interest it appears that some species select grazing sites that have been modified by elephant.

Figure 80: Movements of five elephants (cows?) between November 2012 to December 2013.
Movements at least 80km in Botswana during the rains.
Herds returned to Main Camp between May and July.

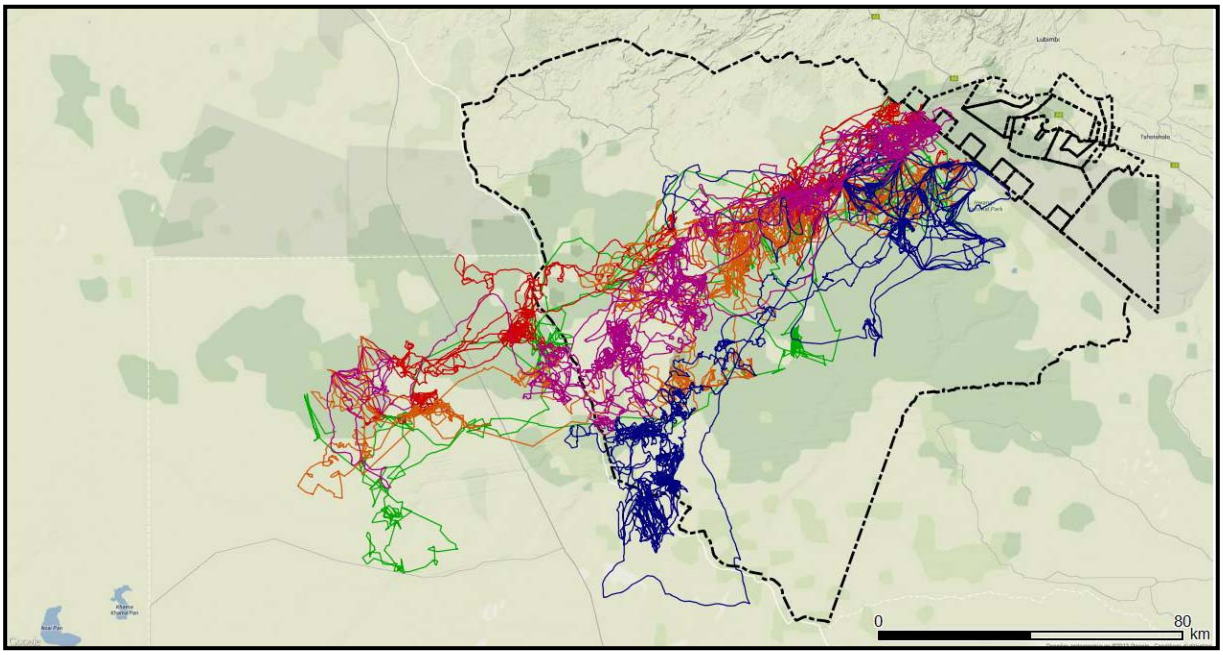


Figure 81: Movements of elephants that remained in Hwange between Nov.2012 to Dec. 2013.
Of the 7collared elephant cows that stayed in the Park during the rainy season only 3 remained in their dry season home-range, the others moved on average 50km west.
Only 2 cows visited Sikumi Forest during the dry season.

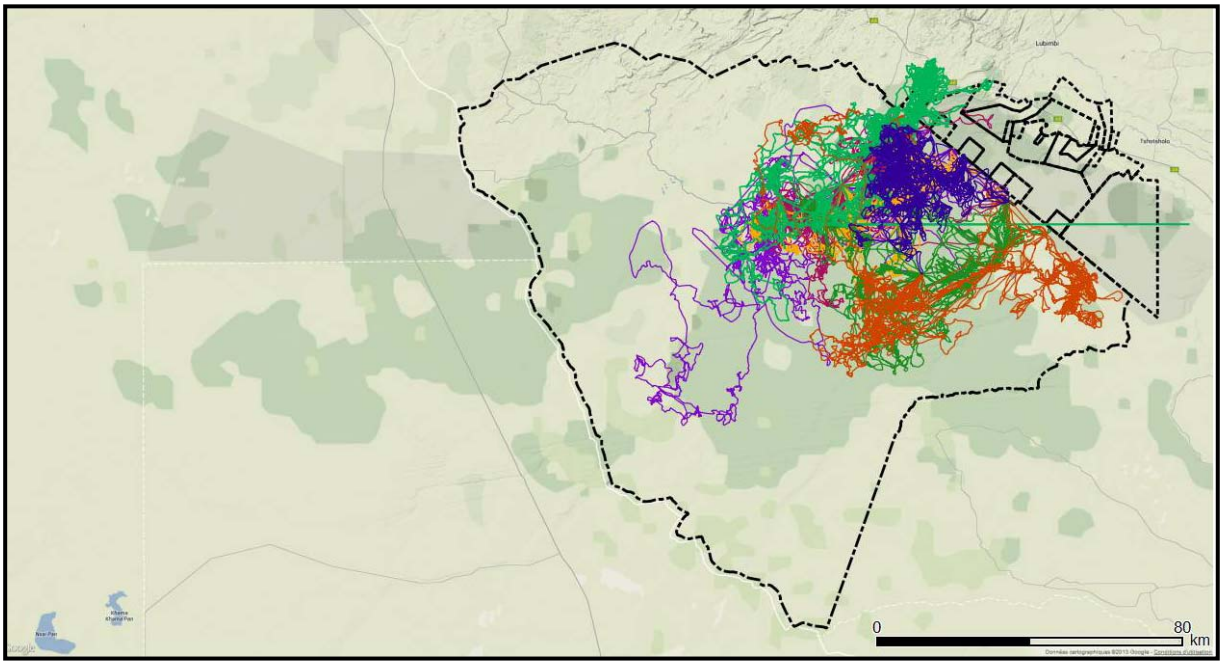


Figure 82: Home ranges for elephant bulls in 2012
Perhaps I can get this data to make some clearer maps?

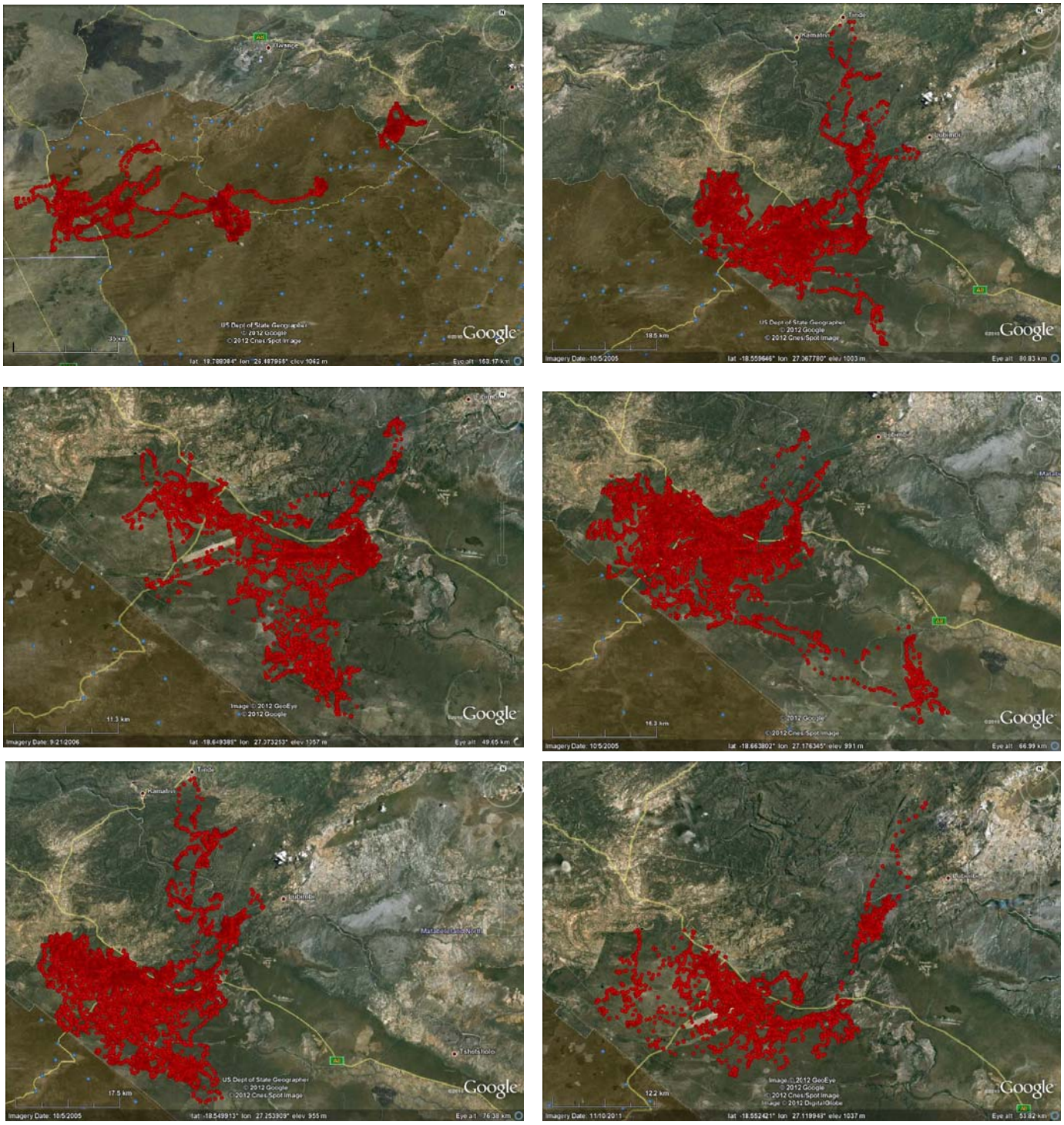
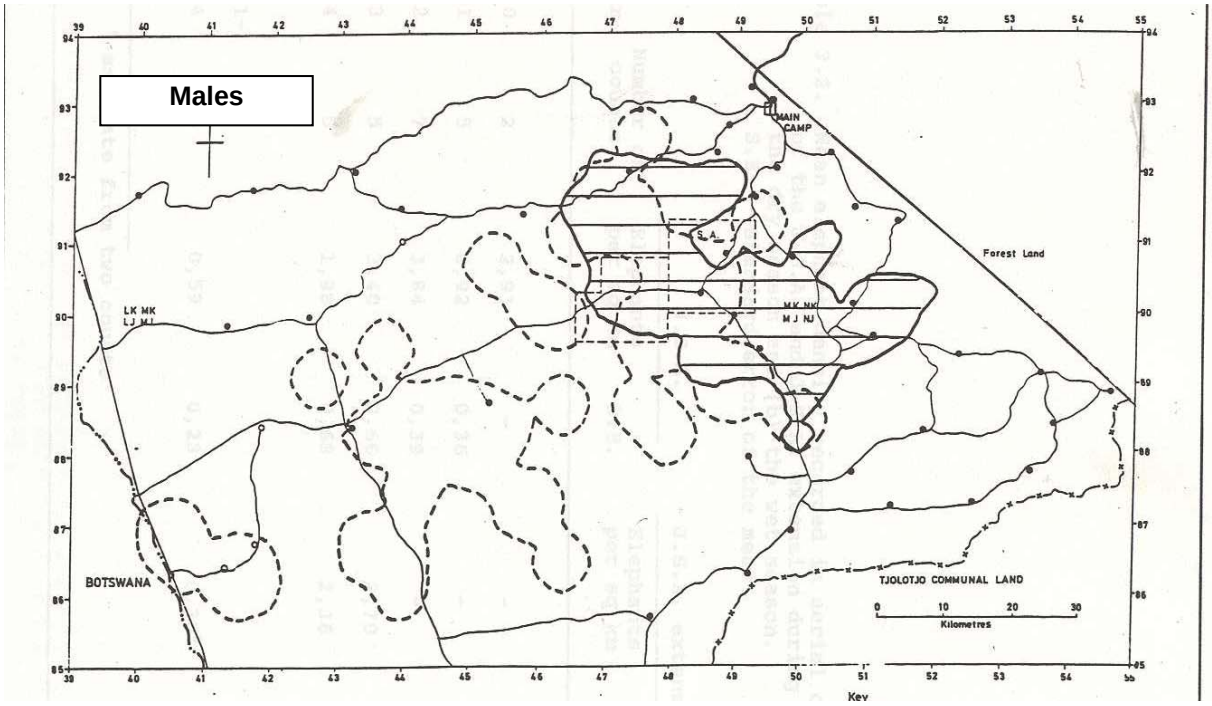
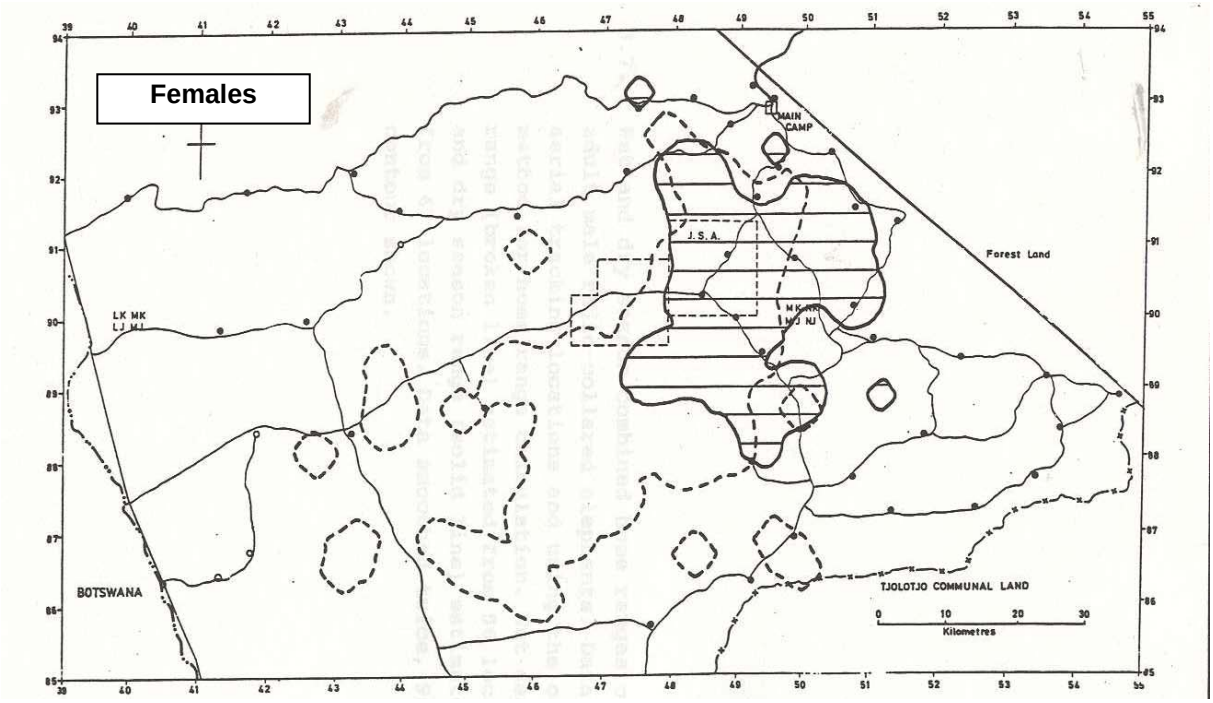


Figure 83: Wet and dry season combined home ranges of elephant males and females
Summed for 5 males and 10 females (Conybeare, 1991)
Dotted lines = Wet; Shaded = dry
Will digitise these shortly

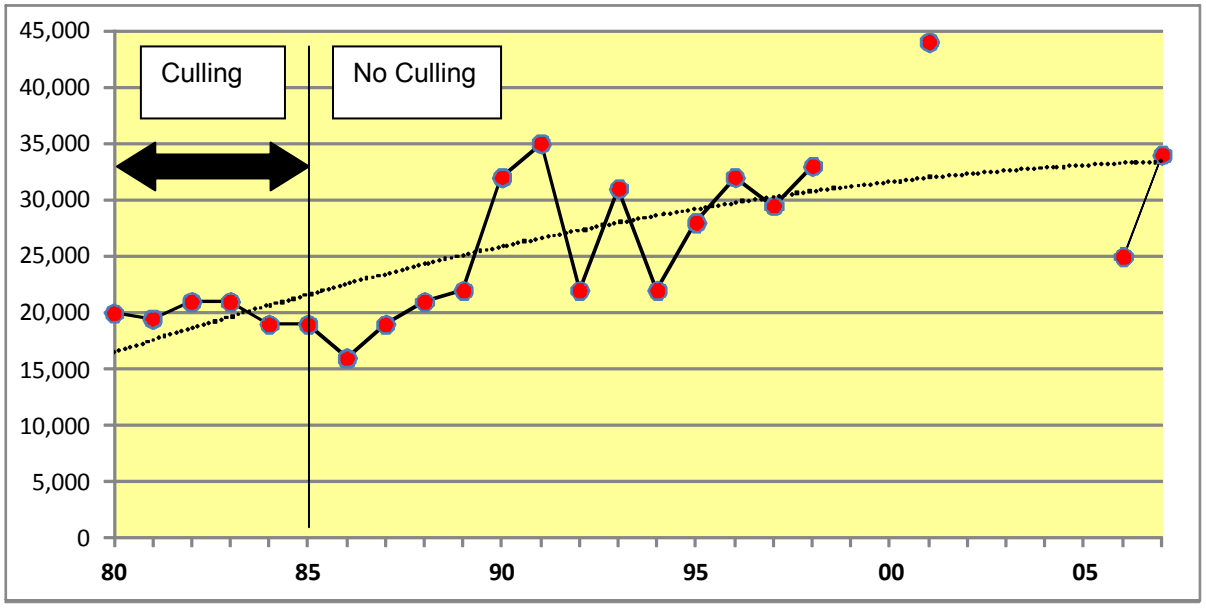




Population Fluctuations

The elephant population has doubled since culling stopped in 1986. Most of the increase happened during the first six years when the population increased continuously at a rate indicating that the recovery was not only due to demographic processes but also to immigration. During the dry period following 1992 the population has been fluctuating widely around 30000 elephants, but reached up to 45000 elephants during the exceptionally wet year of 2001. Statistical modelling of the dynamics indicates that the number of elephants is likely to be positively linked to rainfall conditions, and close to 37,000 under average conditions (Valiex and Chamaillé-Jammes, 2013?)

Figure 84: Estimates of elephant numbers in Hwange

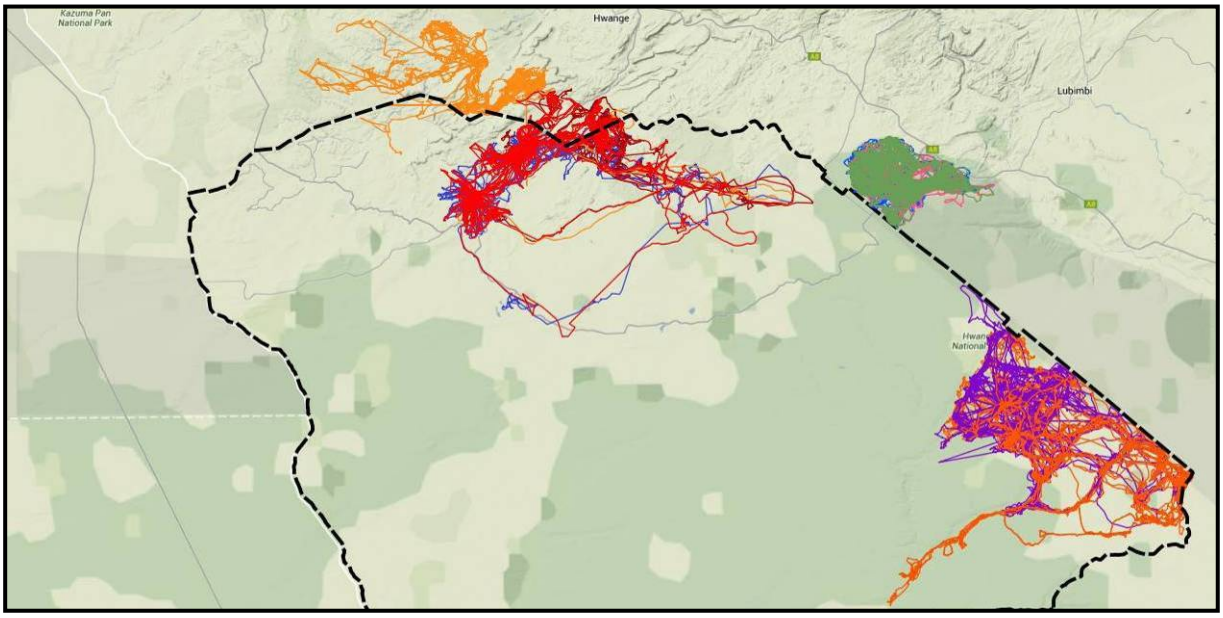


There is a strong variability of elephant dynamics within the park. In dry years, elephant abundance increases where artificial water is maintained (Main Camp, Robins, Ngamo) whereas it decreases elsewhere (Shakwankie), which suggests an annual redistribution of elephants linked to surface-water availability across the landscape. Since culling stopped, elephant abundance increased in most areas of the Park but not in the driest part of the park (Central, Shakwankie). (Valiex and Chamaillé-Jammes, 2013?).

2.7.2.2 Buffalo

A number of buffalo were collared in three different areas of the park. They showed local but not significant long range movement (Figure 85).

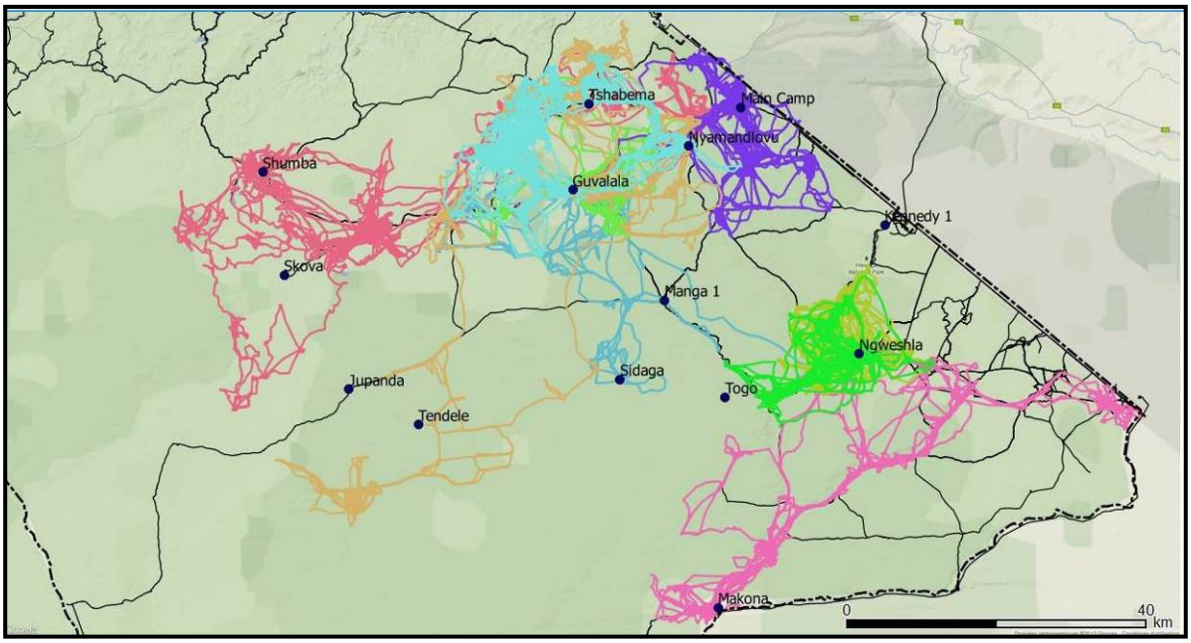
Figure 85: Buffalo movements between November 2012 and December 2013
from individuals belonging to the Sinamatella herds (1a, 1b),
the Sikumi herd (2) and the Kennedy 2 - Ngamo herd (3).



2.7.2.3 Zebra

Similarly a number of collars have been placed on zebra. The resultant mapped movements are shown below.

Figure 86: Movements of nine zebras in eastern Hwange since late 2012
Four became inactive during 2013 and 5 were still running in December 2013,
Two of these migrated to the same areas out west (resp. Skova and Tendele) both years.



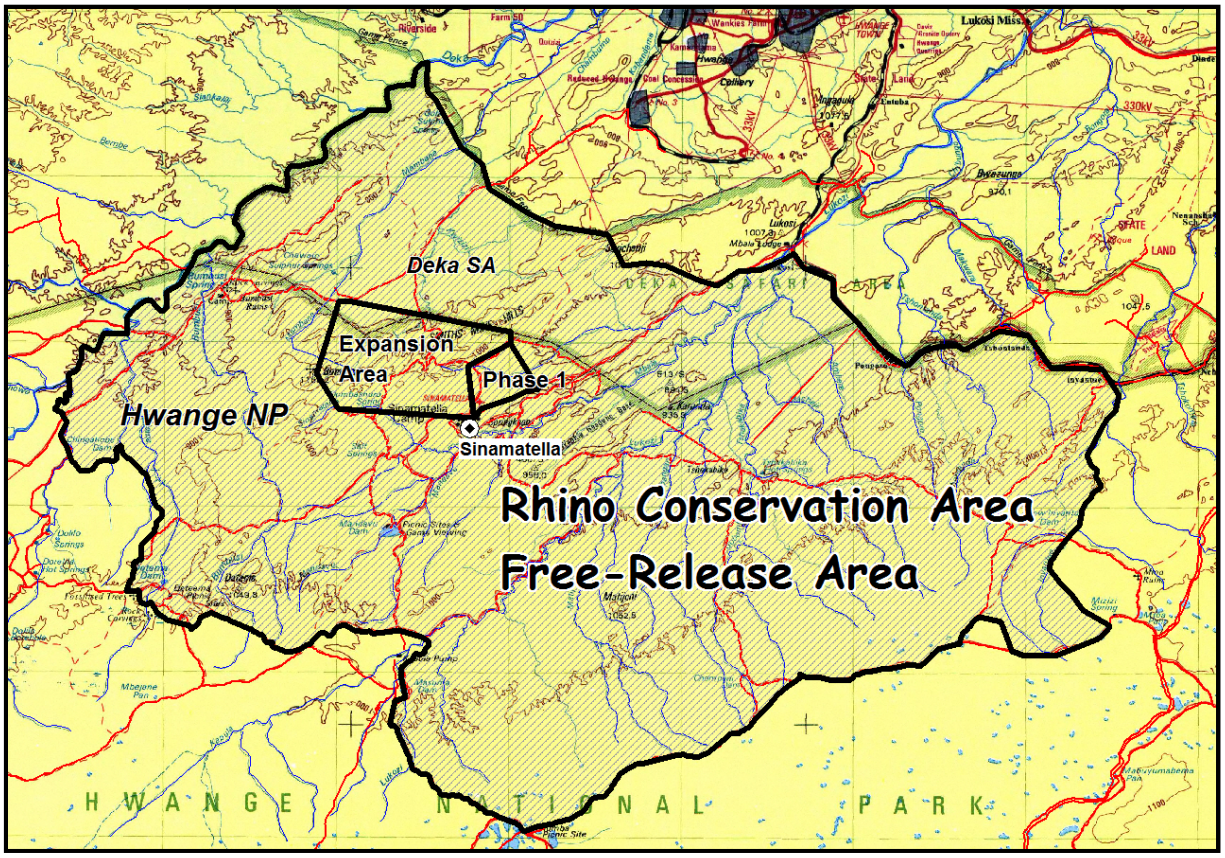
Survival of zebras from a detailed Capture-Mark-Recapture study which monitored 184 known individuals was carried out in the Main Camp Area by the CIRAD/CNRS team. They found that survival was low during the first year (0.444); increased in yearlings (0.624) and peaked at 0.795 and 0.847 in adult males and females respectively. Survival at all ages was low compared to ungulates without predators. The survival of adult females was lower during the dry season, which probably resulted from higher predation due to predictable movements of zebras to waterholes.

The demographic model showed a declining trend (λ=0.94), which was consistent with the data from road counts (λ=0.92). Analyses showed that the main cause of this declining trend was low survival in yearling females; low foal and adult survival also contributed. In this ecosystem with a complete guild of large predators at high densities relative to prey, predation is likely to be the main ecological process causing low survival, and therefore a decline in the zebra population (Grange, et al. 2013?).

2.7.5.4 Rhino

Rhino are an African flagship species and have been the focus of significant conservation efforts throughout Africa, There are currently less that 10 rhinos in Hwange, all to be found in the north which is ideal habitat for them. Plans are underway for a rhino release programme in the Sinamatella area, once the security of the park is deemed sufficient for their protection. The model is based on the Ngulia Rhino Sanctuary in Kenya (Tsavo West). This has an initial small fenced and intensively guarded protection area with the possibility of expansion into a larger fenced area. The eventual goal is to allow the rhinos to be released into a larger unfenced area, depending on the prevailing security situation. The proposed area is shown below (Figure 87).

Figure 87: Proposed rhino conservation areas in Hwange
(Phase 1 = 10 km^2; Expansion = 50 km^2; Free release area = 1,500 km^2)



2.7.5.4 Management of Large Mammals

Past management activities for large were based around population reductions or movements. Cropping of selected species started in 1963 and continued until 1988. Since that time no population reduction exercises have been carried out. Elephant, buffalo and impala constituted the bulk of animals shot with in excess of 17,000 elephants taken in those 25 years (Table 21).

Table 21: Herbivores shot on population reduction exercises

Year	Buffalo	Elephant	Impala	Kudu	Warthog	Waterbuck	Wildebeest	Zebra
1963	140	0	0	0	0	0	0	0
1964	169	0	0	0	0	0	0	0
1966	0	278	0	0	0	0	0	0
1967	1014	500	0	0	0	0	0	0
1968	0	0	0	0	1	0	0	230
1971	0	1364	311	10	9	21	0	35
1972	68	1007	622	0	0	0	45	0
1973	92	12	624	2	3	0	504	0
1974	575	768	749	3	1	0	0	288
1975	0	430	0	0	0	0	0	0
1976	206	552	41	2	0	0	0	126
1977	189	605	15	6	2	0	0	5
1978	0	396	0	0	0	0	0	0
1979	119	244	4	13	8	0	0	0
1980	0	504	0	0	0	0	0	0
1981	12	773	0	0	0	0	0	0
1982	15	42	12	9	3	1	0	0
1983	0	2055	0	0	0	0	0	0
1984	15	4107	14	1	0	0	0	0
1985	23	2421	30	0	0	0	0	0
1986	0	1213	17	1	0	0	49	0
1987	0	0	257	0	0	0	70	59
1988	222	0	0	0	0	0	118	97
Total	**2 859**	**17 271**	**2 696**	**47**	**26**	**22**	**786**	**840**
Total, all species		24 547						

In addition to the herbivores carnivores were also shot, but in the early years of the park (1928 to 1936), in the belief that it would help the herbivore populations (Table 22).

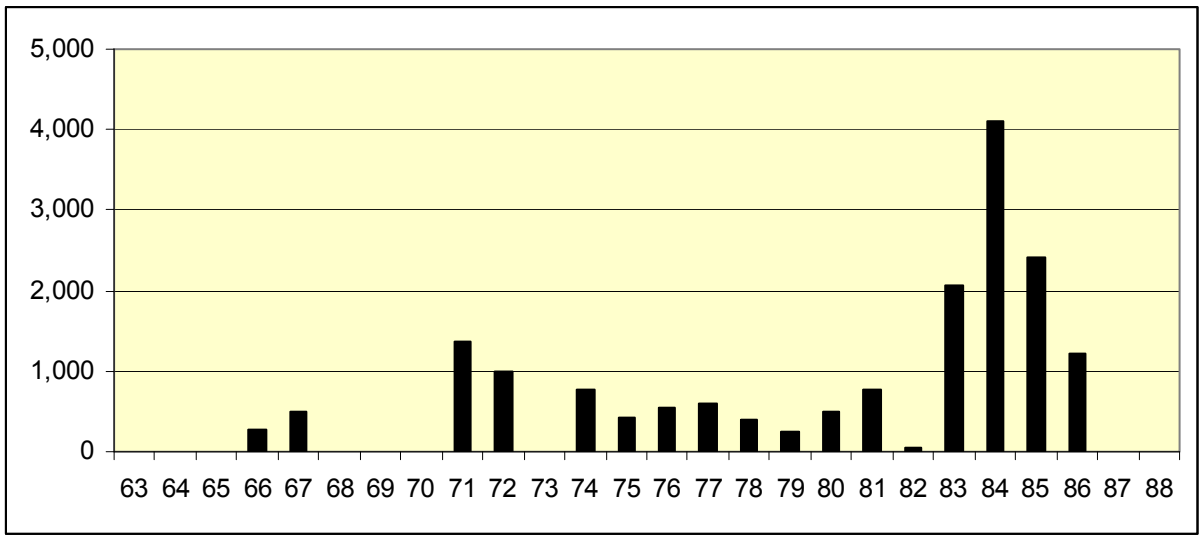
Table 22: Carnivores shot on population reduction

Year	Lion	Leopard	Cheetah	Hyaena	Wild dog
1928/9	18	4	0	15	10
1930	5	5	0	9	2
1931	13	3	1	11	4
1932	3	1	1	1	14
1933	0	0	0	2	17
1934	7	0	0	0	0
1935	7	0	0	0	0
1936	2	0	0	0	0
Total	**55**	**13**	**2**	**38**	**47**

Elephant Culling

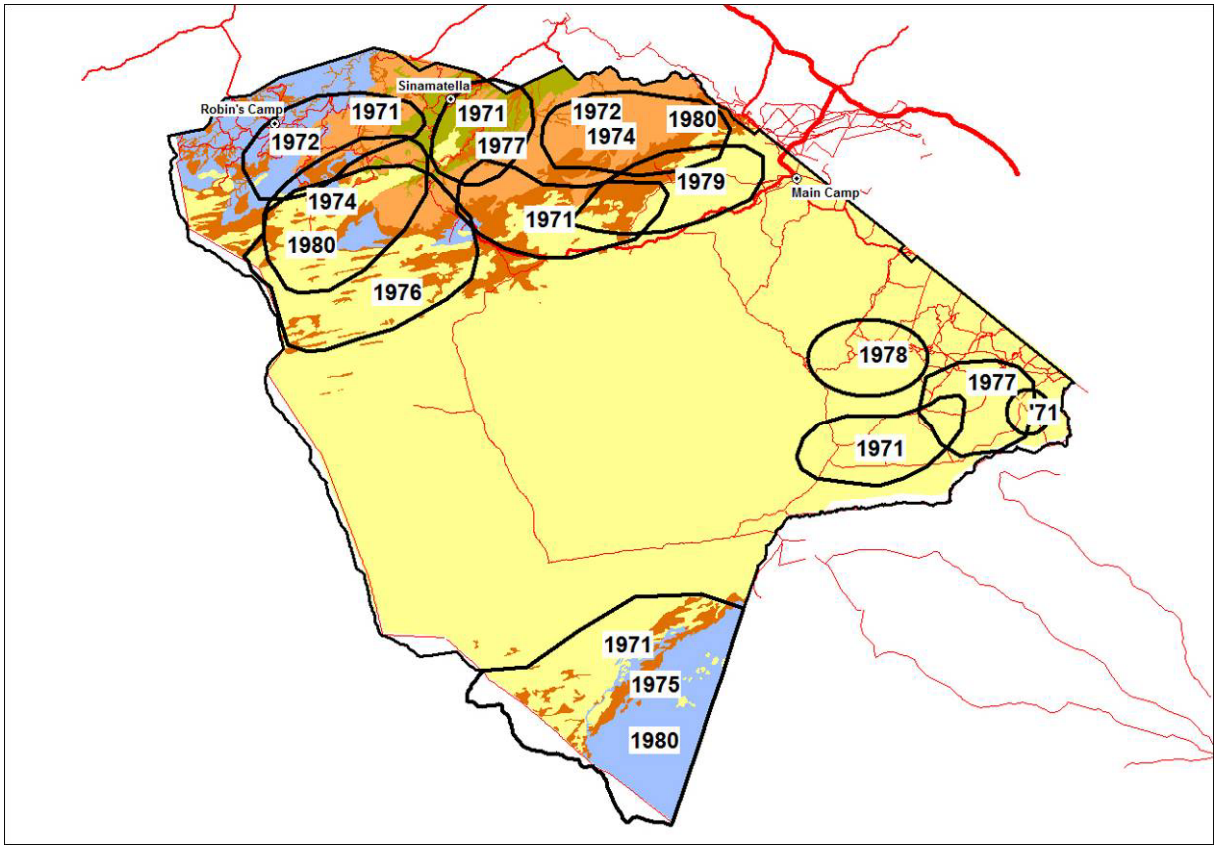
Elephant culling and Hwange will always be synonymous and this section provides a little more detail on this aspect.. Between 1966 and 1987 over 17,000 elephant were culled. In 1966 the elephant population was estimated to be 5,000 animals. In 1971 the estimate was 10,000 and a decision was taken to remove 3,000 animals but in fact only 1,300 were culled. The largest cull took place in 1984 when over 4,000 elephants were shot from an estimated population of 20,000.

Figure 88: Elephant culling in Hwange



The distribution of culling was designed to provide protection to the most susceptible habitats in the park and was concentrated on the shallow soil areas in the north and south (Figure 89). Surveys indicated that elephant densities remained low in these localised areas for up to two or three years after a cull (Cumming, 1981).

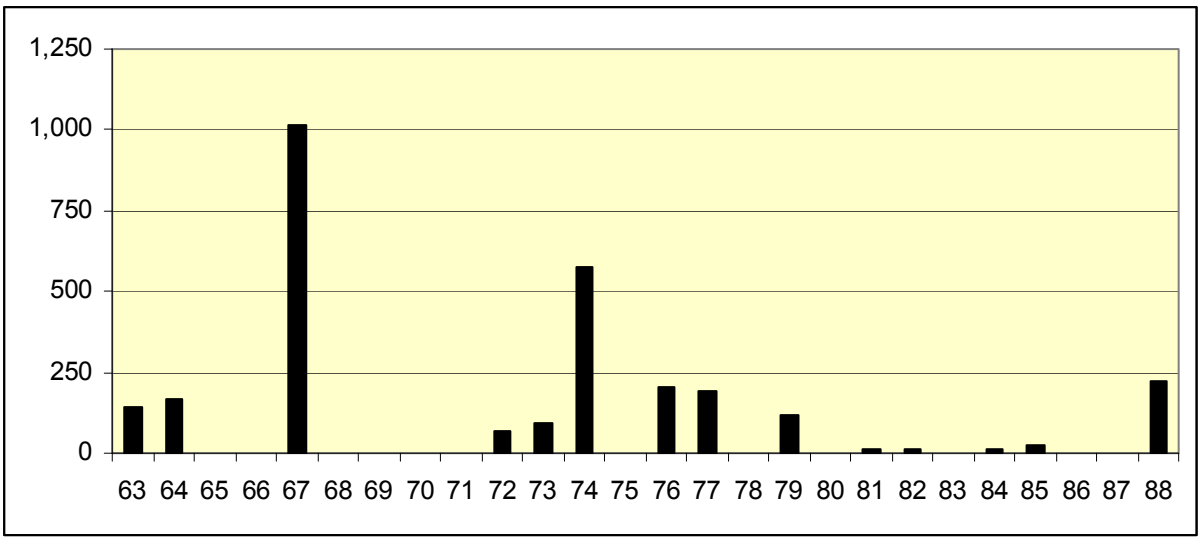
Figure 89: Location of the major elephant culling operations in Hwange
(From Cumming, 1981)



Buffalo Culling and Translocation

Nearly 3,000 buffalo have been shot on control operations with over 1,000 taken in 1967 (Figure 90). In addition a further 500 to 2,000 animals were translocated to the south-east Lowveld in 2012 (I have no details on this).

Figure 90: Buffalo killed in Hwange



Rhino Reintroductions

Close to 200 rhino have been translocated to Hwange. The majority of these have been black rhino and most were released in the northern parts of the park but some white rhino were released in the Makololo area in 2005?

Table 23: Rhino Reintroductions to Hwange		
Year	Black Rhino	White Rhino
1962	6	0
1963	40	0
1966/7	0	35
1980	0	5
1983	0	2
1984	21	0
1985	31	0
1986	34	5
1997?		?
2005?		10?
Totals	134	60?

2.7.6 Monitoring and Research Summary

As mentioned above, in addition to the ZPWMA own research and monitoring, there are a number of NGOs involved in research in the Hwange area. It is important to note that these research projects constitute the bulk of the research in the Hwange ecosystem since 2000. However, ZPWMA ecologists also participate on these projects. They are briefly summarised below.

Table 24: Summary of Research Related NGOs

NGO	Comments
CIRAD/CRNS	Herbivore related research. Started in 1994? Main research components are listed below o Animal Behaviour (zebra, impala) o Wildlife Distribution (elephants, zebra, buffalo) o Interdisciplinary Research o Hyaenas (movements, home ranges) o Parks-Periphery Interface (Community perceptions, crop raiding, cattle, forests) o Disease (Rift valley fever) o Vegetation Surveys (waterholes, expanded & revised vegetation map) o Water (quality, recharge, pan dynamics)
WildCru	Lion related research. Main research components are listed below o **Population Monitoring (Long-term in north and east of the park)** • Pride and individual monitoring • Radio Tracking • Abundance surveys (spoor) • Camera Trapping • Trophy monitoring o **Transboundary Research** • Radio Tracking • Corridor identification • Computer simulation for dispersement o **Lion-Human Conflicts** • Conflict and incident recording • Monitoring of lion movements for early warning • Improved livestock husbandry and protection • Abundance surveys (spoor) • Community Awareness (e.g. comic book) • Anti-poaching assistance (from Wexcau)
Painted Dog	**Painted Dog** was one of the first organisations to start a species related programme in Hwange o **Land and Water Management** – Anti-poaching activities, treatment of individual dogs and radio tracking studies o **Species Management** - monitoring the status, distribution, direct and indirect threats to painted dogs in Zimbabwe o **Education and Awareness** – Education Centre, bush camps, Conservation Clubs, Community outreach etc o **Law and Policy** – Lobby for legal changes with respect to painted dogs

Table 24: Summary of Research Related NGOs	
NGO	**Comments**
DART	**Dete Animal Rescue Trust** o Leopard Research – Comparison of status inside and outside national park (radio collars, spoor transects, camera trapping) o Other Research (waterhole counts, road transects) o Snare removal o Waterhole assistance
Cheetah Conservation Project Zimbabwe	Main research components of the Cheetah Conservation Project Zimbabwe are: • Country wide population survey of cheetah and other carnivores • Cheetah population monitoring (movement, home ranges, reproductive success), with a main focus on Hwange National Park which inhabits the largest cheetah population in Zimbabwe
Wilderness Wildlife Trust	Wilderness Safaris employs its own concession ecologist who works both with the ZPWMA and the research related NGOs. Current activities include o Wildlife counts o Game water supply o Anti-Poaching assistance o Well production study o Other smaller studies o Liaison with ZPWMA and NGOs o School rehabilitation **Hwange Networking Project.** Attempting to provide linkages between stakeholders to disseminate information and ideas and to allow the different groups to influence each other (e.g. research to influence policy or policy to guide research).
WEZ	Wildlife and Environment, Zimbabwe. WEZ carries out an annual 24 hour game count at waterholes in the park. This has been ongoing since 1972.

2.7.6.1 Monitoring

The ecology section, in collaboration with other research NGOs carries out a number of monitoring activities in the Hwange area. These are briefly outlined below

Table 25: Current monitoring in Hwange	
Monitoring	**Comments**
Climate	Several rainfall gauges in the park, mostly at stations. Other climatic data monitored at stations
Antipoaching	
Animal movements	Collaring of selected species
Poaching incidents	
PAC Incidents	
Trophy Quality	All animals hunted and associated data recorded at Matetsi and Main Camp
Animal Distribution	Road counts, spoor transects, camera trapping, aerial survey

2.7.6.2 Research Priorities

At present the park does not have well defined research priorities. However, the following were extracted from the 2003 plan.

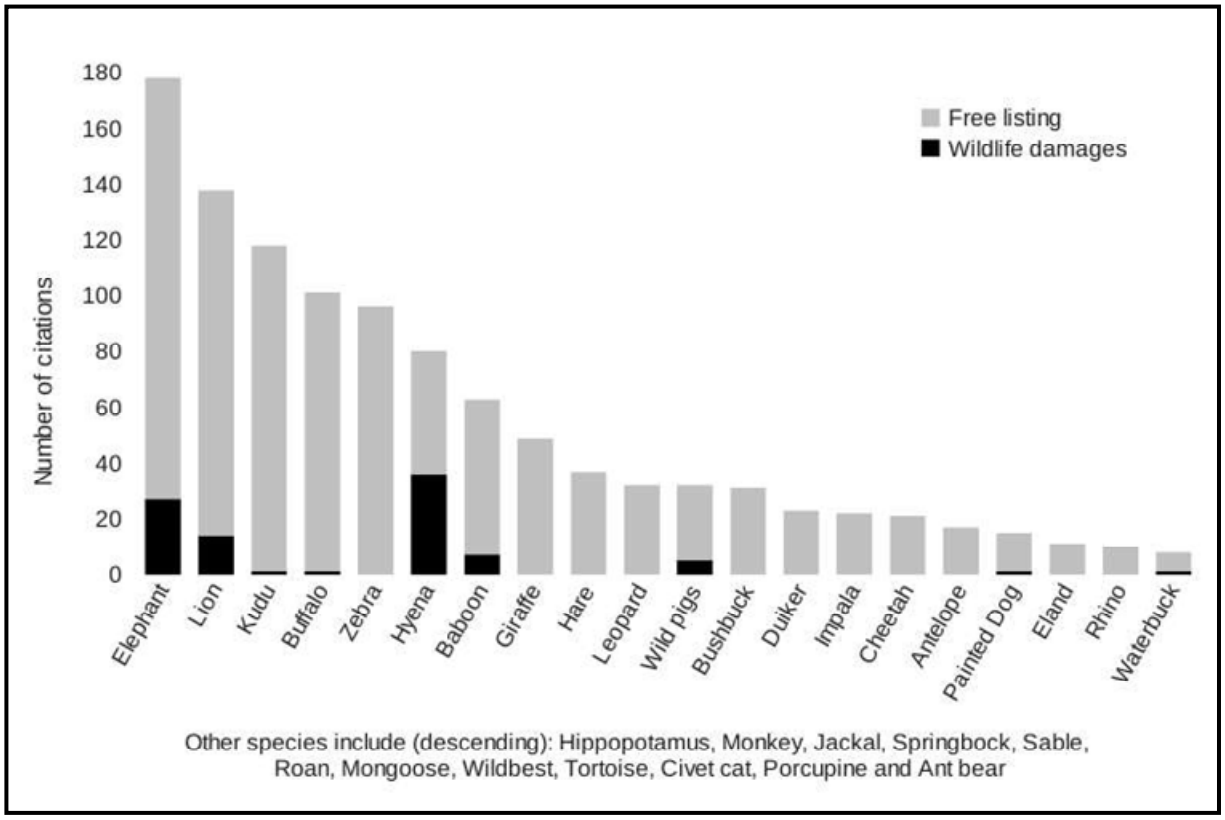
- Establish seasonal densities, distribution and movement of elephants
- Establish the effect of manipulating water supply on densities and drinking behaviour of elephants
- Improved knowledge of ground and surface water resources
- Improved knowledge of water demand
- Monitor elephant vegetation interactions
- Monitor natural fires
- Determine the effects of fire on vegetation, nutrient cycling and herbivore relationships
- Determine extent, changes and causes of soil erosion
- Research into reclamation techniques
- Establish number, distribution and interaction of lion, hyaena, leopard, wild dog and cheetah
- Establish numbers and distribution of threatened species
- Establish the herbivore community structure in the major habitat types
- Monitoring of species
- Assess and monitor the environmental impacts of tourism
- Inventory of archaeological and cultural sites

Some of these priorities have been addressed in the last 20 years (notably carnivore and herbivore research) while others have not.

2.8 PROBLEM ANIMALS

Negative interactions between humans and wildlife is a common problem along the periphery of protected areas in Africa and Hwange is no exception. Both carnivores and herbivores are considered to be problem animals with hyaenas and lions topping the list of carnivores while elephants, wild pigs and baboons are considered to be the most problematic herbivores (Figure 91. From research in Hwange Communal Land, Gerbois, 200x).

Figure 91: Comparison between species recorded and damages from wildlife in Hwange CL
(Guerbois, 2012)

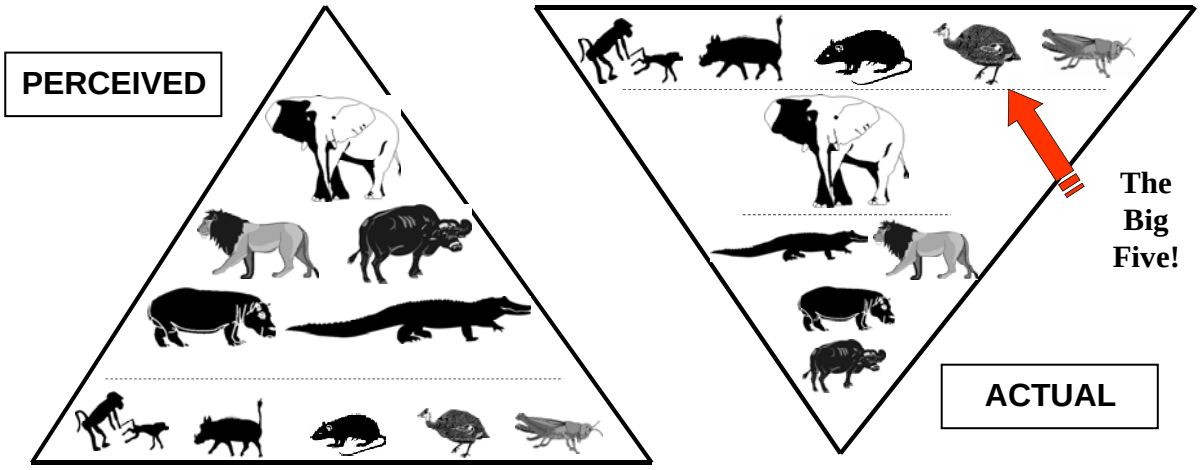


In Zimbabwe the CAMPFIRE programme was established to embed the concept of community based natural resource management in the communal lands and communities that have to live with wildlife. The appears to be a divergent opinion as to the effectiveness of CAMPFIRE with the implementers of the programme (the Rural District Council) claiming that it is working as envisaged and that communities do receive benefits. However, traditional leaders claim that it is not and they receive very little of the benefits.

A critical point is that the cost of human-wildlife conflict is borne by individuals or households but the benefits from community based natural resource management programmes accrue communally. This may mean that benefits from the programme are skewed with those in the “front line” feeling that their benefits do not offset the costs.

Perceptions and attitudes of people towards wild animals is considered to be a key element in the management of human-wildlife conflict. In some cases the perception of human-wildlife conflict and the attitude to wild animals is more of a problem than the problem animals themselves.

Figure 92: Perceived versus actual important problem animals (after Hoare, 2014)



In Figure 85 the top layer shows the "worst" animals and the bottom layer the least problematic. The more numerous, but no so dangerous small species do more economic damage and therefore are probably the most serious for crop losses. However, the less numerous large and dangerous species are more feared because of the physical threat AND the fact that they are often state property (on quotas, inside a park etc).

Conflict mitigation measures are varied and can be separated into short- and long-term categories. Short-term measures include the more traditional responses by the authorities and the concerned people themselves. They include

- scaring animals away (fires, noise, chasing)
- translocation,
- hunting and killing
- compensation.

Longer-term measures include
- research,
- appropriate fencing projects,
- safari hunting projects
- separation of humans and wildlife through land-use planning.

The methods can also be separated into measures against animals (mostly the short-term measures listed above) and measures involving people (mostly the longer-term measures listed above). Pro-active responses to crop-raiding are far more effective than responses after the event.

The ten main categories defined after nearly 20 years of research on human-elephant conflict mitigation methods (Hoare, 2015) are

1. Traditional deterrent and disturbance methods used by rural communities
2. Disturbance and chasing of problem elephants by wildlife authorities
3. Killing of problem elephants by wildlife authorities
4. Translocation of problem elephants by wildlife authorities
5. Fencing options
6. Olfactory and auditory deterrents with fences (chilli extracts, bee sounds etc)

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7. Systematic data collection and contextual research
8. Compensation and insurance schemes

9. Wildlife utilization and benefit programmes ('community conservation')
10. Land-use planning, changes and zonation

A very important distinction is between those measures applied AGAINST ANIMALS and used WITHIN THE CONFLICT ZONE (1 – 6) which mostly used in the SHORTER TERM (except some fencing), and those measures WORKING WITH PEOPLE, relying heavily on official policy and administration which is often situated BEYOND THE CONFLICT ZONE (7 –10). The researching, refinement and re-assessment of HEC mitigation methods that has occurred since 2003 can be summarised as follows into biological, physical and governance categories.

The evolution of the 'arsenal' of Human-Elephant Conflict mitigation methods suggests that the following principles can be applied - almost in the form of ' **commandments**' - across several taxa of dangerous problem animals in Africa (elephants, large carnivores, crocodiles, hippopotamus, buffalo). Therefore human-wildlife conflict refers here to specific forms of human-wildlife conflict across a range of species.

- Human-Wildlife Conflict shows complex spatial dynamics in landscapes where relatively few 'problem animals' are responsible, often displaying particular individual behaviours.

- The human perception of hwc and the attitude to wild animals is more of a problem than the problem animals themselves. Social 'opportunity costs' of human-wildlife conflict are very difficult to quantify but are extremely important in the impact assessment of human-wildlife conflict.

- The spatial scale of assessment of the human-wildlife conflict problem is crucial to its evaluation.

- Human-wildlife conflict cannot be eliminated; therefore aim to reduce it to acceptable levels, not eliminate it. Tolerance levels to human-wildlife conflict do exist in rural communities and can be increased.

- Prioritize mitigation measures aimed at working with people over those against animals.

- Don't kill problem animals as a routine; stop them reaching their 'targets'. Killing may be appropriate for occasional severe cases of badly injured or otherwise intractable animals.

- There is no panacea for human-wildlife conflict; mitigation measures have to be flexibly used in combination at different scales. Combinations of longer-term human-wildlife conflict mitigation measures produce synergy.

- Local participation is vital and best as part of a community-based natural resource management programme. One unavoidable issue is the cost of human-wildlife conflict is usually borne by individuals or households but the benefits from community-based natural resource management programme generally accrue communally.

- Vertical and horizontal integration in government administration is required to tackle human-wildlife. Land use planning and official zonation are the most vital tools to mitigate human-wildlife.

- New technologies used imaginatively (mobile phones, GPS radio-collars, camera traps etc.) Can assist human-wildlife mitigation. Research is constantly required to allow mitigation methods to evolve.

Both ZPWMA and CAMPFIRE officials are tasked to deal with problem animals. In 2012 ten problem animal reports for lions were received at Main Camp and there were six reactions to these. No lions were killed during these reactions. In the same year 20 elephant reports were received and 15 of these were reacted to which resulted in the killing of 5 elephants. The meat from these elephants was distributed in the community area.

2.8.1 Carnivores as Problem Animals

Hyaenas and lions are the most problematic carnivores in the communal areas adjacent to Hwange. Hyaenas are perceived to be more of a problem than lions but most data has been collected for lions through the WildCru Lion Research project and this is summarised below.

2.8.1.1 Lion-Human Conflicts

Since 2007 a significant component of the project has focused on the issue of conflict between the local agro-pastoralist people and lions. The research has sought to gain an understanding of both the underpinning ecological factors and the human socioeconomic factors that contribute to conflict situations. The project has an intensive reporting system for conflicts and have undertaken a detailed survey to record the baseline data on human wildlife conflict at the household level. Between 2007 and 2013 a total of 1,113 conflict incidents were recorded in the Hwange area in which 915 head of stock were lost to lions.

There is a strong seasonal component to the incidents of predation (Figure 93), probably based on the low availability of prey in the wet season and also to the fact that the herds are grazed further away from the villages at this time.

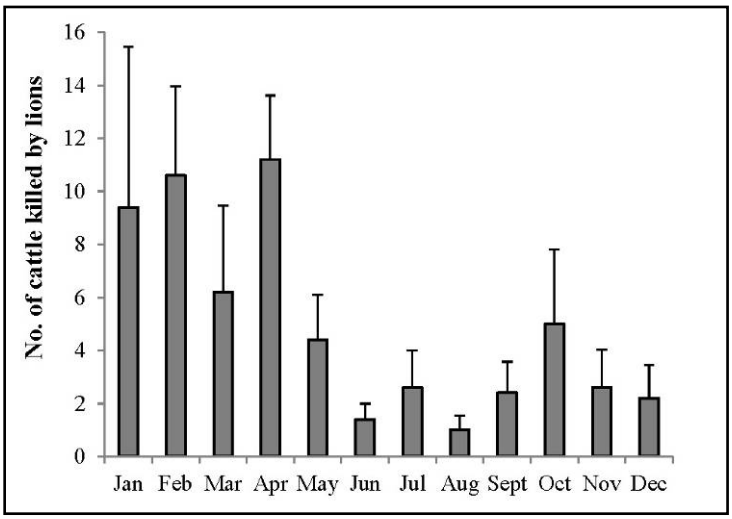


Figure 93. The mean number of cattle (N= 5 years) killed by lions per month in the Tsholotsho communal lands between 2008 and 2012.

Error bars represent standard error. (Loveridge, Kuiper et al. in prep.).

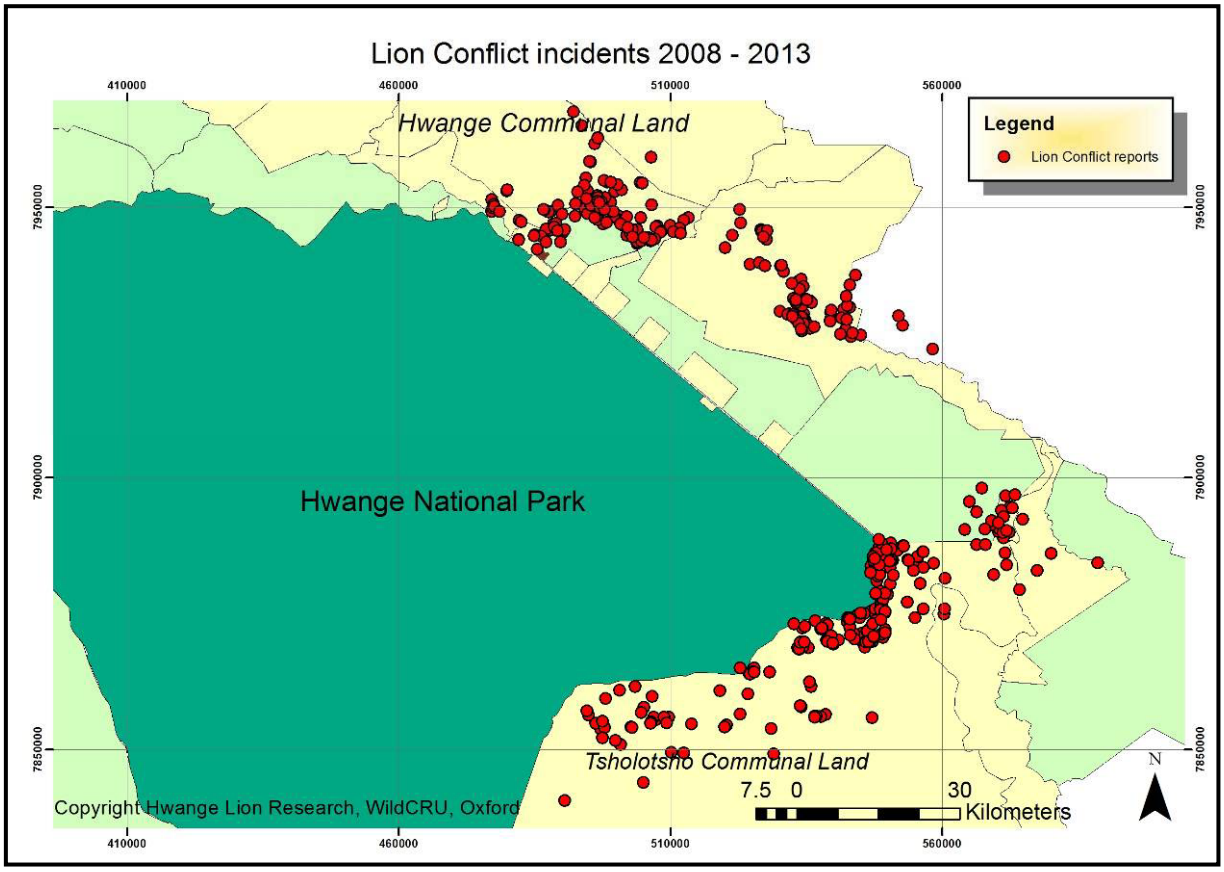
Figure 94: Cattle killed by lions and retaliatory PAC

Based on the research the project has initiated an early warning system whereby communities are notified of lion movements into their areas. Obviously this will be for collared lions only. The "Long Shields Guardian Programme" has been established and lion movements into sensitive areas are sent to the guardians via cell phone who then motivate the community to take appropriate action (move the cattle, chase the lions etc). In 2013 alone, 1,850 warnings were passed to the long shields. It is important that the collars are put onto lions that are cattle killers and these individuals are notoriously shy and difficult to capture.

In addition the project is working on improving bomas and husbandry techniques as another way to lessen the conflict between lions and people (see Figure 95). However, people are aware that leaving cattle unattended can result in their deaths but sometimes this is unavoidable due to reason suck as sickness or other commitments in daily life.

Figure 95: Traditional and plastic boma systems for livestock protection
(Plastic boma photo : B. Staplekamp, WildCru)

Figure 96: Reported lion conflicts 2008-2013 and lions snared 1998-2014
(Maps courtesy of WildCru)



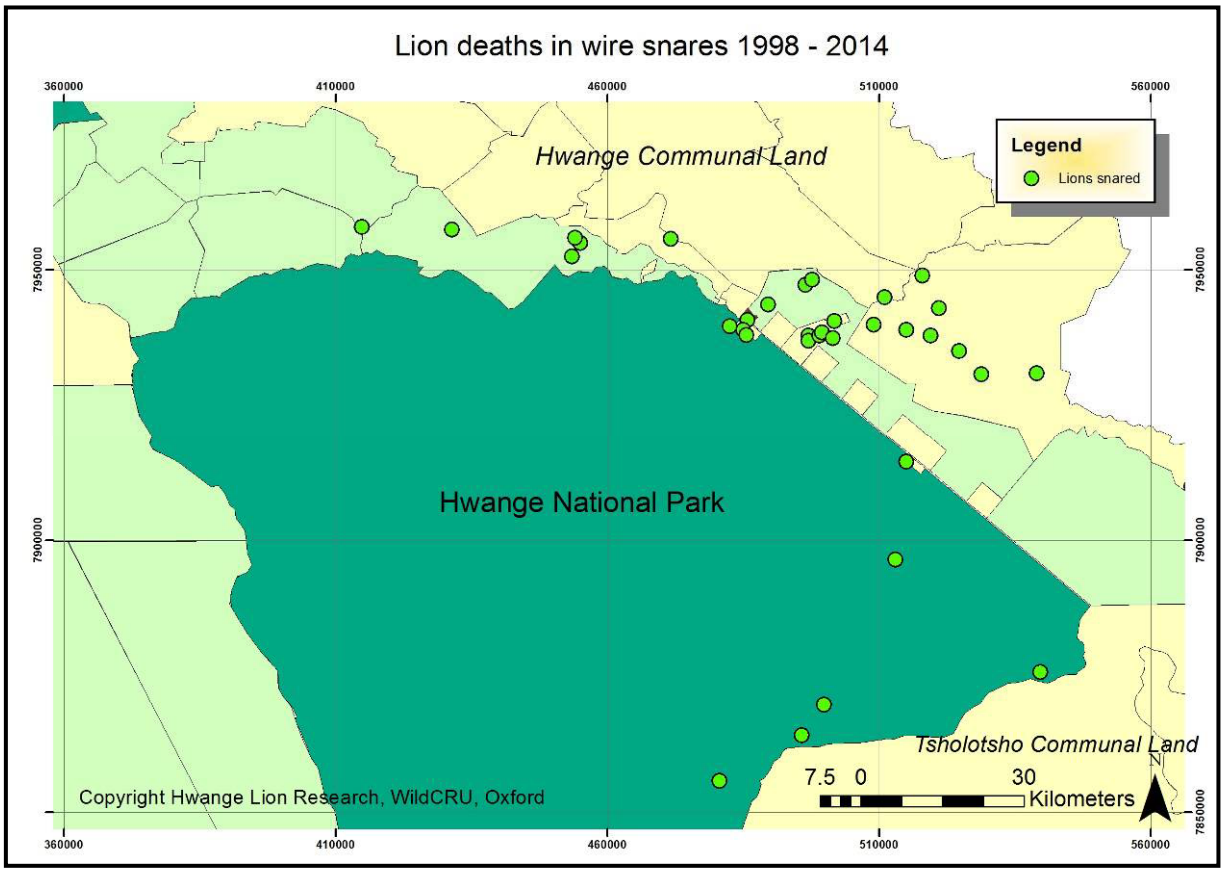
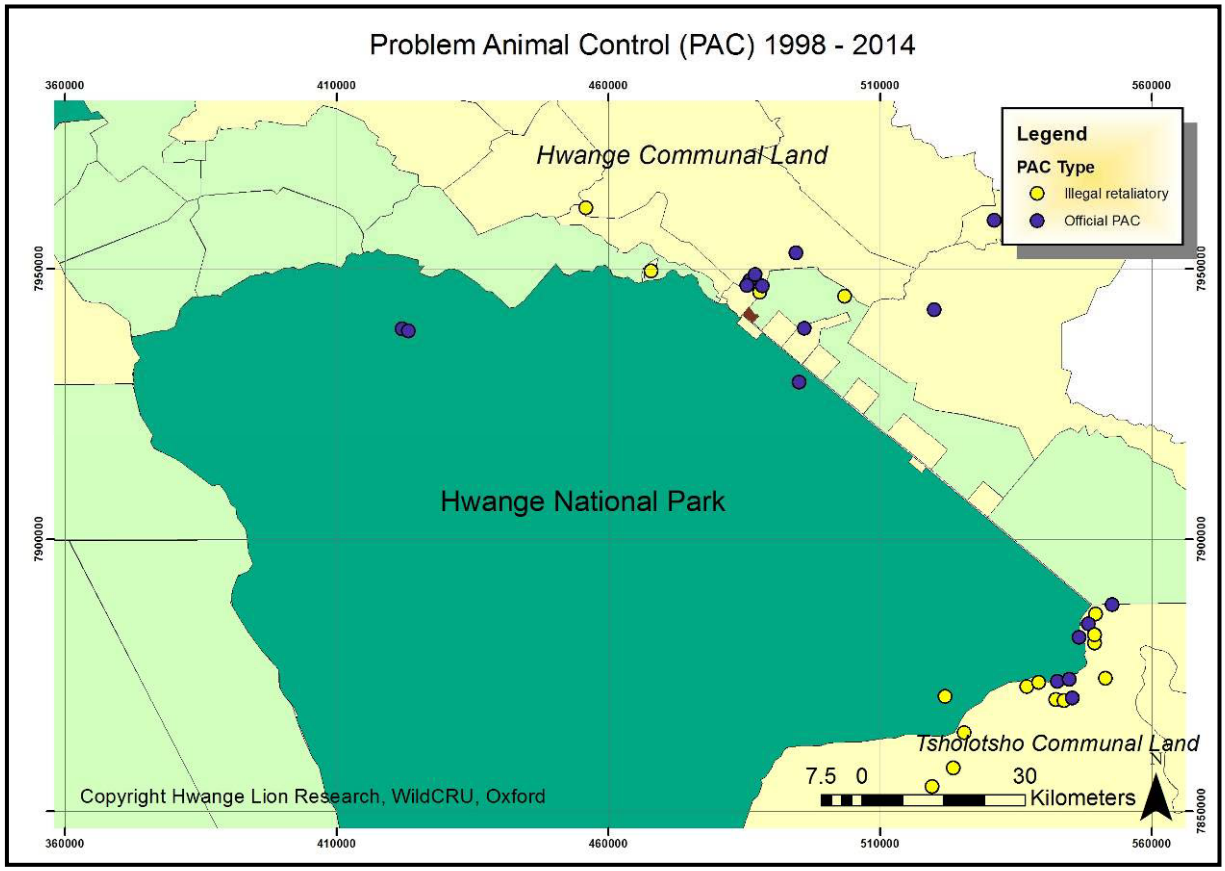


Figure 97: Legal and illegal control of lions 1998-2014



2.8.1.2 Other Carnivores

Conflict reports were collated for hyaenas, leopards and cheetahs between 2008 and 2014 and these are represented below. All map courtesy of WildCru.

Figure 98: Spotted Hyaena conflict reports 2008-2014

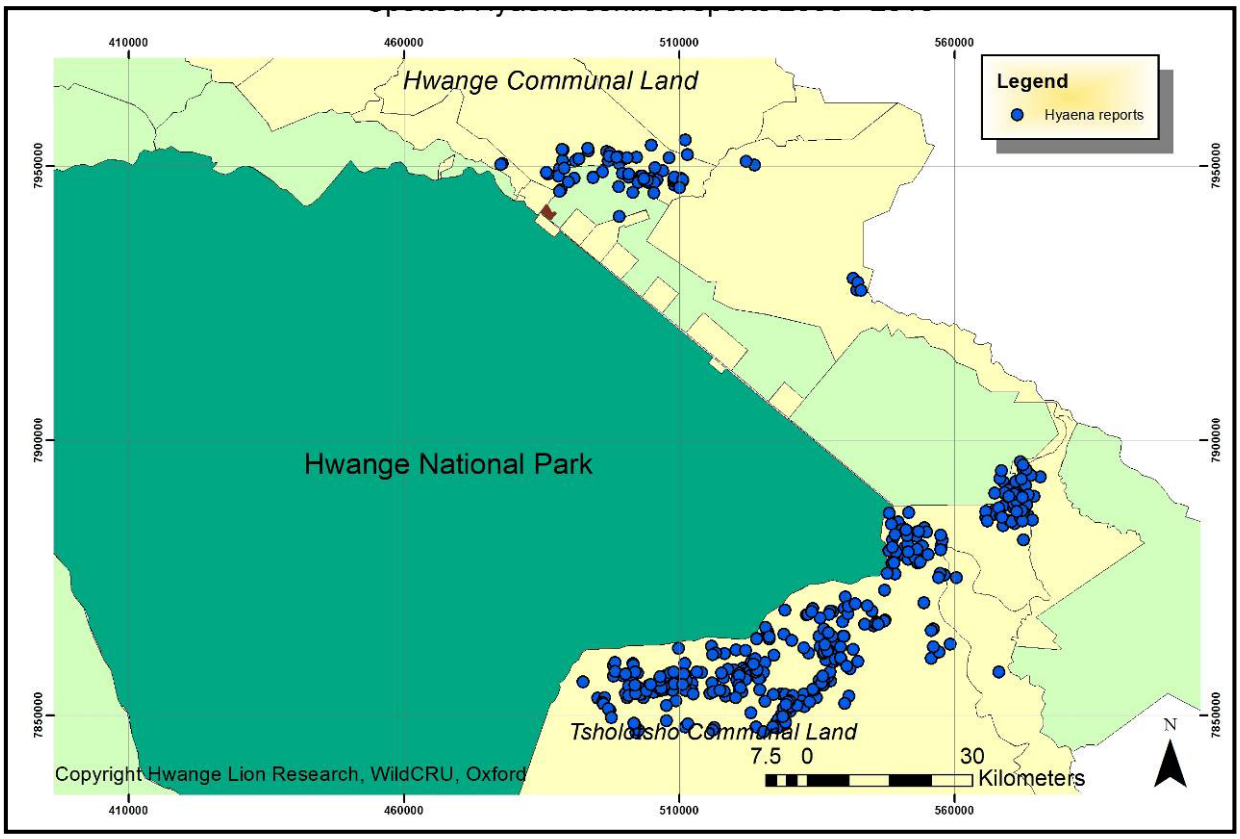
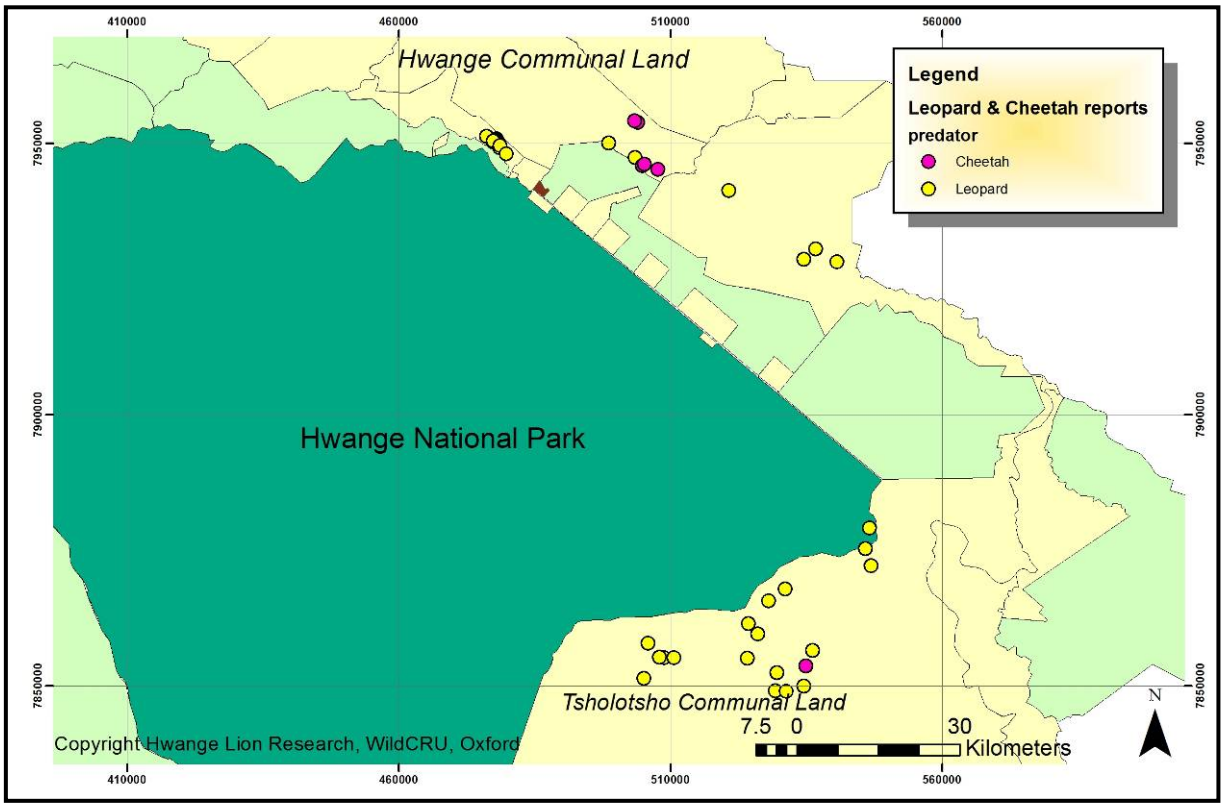


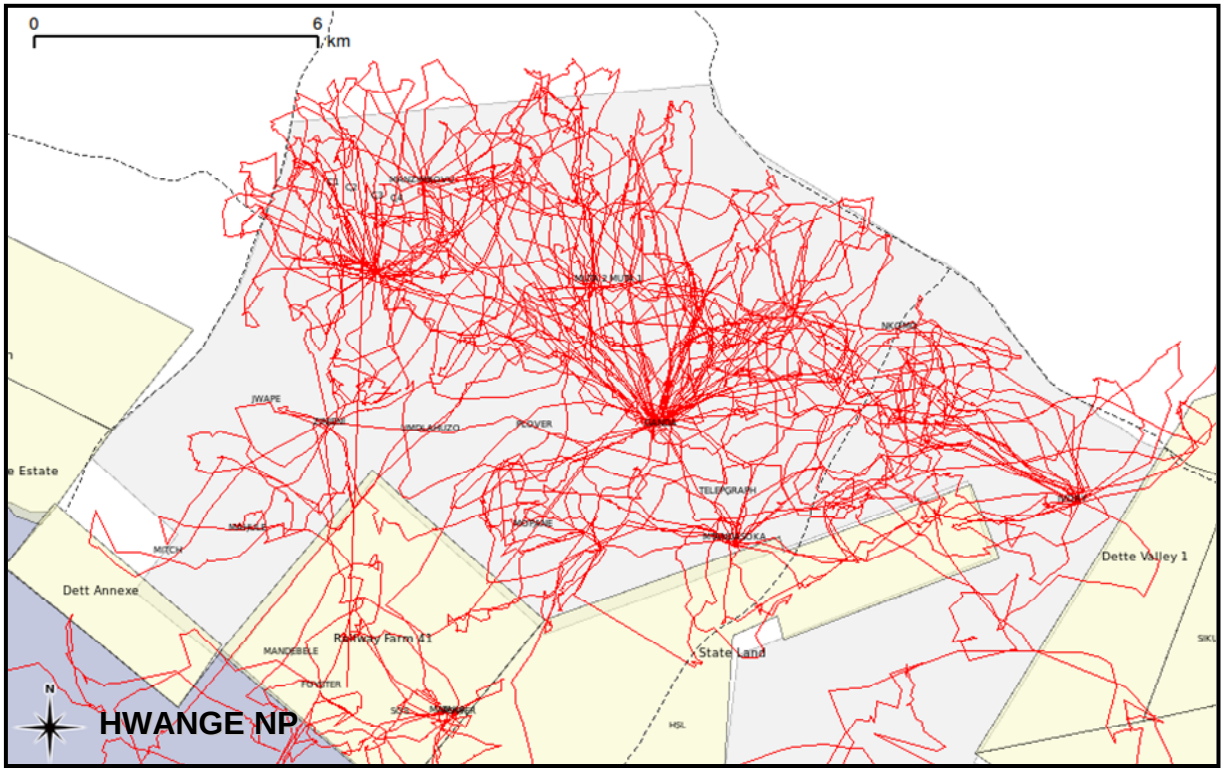
Figure 99: Leopard and cheetah conflict reports 2008-2014



2.8.2 Herbivores as problem animals

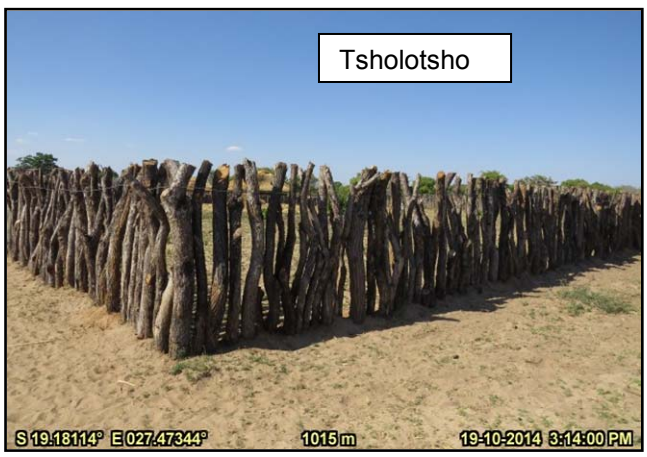
Elephants are the most visible herbivore causing damage to crops in the areas adjacent to Hwange. They are also the largest, most numerous and a single animal is capable of enormous damage. Consequently most research has been carried out on elephants and some results pertaining to Hwange CL are presented here (based on Guerbois, 2012).

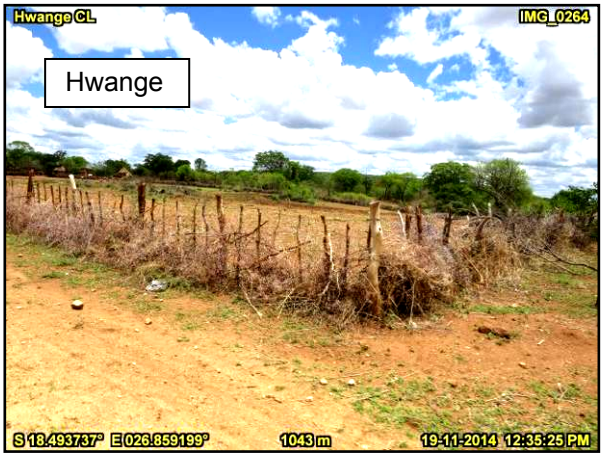
Figure 100: Movements of a collared crop raiding elephant in Hwange CL
(Guerbois, 2012)



Crop raiding elephants are mostly active at night and obviously is correlated with the growing period, reaching a peak in March. The frontline fields are hit harder than those further away and the presence of millet appeared to be an attractant. Levels of care (guarding, noise, density of households/livestock) helped to protect fields. Settlements located on elephant movement routes (as indicated by paths) increased the risk of damage.

Figure 101: Methods of field protection in Tsholotsho and Hwange
(Tsholotsho, on Kalahari sand, has significantly more wood available and this can be seen in the style of field protection)





2.8.3 Wildlife Disease

Although not problem animals as such wildlife related diseases do cause issues across the wildlife/livestock interface. The following information comes from Garine-Wichatitsky, *et. al.*, 2013

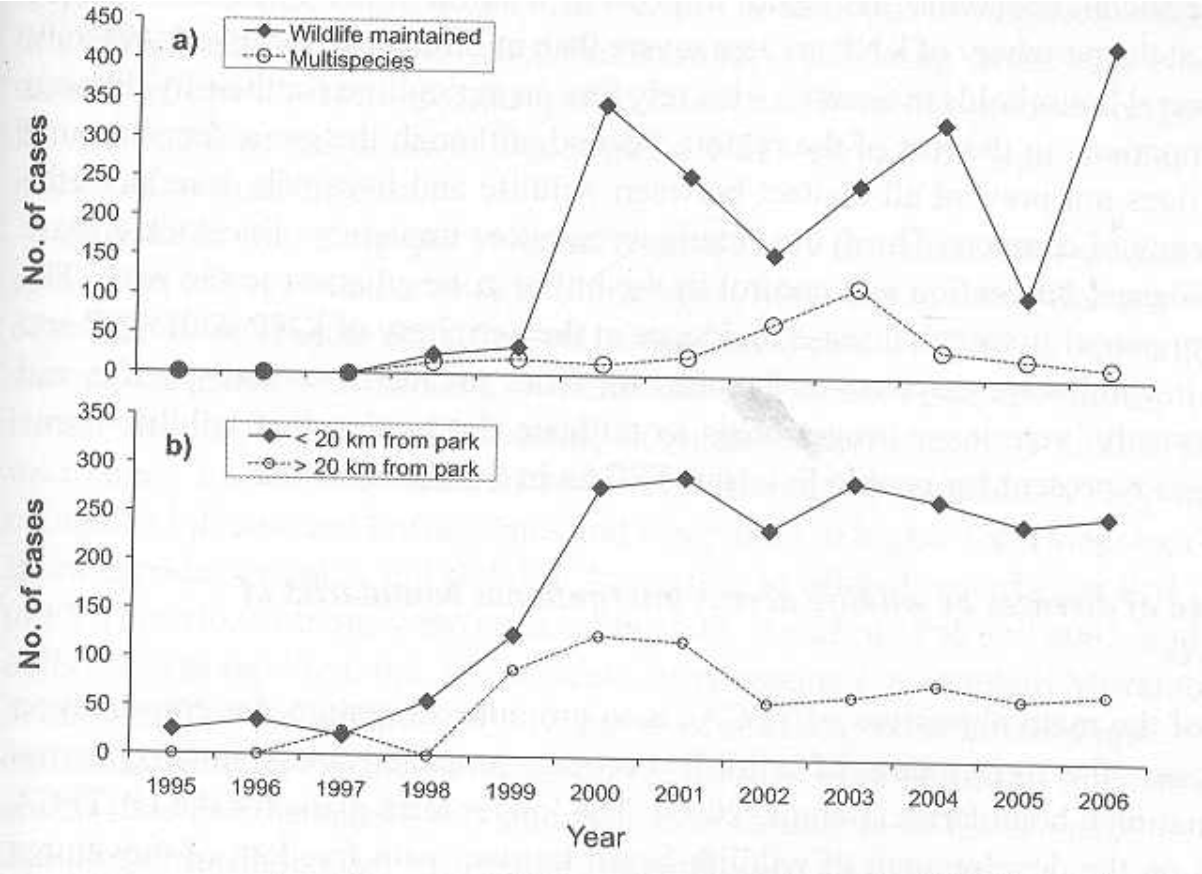
Movements of livestock and wildlife across the edges of protected areas are an avenue for the transmission of pathogens in either direction: from wildlife to livestock and vice-versa. In some cases, the direction of pathogen transmission has been documented using molecular tools in Southern Africa (e.g. rabies, Sabeta etal., 2003; Foot and Mouth Disease, Vosloo et al., 2005; bovine tuberculosis, Michel et al., 2006). The role as disease reservoir played by wildlife species is well established, for example buffalo act as a reservoir of Theileria parva lawrenci *responsible for corridor disease. But in most of the cases a role is suspected but not sufficiently documented, as the occurrence of the same disease is no proof of the transmission of pathogens between wildlife and livestock. Diseases occurring in livestock and wildlife at the edge can be categorized into:*
(a) wildlife-maintained diseases, to which wildlife are resistant or silent carriers of infection and
(b) multi-species diseases, which have serious outcomes in both livestock and wildlife.

Important wildlife-maintained diseases are many, including Foot and Mouth Disease (FMD), malignant catarrhal fever, trypanosomiasis, theileriosis (corridor disease), ehrlichiosis (heartwater), lumpy skin disease and Rift Valley fever (Bengis et al., 2002). Multi-species diseases, which include anthrax, rabies, brucellosis and bovine tuberculosis (BTB), occur in both wildlife and domestic livestock, and transmission can occur in both directions. Uniquely, these diseases generally have a fatal outcome in both wildlife and domestic livestock, and are frequently zoonotic, meaning that they can be transmitted to humans (Bengis et al., 2002).

Endemic in Southern Africa, rabies is responsible for numerous human deaths (Knobel et al., 2005), and also represents a major threat for the conservation of highly threatened African species such as wild dog (Lycaon pictus). BTB, which is discussed further below, is a disease that affects wildlife in Southern Africa (Renwick et al., 2007) and was originally introduced through livestock. Although livestock diseases that infect wildlife can have a major impact on conservation, we focus our attention on livestock diseases that affect the people living at the periphery of TFPs in Southern Africa

Hwange hosts a large variety of wild herbivores and carnivores which are known to play an important role in the epidemiology of diseases that are transmissible between wildlife and livestock. A retrospective study covering a period of 13 years in communal areas surrounding HNP (January 1995 to July 2007; Marange and Marimwe, 2008) collected data on diseases transmissible between wild and domestic animals.3 Wildlife-maintained and multi-species diseases contributed over 70 per cent of the total disease cases reported (n = 2989). The study detected an increased occurrence of wildlife-maintained and multi-species diseases between 1995-2000 and 2001-2006 (Figure 95a). The increase started in 1999-2000, just after the economic downturn in Zimbabwe, which began in 1997, but before the resettlement of communal farmers in former game ranches, which increased interactions between wildlife and livestock. In addition, a significantly higher number of cases of these diseases were reported from dip tanks located within a radius of 20 km from the national park boundary compared with those further from the park (Figure 95b).

Figure 102: Annual occurrence of wildlife-maintained and multi-species diseases in livestock. 1995-2006, Hwange District, Zimbabwe. Number of cases reported according to (a) year and (b) distance from Hwange National Park. Figure adapted from Marange and Marimwe, 2008

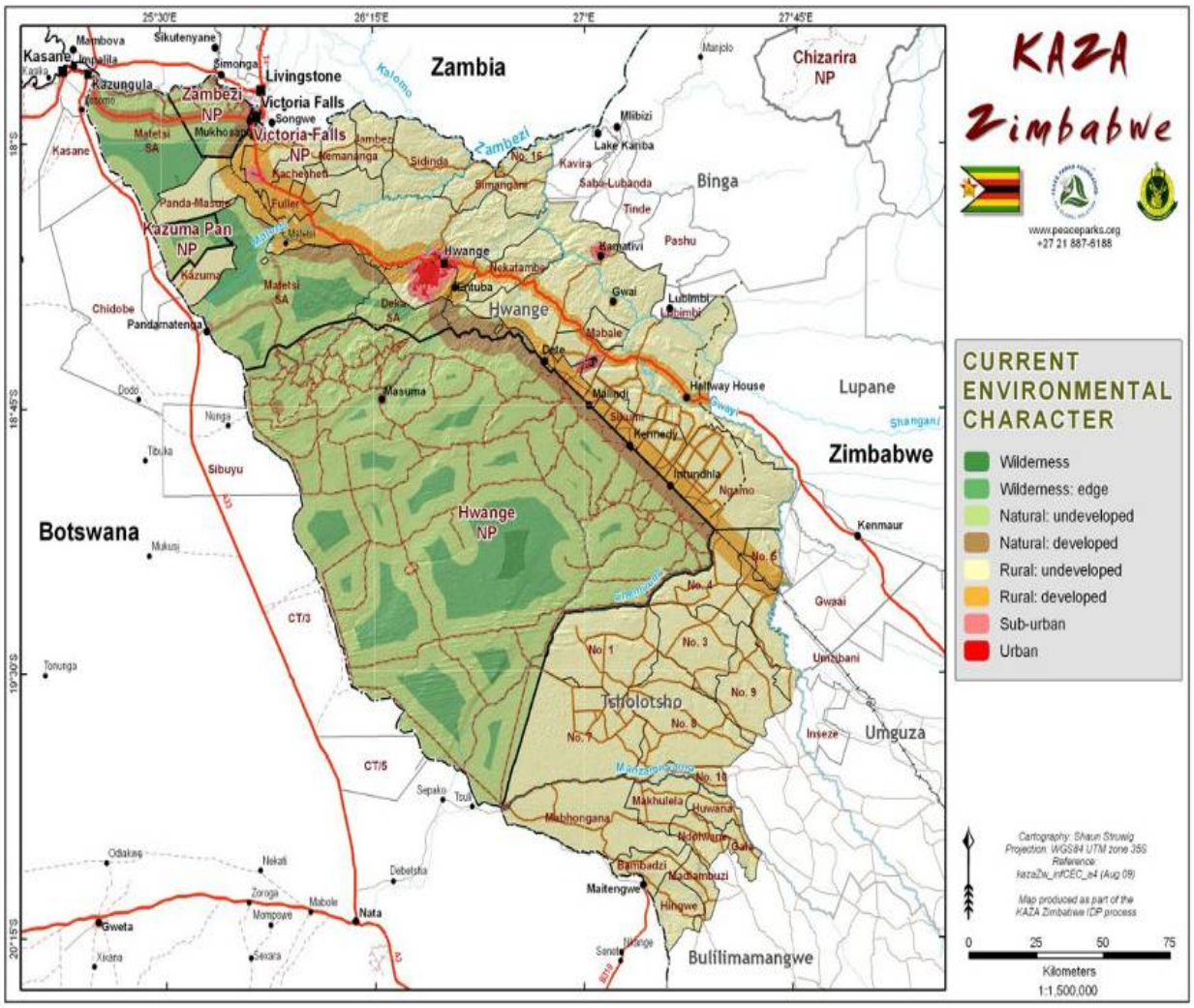


The main reason for the increase is attributed to the removal of the veterinary fences. Apart from the fences, additional factors contributed to the differences observed between HNP in Zimbabwe and KNP in South Africa. In addition to the destruction of the game fence, increased transmission of diseases was favoured by difficulties faced by the Zimbabwean veterinary services since the early 2000s to implement efficient disease surveillance and control, and increased human densities at the periphery of the HNP with inadequate grazing and watering resources particularly during the dry season.

2.9 WILDERNESS VALUES

Hwange is one of the largest national parks in Africa. Its shape (roughly square) means that the centre seems to be a long way from the boundaries, increasing it value and potential as a wilderness area. However, this idea has been challenged by recent research that shows that predators will move large distances and will not remain isolated in the centre of the park. The figure below is a computer analysis of “wilderness” areas in Hwange and seems to be based on analysis of the road network as an indicator of disturbance.

Figure 103: Hwange Wilderness Areas
(Peace Parks Data)

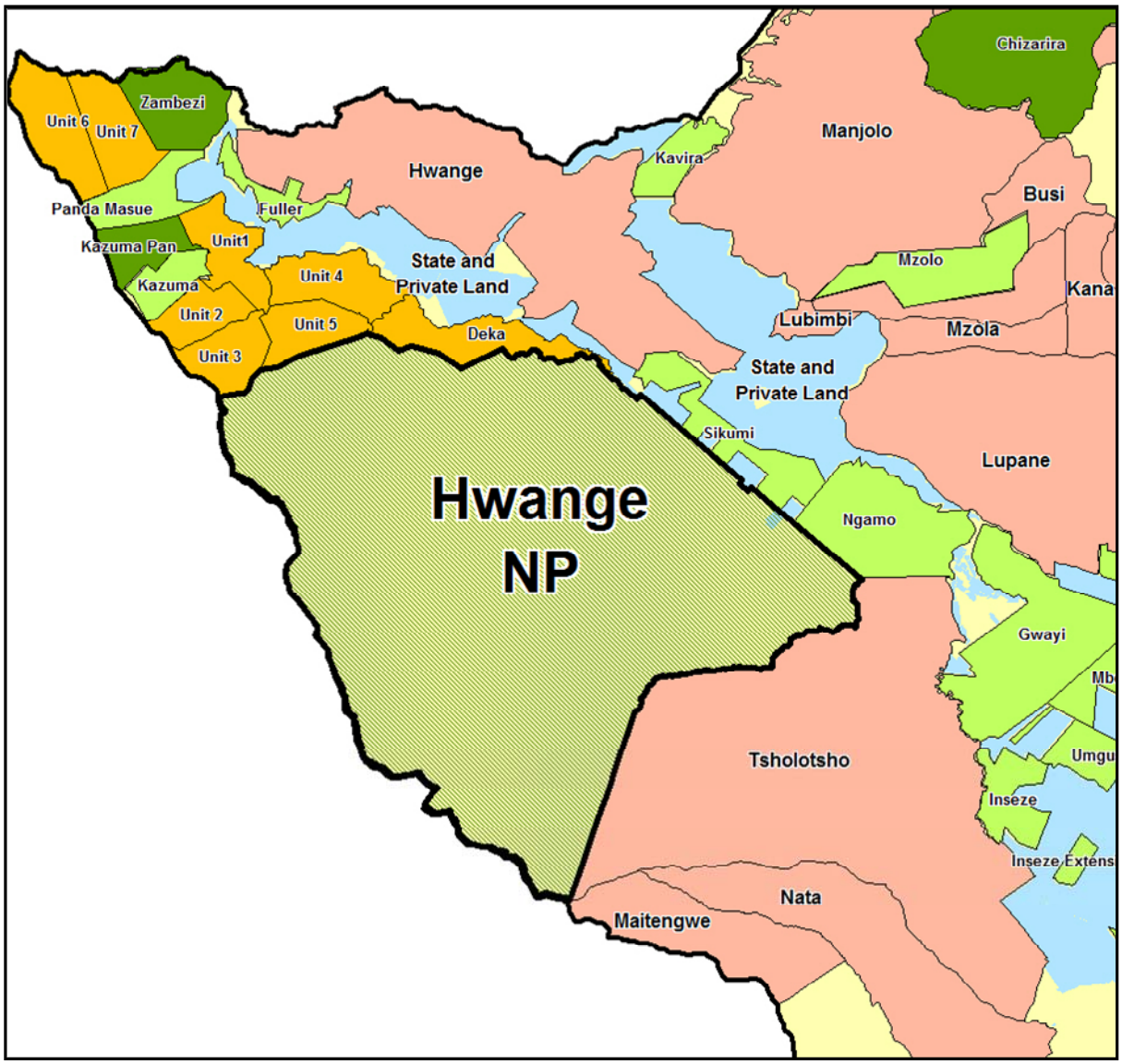


2.10 REGIONAL RESOURCES

2.10.1 Zimbabwe

Hwange NP is surrounded by a mosaic of land categories inside Zimbabwe. These include Communal Lands, Forestry Estate, Safari Areas (also under the direct control of ZPWMA) and private and state land (Figure 104).

Figure 104: Land adjacent to Hwange in Zimbabwe



These land types are briefly outlined below

2.10.1.1 ZPWMA Land

There are three national parks to the north of Hwange. National Parks are the highest category of protected land in Zimbabwe and consumptive use is theoretically not permitted. However, as we can see in Hwange this is not strictly true.

Table 26: Zimbabwean National Parks near Hwange	
Park	**Brief Synopsis**
Zambezi	560 km^2. Has xx km of river frontage with a variety of accommodation facilities along the river,
Kazuma	310 km^2. Declared to protect a seasonal pan system. Currently no accommodation apart from camping. The possibility of a co-management agreement with the private sector has been discussed. Currently managed by the Area Manager from Robins Camp in Hwange,
Victoria Falls	Contiguous with the Zambezi NP but designated for protection of the falls and gorges. Most of it is part of the World Heritage Site.

Safari Areas are under the direct control of ZPWMA but are usually leased out of (typically) five year terms to safari hunting companies. In recent years the ZPWMA has created its own safari company and currently has allocated itself three concessions within the Matetsi Safari area complex.

Table 27: Zimbabwean Safari Areas adjacent to Hwange	
Area	**Brief Synopsis**
Deka	A long standing safari area on the northern boundary of Hwange with an area of 520 km^2. Has been used as a “pool” hunting area.
Matetsi	Created in 1972 after a lengthy expropriation process. Essentially an experiment to change from patchy cropping/pastoral activities by a variety of private landholders to a consolidated hunting area which includes seven safari areas and Forestry land used for hunting. The safari areas total over 2,000 km^2 of land.

2.10.1.2 Forestry Estate

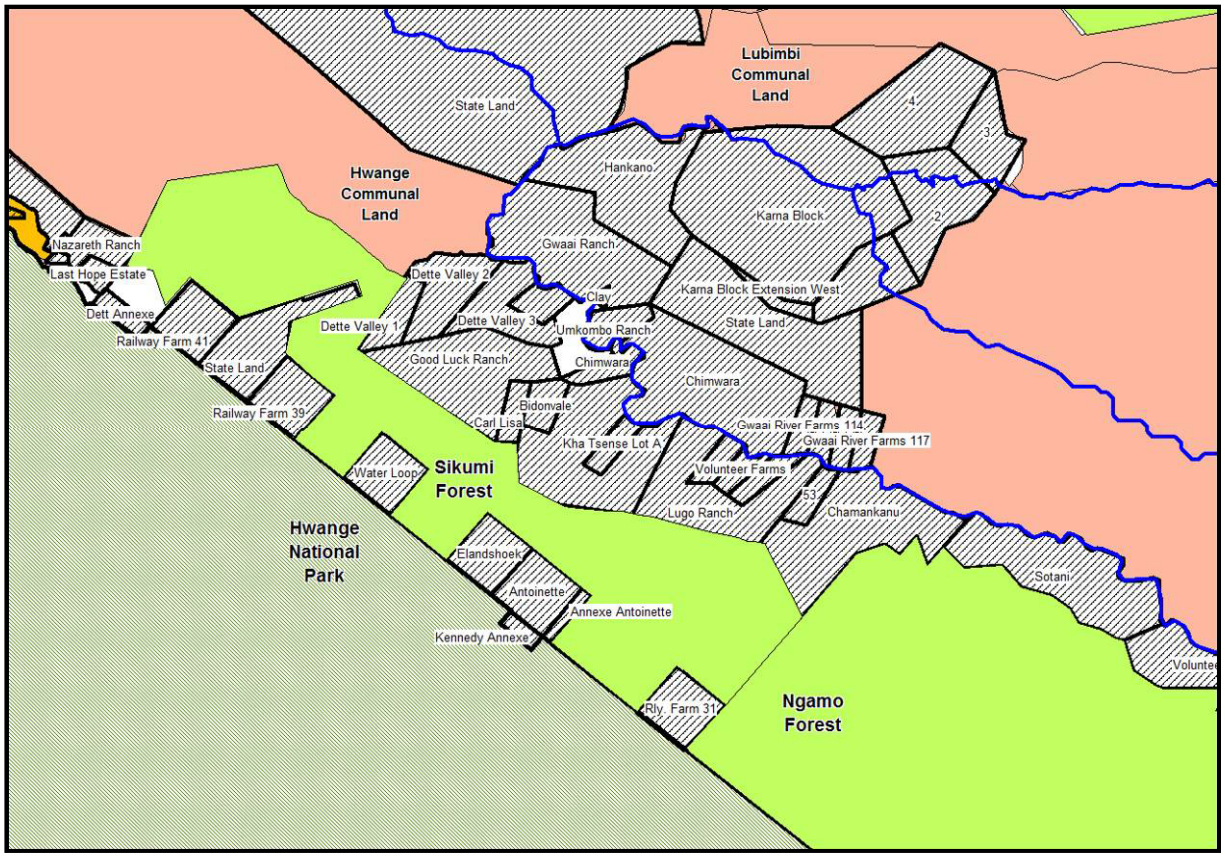
The Forestry Estate is less protective of its resources in some areas and access into the estate by communities is permitted. In the Sikumi Forest Area, following the severe droughts in the early 90s, local communities were authorized to graze cattle up to 3 km within the forest area boundaries. Firewood collection is also authorized and regulated (only women may collect dead wood, on Thursdays only and axes are banned) and wood harvesting can be authorized by the Forestry offices. In the early 2000s, coinciding with the Zimbabwean economic crisis, the veterinary fence separating SFA and the communal area was dismantled, which lead to an increase in encroachment of rural communities into the protected areas, now a major source of conflict between stakeholders (Guerbois, 2102).

Table 28: Zimbabwean Forestry Areas near Hwange	
Area	**Brief Synopsis**
Ngamo	1,100 km^2. Wholly used for hunting but has a small photographic lodge on the boundary with Hwange.
Sikumi	454 km^2. Partially used for hunting. Northern section has several photographic camps leased on it, including Forestry Conmmission's own lodge
Fuller	245 km^2. Is this used for hunting?
Panda Masuie	360 km^2, Hunting area, often as part of a pool area?
Kazuma	237 km^2,

2.10.1.3 State and Alienated Land

The mix of land categories adjacent to Hwange is complicated as there is both state land and large scale commercial land. All of these individual properties are allocated quotas from the ZPWMA.

Figure 105: State and LSCFL adjacent to Hwange



2.10.1.4 Communal Lands

There are two communal lands associated with Hwange. These are the Tsholotsho and Hwange. Tsholotsho has a 140 km long continuous boundary with the park while Hwange is buffered from a direct boundary with the park by other land, mainly safari area and Forestry estate.

The two areas are significantly different and this is due to their underlying geology. The main differences are outlined below. However, both areas are settled by people who were resettled when Hwange was established.

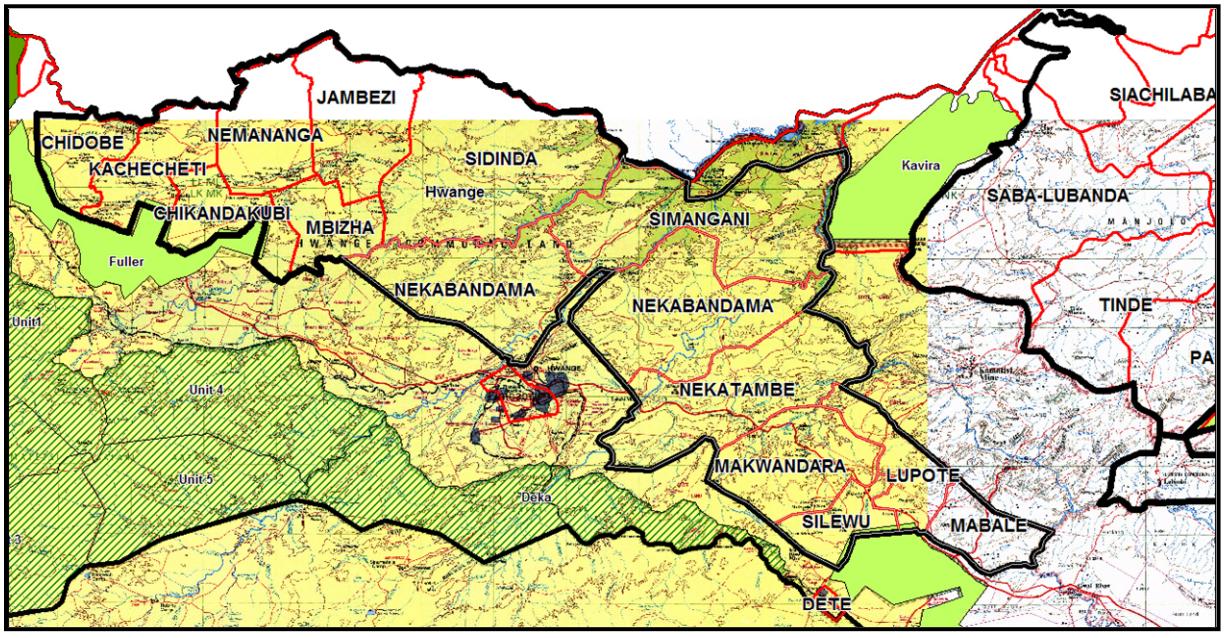
Table 29: Communal lands adjacent to Hwange

Area	Brief Synopsis
Hwange	On basement complex rocks. These give rise to shallow soils. The terrain is broken, stony and easily eroded. No direct boundary with Hwange. Buffered by forestry areas, safari areas and state land.
Tsholotsho	On Kalahari sands. Less erodable than Hwange. Very flat topography with no flowing surface water in north. Some in south (Dzivanini). Direct boundary (140km) with Hwange with fence in variable condition.

Hwange Communal Land

Hwange Communal Land is 4,000 km2 and stretches from Hwange to the Zambezi. It is divided into 15 wards and has two CAMPFIRE hunting areas. The area is administered from Lukosi, a few kilometres outside Hwange town.

Figure 106: Hwange Communal Land and Ward Boundaries



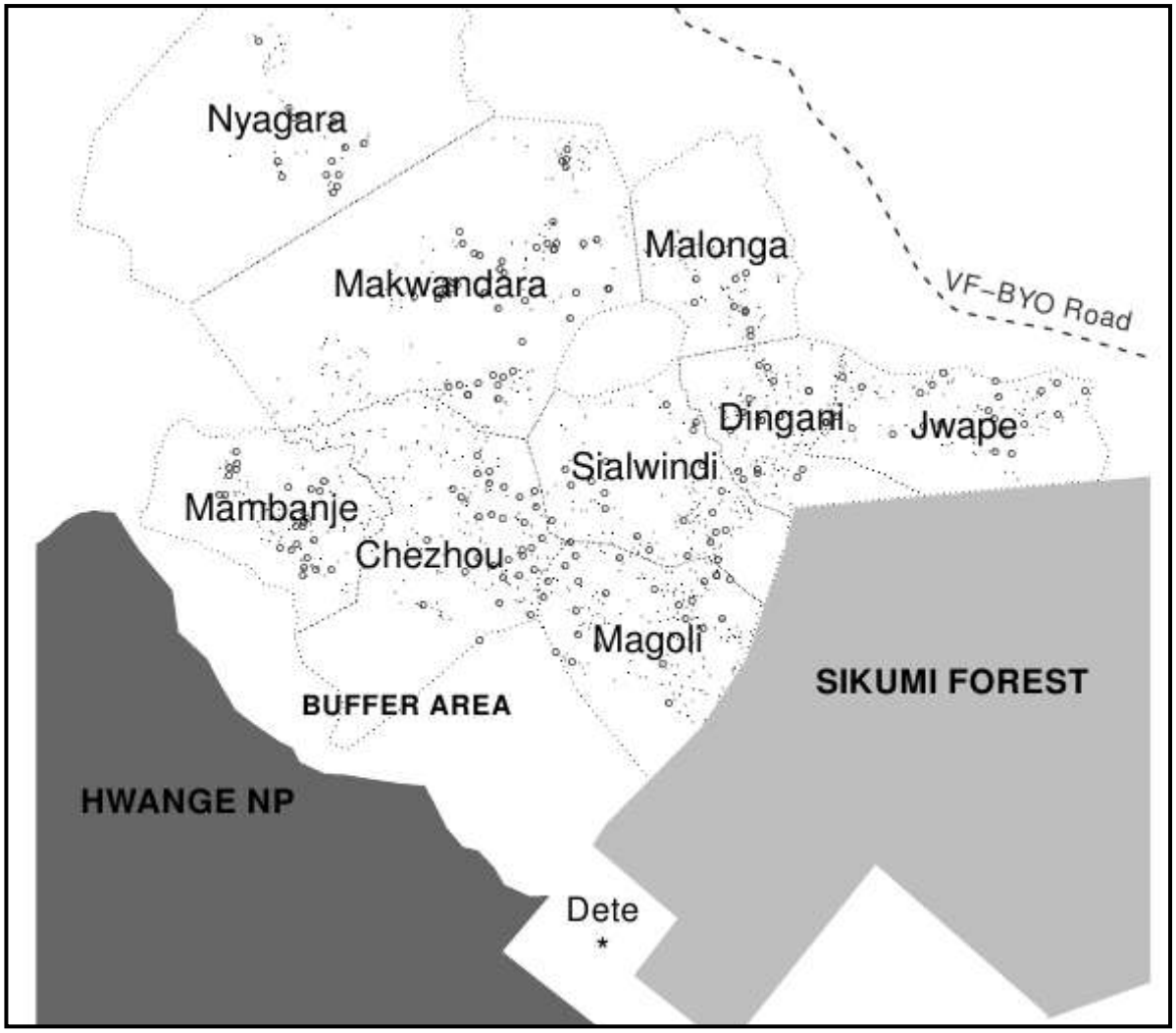
From work carried out in the Silewu ward the economy in Hwange is based on subsistence agriculture with a dependence on three main crops – Maize, sorghum and millet. The average cultivated area is around 2.5 acres. With an average household size of 6.5 person the average harvest yield ensures only 2.5 months of food for a household. Cattle (an average of 4 per household) play an important role as capital, social assets and draught power. Goats (4.5 per household) and chickens (around 8 per household provide protein. The low level of agriculture production and the crash of the tourism industry

in the 2000s have increasingly pushed household to rely on natural resources as a safety-net against crises, as well as social solidarity and remittance from family members abroad (only 19% of the interviewed households declared benefiting from a salary). The level of education remains high in the area, as 86% of the children between 6 and 18 years old attending school (Guerbois, 2012)..

As in most places around Hwange National Park, the CAMPFIRE program has been problematic since 2000, and the expected returns from trophy hunting (cash benefits) or from problem animal controls, PACs (meat benefits) have been very low. This situation has also contributed to the people's opinion of a lack of environmental justice that has increased the difficulties in the dialogue between rural communities and local authorities (Guerbois, 2012).

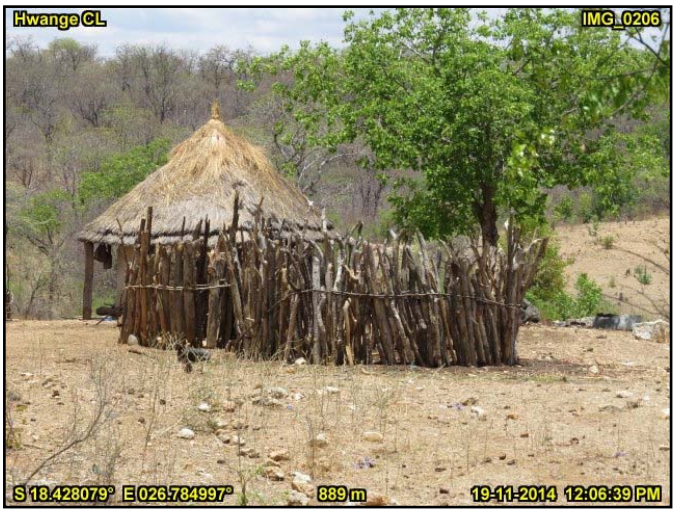
Of interest there was been a significant population increase in this area during 2000 decade, brought on largely by the economic crisis in Zimbabwe.

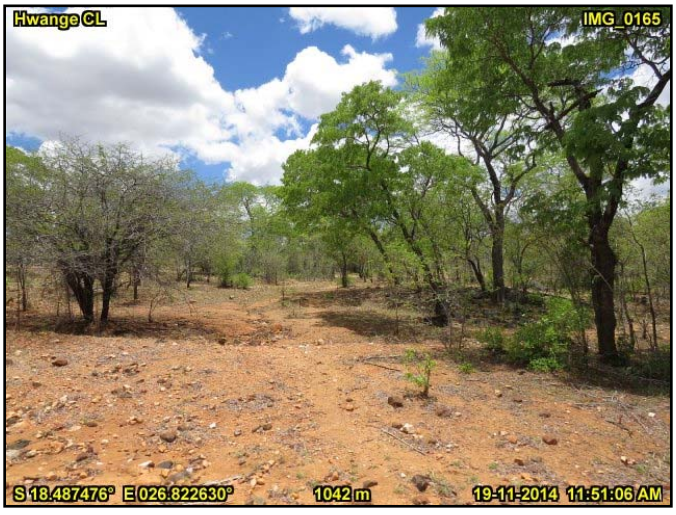
Figure 107: Hwange communities in the Hwange CL adjacent to Hwange NP
(Settlements indicated – From Guerbois, 2012)

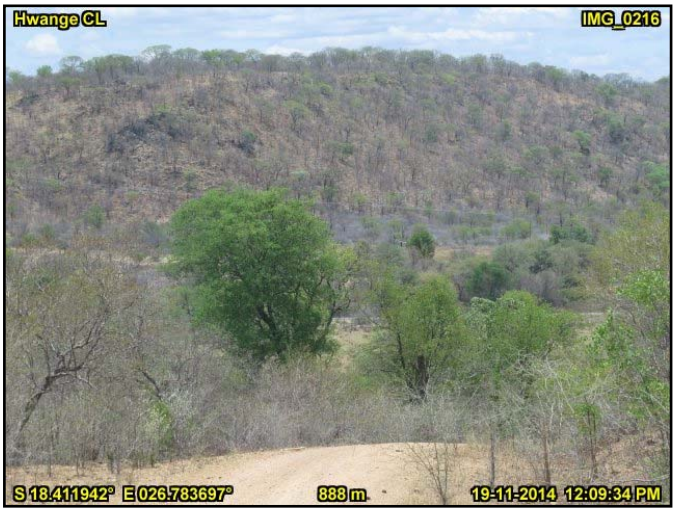


Most of these settlements were established by resettling people from the existing Hwange NP. Areas in the park from where they were removed include Mambanje, Deteema, Bumboosie, Sinamatella and Mbala (Guerbois, 2012).

Figure 108: Hwange Communal Land







Tsholotsho Communal Land

Thsolotsho Communal Land is 7,500 km2 and stretches from south Hwange almost to Bulawayo. It is divided into 16 wards and two CAMPFIRE hunting areas.

Figure 109: Tsholotsho Communal Land and Ward Boundaries

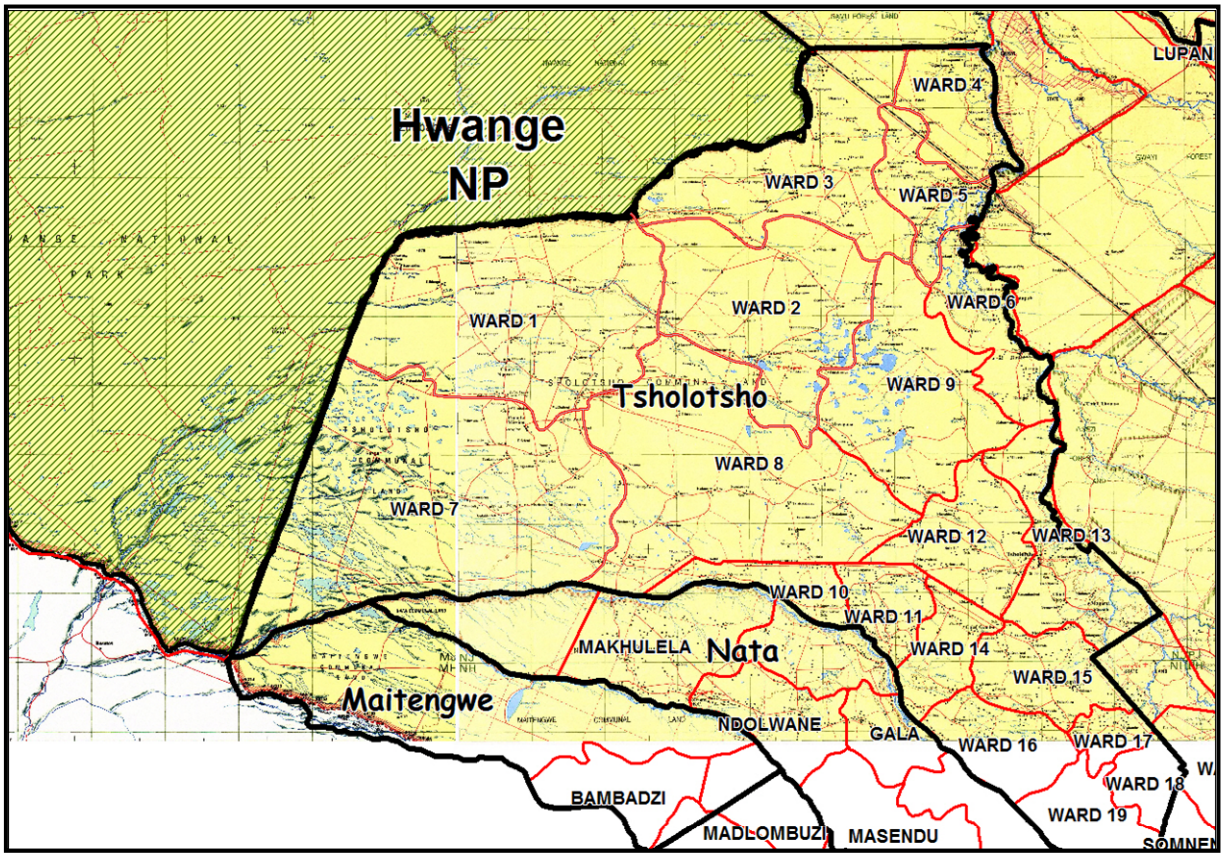
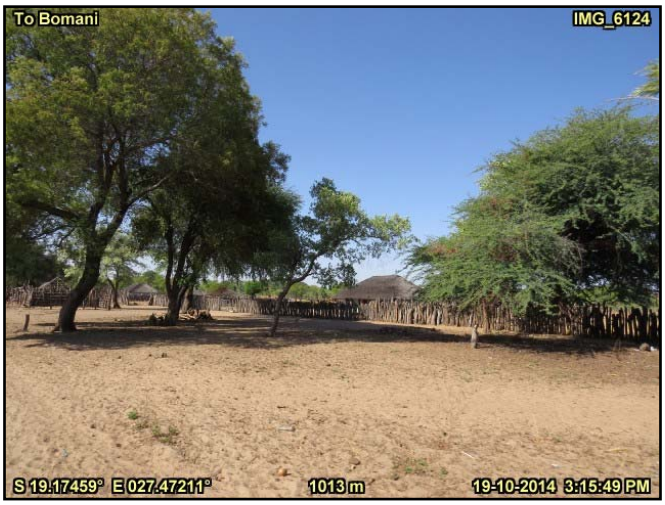
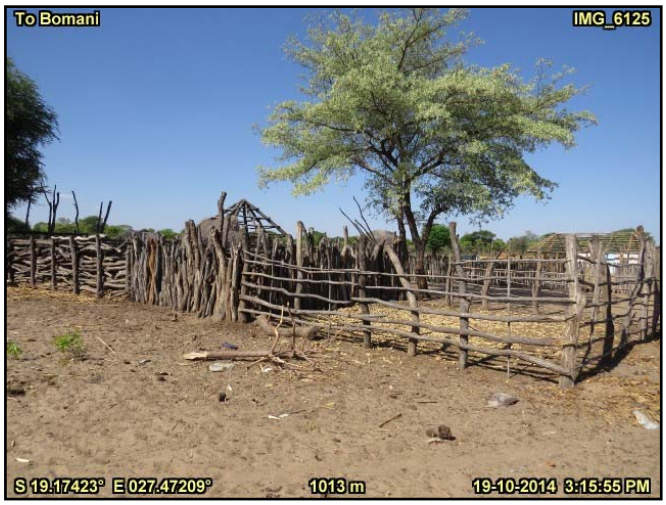
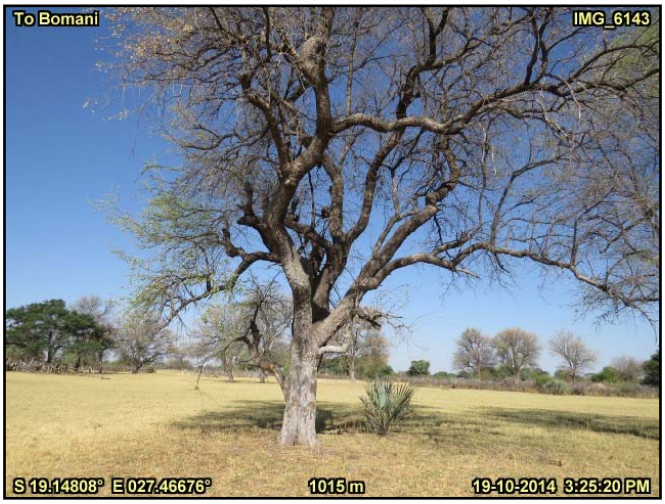


Figure 110: Tsholotsho Communal Land

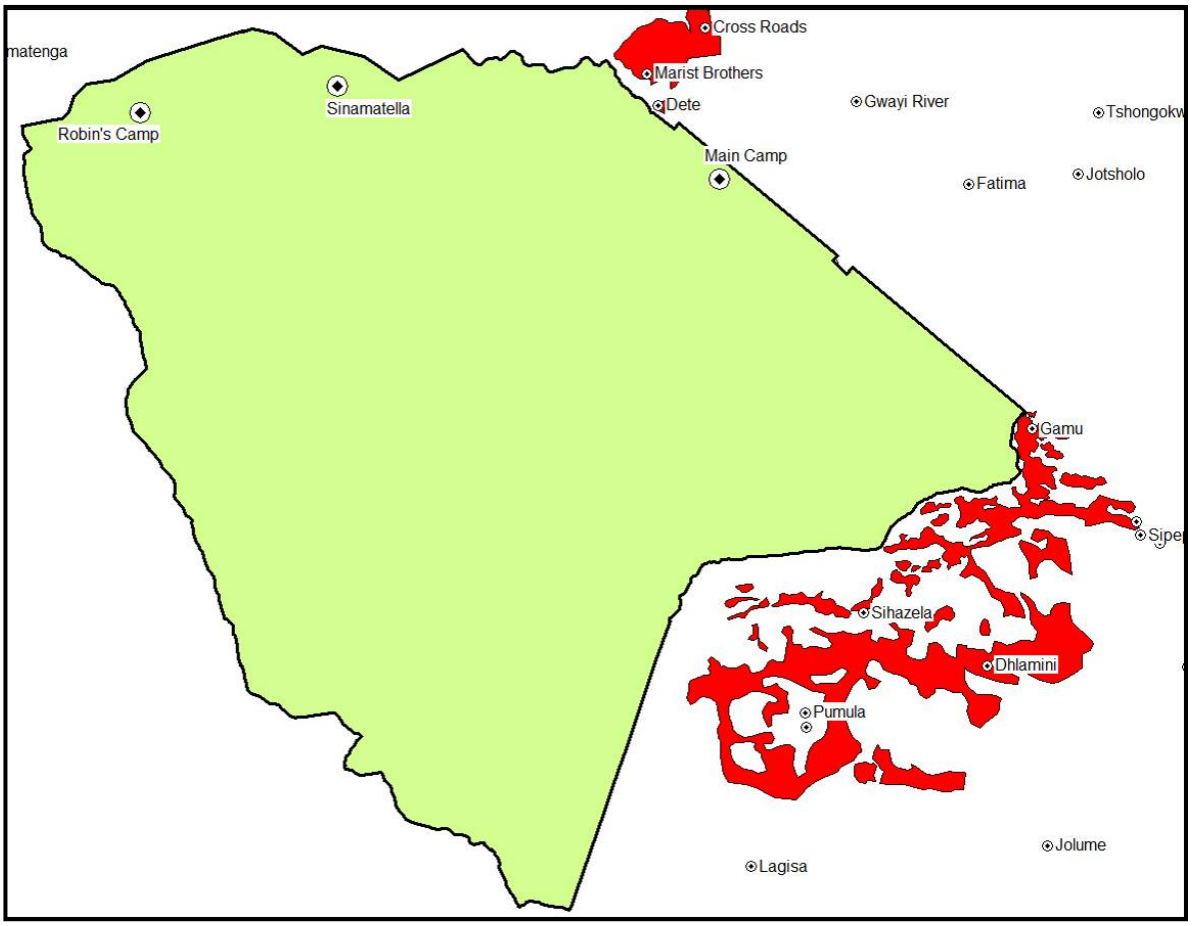






Hwange is fortunate in that there are very few areas where clearing for agriculture comes right up to the park boundary. One area where this happens is in the Ngamo area in Tsholotsho (Figure 111).

Figure 111: Broad settlement patterns in Communal Lands adjacent to Hwange
(as evidenced from clearing - Data from Landsat)

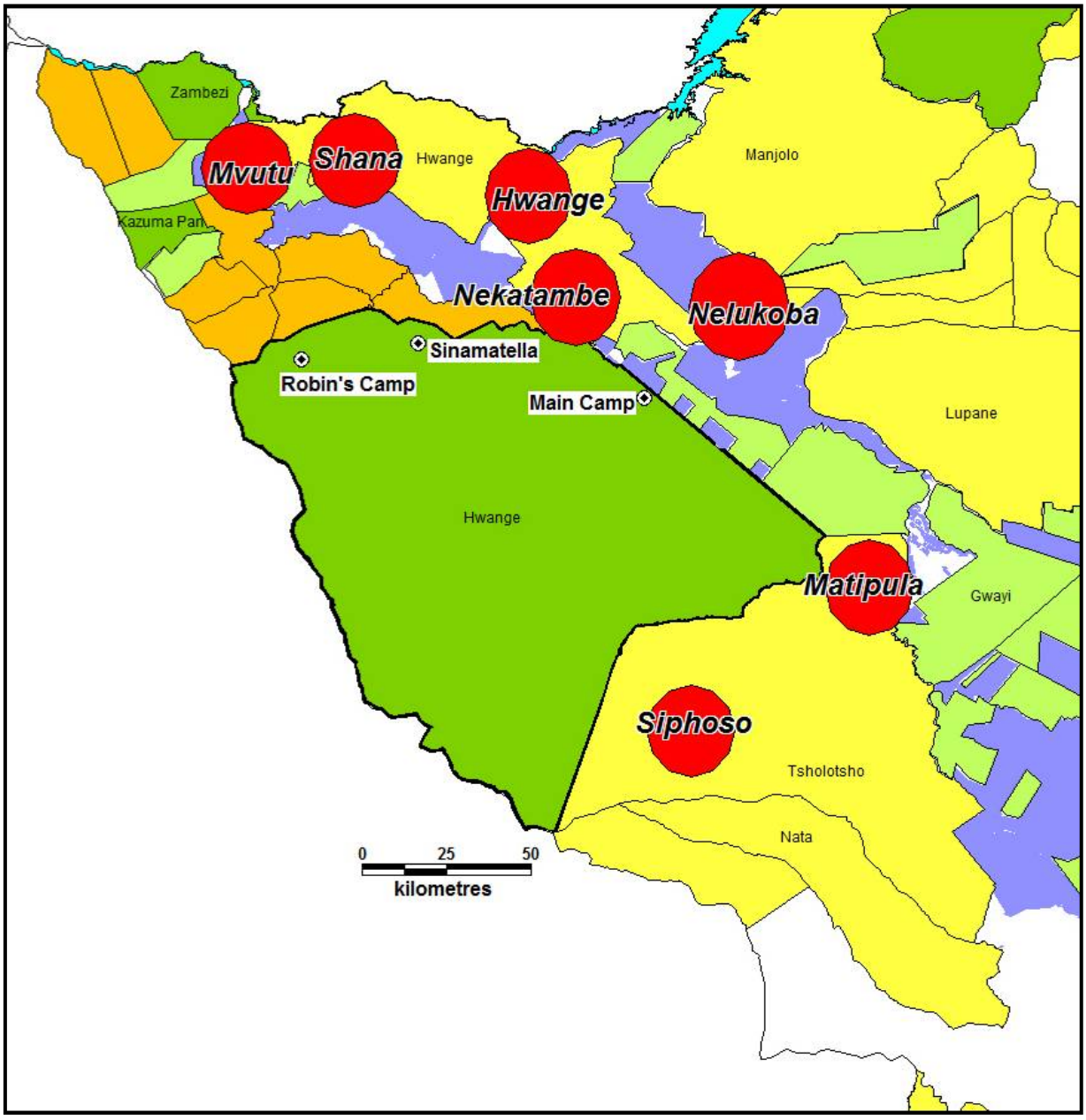


2.10.1.5 Traditional Leadership

There are seven traditional leaders with areas of control in north-west Matabeleland. A diagrammatic representation is shown below. It should be noted that the red circles in no way denote areas of influence for the respective leaders.

Chief Hwange – Wards Kabandana and Simangani. Campfire fund distribution problems
Chief Nekuloba – 7 wards
Matipula – 4 wards
Siphoso – 2 wards

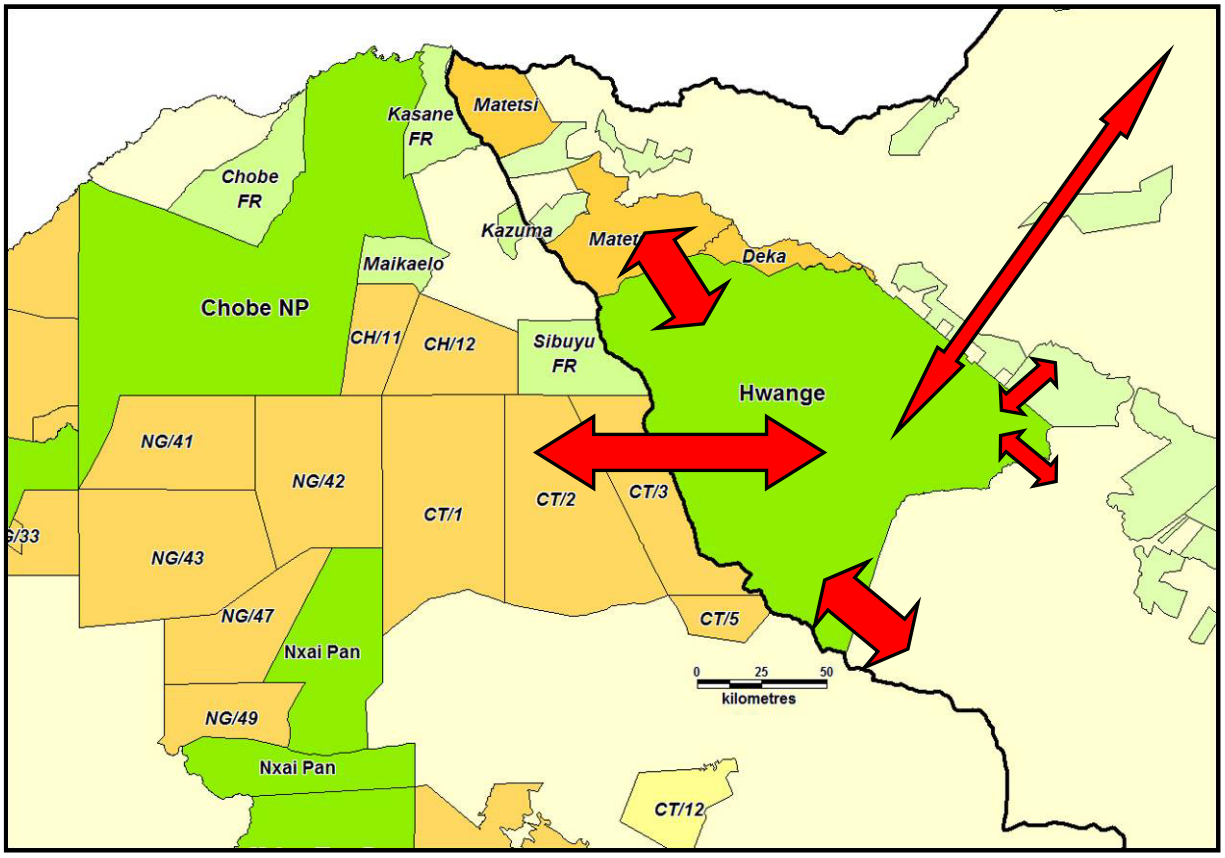
Figure 112: Diagrammatic representation of traditional leadership near Hwange



2.10.1.6 Potential Wildlife Corridors

There is no doubt that Hwange is part of a connected ecosystem between Zimbabwe and Botswana and other areas in Zimbabwe. The map below shows a diagrammatic representation of potential wildlife movement corridors from the park. These include short movements into the surrounding communal lands and also longer movements into Botswana and towards Lake Kariba and the Victoria Falls.

Figure 113: Potential wildlife corridors



2.10.1.7 Veterinary Fences

Fences were created over large parts of southern Africa to stop the spread of disease between wildlife and livestock (Figure 114). Many of these were constructed in the 1960s and 1970s and some are in a better state of repair than others. Many of the fences in Zimbabwe, both in the south-east Lowveld and north-west Matabeleland suffered from poor maintenance and some have been completely removed. Once fence line that still remains, although of variable quality along its length is the fence between Beacon 222 (Hwange park boundary/Maitengwe CL boundary and Botswana) and Ngamo. Other fences have disappeared (Figure 115).

Figure 114: Fence alignments – Zimbabwe, Botswana and Namibia

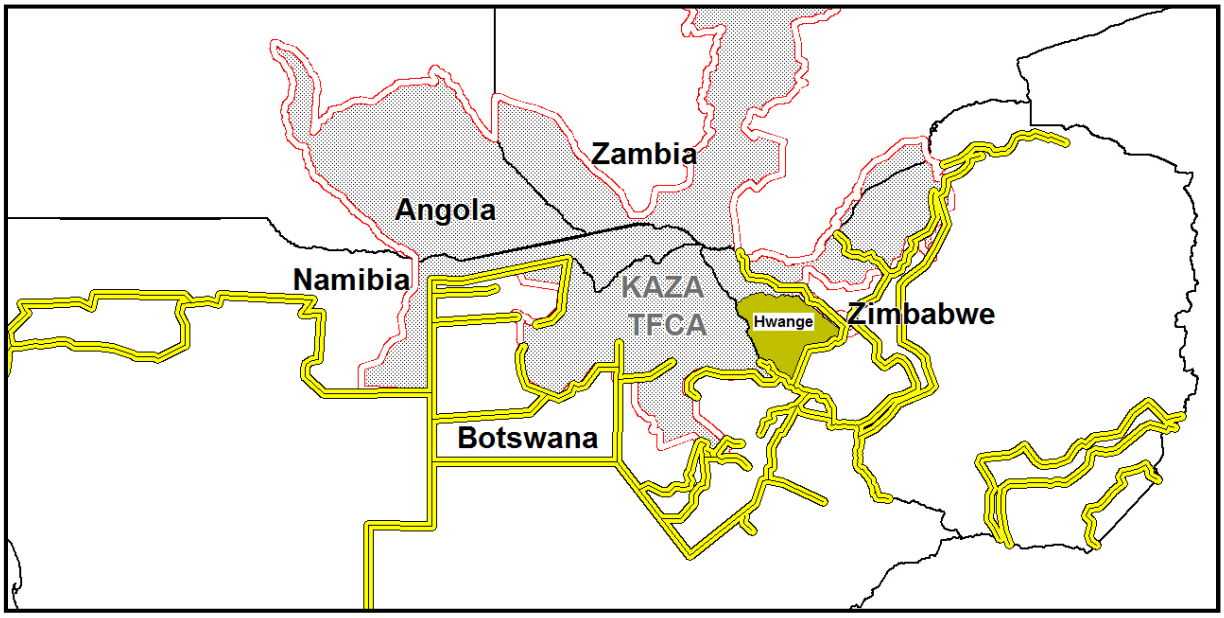
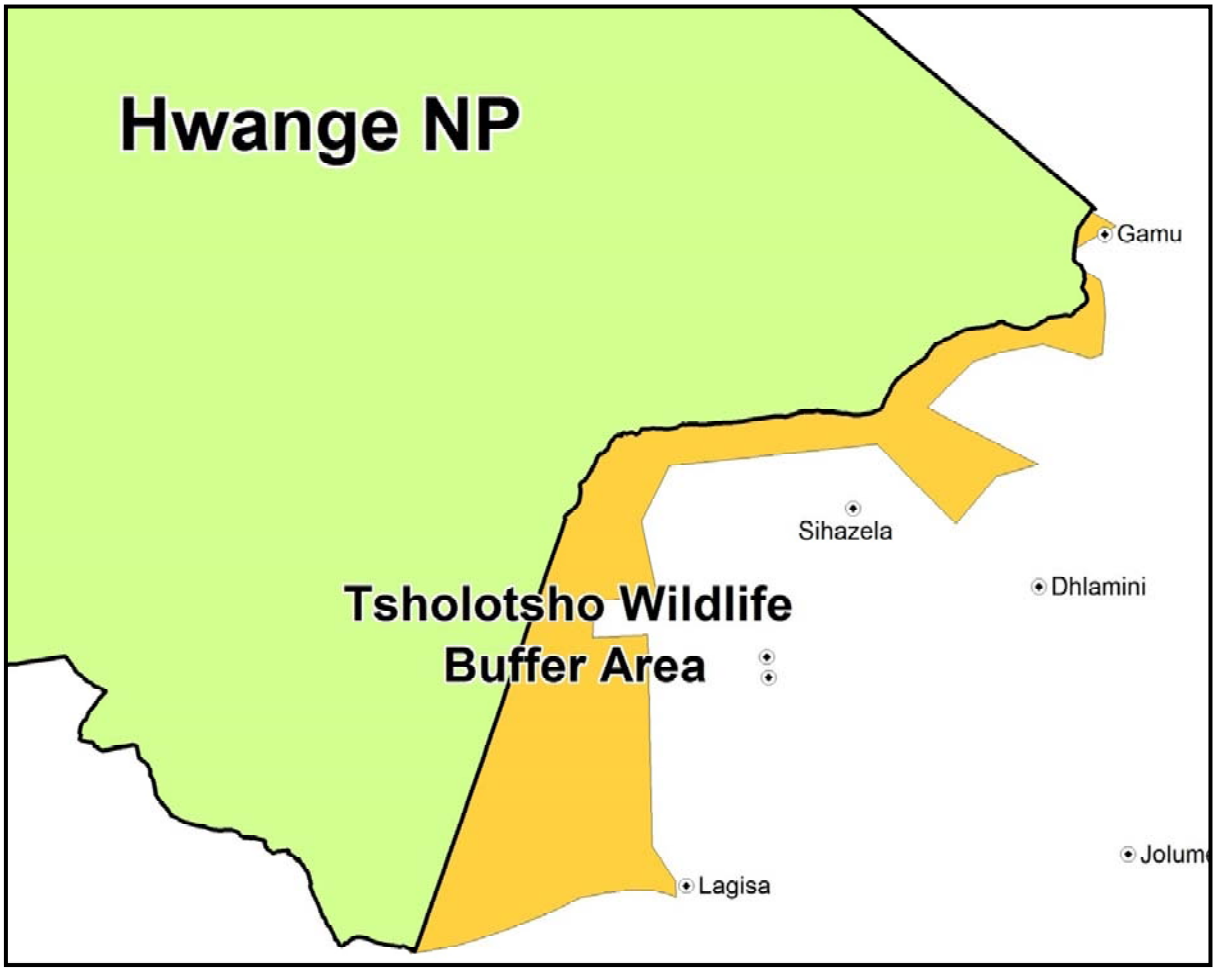


Figure 115: Fences in the Hwange area

In the late 1990s a fence was built to the south and east of the Hwange boundary in the Tsholosho Communal Land. The fence was to formally demarcate a buffer area adjacent to Hwange which could be used for wildlife based activities which would benefit the communities. The fence line skirted the existing settlements and cultivated area (Figure 116).

Figure 116: Tsholotsho buffer area, late 1990s



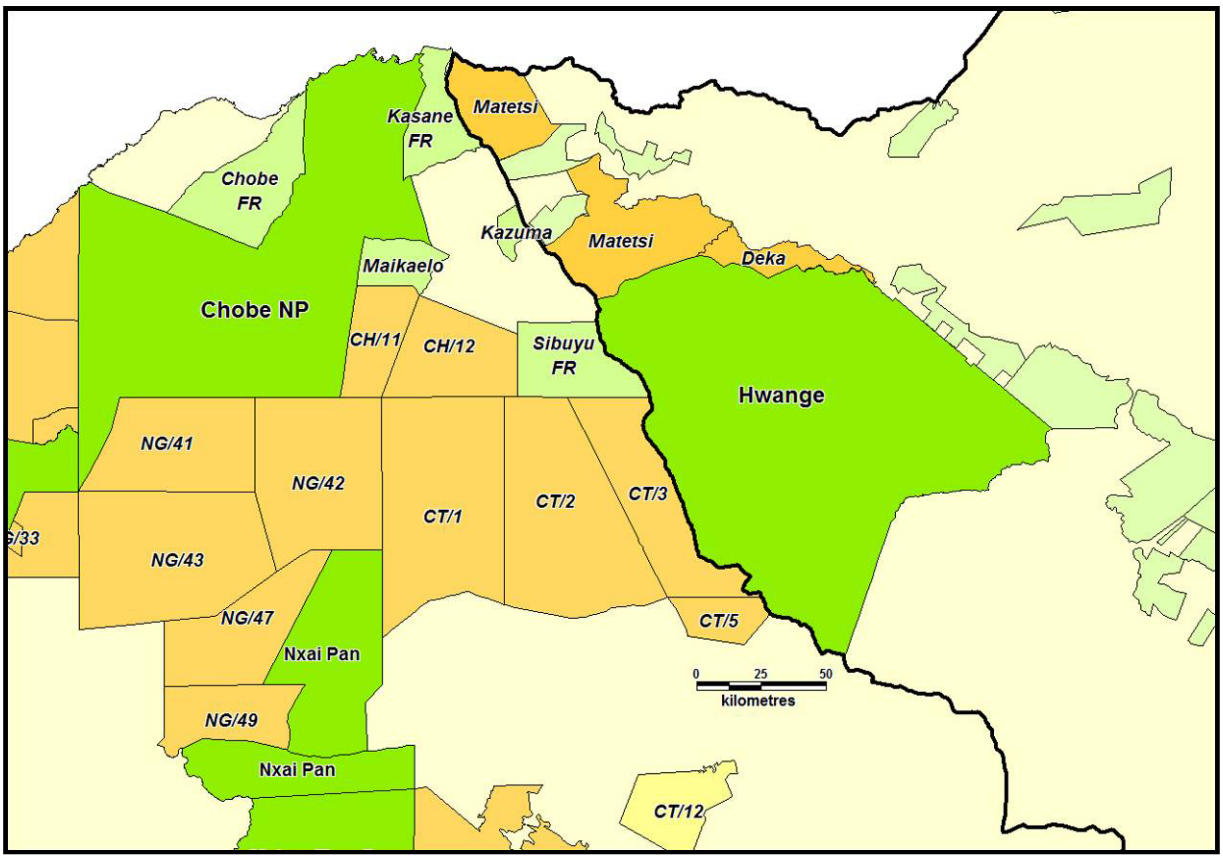
Although this demarcation and fencing were done with the best of intentions, by 2014 all that remains of much of the fence is a cutline and fence posts.

2.10.2 Botswana

Botswana has an extensive network of protected areas and a significant part of Hwanges's western boundary abuts some of these. Essentially three types of protected area are found in the north-east part of Botswana. These are

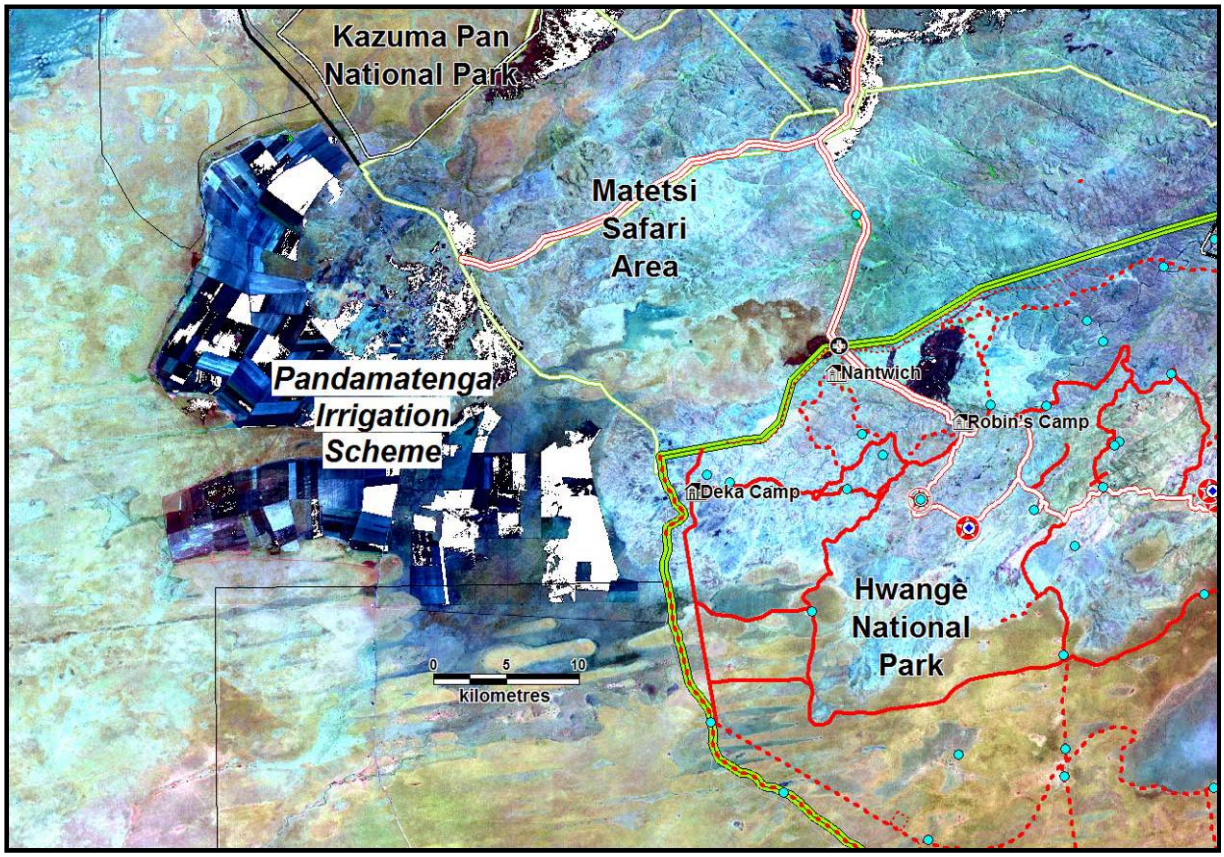
- National Parks – Chobe, Nxai Pan and Magadigadi
- Wildlife Management Areas – at least 11 of these (numbered according to District; CT = Central, CH = Chobe, NG = Ngamiland)
- Forest Reserves – Sibuyu, Kazuma, Maikaelo and Kasane (Figure 117).

Figure 117: Protected Areas – Botswana and Zimbabwe



The wildlife management areas in Botswana were previously used as hunting areas but this was stopped in 2011? The future of these areas as a category of protected area is uncertain without the income from hunting. However there are rumours that hunting may be reopened in Botswana.

Figure 118: Pantamatenga irrigation scheme in Botswana



HWANGE NATIONAL PARK

CHAPTER 3: CURRENT MANAGEMENT

CHAPTER 3: CURRENT MANAGEMENT

This chapter provides a brief outline of the current management and utilisation status of the Hwange National Park and the surrounding areas (with respect to wildlife and environmental issues).

3.1 MANAGEMENT OF HWANGE

Hwange National Park is divided into three management areas, each with its own headquarters and administration. Each area is responsible for all management and tourism activities. The areas are shown below (Figure 119).

Figure 119: Hwange administrative areas

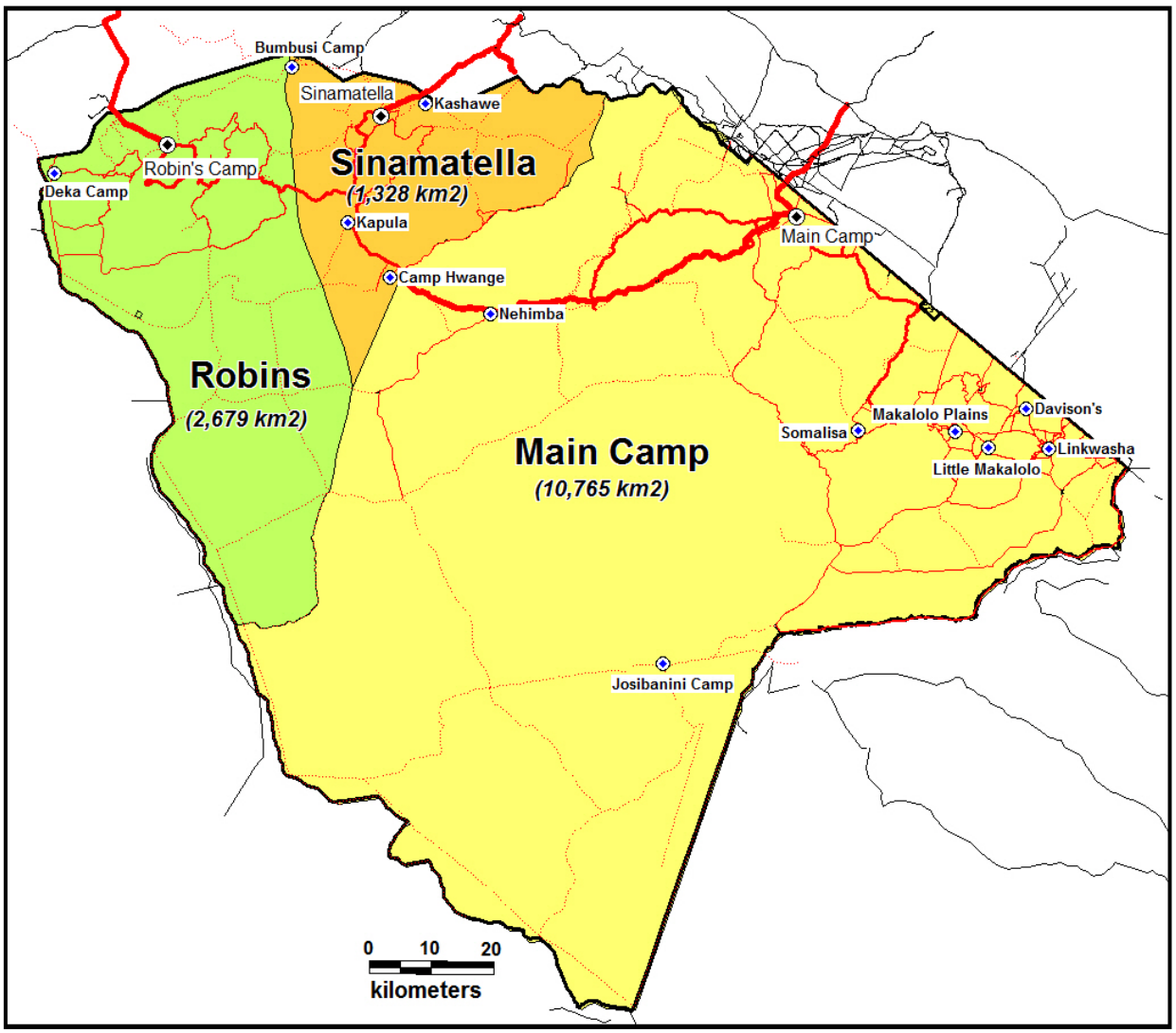


Table 30: Salient features of the three administrative areas		
Main Camp	**Sinamatella**	**Robins**
Area: 10,765 km^2 **Park %**: 73% **Geology**: Mostly on Kalahari Sands with extensive "mudflats" on basalts in the Dzivanini area **Drainage**: Undefined drainage on Kalahari sand. Fossil drainage feeders into the Nata catchment in the south. Numerous pans **Pans**: 41 pans pumped in 2014 **Vegetation**: Broad mix of forest, and bushland. Mopane in extreme south **Roads**: 2,400 km of roads with 262 km of class 1 and 2 roads, 2,040 km of class 3 and 4 roads. **Tourism**: Main camp with over 100 beds. Seven leased concessions totalling 1,000 km^2. **Management Concerns:** Water management, fire, elephants, poaching **Staff:** 102, 63 rangers	**Area**: 1,328 km^2 **Park %**: 9% **Geology**: Basement complex and undifferentiated sandstone. Elevated eroded hills **Drainage**: Inyantue and Lukosi drainage **Pans**: 9 pans pumped in 2014 **Vegetation**: Mopane and mixed bushland **Roads**: 482 km of roads with160 km of class 1 and 2 roads, 313 km of class 3 and 4 roads. **Tourism**: Sinamatella camp with 40 beds. Three leased concessions and one leased camp (Bumboosie) with concession areas totalling 130km^2. **Management Concerns:** Erosion surfaces, eroding river crossings, Fire. Rhino, poaching **Staff:** 75. 53 rangers	**Area**: 2,679 km^2 **Park %**: 18% **Geology**: Batoka basalts in the north with some extensive, poorly drained mudflats. Kalahari sand in the south **Drainage**: Mainly drained by the Deka and part of the Lukosi. **Pans**: 3 pans pumped in 2014 **Vegetation**: Mainly mopane woodland in the north and mixed *Baikiaea* woodland in the south **Roads**: 893 km of roads with 73 km of class 1 and 2 roads, 758 km of class 3 and 4 roads. **Tourism**: Robins Camp with 80 beds. Parks owned camps at Nantwich and Deka – currently vacant. **Management Concerns:** Fire and poaching. Kazuma Pan is part of Robins responsibility **Staff:** 40, 27 rangers

Figure 120: Management Blocks

In addition, the area has been subdivided into a number of management blocks (Figure 120). Although these are not being used for management purposes at the moment they form a useful sub-division of the area for activities such as monitoring patrol effort or fire management. In addition there are used in several research publications for comparative purposes.

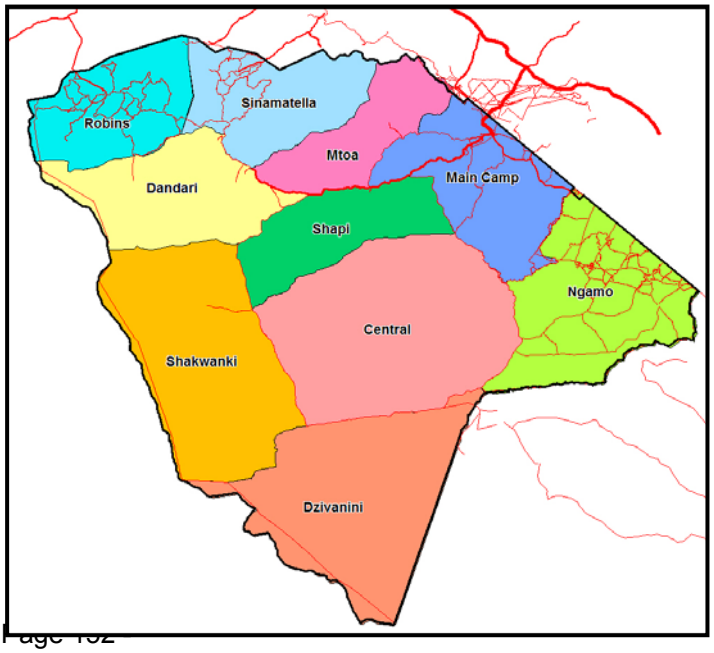


Figure 121: Hwange administrative centres and outposts

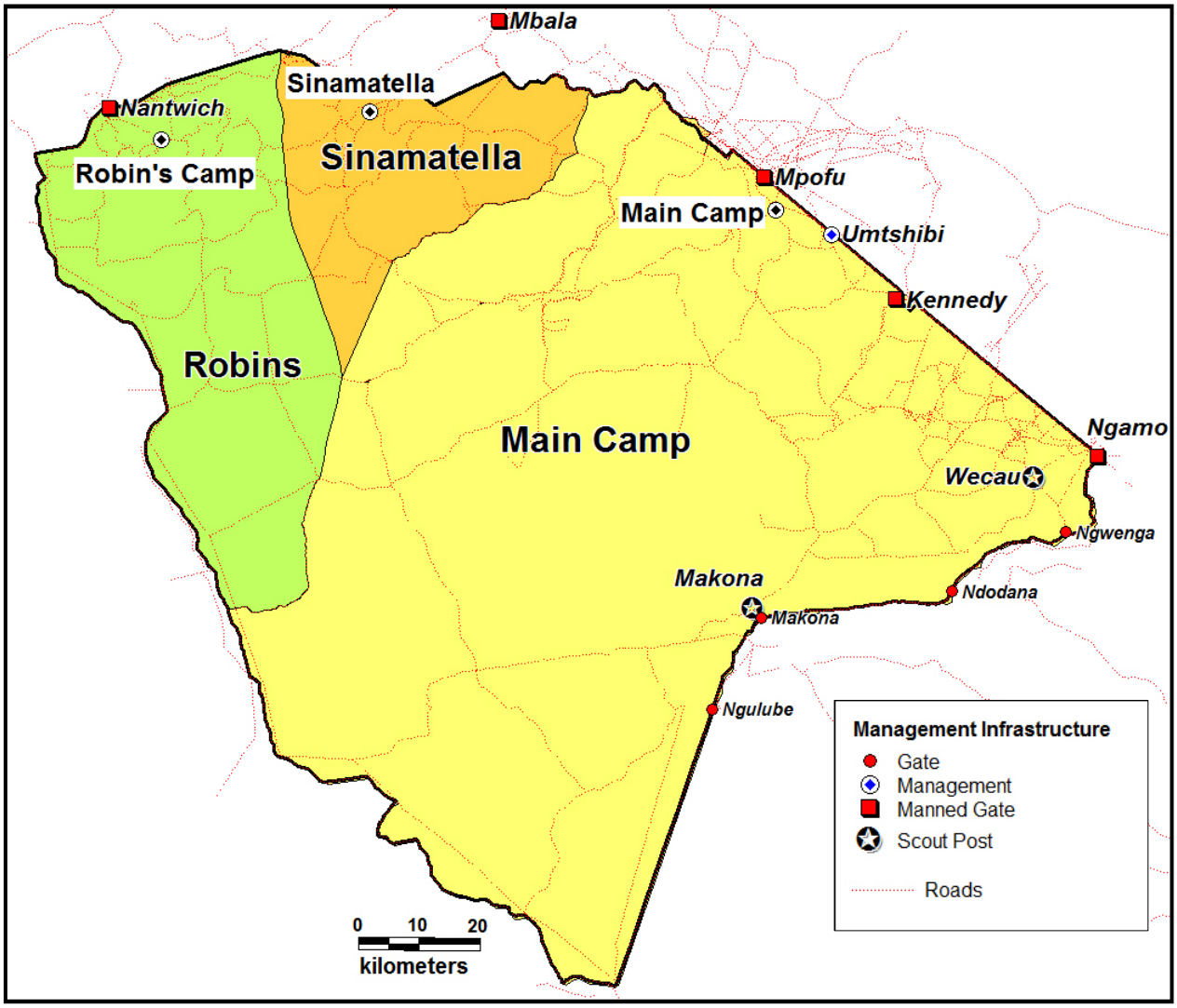
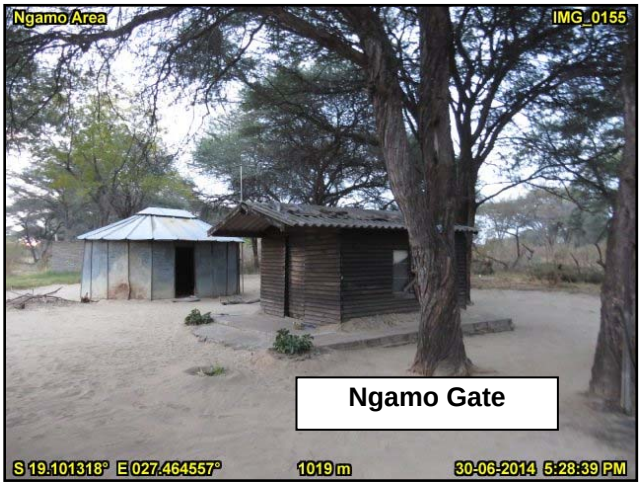
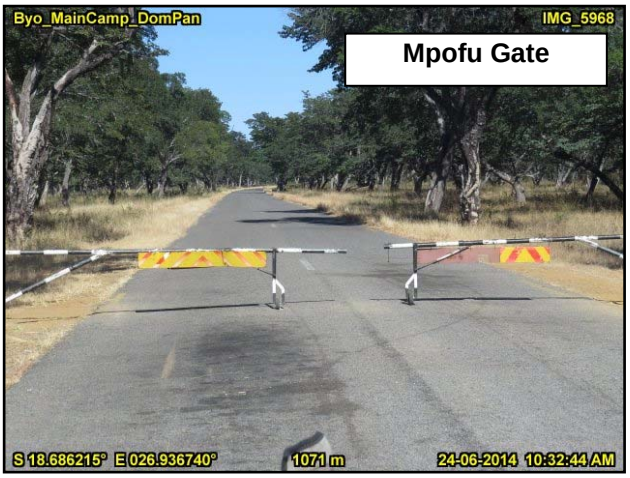
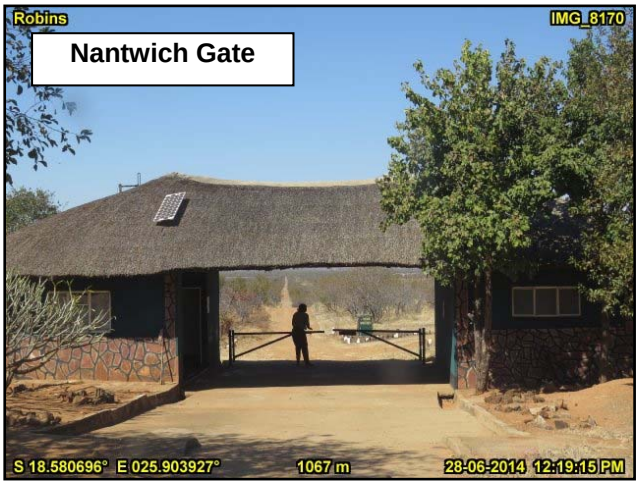


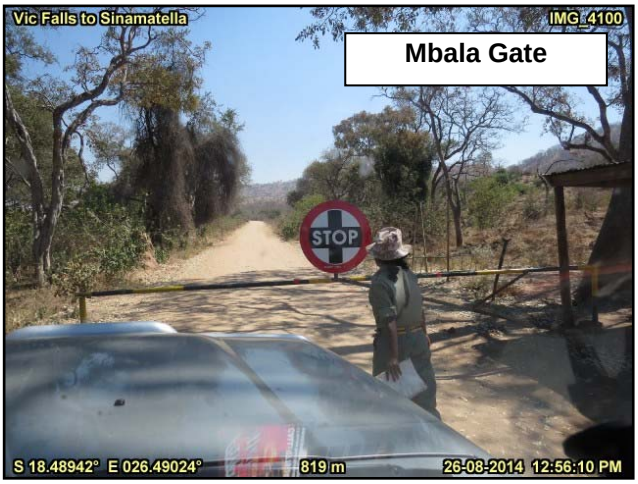
Table 31: Administration centres in Hwange	
Type	**Comments**
HQ	Main Camp (600 people), Sinamatella (400 people) and Robin's Camp (250 people)
Gates	Eastern Boundary - Mpofu, Kennedy, Ngamo, Southern Boundary - Ngwenga, Ndodana, Makona and Ngulube Northern Boundary - Nantwich
Outposts	Wecau and Makona
Other	Umtshibi

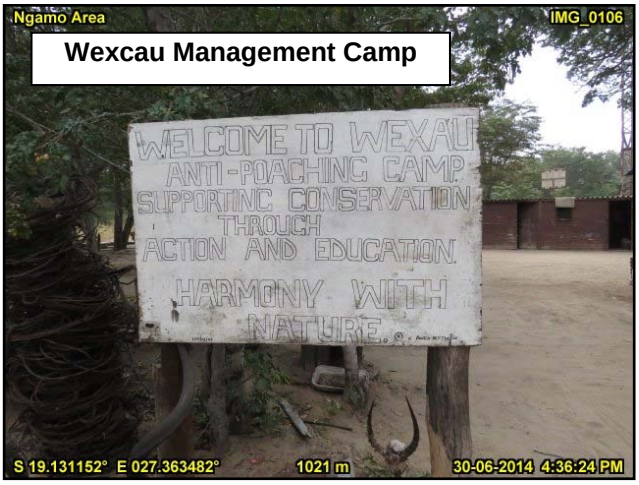
Figure 122: Management Infrastructure











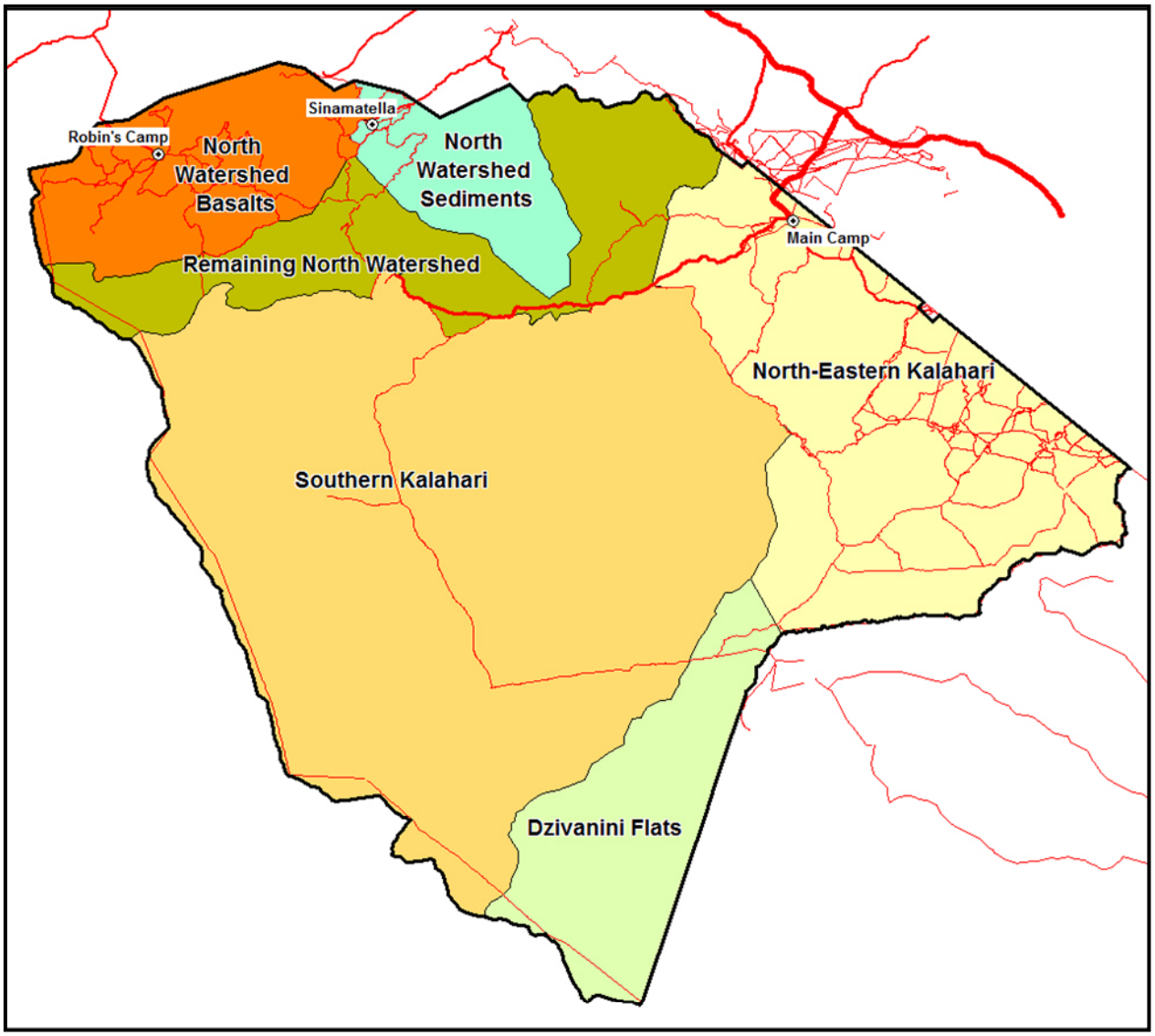
3.1.1 Management Compartments

In the 1989 plan, and this was carried over into the 2003 plan the park was divided into a number of compartments which have different objectives for biological management resulting from differences in their geology, soils, vegetation or large herbivore carrying capacity. Each management compartment had an objective or objective (see below). In addition a fairly detailed set of "permissible limits to change were established. In retrospect these may have been too ambitious and required a very active research programme in the park.

Table 32: Hwange Biological Management Compartments

Management Compartment	**Objectives**
Northern Watershed Basalt	o Maintain vegetation diversity, particularly grasslands and savannas on basalt soils. o Maintain populations of the specialised grazers including roan, sable, waterbuck and reedbuck associated with grasslands and savannas. o Reduce shrub encroachment of grasslands and savannas. o Restore herbaceous vegetation to denuded areas and reduce areas of sheet erosion. o Reduce rate of headward erosion of gullies in drainage line grasslands.
Northern Watershed Karroo Sediments	o Maintain grasslands and savannas on basalt soils and populations of the specialised grazers including roan, sable, waterbuck and reedbuck which are associated with them. o Reduce shrub encroachment of grasslands and savannas. o Restore herbaceous vegetation to degraded areas and reduce areas of sheet erosion. o Reduce headward erosion of gullies in drainage line grasslands.
Northern Watershed Remainder	o To maintain vegetation and large mammal diversity. o Reduce rate of headward erosion of gullies in the upper Inyantue catchment. o Restore herbaceous vegetation in degraded areas and reduce areas of sheet erosion.
North Eastern Kalahari	o To maintain relatively high densities of as full a range of large mammals as possible for game viewing by tourists. Management aims for this area of the park emphasises the maintenance of high densities of large herbivores for tourism. Habitat change is of secondary importance, provided that the integrity of grasslands and savannas on which many of the medium and small grazing species depend, is maintained. Management activities in this compartment should be co-ordinated with management of the surrounding forest, communal and commercial land where wildlife utilization is an important form of land use.
Southern Kalahari	o Maintain diversity of vegetation and associated large herbivores in Kalahari communities where dry season water availability is limited by rainfall.
Dzivanini Flats	o Maintain pan grasslands, savanna woodlands and relatively high densities of associated large herbivores. Objectives and management actions in this compartment should be planned in conjunction with plans for the adjacent Communal Lands where communities have embarked on the CAMPFIRE programme and are developing their capacity to manage wildlife. Without a joint approach, it is likely that attempts to maintain high densities of large herbivores in this remote region of the park will fail.

Figure 123: Hwange management compartments



3.2 INFRASTRUCTURE AND EQUIPMENT

3.2.1 Roads, River Crossings and Airstrips

3.2.1.1 Roads

There are 3,250 km of roads and tracks in Hwange national Park (including boundary roads and firebreaks). The condition of many of these is not up to a standard conducive to a quality tourism experience or for management. In the 1960s a 50 km stretch from Main Camp to Shumba was tarred to allow easier access for tourists. Unfortunately this road has not been maintained and now has deteriorated along most of its length. Approximately xxx km of road are annually maintained with some concession holders taking responsibility for maintenance of certain sections.

For the purposes of this management plan the roads and tracks were allocated to several categories based on their condition. Some of these roads are unopened old alignments where the road is no longer in use but could be reopened if required.

Table 33: Road categories and lengths in Hwange

Grade	Description	Length
1	Wide or narrow tar. Easily passable with a saloon car, Includes the degraded section of tar within Hwange. Other roads easily passable with a saloon car.	390
2	Fairly good track with some poor sections or dodgy river crossings. High-clearance and 4x4 recommended but some are passable with a saloon car	1,680
3	Bad track. Probably unused for some time. Also uncleared alignments	170

A significant amount of effort went into bridges, culverts and other river crossings in the past. Many of these have stood the test of time but others are in need of attention.

Figure 124: Roads and tracks in Hwange National Park

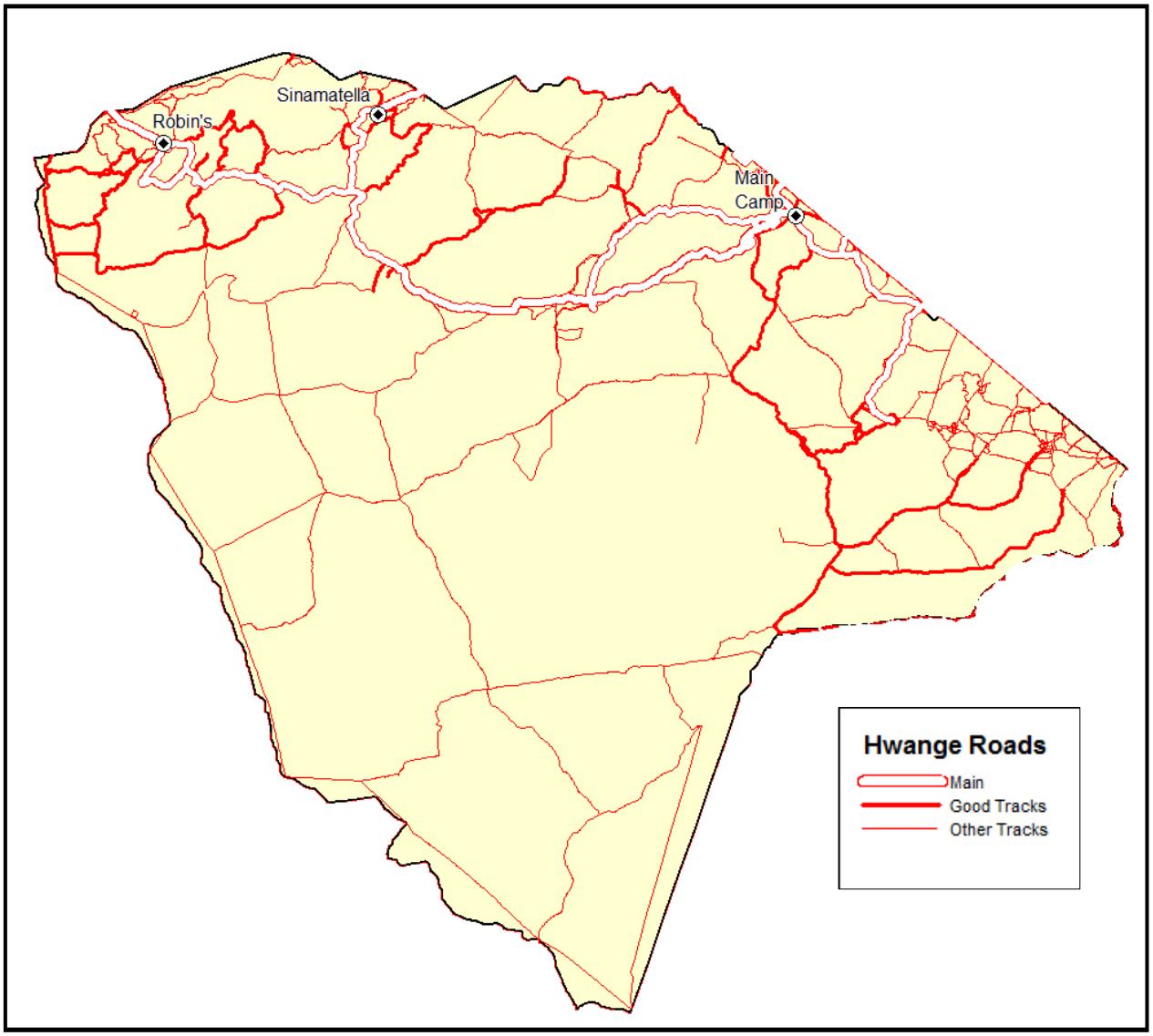


Figure 125: Examples of roads and tracks in Hwange National Park

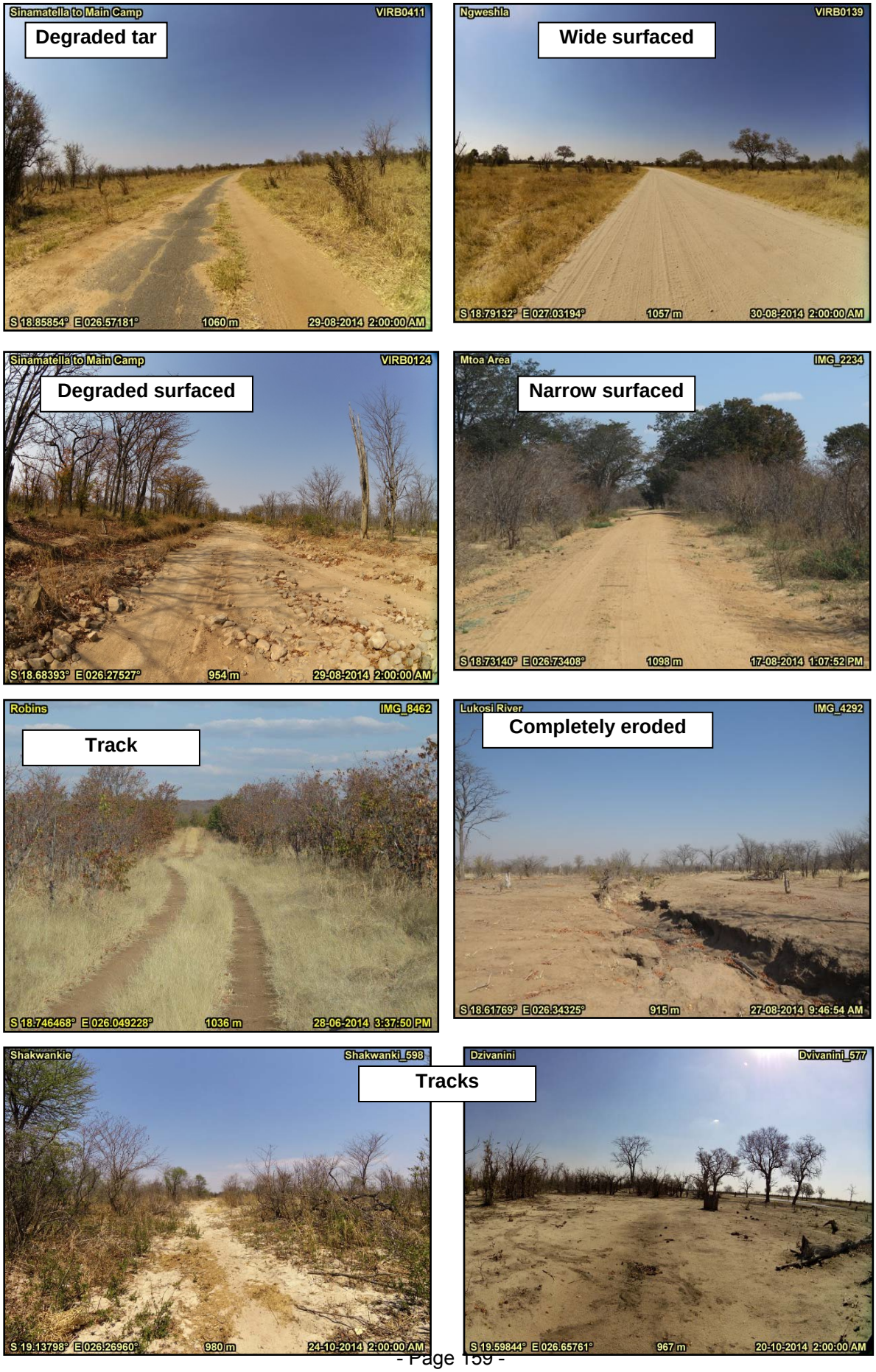
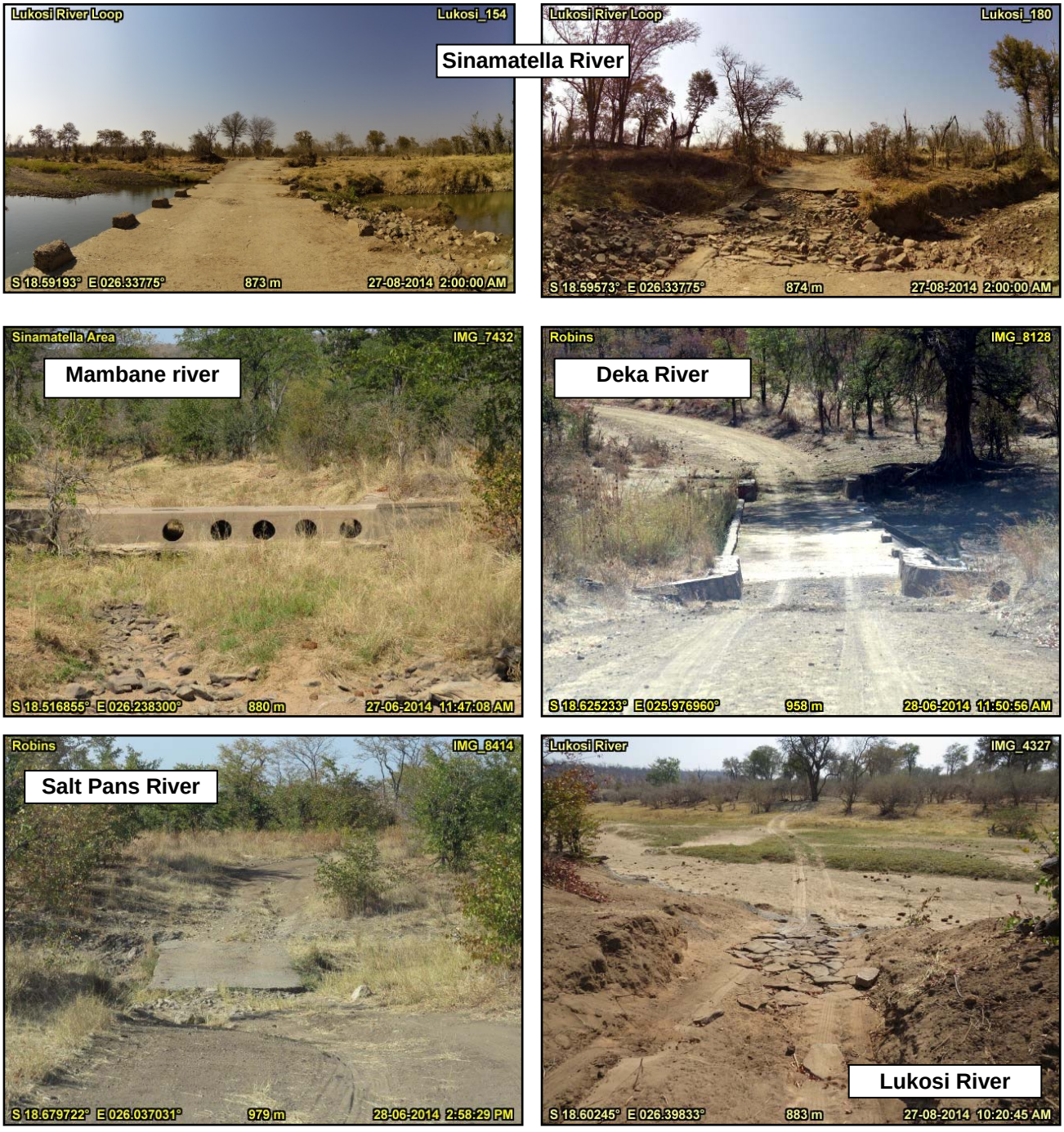


Figure 126: Examples of river Crossings



3.2.1.2 Firebreaks

The firebreak situation has improved in recent years with several double trace firebreaks being opened. Figure 127 shows the currently known extent of firebreaks in the park. It should also be noted that many of the roads, especially the larger ones, will also act as firebreaks.

Figure 127: Main firebreaks in Hwange

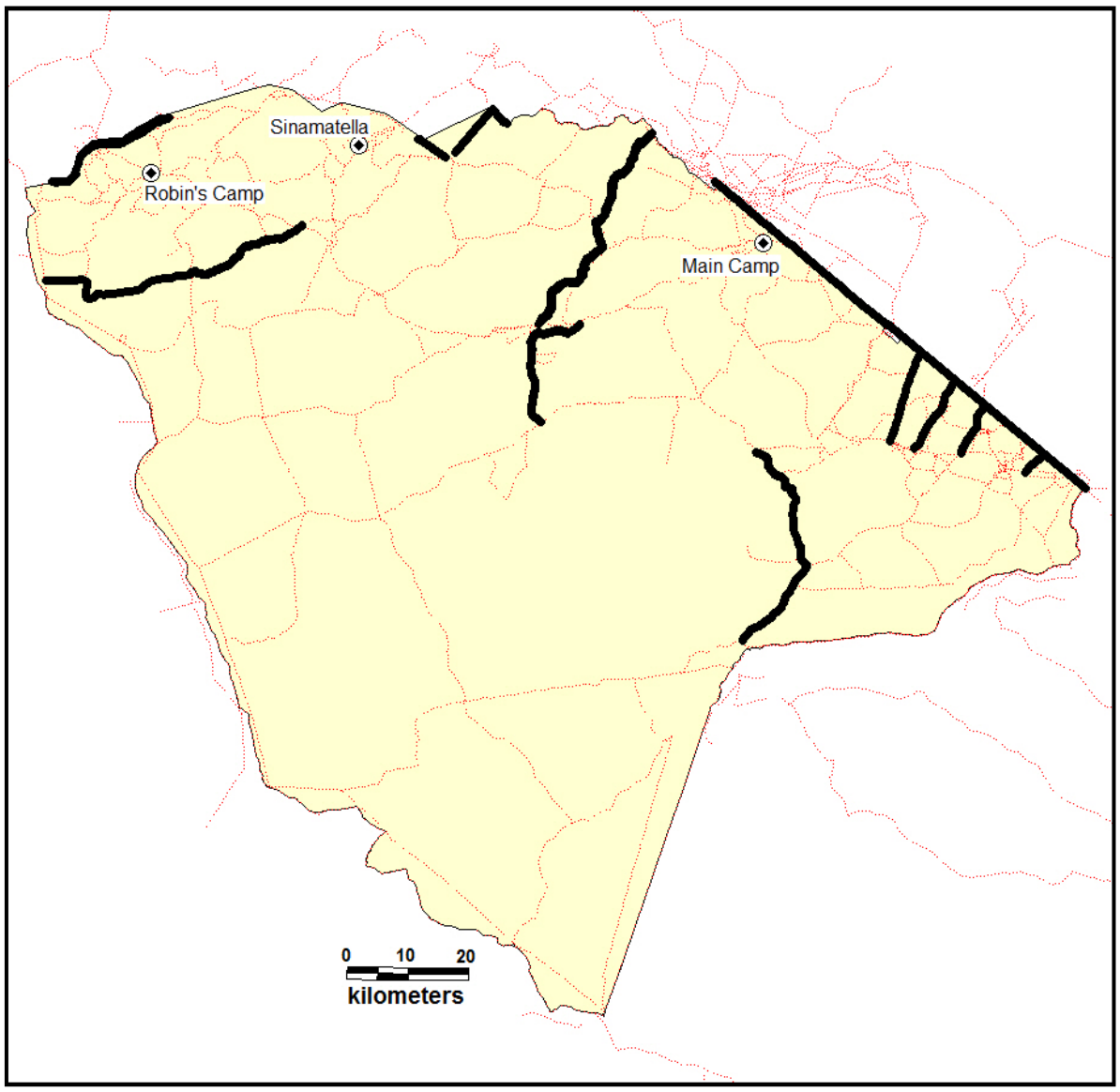


Table 34: Fire management activities in Hwange (2013)	
Main Camp	Grade roads and fire guards Mow grass along tourist routes Early burning along major fire guards Block burning – early burns
Sinamatella	
Robins	250 km of firebreaks graded (Tshowe to Tibukai) Dual trace firebreak – Saddam Pan area to Bhejane Early burns – 80km^2.

3.2.1.3 Airstrips

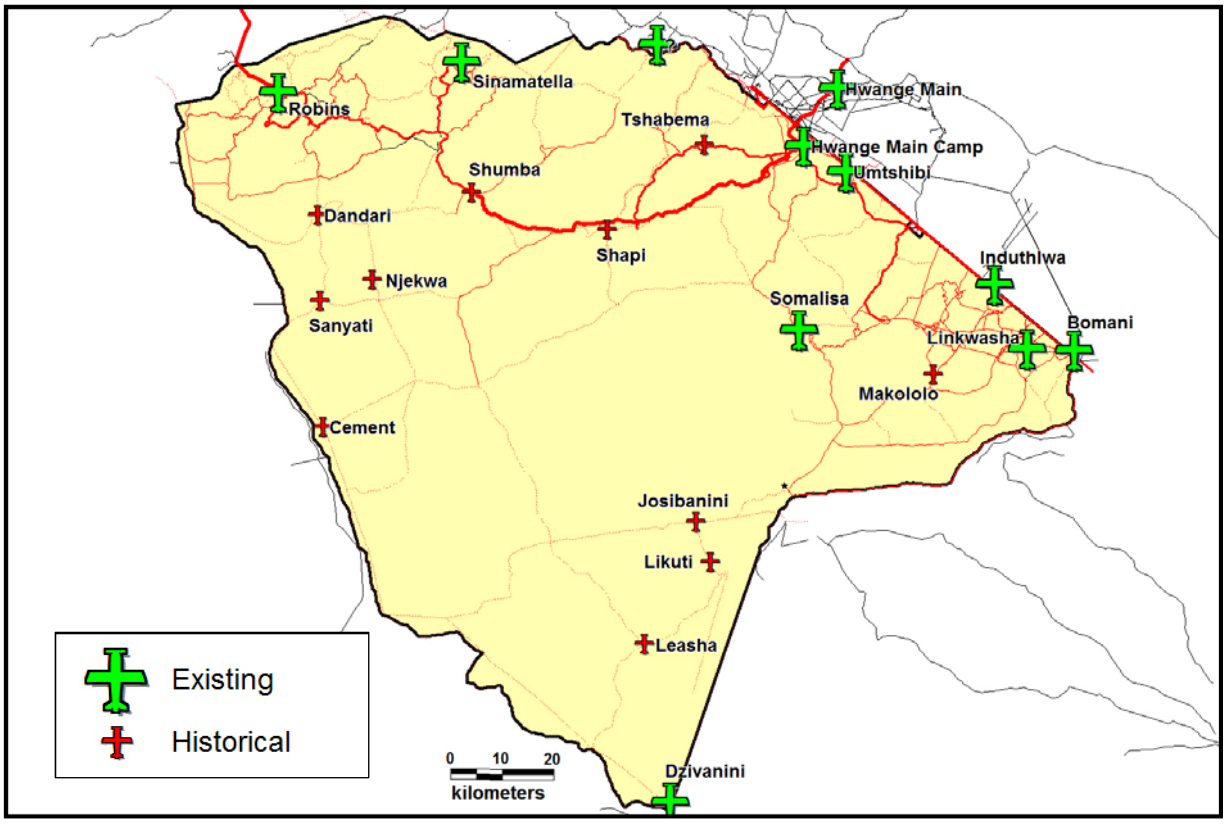
Use of aircraft was an important facet of park management in the past which resulted in the construction of at least 16 airstrips throughout the park. Many of these were only for management and were opened and cleared when required. They proved to be invaluable during the elephant management exercises.

Currently there are airstrips at all management centres, including Umtshibi. Almost all of these will require work to ensure that they are serviceable. An airstrip at Manga 3 is open and working in order to service the tourist camp at Somalisa. In addition, there are several strips near the boundaries of the park, including Hwange Main which can take large commercial aircraft. The location and condition of all airstrips in the park is shown in Table 30 and Figure 117 below.

Table 35: Airstrips in Hwange National Park
(Current and historical)

Main in Park	Historical	Outside
• Main Camp • Robins • Sinamatella • Umtshibi • Manga 3 (Somalisa) • Linkwasha • Dzivanini?	• Josivanini • Tshabema • Libuti • Leasha • Cement • Sanyati • Dandari • Shapi • Shumba • Njekwa	• Hwange main • Umtundlhwa • Bomani • Deka Safari Area • Deka

Figure 128: Airstrips in Hwange National Park



3.2.2 Staff Housing, Offices and Workshops

3.2.2.1 Main Management Stations

The three main management centres – Main Camp, Sinamatella and Robins - have well developed staff housing and office facilities. In addition, there are a number of gate stations and patrol bases. In general it should be said that much of the housing needs to be renovated. The types and numbers of housing are indicated in Table 31.

Existing staff structures are old and in need of urgent renovations, and there is a need for additional accommodation, to cater both for the current staff establishment, as well as to take into consideration future increases in staff numbers and the need to supply suitable accommodation for seasonal contract labour.

Table 36: Current houses and house shortages in Hwange

Locality and house types	Currently Available	Number vacant	Current shortage	Approved establishment shortage	Total new houses needed
Main Camp :					
Managers Houses	20	0	0	3	3
F13	3	0	9	17	17
F15	2	0	2	4	4
R 27	2	0	0	0	0
R 26	50	5	0	0	0
2 roomed/veranda	69	22	0	0	0
2 roomed/ outside kitchen	12	1	0	0	0
4 roomed with veranda	4	0	0	0	0
3 roomed/ toilet and bath	2	0	0	0	0
2 roomed single quarters 4 by 4 blocks	16	16	0	0	0
Sinamatella					
Managers Houses	4	1			
F13	3	0			
F15	2	0			
R 27	17	0			
R 26	10	0			
Single quarters (# rooms)	1	0			
4 Rooms Fabricated	24	0			

Table 36: Current houses and house shortages in Hwange					
Locality and house types	**Currently Available**	**Number vacant**	**Current shortage**	**Approved establishment shortage**	**Total new houses needed**
Robins :					
Managers Houses	3	0	0	1	1
F13	1	0	0	19	19
F15	1	0	0	19	19
R 27	26	2	0	0	0
R 26	14	13	0	0	0
Single quarters (# rooms)	4	3	0	0	0

The status of other buildings at all stations is shown in Table 32.

Table 37: Other buildings and infrastructure shortages in Hwange				
Station	**Type**	**Existing**	**Condition**	**Requirements**
Main Camp	Office	1	Good	Interior painting
	Workshop	1	Poor	Interior,exterior painting, Power replacement
	Water W'Shop	1	Good	Electrification repairs
	Butchery	1	Repairs needed	Doors,fly gauze,gate,cold room repair
	Aircraft hangar	1	Good	Interior,exterior painting
	Storeroom	6	Good	
	Radio room	1	Painting required	Painting
	Tourist office	1	Good	Interior painting
	Clinic	1	Good	Furniture
	Restaurant/Shop	1	Good	Interior painting
	Museum	1	Good	
	School	1	Needs repairs	Doors,light fittings,roof repair
Sinamatella	Office	2		Interior painting, curtaining and furnishing
	Workshop	1		Needs to be equipped
	Butchery	1		Also slaughter shed
	Storeroom			
	Radio room			

Table 37: Other buildings and infrastructure shortages in Hwange				
Station	**Type**	**Existing**	**Condition**	**Requirements**
Robins	Office	0	No office	Need for an office block
	Workshop	1	good	Need equipment
	Butchery	1		Needs repairs and equipment
	Storeroom	5	good	Needs repairs
Makona	Accommodation	1	Good	
	Ops Room	1	Good	
Wecau	Ops Room	1	Adequate	

Table 38: Status of the water supply infrastructure in Hwange				
Location	**Responsible authority**	**Source**	**Type of storage facility**	**Working status and suggested action**
Main Camp	ZINWA	Borehole	Concrete reservoir	Poor pressure, many leaks
Sinamatella	ZINWA	Borehole	Concrete tanks	Pipe leaks, often no water, pump down and transformer was struck by lighting
Robins	ZINWA	Borehole	Gravitational tank	Constant borehole and pipe breakdowns
Makona	Parks	Borehole		Makona borehole not productive so water from xx

Figure 129: Main Camp Management Infrastructure

Staff Housing

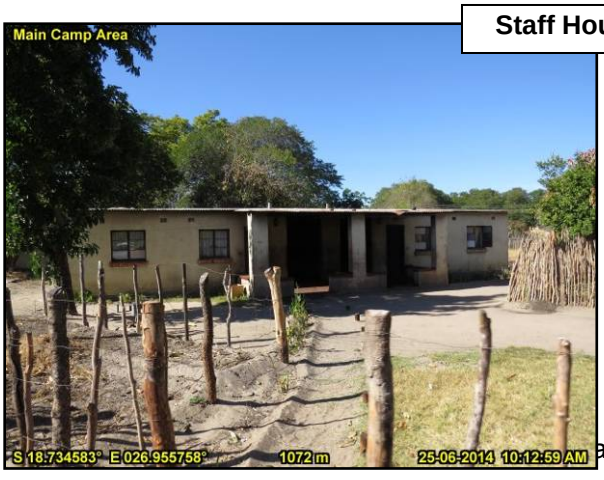


Figure 130: Sinamatella Management Infrastructure

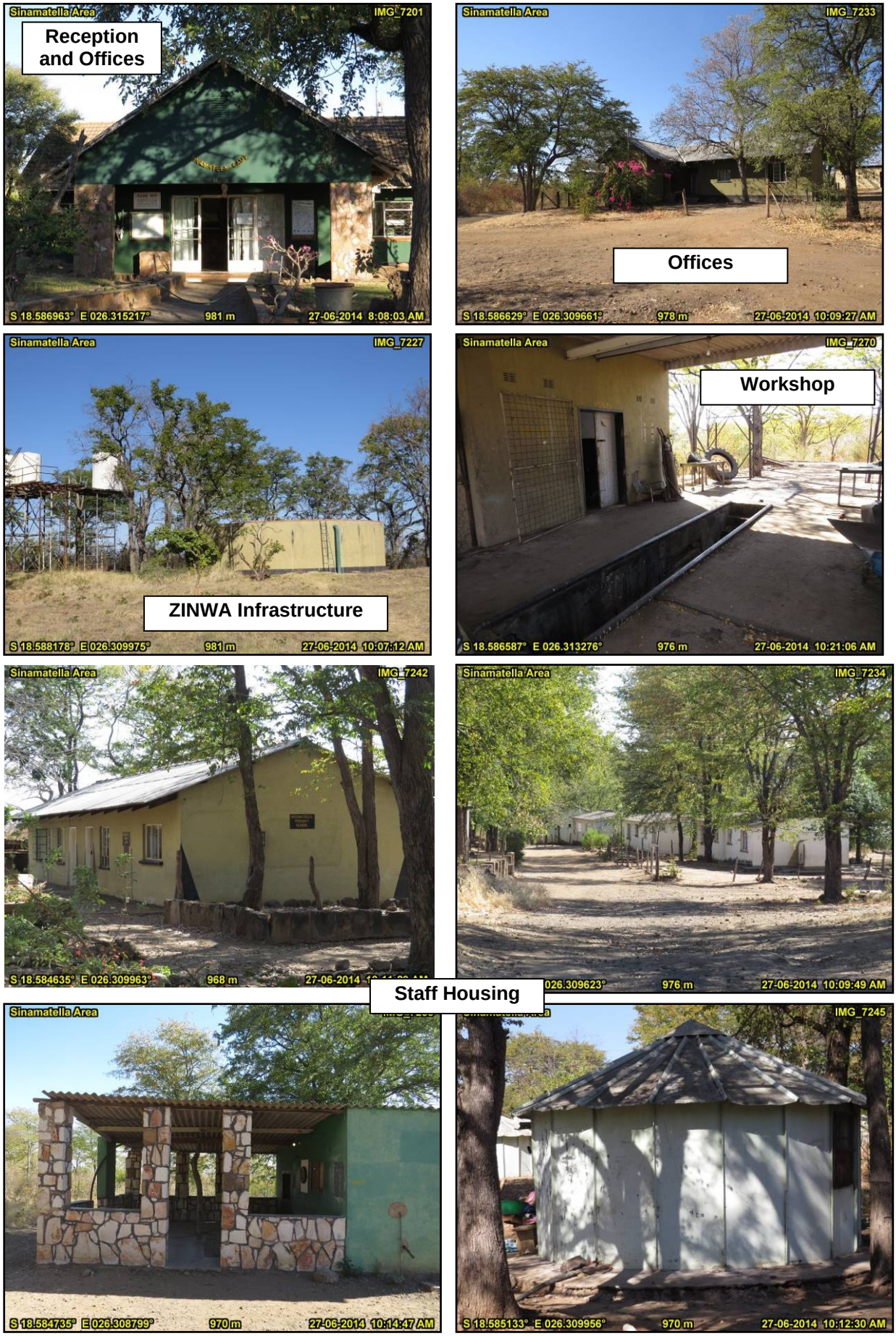
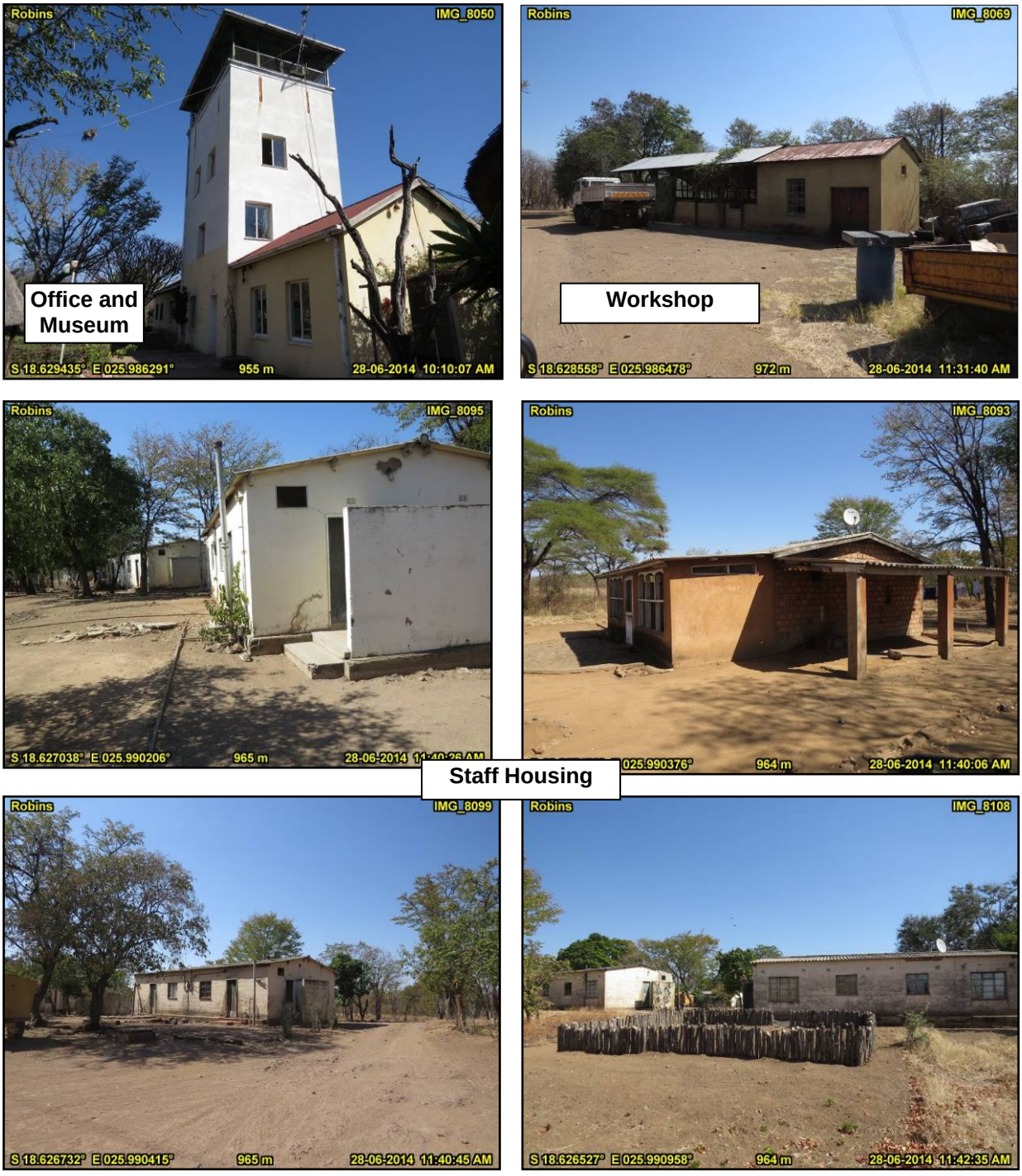


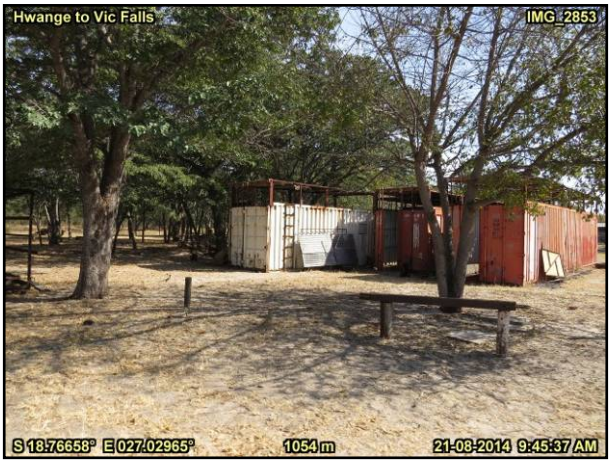
Figure 131: Robins Management Infrastructure

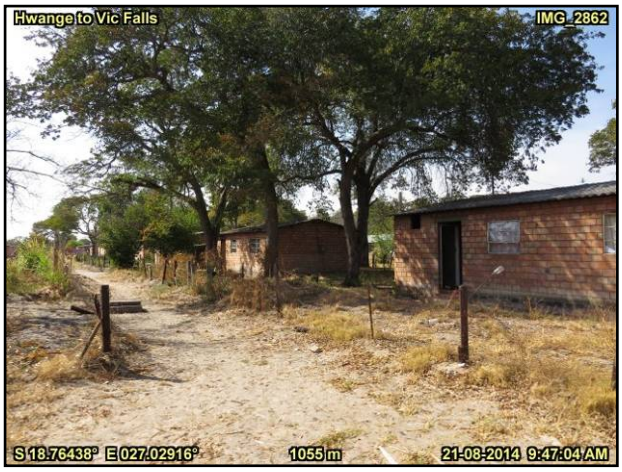


3.3.3.2 Umtshibi Management Camp

Umtshibi Management Camp is located a short distance from Main Camp. This facility plays no part in the actual day-to-day management of Hwange. Rather it is a facility for the whole of the Zimbabwean Parks and Wildlife Estate and undertakes culling, cropping and capture projects throughout the estate. Initially established at Shapi pan in the 1960s it was moved to the Umtshibi site after a parks' employee was attacked and killed by a lion at the Shapi site.

Figure 132: Umtshibi management camp





3.2.4 Equipment

As with many protected areas, useful and serviceable equipment is a problem. Main Camp has xx light trucks while xx has one (Table 33). These vehicles need to service all the park management needs. In addition vehicles are often out of service in the park as they are also used for administrative business which requires trips to Hwange, Victoria Falls and Bulawayo.

Table 39: Equipment inventory

Type	Main Camp	Sinamatella	Robins
Light Trucks	7		2
Tractor	1		1
Tipper Truck	1		
Truck	1		1
4 Wheel Trailer	1		
Tipper Trailer	0		
Mower	1		
Tow Grader	1		
Water Bowser	0		4
Compacter	0		
Front end loader	0		
Dozer	0		
Boat	0		
Firefighter	2		
Backpack spray (fires)	1		3
Welding machine			1
Motorized grader			
Pumps			7
Windmills			
Solar Panels/Pumps			

The radio network is being improved and Table 30 lists the current status of radio equipment in Hwange. Repeater stations have been established at the following locations:

- White Hills
- Makona
- Ngweshla
- Manga 3
- Main Camp
- Wexcau.

Table 40: Radio equipment analysis for Hwange

	Repeaters	Handsets	Vehicles	Base	Big Means
Main Camp	4	26		3	
Sinamatella					
Robins		4 (7)		2	1
Makona	2	2		3	

Figure 133: Hwange Equipment

3.3 STAFFING, MANAGEMENT AND ENFORCEMENT ACTIVITIES

3.3.1 Staffing

There are currently xx staff assigned to Hwange and these numbers are split between Main Camp, Sinamatella and Robins (Table 36).

Table 41: Current staff establishment compared to approved establishment

C= Current; P=Proposed; S=Shortfalll	Main Camp			Sinamatella			Robins		
Position	**C**	**P**	**S**	**C**	**P**	**S**	**C**	**P**	**S**
Area Manager	1	1	0	1	0	0	1	1	0
Senior Wildlife Officer	1	1	0	1	0	0	0	1	1
Wildlife Officer	0	2	2	1	0	0	1	1	0
Senior Ranger	3	4	1	3	0	0	2	2	0
Ranger 1	12	16	4	10	0	0	5	12	7
Ranger 2	17	30	13	30	0	0	13	15	2
Ranger 3	34	50	16	1	0	0	7	15	8
Senior Ecologist	1	2	1	0	0	0	0	0	0
Ecologist	2	3	1	0	1	1	0	0	0
Senior Ranger–Scientific Services	1	2	1	0	0	0	0	0	0
Ranger 1-Scientific Services	0	3	3	2	0	0	0	1	1
Ranger 2-Scientific Services	1	5	4	1	0	0	0	1	1
Ranger 3-Scientific Services	2	6	4	0	0	0	0	1	1
Medic	2	5	3	0	1	1	0	1	1
Clerk	4	5	1	1	0	0	1	2	1
Reservationists	3	5	2	2	0	0	1	2	1
General hand	9	25	16	1	7	7	0	6	6
Lodge attendant	8	20	12	9	6	6	1	9	8
Linen attendant	0	4	4	0	0	0	0	4	4
Handy man	3	9	6	3	0	0	2	2	0
Ranger 3 - (Stores man)	1	2	1	0	0	0	0	1	1
Ranger 3 - (Workshop assistant)	1	3	2	1	0	0	0	2	2
Ranger 3 - (Drivers)	5	8	3	2	0	0	0	4	4
Ranger 3 - (Gate attendants)	4	10	6	2	0	0	sunk	sunk	sunk
Ranger 3 - (Night watchman)	3	6	3	0	0	0	sunk	sunk	sunk
Ranger 3 - (Radio operator)	1	3	2	2	0	0	sunk	sunk	sunk

Table 41: Current staff establishment compared to approved establishment									
C= Current; P=Proposed; S=Shortfalll	**Main Camp**			**Sinamatella**			**Robins**		
Position	**C**	**P**	**S**	**C**	**P**	**S**	**C**	**P**	**S**
Ranger 3 - Commercial services	1	2	1	1	0	0	0	0	0
TOTAL	**120**	**232**	**112**	**74**	**14**	**14**	**34**	**83**	**49**

3.2.2 Staff welfare

Staff welfare is an important part of ensuring that the park has an effective and motivated workforce. As most employees live on station with their families the health and education aspects are important

Table 42: Staff facilities available in Hwange			
House types	**Main Camp**	**Sinamatella**	**Robins**
School	Yes	Yes	None
Clinic	Yes	None	
Store	Yes	Yes	Yes
Recreation			

3.2.3 Ration Hunting

On ongoing staff benefit is the ration quota. Initially conceived as a way for scouts on patrol to supplement their food rations, it has evolved into a more formal quota, managed from the station offices rather than by individual scouts. Each station has a butchery to process the meat.

In 2014 Sinamatella and Robins elected not to utilise the ration quota from the park. The rations are taken from the Matetsi and Deka Safari Areas instead.

In addition to the ration quota, Main Camp also has a state function quota. Umtshibi also has its own ration quota. In 2014 the ration quotas were halved for the three stations

Table 43: Ration quotas for Hwange				
Species	**Main Camp**	**Sinamatella**	**Robins ***	**Totals**
Elephant	16+6+2	4	4	
Buffalo	11+4	8	4	
Kudu	6	8	8	
Impala	12	40	20	

* The Robins quota is shared with Kazuma Pan NP

3.3.4 Enforcement Activities

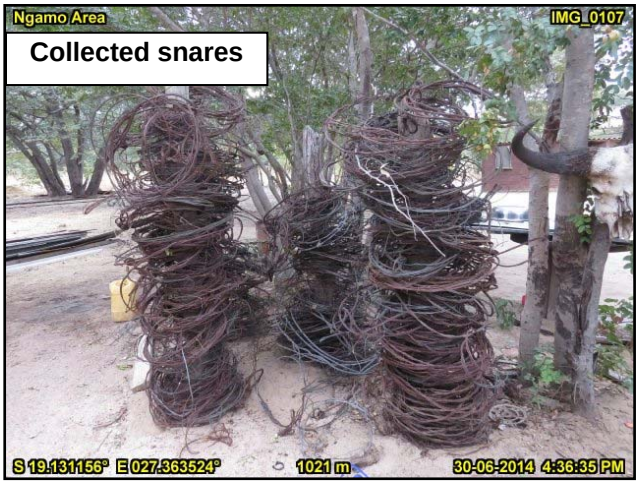
Daily Patrols
Extended Patrols
Border Patrols
Joint/Combined Patrols

Patrol bases?? – Types? Well established like Wecau, Temporary bases like Mtoa?

What are the monitoring systems in place for protection activities? GPS data recording?

Table 44: Enforcement activities in Hwange (2013)	
Main Camp	
Sinamatella	
Robins	26 rangers available for patrol duties o Day patrols (2 sticks by 2 men by 10 days per month) o Extended patrols (3 sticks by 3 men by 10 nights by 3 deployments per month) o Strategic patrols (2 sticks by 3 men by 3 nights per month) o Reaction patrol (3 sticks by 3 men by 3 nights per month) o Mobile patrol (once a month)

Data needed on arrests, recovered ivory, incursions recorded, successful prosecutions etc etc



Collected snares

3.3.5 Management Activities

The main management activities carried out in the park are concerned with water, roads and fire

Table 45: Management activities in Hwange	
Water	Drilling and maintaining boreholes Pumping pans during dry season
Roads	Road maintenance
Fire	Opening and clearing firebreaks Prescribed early burns

3.3.6 Management Related NGOs

There are currently two management related NGOs active in the park. These are

1. Friends of Hwange
2. Bhejane Trust
3. WildCru through Wexcau anti-poaching

They assist with water and other management related activities.

3.4 INCOME AND EXPENDITURE

This section is a brief summary of available information regarding income and expenditure for Hwange. Data was difficult to come and to verify so it should be regarded as an estimate and indication rather than being a final definitive analysis.

3.4.1 Income

In summary, Hwange NP made approximately 1.3 million dollars in 2013. The majority of this (84%) was from entry fees. Concession fees alone accounted for 12% of the total. However, the presence of the camps inside the park contributed somewhere between 150 and 200 thousand dollars to the entry fees.

Table 46: Estimated income for Hwange Park in 2013

Category	**Income**	**%**
Entry	1,125,000	84%
Lease Fees	160,000	12%
Other Income	50,000	4%
Totals	**1,335,000**	

It should be noted that most fees for accommodation are paid in advance in Harare. In addition, all concession fees are also paid in Harare. Entry fees are paid at the gates.

It should also be noted that the Authority collects all revenues centrally and then uses this to run the entire estate. So relatively high earning parks like Hwange may not get funded to the same level as their earning capacity. The three stations are permitted to retain 10% of cash income (mainly entry fees) to help run the station.

3.4.2 Expenditure

Running costs for Hwange are estimated to be in excess of 1.6 million dollars (Table 47). As said above, these figures should be regarded as indicative only as it was difficult to get accurate and reliable data. The wage bill (paid from HQ) for example was estimated using average wage packets for the different grades of employment.

Table 47: Estimated expenditure for Hwange Park in 2013

Category	Sub-Category	Main Camp	Sinamatella	Robins	Totals	%
Wages	ZPWMA	375,600	278,520	132,720	786,840	48%
	Casuals	91,189	44,550	62,592	198,331	12%
Maintenance	Tourism Buildings	3,387	20,000	18,692	42,079	3%
	Mgmt Buildings	1,398	10,000	13,160	24,558	2%
	Vehicles	6,767	15,000	4,619	26,386	2%
	Other				0	0%
Utilities		71,000	65,000	79,500	215,500	13%
Roads/Fireguards		128	4,800	5,049	9,977	1%
Game Water			7,200	78,000	85,200	5%
Anti-Poaching	Provisions		3,600		3,600	0%
	Fuel		76,800		76,800	5%
Consumables	Fuels/Lubricants	9,306	9,000	58,400	76,706	5%
Meetings		2,355	4,000		6,355	0%
Training			15,000	28,000	43,000	3%
CSC			36,000		36,000	2%
Totals		**561,130**	**589,470**	**480,732**	**1,631,332**	

HWANGE NATIONAL PARK

CHAPTER 4: TOURISM OVERVIEW

CHAPTER 4: TOURISM OVERVIEW

4.1 INTRODUCTION

This section outlines the current state of tourism in Hwange National Park. It should be remembered that this is a working draft and it will be updated as more information becomes available. Please inform us of any errors or omissions.

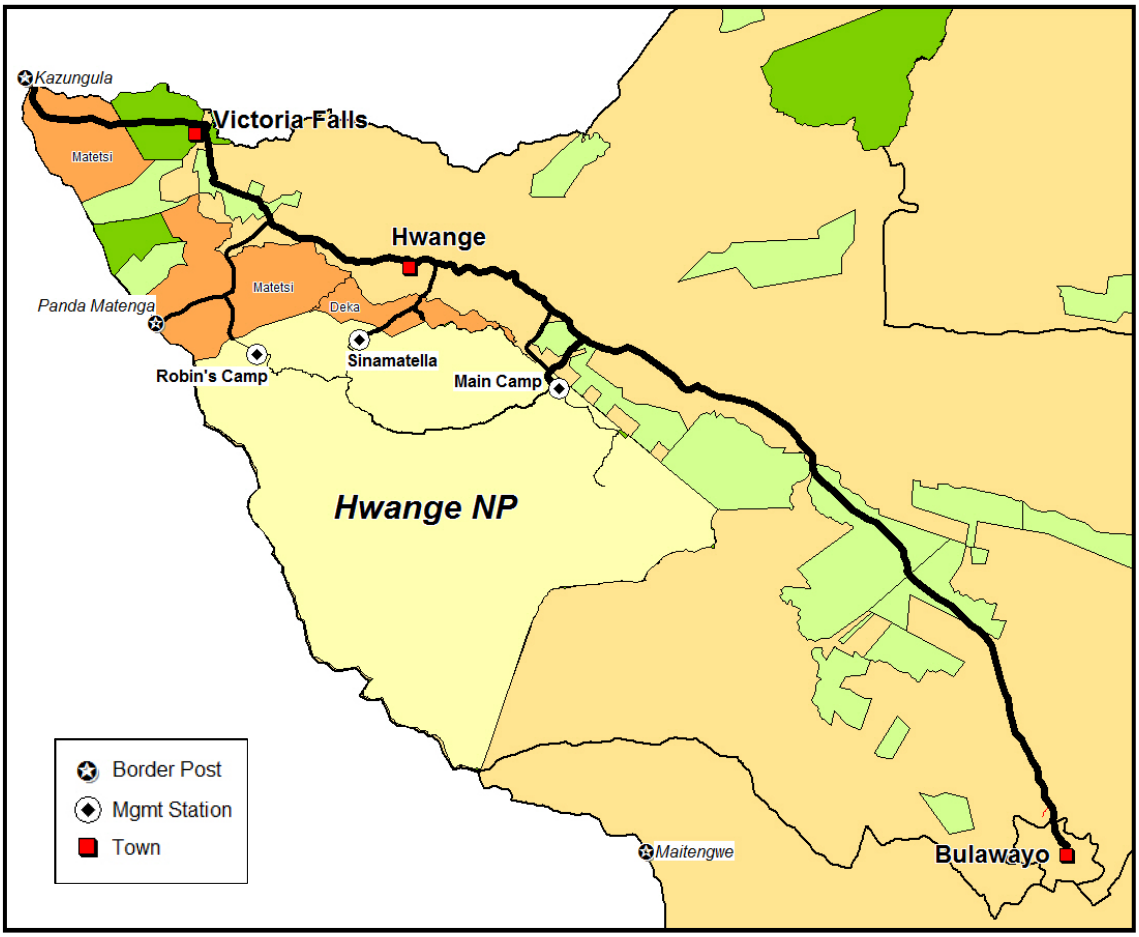
4.2 ACCESS

Access to Hwange is relatively easy. Main Camp is 170 km from Victoria Falls which is serviced by an international airport. Previously the park was serviced by the Hwange Airport (with a five kilometer long surfaced runway). There were daily flights between Harare and Victoria Falls with stopovers at Kariba and Hwange. One assumes that this service could be reinstated should the demand be there. In addition, the Victoria Falls airport is being upgraded and more flights are expected to use this hub. This will have important spin-offs for tourism in Hwange.

However, a commuter service industry between Victoria Falls and Hwange has grown up since the demise of the air service. Commuting times are about 1 ½ hours to the Sinamatella Gate and about 2 hours to Main Camp.

Main Camp is approximately 3 hours from Bulawayo town and at least 8 hours drive from the capital of Harare.

Figure 134: Access routes to Hwange



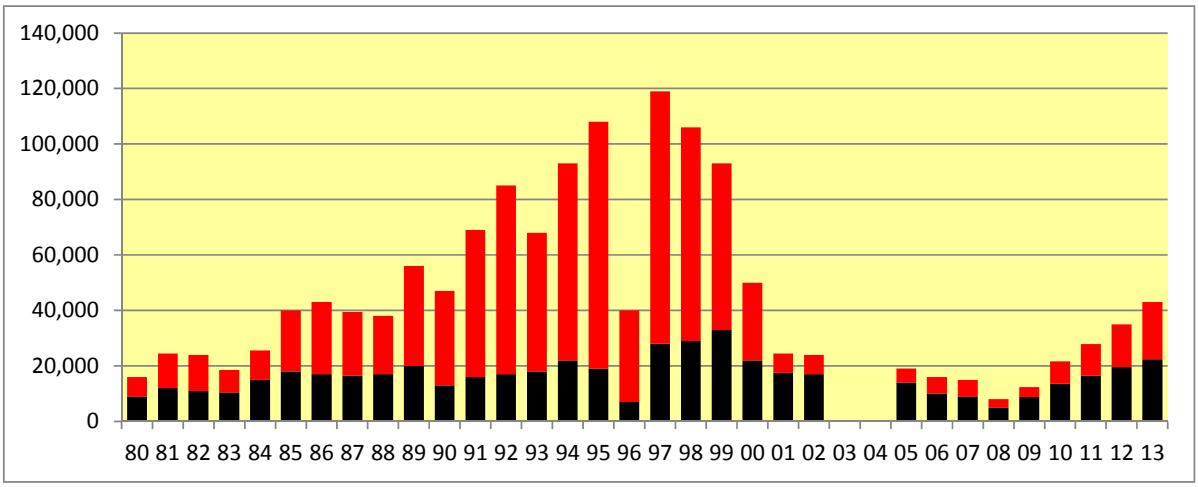
4.3 HISTORY

[1]Tourism started in Hwange in the early 1930s when the first boreholes were drilled and dams constructed to attract game. In those days most tourists were camping as there was no accommodation, apart from some simple pole and dagga huts constructed in 1933. However, most guests preferred to camp outside the huts. In 1949 there were 2,771 visitors and this had grown to over 25,000 by 1965. The first brick huts were established in 1966 at Main Camp and these formed the basis of the current camp.

The original access to Main Camp from the Victoria Falls – Bulawayo road was down the Dete Vlei but the current new road was constructed in the 1960s. The narrow tar between Main Camp and Shumba was laid down in 1962 and was a gamble for cost recovery from increased tourism. Sinamatella and Robins were both on the site of previous private land and were initiated in 19xx and 19xx respectively.

Tourism peaked in 1997 with probably as many as 140,000 entries[2]. However between 1992 and 1999 it was likely that entries were in excess of 100,000 per annum in most years (1996 excluded). At that time, apart from Makololo and Linkwasha, there were no private sector camps inside the national park. Most visitors were accommodated outside the park in a plethora of camps on different land categories – safari areas, forestry estate and private land. Many of them used these areas for their activities along with visits to the park. Main Camp received the most visitors, averaging around 80%, Sinamatella with around 15% and Robins with around 5%.

Figure 135: Main Camp tourist entries 1980-2013

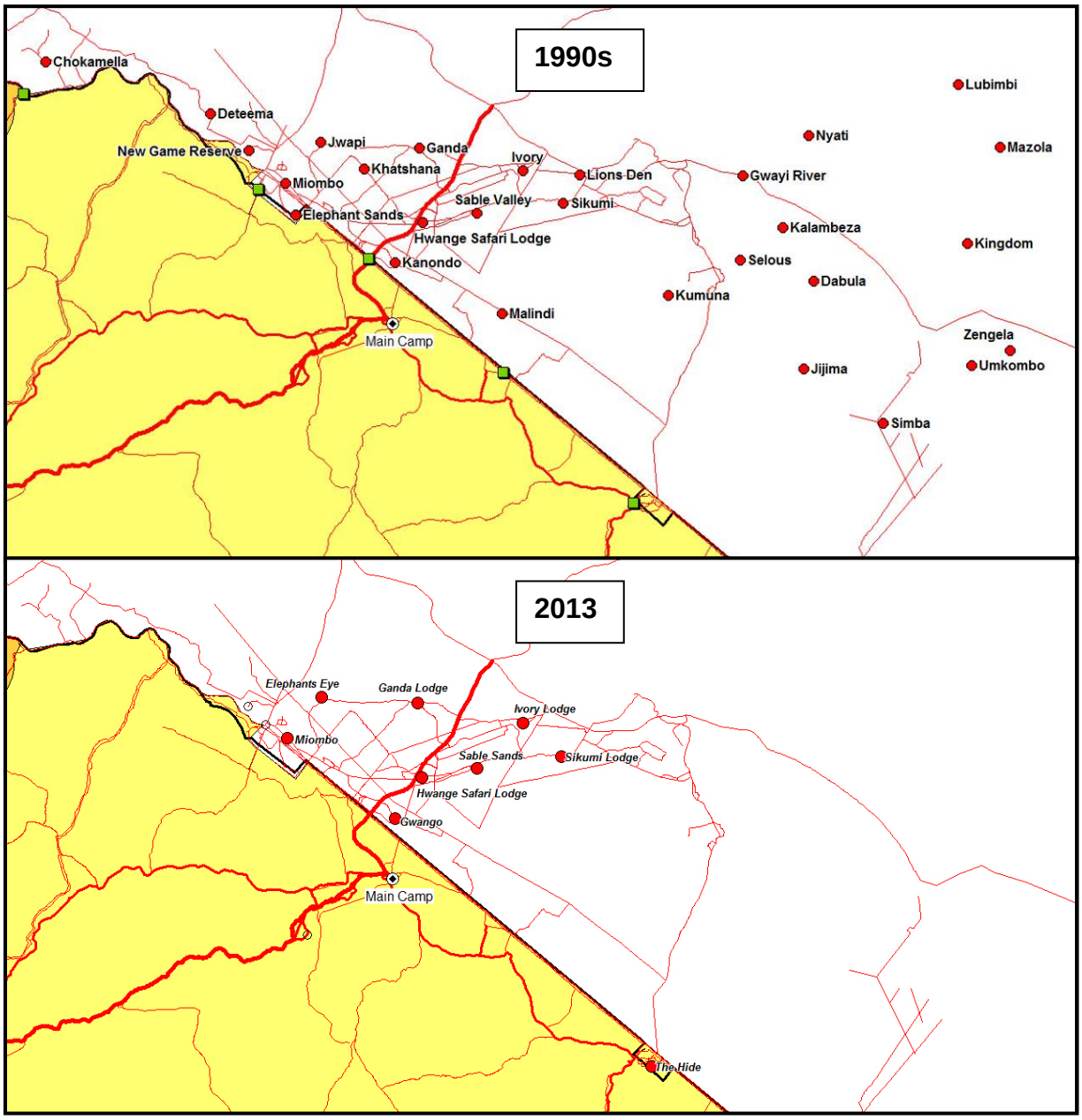


The distinction between visitors and entries needs to made here. Number of visitors is not the same as number of entries as (for example) a single person staying at a concession site inside the park for four nights will count as four entries even though they are a single visitor. This needs to be kept in mind when viewing the data - which is all based on entries.

[1] *It must be stated at the outset that the way in which tourism data is recorded could be improved. There were many cases where data from one source did not match that from another. For example, the annual tourism data shows 35,488 visitors in 2013 while that compiled from the monthly statistics records 42,942 visitors. The missing visitors match the school visitors. In addition the data could not be separated out to differentiate between people staying in concession camps or the numbers of people using the picnic sites for overnight stays (as they are recorded by site and not by actual use).*

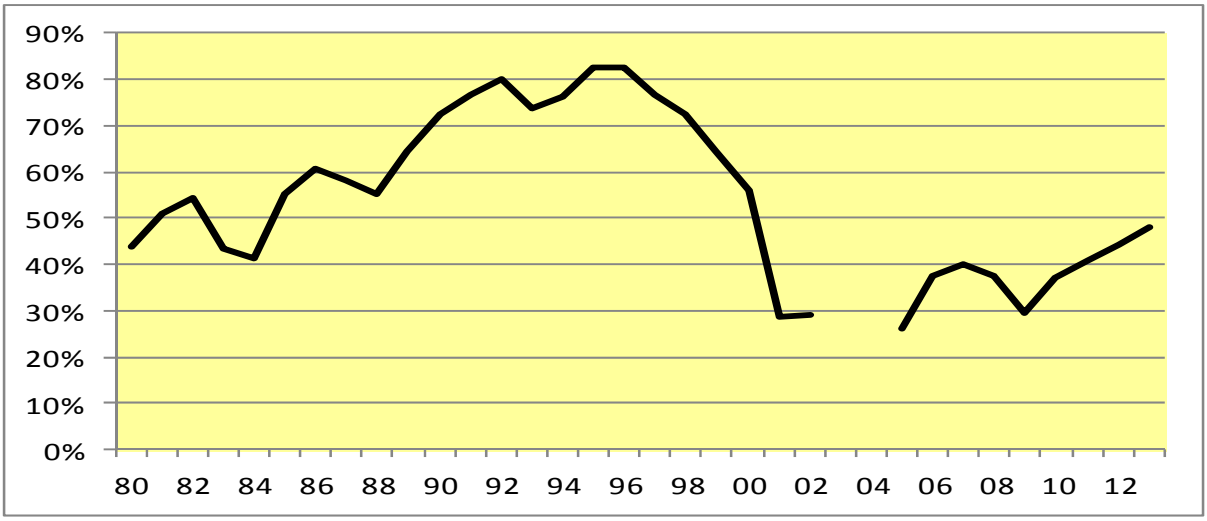
[2] *Figure 135 reflects main camp data only. The figure of 140,000 is from extrapolating the percentage visitors for the three camps in the 1980s and in recent years. These average out at 80% of entries are at Main Camp, 15% at Sinamatella and 5% at Robins.*

Figure 136: External camps servicing the Main Camp Area – 1990 and 2013



The percentage of foreign visitors is important for the income for the park as these visitors pay four times as much to enter the park compared to locals. In the late 1990s foreigners constituted over 70% of visitors. In the lean years since 2000 this dropped to around 30% but is again on the rise. Tourism can be a fickle business with people staying away in response to perceived or real fears (e.g. election violence and bad publicity). Kenya is already experiencing a drop in foreign visitors this year in response to the ebola virus outbreak.

Figure 137: Percentage of foreigner entries at Main Camp 1980 to 2013



4.4 ZONING

Hwange was formally zoned for tourism in the 2003 management plan. Three zones were established with the category of "Wild Area" (Figure 138). The Northern Wild area had significant areas set aside for walking safaris (Table 48).

- Northern Wild Area
- Southern Wild Area
- Dzivanini Wild Area

Figure 138: Tourism Zones in Hwange (2003)

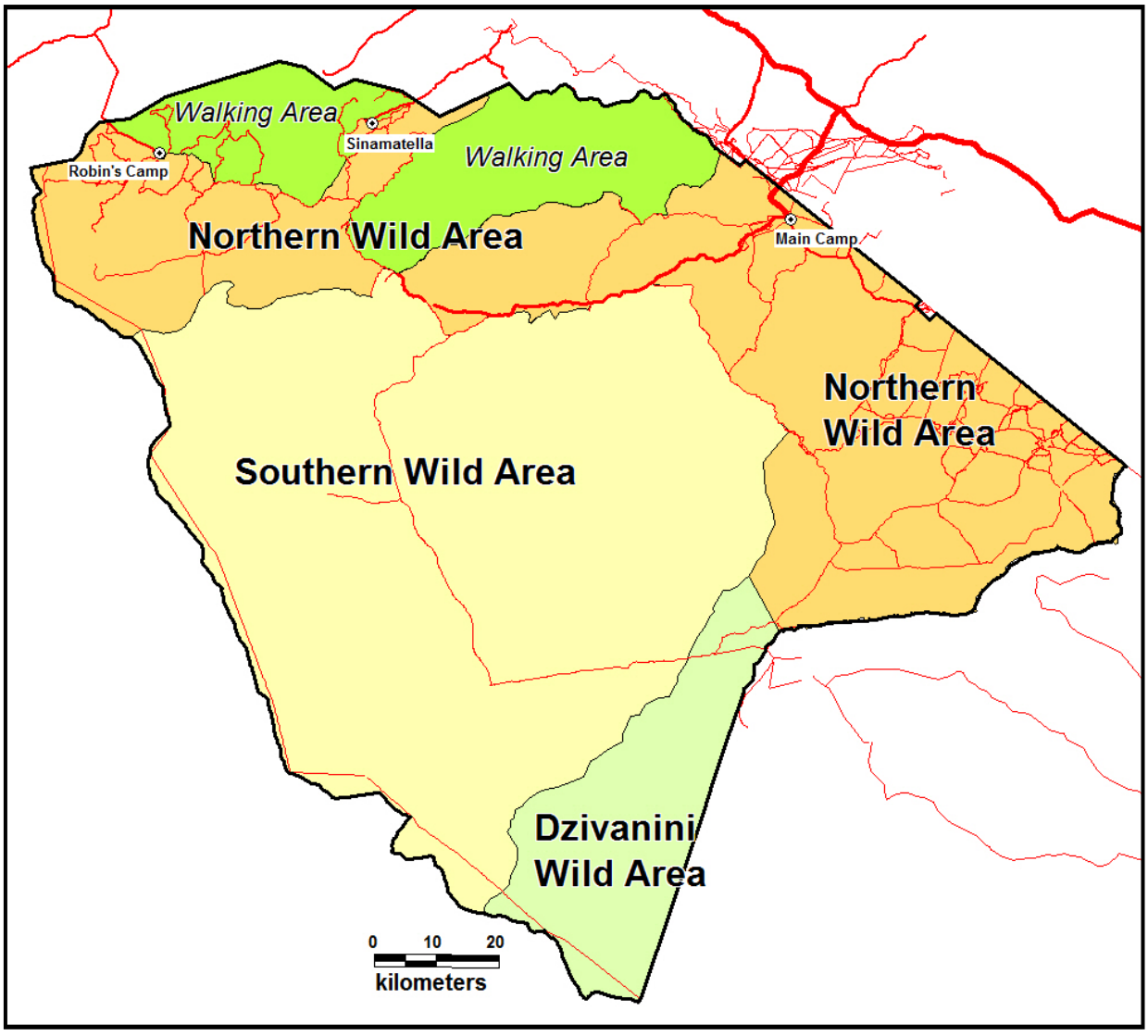
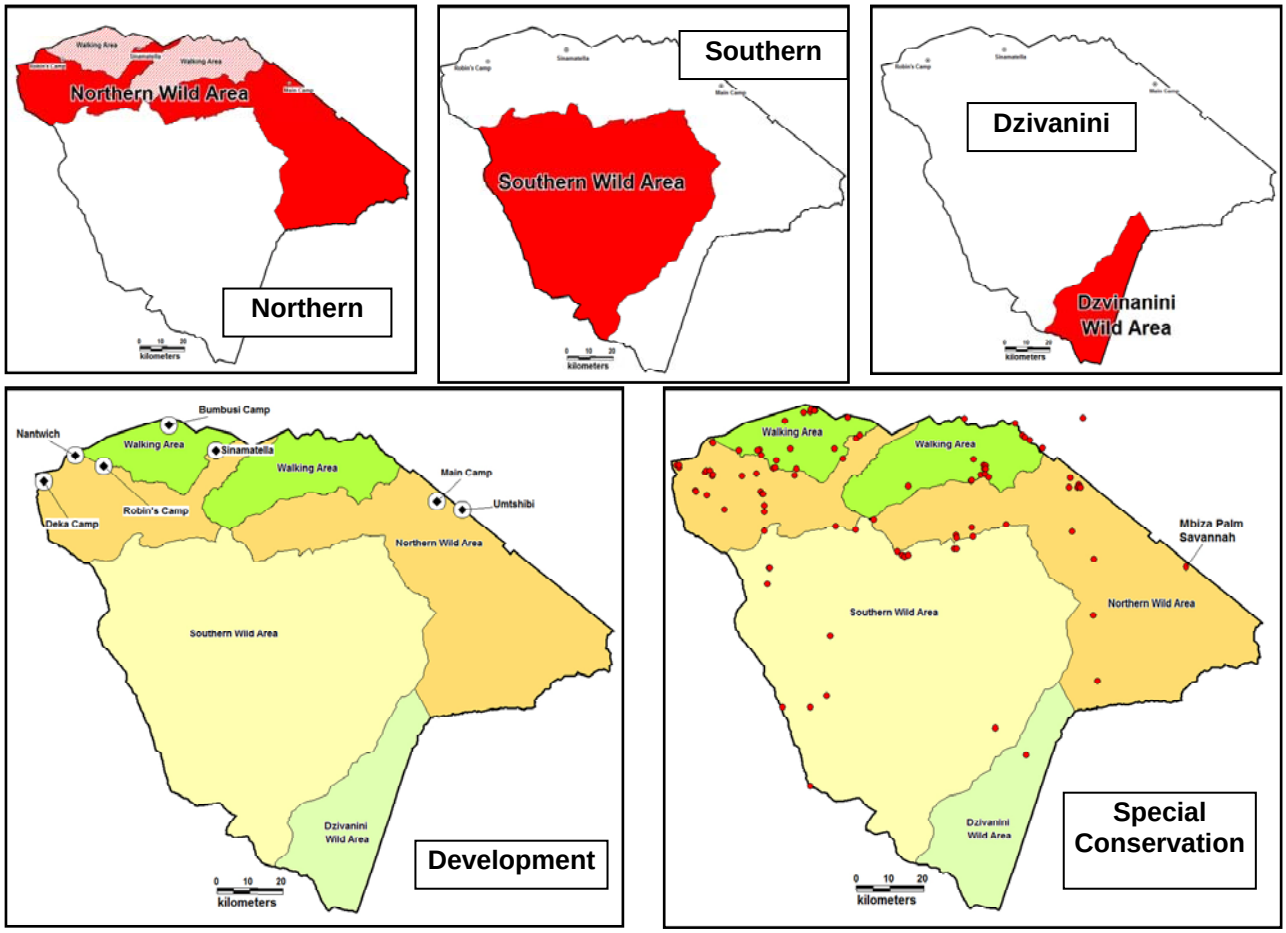


Table 48: Current Zoning for Hwange	
Zone	**Purpose**
Northern Wild 6,574 km^2	o To provide large tracts of relatively undisturbed but accessible land for non consumptive visitor use o Sub-division to provide areas where access only permitted on foot (24% of the area)
Southern Wild 6,850 km^2	o To provide large tracts of relatively undisturbed but accessible land for non consumptive visitor use
Dzivanini Wild 1,283 km^2	o To provide large tracts of relatively undisturbed but accessible land for non consumptive visitor use o Limited dry season access
Development	o To provide sites for staff accommodation, offices, workshops and tourist complexes for management and visitor purposes o Main Camp, Robins, Sinamatella, Umtshibi o Nantwich, Little Deka, Bumbuzi
Special Conservation	o Protection of sites that have unusual or important biotic or abiotic features o 200 metre radius of all seeps and springs. All archaeological sites o Mbiza palm savannah (20ha)



4.4.1 Camp Types and Descriptions

4.4.1.1 Restrictions from the 2003 Management Plan

In the 2003 Management Plan two types of camps in the park were envisaged

1. Semi-permanent Camps
2. Temporary Camps

Some though had been given to the possible locations of these camps and the following is a transcript *"The construction of up to five semi-permanent camps is permitted in the **Northern Wild Area** except that they may not be built in the Linkwasha area which is presently served by two such camps. Actual sites for the camps have not been specified so as to allow users some freedom of choice but no camp should be constructed without the authority of the Director. Potential sites include places such as Sibaya, Tchabema, Chivisa, Inyantue, Mabuyamabema, Shapi, Shumba, Bumbumutsa and Tsamhole*".

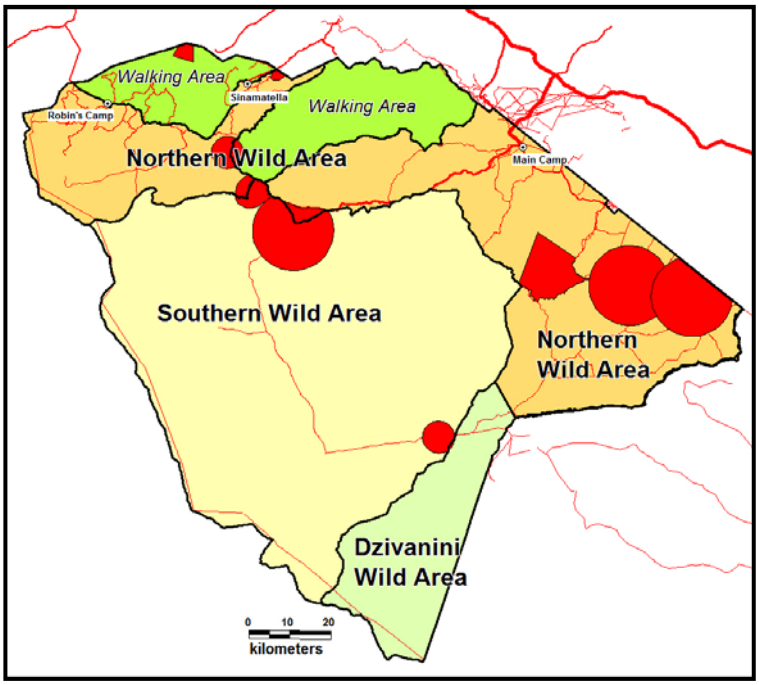
The plan also detailed the specifications for these camps and they are reproduced below.

Table 49: Camp types and specifications - 2003

Camp Type	Specifications - 2003
Semi-Permanent	A semi-permanent camp is defined as a camp which may be continuously occupied for one or more years but should be constructed so that it may be dismantled and all traces of its existence readily removed. No semi-permanent camp should be larger than: o 12 by 2 bed units with shower and toilet o 3 by 2 bed tents for occasional occupants o 3 by 2 bed units domestic staff l kitchen o 1 dining/lounge/bar o 1 secure store The camp may be built either from canvas or poles, thatch and wood planking with either concrete or daga floor. All other materials are to be imported. The camp may not be built in sight of other park visitors, within 300m of a water point or in any special conservation zone. A water supply from one of the existing bore holes via an underground pipe to an overhead tank in the campsite may be installed. The total number of people permitted to occupy a camp is restricted to: o 24 clients o 4 guides o 5 domestic staff. Firewood may be purchased or imported for one camp fire for aesthetic reasons but alternative energy sources such as gas and solar power are to be used for cooking and hot water. All litter is to be placed in a rubbish pit which is to be burned at regular intervals and all non-combustible rubbish must be removed to the dump at the nearest development area. The development of lawns using grass species indigenous to the park to within a maximum of 10 m radius of the camp and the cultivation of non self- propagating vegetables in a specified area are permitted.

Table 49: Camp types and specifications - 2003	
Camp Type	**Specifications - 2003**
Temporary	A temporary camp is defined as camp established for the duration of one visit to a particular site and should be dismantled at the end of the visit. There is no restriction on the location of campsites except that: 1. They should not be situated within 100 m of a water point 2. They should be sited so that they are concealed from the view of other tourists using the area Development is limited to no more than one temporal long drop and one ablution facility with a french drain. All camp equipment and non combustible rubbish must be removed from the area at the end of each period of occupancy and sites are to be left showing minimum signs of human occupation. The collection of firewood is permitted, subject to an appropriate fee but the number of fires is limited to one per campsite and fires must be properly protected to ensure that there is no risk of wild fires. No vegetation is to be cut for the erection of temporary camp structures or any other purpose, Other restrictions may be imposed at the discretion of the Planning Committee of the Department

Although not specifically stated in the plan it appears that there were to be no semi-permanent camps in the Southern or Dzivanini Wild Areas. There was also discussion that a 10km exclusion radius was too large and that this should be reduced to 2 km. Sites were not to be within 300 m of any watersource or potential special conservation zone (archaeological site). A quick glance at the Figure opposite shows that these prescriptions were not adhered to. Several new sites have large exclusive areas (Nehimba and Somalisa) and some are in the Southern Wild Area (Nehimba, Camp Hwange and Josivanini), The 300 m rule about distance from water sources is also a non-starter as all camps put up water sources in front of their camps, some less than 300 m away. In addition, Nehimba is visible from the main road in the dry season.



4.4.1.2 Camp Types from Gonarezhou

The following table shows camp specifications as outlined in the Gonarezhou Management Plan. They are included here for discussion purposes. Gonarezhou had a tourism plan that was aiming for a specific segment of the market (wilderness seekers) in addition to the more traditional tourism markets, hence the wide range of accommodation and camping described. Some standardization of camp type specifications for the whole of the Parks and Wildlife Estate may be considered a desirable goal.

Table 50: Camp types and specifications – Gonarezhou - 2011

Camp Type	Specifications
Lodge	**Lodges** only permitted on sites within 2.5 km of the park boundary. However, and where possible, investors will be encouraged to locate outside the park. EMA approved EIA required. Design specifications need to be approved by PWMA and these can be site specific. Maximum size on application, but 50 beds recommended. Usually one level, permanent structures of concrete and stone. Can be steel reinforced cement foundations with permanent hard walls; can be a continuous structure with reception, gift shop, dining room, bar, and offices under one roof with interior plumbing and power; can be a series of one level, separated, permanent, steel reinforced cement bedroom structures (cottages etc); swimming pool optional; only essential staff housing; essential parking and storage space permitted on sites within the park. Where feasible staff accommodation should be outside the park. Underground cabling if power brought in from outside. Also underground cabling in camp area. Appropriate, low noise level generators permitted
Permanent Camp	The maximum size of these camps will be 24 beds with only 12 essential staff permitted to live on site. Families and other staff must be accommodated outside the park. Appropriate, low noise level generators permitted. Underground cabling permitted if power brought in from outside. Also underground cabling in camp area. Gas or electricity to be used for cooking and heating water. Moulded fibreglass above ground swimming pools permitted. EMA approved EIA required.
Semi-Permanent	Maximum size is 12 client beds with 6 essential staff permitted to be accommodated on site. Ideally these camps should be 6 to 8 client beds with 4 to 6 staff. No concrete is permitted at these camps, even for floors. Raised wooded floors are preferred, the supports of which can be secured with well packed rocks. Gas must be used for cooking and either gas or solar systems for water heating. Aesthetic wood fires will be permitted. No generators will be permitted at these camps and power needs to be supplied through alternative renewable power sources. Toilet systems need to be based on removable septic tanks with rock based soakaways. Biodegradable trash buried and combustable materials burned by tour operator. Non-combustables removed from the park by tour operator.
Annual	Maximum size is 12 client beds with 6 essential staff permitted to be accommodated on site. Ideally these camps should be 6 to 8 client beds with 4 to 6 staff. No concrete is permitted at these camps, even for floors. Raised wooded floors are preferred, the supports of which can be secured with well packed rocks. Chemical toilets will be encouraged. Gas must be used for cooking and either gas or solar systems for water heating. Aesthetic wood fires will be permitted. As the camp must be completely removed on an annual basis the ZPWMA will consider the possibility of the camp being able to change position from year to year, within a pre-defined area. This will allow the operator to react to changing water regimes within a particular area.

Table 50: Camp types and specifications – Gonarezhou - 2011	
Camp Type	**Specifications**
Developed Campsite	Generally run by ZPWMA. Maximum 6 people per site. Water borne sewage and showers in ablutions. Hot water generally available. Where possible water provided to individual sites. Wood available on site for purchase. Attendant always on site for protection and maintenance. Where appropriate each site can have a gazebo shelter. Animal proof refuse containers. Currently at Main Camp, Sinamatella and Robins.
Transit Campsite	These sites only to be used for two nights maximum as they are transit camps for 4x4 trails. Can only be used after registering either at Chipinda or Mabalauta. Visitors should also check out either through a ZPWMA station or an official gate. Facilities on offer will be minimal (similar to an Exclusive Campsite) but they will be no guarantee that the user will have exclusive use. Individual sites could be discretely located a short distance away from each other.
Exclusive Campsite	Individual sites to be occupied a maximum of 10 people. Long-drop toilet provided. Braai site comprising of a metal stand with fire place. All litter to be removed and bags provided from reception. Wood to be purchased at collection points. Exclusive campsites will be more expensive than the developed campsites. Visitors will be paying for the exclusivity rather than for site developments. Maximum stay 21 days (specified in the general ZPWMA Regulations). A minimum of five people needs to paid for. For example, if only two people use the site, they still need to pay for five people
Bushcamp	These are only in the Wilderness Zones. Recommended that there are four in Pombadzi and five in Guluene. Site identified but no facilities available. User to bring and remove everything, including all litter. Chemical toilets to be encouraged. More expensive than other campsites but differential price structure to encourage use of more remote areas. Only to be occupied for a maximum of 10 days by registered operators and their clients or by members of the general public on application. Maximum number of guests is set to 10.

4.5 CURRENT TOURISM

The tourism product can be broadly separated into two parts – inside and outside the park.

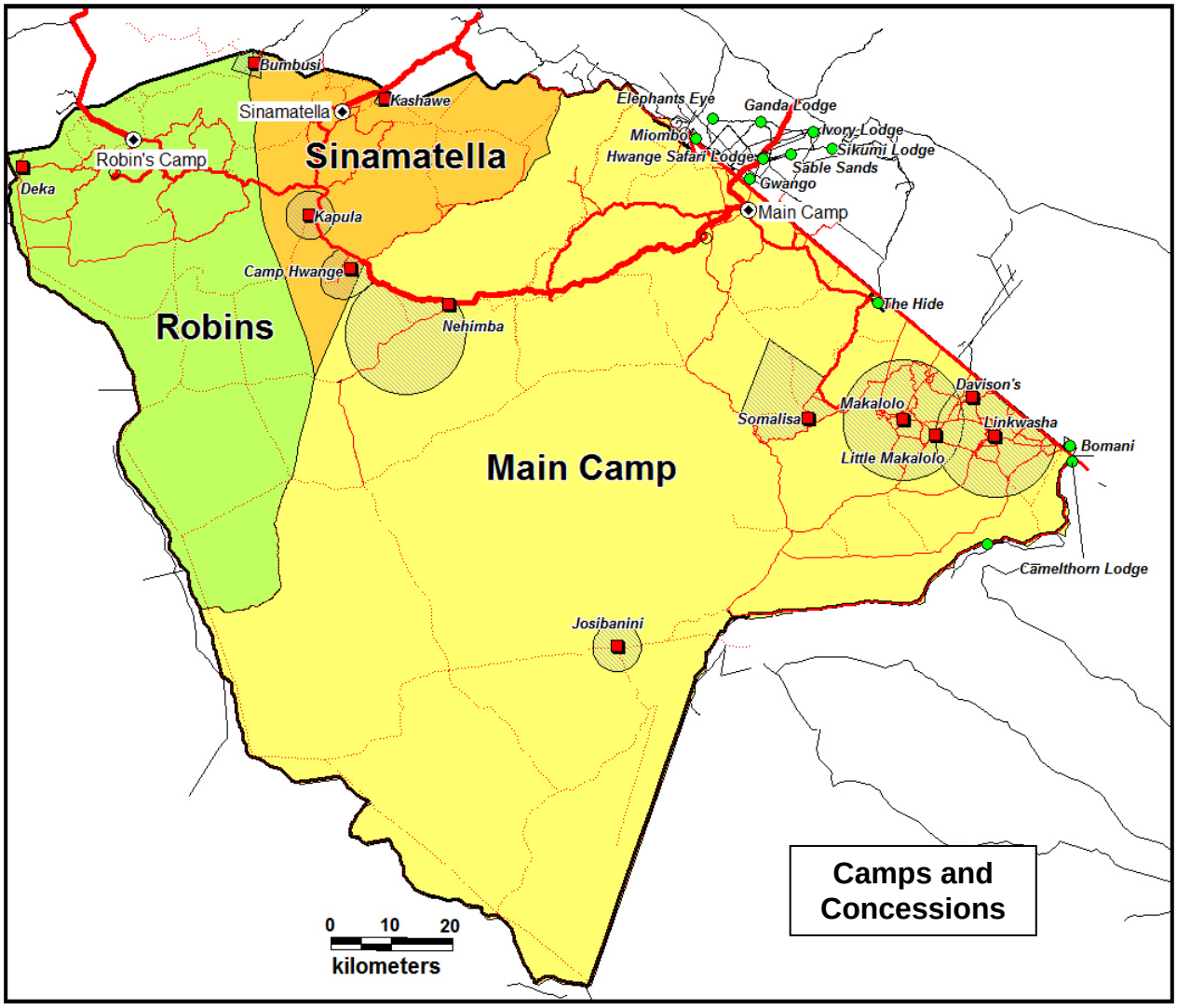
4.5.1 Facilities Inside The Park

There is a variety of tourism accommodation facilities inside the park, ranging from bush camping up to high-end lodges and camps.

Table 51: Tourism accommodation facilities inside the park

	Level	Description
Camping	Bushcamps	These are designated sites in the Sinamatella area with no facilities (long drop). They can be booked exclusively for up to xx days continuous use. Of the five sites, two or three are popular while the rest are little used. They are mainly along the Lukosi river. In addition two sites have been opened up near Main Camp – Manga 3 and Kennedy 2).
	Exclusive Camps	These are the picnic sites at which exclusive overnight camping is permitted. However, during the day the site may be used by other visitors. All sites are attended and have water, showers and toilets. Some have shelters and cooking areas. These sites are very popular and are fully booked during the season (mainly coinciding with school holidays, both South African and Zimbabwean). Sites can be booked for xx consecutive nights with up to xx people and x vehicles.
	Developed Camps	These are the ZPWMA campsites found at the three area management headquarters – Main Camp, Sinamatella and Robins. Water and ablutions are provided. There are shelters as well.
Accommodated	Self Catering	Self-catering accommodation is found at all three area management headquarters. These are of three different categories (not found at all sites – Lodges, Chalets and Cottages). All of these facilities are run and maintained by parks. Additional accommodation facilities run by ZPWMA are found at Nantwich but these are currently not functioning.
	Leased	The ZPWMA leases out some of its facilities to private sector. These include Bumboosi and Deka Camp. Deka Camp is currently not operational
	Private Sector	There are nine main private sector camps on concessions of varying sizes in the park (Giraffe Spring was recently relinquished and removed). These camps provide an up-market catered experience in Hwange. Prices range from $80 to $700. All camps are permitted to carry out extra activities (such as night drives and escorted walking on their concession areas).

Figure 139: Tourist camps, campsites and concessions inside Hwange



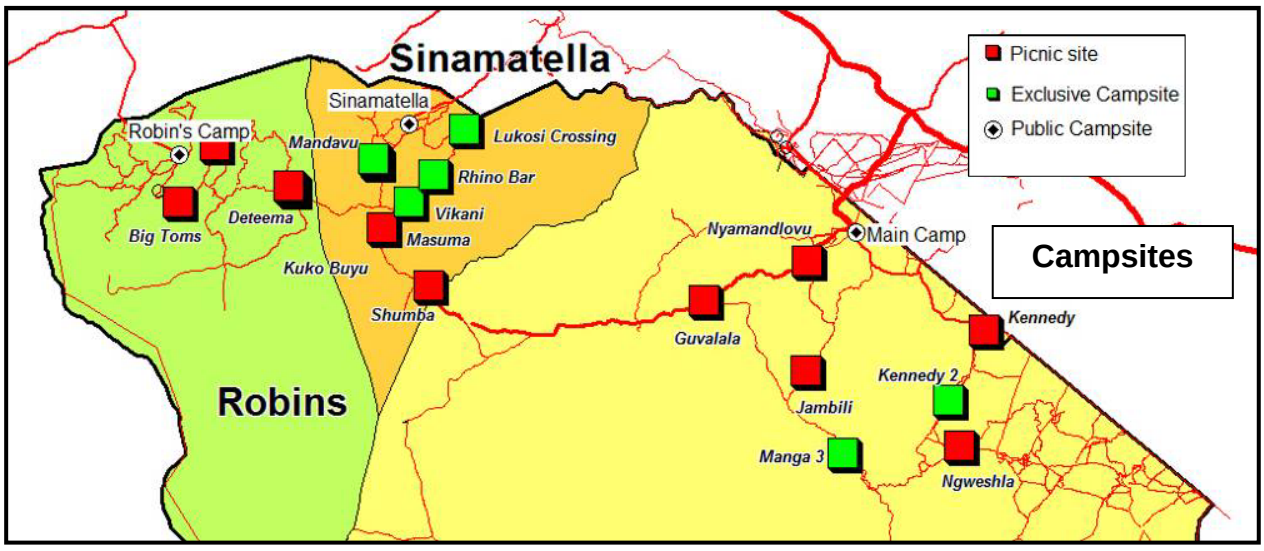
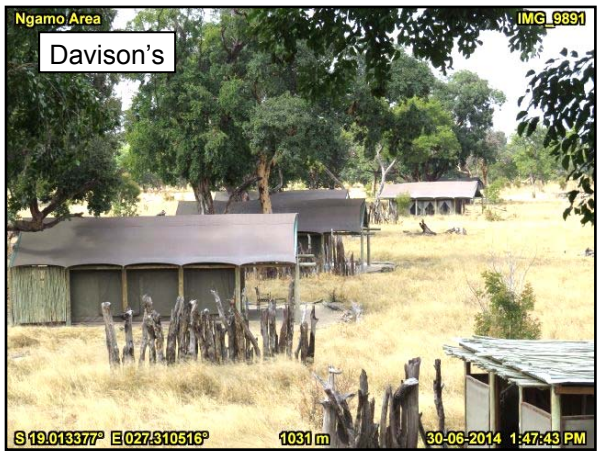
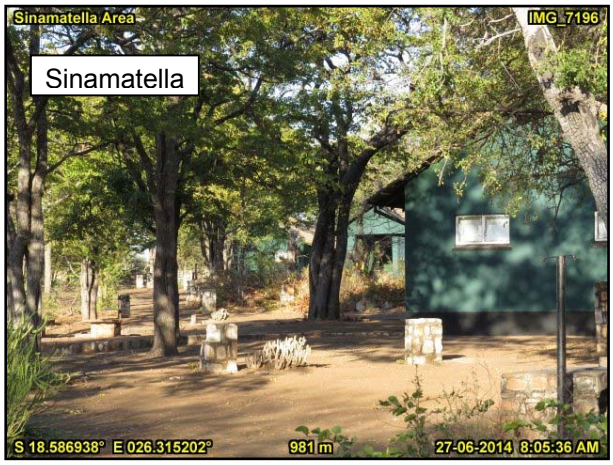
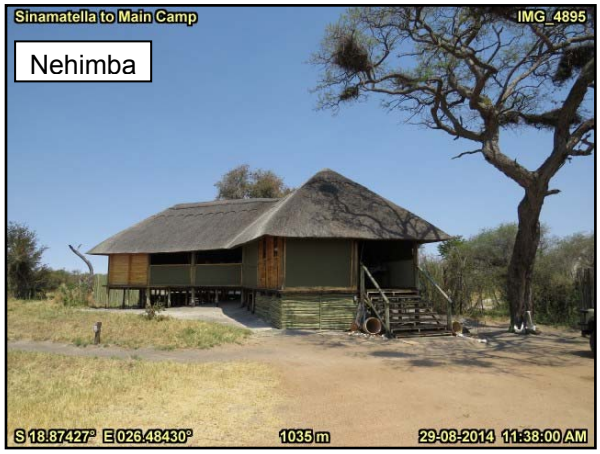
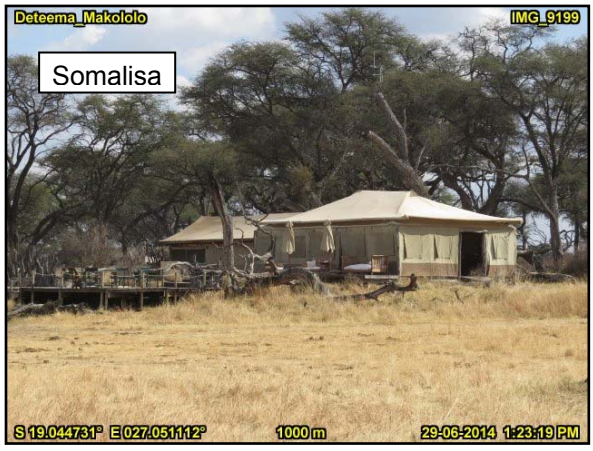


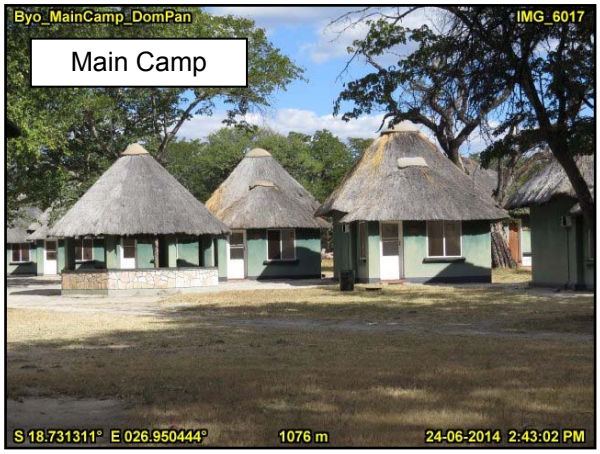
Figure 140: Hwange Accommodation











4.5.1.2 Tourism Concessions

The ZPWMA have leased out a number of concessions for tourism development in the park. The first of these (Makololo) was put out to tender in 1997 and then followed by the Linkwasha concession. Both of these are now leased by Wilderness Safaris who have opened two camps in each area. Since 2006 seven more concessions have been issued on "open land" (i.e. areas that have not had any previous tourism while another has been issued for the private sector operation of a Parks facility. The sizes and or these concessions are highly variable ranging from $2,500 to nearly $50,000 per annum. However all are on a fixed fee only. Visitor entries are paid to the park and there are no variable incentives to maximise visitation. One owner-built camp is a self-catering establishment.

All concessions have an exclusive area ranging from 5 km^2 to over 300 km^2. No other visitors are permitted in these areas and the concession holder may have the right to conduct walking safaris, night drives and other specified activities. The areas of the concession appear to be unclear in some cases. Leases will state a km radius from a certain point but this seems to be amended in some cases to take cognisance of general tourist roads.

Table 52: Lease details for private sector camps inside Hwange

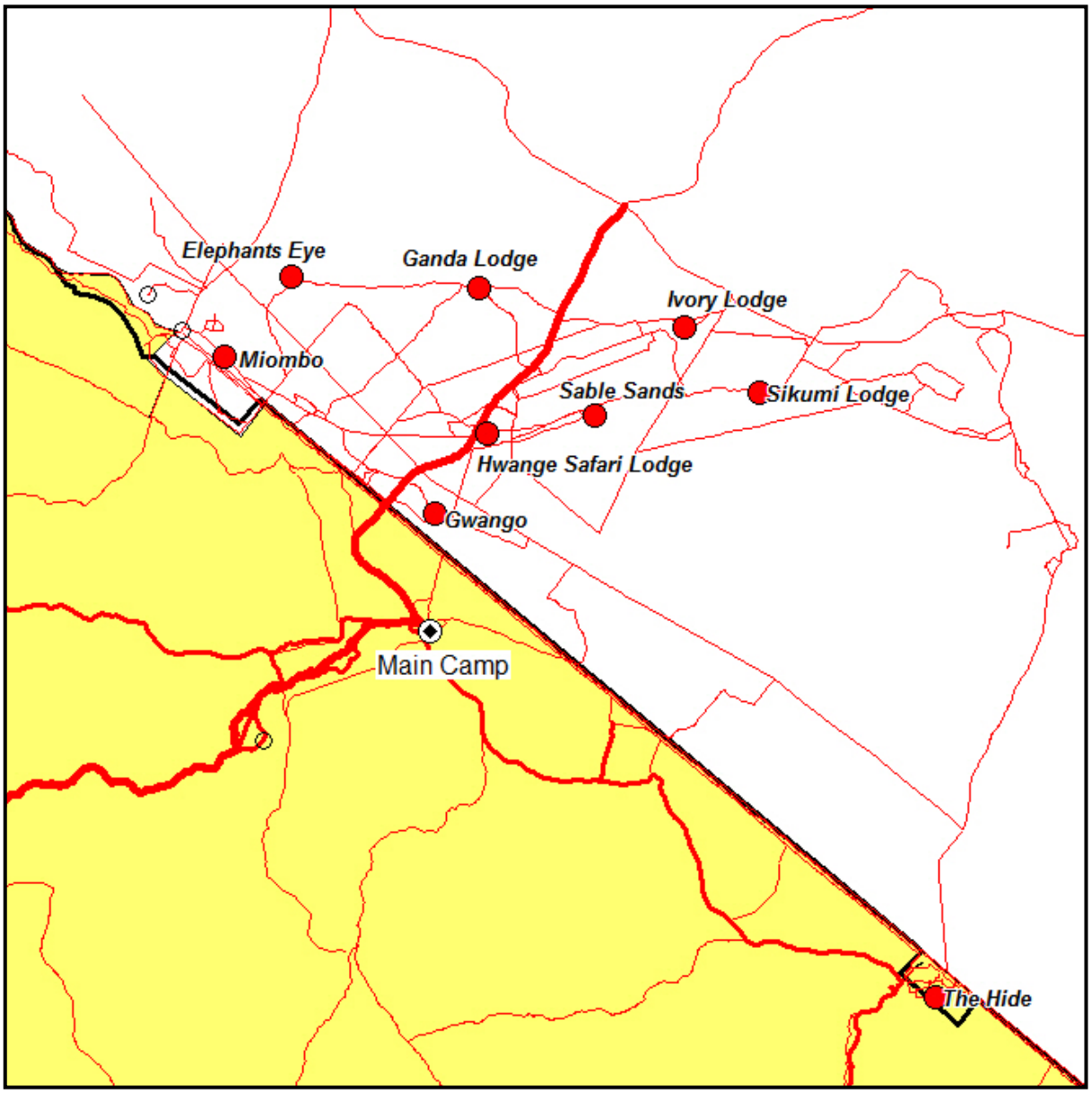
Camp	Operator	Lease	Fee US$	Area	Comments
Makololo	Wilderness	2009-2014	20,000	10 km radius each 533 km^2 (for both)	Centred on Makololo Pan
Little Makololo					
Linkwasha	Wilderness	2009-2014	20,000		Centred on Linkwasha Pan
Davisons					
Kashawe	Wilderness	2012-2017	20,000	1 km radius 6 km^2	
Giraffe Springs	Wilderness	2009-2014	7,000	1-2 km radius	Closed
Nehimba	Nehimba	2010-2019	36,000	7.5 km radius 278 km^2	Centred on Nehimba Seeps. Stops at Main Road
Camp Hwange	Relax Net Safaris	2011-2020	25,000	5 km radius 50 km^2	Stops at Main Road
Somalisa	Beks Safaris ?	2006-2015	12,000	7.5 km radius 156 km^2	Pear shaped rather than a circle. Avoids public road
Kapula	Winterswijck	2009-2034	2,500 *+2% gross*	4 km radius 36 km^2	No data
Deka	Out to tender				Parks Infrastructure
Bumboosie	Kaikora Trading	2006-2015	3,194	2 km radius? 20 km^2 ?	Parks Infrastructure
Josivanini	Imvelo Safaris			2 km radius? 20 km^2 ?	Old lease recently reactivated

4.5.2 Facilities Outside the Park

Most of the tourism facilities feeding Hwange Park are located in the Main Camp Area. As mentioned in section 1.3 there has been a significant reduction in operational lodges since the 1980s and 1990s. However, it is likely that bed count outside Hwange will continue to rise at lodges are resuscitated and new ones come on line, economic and political aspects remaining favourable.

In the main camp area there are over 200 beds available, 50% of them at the Hwange Safari Lodge (Figure 141).

Figure 141: Camps in the vicinity of Main Camp



In addition to the camps depicted above there are also camps in the south, in the vicinity of the Ngamo pans. Two of these are notable in that they are on communal land. All other camps that are outside Hwange at present are on Forestry Estate, alienated or state land, with little scope for meaningful community participation.

Figure 142: Camps outside Hwange

4.5.3 Tourism in Community Areas

The only areas adjacent to the park where there is a possibility for community tourism are along the eastern/southern boundary with the Tsholotsho Communal Land. This is because, in Zimbabwe, the rest of the park abuts onto Parks and Wildlife Estate Land, the Forestry Estate or onto alienated and State Land.

Currently both safari hunting and photographic tourism is taking place in the Tsholotsho Communal Land.

4.5.4 Beds Available

There are over 800 beds available inside the park and in close proximity to its boundaries. The ZPWMA has over 200 beds available spread over three camps. However, this does not include the camping sites, both public and picnic, which are popular forms of accommodation in Hwange.

Table 53: Current tourism beds available in the Hwange area

Camps Inside		**Camps Outside**		**ZPWMA**	
Camp	**Beds**	**Camp**	**Beds**	**Camp**	**Beds**
Makololo	18	Elephants Eye	16	Main Camp	116
Little Makololo	12	Sable Sands	32	Sinamatella	30
Linkwasha	18	Ivory Lodge	20	Robins	74
Davisons	20	The Hide	40		
Kashawe	36	Miombo	20		
Nehimba	19	Hwange Safari Lodge	200		
Camp Hwange	16	Bomani	18		
Kapula	16	Camelthorn	16		
Somalisa	20	Gwango	16		
Bumboosie	12	Sikumi	30		
Josivanini	24				
Totals	**187**		**408**		**220**

4.5.5 Activities

There are a number of activities available to tourists in Hwange (Table 54). Some of these are limited to the concession areas (night drives, some walking). However the main activity type is either game drives or waiting at hides situated at waterholes for wildlife to come and drink. The state and extent of the road system can lead to congestion at prime sites, especially in the vicinity of Main Camp.

Table 54: Tourism activities permitted inside the park

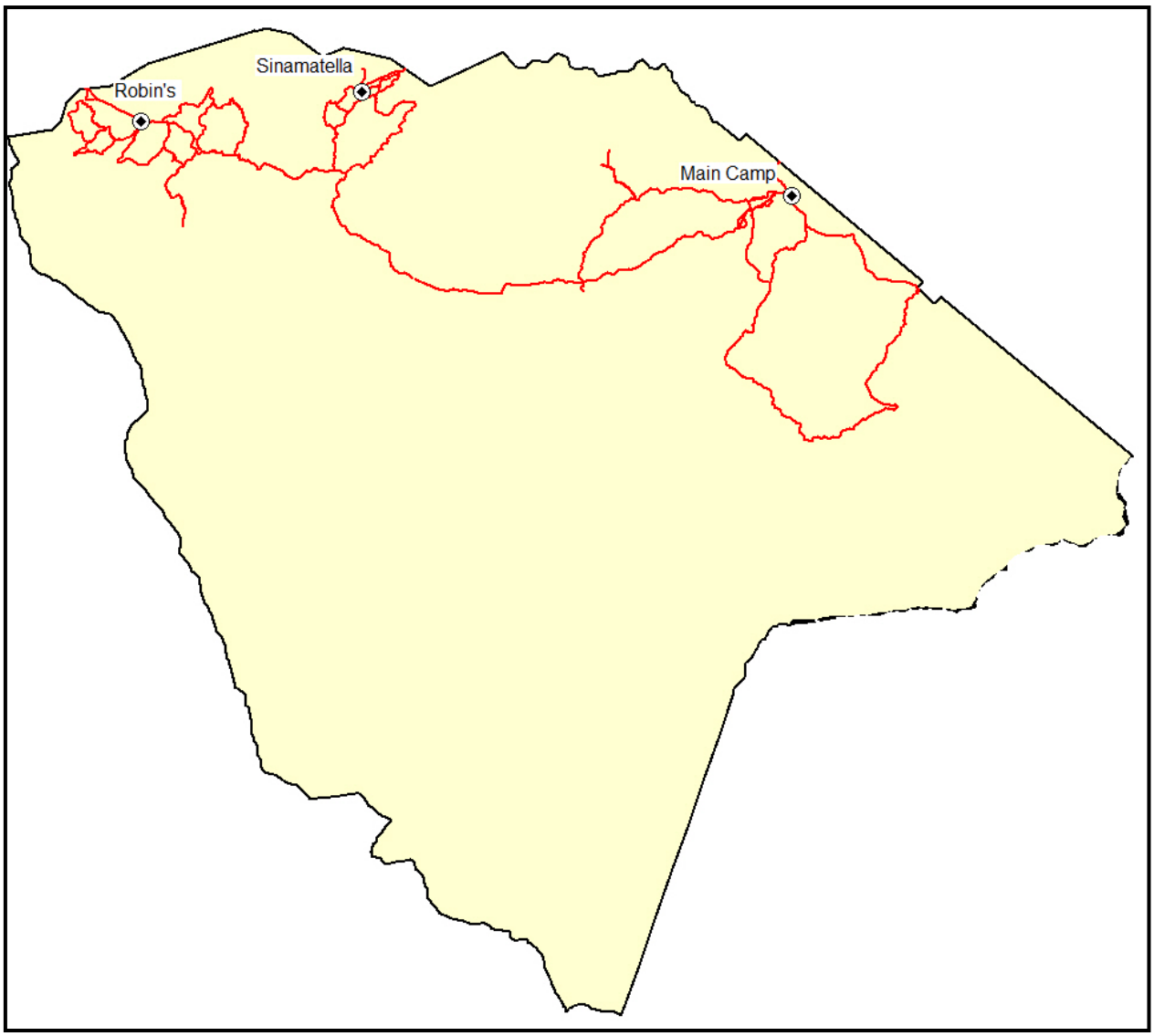
Level	Description
Game Drives	Game drives using open vehicles is the standard tourist experience in national parks in Africa and Hwange is no exception.
Game Viewing from Hides	ZPWMA has several hides and platforms for game viewing at pumped pans and dams. These are at o Nyamandlovu o Guvalala o Little Toms o Big Toms o Shumba o Deteema o Mandavu o Masuma
Camping and Picnicking	In addition to the hides picnicking is permitted at the following sites o Kennedy 1 o Ngweshla o Jambili o Masuna o Shumba o Mandavu
Night Drives	Night drives are permitted in private concessions within the park and on other land adjacent to the park
Walking with guides	Currently escorted walking with a registered professional guide or a ZPWMA ranger is permitted almost anywhere in the park.
Exclusive Camping	Overnight camping is permitted at the following sites Rhino Bar Vikani Mandavu Dam Lukosi Crossing Kennedy 2 Manga 3
Horse Safaris	No longer on offer within the park

There are currently five main entry points for tourists into the park. These are at Mpofu (Main Camp), Sinamatella (Mbala), Robins (Nantwich), Kennedy and Ngamo. Although there are other gates in the south they are not really used by tourists. In the peak tourism years during the 1990s there were gates at Chokamella, Dete and Umtshibi. However, these are no longer operational.

4.5.6 Tourist Roads

Although there is a general perception that most of the park is off-limits to the general tourist this is nowhere formalised. Of course many roads will be closed to self-drive tourists if they do not have 4x4 vehicle but as a significant number visit in tour company 4x4 vehicles or in their own there needs to be some clarity on the roads.

Figure 143: First cut at a tourist road map
Based on the old Park map currently distributed by WEZ
This represents 675 km of road



It seems likely that there are about 100km of well used roads in the vicinity of Main Camp and these take the brunt of the tourist traffic. So effectively a considerable portion of the Park income comes from this road network.

4.5.7 Signage

Signage is an ongoing problem in Hwange with many signs in a poor state of repair. Design of signs is important as many have been demolished or moved by elephants and the problem has never been satisfactorily resolved. It should be stated that sign condition and state of repair is quite good close to the stations but deteriorates with distance. Also, in general, given that many signs are not maintained, the sign system works and it is difficult to get lost in the main tourist area.

Tall signs are used as scratching posts and have a short life, concrete blocks placed on the ground get moved, small signs get demolished and the list goes on…..

The ideal sign still needs to be designed for Hwange.

Figure 144 : Signage in Hwange

4.5.8 Waste Management

Waste management from ZPWMA facilities needs some attention. All picnic sites have open rubbish pits. Some of these are collected and returned to the station. But then this material joins the larger station open rubbish pit. In campsites many bins (which encourage tourists to deposit rubbish) have no bottoms. Clearly the system needs some attention and with regard to picnic sites visitors should remove their rubbish out of the park.

Private camps are obligated to burn combustible rubbish and remove non-combustible rubbish to a designated municipal dump.

Figure 145: Hwange rubbish dumps

4.5.9 Wood Management

All ZPWMA tourism facilities use wood for heating water. This is a historical anomaly and the Authority should be considering moving away for use of the Park's natural resources for heating water. Although efforts have been made at Sinamatella to use more efficient wood boilers, those at Main Camp and Robins are very wasteful.

Private camps are expected to move towards the use of gas or electricity to heat water and this is usually part of their commitment to a "green footprint" which can used in marketing.

Wood is provided for sale to campers for aesthetic and cooking purposes.

Figure 146: Wood use in Hwange

1.5.10 Rules and Regulations

The current rules and regulations are shown below. In addition, the general rules and regulations pertaining to wildlife and protected areas, as outlined in Act, also apply.

HWANGE NP – RULES AND REGULATIONS

The Hwange National Park is a nature reserve of considerable beauty and national pride. For you to continue to enjoy your visits, we ask that you please observe these regulations and, above all, help us keep the park clean

- For your safety stay on the road and in your vehicle at all times
- Please do not feed animals of birds
- Camp at designated sites only
- Do not use scooters or motorbikes in the park
- The carriage of weapons, explosives or poisons is prohibited
- Please do not disturb animals by making unnecessary noise
- Removal of any plant or animal samples is prohibited
- Do not pollute water sources
- Bringing pets into the park is prohibited
- Please do not damage or remove state property
- Political and public meetings are prohibited
- Do not place advertising material within the park
- Flying aircraft at less than 150m above the ground is not permitted
- For your convenience you are advised to claim booked accommodation by 5:30 on the day of your arrival as it may after that time be reallocated.

4.5.11 Market Position

How does Hwange sit in the general tourism market in southern Africa?

Table 55: Pricing structure for Hwange ZPWMA accommodation					
Roofed Accommodation			**Camping**		
	Local $	Forex $		Local $	Forex $
Lodges	50/75	75/100	Public Sites	10	15
Chalets	40/50	60/75	Picnic Sites	115	150
Cottages	20/40	35/60	Platforms		

Table 56: Pricing structure for Hwange private sector camps			
Camps Inside		**Camps Outside**	
Camp	**Price Bracket (p.p sharing)**	**Camp**	**Price Bracket (p.p sharing)**
Makololo	Packages	Bomani	$295 (Average)
Little Makololo	Nov-Jan = $481 June-Oct = $752	Sable Sands	$340 (per room; No activities)
Linkwasha	June-Oct = $875 Nov-Dec = $550	Sikumi	
Davisons	Nov-Jan = $415 June-Oct = $596	Miombo	$170 (All Activities)
Kashawe	Packages	Ganda	$110 (No Activities)
Nehimba	$500	Ivory (All Activities)	Green: $275 High: $300
Camp Hwange	June-Oct = $495 Nov-Dec = $360	Hwange Safari	$400 (1 Activity)
Somalisa	Green: $365 Shoulder: $415 High: $595	Elephants Eye	Green: $290 High: $395
Kapula North *	Apr-Sept = $80 Oct-March = $70	The Hide	Green: $375 High: $460
Kapula South *	Apr-Sept = $40 Oct-March = $35		

Notes

* These prices put these camps in direct competition with ZPWMA accommodation.
Green = Jan-March and December
Shoulder = April-June and November
High = July to October

4.5.12 Administration of Tourism

In the normal course of events all bookings are run through the central booking offices in Harare and Bulawayo. Ideally all clients book accommodation (roofed and camping) at these offices and this information is relayed on a daily basis to the park.

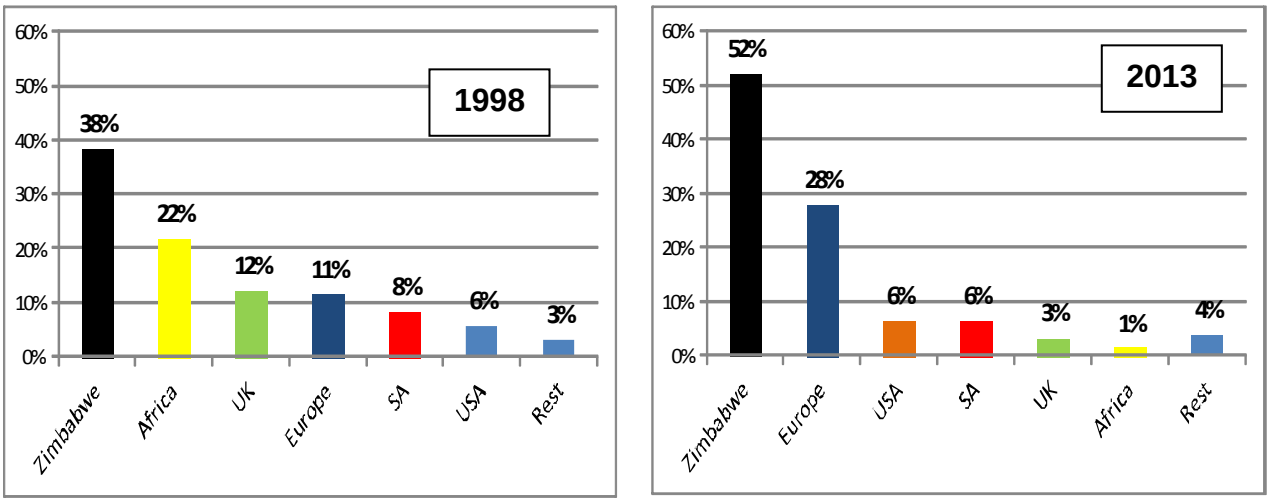
There is a general belief that system is flawed and is a significant point of leakage of park income. It is interesting to note that the first formal plan in 1989 said that the booking system needed to be improved!

4.6 VISITOR ANALYSIS

The data recording systems for tourism varied in quality and quantity between the three management areas. In some it was easy to access data which had been stored on computer. In others we had to rely on transcribing data from photocopied sheets. So the following analysis may be compromised by these shortfalls, making direct comparisons sometimes difficult. In some cases the monthly records did not match the annual records. On average Main Camp captured 80% of the entries, Sinamatella 15% and Robins 20%.

In 2013 just over 50% of entries were Zimbabwean, followed by 30% from Europe. The remaining 20% were from other regions, including South Africa, the USA and the United Kingdom. Interestingly, the percentage of Zimbabweans visiting had increased from a similar analysis done in 1998 (Figure 147).

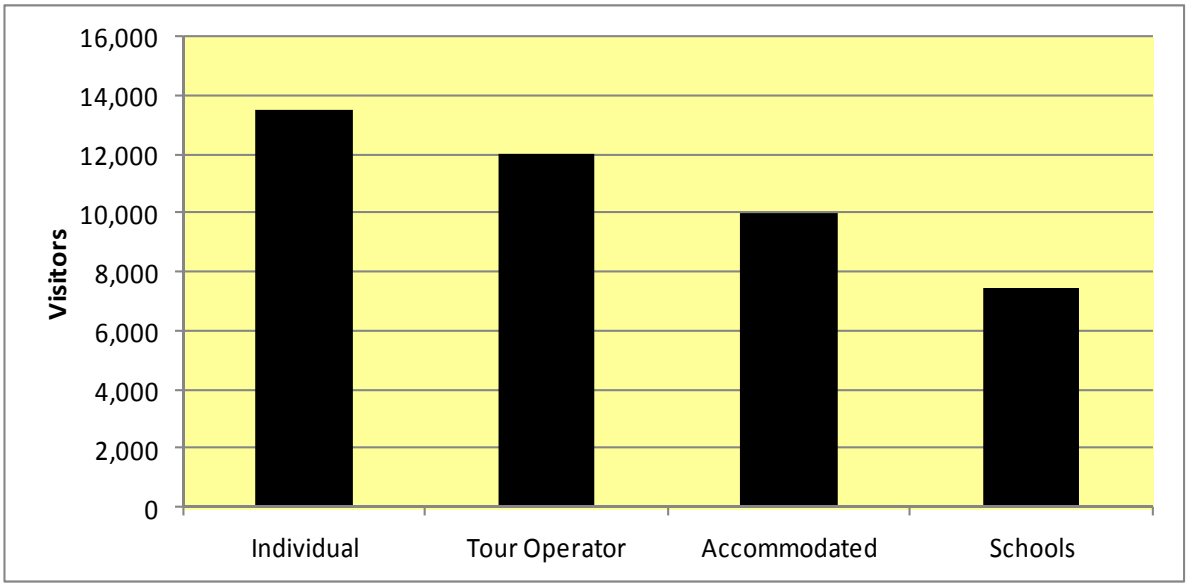
Figure 147: Source of visitors to Hwange



4.6.1 Main Camp Data

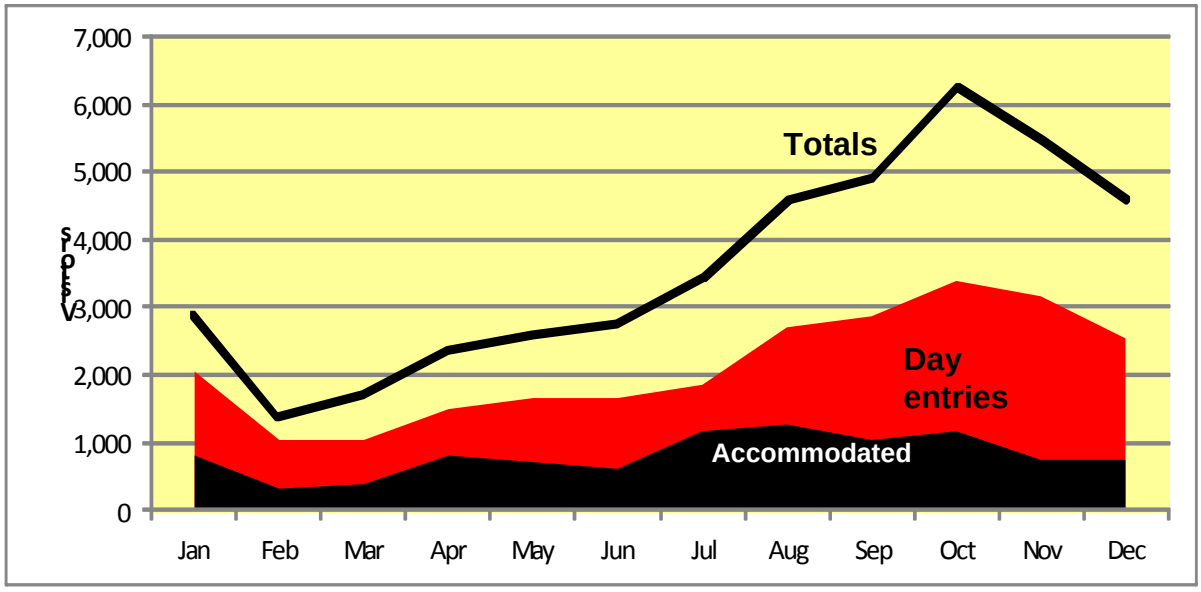
In 2013 almost 43,000 entries were recorded at Main Camp. Individual, self-drive visitors, made up 31% of this with tour operator entries (I assume both from outside lodges and those staying at the internal private camps) making up 28%. However, if one assumes that those who were accommodated were also self-drive individual visitors, it means that 54% of visitors to the park were self-drives. School visitors accounted for 11% of the total.

Figure 148: Numbers of entries in different categories at Main Camp, 2013



There was a seasonal variation in the arrivals with 60% of visitors arriving between August and December (Figure 149).

Figure 149: Monthly visitor arrivals at Main Camp, 2013



Of the 43,000 visitors in 2013, 74% of these were day entries. The remaining 26% would have been accommodated in ZPWMA facilities (as these records don't tell us how may people stayed in the private sector camps) and 16% used the roofed accommodation at Main Camp, while the remaining 10% were camping (either in the Main Camp communal campsite or in the picnic sites),

A total of 10,500 visitors were accommodated at Main Camp in 2013, 55% in roofed accommodation. Percentage occupancy-wise the chalets were the most popular (46% occupancy). Unfortunately, because of the way in which the data was recorded it was not possible to determine the occupancy rates of the picnic sites as numbers of people were recorded rather than the number of nights the site was occupied. However, it has been indicated that these sites are very popular and it is difficult to get a booking during the season.

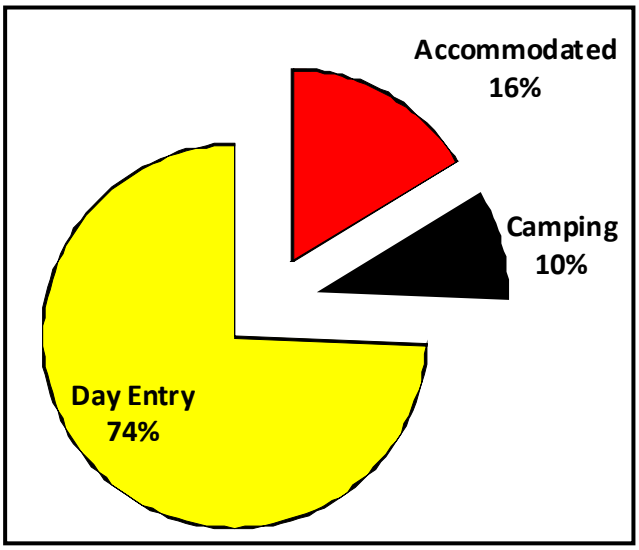
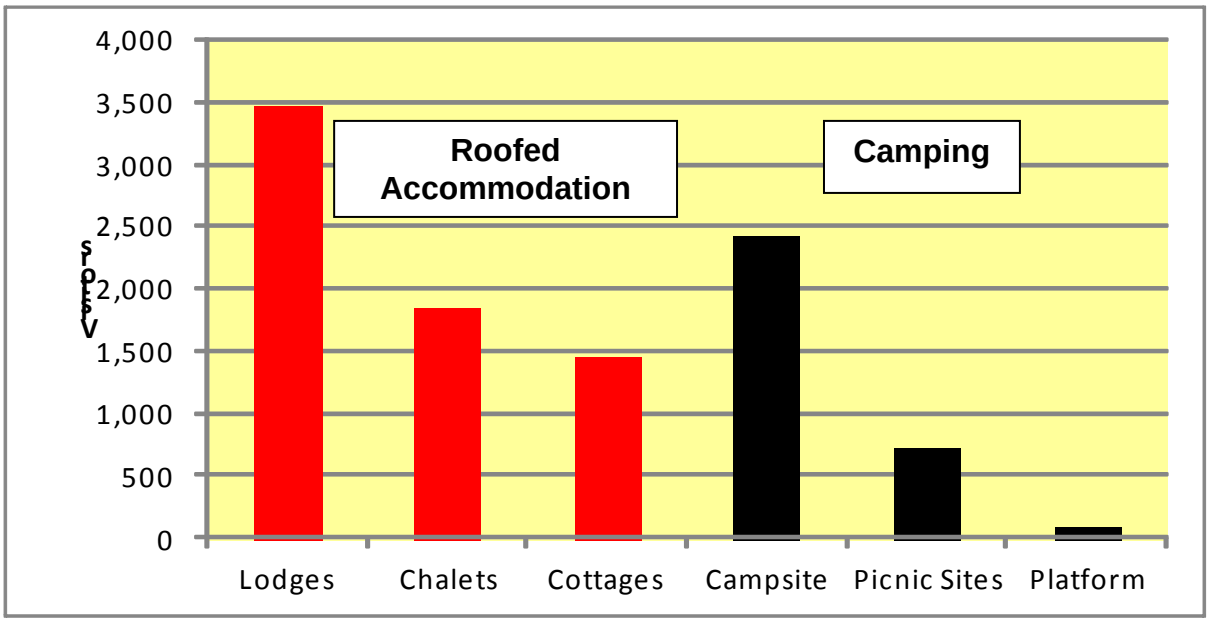


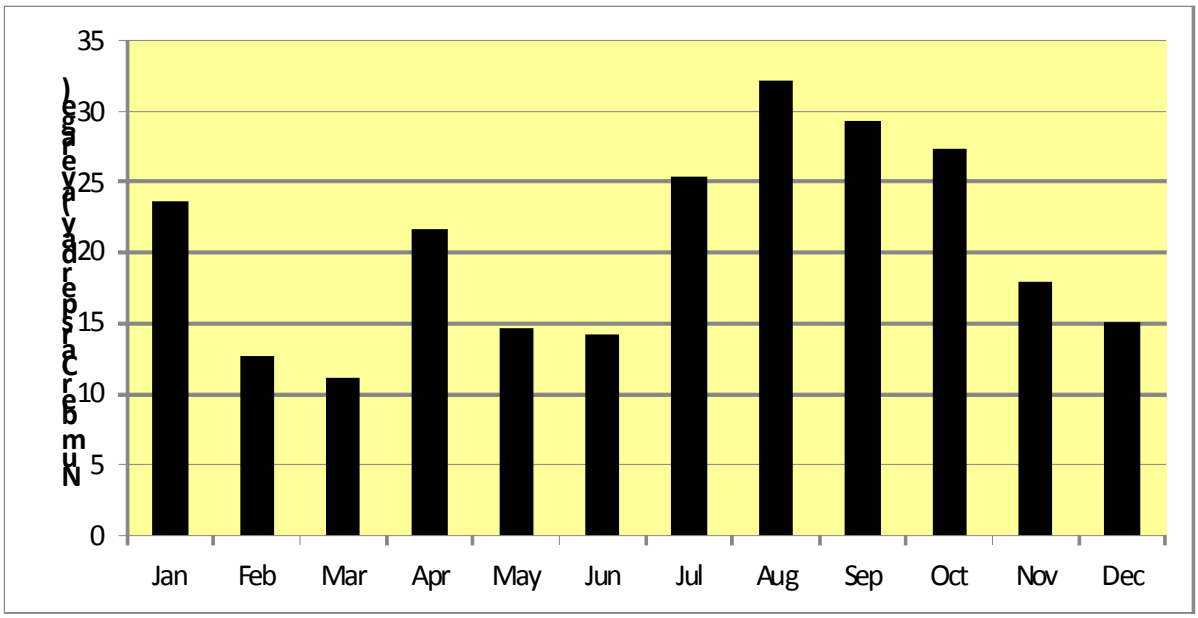
Figure 150: Numbers of people using Main Camp ZPWMA accommodation in 2013



Concerns were expressed regarding congestion and an attempt was made to reconcile the data on vehicle entries at the Main Camp gate. This showed a peak of 32 cars per day in August of 2013. Unfortunately the daily records were not available and this figure represents and average for the month.

This congestion at the gates was a real concern in the late 1990s where there were delays and people waiting to gain access as the gates opened for the early morning game drives.

Figure 151: Average number of cars per day entering at Main Camp, 2013



4.6.2 Sinamatella Data

In 2013 Sinamatella had between 6,000 and 7,000 visitors (I should note that the figures never seemed to completely match up, depending on which category was used). Almost 50% of these were Zimbabweans while a further 25% were South Africans. It seems likely that this data only includes visitors to Sinamatella Camp, and not those through Kashawe, which only opened in August, 2013. On average Sinamatella captured about 13% of entries to the park.

Over 3,000 visitors were accommodated with the majority staying in the lodges. Camping at the public camp site was also popular, as were the picnic sites where over 600 visitors were accommodated. Unfortunately the data does not allow a percentage site occupancy to be calculated. However, as with Main Camp, these are reputed to be very popular.

Figure 152: Use of accommodation in Sinamatella by visitors in 2013

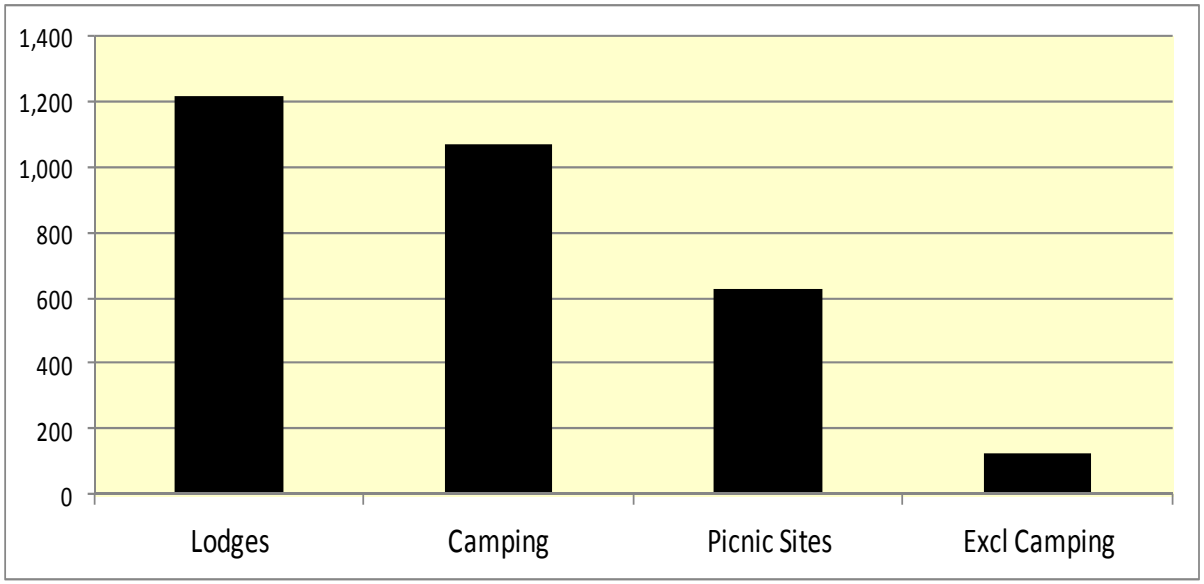
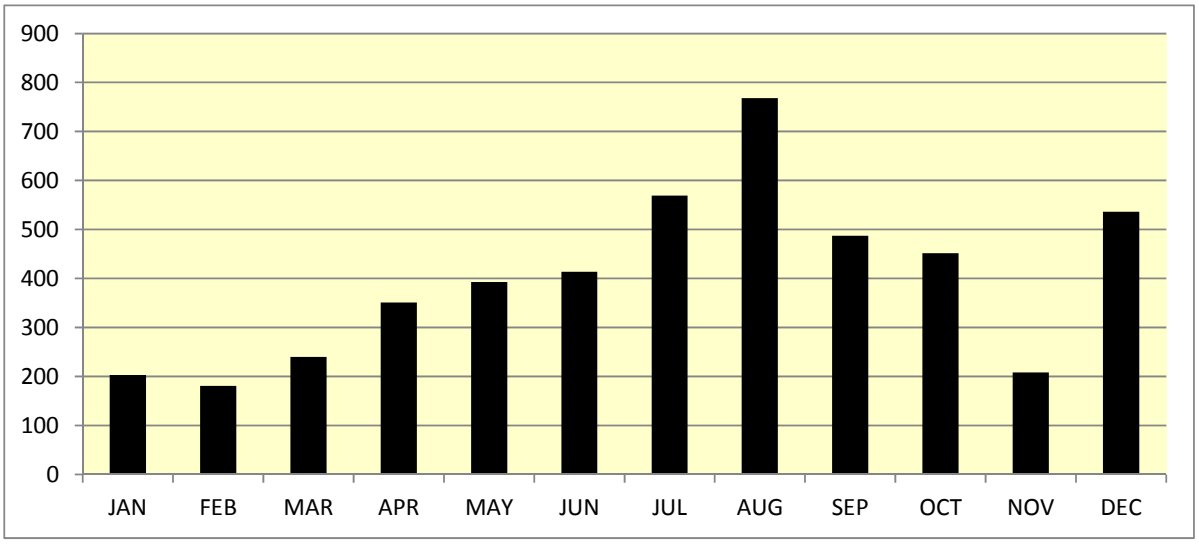


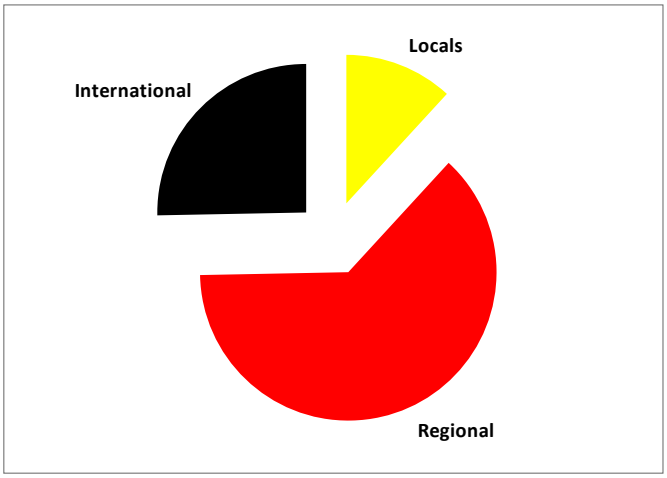
Figure 153: Monthly average number of visitors to Sinamatella (2013)



4.6.3 Robins Data

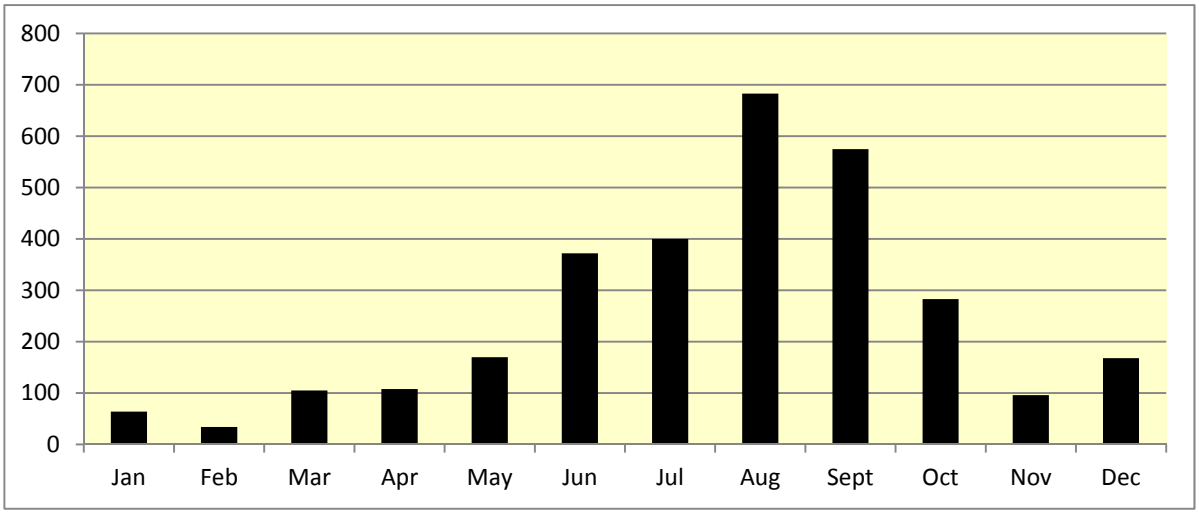
In 2013 3,058 people entered the park through the Robins/Nantwich gate. The majority of these were regional with most coming from South Africa. This represented around 6% of the visitor flow in 2013.

Figure 154: Breakdown of visitors to Robins, 2013



There was a more marked seasonal variation with visitor numbers in Robins with nearly 70% of arrivals between June and October (Figure 155). Unfortunately the data set that I received did not have details regarding use of the accommodation.

Figure 155: Monthly breakdown of visitors to Robins, 2013



4.7 INCOME FROM TOURISM

4.7.1 Fees

There are several tourism income streams. These are from daily conservation fees, vehicle entry fees, accommodation (camping and roofed) and other permits.

Entry and other fees are set legally by Parks and Wildlife Management Authority (Tariff of fees) By laws, 2014 (Table 57).

Table 57: Revenue streams from tourism

Daily Conservation Fee	All visitors need to pay a daily entry fee. Tour operator clients will be allowed re-entry in the Park on production of copies of pre-submitted lists and identification details relating to entering clients. Individual visitors who exit before the day expires will be required to pay for re-entry on the same day. o Visitors Locals $5 o Accommodated Local Visitors $3 o Visitors International $20 o Accommodation International - $10 o Visitors SADC $15 o Accommodated SADC $8				
Vehicle entry fee	Vehicle entry fees for Foreign Tours Operators pertain to entry fees into the Park for purposes of handling over clients to a local operator ONLY. Please note Foreign Operators are not allowed to operate in the Parks Estate. Local Vehicle entry fee (5 days) $5 Foreign Vehicle entry fee $10				
Camping	Public Campsites o Locals $10 o Foreigners $15 Picnic Sites/ Overnight Use/ Site o Locals $115 o Foreigners $120 *(Max 6 people, any extra to be charged US$25 per person)*. o Walk in clients (<less than 3) $25 Bush Camps and Guvalala Platform o Locals $12 o Foreigners $20				
Accommodation revenue		Larger – 4 beds		Smaller – 2 beds	
		Locals	Foreigner	Locals	Foreigner.
	Lodges	75	100	50	75
	Cottages	50	75	40	60
	Chalets	40	60	20	35
	Nantwich	75	150		
	Islwane	140	200		
Licenses	Walking Permit $600 Tour Operator Game Drive Permit $800				
Lease fees	Between $2,500 and $38,000 per annum				
Others	Fishing permits – Daily, weekly and annual (Mandavu Dam)				

4.7.2 Main Camp

According to the tourist office data, Main Camp earned just over US$ 800,000 in 2013 from visitors. July, August and September are the peak income months

Figure 156: Income to Main Camp in 2013 from entries

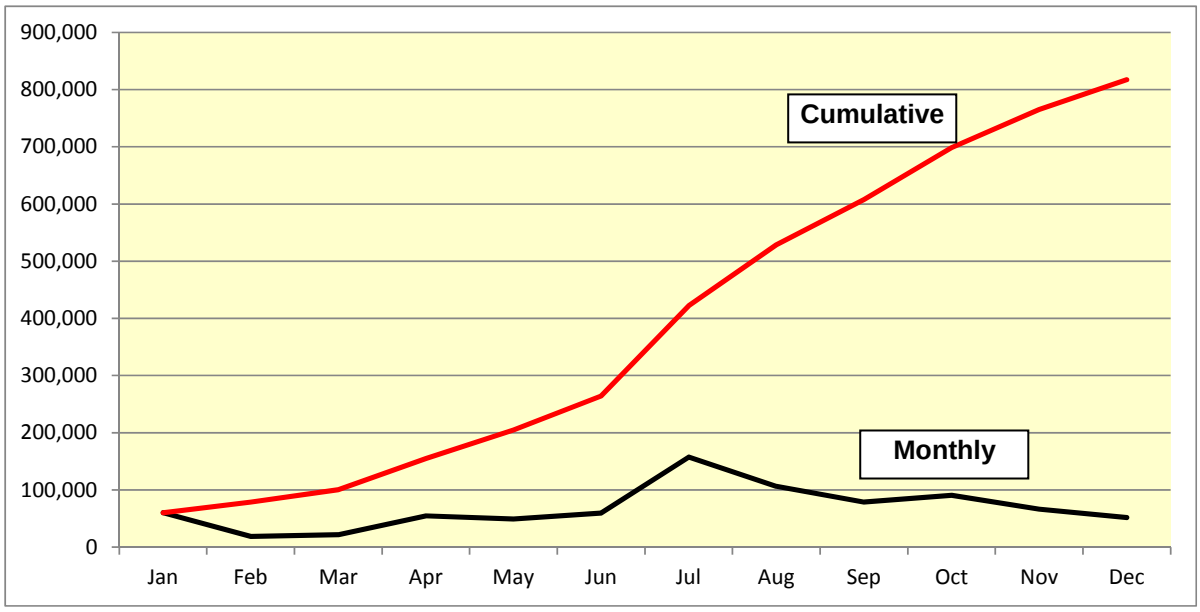
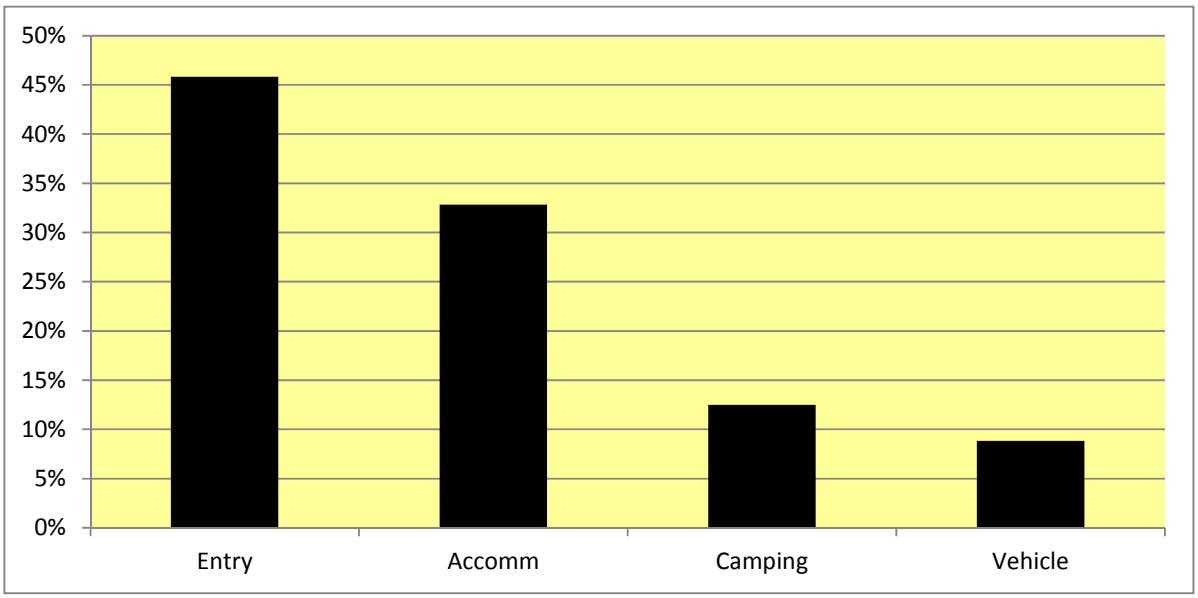
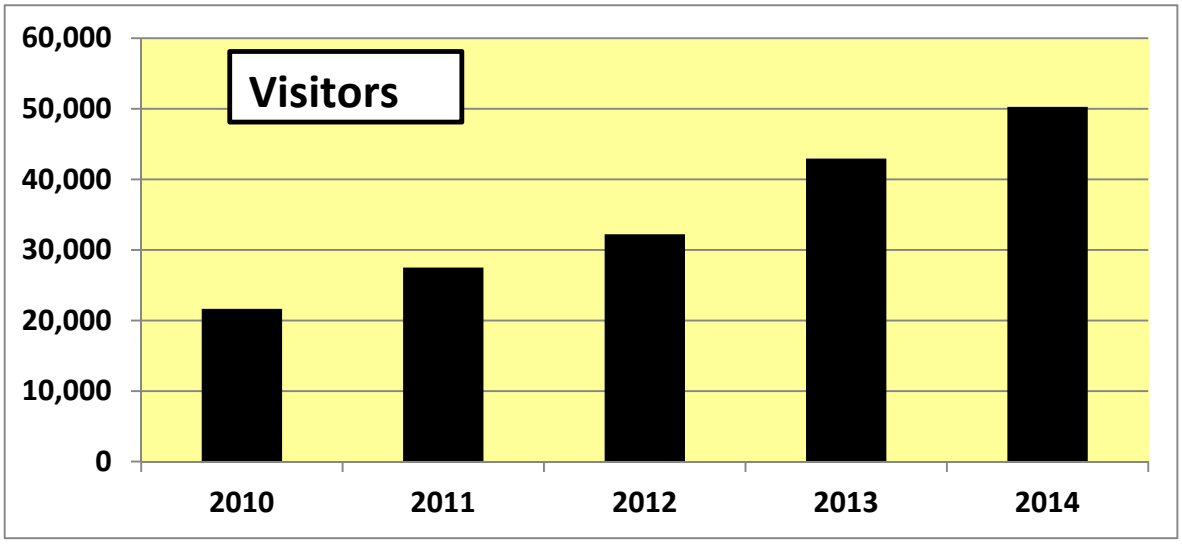


Figure 157: Percentage contributions to Main Camp Income, 2013



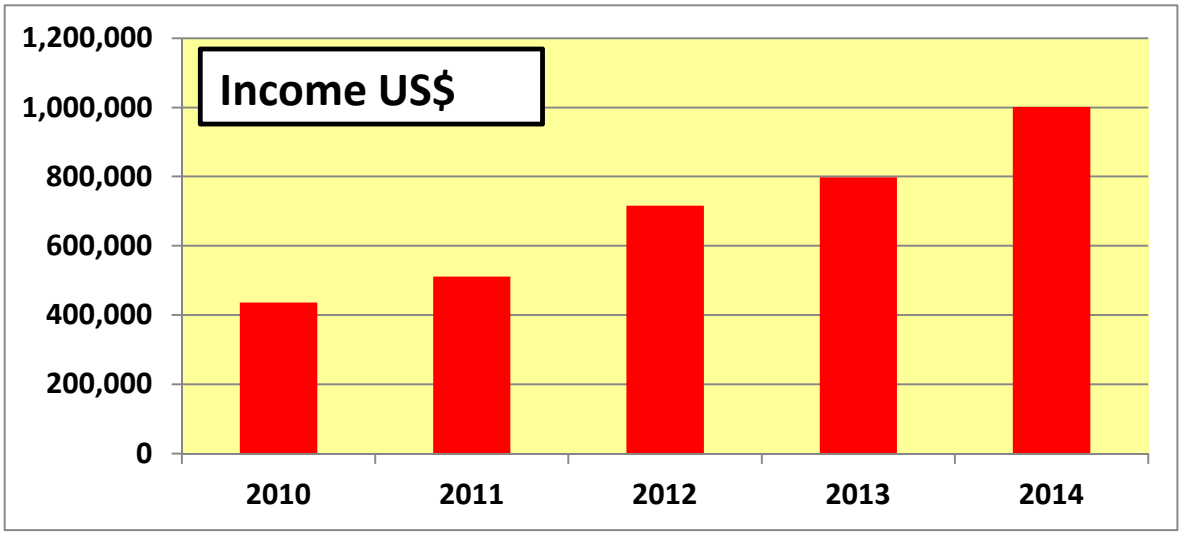
Records from Main Camp - which are borne out in discussions with operators - indicate that visitor numbers are increasing at an average of 25% per annum (2010 to 2014). Obviously this is unlikely to continue at this rate but it does show that there is increased visitation to the park. At the same time the percentage of foreigners is increasing and these pay four times as much of an entry fee than locals.

Figure 158: Main Camp visitor entries (2010 to 2014)



Obviously the income to the park is also increasing and the revenue from entry fees at Main Camp has almost trebled in the same five year period.

Figure 159: Main Camp income from visitor entries (2010 to 2014)



4.7.3 Robins Camp

In 2013 the income to Robins Camp from photographic tourism was just under $100,000 with 60% of this being made in the four months between June and September.

Figure 160: Income to Robins Camp in 2013 from entries

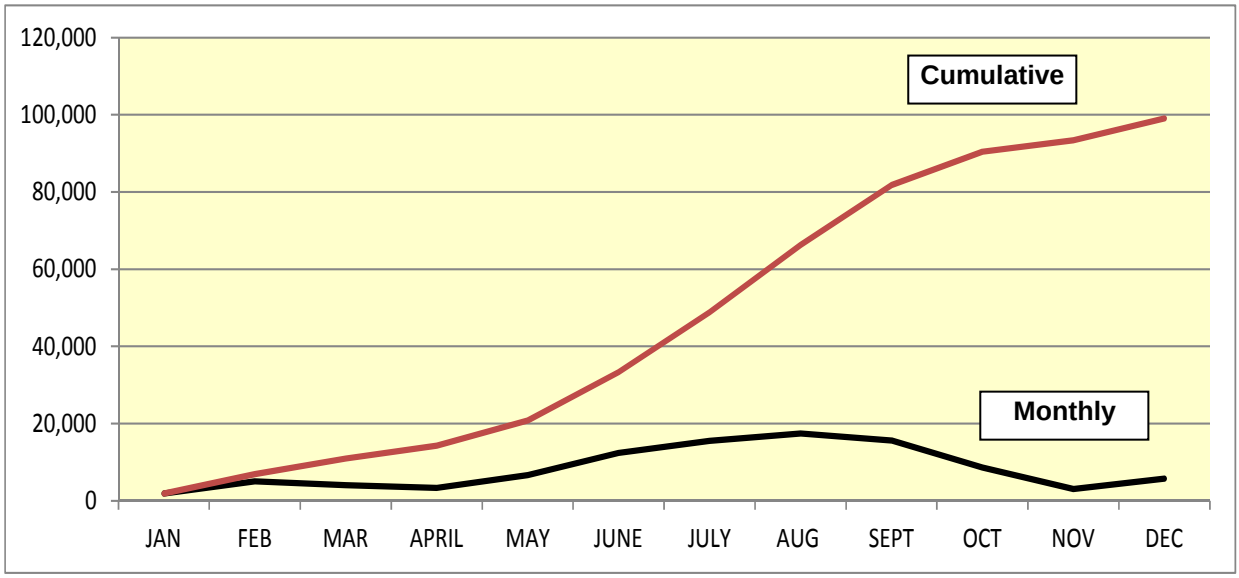
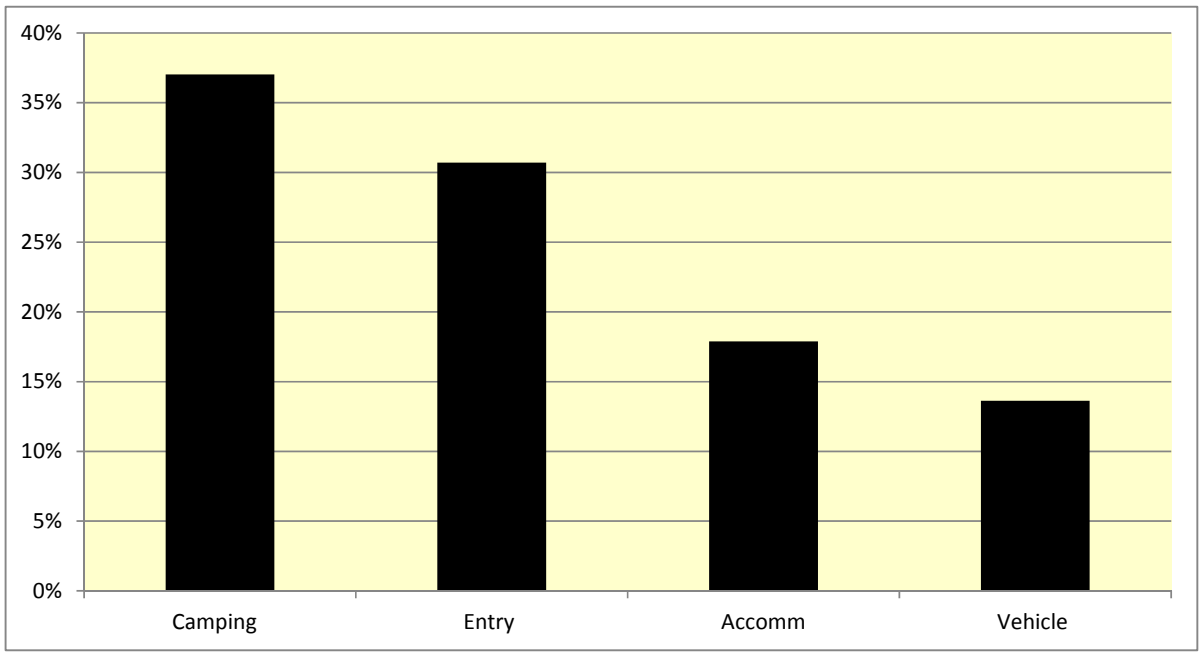


Figure 161: Percentage contributions to Robins Income, 2013



4.7.4 Sinamatella

The 2013 records from the Sinamatella office showed that the camp earned nearly $250,000.

Figure 162: Income to Sinamatella in 2013 from entries

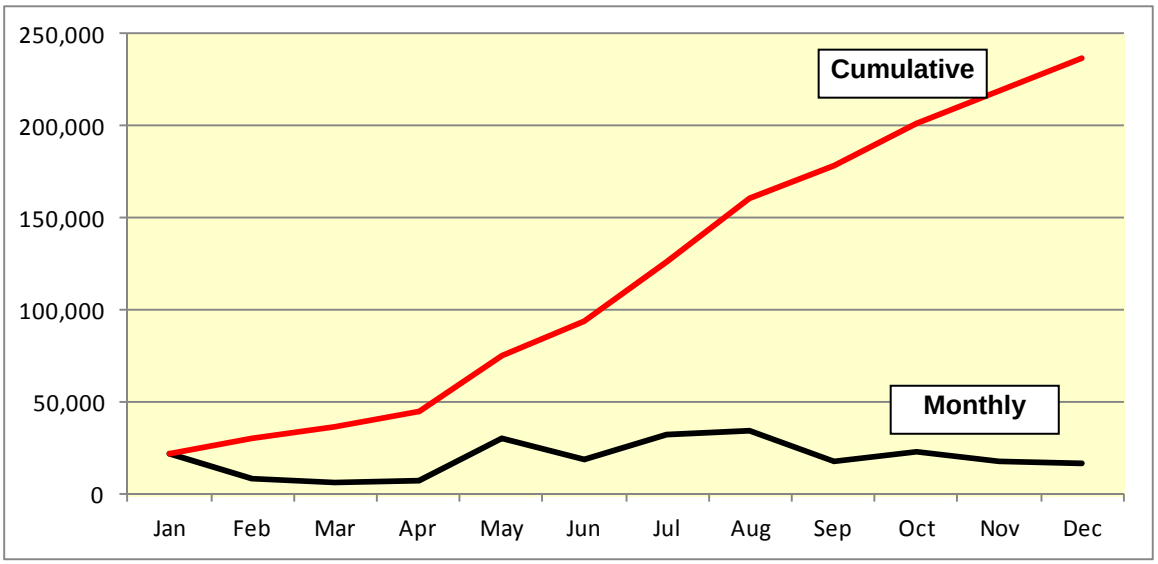
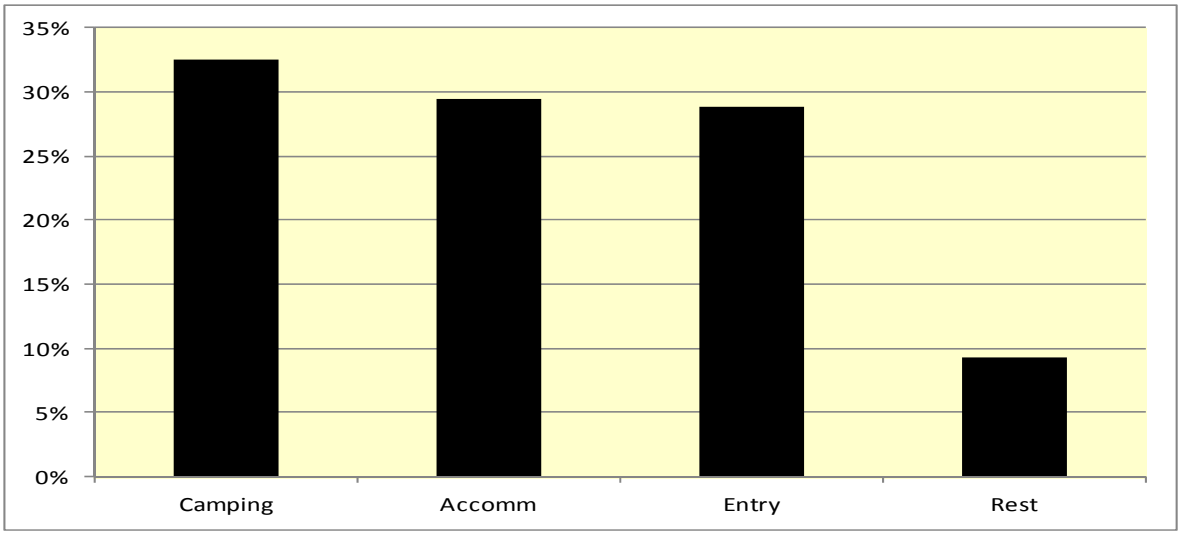


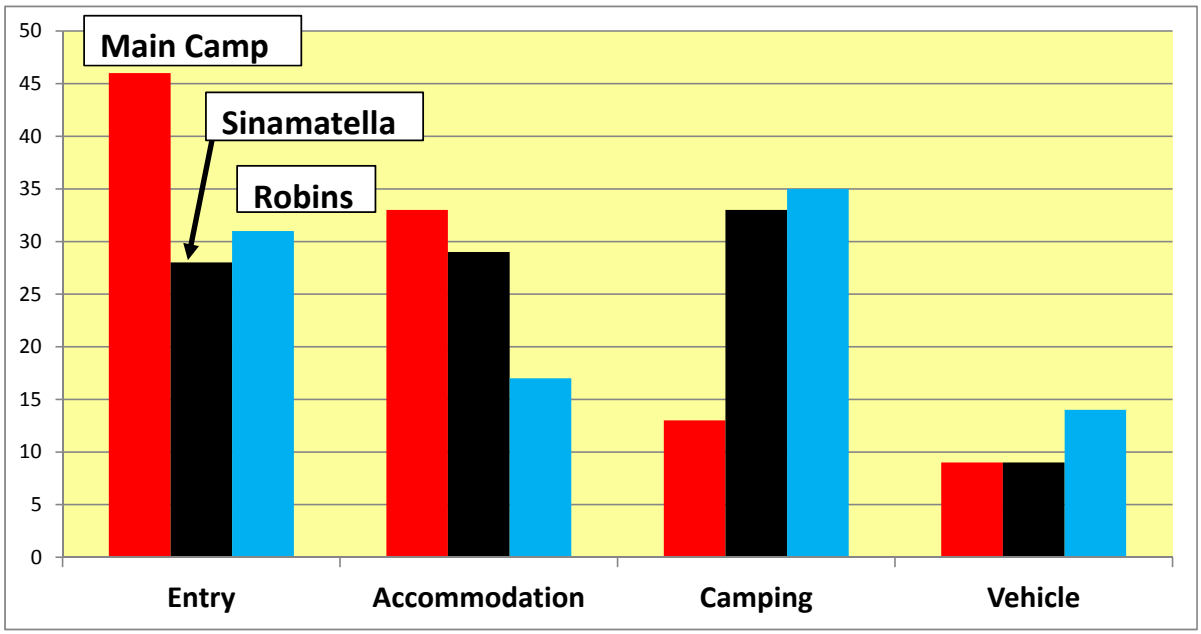
Figure 163: Percentage contributions to Sinamatella Income, 2013



4.7.5 Importance of income streams

Income from entry fees was very important to Main Camp representing 46% of the income. The most important income stream for both Sinamatella and Robins was camping (both exclusive and public) representing between 30 and 35% of the income. However this may change in Sinamatella as Kashawe Camp comes on line and increases income from daily entry fees.

Figure 164: The percentage contribution of the income streams to the three camps



4.7.6 Other Income

The restaurants, fuel and shops at the management camps were previously run by an outside concessionaire. However, with his death, these reverted to ZPWMA. Dormant for many years they have recently been resuscitated and are very successful. Starting with Main Camp they are now expanding to Robins and Sinamatella.

Other forms of income include the contentious commercialization of ration hunts where paying clients were permitted to shoot part of the ration quota for the park. Only non-trophy animals were permitted to be taken but there were complaints that the system was abused. It is not known how much this activity made for ZPWMA. Currently it seems that this activity has been curtailed and the ration quotas for the stations have been reduced.

4.7.7 Contributions From Concessions

To date there are nine exclusive leases inside the park. All of these pay an annual lease fee to ZPWMA which ranges from $2,500 to nearly $50,000. Some also pay a "right to lease" fee at longer intervals. In addition to this, the ZPWMA makes money from the daily entry fees and other permit fees (e.g. vehicles, walking, road access fees etc). Many operators also contribute to park management through road and water supply maintenance but this is not a stipulated legal requirement. Some operators will supply "capital" equipment also and this includes things such as pump donations, borehole drilling etc. Again this is not a legal requirement.

Table 58: Estimated annual income and contributions to ZPWMA from private concessions in Hwange

Due to the fluid nature of the business this table should be regarded as indicative only. In the case of Wilderness camps come on and go off line. In others the occupancy rates fluctuate. The contributions in kind fluctuate. The point of this table is to assess the value of concessions to Hwange

Concession	Lease Fee S	Other Permits $	Beds	Ave Ann. Occup. %	Entry fees to ZPWMA	TOTAL fees To ZPWMA	Ann. Cont in Kind $	Capital Contribution outside fees
Makololo	21,958	3,300	30	60	42,000	67,000	6,000	
Linkwasha	21,958	3,300	36	56	30,000	55,000	6,000	
Kashawe	20,000	3,300	36	76	52,000	75,000	6,000	
Nehimba	48,300	5,000	19	15	1,000	54,000	7,500	
Camp Hwange	31,000	4,000	16		16,000	51,000	6,000	
Somalisa	12,000		20					
Kapula	2,500		16					
Bumboosie	3.197		16					
Josivanini/Bomani	26,000					26,000	22,000	

Notes

1. *Makololo/Little Makololo summed; Linkwasha/Davison's summed*
2. *Linkwasha was closed in 2014 but considered open for this exercise*
3. *Kashawe operational in 2014 but year not completed*
4. *Kapula has an additional 2% of gross but don't know what this is*
5. *Josivanini is under construction in 2014. However this company has been pumping pans in the south of the park for past five years and is included here.*
6. *Annual contribution in kind is an estimated $ value on diesel, firebreak/road maintenance, anti-poaching assistance etc.*
7. *Once-off "capital contribution" is borehole drilling, pump purchase, airstrip or road opening etc, usually at the beginning of the lease period*
8. *Other permits includes vehicle, walking, road permits, access etc*

Table 59: Summary of estimated annual income and contributions to ZPWMA from private concessions in Hwange
It must be noted that these are estimates but based on figures given to me by operators.

Concession	Area	Years	Lease Fee $	Entry Fees	Other Contributions	Total	Km2 Income
Makololo	533 km^2	17	22,000	42,000	12,000	76,000	236
Linkwasha		17	22,000	30,000	12,000	64,000	
Kashawe	6 km^2	1	20,000	52,000	6,000	78,000	13,000
Nehimba	278 km^2	3	48,300	1,000	12,000	61,000	220
Camp Hwange	50 km^2	2	31,000	16,000	5,000	52,000	1,040
Somalisa	156 km^2	8	12,000				
Kapula	25 km^2?	5	2,500				
Totals			157,800	141,000	47,000		

Notes:

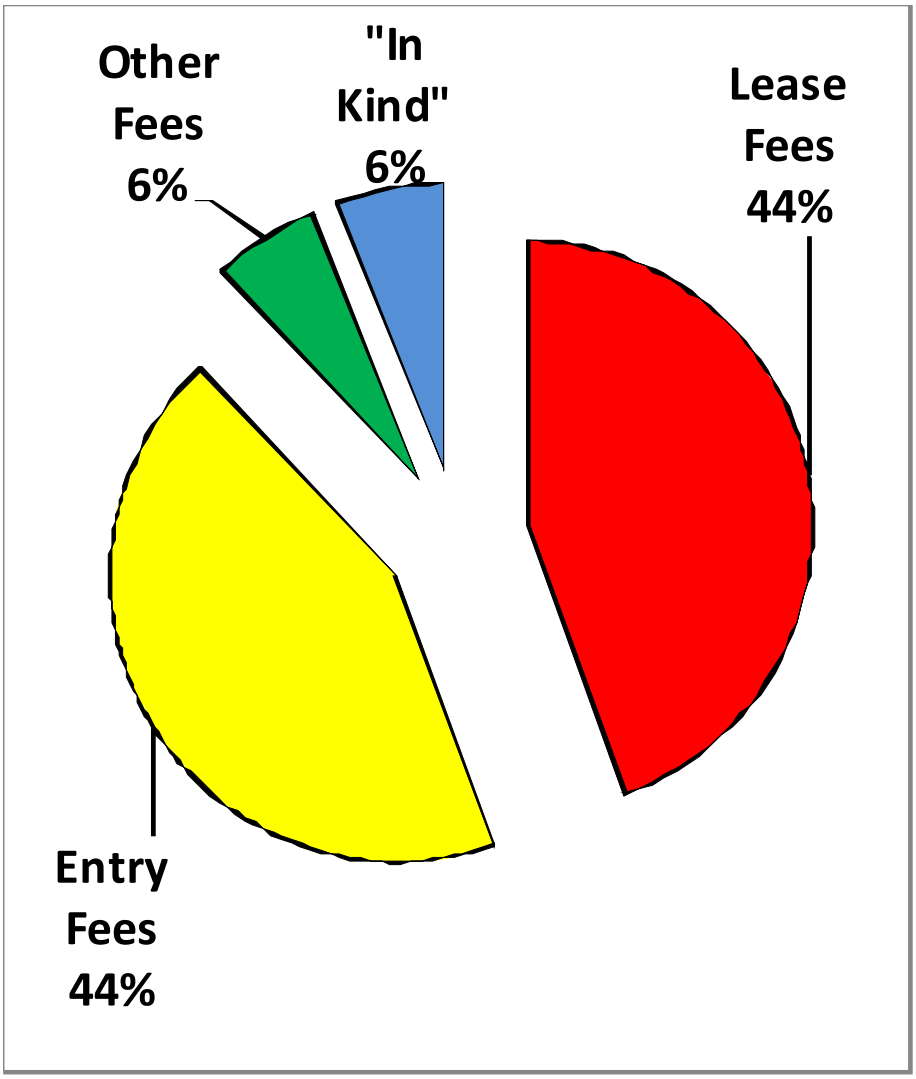
1. *Based on a mix of 2013 and 2014*
2. *The Makalolo and Linkwasha Concessions have been operation for almost 20 years. However, the second camps in these areas are newer with Davisons only being open for 5 years*
3. *When the new Linkwasha Camp is opened, entry fees to ZPWMA will increase*
4. *Kashawe only became operational in 2014*
5. *Most operators expect their occupancies to increase and hence their entry contributions to the park to increase*
6. *Right to Lease fees have been summed into annual lease fee*
7. *Km2 Income column is an attempt to rationalise concession size with contribution to income. We are aware that it is only one factor in the arguments for and against concessions. Josivanini is not included here*
8. *All operators also use other parts of the park outside their concession. Obviously the smaller the area the more use of the outside area they will make.*

The above table is based on annual contributions. However, it must be realised that concessionaires will have substantial capital inputs when starting up. This usually means drilling and equipping boreholes and opening roads. Some concessions have been operational for 20 years which means the cumulative contributions towards the park and the surrounding communities can be considerable.

So, in summary the estimated value of the current concession to Hwange in 2013 was as follows (see also Figure 165).

- Lease Fees total $184,000 p.a for all concessions
- Entry fees approx 160,000 in 2013 (not all camps gave me data)
- Approx $25,000 p.a for “other permits” (vehicle, walking, road & access permits etc)
- Est around $25,000 contribution “in kind” (fuel, road maint., anti-poach assist etc)
- So close to $400,000 total

Figure 165: Concession value to Hwange in 2013



4.7.8 Contributions From Outside Camps

As seen in section x.x.x there are as many beds outside the park as inside. Most of these are close to Main Camp and it is certain that the majority of the people staying in these camps will visit the park. In addition to the bed numbers indicated in the table below there are also additional beds in the form of campers, many of whom are foreigners.

Table 60: Estimated annual income and contributions to ZPWMA from operational camps outside Hwange

Camp	Beds	Occupancy	Est Entries 2013	Est. Income to ZPWMA
The Hide	40			
Miombo	20	35%	3,000	54,000
Elephants Eye	16			
Sable Sands	32	40%	4,600	84,000
Ivory Lodge	20			
Hwange Safari Lodge	200			
Ganda Lodge	32			
Bomani	20			20,000

Notes

1. *Sikumi is opening in 2014*
2. *Gwango is opening in 2015*
3. *Some camps such as Miombo have a significant component of campers who also visit the park*

4.7.9 Summary

In summary, Hwange NP made approximately 1.3 million dollars in 2013. The majority of this (84%) was from entry fees. Concession fees alone accounted for 12% of the total. However, the presence of the camps inside the park contributed somewhere between 150 and 200 thousand dollars to the entry fees.

Table 61: Estimated income for Hwange Park in 2013

Category	Income	%
Entry Fees	1,125,000	84%
Lease Fees	160,000	12%
Other Income	50,000	4%
Totals	**1,335,000**	

It should be noted that most fees for accommodation are paid in advance in Harare. In addition, all concession fees are also paid in Harare. Entry fees are paid at the gates.

4.8 HWANGE CONTRIBUTION TO ADJACENT AREAS

4.8.1 Safari Hunting

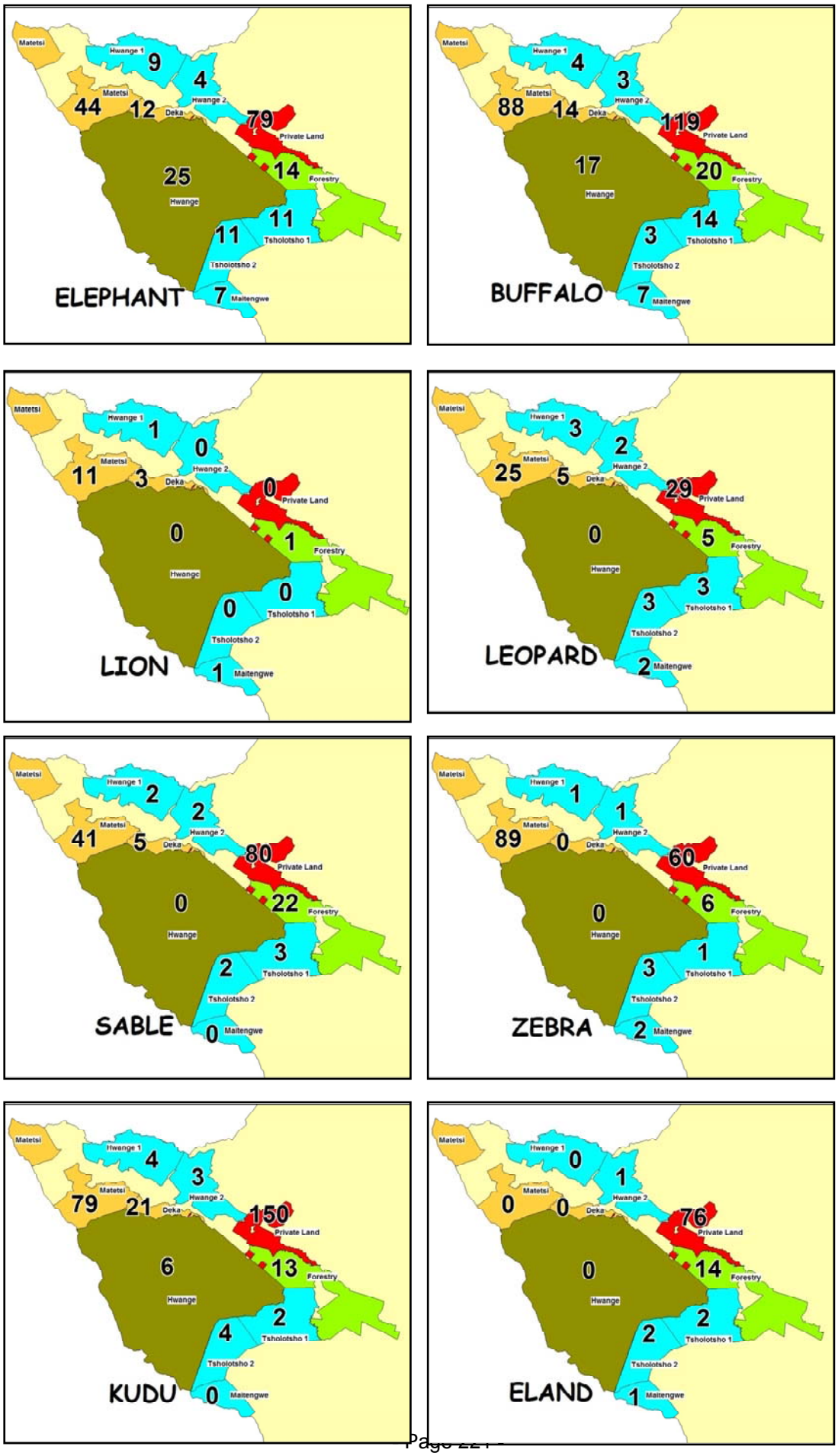
The Hwange National Park is the core area for safari hunting in north-west Matabeleland. In addition it should be noted that the Matetsi Safari Area was a bold experiment in reforming land use in the early 1970s. Essentially around 30 to 40 unsuccessful private sector mixed faming properties were expropriated, compensated and the resultant block of land turned over to safari hunting – a largely untried venture at that time on a large scale. An intensive monitoring system was set in place to gauge the effectiveness of the scheme and this continues to this day. The seven concessions (six given over to safari hunting) are leased on five year terms? and concessionaires pay a 5 year “right to lease” fee, an annual rental, a fixed quota fee (payable if animals are shot or not) and a supplementary quota fee which allows additional animals to be bought according to need.

The ZPWMA is responsible for setting and administrating quotas in conjunction with stakeholders. To this end there are annual quota setting meetings where this is discussed. Quotas are issued for the safari areas, forestry areas, communal lands and alienated land (private properties). In addition there is a ration (and state function) quota issued to the three management areas in the park. Although all these quotas are issued individually the ZPWMA was only able to supply amalgamated quotas for this analysis.

Figure 166 attempts a reconciliation of this data in relation to the land areas involved. Data on private property boundaries was obtained from the WWF “Farms Database” and it is hoped that this is a true reflection of the situation on the ground.

Unfortunately ZPWMA was not able to supply offtake data which is a far more indicative measure of what is happening in the hunting industry. All hunts are obliged to fill in TR2 forms indicating the position, size, sex and other details pertaining to each animal shot on the quota. It appears that the analysis of this data is not up-to-date. This is a serious flaw with respect to the management of a sustainable hunting system for north-west Matabeleland.

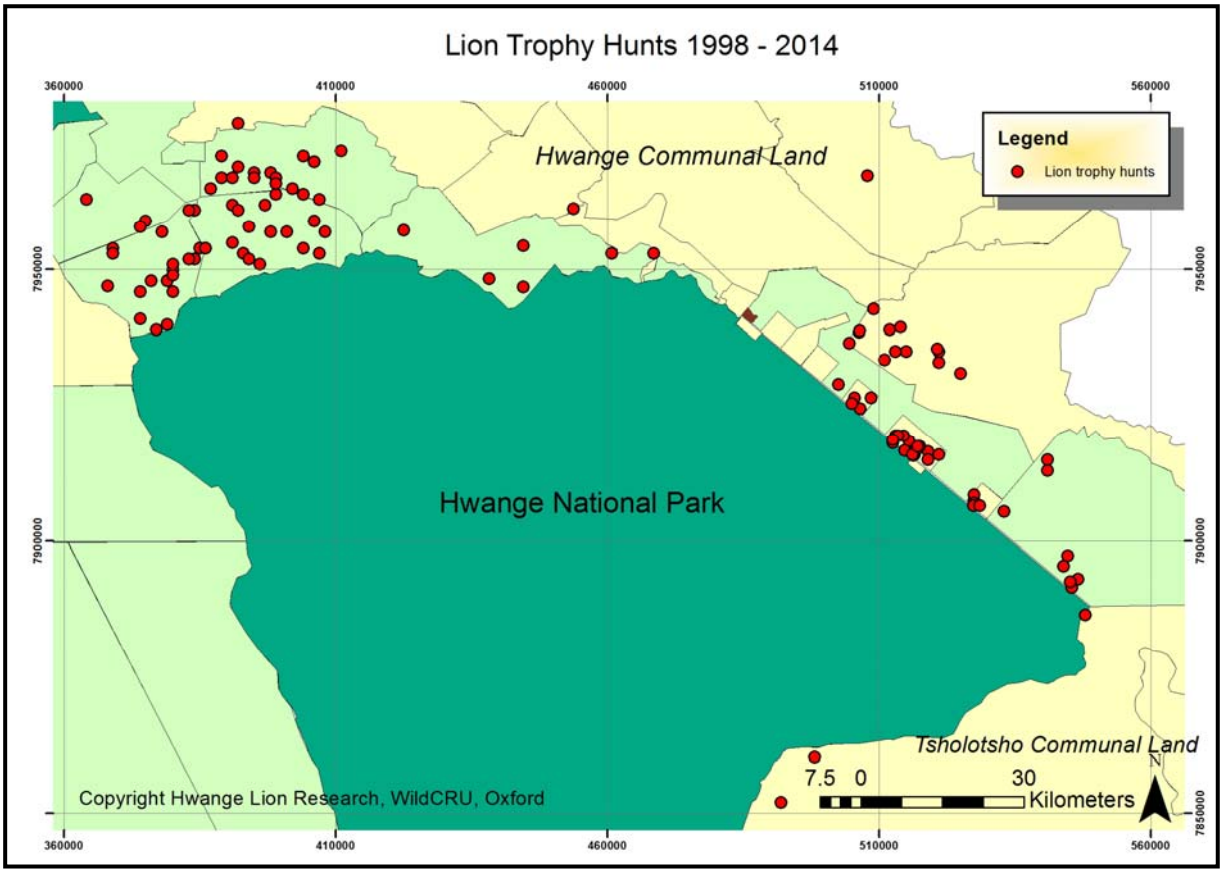
Figure 166: Quotas for selected species in the Hwange area



Some data exists for the offtake of lions. This data was collected as part of an information gathering exercise to investigate the sustainability of the lion quota. It appears that 50% of the 60 lions hunted in Gwaai and Forestry areas since 1999 were hunted on four 5 x5 km 'railway farms'- and 32% on a single property (Antoinette – Figure 167).

The study recommended that the lion quota be adjusted in response to the age of the lions shot by trophy hunters. In short, if young lions are shot (under 6 years of age), then the quota will be reduced. However, if lions older than six years are shot then there is a “reward” system that will see a quota increase. This is a pathway to an ecologically sustainable quota – and a quality of trophy that will help the marketing of safaris.

Figure 167: Lion offtake in areas adjacent to Hwange 1998-2014



4.8.2 Tour Operator Involvement in Communities

Many tour operators are aware that Hwange will not survive without the support of the surrounding populations and have initiated programmes in the surrounding communities. These are briefly outlined below. This table is a preliminary analysis and is under development. It should be noted that many camps contribute annually and therefore the amounts used in the community areas are quite substantial.

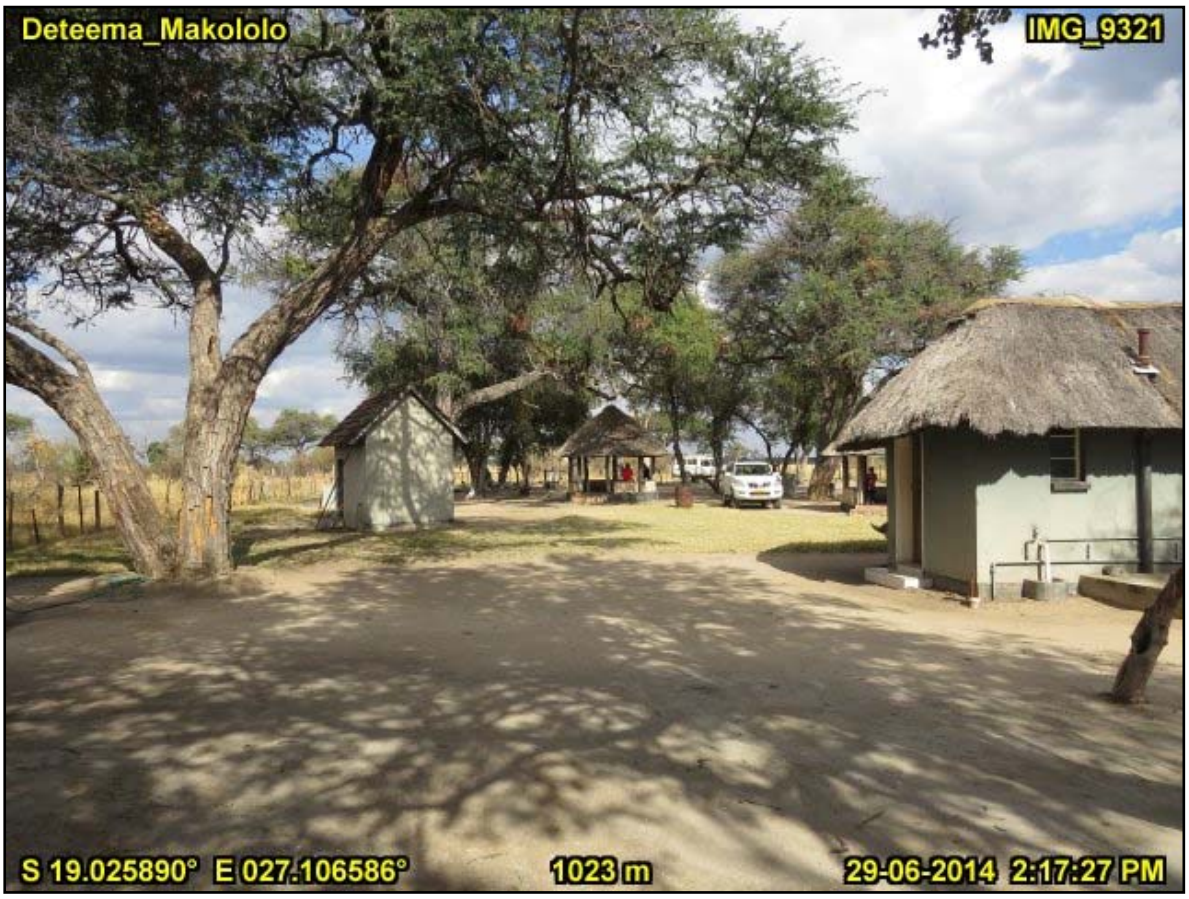
Table 62: Tour Operator Community Programmes

Operator	Activities/Programmes	Approx Value
Wilderness	Infrastructure Nutrition Literacy Training Education/Scholarships Sustainable micro projects	 100,000
Nehimba		
Camp Hwange		
Somalisa	Education Conservation Community Infrastructure	 160,000
Kapula		
Imvelo	68 boreholes Maitengwe dam repairs Education Infrastructure and equipment Health Others	68,000 30,000 450,000 90,000 50,000
Miombo		
Gwango		
Hwange Safari		
Sable		
Ganda		
Ivory		
Elephants Eye		

Notes

1. *Wilderness and Somalisa are annual estimates for 2014?*
2. *Imvelo's contributions reflect the last 8 years, excluding 2014*

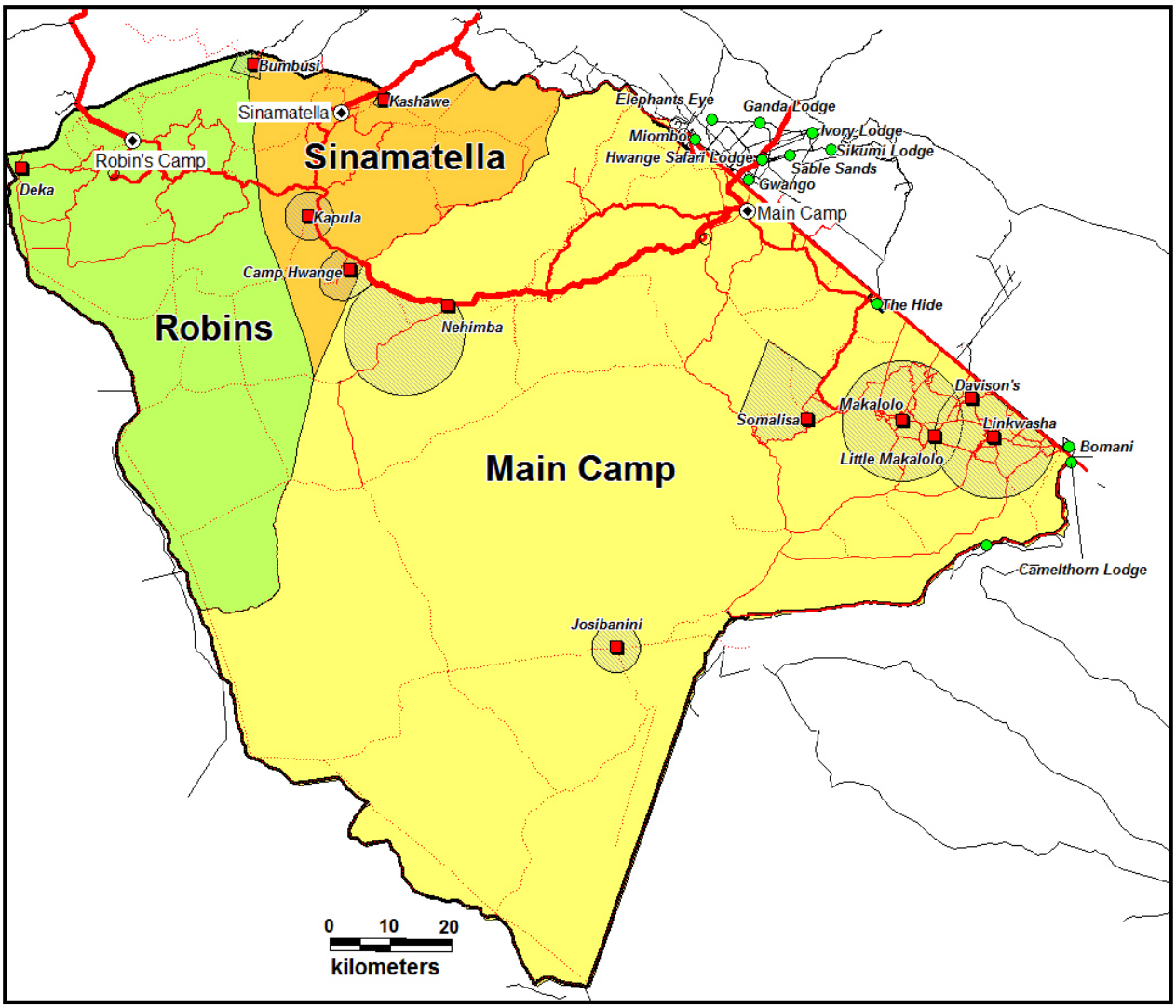
TOURISM IN HWANGE

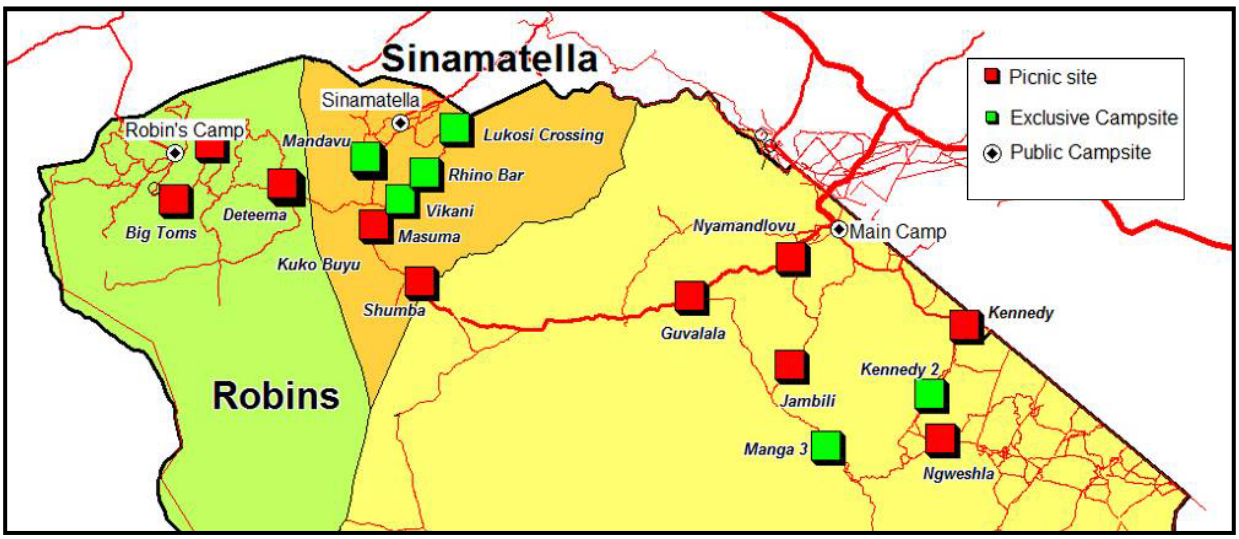


SITE DETAILS

HWANGE TOURISM SITE ANALYSIS

Classification	**Site**	
Camps Inside – Owner Built	Makololo Little Makololo Linkwasha Davison's Kashawe Giraffe Springs (closed)	Somalisa Nehimba Camp Hwange Kapula Josivanini (Under construction)
Camps Inside – ZPWMA Leased	Bumboosie Deka (not leased in 2014) Nantwich and Islwane (not leased in 2014)	
Camps Outside 10km from park boundary	Elephants Eye Sable Sands Ivory Lodge Bomani Camelthorn	The Hide Miombo Gwango Hwange Safari Lodge Sikumi
Picnic Sites/ Camping Sites	Jambili Kennedy Ngweshla	Masuma Mandavu Deteema
Platforms/Hides	Nyamandlovu Guvulala Big Toms	Little Toms Crocodile Pools Sedina
ZPWMA Roofed Accommodation	Main Camp Sinamatella	Robins Nantwich
Hunting Camps On park boundary	Induthlwa Mtshwayeli Ndabambi	

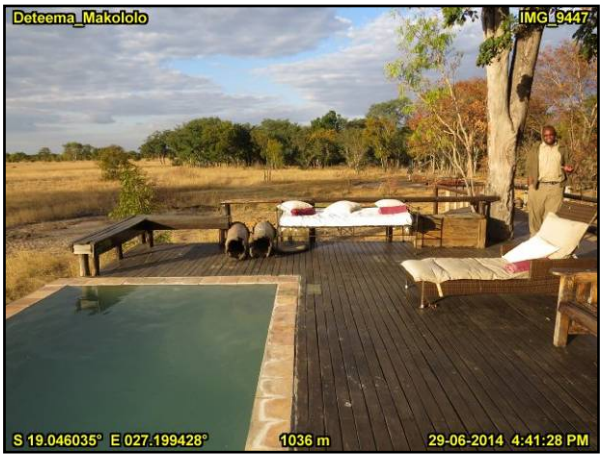

Bumbusi
Kashawe
Sinamatella
Sinamatella
Robin's Camp
Deka
Kapula
Camp Hwange
Robins
Nehimba
Elephants Eye
Ganda Lodge
Ivory Lodge
Miombo
Sikumi Lodge
Hwange Safari Lodge
Sable Sands
Gwango
Main Camp
The Hide
Davison's
Makalolo
Somalisa
Linkwasha
Bomani
Little Makalolo
Main Camp
Camelthorn Lodge
Josibanini
0 10 20
kilometers


Sinamatella
Sinamatella
Robin's Camp
Mandavu
Lukosi Crossing
Rhino Bar
Vikani
Masuma
Deteema
Big Toms
Kuko Buyu
Shumba
Robins
Picnic site
Exclusive Campsite
Public Campsite
Nyamandlovu
Main Camp
Guvalala
Kennedy
Kennedy 2
Jambili
Manga 3
Ngweshla

CAMPS INSIDE – OWNER BUILT AND OCCUPIED

Table: Lease details for private sector camps inside Hwange					
Camp	**Operator**	**Lease**	**Fee US$**	**Area**	**Comments**
Makololo	Wilderness	2009-2014	20,000	10 km radius	Centred on Makololo Pan
Little Makololo					
Linkwasha	Wilderness	2009-2014	20,000	10 km radius	Centred on Linkwasha Pan
Davisons					
Kashawe	Wilderness	2012-2017	20,000	1 km radius	
Giraffe Springs	Wilderness	2009-2014	7,000	1-2 km radius	Closed
Nehimba	Nehimba	2010-2019	36,000	7.5 km radius	Centred on Nehimba Seeps. Stops at Main Road
Camp Hwange	Relax Net Safaris	2011-2020	25,000	5 km radius	Stops at Main Road
Somalisa	Beks Safaris ?	2006-2015	12,000	7.5 km radius	Pear shaped rather than a circle. Avoids public road
Kapula	Winterswijck	2009-2034	2,500 *+2% of gross*	3 km radius?	No data
Deka					Parks Infrastructure
Bumboosie	Kaikora Trading	2006-2015	3,194	2 km radius?	Parks Infrastructure
Josivanini	Imvelo Safaris		26,000	2 km radius?	Old lease recently reactivated

Makololo



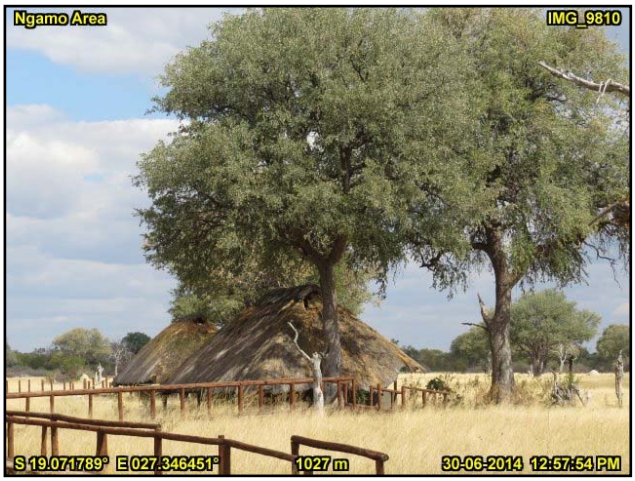
Makololo was one of the first camps in the Wilderness concession areas, opened in 1997. Initially was owned by Touch the Wild (Alan Elliot). Has 9 tents and 18 bed capacity. The Wilderness ecologist is based at Makololo. Wilderness camps use electricity for heating water, using either mains or generator. Have backup wood boiler All camps cook with gas.

Wilderness currently pumps 13 pans in the area, including Mbiza which is outside the concession

Little Makololo

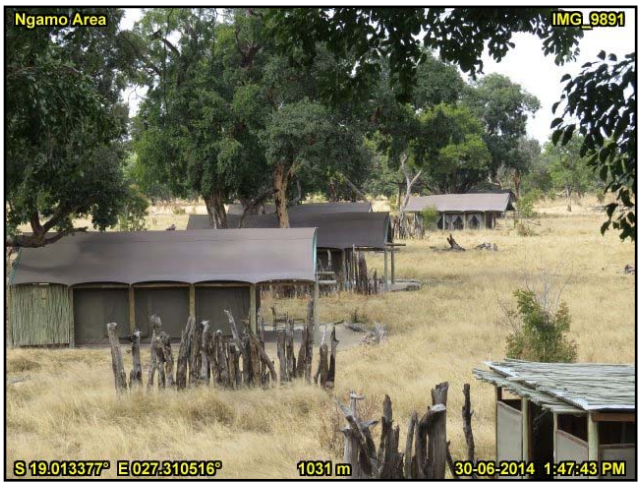
Little Makololo has been open for 12 years and has 6 tents or 12 beds. There are 20 staff on site, including senior management.
Generator. Water heating with electricity
Cooking with gas

Linkwasha

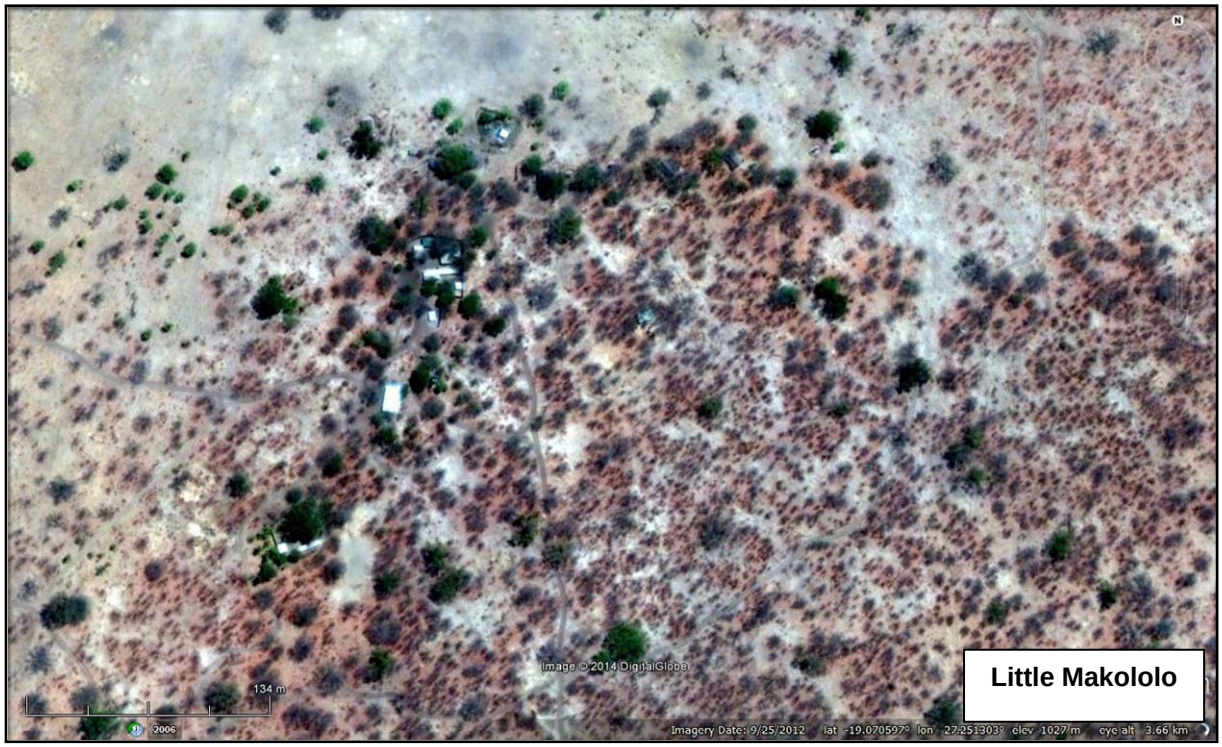


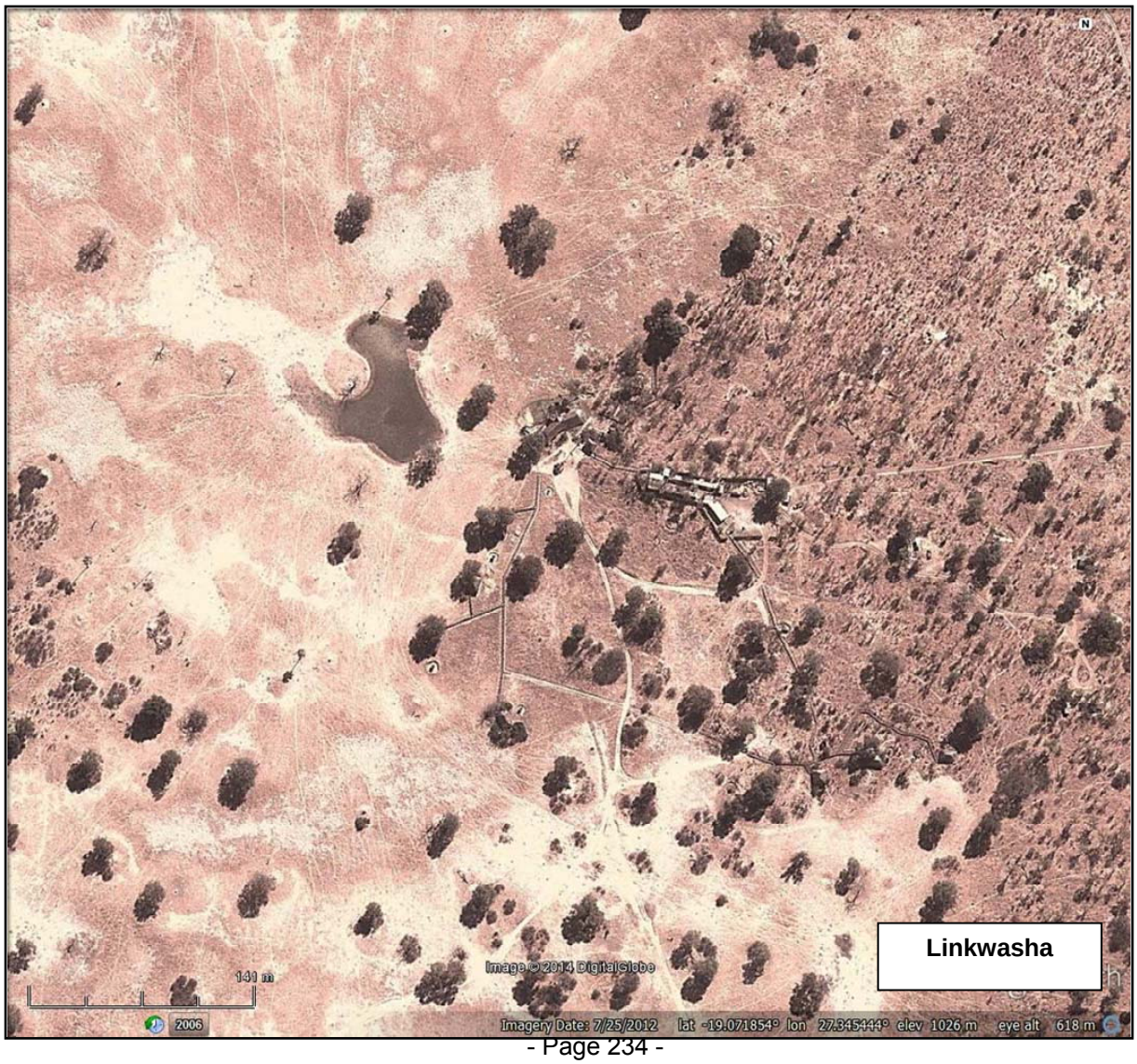
Linkwasha is one of the longer running camps in the area but has been closed for over a year. There are plans for a major refurbishment before the end of 2014.

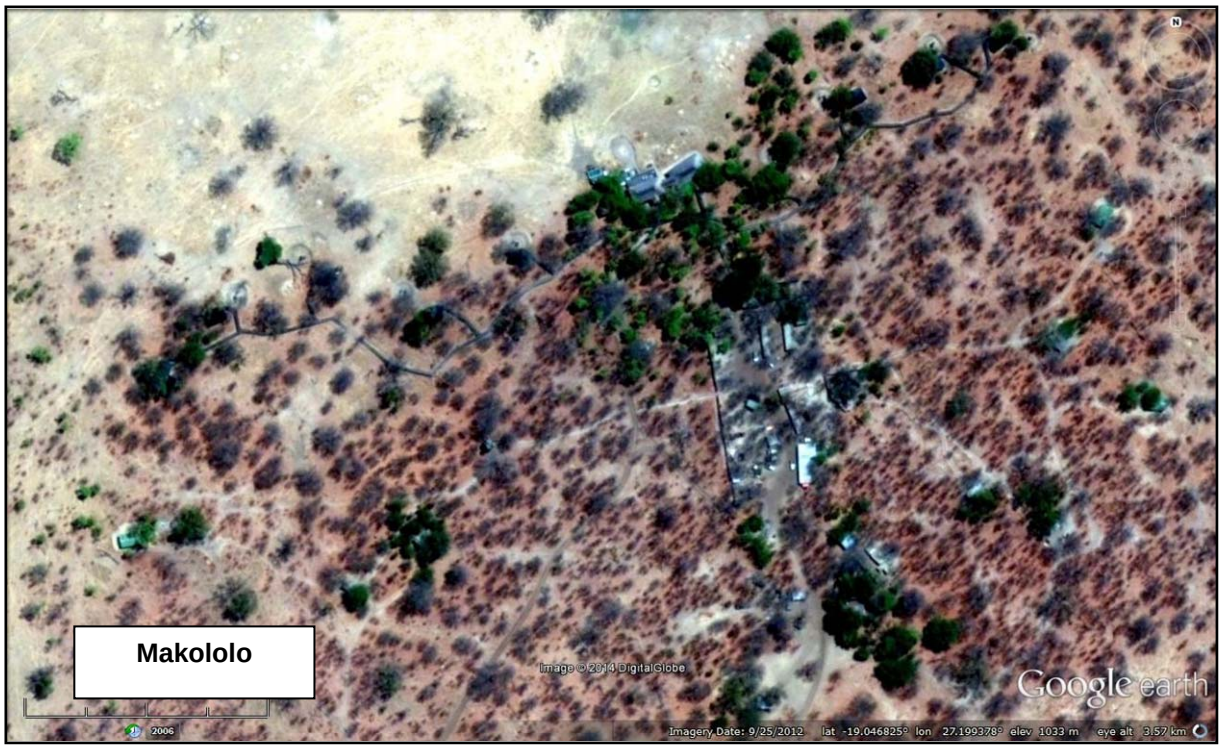
Davisons

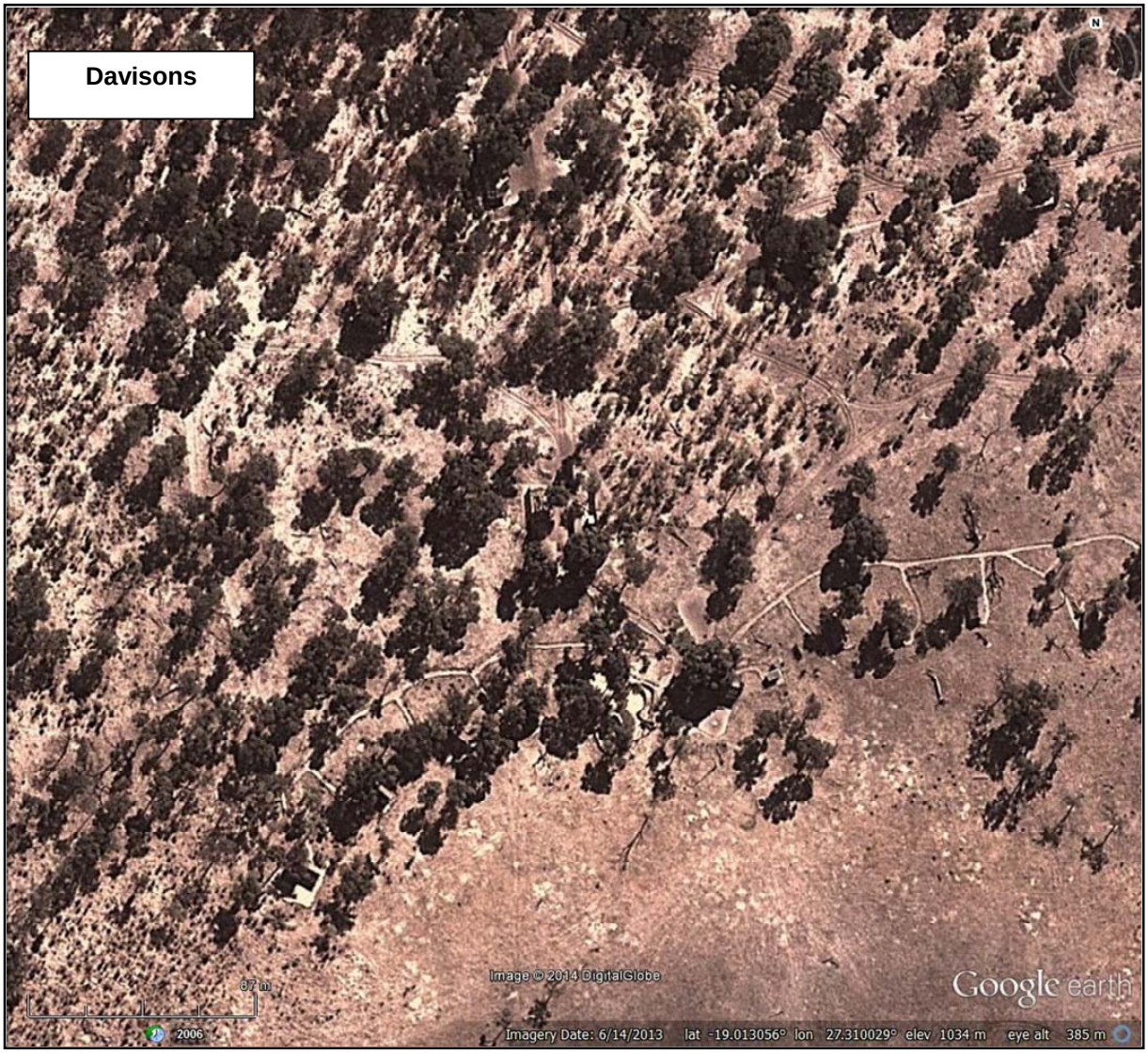


Opened in 2006. Have 9 tents with 20 beds. Main season is July to Oct when they average around 60% occupancy. Low season it drops to around 20%. Have 32 staff (23 general and 9 management). On ZESA so electricity for heating water.


Little Makololo
Image © 2014 DigitalGlobe
134 m
2006
Imagery Date: 9/25/2012 lat -19.070597° lon 27.251303° elev 1027 m eye alt 3.66 km


Linkwasha
Image © 2014 DigitalGlobe
141 m
2006
Imagery Date: 7/25/2012 lat -19.071854° lon 27.345444° elev 1026 m eye alt 618 m

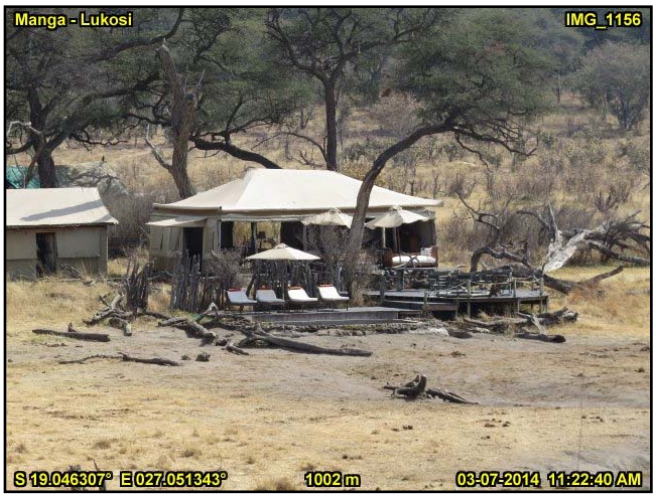

Makololo
Image © 2014 DigitalGlobe
Google earth
2006
Imagery Date: 9/25/2012 lat -19.046825° lon 27.199378° elev 1033 m eye alt 3.57 km

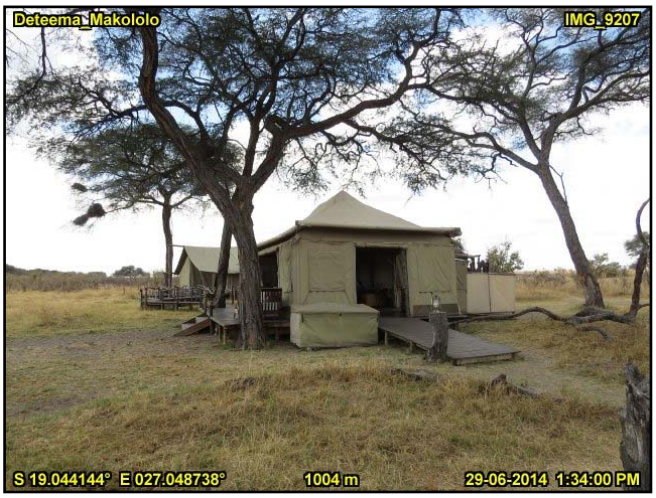

Davisons
Image © 2014 DigitalGlobe
Google earth
67 m
2006
Imagery Date: 6/14/2013 lat -19.013056° lon 27.310029° elev 1034 m eye alt 385 m

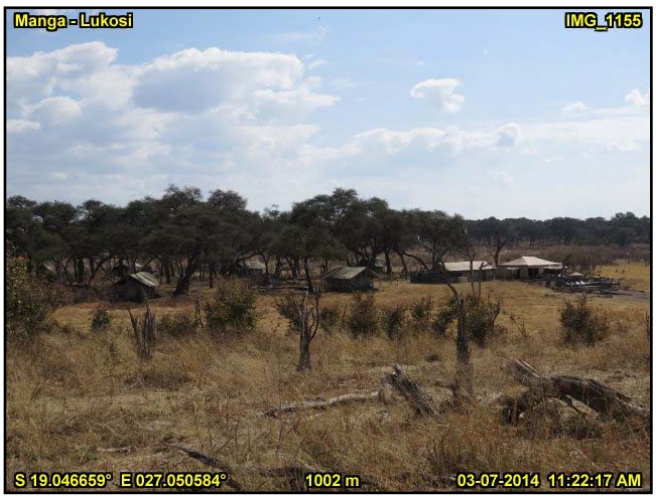
Kashawe

Kashawe. Split into two camps of 18 beds each. Kashawe East and Kashawe West. Built on an escarpment overlooking the Kashawe river. Pump into a small pan in front. Opened in Aug, 2013 with clients mainly driven in from Victoria Falls. Usually groups of 15 (to fill one camp) Have an exclusive area of about 3x3 km. Main clientele is older Americans on a package tour. Have 42 staff but not all in camp at the same time. The camp is on ZESA so electricity for heating water.

Somalisa



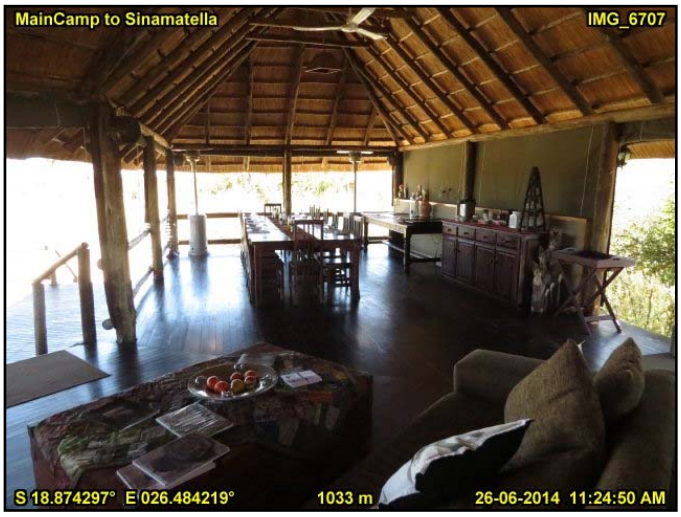


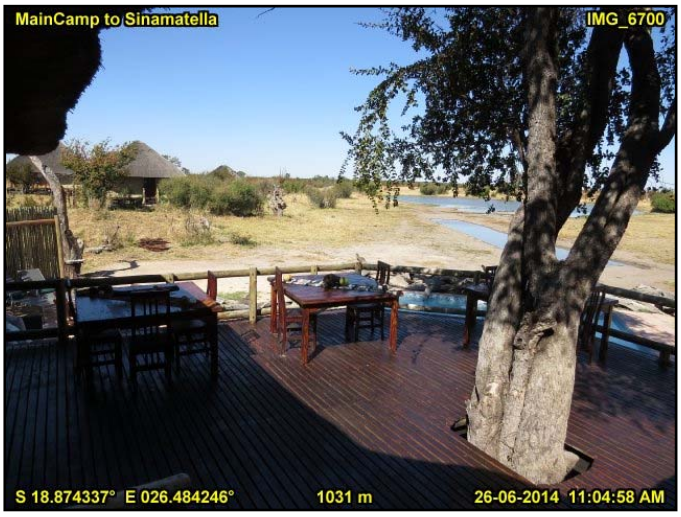


Split into two camps – Somalisa with 6 tents/12 beds and Somalisa Acacia with 4 tents/8 beds. Each camp has a pumped waterhole in front of the main tent. Has been open for about 8 years. They currently pump 4 waterholes (Chis Pan, Somalisa (x2),Manga 1 and Umkwazaan). They also supply diesel to ZPWMA to pump Manga 3. Mainly Australian and American clients. Many clients come in via Manga 3 airstrip. Permitted to do night drives in their concession area. Installing solar farm to move away from generator. Solar geysers to be installed in all rooms and kitchens. Wood only for aesthetic purposes. Staff = 25. % magmt, 5 guides, 15 others. Use casuals seasonally.


162 m
Image © 2014 CNES / Astrium
Somalisa
Imagery Date: 10/10/2013 lat -19.04

Nehimba



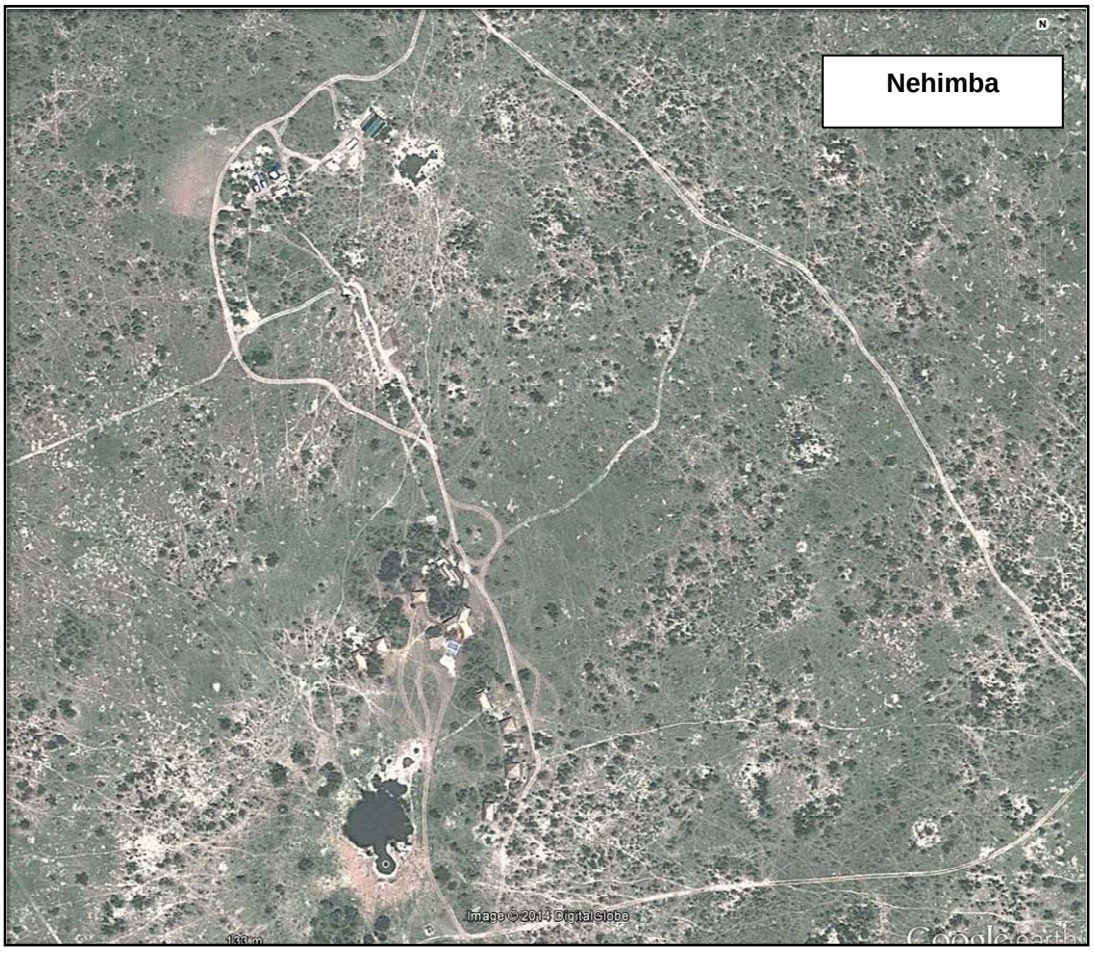


Lease was issued in 2009 and the camp opened in 2011. Can take 19 guests in seven rooms. Four double rooms. Have a 10km radius lease with the centre being the Nehimba seeps. The concession area does not include the main road. Permitted to do walking safaris in the park and night drives in the concession area. Gas geysers for heating client water. Wood boiler for staff. All cooking on gas. 15 staff.

Camp Hwange

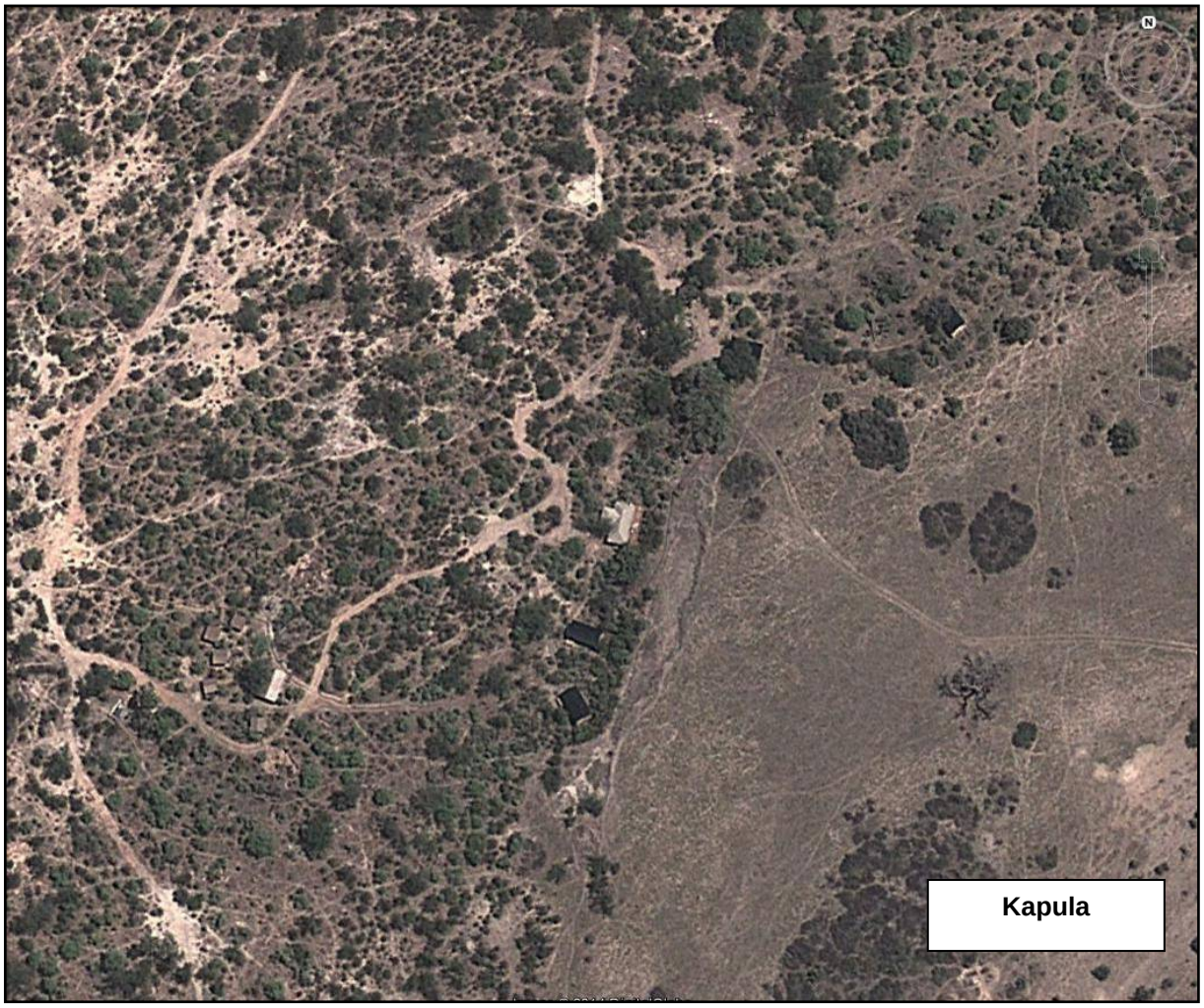
Camp Hwange opened in 2012 and has a 25 year lease. There are 8 rooms and the lodge can accommodate 16 guests. Permitted to do walking safaris in the park and night drives in the concession area. 26 staff on site.


Camp Hwange
Image © 2014 DigitalGlobe
Google earth
Imagery Date: 12/21/2011 lat -18.822831° lon 26.330937° elev 1046 m eye alt 473 m

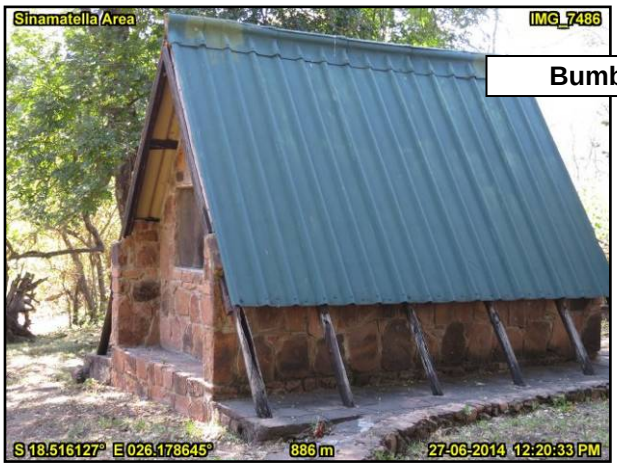

Nehimba
Image © 2014 DigitalGlobe

Kapula

Established in 2009. Situated only 2km from Masuna Picnic Site. Essentially two self-catering camps with non-luxury tented accommodation and a central raised deck area. Initially one of the camps was for camping but as this was in direct competition with parks it was stopped. Is an eight bed camp that can accommodate16 guests. Six permanent staff on site. Water heating via a combination of solar and wood fires. All refuse removed to Hwange town.


Kapula

OWNED BY ZPWMA



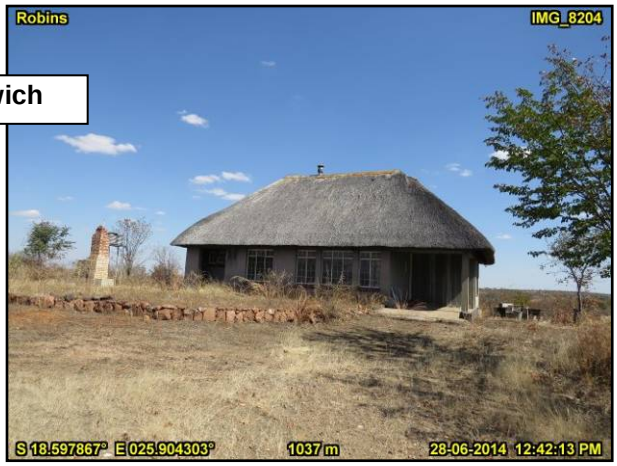
Bumboosi

Bumboosie

The ZPWMA runs its own tourism facilities at the three main camps – Main Camp, Sinamatella and Robins. It also has several small tourist facilities in the north, one of which has been leased out (Bumboosi). In addition there are three sites that are currently not operational. These include Nantwich and Isliwane (on the same dam) and Deka. Site sizes – **Nantwich** 3 Lodges with 2 beds - currently under refurbishment; **Isliwane** - Single lodge with 3 bedrooms ($140/$200 (local/foreigners); **Deka** – Five accommodation units – Out to tender but not allocated. Unused since 2006. **Bumboosie** falls under Sinamatella. Currently leased.

Isilwane

Nantwich



Deka

The ZPWMA runs its own tourism facilities at the three main camps – Main Camp, Sinamatella and Robins. It also has several small tourist facilities in the north, one of which has been leased out (Bumboosi). In addition there are three sites that are currently not operational. These include Nantwich and Isliwane (on the same dam) and Deka. Site sizes – **Nantwich** 3 Lodges with 2 beds - currently under refurbishment; **Isliwane** - Single lodge with 3 bedrooms ($140/$200 (local/foreigners); **Deka** – Five accommodation units – Out to tender but not allocated. Unused since 2006. **Bumboosie** falls under Sinamatella. Currently leased.


Islwane

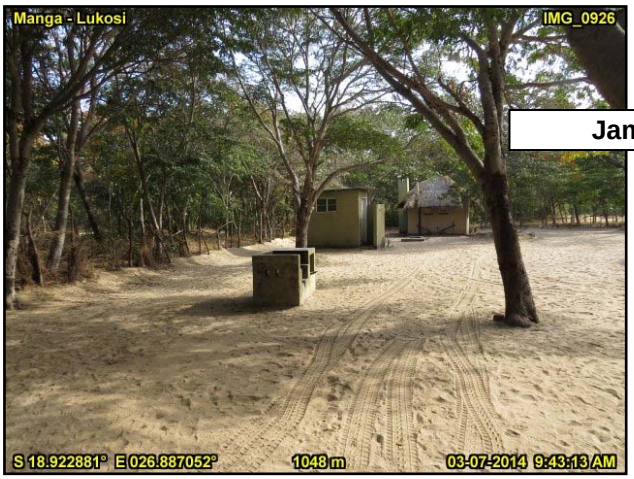

Nantwich
© 2014 Google
Image © 2014 DigitalGlobe
Google earth
Imagery Date: 11/2/2009


Deka
Image © 2014 DigitalGlobe
Google earth
Imagery Date: 7/28/2007

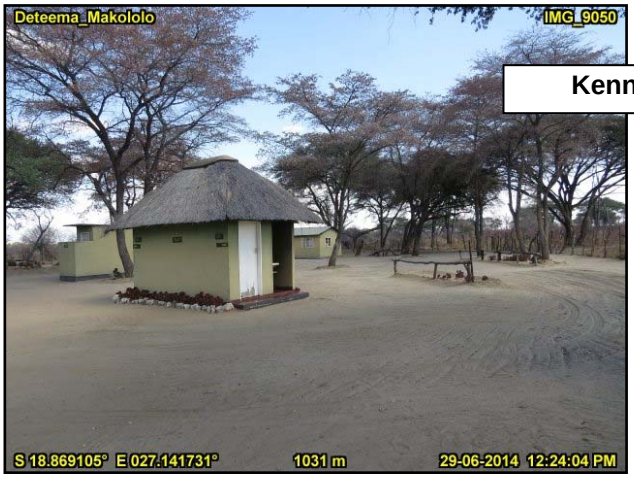
Picnic Sites – Hides

Picnic Sites – Overnight Camping	
Jambili	In dense Baikiaea woodland. Not as popular as the ones to the east
Kennedy 1	On main route to Ngweshla Pan
Ngweshla	On Ngweshla Pan. Very popular lunch site with operators
Masuma	Overlooking Masuma Dam. Right on Main Road
Mandavu	Large site overlooking Mandavu Dam
Deteema	Two sites, one on Dam, the other on a spring. Spring site needs attention
Exclusive Camping Sites	
Kennedy 2	
Manga 3	
Rhino Bar	Popular site on the Lukosi river
Vikani	Probably the most popular. On the Lukosi river
Lukosi Crossing	At the site of the crossing but doesn't appear to have much use.
Mandavu	On western side of the dam
Picnic Sites – NO Camping	
Verney's Pan	Concrete picnic tables. No water. Broken by elephants
Mabuya Mabena	Concrete picnic tables. No water
Bembesi	Concrete picnic tables. No water
Platforms/Hides	
Nyamandlovu	Most popular site in the park. Well used and maintained. No overnighting?
Guvulala	30 km from Main Camp so less use and maintenance
Big Toms	
Little Toms	Shelter in need of attention. Not sure if it used for overnighting
Crododile Pools	
Sedina	
Get-Out Points - Undefined	
Baobab	
Kennedy 2	People get out of cars near the solar panels
Mandavu Dam	Appears that the area to the west of the picnic site is used by fishing parties

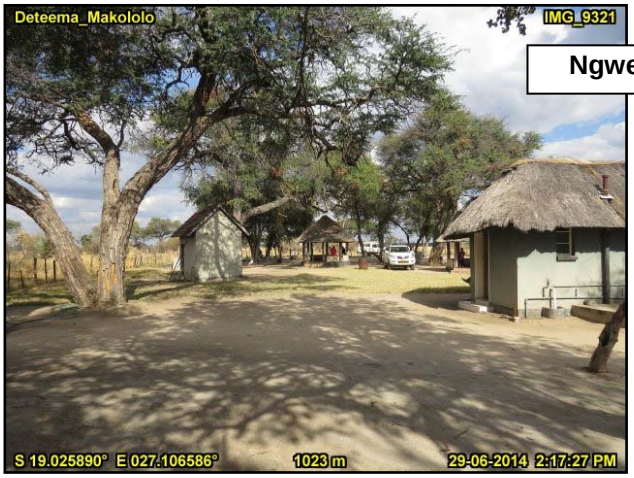
MAIN CAMP MANAGEMENT UNIT – PICNIC SITES



Jambili



Kennedy



Ngweshla

Picnic sites are available for use by all visitors during the day but can be booked for exclusive use at night. Restrictions are 1 week continuous, two cars , 10 people max.

MAIN CAMP MANAGEMENT UNIT – PLATFORMS/HIDES

Guvalala

Nyamandlovu

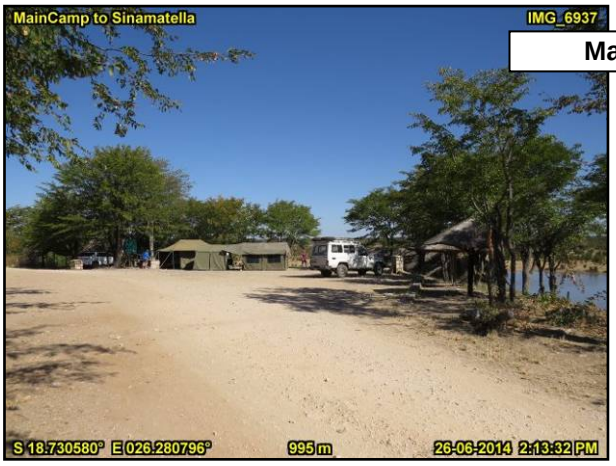
Sedina

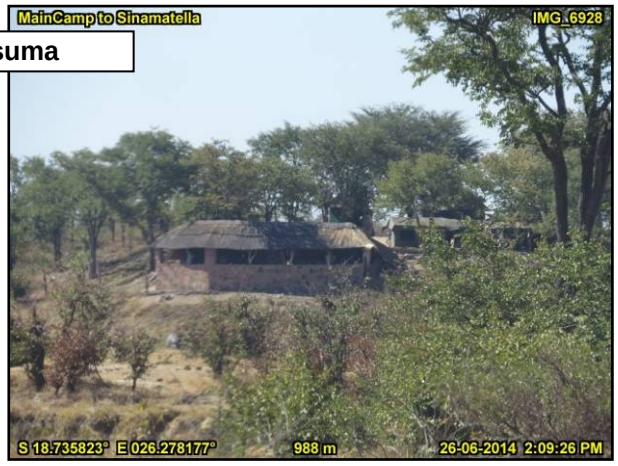
In addition to the picnic sites, visitors may also stay overnight at Guvalala platform. Toilets are established at the two main platforms in the Main Camp Management Area.

SINAMATELLA MANAGEMENT UNIT – PICNIC SITES AND HIDES

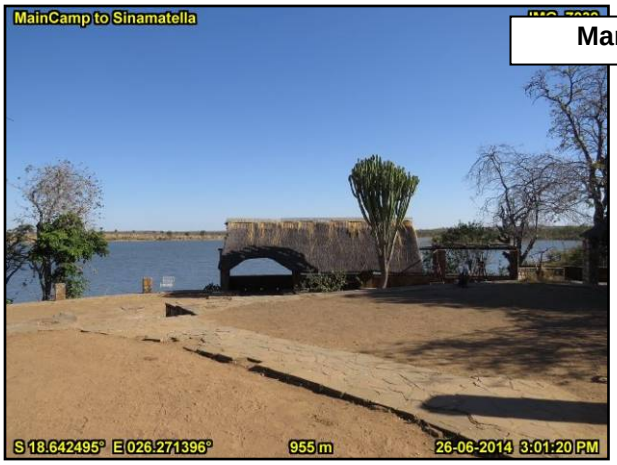
Shumba

Masuma





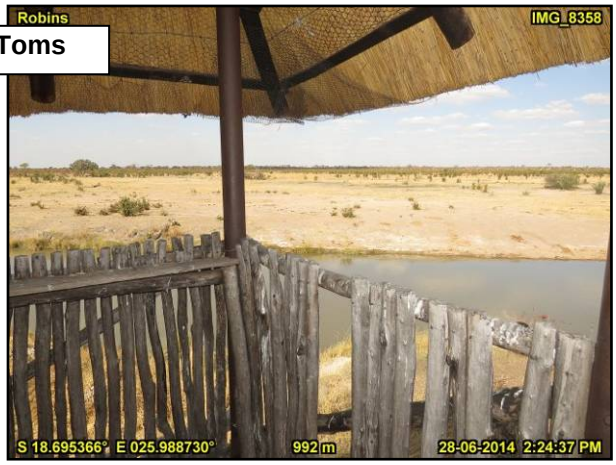
Mandavu



Masuma and Mandavu are picnic sites where overnight camping is permitted. At Masuma the site is exclusive, in that only one group can book the site, while Mandavu can be occupied by several groups?

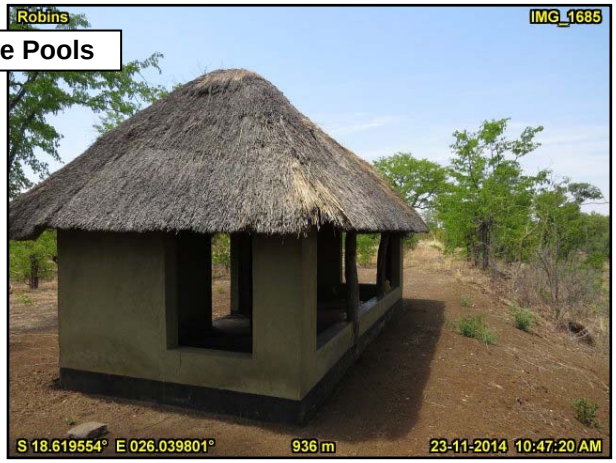
ROBINS MANAGEMENT UNIT

Big Toms



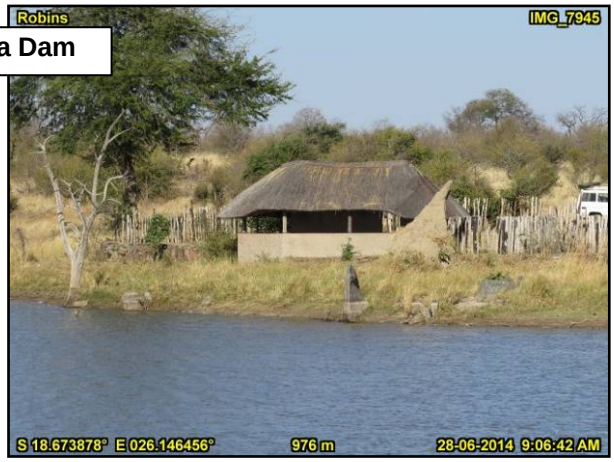
Little Toms

Crocodile Pools

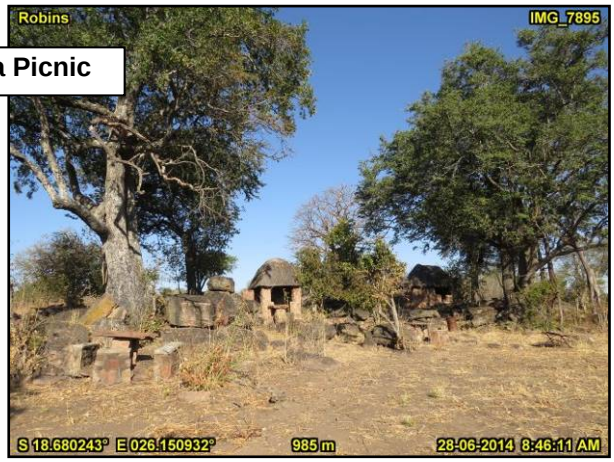


Big Toms has water and toilet facilities. Crocodile Pools has a “long-drop” while Little Toms has no water or ablutions at the hide.

Deteema Dam

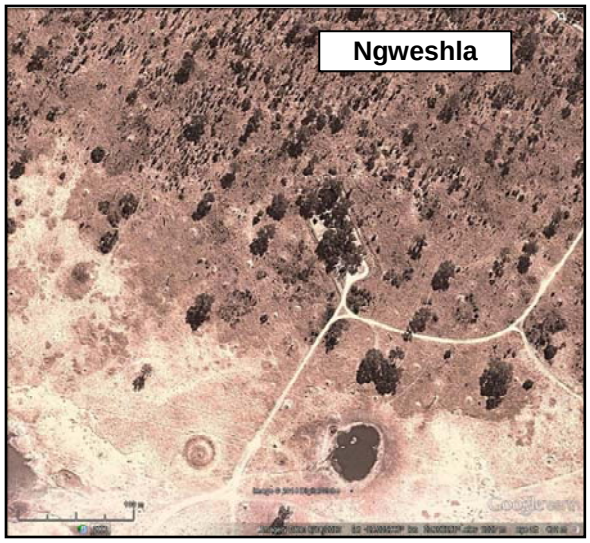


Deteema Picnic

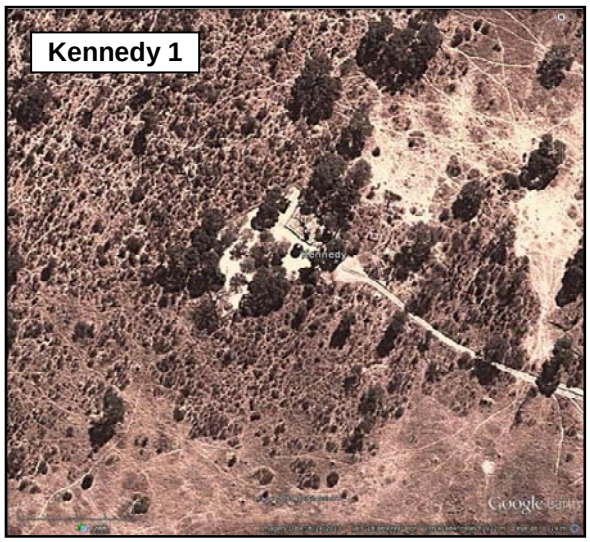


Deteema has two sites where camping is permitted – Deteema Dam and Deteema Picnic Site. These are exclusive campsites in that the site is occupied by a single group. The Deteema picnic site has deteriorated and the toilets are no longer functional.

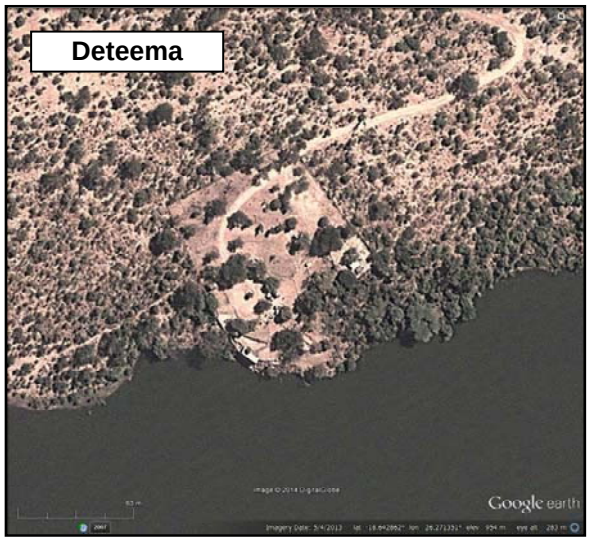

Shumba


Ngweshla


Jambili

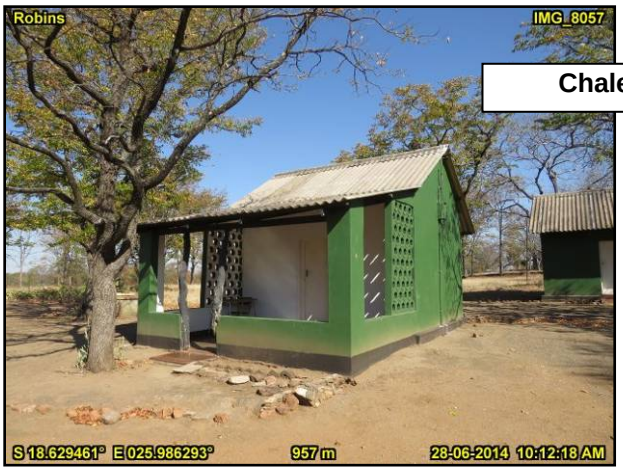

Kennedy 1

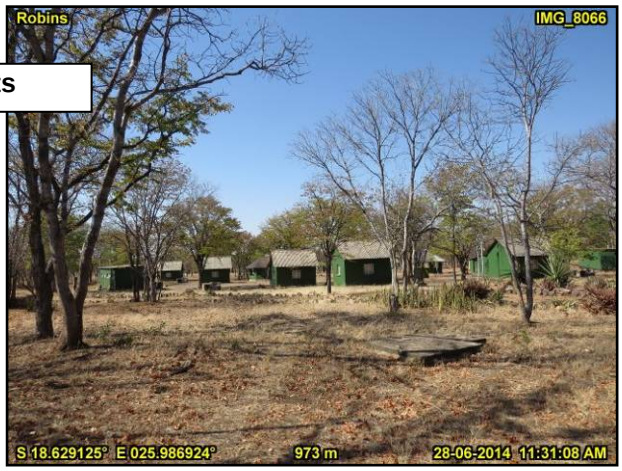

Masuma

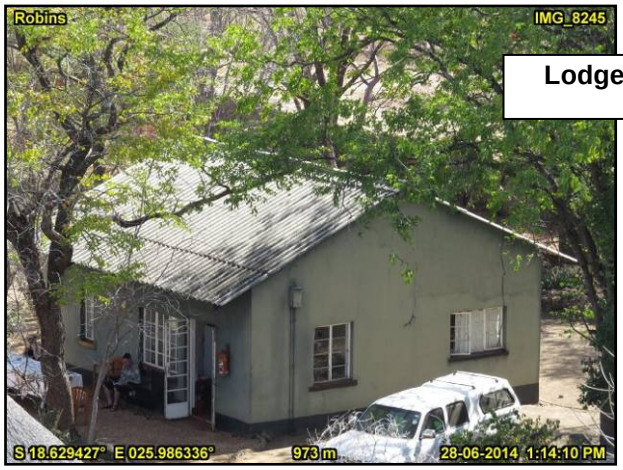

Deteema

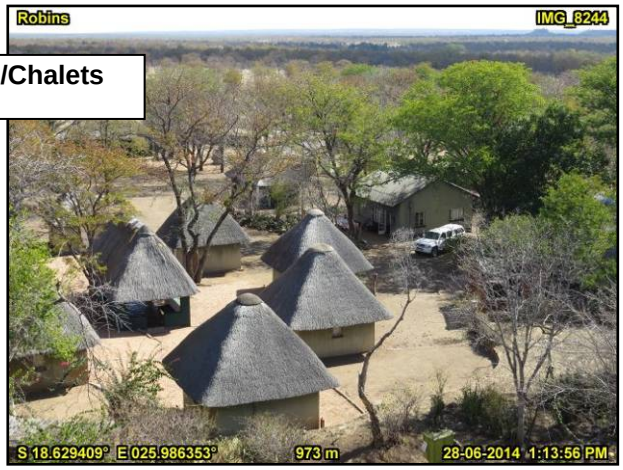
ZPWMA – OWN ACCOMMODATION

ROBIN'S CAMP



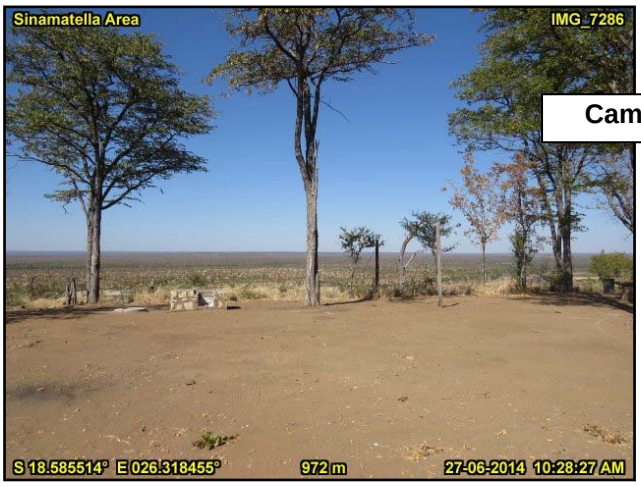




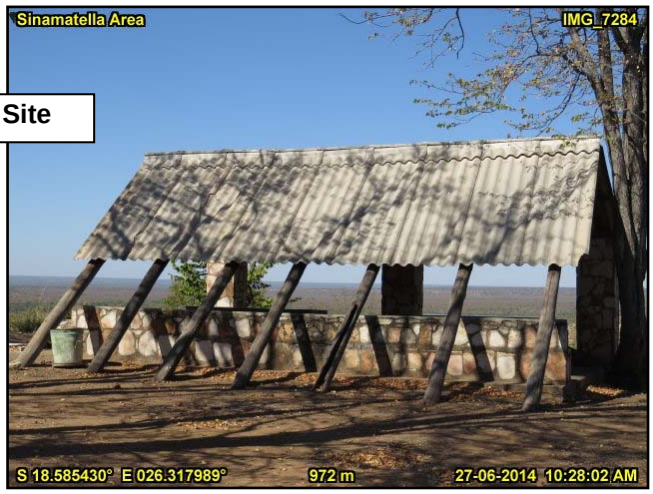


Robins camp has both Lodges and Chalets. There are two lodges with 8 beds each and 18 chalets with between 3 and 4 beds. Chalets have communal cooking and ablution facilities. There are 18 camping sites

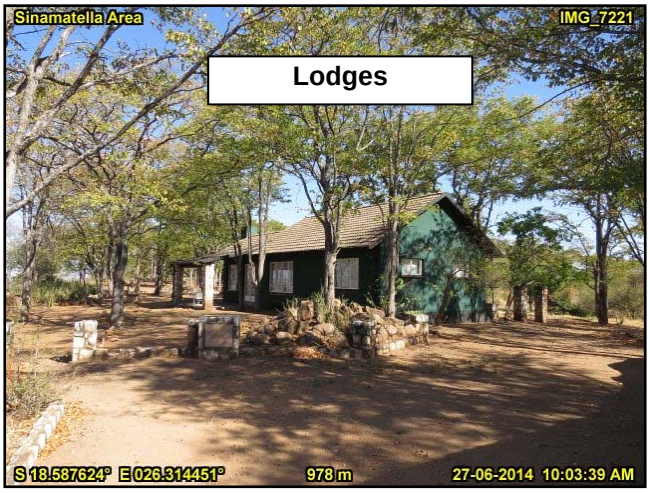
SINAMATELLA CAMP



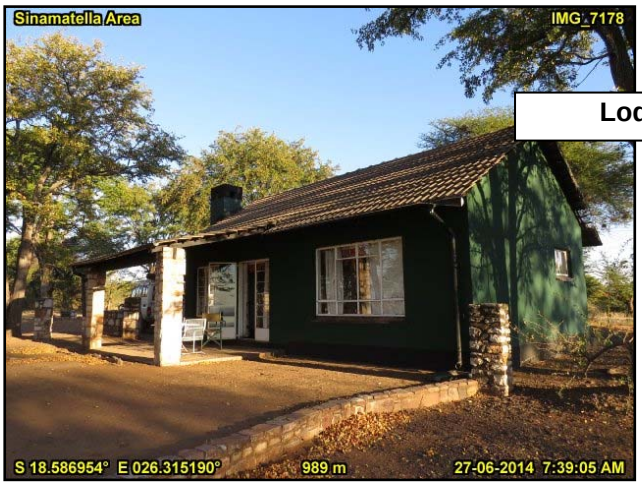
Camp Site



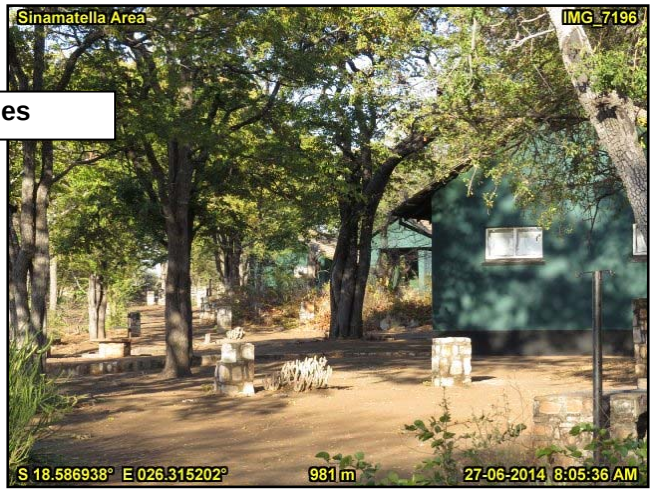
Restaurant



Lodges

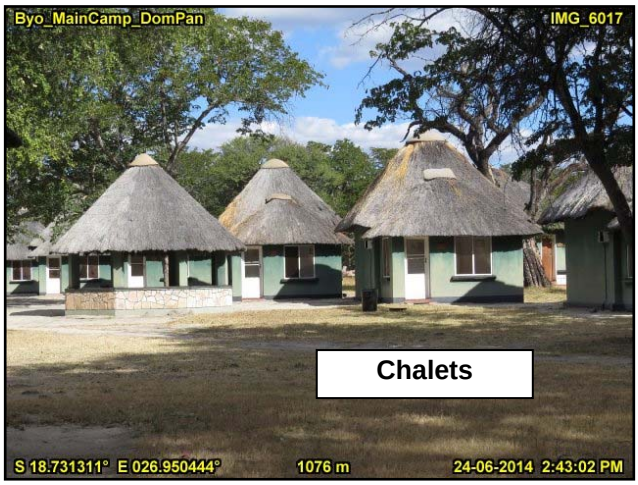


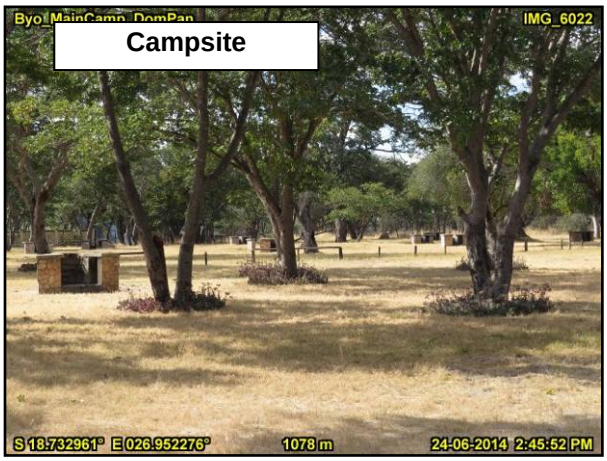
Lodges

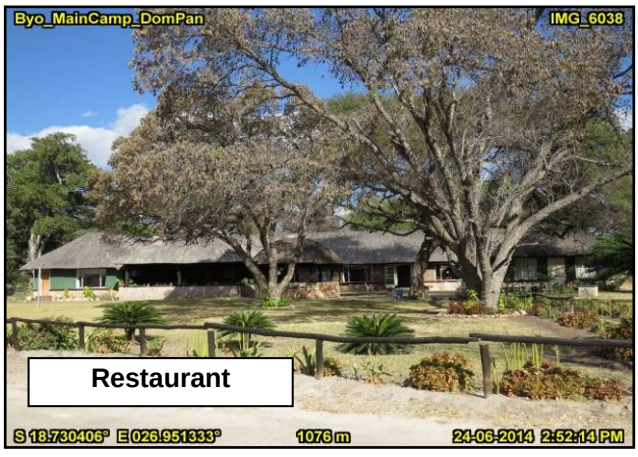


Sinamatella has 26 Lodges and a theoretical capacity of 60 beds?. However, at the time of writing, only 11 Lodges are operational catering for 30 clients?. There is an extensive campsite. The restaurant and bar is currently being refurbished.

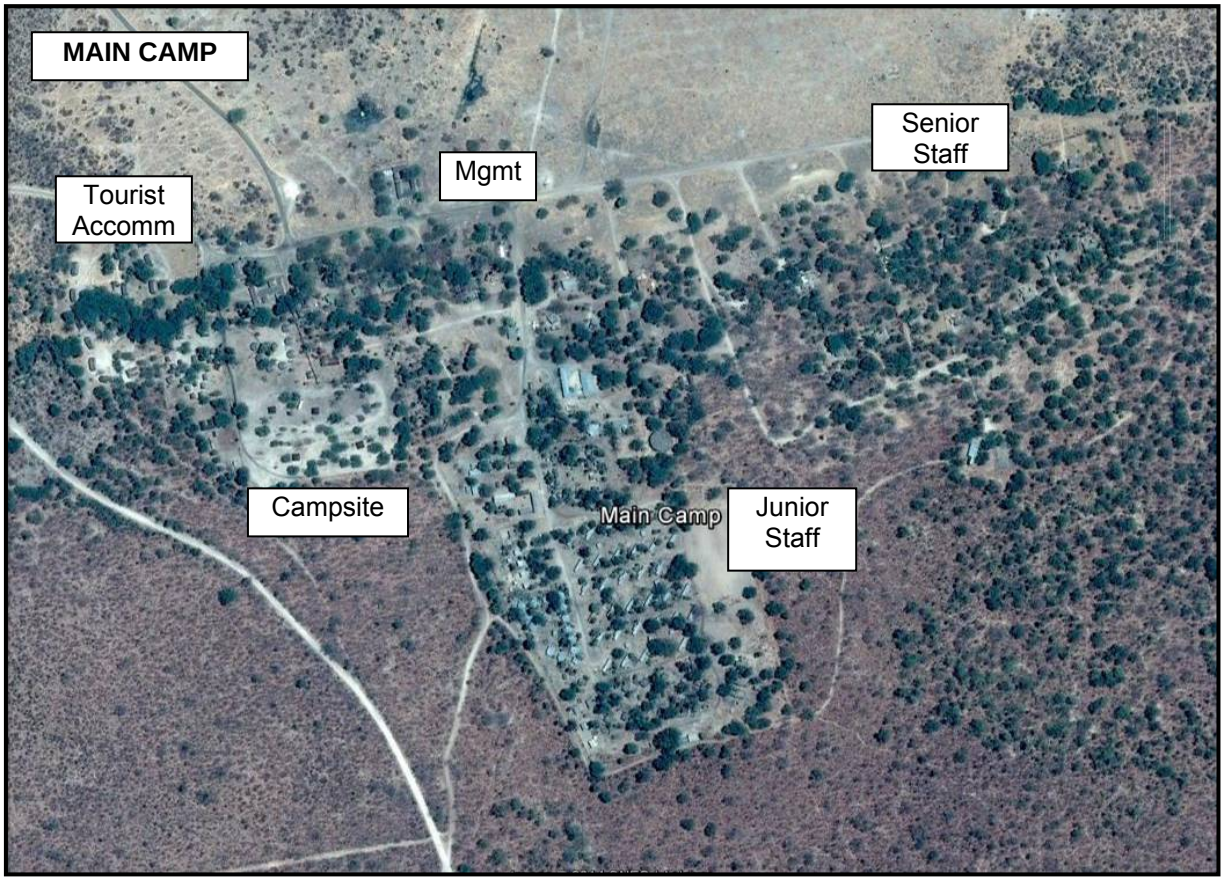
MAIN CAMP

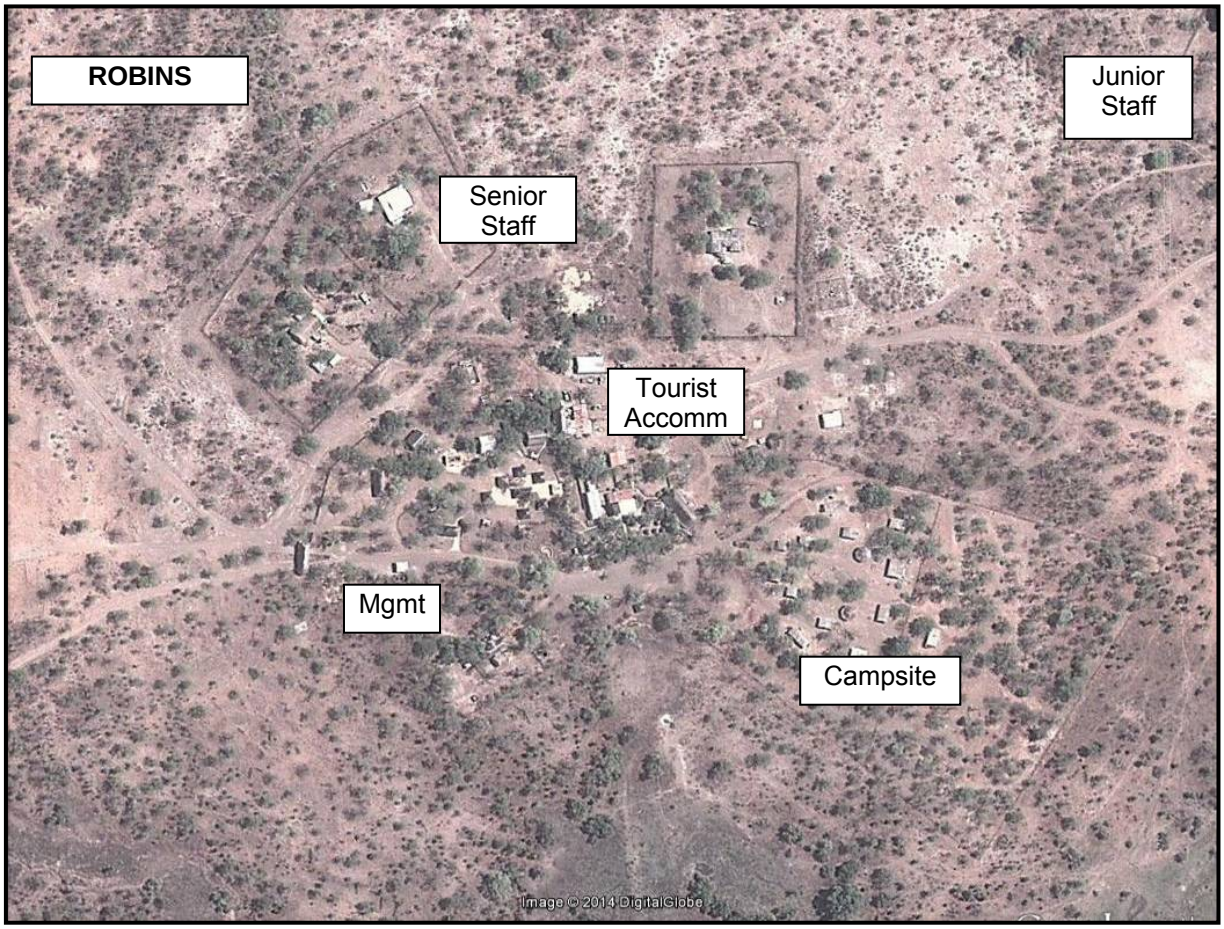


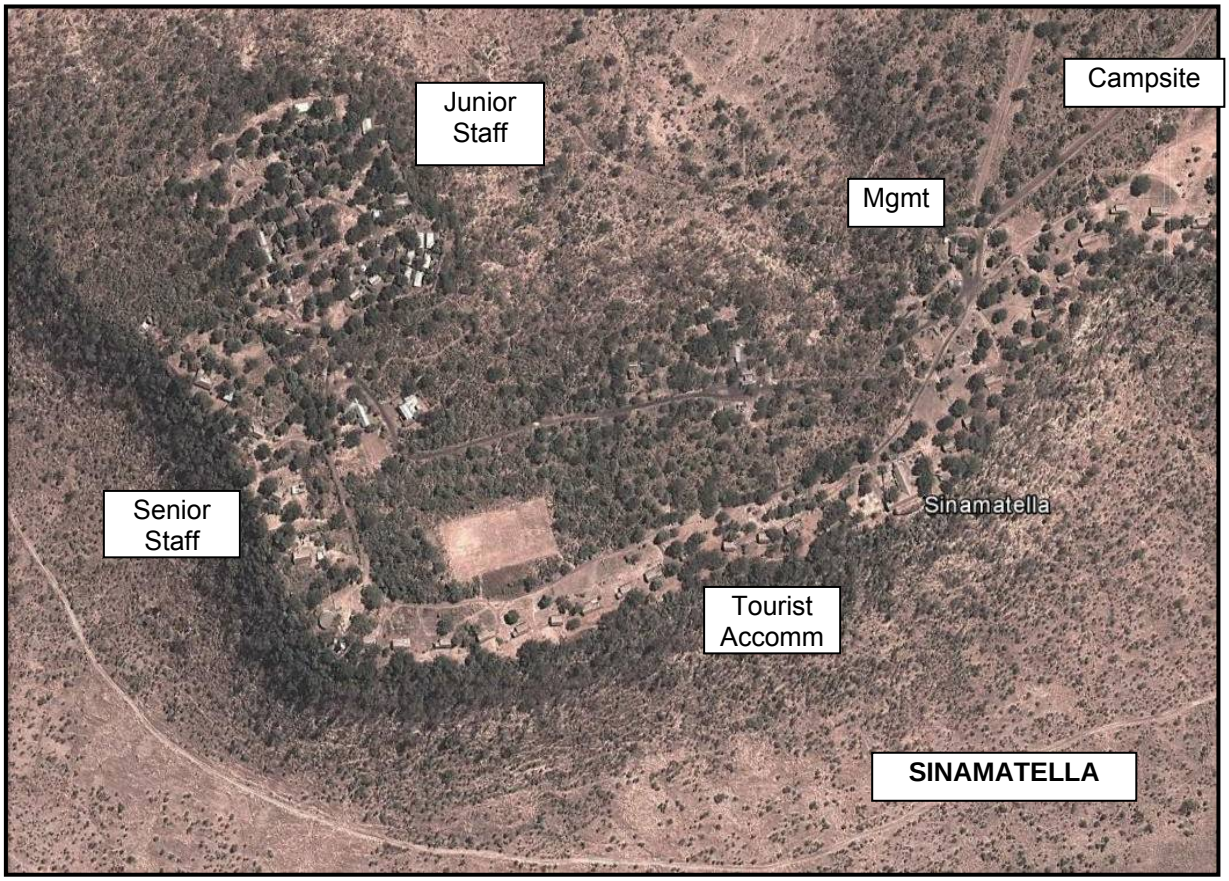




Main Camp has a variety of accommodation available. These include 23 Lodges (with self-catering facilities and toilet/bathroom), 11 Cottages (with communal self catering facilities and toilet/bathroom) and 15 Chalets (communal self-catering and ablutions). There are 116 beds available. In addition, there is an extensive campsite. The Waterbucks Head restaurant and bar caters for guests.


MAIN CAMP
Senior Staff
Mgmt
Tourist Accomm
Campsite
Main Camp
Junior Staff


ROBINS
Junior Staff
Senior Staff
Tourist Accomm
Mgmt
Campsite
Image © 2014 DigitalGlobe

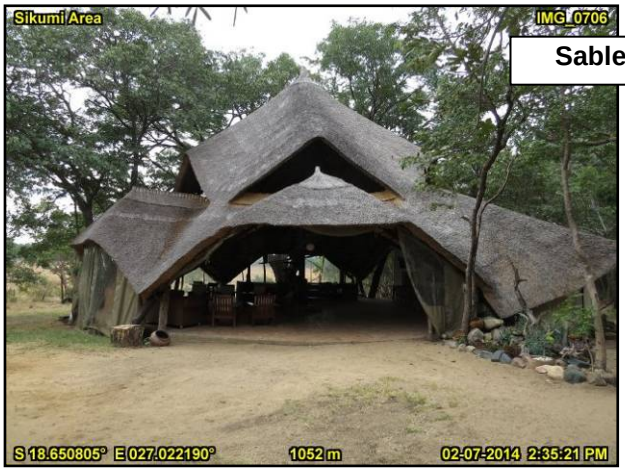

Junior Staff
Campsite
Mgmt
Senior Staff
Sinamatella
Tourist Accomm
SINAMATELLA

Camps Outside

Camp	Comments
Sikumi Forest Area	
Sable Sands	16 rooms, 32 beds. Recently reopened after being closed for 5 years
Elephants Eye	8 rooms 16 beds. Recently rebuilt
Ganda Lodge	Owned by Forestry Commission
Ivory Lodge	9 rooms 20 beds. Older, long-standing lodge
Ngamo Forest Land	
Indutlhwa	Hunting Camp. Very little use of the park
Bomani	Opened in 1999. Use Ngamo area through Ngamo Gate
Private Land	
The Hide	On west of railway on alienated enclave “within” the park. Entrance gate maintained at Kennedy 1
Miombo	**Dete Council Land**
Hwange Safari Lodge	Long established lodge with 200 beds.
Gwango	Currently under construction
Sikumi	Has been closed for some time but will be reopened in 2014. 15 rooms
Communal Land	
Camelthorn	Small camp linked to Bomani

SIKUMI FOREST LAND

Ganda Lodge



Sable Sands

Ivory Lodge

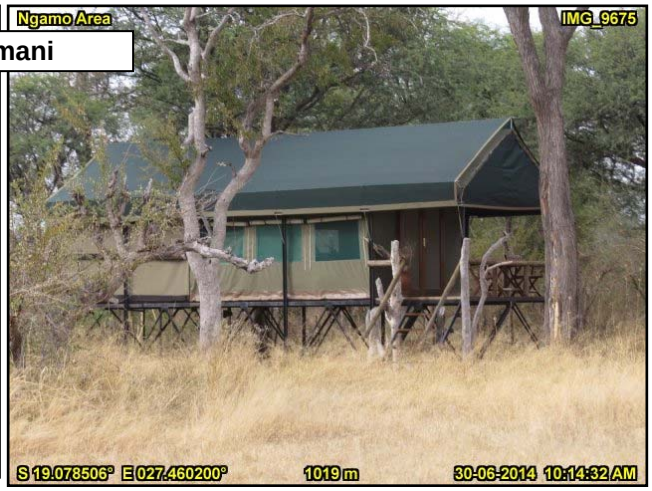
There are four lodge sites currently operational in the Sikumi Forest Reserve. Three of these are leased while Ganda Lodge is a Forestry Commission owned and operated lodge.
Ganda Lodge: 8 Chalets, 32 Beds. Opened 1992. Conference Room
Sable Sands: 16 rooms, 32 Beds
Ivory Lodge: 9 rooms, 20 Beds. Established early 1980s
Elephant's Eye: 8 Rooms; 16 Beds. Opened on old site in 2013

SIKUMI FOREST LAND

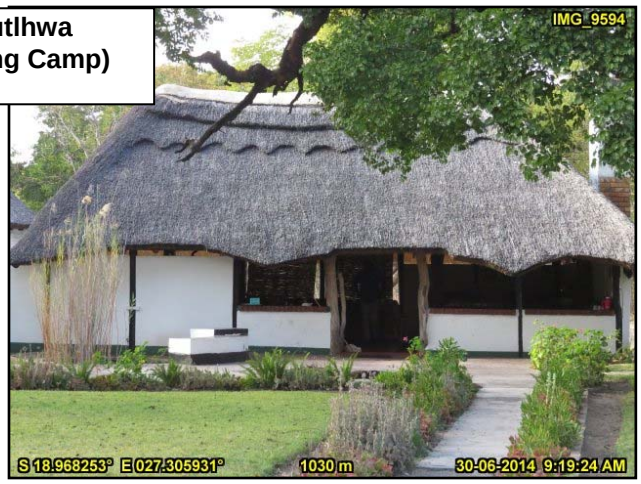
Elephants Eye

NGAMO FOREST LAND

Bomani



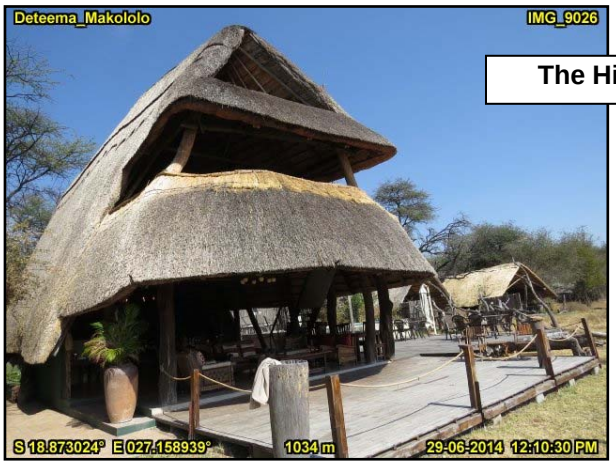
Indutlhwa (Hunting Camp)



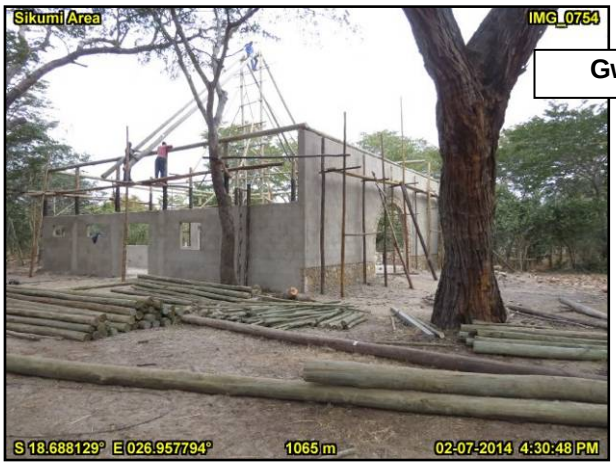
There is one photographic lodge in the Ngamo Forest Area at Bomani. There is a hunting camp at Indutlwa. Bomani was opened in 1999 and has 9 units with 18 beds.

ALIENATED LAND

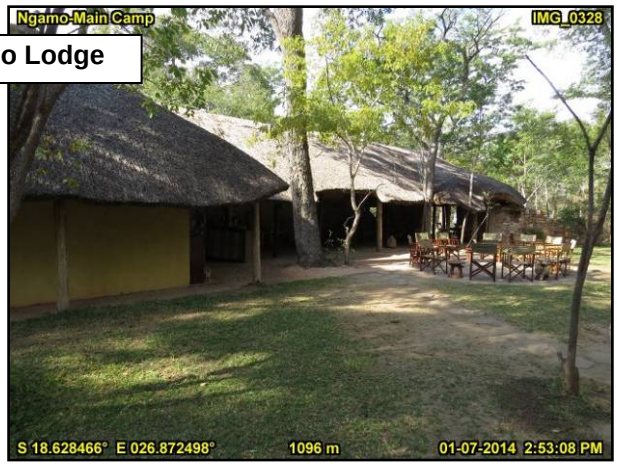
The Hide



Gwango

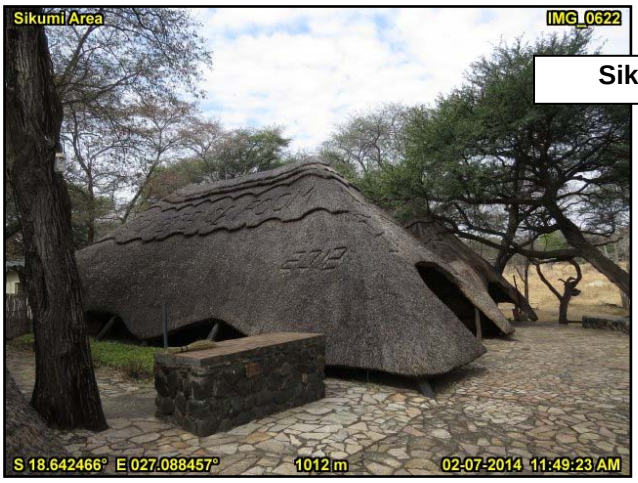


Miombo Lodge

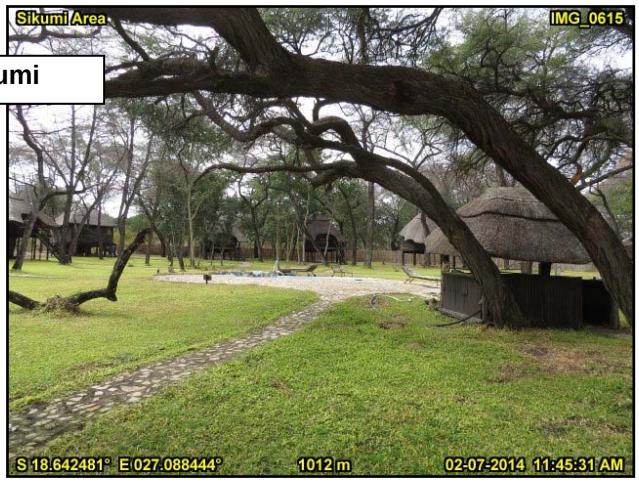


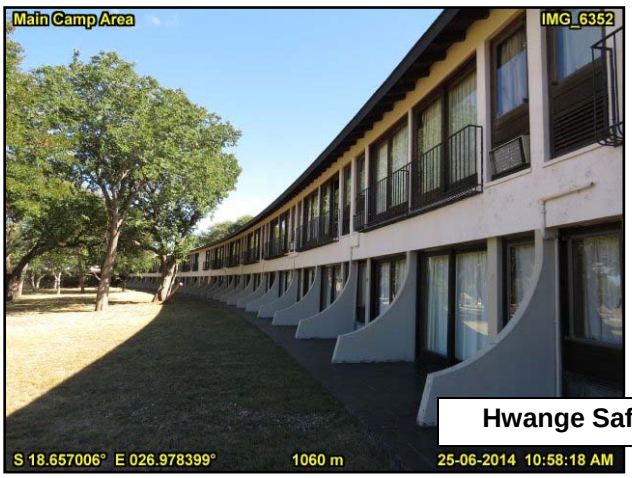
The Hide is on an enclave of alienated land west of the railway line, leased from Zimbabwe Railways. Has 10 tents with up to 24 bed capacity. In addition a small 8 bed exclusive camp served by same kitchen. Can do night drives on enclave. Entry through Kennedy 1 gate. Has been open since 1992.
Gwango is on the site of a previous camp. Currently being rebuilt. Expecting to open an education centre nearby as well.
Miombo has 10 rooms and 20 beds on Dete Council Land

ALIENATED LAND



Sikumi

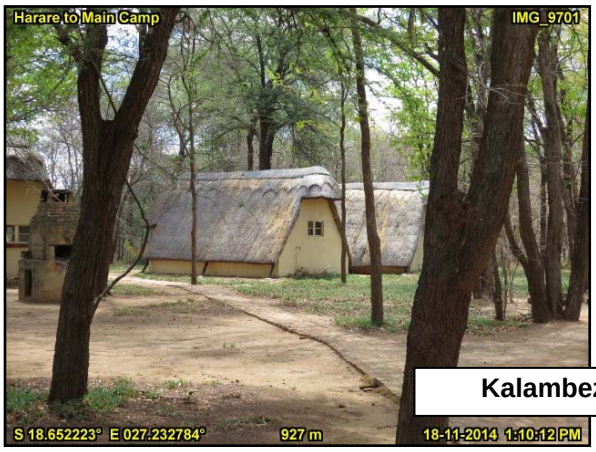




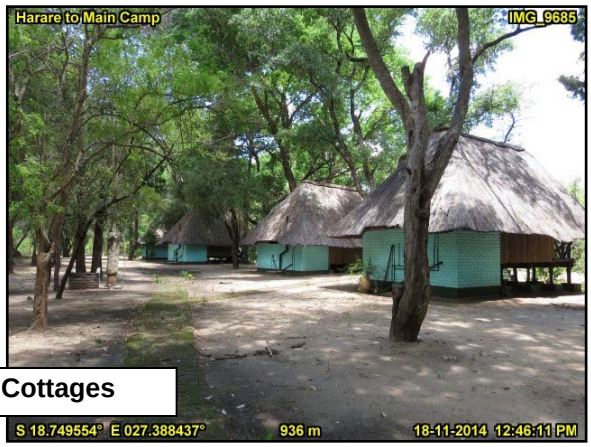
Hwange Safari Lodge

Sikumi has 15 cottages and 30 beds. Was a popular lodge in the past and will be reopened in 2014
Hwange Safari Lodge has 100 rooms and 200 beds. Established previously in keeping with the philosophy of having large accommodation facilities on the boundaries of the park.

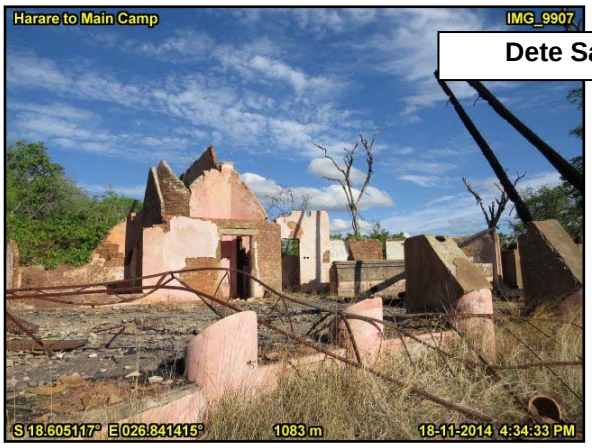
ALIENATED LAND



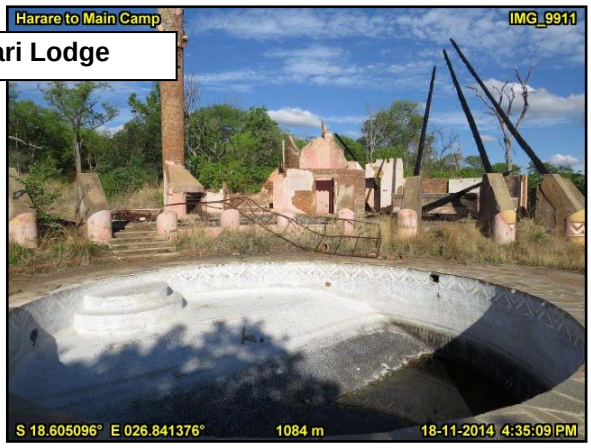
Kalambeza Lodge



Kingdom Cottages



Dete Safari Lodge



COMMUNAL LAND

Currently there is only one lodge in the communal lands surrounding Hwange National Park – Camelthorn Lodge in the Tsholotsho Communal Land. Linked to Bomani. Eight rooms and 16 beds.