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Miombo Eco-region

“Home of the Zambezi”

Conservation Strategy: 2011-2020

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ACRONYMS

ABS	Areas of Biological Significance
CAMPFIRE	Community Area Management Programme for Indigenous Resources
CBNRM	Community Based Natural Resources Management
CBO	Community Based Organizations
CDM	Clean Development Mechanism
CEA NI	Coastal East Africa Network Initiative
CPP	Community Partnership Park
COPASSA	Conservation for Partnerships for Sustainability for Southern Africa
ESARPO	Eastern and Southern Africa Regional Programme Office
Eflows	Environmental Flows
FSC	Forest Stewardship Council
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GHG	Green House Gas
GMA	Game Management Area
HSAF	Hydropower Sustainability Assessment Forum
HWC	Human Wildlife Conflict
ILUC	Indirect Land Use Change
ITCZ	Inter Tropical Convergence Zone
KAZA	Kavango Zambezi
NGO	Non-Governmental Organisation
NO	National Office
PES	Payment for Ecosystem Services
PPCP	Private Public Community Partnership
REDD+	Reduced Emissions from Deforestation and forest Degradation
RSB	Roundtable on Sustainable Bio-fuels
SADC	Southern African Development Community
SARPO	Southern Africa Regional Programme Office
SEA	Strategic Environmental Assessment
TFCA	Transfrontier Conservation Area
WWF	World Wide Fund for Nature
ZRB	Zambezi River Basin

FOREWORD

WWF Eastern and Southern Africa Regional Programme Office (ESARPO) is pleased to share its revised Miombo Eco-region Conservation Strategy for 2011 to 2020. It was formulated through a series of consultations, interactions and meetings with relevant teams and partners within and outside the WWF Network.

The Miombo woodland is one of the 35 eco-regions/priority places of the Global Programme Framework of WWF. It is extraordinarily rich in biodiversity and is home to over 65 million people. The Miombo Eco-region Conservation Strategy focuses on WWF's conservation efforts within the Zambezi River Basin (ZRB) of the eco-region. It outlines responses to biodiversity conservation challenges, and at the same time, opportunities within the Basin and is informed by the ESARPO Strategic Plan of 2011 to 2015. We are targeting only eight priority focal landscapes within the Basin to ensure synergy and coherence in our work within Southern Africa. The Strategy will guide our conservation delivery efforts by tackling key drivers to biodiversity loss and ensuring that the Basin and its associated ecological processes remain the life line for people and nature for generations to come. The Strategy, led by the Miombo team, with ongoing support from relevant country offices and ESARPO, will succeed with the integral support of our many partners and communities with which we work.

I wish to express our sincere gratitude and appreciation to all who contributed to the development and review of this document. We look forward to further collaboration and enhanced partnerships during its implementation in order to leverage greater impact from the limited resources that are available. It remains our collective responsibility to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature!

Yours sincerely,



Niall O'connor
REGIONAL REPRESENTATIVE, ESARPO

EXECUTIVE SUMMARY

The World Wide Fund for Nature (WWF) has been working in the Miombo eco-region for about 25 years, addressing different conservation issues that include freshwater, forests, species, protected area networks, livelihoods and education. This has been done in collaboration with various partners, from both conservation and non-conservation oriented sectors. The efforts have contributed to a number of successes that include: supporting participatory natural resources management approaches; linking conservation delivery and livelihood improvement; facilitating the conservation and sustainable use of WWF flagship species; supporting the development of policy and strategy frameworks for sustainable bio-energy investments; and facilitating the development of environmental flows.

A 2009 WWF Programme Audit of Eastern and Southern Regional Programme Offices noted the vast extent of the Miombo eco-region and identified a need to focus WWF's conservation efforts within the Zambezi River Basin (ZRB) and to revise the Miombo Eco-region Conservation Strategy accordingly. The Basin is representative of the ecoregion as it covers a third of its geographical area and is home to over 60% of its human population. The Revised Strategy will be implemented in eight priority focal landscapes by WWF offices and their partners. The landscapes are: Upper Zambezi; Kavango Zambezi Trans-frontier Conservation Area (TFCA); Middle Zambezi-Luangwa Valleys; Lower Shire Valley; Zambezi Delta; Malawi-Zambia TFCA; Lake Malawi/Niassa/Nyasa; and Bangweulu Basin.

The Strategy will seek to enhance conservation delivery and ensure synergy between various WWF projects (including existing ones) at the priority landscapes and represents a shift away from the current project approach to a programmatic approach to projects and priority landscapes. This involves collaboration between initiatives that feed into overarching objectives; and sharing lessons between projects and landscapes. The Strategy also seeks to effectively link conservation and livelihoods.

The Revised Miombo Eco-region Conservation Strategy addresses a number of threats and opportunities to biodiversity conservation in the ZRB. Its vision is *“By 2050, the Zambezi River Basin and associated ecological processes are the lifeline for people and nature, where sustainable natural resource use contributes to socio-economic development and wildlife thrives”*.

The Strategy aims to enhance conservation delivery by focusing on four strategic programme components whose objectives are as follows:

- a. Ecological networks and ecosystem integrity: To develop robust and resilient ecological networks within the focal landscapes of the Zambezi River Basin by protecting, restoring and managing biodiversity patterns and processes;
- b. Sustainable and equitable use of natural resources: To enhance good governance that promotes equitable access and sustainable use of natural resources with a focus on community level benefits and empowerment;
- c. Responsible and fair trade and investment: To optimize the sustainability of market mechanisms (trade/investment) for ecosystem goods and services that benefit people and nature; and,
- d. Climate change adaptation and mitigation: To create greater resilience (flexibility of ecosystems and

land use) to cope with and minimize climate change impacts.

Main strategies for effecting conservation delivery for each programme component are elaborated. A Strategy Oversight Group will be established to coordinate project development; financial resource mobilization; and project implementation, monitoring and reporting under the Revised Strategy.

INTRODUCTION

This chapter presents a historical account of work carried out by WWF and its partners in the Miombo eco-region over the last 25 years.

MIOMBO ECO-REGION OVERVIEW

The Miombo woodland is a dominant vegetation type that covers 3.6 million square kilometres, spreads over ten countries of Southern Africa and is globally recognized for its biological diversity and potential for nature based tourism. “Miombo” is the Swahili/Bantu word for *Brachystegia*, a genus of large trees, which characterizes this African woodland. The term is now used to cover other associated vegetation types found in Southern Africa. The woodland is linked to the Zambezi River and its tributaries such as the Kafue, Luangwa and Shire (Fig 1) and provides crucial life support systems for over 65 million people. Indeed, some of Southern Africa’s iconic national parks- Hwange, Chobe, South Luangwa, Lower Zambezi and Mana Pools-with their globally significant populations of mega-fauna (e.g. elephant-WWF flagship species, rhino-WWF flagship species, lion, buffalo and leopard) and flora such as the Zambezi /African teak-WWF footprint impacted species are found in the Miombo woodland. Consequently, securing its conservation and sustainable use is critical for the socio-economic development of Southern Africa. It is therefore not surprising that the woodland is one of the 35 priority ecoregions/priority places of the Global Programme Framework of the World Wide Fund for Nature (WWF).

With input from regional and international scientists, WWF identified 26 Areas of Biological Significance (ABS) throughout the Miombo eco-region in the early 2000s. The areas became focal landscapes for WWF’s conservation and footprint work in the ecoregion. ABSs are large landscapes that represent biodiversity, ecological processes and goods and services of an ecoregion.



The Victoria falls-one of the, “Seven Wonders of the World,” is on the Zambezi River

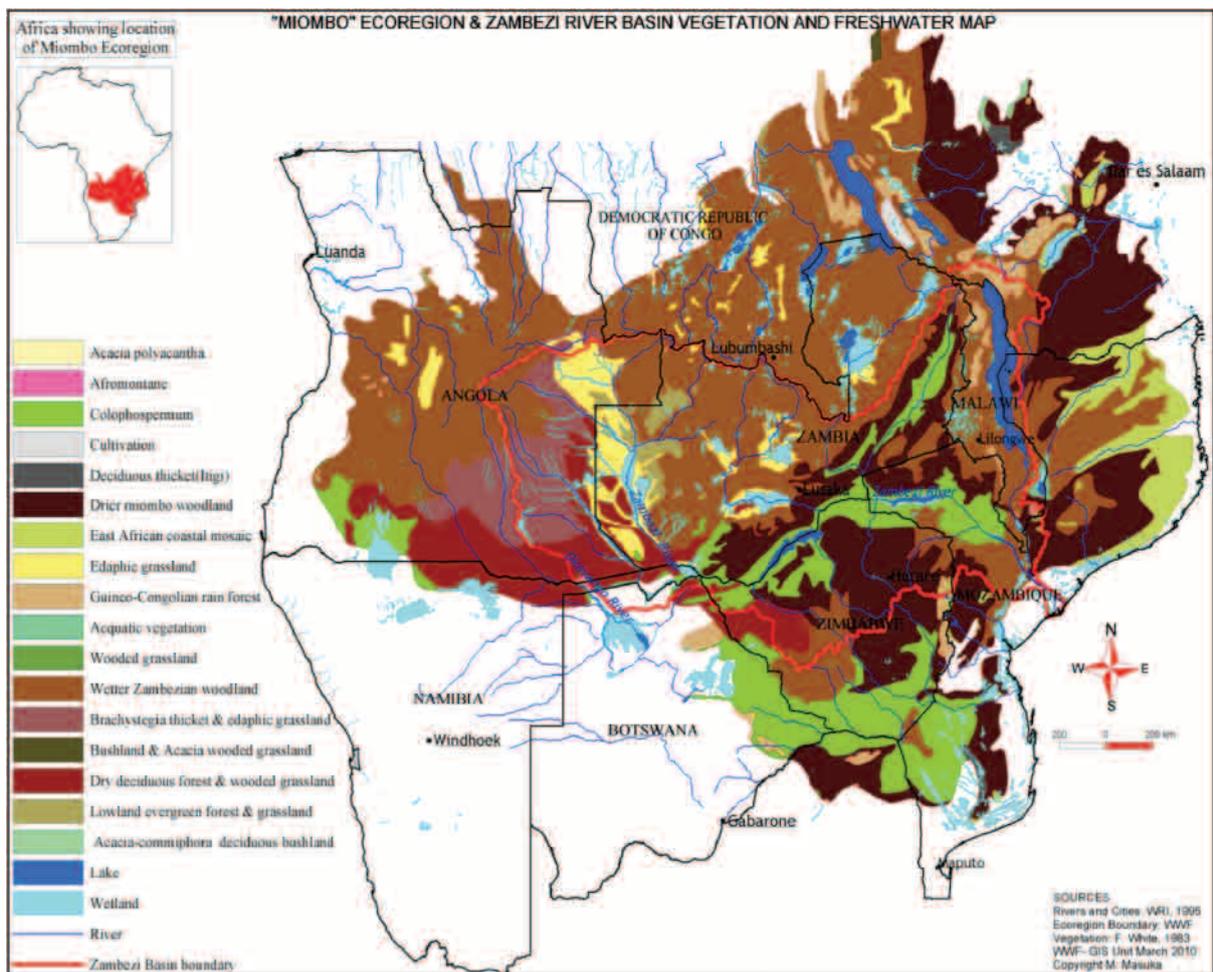


Figure 1: The woodland and river system network of the Miombo eco-region

ACHIEVEMENTS OF WWF OFFICES AND PROJECTS

WWF has been working in the Miombo ecoregion for over 25 years, addressing different conservation issues that include: freshwater, forests, species, protected area networks, livelihoods and environmental education. This has been accomplished through collaboration with partners, from both conservation and non-conservation oriented sectors, albeit with limited coordination between projects. Results of these different initiatives have not always been adequately documented and shared in an integrated manner-making it difficult to assess the impact of WWF's work in the ecoregion. Notwithstanding, the organization's efforts have contributed to a number of achievements that include: participatory natural resources management; linking conservation delivery with livelihood diversification and improvement; conservation and sustainable use of WWF flagship species; policy and strategy frameworks for sustainable bio-fuel investments; and environmental flows. The achievements are elaborated in this section.

Participatory natural resources management

With technical, financial and/or oversight support from WWF and other partners, several Basin states have supported Community Based Natural Resource Management (CBNRM) programmes and activities for more than two decades. These initiatives, which include the Community Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe; Namibian National CBNRM Programme (Community Conservancies); and the Regional Southern Africa CBNRM Programme have greatly influenced global thinking on sustainable use and devolved systems of natural resources management. Unfortunately, the effectiveness of the CAMPFIRE Programme has declined considerably under the adverse socio-economic conditions in Zimbabwe of the past decade. However, some observers have reported the high level of resilience of the CAMPFIRE programme despite the adverse socio-economic conditions in the country. Namibia's CBNRM programme continues to flourish with lessons learnt being shared with neighbouring communities in Zambia and elsewhere, partially by building synergy with the Regional Southern Africa CBNRM programme.

CBNRM is an incentive based conservation and development approach that is implemented by people who live with and directly depend on biological resources. Its success has largely depended on the level of devolution, donor commitment, policy changes, links with tourism and hunting and the economic viability of the resource base for initiatives such as hunting, tourism and enterprise development. The key economic driver of CBNRM in Southern Africa has been wildlife (large mammals), mostly through trophy hunting and eco-tourism. The potential role of veld products in these areas is only beginning to be realized through value addition and commercialization. Such products have potential for nutritional, pharmaceutical and industrial use, and for generating income for rural people. Consequently, they have the capacity to broaden the economic viability of CBNRM initiatives. One advantage of veld products is their wider distribution when compared to wildlife.

Linking conservation delivery with livelihood diversification and improvement

WWF is promoting the formal management of traditional or communal land by local communities in the Bangweulu Basin (Zambia) using honey production, fish farming and conservation agriculture as entry points/incentive systems. Under this initiative, some 27 532 ha of traditional land was mapped out, characterized and delineated for active management. Of the mapped area, 730 ha were set aside for local level management through formal agreements drawn up by communities and sanctioned by the traditional leadership. The remaining land will be zoned and participatory land use plans developed collectively by local institutions, traditional leaders and local communities.

The latter received training in by-law formulation and subsequently elaborated rules on the management of the land. The laws highlight what can and cannot be done on the zoned land and were ratified by the traditional leadership.

The success of this initiative will largely depend on the level of direct benefits that accrue to communities from honey production, fish farming and conservation agriculture. In the area of honey production, a revolving fund was established to enable members of bee keeping groups to increase the number of hives per individual from three to at least seven. Beekeepers are also encouraged to feed bees to enhance their productivity.

Conservation and sustainable use of WWF flagship species

Together with its partners, WWF has been working in assisting governments of Southern Africa to conserve and sustainably use wildlife species such as elephants. This has included support to the improved management of wildlife in Protected Areas (PA); and in catalysing the implementation of sustainable use initiatives such as CAMPFIRE in Zimbabwe and the national CBNRM in Namibia. Conservation and sustainable use approaches adopted by governments have resulted in increases in elephant numbers over time. For example, Zimbabwe's elephant population steadily increased from 4 000 in 1900 to 120 000 in 2008.

Another example of successful species conservation work has occurred in the Caprivi region of Namibia. Census work has documented increasing wildlife populations along the north-east rivers and flood plains between 2004 and 2007; and 2007 and 2009 respectively. The increase in wildlife both within protected and conservancy areas may be attributed to the movement of wildlife within the Caprivi and movements between Botswana and the Caprivi as well as local conservation initiatives such as conservancies which encourage increased wildlife numbers through reduced poaching and game introductions.

Rising wildlife population numbers have led to increased human-wildlife conflicts. The birth of CAMPFIRE in the early 1980s was, among other things, aimed at addressing this challenge. WWF, in partnership with the Food and Agricultural Organization (FAO) and BioHub (a consortium of local and international Non Governmental Organizations-NGOs) supported the development of a toolkit for Human-Elephant Conflict management. The kit is being promoted in a number of Southern African countries. In Namibia, WWF and its partners have assisted conservancies in the Caprivi region to develop an internal insurance scheme that provides a fixed level of reimbursement for documented cases of damage by wildlife.

Policy and strategy frameworks for sustainable bio-energy investments

WWF carried out studies to assess the status of bio-fuel production in Southern Africa. The studies showed that although Malawi, Mozambique, Zambia and Zimbabwe have established sugarcane industries, only Malawi and Zimbabwe can produce significant amounts of bio-ethanol from molasses, a sugar by-product. All four study countries (plus Botswana) have initiated some work on *Jatropha* cultivation for bio-diesel production. However the latter is still in its infancy. Current bio-fuel investments in the study countries range from large to small scale. The former are supported by national and international investors and the latter are mostly facilitated by Non Governmental Organizations (NGOs).

With respect to large scale bio-fuel production, the studies showed that such initiatives are operating in a policy vacuum as national bio-fuel policies are still evolving and are usually not more than general statements on renewable energy or on bio-fuels. The studies demonstrated that without sound policies and strategies, benefits from such investments will have no bearing on poverty alleviation; respect for human rights; or environmental conservation. Consequently, they recommended the need for a regional bio-fuels policy and strategy framework that would inform the development of country specific bio-fuel policies and strategies. The regional framework was adopted by the Southern African Development Community (SADC) at a joint WWF and SADC regional meeting.

Environmental flows

Hydropower generation in the Zambezi River Basin is essential for meeting the ever increasing energy demands of Southern Africa and additional dams are planned for this purpose. They include the Mphanda Nkuwa hydropower dam in Mozambique and the new Kafue Gorge Lower in Zambia. Artificial reservoirs for hydropower generation such as Kariba, Kafue and Cabora Bassa gorges have modified the Middle and Lower Zambezi Basin by altering the flow and flood regime downstream, including the Zambezi delta. The dams have changed downstream ecology, largely through the loss of seasonal high and low flows and sediments trapped behind the dam wall. This has contributed to habitat loss and declines in plant and animal biodiversity.

Environmental flows (Eflows) are the quantity, timing and quality of water flows required to sustain freshwater and estuarine ecosystems and the people who depend on the ecosystems. It implies mimicking-within given limitations-natural flows in the river basin. An understanding of the upstream-downstream consequences and stakeholder trade-offs is therefore a key element in the design and management of water courses such as the Zambezi River Basin. This mitigates many threats associated with the disruption of natural river flows by dams and other large infrastructural works including irrigation.

In partnership with other stakeholders, WWF made a breakthrough in environmental flows that involved the modification of the Itezhi-Tezhi dam operating rules in the Kafue flats. This resulted in the release of freshets mimicking natural flows that existed before the construction of the dam. However, there is need for enhanced understanding and quantification of possible effects of environmental flow releases and verification of project benefits where possible. This will further require high level negotiation and persuasion at the level of decision makers to obtain the necessary buy-in and internalization of environmental flows management. This is mainly because of the strategic nature of dam operations.

THE ZAMBEZI RIVER BASIN FOCUS

This chapter provides justification for revising the Miombo Eco-region Conservation Strategy with a focus on the Zambezi River Basin (ZRB). It gives a brief overview of the biodiversity status of the Basin including major biodiversity threats and opportunities; and describes priority focal landscapes for future WWF work.

MOTIVATION FOR REALIGNING WWF'S GEOGRAPHIC FOCUS

The 2009 WWF Programme Audit of the Eastern and Southern African Regional Programme Offices noted the vast extent of the Miombo eco-region and identified a need to focus WWF's conservation work within the ZRB and to revise the Miombo eco-region conservation strategy accordingly. The ZRB is representative of the eco-region as it covers a third of its geographical area, is home to over 60% of its human population and accommodates eight of its 26 ABSs. Consequently, the Revised Miombo Eco-region Strategy focuses on the ZRB and is informed by the Eastern and Southern Africa Regional Programme Office (ESARPO) Conservation Plan of 2011-2015.

STATUS OF BIODIVERSITY IN THE ZAMBEZI RIVER BASIN

The ZRB is a multiple catchment basin that covers 1.3 million square km and is the largest basin in Southern Africa. It is shared by eight riparian states (Table 1).

Table 1: Proportion of riparian states comprising the Zambezi River Basin

Riparian state	Proportion within Basin, %
Zambia	41
Zimbabwe	19
Angola	11
Mozambique	11
Malawi	8
Botswana	6
Namibia	2
Tanzania	2

The Basin is divided into three sections that differ in landscape characteristics, geological history and biodiversity. They are the upper Zambezi-comprising the headwaters of the Zambezi and Liuwa-Mussumu area; the Middle Zambezi-covering Victoria Falls to the confluence of the Luangwa river; and the lower Zambezi-starting at the confluence of the Luangwa river to the coast at Chinde and includes the Shire river. The Basin is home to about 38 million people and accommodates some 33% of the total population of six riparian states (Chenje, 2000). It is an area of high biodiversity value and is critical to human livelihoods as illustrated by the following:

- It has more than 6 000 species of flowering plants, 650 species of birds and 200 species of mammals. The latter includes elephant and rhino, WWF flagship species;
- It consists of some of Southern Africa’s most important sub-ecosystems, biomes and landscapes characterized by teak forest reserves in Zambia and Zimbabwe; and wetlands and protected areas such as Chobe National Park in Botswana, Liwonde in Malawi, Gorongosa-Marromeu in Mozambique, Kafue and Luangwa in Zambia and Hwange in Zimbabwe;
- Its rivers provide most of Southern Africa’s power generation; irrigation; domestic and industrial water supply; ecosystems use; and inter basin transfers. Water demand for some of these uses is shown in Table 2: and,
- It provides livelihood to some of the poorest communities of southern Africa who depend on subsistence agriculture and the exploitation of natural resources for survival. It is estimated that close to 60% of households across the Basin live on less than \$1/day.

Table 2: Water demand for select uses in riparian states during 1995 (million cubic metres/year)

Riparian state	Domestic & industrial	Stock	Mining & energy	Irrigation	Total
Angola	1 720	272	15	750	2 757
Botswana	175	44	65	47	331
Malawi	730	23	5	1 820	2 578
Mozambique	135	65	10	3 000	3 210
Namibia	200	70	15	248	533
Tanzania	1 690	70	10	10 450	12 220
Zambia	532	60	20	1 580	2 192
Zimbabwe	697	30	30	4 980	5 737

Source: Chenje, 2000.

MAJOR THREATS TO AND OPPORTUNITIES FOR BIODIVERSITY CONSERVATION

Major threats

Major threats to the integrity of biodiversity in the ZRB include: high population growth; environmental degradation; weak national institutions; large scale infrastructural and agricultural investments; and climate change. They are highlighted in this section.

a. High population growth

The Basin has a human population that is growing at an average rate of 2.9% annually, is predominantly poor and dependent on subsistence agriculture and natural resources. Population growth is linked to land clearing for agriculture and for wood energy (including charcoal). Wood is the primary energy source for rural communities who constitute the bulk of the population of riparian states. Its demand in urban areas is also on the increase due to the high cost and limited availability of electricity. Deforestation contributes to loss of habitat; and increased soil erosion and river sedimentation that negatively impact water quality. Industrial expansion is also increasing the levels of water pollution and raising demands on water and ecological resources.

According to the 2000 State of the Environment Report for the ZRB, poverty is probably the biggest single constraint to the effective conservation of the Basin and its biological components. With the exception of Botswana, riparian states are poor countries whose external debt, terms of trade and market access, and dependence on single commodities combine to create an adverse macroeconomic climate (Table 3). Furthermore, inadequate access to capital, employment and markets, top down development, natural disasters, over dependence on agriculture and decreasing land availability contribute to natural resource degradation.

Table 3: Some key socio-economic statistics on riparian states

Riparian state	GDP (\$ billions)	GDP per capita (\$)	Population (millions)	Urbanization (%)
Angola	9.76	696.9	14.0	42.4
Botswana	6.50	2 796.0	1.7	46.4
Malawi	2.28	198.0	11.5	15.0
Mozambique	4.09	226.0	18.1	23.0
Namibia	2.82	1 667.0	1.8	27.0
Tanzania	9.74	266.0	33.6	30.0
Zambia	4.34	392.0	10.7	35.0
Zimbabwe	22.00	1 891.0	11.6	33.6

Source: SADC, 2006

b. Environmental degradation

The Basin is experiencing significant levels of environmental degradation and biodiversity loss (Chenje, 1998). Table 4 shows changes that took place on selected land cover types between 1990 and 2006. The greatest changes occurred to primary woodlands and wet grasslands that were reduced by 9.2% and 7.5% respectively. The greatest expansion was rain-fed agriculture, mixed woodlands and settlement areas. The loss of vegetation cover contributes to biodiversity loss, increased run off, soil loss, decreased base flows, and siltation of water bodies and reduced tourism opportunities.

Table 4: Change in some land cover types in the ZRB: 1990-2000; and 2000-2006

Land cover type	% cover in 1990	% cover in 2000	% change 1990 to 2000	% cover in 2006	% change 2000 to 2006
Primary woodland	22.6	15.8	-6.5	13.1	-2.7
Mixed woodland	22.8	28.8	+5.9	31.3	+2.5
Built up areas	5.7	11.4	+5.7	13.4	+2.3
Rain fed agriculture	11.7	17.9	+6.2	21.3	+3.4
Irrigated fields	0.1	3.5	+3.4	4.4	+0.9
Wet grasslands	13.8	7.7	-6.1	6.3	-1.4
Open grasslands	9.6	5.4	-4.2	4.9	-0.7
Deep water body	6.1	4.1	-2.0	3.2	-0.9
Rivers	1.9	0.6	-1.3	0.5	-0.1

Source: WWF SARPO, 2007

c. Weak national institutions

National institutions that deal with biological resources in the Basin states are generally weak in policy formulation; enforcement of legislation; and provision of management oversight on various resources. In addition, the implementation of SADC wide protocols such as those on: shared watercourse systems; wildlife conservation and law enforcement; energy; trade; and forests is inadequate. This is largely attributed to inadequate human and financial resources (SADC, 2006). In addition, local level institutions that deal with biological resources have been weak, especially under communal land tenure systems. Furthermore, there has been limited participation by women in existing institutional structures.

d. Large scale infrastructural and related investments

Large investments include transportation, dams and communication infrastructure; extractive industries; and bio-energy plantations as elaborated below.

Transportation and communication infrastructure: Increased demands for development are resulting in new roads, power lines and communication towers/lines being built. These developments frequently traverse biodiversity sites or interrupt wildlife migration corridors.

Extractive industries: The global rise in demand for oil and minerals has contributed to increased prospecting and development of mines or oil fields in some Basin states. Some of this is taking place in national park areas. Unfortunately, such developments frequently occur at the expense of unique biodiversity assets although little of the generated benefits go back into conservation or rural development.

Bio-energy plantations: European and Chinese investors are actively seeking land for bio-fuel feedstock cultivation in some Basin states. This is in response to a recent surge of interest in bio-fuels caused by high prices of imported fossil fuels, energy security and climate change concerns; while the major motivation for embracing bio-fuels by basin states is a desire to promote rural development and reduce poverty. However, improper large scale bio-fuel investments may in fact create high Green House Gas (GHG) emissions if they lead to direct land use change or indirect land use change (ILUC). Consequently, they can be an emerging driver of global warming, habitat alteration, biodiversity loss, food insecurity and community displacement and disenfranchisement, if not properly guided and responsibly implemented. Community level bio-fuel feedstock production, processing and utilization can also be a livelihood diversification and enhancement option.

e. Climate change

Climate models indicate that there will be a 1.5-2.5 degrees Celsius temperature increase across the Zambezi river basin within the coming 40 years. Rainfall predictions across the Basin vary. In general terms, four main regions with different rainfall predictions are considered relevant for the Basin. They are:

- The south region (southern Zambia, Botswana, Namibia, Zimbabwe and Mozambique) is expected to receive less rainfall particularly less winter rainfall and a condensed summer rainfall season (albeit with little change in total summer rainfall). Some projections suggest decreased mean annual rainfall of up to 10% by the end of the 21st century;

- The north eastern part of the Basin (eastern Zambia-part of Kafue and Luangwa and Malawi) will experience an increase in mean annual rainfall as a result of a wetting trend emanating from Tanzania. Besides the increase in annual rainfall that could even reach 10%, the intensity of rainfall events is projected to increase, with longer dry-spell duration intra-seasonality. Shifting onset of the rains and marked rainfall variability in the early rainy season is anticipated;
- In the northwest (western Zambia, Angola-Upper catchment & Kafue) there will be opposing wetting and drying instances based on the movement of the Inter-Tropical Convergence Zone- (ITCZ); and,
- The coastal portion of the Basin (southern Malawi and coastal Mozambique-Lower Shire and the Delta), that part which mostly concerns the delta, will experience opposing wetting and drying instances and will be subject to increased cyclonic activity of higher intensity and possibly higher frequency.

In order to get a better understanding of the hydrological consequences (like river discharges) of climate change, other factors than rainfall need to be taken into account, like evapo-transpiration and water retention and discharge characteristics of the system. These factors are determined by development scenarios in the Basin such as increase in irrigated area, planned dams and other developments that affect water use and regulation. It is therefore recommended to assess relevant development scenarios to gain a better understanding of hydrological responses of the system. For example, analyses to date show that although the Upper Zambezi might receive 5% more rainfall, the increase of evaporation will result in the same amount of runoff or even decrease river flows depending on the development and deforestation rate in the area. The Zambezi river main stem will experience some to severe drying. The Kafue basin can expect the same level of water stress as the Upper Zambezi. The Luangwa river is expected to see an increase in runoff, more peaks of floods and more water in the river, but with a strong increase in irrigation, this could as well result in significant drying of regulated systems. The same accounts for the Shire river. The Zambezi delta with the increased cyclonic activity will (especially with more runoff from the Shire) generate more water in the Zambezi, but with increased extremes and longer dry periods.

Understanding of the hydrological responses of the Zambezi basin to climate change is of great importance to WWF because-besides expecting significant and diverse climate change responses as described above-it determines to a great extent the sustainability of many conservation and development initiatives being promoted by WWF. The aquatic and water dependent terrestrial systems and thereby animal life are heavily impacted upon by the changing environment. As climate changes different areas experience shifting temperatures and water availability. As such, species may migrate or become extinct which affects the viability of eco-tourism and game parks. The key areas of risk within the Zambezi River Basin from an environmental standpoint are primarily the Kafue sub-basin, the Barotse flood plains, the Zambezi delta, Lake Malawi and the Shire river. Another example is that high impact flooding events are expected (if appropriate steps are not taken) to occur more often downstream of Victoria falls, especially in the Delta, hence putting people and wildlife at risk. Building more dams would be a mal-adaptation response to this problem as the technocratic approach to water management (e.g. construction of dams) is the very reason for unpredictable floods to take place. Moreover, dams might very well be at risk throughout the Basin with possible reduced river flow over several years hampering the ability of dams to generate electricity. Consequently, WWF's ecosystem approach to water management can be an effective and sustainable response to flooding.

Major opportunities

Major opportunities for biodiversity conservation and sustainable use in the Basin include: vast forest, woodland and wildlife resources; the untapped potential to add value to natural resources; its long history of participatory community-based natural resources management and the potential to further develop and expand it; and the existence of a network of protected areas that, combined with communally managed areas present unlimited tourism opportunities. They are elaborated in this section.

a. Vast forest, woodland and wildlife resources

Forests and woodlands constitute the dominant vegetation cover of the Basin and are therefore of vital importance in the regulation of river catchments. They help maintain the supply of water for irrigation, industry, hydropower and human consumption. When wetlands are well managed through balanced land use, woodlands absorb excessive rainfall during the rainy season that is gradually released during the dry season. In this way, they regulate stream flows and minimize both downstream flooding and drought conditions (maintenance of environmental flows). Woodlands also play an important role in reducing global warming as they are significant sinks of carbon dioxide. This offers riparian states opportunities to benefit from existing and potential carbon markets under voluntary schemes such as the Clean Development Mechanism (CDM) to trade their carbon stocks. Furthermore, the Reduced Emissions from Deforestation and forest Degradation (REDD+) offers riparian states an additional opportunity to benefit from global carbon trade. Carbon trading can be an important incentive for rural communities and nations to practice good environmental stewardship.

With respect to wildlife, the miombo forests and woodlands provide habitat and wildlife corridors for species such as the elephant, buffalo, rhino, leopard and lion which are important for consumptive and non-consumptive tourism. Wildlife corridors are increasingly becoming important in TFCA wide conservation and tourism ventures.

b. Untapped potential for value addition to natural resources

With the exception of wildlife-based hunting and tourism, much of the Basin's biological resources are of low economic value in their natural state. This is further compounded by a lack of linkages to global markets with the result that local communities derive little benefit from them. Consequently, some CBNRM initiatives that focus on resources such as veld products have had limited success. This has generated interest in bio prospecting; value addition through transformation; improved marketing (e.g. creation of producer associations) to external buyers; and in exploring opportunities offered by carbon trading.

c. Enabling legal frameworks

Governance changes on ownership and access to natural resources are beginning to emerge in some riparian states. For example, local bodies and communities are being empowered to manage and benefit from communal resources through the process of decentralization and devolution of administrative powers and responsibilities. This was the cornerstone of CAMPFIRE in Zimbabwe and Community Conservancies in Namibia. Customary ownership of land is also receiving legal recognition in some Basin states. For example, Mozambique's land reform law of 1997 recognises customary land rights over local resources. Similarly, Namibia's Nature Conservation Act of 1996 provided a basis for communal area conservancies and granted conservancy members the right to consumptive uses of

wildlife. However, the impact of some of these policy changes on the sustainable management of biological resources still remains to be seen in countries where they have been implemented while in countries such as Zambia, resource tenure, even on customary land, remains not well articulated and certainly not adequate as an incentive for local community participation in natural resources management.

d. Existence of a network of protected areas

The proportion of Basin states under protected areas ranges from 6.6 % in Angola to 30.4% in Zambia. Protected areas have the following attributes:

- They have rich forest and wildlife biodiversity that has facilitated the development of a booming tourism industry;
- They provide habitats for endangered species of flora and fauna. For example, the bulk of “Important Bird Areas” for threatened bird species such as the crowned crane and bearded vulture are found in protected areas; and,
- They offer opportunities for TFCA initiatives as over 60% of them straddle international boundaries.

However, the integrity of most protected areas is threatened by poor management largely caused by financial and human capacity constraints faced by Park’s Authorities; wildlife poaching by local communities and national and international syndicates; and climate change.

FOCAL LANDSCAPES FOR THE CONSERVATION STRATEGY

Landscape prioritization

The revised Miombo Eco-region Strategy will be implemented in eight priority focal landscapes selected by WWF. The pre-selection of landscapes is intended to ensure synergy and coherence of the organization’s work. The landscapes are: Upper Zambezi; Kavango Zambezi (KAZA) TFCA; Middle Zambezi-Luangwa Valleys; Lower Shire Valley; Zambezi Delta; Malawi-Zambia TFCA; Lake Malawi/Niassa/Nyasa; and Bangweulu Basin (Fig 2). Reasons for choosing the landscapes include the following:

- They have considerable ecological inter-connectivity (e.g. Upper Zambezi & KAZA TFCAs);
- They hold sizeable populations of flagship species (elephant and rhino) and footprint impacted species (the Zambezi/African teak);
- They offer opportunities for trans-boundary work and are receiving collective investment priority by their respective governments (e.g. Upper Zambezi, KAZA, Middle Zambezi-Luangwa valleys and Malawi-Zambia TFCA);
- WWF has used participatory approaches in its natural resource conservation work in most of the focal landscapes already. Similar approaches will be used to deliver on the strategic programme areas of the revised Miombo Conservation Strategy; and,
- WWF and its partners have been working in most of the landscapes for some time and have made considerable investments and established important partnerships that should be followed through.

The eight landscapes cover a total area of 1 137 000 square km. For purposes of maximizing conservation impact, the landscapes were further prioritized into two groups. Group 1 landscapes are those that will require direct WWF engagement and investment while those in Group 2 will require less investment and can be transitioned to other external partners and/or can be used for cross cutting policy and advocacy work. Group 1 landscapes cover 923 000 square km and consist of Kavango-Zambezi TFCA, Middle Zambezi- Luangwa valleys, Upper Zambezi and Zambezi Delta. Bangweulu River Basin, Malawi-Zambia TFCA, Lower Shire Valley and Lake Malawi/Niassa/Nyasa comprise the Group 2 landscapes and cover 214 000 square km. Details on the area coverage and country spread of the landscapes is given in Table 5. Three of the Group 1 landscapes are found in Zambia; two in Zimbabwe; and one each in Mozambique and Namibia. With respect to Group 2 landscapes, Mozambique and Zambia host two while Tanzania has one.

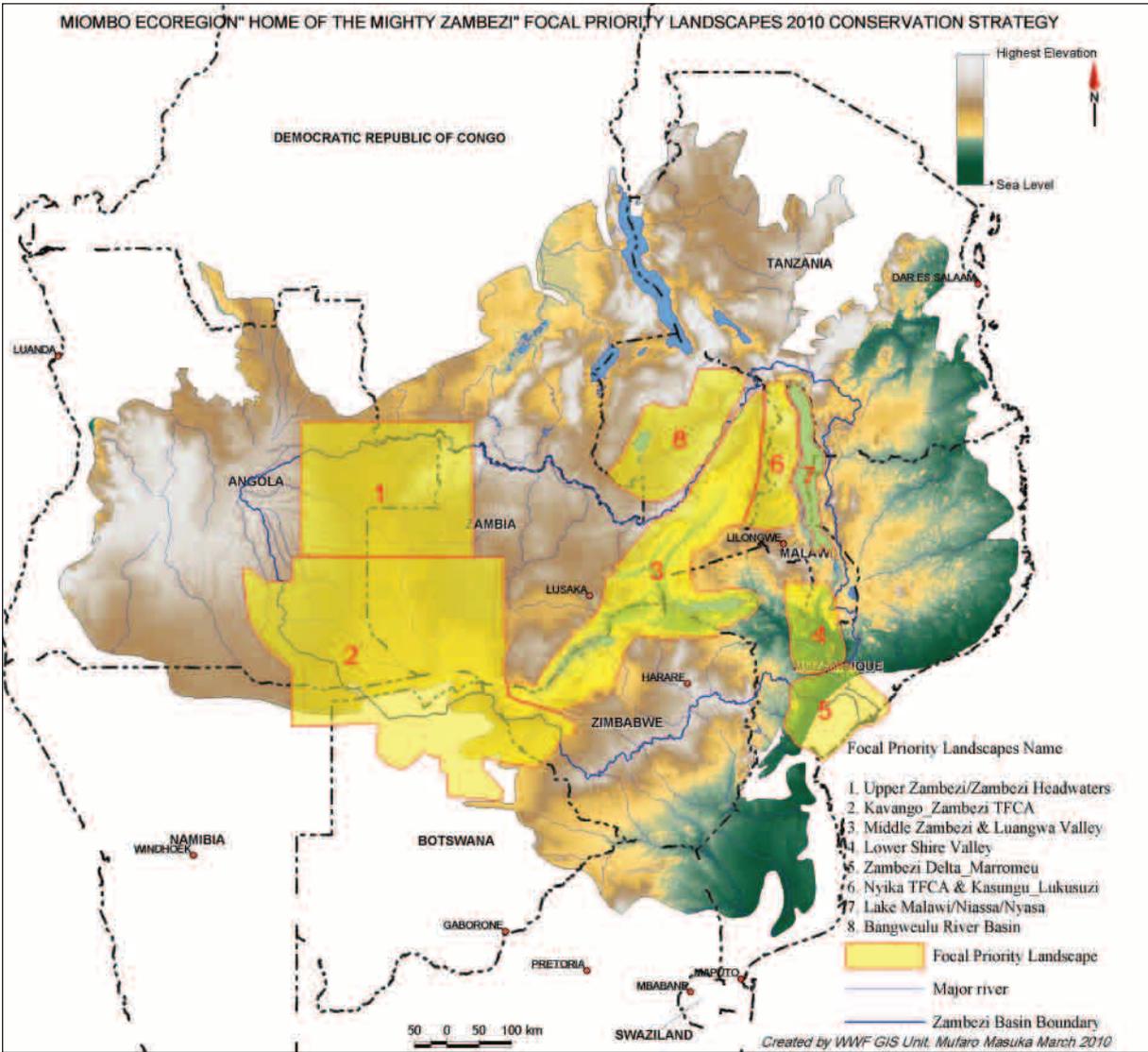


Fig 2: Geographical location of the focal landscape

Table 5: Landscape land area and country coverage

Priority landscapes	Area (1000 km ²)	Country coverage							
		Ang	Bots	Mal	Moz	Nam	Tanz	Zam	Zim
Group 1									
Kavango – Zambezi TFCA	454	X	X			X		X	X
Middle Zambezi - Luangwa Valley	223							X	X
Upper Zambezi	218	X						X	
Zambezi Delta	28				X				
Total	923	2	1	0	1	1	0	3	2
Group 2									
Bangweulu Basin	83							X	
Malawi – Zambezi TFCA	52			X				X	
Lower Shire Valley	41			X	X				
Lake Malawi / Niassa	38			X	X		X		
Total	214	0	0	3	2	0	1	2	0

Landscape prioritization

The eight focal landscapes are briefly described in this section.

a. Kavango Zambezi Trans-frontier Conservation Area

The Kavango Zambezi (KAZA) TFCA is situated in the Okavango and Zambezi river basins where the borders of Angola, Botswana, Namibia, Zambia and Zimbabwe meet. It is a joint initiative between governments of the five riparian states to collectively form and manage what will eventually become the largest TFCA in the world. Once formalized, it will encompass about 287 132 square km of land that includes 36 national parks and game reserves; a significant number of forest reserves; community conservancies; GMAs; and wildlife management areas; with open communal areas serving as linkages between the conservation areas across the landscape.

KAZA TFCA has a rich array of conservation assets that include: approximately half of Africa’s elephant population; small but increasing numbers of black rhino; the Okavango Delta, the world’s largest Ramsar site; extensive and untouched wetlands and riparian habitats along the Okavango and Zambezi Rivers; intact but increasingly threatened teak forests; and a large number of endangered, threatened or rare mammals, birds, reptiles and plants.

The TFCA offers the following opportunities:

- It is one of the least populated and under developed landscapes remaining in Africa. Consequently, it has immense potential to be developed as one of the continent's eminent tourist destinations;
- There is high potential to enhance recovery of wildlife stocks in low-density wildlife areas of the landscape through translocations and natural range expansion;
- It can potentially become an important testing ground for the development and introduction of standards and protocols for the use and trade of natural resource products, water management and distribution schemes and other payment for environmental service type mechanisms; and,
- There is extensive potential to increase land under conservation management through the creation of new parks, forest reserves and community managed areas.

b. Middle Zambezi-Luangwa Valleys

The Mid Zambezi-Luangwa Valleys landscape is shared by Zambia and Zimbabwe.

The Mid Zambezi Valley is an extension of the African Rift Valley. On the Zimbabwe side, it consists of three national parks (Mana Pools-a world heritage site; Matusadona; and Kariba); five safari areas; and communal lands (Dande and Mukwiche). On the Zambian side it encompasses the Lower Zambezi National Park; and three GMAs namely Chiawa, Luano and Rufunsa. Mana Pools and Lower Zambezi National Parks form part of the proposed Mid Zambezi-Luangwa Valley TFCA. The Chiawa GMA "houses" the Chiawa Partnership Park. The Park will be a community and leaseholder managed protected area. It offers an innovative model for conservation management that involves local communities. The Zambezi valley is characterized by broken topography, low rainfall and poor soils which limit agricultural production and rural settlement. Given the fragile nature of the valley, wildlife is probably the valley's most valuable asset. Its vegetation is characteristically dry deciduous *Colophospermum mopane* and open woodland with trees and shrubs of varying height and density. On higher ground and above the escarpment, miombo woodlands of *Julbernardia globiflora* and *Brachystegia* species predominate. The valley holds significant wildlife populations and is one of Zimbabwe's foremost wildlife attractions. Its large mammals include elephants, buffalo, lion, impala, hippo; has two Important Bird Areas; and carries 30 fish species and the crocodile. It used to be a rhino habitat and there are plans to reintroduce the species into the Matusadona National Park, an ideal habitat for the endangered species. The main land uses in settled areas include subsistence and cash cropping and livestock production. Poaching and extractive industries threaten Mana Pools National Park. For example, multiple exploratory mining projects recently commenced in the Lower Zambezi Catchment Area from Lake Kariba downstream along the Zambezi river through the New Partnership Park, and within the Lower Zambezi National Park.

Two large man-made lakes (Lake Kariba and Lake Cahora Bassa) are found in the Middle Zambezi. Apart from generating the much needed hydro power, the dams are important tourist attractions and affect environmental flows of the Zambezi River Basin. New power generation projects in the valley will threaten the landscape's ecosystem integrity. In addition, the valley presents suitable geological formations for uranium, oil and natural gas prospecting. This and any eventual extraction of such deposits frequently takes place at the expense of unique biodiversity assets, with little of the generated revenue going back to conservation or rural development.

The Luangwa Valley is located in the eastern province of Zambia and is an extension of the Great East Rift Valley. It consists of major protected areas (South Luangwa and North Luangwa) and several Game Management Areas (buffer zones). It is drained by a network of streams including the Luangwa

river and is home to the Luangwa floodplains (a Ramsar site and Important Bird Area). The Luangwa river is not dammed for hydro power generation hence its flows are assured and occur naturally. However, it could be targeted for hydro power generation projects. The valley consists of riverine vegetation, Miombo tree species (e.g. African ebony and Natal mahogany) and Mopane woodlands; and provides habitats for wildlife and fisheries. It shelters large populations of wildlife including elephant, hippo, fish, birds and the wild dog and a founder population of black rhino has already been reintroduced in the North Luangwa Park. It is also an important tourist destination as well as a designated Ramsar site. Among the key threats to the valley are charcoal production, agricultural expansion, illegal trade in wildlife products, human wildlife conflicts and extractive industries.

c. Upper Zambezi

The Upper Zambezi landscape starts on the Benguela plateau in Angola and extends through Zambia's remote western region down to Victoria Falls. Its western side includes the Barotse floodplain—a Ramsar site; Sioma, Liuwa Plains and West Lunga National Parks; and Lukwakwa Game Management Areas. The Barotse floodplain is famous for its fisheries and annual Barotse ceremony of “Kuomboka” which is characterized by the movement of the Barotse people and their King from the floodplain (when flooded) to the upland areas. The Liuwa Plains National Park is a large grassy plain and wooded area. It witnesses Africa's second largest wildebeest migration between Angola (Mussuma area) and Zambia each year. The landscape has a total of 13 Important Bird Areas. The Barotse floodplains are a critical water retention system for recharging the Zambezi River during winter and early periods of summer before the onset of floods and control flooding downstream.

The vegetation of the Upper Zambezi is diverse and comprises western Zambezi grasslands, *Cryptosepalum* dry forests, Zambezian *Baiea* woodlands and flooded grasslands. On the Angolan side the country's central highlands are dominated by Angolan miombo and extensive patches of *Cryptosepalum* dry forests. Within the diverse vegetation of the landscape is a variety of wildlife such as Sitatunga, wildebeest and the wattled crane. Rare and large mammals like cheetah, lion, roan antelope and the African wild dog as well as buffalo, hartebeest and zebra are also found. Its freshwater bodies carry various fish species.

Potential threats to the landscape include agricultural expansion, illegal trade in timber and wildlife products, wild fires and human wildlife conflicts. Major opportunities are: the existence of a relatively unexploited natural resource base and its associated tourism potential, including bird watching; the proposed Liuwa-Musuma TFCA that provides suitable ecological conditions for wildebeest migration between Zambia and Angola; and the huge upland forests (especially the *Cryptosepalum*) that are suitable for forest carbon trading through the REDD+ mechanism.

d. Zambezi Delta

The Zambezi Delta is a very diverse landscape. Its vegetation types include dry miombo and *Acacia-Combretum* woodlands; *Acacia* woodlands in the valley; coastal forest with *Brachystegia speciformis* on the Cheringoma plateau; and grasslands and swamps; as well as mangroves and littoral vegetation. It has a number of protected areas including Gorongosa National Park, Marrumeu Buffalo Reserve and three Game Management Areas (coutadas). The remainder is under subsistence farming, although commercial sugar plantations covered a significant area in the past.

Plant diversity is high owing to the wide range in altitude and habitats. Historically, large mammal diversity was high, but numbers greatly declined during and after the civil war. However, there are now signs of recovery. The main wildlife concentrations are on the rift valley floor (elephant and plains game) and on the Marrameu grasslands (buffalo and elephant). Bird diversity is high owing to habitat diversity, with a number of localised forest species on Mt Gorongosa and Cheringoma, and important wetland bird populations in the rift valley basin and the Zambezi Delta grasslands/wetlands. Tourism potential is high, and is principally wildlife-based (mostly hunting), although infrastructure is inadequate.

Major threats to the Delta's biodiversity are commercial logging in the forests of Cheringoma, an influx of subsistence cultivators and poaching. The wetlands have been impacted upon by the construction of dams upstream. This adversely affects the Zambezi river flows and natural flooding regimes in the delta. In addition, commercial agriculture, particularly sugar, may have a marked impact on the landscape in future. Extensive fires sweep across the grasslands regularly, causing much destruction. The Zambezi delta offers the following opportunities:

- River flows can be modified by implementing environmental flows;
- The Marrameu complex is already a Ramsar site and has a management plan. Based on this experience, the development of a Ramsar site north of the river is possible; and,
- The delta has a number of programmes that can compliment WWF's work. They include the disaster early warning programme by the Red Cross and the community based biomass production programme by Solidaridad.

e. Bangweulu River Basin

The Bangweulu Basin is located in north eastern Zambia. Although it falls outside the ZRB, a decision was made to continue working in the landscape in recognition of WWF's long and continuing commitment to the area. The landscape is one of the most diverse areas in southern Africa. It consists of more than 11 900 square km of seasonally flooded plains and permanent swamps and has two dominant vegetation types namely swamp grassland in the lowlands and the Miombo woodlands in the uplands. The vegetation-water complex provides a cross section of habitats for wildlife. The Bangweulu Swamps do not only contain globally threatened and biome restricted species but also globally important congregations particularly of stock, herons and water fowl. The importance of the landscape derives from the following:

- It provides unique habitats for different species; and breeding and nesting sites for fish and birds;
- The landscape accounts for 20% of Zambia's annual fish production and is important to local traditional fisher communities;
- It has two national parks, five GMAs and about 40 forest reserves that hold considerable biodiversity;
- Its extensive and largely intact forest areas provide an opportunity for the country and the resident communities to benefit from global carbon trade through the REDD+ mechanism;
- It contains endemic and globally important species such as the black lechwe and shoebill stork; and,
- It provides a source of livelihood for thousands of poor communities through the provision of goods and services such as timber, game, fish, charcoal, wood fuel, fruits, medicines, edible insects, mushrooms and spices.

Major human activities in the upland areas of the landscape are low yielding shifting agriculture and commercial charcoal production. On the other hand, fishing is the primary activity in the swamps and wetlands although semi-permanent hoe cultivation is on the increase. Seasonal fishing attracts large numbers of people who illegally overfish the swamps. Recently Zambia introduced a new concept in African conservation-a “Community Partnership Park (CPP)”. This is a protected area with the status of a national park but owned by the local community and managed by a private sector partner. Such commercialization of conservation and natural resource management introduces new challenges and opportunities. This raises the need to strengthen civil society to become a strong independent voice in the management of biodiversity.

f. Malawi-Zambia TFCA

The Malawi-Zambia TFCA consists of Nyika and Kasungu National Parks and Vwaza Marsh Wildlife reserve in Malawi and the Lukusuzi National Park in Zambia. Governments of the two countries have combined the Nyika and the Kasungu/ Lukusuzi TFCAs to form this TFCA or landscape. The following developments have taken place in the TFCA:

- An institutional framework consisting of committees and working groups was established. The committees are addressing issues such as tourism, immigration, joint management and security;
- The Kasungu-Lukusuzi TFCA and Nyika TFCA project plans have been drafted and approved respectively; and,
- A draft international treaty was approved by Ministers of Environment of both countries. The signing of the Treaty by their respective Presidents will formally establish the TFCA.

Nyika National Park and Vwaza wildlife reserve are located in northern Malawi and have World Heritage site status. The former is centred on a high undulating montane grassland plateau and has a large number of plant species. It carries species such as the elephant and hippo. The Lukusuzi and Kasungu National Parks are separated by traditional land on the Zambian side. This provides an ecological link between the parks. Large ungulates (elephants and buffalo) move between the parks through this ecological corridor. The parks are dominated by the *Brachystegia boehmii* woodland and montane grassland. In addition, a number of forest birds move seasonally up and down the escarpment. The Wattled Crane, a globally threatened bird species, is present and so is Mpasa, an endemic fish species that breeds in small rivers running off the escarpment. The landscape has the following protected areas: the Nkotakota Wildlife Reserve in the south, and the Nchisi, Chikangura and southern part of Viphya Forest Reserves in the north. It has good access and scenery and has significant potential for ecotourism.

Threats to the landscape include the construction of small dams on rivers running off the escarpment, exotic timber plantations on the Viphya Plateau in the north; the invasion of alien tree species onto the plateau grasslands; shifting cultivation; poaching; overfishing; increasing demand for wood fuel and human encroachment into protected areas.

g. Lower Shire Valley

The Lower Shire Valley landscape consists of the Lower Shire Valley and its immediate surroundings in Malawi and Mozambique. On the Malawi side it has one national park (Lengwe) two wildlife reserves (Majete and Mwabvi) and four forest reserves. The Mozambique side has no formally protected areas but some high biodiversity areas that could be candidates for some protection (e.g. Morrumbala and Chipero mountains).

The Lower Shire landscape is biologically rich and diverse, but has been reduced to scattered remnants of its former self due to a large human population and large scale irrigated agriculture for sugar and ethanol production. Notwithstanding, its modestly sized protected areas serve an important role in the survival of unique dry forest and thicket vegetation types (Lengwe and Mwabvi). The latter two could, in future, serve as “hotspots” for black rhino conservation due to their high carrying capacity for this specialized browser. The Mulanje and Chipirone mountains are important for a number of highly endangered and extremely localized bird species of Afromontane evergreen forests as well as small mammals and reptiles. The Majete Wildlife Reserve has the most diverse large mammal fauna (e.g. elephant and rhino) in the landscape. On the other hand, the Elephant and Dinde Marshes are important for retaining water for the Shire River as well as being habitat for water birds and local fisheries.

Major threats to the landscape’s biodiversity are: population growth, large sugarcane projects, bio-energy plantations, charcoal production and Human Wildlife Conflicts (HWC) especially with crocodiles and hippos. The landscape offers the following opportunities:

- A growing reservoir of wildlife populations in Majete wildlife reserve that could serve as a source of relatively cheap animals for other protected areas;
- There are tourism, birding and fisheries possibilities in the Elephant and Dinde Marshes; and,
- There is potential to establish a TFCA between Lengwe National Park and the Mozambique side.

h. Lake Malawi/Niassa/Nyasa

The Lake Malawi/Niassa/Nyasa landscape straddles three countries as follows: Malawi-66%; Tanzania-27%; and Mozambique-7%. The landscape is characterized by an extremely high diversity of cichlid fish species and species flocks (groups of closely related species in which new species are rapidly evolving) making it one of the richest, if not the richest lake in the world in terms of fish species numbers. For example, it is home to about 800 species of fish, 90% of which are endemic. This is the single highest concentration of freshwater fish biodiversity in the world. It contains a number of national parks that hold large mammal species such as the elephant. They are Lake Malawi, Mwaza March and Nkotakota in Malawi and the Niassa Game Reserve in Mozambique. In addition, the landscape has numerous gazetted forest reserves and communal forests in Malawi and Tanzania. Some 18 Important Bird Areas, 13 of which are in Malawi and the remainder in Tanzania were identified in the landscape’s national parks, game reserves and forest reserves. They provide refuge to species of global conservation concern and of restricted biome.

Key threats to the landscape’s biodiversity include: high population growth rate; poverty; over-fishing and use of inappropriate fishing methods; agricultural expansion; increasing demand for wood fuel and chemical pollution.

Priority landscapes and WWF flagship species

Some of the priority landscapes hold significant populations of the elephant and the rhino and sizeable tracts of African teak forests (Table 6). The elephant population at Group 1 landscapes is 196 300 and that of the rhino is 313. Corresponding figures for Group 2 landscapes are 3 425 and 16 respectively. At individual country level, Botswana has the highest elephant population of 134 000 followed by Zimbabwe at 90 000 and Zambia at 17 000. With respect to the rhino, Namibia has 1 750 followed by Zimbabwe (1 050) and Botswana (110).

Table 6: Priority landscapes by WWF flagship species

Landscape	Elephant numbers	Rhino numbers	Teak presence
Group 1			
Kavango-Zambezi TFCA	160 000	220	X
Middle Zambezi-Luangwa TFCA	35 000	93	
Upper Zambezi	1 000	0	
Zambezi Delta	300	0	
Total	196 300	313	
Group 2			
Bangweulu River Basin	95	0	
Malawi-Zambia TFCA	3 000	0	
Lower Shire Valley	130	9	
Lake Malawi/Niassa/Nyasa	100	7	
Total	3 425	16	

REVISED MIOMBO ECO-REGION CONSERVATION STRATEGY

STRATEGY DEVELOPMENT PROCESS

This Chapter is based on an analysis of the biodiversity status, threats and opportunities in the Zambezi River Basin with emphasis on the eight priority focal landscapes. It also recognizes current WWF led initiatives within the eco-region. They include the following:

- Socio-ecological transitions in the Miombo woodlands: The Bangweulu Basin ecosystem biological hotspot project supported by WWF Sweden;
- The Zambezi River Basin Environmental Flows programme supported by WWF Netherlands;
- The regional Community Based Natural Resources Management (CBNRM) programme supported by WWF Norway;
- The Mufunta GMA project supported by WWF Norway;
- Assessments of community level production of bio-fuels and of smallholder out-grower scheme models project supported by WWF Sweden; and,
- The Conservation for Partnerships for Sustainability for Southern Africa (COPASSA) programme supported by WWF United States of America.

The foregoing initiatives will be incorporated into the Revised Miombo Eco-region Conservation Programme for purposes of creating synergies and leveraging greater impact from the limited resources that are available.

The chapter presents a ten year conservation strategy that revolves around four strategic programme components. The resultant programmes and projects will be implemented by different WWF offices and their partners. The content and structure of the Strategy is largely based on outcomes of a regional planning meeting convened by WWF in February 2010. The meeting took into account prior planning processes in the Miombo eco-region in general and the Zambezi River Basin in particular.

VISION OF THE STRATEGY

The vision for the Revised Miombo Eco-region Conservation Strategy is: “By 2050, the Zambezi River Basin and associated ecological processes are the lifeline for people and nature, where sustainable natural resource use contributes to socio-economic development and wildlife thrives in the wild (*Catching pitch: Elephant roaming.....; Cranes flying from headwater to delta*)”. “By 2030, high biodiversity and interconnected focal landscapes ensure the integrity of the Zambezi River Basin from source to delta and provide a lifeline for people”.

GOALS OF THE STRATEGY

Goals of the Revised Strategy have been adapted from the two meta-goals of the WWF Global Programme Framework and the intent of the WWF Global Policy on Poverty and Conservation in Africa and are as follows:

1. 2050 Biodiversity Meta-Goal: By 2050, the integrity of the eight priority focal landscapes of the Miombo/ZRB is conserved, contributing to a more secure and sustainable future for all inhabitants and those beyond;
2. 2050 Footprint Meta-Goal: By 2050, humanity’s footprint in the ZRB stays within the basin’s capacity to sustain life and the natural resources of the Basin are shared equitably; and,
3. Global Policy on Poverty and Conservation in Africa: By 2050, livelihood issues are intricately mainstreamed into the conservation agenda of the Basin.

Annex 1 summarizes delivery targets for the Revised Miombo Eco-region Conservation Strategy’s biodiversity, footprint and livelihood goals by 2020.

STRATEGIC PROGRAMME FRAMEWORK

Overview of Programme components and their objectives

The Revised Miombo Eco-region Strategy seeks to enhance conservation delivery at the priority landscapes by focusing on the following strategic programme components: 1. ecological networks and ecosystem integrity; 2. sustainable and equitable natural resource use; 3. international trade, investment and equitable sharing of benefits; and 4. climate change adaptation and mitigation (Fig 3).

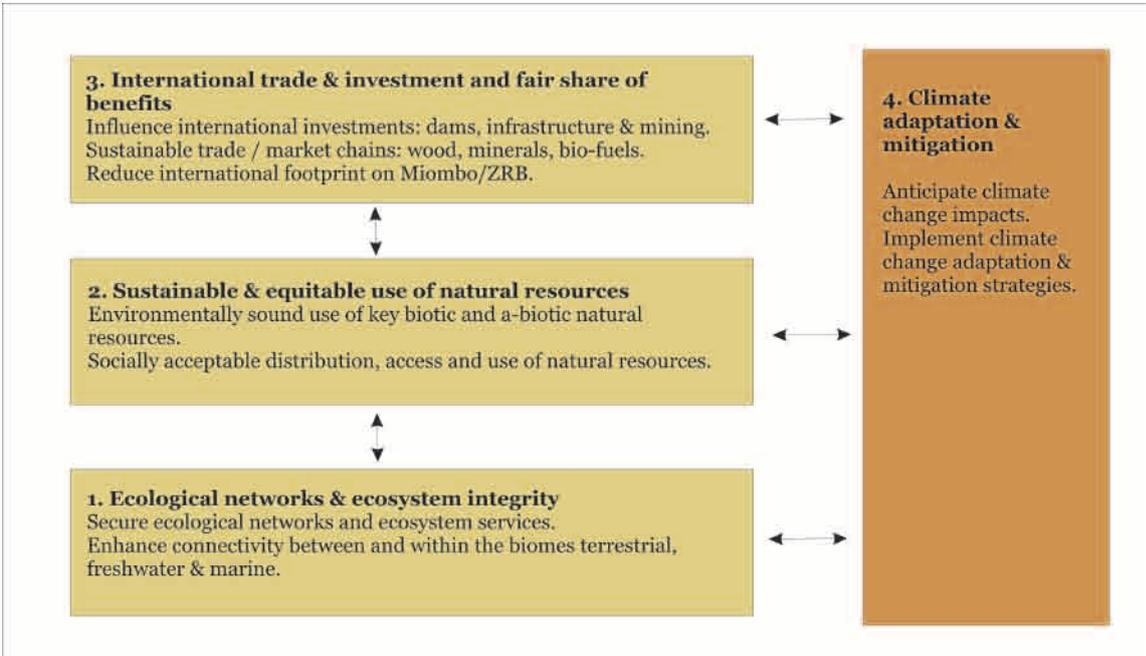


Fig 3: Strategic programme components for the Zambezi River Basin-The Conservation Framework.

The basic philosophy to the above conservation framework is the need to protect and restore ecosystems services in order to provide a sound and sustainable base for the future of nature and people. Ecological network and ecosystem integrity is therefore a basic component of WWF's work. Ecosystem services are used by people to meet their socio-economic needs. Although people highly depend on the integrity of such services, they greatly impact on their existence and functioning. Consequently, there is need to develop and implement sustainable and equitable use practices to sustain such services. International trade and investment is increasingly becoming a determining factor in the use of natural resources hence the need to address it at global level in order to preserve focal landscapes and their high conservation values. New ways that decrease its footprint and ensure a fair share of resultant benefits are therefore required.

The foregoing components of the Revised Strategy are increasingly being affected by climate change. Ecosystems change over time in their geographical location and ability to produce services; while land-use systems that seem viable today might not be so in ten years time. On the other hand, international trade and investments will intensify due to the search for renewable energy and carbon off-sets. Consequently, there is need to anticipate the impacts of climate change in order to develop sustainable solutions and to promote the conservation of ecosystems services and related instruments so that they provide for climate change adaptation and mitigation measures.

Given the foregoing, this Strategic Programme Framework should be viewed in a holistic and integrated manner that incorporates all the four components. This has implications on the role of WWF in its implementation. While the organization can take care of the conservation of ecosystem services, it will require partnerships with complementary organizations to achieve sustainable results in the other components.

Table 7 presents the objectives of the four programme components.

Table 7: Objectives of Programme components of the Revised Miombo Eco-region Conservation Strategy

Component	Objective
Ecological networks & ecosystem integrity	To develop robust and resilient ecological networks within eight landscapes of the Zambezi River Basin by protecting, restoring and managing biodiversity patterns and processes. Emphasis will be on viable populations of keystone species (elephant, rhino and African teak); representative and viable patches of Miombo, Mopane and <i>Cryptosepalum</i> habitats; vital environmental flows; key wetland ecosystems; and ecologically sensitive and high biodiversity areas in both protected and open areas. Strong incentive mechanisms will be required to encourage biodiversity conservation in the latter areas.
Sustainable and equitable use of natural resources	To enhance good governance that promotes equitable access and sustainable use of natural resources. Focus will be on community level benefit creation and empowerment as incentives for good natural resource stewardship. It will be achieved by the further adoption and promotion of CBNRM approaches; promoting PPCPs; and mitigation of HWCs.
Responsible and fair trade and investment	To optimize the sustainability of market mechanisms (fair trade/investment) for ecosystem goods and services that benefit people and nature. Emphasis will be on FSC certification of timber concessions; application of RSB production guidelines to large scale bio-fuel investments; adherence to recommendations of Environmental Impact Assessments for large scale investments such as agricultural plantations, large infrastructural developments and mining and extractive industries; and the adoption of HSAF guidelines for hydro power development projects.
Climate change adaptation and mitigation	To create greater resilience (flexibility of ecosystems and land use practices) to cope with and minimize climate change impacts. Attention will be on promoting conservation agriculture; alternative renewable energy; forest carbon trading; and sustainable land use systems and practices. Climate change adaptation will also include vulnerability assessments and basing project formulation on scientifically derived climate change models.

Main strategies for the Programme components

The main strategies for the four Programme components are elaborated in this section.

a. Ecological networks and ecosystem integrity

The main strategies for this component are to:

- Review and analyse ecosystem conditions in the focal landscapes in terms of ecosystem services provided, degradation of ecosystem services as a consequence of future land use (conversion) and climate change projections; and connectivity between important ecosystems (within and between the biomes-terrestrial, freshwater and marine) that are important for nature, local people and wildlife corridors. The net result of this will be a map of focal landscapes describing ecosystem services that need to be conserved, connectivity that should be ensured, and thereby areas and rivers (stretches; and free flowing rivers) that are a priority to WWF and need adequate protection and management;
- Assess the protection status of the focal landscapes and conduct gap analyses. Based on the results, determine the desired (legal) protection status to adequately protect the priority areas within the landscapes and determine gaps in protection status compared to the current status. Develop a road map for realizing the desired (legal) protection status;
- Ensure protection of sections of the focal landscapes through e.g. proclamation of legal status. Based on the road map for protection status, lobby for declaration (protected areas, Game Management Areas and Ramsar sites) of the priority areas;
- Support the creation of community conservation areas outside the protected area network; and,
- Introduce/implement sustainable models for biodiversity management.

b. Sustainable and equitable use of natural resources

The main strategies for this component are to:

- Lobby and advocate for legal and institutional frameworks for the sustainable use of natural resources;
- Demonstrate the value of CBNRM as an approach to preserve ecosystem services and improve livelihoods of rural communities;
- Valuate (ecosystem) goods and services for people and nature;
- Provide incentives for biodiversity conservation by encouraging communities to add value to natural resources at source and to market the resultant products through PPCPs. Consequently, a multidimensional community business approach (or solution thinking) that introduces a transformational twist to the Conservation Strategy will be required (Box 1);
- Support the improvement of community livelihoods through integrated solutions of renewable energy access and local processing of wood or agricultural products; and,
- Build the capacity of local communities in natural resource management and local entrepreneurship development. This can lead to further local processing, value addition and enhance opportunities for increasing market access.

Box 1: A simplified example of a multidimensional community business approach

- i. Analyse opportunities for CBNRM, tenure/access arrangements, sustainable production of different alternatives (wood, medicinal plants, foods, feeds, organic fertilizers, cotton/textiles, bio-fuels, etc.) and processing opportunities as a baseline.
- ii. Assess possibilities to introduce and produce local renewable energy (e.g. bio-energy, solar energy and wind) and how this can be integrated in processing.
- iii. Assess the potential impact of introducing robust technology or alternative solutions (e.g. saw mill, generator, solar panels, wind mills etc.).
- iv. Analyse the need for an educational input to achieve sustainable management and maintenance of machinery at community level; and identify local entrepreneur champions.
- v. Establish the potential and need for certification (e.g. Fair Trade, FSC and RSB) in the case of external markets.
- vi. Develop a road map, financial plan and market investigation (potential buyers) and the need for experts/trainers, etc.
- vii. Source capital to catalyse the operations (e.g. initial donor funding, micro loans, etc.)
- viii. Carry out step wise and iterative implementation.
- ix. Continue to monitor and evaluate the options until they become self sustaining.

c. International trade, investment and fair share of benefits

The main strategies for this component are to:

- Encourage industry to adopt conservation friendly practices that reduce the industry footprint and increase returns to local shareholders by setting up environmental standards for investments;
- Advocate for the conduct of Strategic Environmental Assessments (SEA) by potential investors. SEAs are by definition more comprehensive in approach and scope than Environmental Impact Assessments. They include impacts of large scale investments on other sectors of the economy, the community and the environment;
- Facilitate the establishment of a multi-stakeholder steering group on the regional governance of investments. Among other things, the group will exert peer pressure and advocate for environmentally friendly and socio-economically just investments;
- Adopt best practices in fair trading and accreditation and enhance the value of natural resource products;
- Promote sustainable forest management using appropriate financing mechanisms; and,
- Focus on financing mechanisms that contribute to better environmental management practices.

d. Climate change adaptation and mitigation

The main strategies for this component are to:

- Protect freshwater resource areas and free flowing rivers through the adoption of appropriate land use systems;
- Promote climate change resilient agricultural systems (conservation and recession agriculture, agro-forestry, etc.);
- Facilitate the REDD+ readiness of riparian states in areas such as forest carbon assessments, carbon ownership arrangements and benefit sharing mechanisms; and,
- Support the development of climate change models; propose coping strategies for different climate change scenarios; and facilitate their pilot testing.

STRATEGIC PLAN FOR 2011-2015

To facilitate the implementation of the Conservation Strategy, a Strategic Plan was developed for the 2012-2015 period. The Plan is in line with the ESARPO Strategic Plan for 2011-2015. It focuses on the four strategic programme components elaborated earlier. The Plan is presented as Table 8.



The Rhino- a WWF flagship species of the Miombo

Table 8: Miombo Strategic Plan: 2011-2015

Main strategy	Sub-strategy	Strategic objectives	Indicators
1. Lobby & advocate for legal & institutional frameworks for sustainable natural resource management.	Empowering civil society.	By 2015 local & national level CSOs positions/voices conducive to WWF's work on bio-fuels, extractive industries & infrastructure development have been incorporated into government & inter-government bodies' decision making processes at select landscapes.	One regional & two national bio-fuel forums established and operational; & at least two national bio-fuel policies formulated.
2. Introduce/implement sustainable models for biodiversity management.	Addressing governance failure by strengthening institutions.	By 2015 adequate management capacity for protected area (PA) authorities and other relevant resource users and managers is in place at two priority landscapes.	Poaching levels reduced; natural resource management committees and CBOs established & operational; incidence of HWCs decline by XX%. Two community conservancies established outside PAs; Two Ramsar sites established.
3. Promote freshwater resource areas and free flowing rivers through the adoption of appropriate land use systems.	Responsible trade and investment & other best practise.	By 2014 freshwater ecosystems goods and services enhanced and livelihoods improved through restoration & maintenance of Eflows in selected landscapes.	No new dams built in the Shire & Luangwa free flowing rivers; 20% of existing dams have multi-purpose flow regimes; and, two Water Authorities adopt HSAF guidelines in hydro power development projects.
4. Demonstrate the value of CBNRM as an approach to preserve ecosystem services and improve livelihoods of rural communities.	a. Promote pro-poor conservation, protected area management & CBNRM.	By 2015 high value conservation areas are secured through participatory natural resource management for the benefit of nature and people in selected landscapes.	Participatory approaches adopted in all new projects; two PPCPs established between PAs & neighbouring communities; Five CBOs benefiting from non wildlife natural resources.
	b. Create climate resilience & adaptation.	By 2015 viable populations of elephants, rhino & African teak secured through effective management & expansion of the wildlife range in three focal landscapes.	Rhino populations increase by 5%; rhino introduced in one landscape; elephant numbers maintained in line with landscape carrying capacity; two teak forests FSC certified.
5. Focus on financing mechanisms that contribute to better environmental management practices.	Sustainable financing.	By 2015 institutionalized financing mechanisms piloted in at least two focal landscapes.	A bio-fund established & operational in two countries; two pilot REDD+ projects developed & implemented.
6. Support the development of climate change models; propose coping strategies for different climate change scenarios; and facilitate their pilot testing.	Integrated national energy strategies developed.	By 2020, at least 5% of energy needs met from renewable energy sources at select landscapes.	Increase in households that use renewable energy solutions; two countries using fossil fuel-bio-fuel blends; and deforestation reduced by XX%.

IMPLEMENTATION FRAMEWORK

KEY PARTNERS

WWF will play various roles in realizing/implementing the strategic programme areas of this Revised Miombo Eco-region Conservation Strategy. They range from advocacy for policy and legislative changes; catalyzing specific agendas through the use of local champions; and direct project implementation, depending on the prevailing realities in a focal landscape. Priority will be given to working with and through partners based on comparative advantage. This will involve a detailed assessment of partner capacities and building the required capacities as necessary. Table 9 presents some of the key partners and target groups that WWF will work with.



The Miombo a dominant woodland of Southern Africa

Table 9: Key partners and target groups for implementing the Revised Miombo Eco-region Strategy by programme area and main activity.

Main activity by programme component	Key partners	Target groups
1. Ecological networks & ecosystem integrity		
1.1 Review & analyse ecosystem conditions for focal landscapes.	Peace Parks Foundation (PPF) & research institutes	Governments
1.2 Assess the protection status of landscapes.	UNDP, IUCN, UNCBD & national govts.	Governments
1.3 Develop land use strategies.	PPF & research institutions & The Nature Conservancy.	Governments
1.4 Put in place restoration measures.	Govts., water authorities & African Parks Network.	Governments & Communities
1.5 Implement sustainable management models.	Govts., traditional authorities, conservation agencies, private sector & communities.	Communities
2. Sustainable & equitable use of natural resources		
2.1 Lobby & advocate for legal frameworks for sustainable use of natural resources.	Govts., SADC, African Wildlife Foundation & private sector.	Governments
2.2 Facilitate that governance conditions are imbedded in policies.	Govts. & research institutions (e.g. Center for Chinese Studies)	Governments & local authorities
2.3 Demonstrate values of CBNRM as an instrument to preserve ecosystem services.	Civil society, communities & research institutes.	Governments & local communities
2.4 Valuate ecosystems goods and services.	Research institutions & governments	Governments
2.5 Provide environmental awareness and legal rights education.	Traditional leaders, communities, governments & civil society.	Local communities
3. International trade, investment & fair share of benefits.		
3.1 Ensure conservation friendly enterprises that reduce industry footprints & increase returns.	Donor agencies, CBOs, entrepreneurs, govts. & standards associations.	Governments & private sector
3.2 Adopt best practices in fair trading & enhance value of natural resource products.	Civil society, Phytotrade, companies, entrepreneurs, govts. & Solidaridad.	Private sector
3.3 Focus on financial mechanisms that contribute to better environmental practices.	Solidaridad, Centre for Chinese Studies & CBOs.	Governments & private sector
4. Climate change adaptation		
4.1 Protect fresh water resources & free flowing rivers with appropriate land use systems.	Water management authorities, govts., climate change experts & PPF.	Local authorities & local communities
4.2 Promote climate change resilient agricultural systems.	Agric. services, provincial govts & ICRAF.	Local communities
4.3 Promote local entrepreneurs to produce alternative local energy.	Civil society, energy depts., provincial govts., local entrepreneurs & private sector.	Entrepreneurs & communities
4.4 Promote proper forest management with appropriate financing mechanisms.	Timber Associations & International Standards Associations.	Private sector & local communities

Source: WWF, 2010b

ECO-REGION COORDINATION AND GOVERNANCE

There is considerable overlap of threats, opportunities and intervention areas across several focal landscapes. A way of building synergies (and rapid information sharing) within and between landscapes will be to initiate multi-stakeholder platforms at landscape level and have a regional platform on information sharing, lessons learnt and on introducing new innovative methods and solutions. Such a platform can be a “nursery” for fostering future conservation leadership that is needed to achieve the ambitious goals of the revised Strategy.

The Miombo Eco-region and the Coastal East African Network Initiative (CEA NI) have some geographical overlaps in the following landscapes: Lower Shire Valley, Lake Malawi/Niassa/Nyasa and the Zambezi Delta. They also are or have plans to initiate work in areas such as renewable energy and climate change in the landscapes. Consequently, there will be need for a mechanism that ensures that potential synergies between the two programmes are effectively harnessed.

An Oversight Advisory Group will be established to provide overall guidance on the implementation of the Revised Miombo Eco-region Strategy and act as an entry point for fund raising for its implementation. Proposed Terms of Reference for the Group are to:

- Coordinate project development and funding to ensure synergy across offices;
- Monitor and assess progress in the implementation of the strategy;
- Provide guidance and support on fundraising for the Strategy; and.
- Provide intelligence on emerging funding and partnership opportunities that are relevant to the Strategy. This will inform targeted project proposal development.

The proposed membership of the Group is as follows: ESARPO (1), Eco-region Leader, Country Directors (Mozambique, Namibia, Tanzania, Zambia and Zimbabwe) and four WWF National Office (NO) representatives. Choice of NOs may be determined by the level of their investment in the eco-region. The Advisory Group will meet twice a year (physically or virtually).

ANNEX 1: DELIVERY TARGETS FOR THE REVISED STRATEGY'S BIODIVERSITY, FOOTPRINT AND LIVELIHOOD GOALS BY 2020

Biodiversity	Footprint	Livelihood
1. Elephant populations are in line with the carrying capacity of the focal landscapes.	1. 25% of commercial timber concessions are Forest Stewardship Council (FSC) certified in select landscapes.	1. Communities derive tangible benefits from the sustainable use of natural resources (wildlife, forests, veld products, etc.) through Private Public Community Partnerships (PPCPs) at two landscapes.
2. Rhino populations are increasing at a rate of 5% in select landscapes.	2. No new dams are built in free flowing rivers (Shire & Luangwa) & 50% of existing dams have multi-purpose flow regimes.	2. Two ownership & user rights policies/bye-laws put in place &/or implemented at select landscapes.
3. Threatened priority species (e.g. rhino) introduced in 2 focal landscapes.	3. Best environmental practices or standards (e.g. Roundtable on Sustainable Bio-fuels-RSB production guidelines) are implemented in two industries (e.g. sugar, cotton and bio-fuel feedstock production) in select landscapes.	3. Local communities receive money from private companies as part of their corporate social responsibility in select landscapes.
4. Effective law enforcement & sustainable forest management (viz. FSC, REDD+, etc.) reduces loss of habitat and commercial timber species (e.g. African teak) by 5% at 2 landscapes.	4. 50% of hydropower dams (design & operation) follow Hydropower Sustainability Assessment Forum (HSAF) guidelines.	4. 30% of returns from forest carbon trade investments (e.g. REDD+) are received by local communities as an incentive for sustainable forest management in 2 focal landscapes.
5. Payment for Ecosystems Services (PES) schemes (e.g. on hydro power and wildlife management) are piloted in at least two landscapes.	5. Two extractive industries follow internationally recognized environmental & social standards/guidelines.	5. A multi-dimensional community business approach adopted at select landscapes.
6. Public Private Community Partnerships (PPCPs) on innovative natural resources management in place at 2 landscapes.	6. Two protocols on trade & movement of forest products established and/or made operational between countries.	6. Five CBNRM type projects promoted as a livelihood diversification and community resilience enhancement strategy in select landscapes.
7. Two critical fresh water areas conserved and natural water flows maintained or restored.	7. At least 5% of energy needs met from renewable energy sources at select landscapes.	
8. Two agreements, policies, or mechanisms to protect sensitive habitats or species from climate change impacts put in place at select landscapes.		
9. One million ha of catchment forests effectively managed.		
10. One million ha of corridors established to ensure the integrity of ecosystem processes and maintenance of genetic diversity at select landscapes.		

MIOMBO ECO-REGION

10

It covers 10 countries in Southern Africa

35

The Eco-region is one of the 35 priority places of the Global Programme Framework of WWF



65M

The woodland provides crucial life support systems to 65 million people.

100

WWF is the world's largest independent conservation organization with a global network in over 100 countries



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony and nature.