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Zimbabwe Biodiversity and Tropical Forest Assessment (118/119)



April 2012

This publication was produced for review by the United States Agency for International Development. It was prepared by David M. Miller, NRM International Development Consultant, and David Gwaze of the US Forest Service

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
INTRODUCTION	7
Purpose.....	7
Methods.....	7
Country profile.....	8
Climate change	11
STATUS OF BIODIVERSITY	12
Ecosystem diversity	12
Species diversity	16
Agro-biological genetic diversity	19
Ecosystem services	19
STATUS OF FORESTS.....	20
ECONOMIC IMPORTANCE OF BIODIVERSITY AND FOREST CONSERVATION	22
Forest resources in the national economy	22
Wildlife resources in the national economy.....	22
The importance to agro-biodiversity to the national economy.....	22
The role of genetic resources in the national economy.....	23
The importance of forest resources and biodiversity to local livelihoods.....	23
MANAGEMENT AND PROTECTION EFFORTS.....	23
Legislative and institutional framework	24
Biodiversity and forest management institutions and organizations.....	27
Management of protected areas.....	29
Forest management	30
Conservation outside of protected areas	31
Current programs and projects in biodiversity and forest conservation.....	32
THREATS TO BIODIVERSITY AND TROPICAL FOREST CONSERVATION	34
Indirect drivers	34
Direct threats.....	36
ANALYSIS	41
Actions needed to conserve biodiversity and forests.....	41
USAID current program and proposed strategy.....	42
Extent to which ongoing and proposed activities meet needs.....	44
Threats from ongoing USAID/Zimbabwe programs	45
Opportunities for linkages within proposed activities	47
APPENDIX I: IUCN RED LIST OF CRITICALLY ENDANGERED, ENDANGERED, AND VULNERABLE SPECIES.....	49
APPENDIX II: DOCUMENTS REFERENCED	53
APPENDIX III: ASSESSMENT STATEMENT OF WORK.....	59
APPENDIX IV: ASSESSMENT TEAM BIOGRAPHICAL SKETCHES.....	67
APPENDIX V: PERSONS INTERVIEWED	68
APPENDIX VI: BRIEF OVERVIEW OF LIVESTOCK AND THE ENVIRONMENT IN ZIMBABWE	69
ANNEX VII: CONDENSED EXECUTIVE SUMMARY	71

TABLE OF TABLES

TABLE 1: ZIMBABWE'S AGRO-ECOLOGICAL ZONES	9
TABLE 2: SUMMARY DESCRIPTION OF ZIMBABWE'S TERRESTRIAL ECOREGIONS.....	13
TABLE 3: MAJOR FRESHWATER ECOREGIONS OF ZIMBABWE	15
TABLE 4: SPECIES DIVERSITY AND THREATENED SPECIES IN ZIMBABWE	18
TABLE 5: LAND USE SYSTEMS	20
TABLE 6: FOREST OWNERSHIP	21
TABLE 7: FOREST COVER TRENDS	21
TABLE 8: HOLDERS OF MANAGEMENT RIGHTS TO PUBLIC FORESTS.....	22
TABLE 9: LAWS INFLUENCING BIODIVERSITY AND FOREST RESOURCE MANAGEMENT	24
TABLE 10: PROTECTED MAMMAL SPECIES.....	27
TABLE 11: NATIONAL PARKS AND OTHER PROTECTED AREAS	30
TABLE 12: AGRICULTURAL POPULATION PER HA OF ARABLE & PERMANENT CROPS LAND ⁵	34
TABLE 13: THREATS TO ENDANGERED SPECIES	37

TABLE OF FIGURES

FIGURE 1: TERRESTRIAL ECOREGIONS OF ZIMBABWE.....	12
FIGURE 2: PROTECTED AND WILDLIFE AREAS.....	29

LIST OF ACRONYMS

AGRITEX	Agricultural Technical and Extension Services
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CBD	Convention on Biological Diversity
CBNRM	Community-based Natural Resource Management
CBO	Community-based Organization
CDCS	Country Development Cooperation Strategy
CITES	Convention on International Trade on Endangered Species
CTDT	Community Technology Development Trust
CSO	Civil Society Organization
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMA	Environmental Management Agency
FAO	Food and Agricultural Organization
FAA	Foreign Assistance Act
FFP	USAID Office of Food for Peace
FtF	Feed the Future
FTLRP	Fast Track Land Reform Programme
GDP	Gross Domestic Product
GEF	Global Environmental Fund
GOZ	Government of Zimbabwe
GRBI	Genetic Resources and Biotechnology Institute
HA	Hectare
IAS	Invasive Alien Species
IITA	International Institute for Tropical Agriculture
IUCN	International Union for the Conservation of Nature
MASL	Meters above Sea Level
MDG	Millennium Development Goals
MEA	Multilateral Environmental Agreements
MOU	Memorandum of Understanding
NBSAP	National Biodiversity Strategy Action Plan
NGO	Non-Governmental Organization
NRM	Natural Resource Management
OFDA	USAID Office of Foreign Disaster Assistance
PA	Protected Area
PGR	Plant Genetic Resources
PWMA	Parks Wildlife Management Authority
RDC	Rural District Council
SADC	Southern African Development Community
TFCA	Transfrontier Conservation Area
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USFS	United States Forest Service
WASH	water and sanitary health
WWF	World Wildlife Fund
ZINWA	Zimbabwe National Water Authority

EXECUTIVE SUMMARY

USAID/Zimbabwe has undertaken this Biodiversity and Tropical Forestry Assessment to inform the process of preparing their FY 2013 – 2015 transitional Country Development Cooperation Strategy and ensure that investments across its entire bilateral portfolio address Zimbabwe's conservation and sustainability challenges to the maximum productive extent. The assessment adheres to the requirements of sections 118 and 119 of the Foreign Assistance Act.

A two person team consisting of an NRM specialist team leader and a USFS silviculturist conducted the assessment, complimented by the USAID/Zimbabwe acting MEO for portions of the field work. Following ten days of preparation in the US, the team traveled to Zimbabwe, where they conducted meetings and interviews with over 40 key persons and undertook a brief site visit between the dates of January 30 and February 10, 2012. Following an outbrief with USAID/Zimbabwe staff, the team returned to the United States where they prepared a document for review by USAID/Zimbabwe. After making edits in response to comments from USAID/Zimbabwe, the team submitted a final for approval on March 19, 2012.

Zimbabwe's climatic and geological foundation favors neither a large timber industry nor widespread crop agriculture. Savanna woodland interspersed with open grasslands covers much of the country, and while woodlands are found on over half of the total area, nine tenths of these forests have little or no commercial timber value. As to agriculture, about seven tenths of the country's soils are sandy, light textured and of limited inherent cropping potential. Limits in groundwater require a heavy reliance on surface water, yet inadequate and erratic rainfall constrains crop farming across at least sixty percent of the country. Climate change is expected to severely increase the water stress already evident, and the aggressive promotion of maize has limited farmer access to a diversity of crop varieties necessary to remain resilient in the face of climate variability.

Within these constraints, Zimbabwe's five distinct ecoregions, nevertheless, provide habitats for an abundant and diverse flora and fauna. Once internationally recognized for its conservation of threatened wildlife, the country continues to provide habitats for over two hundred plants found only in Zimbabwe and contains an important portion of the internationally significant Eastern Afromontane hotspot. Zimbabwe is also responsible for the habitats of thirty eight vulnerable species, three of which, including the black rhinoceros, are critically and globally endangered.

Although the potentially environmentally damaging industries of mining and agriculture currently drive Zimbabwe's GDP, the country's national and local economies also rely heavily on a number of more environmentally sustainable activities. Nature tourism, now experiencing a strong comeback in the country, contributes up to five percent of GDP and represents just below ten percent of formal employment. The exotic tree industry constitutes about four percent of GDP and employs over 14,000 people. Though small, the indigenous hardwood industry employs 2,000 people directly, and many more in the downstream furniture industry. Environmental resources play an even more important role in rural livelihoods; the government's Environmental Management Authority reports that in some parts of the country forest-based resources contribute up to 35% of rural incomes, and communities in over twenty five districts profit from environmental resources in a structured and sustainable manner through CAMPFIRE associations. As the past decade has shown, open access natural resources also represent a means of survival in times of crisis. Most important in the long term, however, are the ecosystem services and products that resist quantification. To mention a few: forests protect important watersheds which feed dams, irrigation and water courses and help maintain soil fertility and help regulate water and control floods. Wetlands absorb pollutants and reduce the siltation of waterways.

Although it is politically too early for thorough assessments, it is, nevertheless, already clear that the institutional and economic upheaval that began about ten years ago has created a forest cover losses and increased threat levels to wildlife. A forty five percent plunge in economic output; a season of food assistance for seventy percent of the population; and the chaotic transfer of over a fourth of the country's land have produced attacks on specific wildlife populations, and the broad, unsustainable and uncontrolled exploitation of the country's forest, soil, and freshwater resources.

While the country was once recognized internationally for the diverse mega fauna and rare floral populations found in its network of protected areas, and a legal and institutional framework that supported innovative co-management arrangements engaging communities and the private sector, such excellence no longer characterizes the enabling conditions for environmental management in Zimbabwe. Plunging funding, staff exodus, and weakened credibility have severely undermined the capacity of the Parks and Wildlife Management Authority, the Forestry Commission, the Environmental Management Authority and other institutions responsible for environmental management at the national scale. In turn, this institutional deterioration has weakened the country's capacity to manage four other indirect drivers of biodiversity and forest decline:

- *Population pressure.* Although out-migration and resettlement have decreased pressure on the most densely populated agricultural zones of the country since 2000, over the long term population pressure will place increasing demand on the country's natural resources.
- *Poverty and food insecurity.* At their peak, the economic crisis and food shortage created wave of uncontrolled harvesting of natural resources as rural poor turned to hunting wildlife, harvesting firewood for urban markets, panning gold, and poaching timber. Despite current macro-economic gains, a continued high poverty rate means that pressure from this driver continues.
- *Land reform.* Also continuing are the shockwaves expanding from the poorly controlled reallocation of more than ten million hectares to farmers, many of whom now employ unsustainable and inappropriate farming systems and engage in the indiscriminate harvesting of wildlife and forest cover.
- *Climate change.* While it is likely to shift the ranges of certain species faster than they can adapt, irrevocably modify habitats, and increase pests and disease among wildlife populations, much of the impact of climate change in Zimbabwe will be felt through changes in the country's agricultural systems. Already believed to have weakening the crop viability in some cultivated lands, the decreases in average annual rainfall, increases in temperature, and anomalous and extreme weather events climate change are expected will both pose great challenges to the irrigated agriculture upon which the country depends, and undermine livelihoods of the poorest farmers, and again push them to coping mechanisms that mine the natural resources upon which they depend.

The assessment also identifies a number of direct threats, most of which occur on both resettled and communal lands, though in different forms. These include uncontrolled deforestation; poaching of wildlife, plants and timber for commercial or domestic purposes; and the agricultural conversion of grasslands, wetlands, forests, biological corridors and even protected areas. Inefficient water use speeds the drying of rivers and water habitats, and fires have ravaged forest and grassland and destroyed habitats, at least temporarily. Invasive alien species degrade the country's ecosystems, including water sources, national forest lands, and endemic species habitats in the Eastern Highlands. Poorly managed residential and commercial development poses threats to freshwater sources and nearby wetlands and provides a market for fuelwood. Mining production also poses a multiplicity of threats, including road

construction which exposes remote areas and elevated rates of erosion. Mining's negative impact increases when it is undertaken in otherwise protected areas.

Actions needed to conserve biodiversity and forests

This assessment takes into consideration government, donor, and other partner strategic plans, policies, and assessments in identifying the following actions necessary to address the country's threats to biodiversity and healthy forests:

Improve the collection and management of information concerning Zimbabwe's biodiversity and forests. Reinforce existing systems and conduct long-neglected inventories and studies necessary to create comprehensive and current inventory and monitoring programs for forests and biodiversity. This would include reestablishing systems tracking important mammal populations and the status of critical biodiversity hotspots, as well as an update of the national Red List of threatened species. It would also require strengthening of national capacity to conduct appropriate research in biodiversity conservation and sustainable use. Focal areas would include the impact of recent population resettlement and the potential impact of climate change.

Strengthen community authority and capacity to effectively and equitably manage natural resources. Improve incentives for local communities to undertake biodiversity conservation and sustainable use initiatives in both protected and non-protected area, including the introduction of alternatives to natural resource extraction. CAMPFIRE and similar approaches would be reinforced and extended beyond wildlife management to a range of natural forest products. This would include clarification of community rights with regard to tenure and property rights regarding the broad range of natural resources, and extend to the designation and protection of local forests, grasslands, and wetlands for community use. Such an effort would require the engagement of all local institutions and eventually extend to support to strengthen Rural District Councils in the development and enforcement of by-laws strengthening environmental management.

Update legislation and harmonize conflicting laws and policies regarding environmental management. Conflicting legislation concerning community management of natural resources and products as well as forestry legislation conflicting with the Environmental Management Act needs to be updated and harmonized. Legislation will also be required to reinforce the sustainable management of all categories of agricultural lands. A presidential review committee has recommended that a wildlife-based land reform policy and a forest-based land reform policy be developed to address resettlement patterns in some parts of the country to facilitate game ranching, safaris and plantation forests.

Include sustainable development considerations in the revision of Zimbabwe's land use, land tenure and property rights regime. The substantial effort that will be required to develop and implement the policies and institutions to effectively and efficiently manage rights in the nation's land and natural resources following the upheaval of the past decade hold the potential for an enormous impact on the country's biodiversity and forests. Legal and policy mechanisms are necessary to facilitate the use of land in accordance with its limitations, manage water resources efficiently and equitably while preserving water quality, and safeguard potentially open access resources such as grasslands and forests. On both newly settled lands and communal areas, tenure reform is required to clarify and secure tenure in a way that is equitable and encourages the conservation and investment in natural resources.

Build national government institutional capacity in environmental management. Robust national institutions will be necessary to address the growing challenges of indigenous forest loss, wildlife poaching, poor water quality and inefficient use, and environmentally destructive mining practices. State environmental

institutions must regain their visibility, vision, and capacity to achieve their mandates and effectively enforce enacted legislation and promulgated regulations in a transparent and accountable manner.

Raise public awareness of the economic, social, and cultural importance of biodiversity and healthy forests. Increase individual and community capacity to address threats to biodiversity and forests and adopt practices more consistent with sustainable development and environmental management through education and training in schools and through public media. Ideally, environmental compliance will be recognized as a positive contribution to environmental and social goals, as well as the environment.

Reinforce rural extension of sustainable land use practices. Farmers in newly settled areas require assistance in developing practices that support sustainable agriculture and natural resource management to reduce the impact they are having on the forests, grasslands, soils, and water sources. Of priority are smallholders farming tobacco who require technical assistance to adopt less destructive energy sources for curing their harvest. On all agricultural lands, extension support should prioritize land use practices that stimulate practices that aim at increased water use efficiency and balanced nutrient management. National government institutions, local NGOs, local level institutions, and community-based organizations will all need to be engaged to effectively undertake this effort.

Promote targeted activities in critical protected areas and hotspots. Targeted efforts will be necessary to conserve both threatened areas identified as biological hotspots and healthy representative examples of each of the distinct forest types found in Zimbabwe. This would include complementary activities to the Hwange-Sanyati Biological Corridor Project currently being planned, in the same or other hotspots, and the protection of the few remnants of medium and low altitude forest on communal lands.

Extent to which ongoing and proposed USAID/Zimbabwe activities meet needs

Neither USAID/Zimbabwe's current portfolio, nor the Results Framework includes activities specifically targeting Zimbabwe's biodiversity and forests. Until recently, mission programming has forgone long term development goals for a focus on crisis management, national stability, basic economic needs, food security and the HIV/AIDS epidemic; current programming continues to reflect that emphasis.

Restrictions on working directly with the national government also limit the potential for support to building capacity to address threats in biodiversity and forestry. Prohibitions on working in contested resettlement areas also prevent USAID/Zimbabwe from supporting activities addressing some of the greatest threats to biodiversity and forests.

Mission activities have nevertheless indirectly eased certain drivers of deforestation, wildlife loss, and natural resources degradation. To the extent that USAID/Zimbabwe's democracy and governance activities help stabilize the political context and promote progress towards effective and equitable governance, these activities have hastened the return to effective, transparent and accountable environmental management institutions. Through food assistance programs, USAID/Zimbabwe has reduced the dependence of rural populations on unsustainable coping strategies, and continuing efforts to strengthen the agricultural livelihoods of the rural poor reduce the risk of a return to these practices. In the health sector, because people struggling with poor health and nutrition often resort to less sustainable livelihood practices, support targeting specific diseases, especially HIV/AIDS, has reduced the impact of disease on people's management of natural resources. In collaboration with other donors, USAID/Zimbabwe also provides support to family planning activities, thus addressing a long term indirect driver of environmental degradation in Zimbabwe.

Threats from ongoing USAID/Zimbabwe programs

This assessment identifies no threats to Zimbabwe's biodiversity and forestry stemming from current democracy and governance and health programs, assuming the effective implementation of their respective environmental monitoring and management plans.

Current humanitarian assistance programs implement activities with the potential of increasing degradation of wildlife habitats and woodlands. This includes the direct support for agricultural activities that may deplete water sources, erode soil, and introduce invasive species. Intended increases in agricultural production and productivity may also result in the opening of slopes, wetlands and woodlands to farming. Seed security activities, especially maize seed, may increase the dominance of hybrid seeds to the exclusion of local land races of other crops, such as sorghum and millet. However, the March 2010 PRIZE IEE and EMMP identifies implementation conditions with regard to these threats which, if adhered to, will conform to a standard stricter than existing norms and likely have a net positive impact on agricultural systems over which Implementing Partners have direct influence.

Humanitarian support to agriculture in marginal areas, on the other hand, may strengthen livelihoods in agro-ecological regions susceptible to drought and increasingly ill-suited to agriculture as the climate changes in the long term. As crop agriculture becomes less viable, communities may fall further into a state of structural poverty and food insecurity as well as an increasing reliance on mining degraded natural resources. The assessment elsewhere recommends a climate change vulnerability and adaptation assessment to explore potential mission strategies to address this complex issue.

Economic Growth projects provide support for activities that may directly or indirectly result in the depletion of water sources, erosion of soil, introduction of invasive species, or pollution of water through increased pesticide and fertilizer use. As with humanitarian assistance projects, anticipated increases in agricultural production and productivity may result in the opening of slopes, wetlands and woodlands to farming. Support for maize seed procurement and use may increase the dominance of hybrid seeds to the exclusion of local land races of other crops, such as sorghum and millet. Further, an increase in the number and functioning of micro and small enterprises may draw down water resources and produce air and water pollution. Also similar to the humanitarian assistance portfolio, an IEE exists which identifies implementation conditions with regard to these threats which, if adhered to, will conform to a standard stricter than existing norms and likely have a net positive impact on areas and institutions over which Implementing Partners have direct influence.

To a much greater extent than the grants of the humanitarian assistance sector, EG programs are expected to expand agriculture beyond the specific regions and institutions over which USAID/Zimbabwe and Implementing Partners have influence. Given that unsustainable agricultural practices are the norm in Zimbabwe, this spread effect will likely result an increase in agriculture-related threats. (Also see the June 2011 IEE topic "Production Activities," described on page 18 but not addressed in the summary Matrix of Activities.)

Opportunities for linkages within proposed USAID/Zimbabwe activities

The assessment identifies the following opportunities to support Zimbabwe's biodiversity conservation and forestry efforts in the proposed Results Framework:

DO 1. Advanced transition to a more accountable and democratic system of governance

Deliberate inclusion of CBOs and CSOs that support the voicing of environmental concerns, especially mobilization around rights in water, forest, grasslands, and soils.

DO 2. Increase Food Security

- Conduct a climate change vulnerability assessment to develop an adaptation and resilience strategy tailored to specific locations, livelihoods and value chains.
- Introduce stand-alone and integrated programming elements that promote sustainable agriculture and practices designed to conserve and restore soil and water resources and increase the use of trees in agriculture and horticulture.
- Introduce a sustainable land management approach in extension activities, integrating crop, livestock, and tree production.
- Explore, and if viable, support value chains of indigenous horticultural products. Support networks preserving indigenous horticultural plant genetic resources.
- Prioritize protected area buffer zones in local site selection.
- Support economically viable organic certification schemes and producers.

DO 3. Increase stability through inclusive growth and development

Include sustainable agriculture, biodiversity, and forestry considerations in policy development, such as planned work on land tenure.

DO 4. Reduce morbidity and mortality related to HIV, TB, malaria, reproductive health and maternal, neo-natal and child health

Continue to support family planning activities to reduce unintended pregnancies and reduce the level of unmet need for family planning.

Expand support for urban and rural water and sanitation activities.

INTRODUCTION

PURPOSE

USAID environmental compliance is directed by U.S. policy and law. Section 118 of the Foreign Assistance Act (FAA) states that each country development strategy statement or other country plan prepared by the U.S. Agency for International Development shall include an analysis of (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified. Section 119 of the FAA relates to endangered species. It states that “the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems and through the protection of wildlife habits should be an important objective of the United States development assistance”. Furthermore it states, “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve biological diversity and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified”.

USAID/Zimbabwe is preparing a new Country Development Cooperation Strategy (CDCS) to guide its bilateral programs in Zimbabwe. To inform this process and ensure that USAID investments across its entire bilateral portfolio address Zimbabwe’s conservation and sustainability challenges to the maximum productive extent, USAID/Zimbabwe has undertaken this Biodiversity and Tropical Forestry Assessment. The assessment offers strategic recommendations across sectors, and adheres to the requirements of sections 118 and 119 of the Foreign Assistance Act.

METHODS

This assessment was conducted by a two person team, and complimented by the USAID/Zimbabwe Strategic Information Specialist and Acting Mission Environmental Officer Mr. Hamfrey Sanhokwe during a portion of the interviews and the site visits. USFS provided Team Leader and Natural Resource Specialist Dr. David M. Miller through a contract with Management and Engineering Technologies International, inc. (METI). A second team member, National Silviculturist Dr. David Gwaze, was seconded from USFS Forest Management Staff, Washington Office.

Prior to leaving to Zimbabwe, Miller spent ten days conducting a desktop review to prepare for the assessment, met with Gwaze, and clarified the statement of work (SOW) with USFS representative Matthew Edwardsen and mission staff. Miller and Gwaze then spent two weeks, from January 30 to February 10, in Zimbabwe. While there they met with Mission Director Melissa Williams and Program Officer Julie Chen. They also conducted 30 minute meetings with representatives of the Economic Growth, Humanitarian Assistance, and Democracy and Governance teams, followed by 42 interviews with representatives of government, donor, and NGO staffs. (For a complete list, see Appendix V). Prior to the conclusion of field work, the team traveled to the city of Bulawayo where they met with Forestry Commission staff and visited the nearby Chesa and Mbembesi forests and held a meeting with residents of the Chesa forest. The team conducted out-briefs with the Mission Director and Program Officer, as well as representatives of the mission technical teams. The team returned to the United States where they prepared a document for review by USAID/Zimbabwe. After making edits in response to comments from USAID/Zimbabwe, the team submitted a final for approval on March 19, 2012.

Description of the information available for this assessment

“The current version is not out yet.”

The tumultuous events of the past decade have prevented the government, donors, and other organizations from undertaking many necessary assessment, studies and inventories. Government agencies have lacked both funds and trained staff to do so. For their part, donors have discontinued many programs, and diverted resources to humanitarian assistance activities. The Government of Zimbabwe published its most recent national state of the environment report 1998, and its most recent National Biodiversity Strategy Action Plan (NBSAP) in 1998. The Parks and Wildlife Authority last conducted aerial large mammal surveys in 2001. Nor have procedures to monitor and measure agricultural genetic erosion at a national level been implemented (Ministry of Agriculture, 2009). No systematic study has been conducted concerning the recent sharp decline of wildlife in private conservancies. And the National Red List is only 60% complete, and does not include some known endemics.¹ Reports that have been produced recently, such as the government’s 4th National Report to the Convention on Biodiversity, are largely based on dated information. For example, FAO figures on forest cover do not take into account the large-scale clearing that has accompanied the recent resettlement program. As a result, anecdotal information acquired in interviews with experts strongly informs this assessment and its characterization of the rapidly changing status of forests and biodiversity.

In the face of this challenge, government and donor representatives with whom we met indicate an ongoing intense effort to rectify this deficiency. Virtually every government agency interviewed had a report in process, (and some graciously provided the assessment team draft versions). Yet the context has been challenging. For example, delayed production of the national forestry strategy, in process since 2005, has received a two year extension. Although EMA will distribute Zimbabwe’s Third State of the Environment in the coming months, staff continues to conduct analyses and complete studies. Overall demand for information is so pressing, and efforts to assess and address recent change so great, that the government cannot produce studies fast enough. Indeed, we were not surprised when interlocutors at one agency told us that the current version was “not out yet.”

COUNTRY PROFILE

Economy. Despite continuing political uncertainty, Zimbabwe’s economy is recovering strongly from a decade-long crisis that saw economic output drop more than 45 percent. The establishment of a Government of National Unity (GNU) in February 2009 and the adoption of macroeconomic stabilization policies including the multi-currency regime contributed to this recovery. In 2010, the country’s GDP had risen to \$7.5 billion, up from \$4.4 billion just two years before, almost reaching the previous height of \$8.5 billion of 1982. In the same year, per capita incomes rose to just short of \$600, up from \$355 two years before (World Bank World Development Indicators, accessed February 13, 2012). GDP growth in 2011 was estimated at 7.8%. The agriculture and mining sectors lead this recovery. Increased mining investment pushed output in that sector to a record level of 47%. Small-holder recovery, including a doubling of tobacco production, helped drive agricultural output to an increase of 34% in 2010. Growth in maize production from 600,000 tons in 2008 to an estimated 1.3 million tons in 2010 has helped address food security.

¹ exceptions to this hiatus in data collection include meteorological data as well as data on levels of dam and ground water, and river pollution, which have been regularly collected (Chagutah, 2010).

Despite this progress, Zimbabwe's poverty rate continues to be estimated at over 70% and food price inflation remains an enduring problem, with prices rising 7.3% in 2010. Donors have provided significant off-budget humanitarian and social services funding estimated at 12% of GDP in 2009 (African Economic Outlook, 2012 and World Bank Zimbabwe Country Page and associated links).

Population. Between 1983 and 2000, Zimbabwe's population grew over fifty percent, from 8.2 million to 12.5 million. The country's total fertility rate remains high at 4.1 births per woman (ZIMSTAT/IFC Macro, 2011). Population has nevertheless remained virtually constant over the past decade, in large part due to significant out-migration; for example, between 2007 and 2011, it is believed that Zimbabwe experienced an estimated net outmigration of 900,000 people (World Bank Development Indicators, accessed February 13, 2012). The HIV/AIDS infection rate among adults (15-49 years old) was estimated to be 14.3% in 2009. Forty one percent of the population is under 14 years of age. Sixty two percent of the population lives in rural areas (CIA World Factbook).

Geography. Zimbabwe covers approximately 39 million hectares. It is bordered by Botswana to the west, Mozambique to the east and north east, and South Africa to the south and Zambia to the north. Four major relief regions are generally recognized: the lowveld (below 600 m); the middleveld (600-1,200 m); the highveld (1,200-2,000 m); and the eastern highlands (2,000-2,400 m). The highest point in the country, Mount Nyangani (2,592 m), lies in the mountains along the eastern border.

Climate. Climatic conditions in Zimbabwe are largely subtropical. The country experiences three seasons: a "summer" from mid-November to March, which is hot and wet; a "winter" from April to July, which is cool and dry; and a "spring" from August to mid-November, which is hot and dry (Gambiza, 2000). Annual rainfall generally decreases north to south and from east to west, ranging from an average of below 400 mm in the low lying areas to 900 mm over the central watershed and 1,500 mm in parts of the eastern highlands.

Agro-ecological regions in Zimbabwe are commonly discussed in terms of five "natural regions" defined by rainfall patterns. (See Table 1.) By some estimates, only 37 percent of the country receives adequate rainfall for agriculture. Most of the communal lands are in the marginal agro-ecological regions IV and V characterized by low rainfall, severe dry spells and shallow soils of low fertility. These conditions challenge even drought-resistant crops such as sorghum and millet (FAO, 2005b).

Soils and Vegetation. About 70 percent of the country's soils are derived from granite and are sandy, light textured and of limited inherent agricultural potential. The extreme west of the country in particular has large tracts of deep Kalahari sandy soils with low agricultural potential. Certain parts of the country do have fertile soils with a heavier clay content.

Zimbabwe vegetation is mainly characterized by savanna woodland interspersed with open grasslands and the *dambos* (seasonally water-logged low lying areas) of the central watershed area. (The country's natural forest ecosystems are described below.)

TABLE 1: ZIMBABWE'S AGRO-ECOLOGICAL ZONES (VINCENT AND THOMAS, 1960)

Natural Region	Area (km ²)	Rainfall (mm yr ⁻¹)
I	7 000	>1 000
II	58 600	750 - 1 000
III	72 900	650 - 800
IV	147 800	450 - 650
V	104 400	<450

Source: USDA, 2004

Freshwater resources. Zimbabwe has limited groundwater resources due to the nature of the rock formations covering most of the country. The country, therefore, relies principally on the surface water of its rivers, lakes and wetlands. Surface water, however, is also of limited supply. Wetlands cover 1.28 million ha in Zimbabwe. Of these, about one fifth are found in communal areas; the remainder is located in commercial farming areas (FAO, 2005). Some estimates indicate that the country's overall water supply-to-demand ratio is currently 0.89 negative, with demand outstripping supply by 631 million m³ (Chagutah, 2010).

Because limited and erratic rainfall patterns cover much of the country, irrigation is necessary for a successful national harvest. Crops grown under irrigation constitute almost half the total value commercially marketed. If one includes water used for fish farming, livestock watering, and irrigation, agricultural use accounts for 80 percent of total water used in the country (FAO, 2005). Water abstraction for agriculture has resulted in low flows of many of Zimbabwe's rivers. The Save river in Mozambique is severely impacted by water use in Zimbabwe, and has been run dry for long periods of time, (Shackleton, 2008), and the flow of the historically perennial Limpopo ceases periodically as a result of water abstraction in the upper catchments (WWF/TNC, 2008).

The land distribution of the past decade will change the nature of irrigation in Zimbabwe as the privately owned schemes of large-scale commercial are retrofitted for use by multiple small hold farmers. Adaptation to the needs of these new farmers, many of whom have no prior experience with irrigation, will require significant training and institution building (FAO, 2005).

After a decade of neglect, the country's urban water and sanitation systems are dysfunctional and dangerous, falling far short of providing sufficient quantities of safe water. In rural areas, an estimated one third of the rural population of the country was without access to improved drinking water in 2007, a steep decline from the 1990's. In 2008, Zimbabwe experienced one of the world's largest known outbreaks of cholera (Chagutah, 2010). In an effort to improve water management, the government subdivided Zimbabwe's drainage system into seven zones in 2000, with each river system managed by a decentralized catchment council.

Tenure system. Four tenure systems apply to land in Zimbabwe: freehold (private), state land, communal, and leasehold (resettlement), although only freehold and state land are defined in law, with communal and resettlement tenure systems a subset of state land.

At the time of independence, 6,000 white large commercial land holders had freehold rights to 47 percent of the country's arable land. About 4.3 million black communal farmers had customary rights to 49 percent of the land, and an additional 8,500 black small scale commercial farmers had rights to the remaining four percent of arable land. The lands of the highest potential were principally owned by the white commercial farmers. By 2000, various land reform programs had transferred 23 percent of the land initially held by large commercial farmers.

Under the aggressive Fast Track Land Reform Programme (FTLRP) resettlement program begun 2000, the government acquired and transferred over 10 million hectares, slightly more than a quarter of the country's total area (390, 000 square kilometers). Resettled land is classified as A1 or A2. Land classified as A1 is allocated in villages and in small, self-contained parcels of up to 5 hectares. It can be inherited, but not sold. Land classified as A2 consists of larger parcels intended for commercial farming.

Out of 4,660 commercial farms in 1998, only an estimated 400 remained in 2009. Those remaining commercial large-scale farmers fear sudden occupation and eviction. Further, because the resettlement was conducted so quickly and often outside the bounds of the legal process, those who have acquired

land under the Fast Track Program also lack security; many resettled persons worry about the legitimacy of their land rights, and conflicts among resettled groups occur in some areas (Integrated Regional Information Network, 2009; USAID, 2010).

The Communal Lands Act defines the tenure regime on land defined as communal. According to this law, all communal land is vested in the president who has powers to permit its occupation and utilization, and Rural District Councils have a dispensation to allocate land to qualified persons on behalf of the state. In practice, the management rights to this land has been subject to local rules and traditional practices rather than governmental regulation (Shumba, 2001; USAID, 2010).

CLIMATE CHANGE

Historical and expected change. Because it is semi-arid, and receives limited and unreliable rainfall patterns, Zimbabwe has long been susceptible to climate variability. Gathering evidence nevertheless indicates signs of progressive climate change of increased temperatures and increased aridity. Records indicate that the national average annual precipitation declined almost five percent between 1900 and 2000, and the 1990s received less rainfall than any other ten years in the century (Unganai, 2009). In the past two decades, precipitation has deviated from the average more frequently, becoming even less predictable and tending to extremes. drought, not unknown in the past, has become more frequent (UNEP GRID-Arendal and Adaptation Learning Mechanism website country profiles, and linked data.)

While climate models do not present matching scenarios for future annual rainfall, together they do suggest that Zimbabwe can expect greater rainfall variability, and the country will see changes in the onset, cessation, and intensity of rainfall. It will also experience more extreme weather events, such as flooding and drought. It is important to note that Zimbabwe's biophysical characteristics will significantly impact the distribution of these changes across the country, and projections for specific locations remain greatly uncertain (UNEP GRID-Arendal and Adaptation Learning Mechanism website country profiles, and linked data).

As to temperature, between 1900 and 2000 annual mean temperatures increased by about 0.4°C; the 1990s were the warmest decade of the century (Unganai, 2009). In recent years, average annual temperatures in Zimbabwe have risen with more hot days and fewer cold days. Climate models consistently indicate a warmer future for Zimbabwe, with a 0.5 to 2 degree Celsius increase by 2030 compared to the 1961-1990 average (UNEP GRID-Arendal and Adaptation Learning Mechanism website country profiles, and linked data). This increase in temperature may significantly impact water availability, as evapo-transpiration increases and runoff declines (FAO aquastat, 2005, cited in Chagutah, 2010).

Potential impacts. All sectors of Zimbabwe's society and economy will feel the impacts of increased precipitation variability, rising temperatures and more frequent extreme weather events. Mounting stress on agricultural systems, water, and health will require effective and aggressive adaptation to sustain the livelihoods and the ecosystems upon which the country depends. Climate change is already pushing farming systems to diversify away from the country's preferred staple -- the water-demanding, drought-susceptible maize -- to sorghum and millet. As the climate continues to change, crop agriculture will no longer be viable across an even greater portion of the country. Adaptation to increasingly insufficient, erratic and unreliable rainfall will include an aggressive expansion of the use of irrigation in agriculture, a shift already supported by the government and donors. This development will, however, further contribute to water stress outside of agriculture. Currently, irrigation, fish farming and livestock watering account for 79 percent of total water use, and irrigated agriculture will continue to dominate the country's water demands for the foreseeable future. Most critically for a country dependant on surface water, the expected increase in evapo-transpiration rates of from four to twenty five percent

will produce a decline in runoff of up to 40 percent and greatly intensify water competition generally (FAO aquastat, 2005). Decreased surface runoff may be expected to dry rural wells and boreholes, reduce urban water supply, and lower hydroelectric power generation. The potential for conflict over water, already reported on newly settled areas, (Banda, 2008), will rise. To this, more frequent droughts and flooding will not only create challenges for agriculture, but damage a variety of man-made and biological systems.

In the health sector, changes in the preferred habitats of disease-carrying insects, especially mosquitoes, tsetse flies, and ticks, will raise the possibility of new geographic distribution of these diseases and increase challenges in their management (Chagutah, 2010).

Mitigation. Zimbabwe's contribution to global emissions of GHG is very small. A carbon tax is levied on cars, but the use of these funds is unknown (Birdlife International, 2011). To date, Zimbabwe has undertaken only very limited institutional readiness and field piloting of carbon credit and REDD+ schemes.

STATUS OF BIODIVERSITY

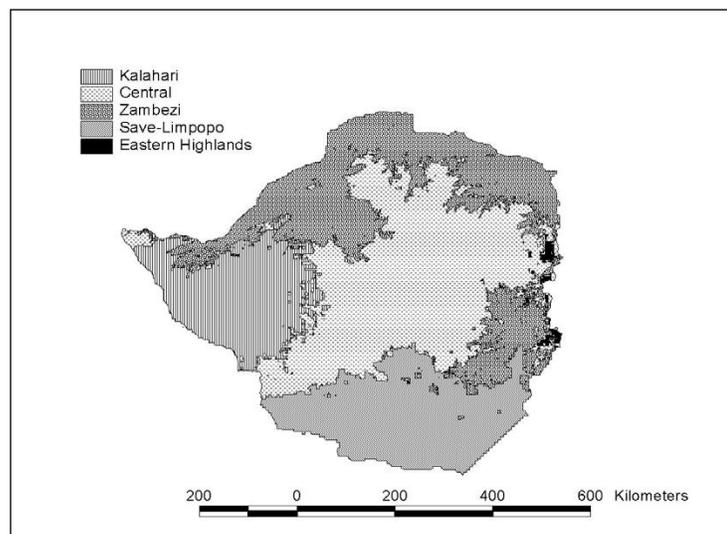
ECOSYSTEM DIVERSITY

Zimbabwe's distinct physical and climatic features shape the country's terrestrial and freshwater ecoregions and frame their diversity. The country's varied and accented landscape supports a rich diversity of life. Zimbabwe provides habitats to an estimated 4,440 vascular plant species, over 200 of which are endemic; 672 bird species, 450 of which breed in Zimbabwe, though none are strictly endemic; 196 mammal species, 156 reptile species, 57 species of amphibians, 132 fish species and uncounted numbers of species in other groups (Government of Zimbabwe State of Environment Report 1998, cited in GOZ, 2010).

Terrestrial ecoregions.

Zimbabwe's high level of biodiversity has its origin in the diverse climatic and geological formations of its ecological regions. These ecoregions are home to the ecosystems that support characteristic assemblages of flora and fauna, the country's natural communities of species. Zimbabwe's Fourth National Report to the Convention on Biological Diversity, (GOZ, 2010), portions the country into five ecoregions. These include the Eastern Highlands, a small montane shrub and grasslands zone to the extreme east of the country, and four regions of tropical grasslands, savannas, or shrub-lands at a lower elevation: the Central region, which extends to the south-west border, but principally occupies the center of the country; the Save-Limpopo

FIGURE 1: TERRESTRIAL ECOREGIONS OF ZIMBABWE



Source: Zimbabwe State of the Environment Report 1998, as presented in Zimbabwe's Fourth National Report to the convention on Biological Diversity

region to the south; the Zambezi region which circles the north and west of the country; and the Kalahari region, located in the east. Figure 1 and Table 2 further present these ecoregions.

TABLE 2: SUMMARY DESCRIPTION OF ZIMBABWE'S TERRESTRIAL ECOREGIONS²

Ecoregion	Altitude (M)	Mean Annual Rainfall (mm)	Area /Portion of Zimbabwe's Land Area	Summary Description
Kalahari	1030	560	46,891 sq km/12%	Dry forest woodlands with grassland patches in areas of seasonal inundation. Includes hot semi-arid deciduous forest lands dominated by <i>Baikiaea plurijuga</i> where the nutrient-poor soils prohibit farming, and woodlands with <i>Colophospermum mopane</i> as the primary canopy species. Good populations of most indigenous animals. African elephant and giraffe are common. [WWF: Zambezi Baikiaea woodlands and Zambezi and Mopane woodlands]
Central	1300	700-1000	195,379 sq km/50%	Flat or gently undulating landscape with frequent isolated rounded hills (<i>dwalas</i>) composed of the highveld and central watershed regions dominated by dry Zambezi Miombo woodland and grassy wetlands in some portions. Sycamore Fig (<i>Ficus sycomorus</i>), Mubvuguta (<i>Croton megalobotrys</i>) and Apple-ring Acacia (<i>Acacia albida</i>) characterize the vegetation flanking the rivers. Large populations of animals are found in the Matobo National park. Eighty eight mammalian species indigenous to Zimbabwe have been reported in the Matobo Hill. [WWF: Southern Miombo woodlands and, to the south, South African bushveld]
Zambezi	1080	650	62,521 sq km/16%	Drought-prone region of low rainfall and high temperatures characterized by Mopane woodlands, and, along the Zambezi river Natal mahogany (<i>Trichelia emetica</i>), Sausage tree (<i>Kigelia africana</i>), Rain tree (<i>Lonchocarpus capassa</i>) and Apple-ring Acacia (<i>Faidherbia albida</i>). A high diversity of large wildlife and the highest densities of hippo and Nile crocodile in the Zambezi river. Elephant population in excess of 10,000 and buffalo in excess of 3,500.

² A second classification of terrestrial ecoregions, developed by the World Wildlife Fund (WWF), consists of 825 terrestrial ecoregions across the globe, five of which extend into Zimbabwe: Southern Miombo woodlands; Southern Africa bushveld; Zambezi Baikiaea woodlands; Eastern Zimbabwe montane forest-grassland mosaic; and Zambezi and Mopane woodlands.

Table 2 takes into account the rough overlap with the GOZ ecoregions. While the information from this source does not present a Zimbabwe-exclusive image, the interactive map and extensive information has been drawn upon in the descriptions of this table and elsewhere in this document. See: http://www.worldwildlife.org/wildworld/profiles/terrestrial_at.html.

				[WWF: Southern Miombo and some Zambezan and Mopane Woodlands]
Save-Limpopo	690	400	78,151/20%	With lower elevation and rainfall than other ecoregions, Save-Limpopo constitutes much of the watershed of the Save and Limpopo rivers. Characterized by mopane woodlands, <i>Acacia spp.</i> and grasslands. Wild mango (<i>Cordyla Africana</i>), sausage tree (<i>Kigelia Africana</i>), and <i>Xanthocercis zambeziaca</i> characterize the canopies of the densely wooded riparian zones. Rich wildlife, with increasing elephant numbers rising to 9,000 in 2009. [WWF: Zambezan and Mopane Woodlands]
Eastern Highlands	1500	740	7,815 sq km/2%	This isolated southern portion of the Eastern Afromontane biodiversity hotspot contains high rates of endemism in terrestrial flora and fauna. The Chimanimani Mountains are the area of highest plant biodiversity in Zimbabwe, with approximately 60 endemic species (WWF/TNC, 2008). Mountainous region with a forest-grassland mosaic wetter than the surrounding ecoregions, and a characteristic foggy climate. Submontane and montane grassland covers rolling hills that make up a large portion of the area. The grasslands are characterized by <i>Themeda spp.</i> , <i>Exotheca spp.</i> and <i>Loudetia spp.</i> , while characteristic vegetation of the woodlands consists of <i>btachystegia spiciformis</i> , and <i>julbernadia globiflora</i> . [WWF: Eastern Zimbabwe montane forest-grassland mosaic]

Source: Fourth National Report to the CBD, Government of Zimbabwe, 2010 and WWF Ecoregions.

Freshwater ecoregions of Zimbabwe. The diversity of Zimbabwe’s aquatic flora and fauna derives from the type and distribution of its freshwater systems. Six major river complexes drain Zimbabwe’s watersheds: the Zambezi, Save-Runde, Limpopo, Nata, Bubi and Pungwe. Although the country has no natural lakes, it has over 80 major dams and approximately 8,000 impoundments. The major artificial impoundments are the Kariba, Mutirikwi, Chivero, Manyame, Mazvikadei, Osborne and Manyuchi dams. Kariba is the country’s largest dam and is shared with Zambia.

Table 3 presents the freshwater ecoregions defined by the country’s major floodplains, riparian wetlands, *dambos*, pans, swamps and artificial impoundments. In addition to those listed below, the ecoregions of the Okavango, Kafue and Lower Zambezi floodplain rivers and wetland complexes also extend into Zimbabwe to a lesser degree.

TABLE 3: MAJOR FRESHWATER ECOREGIONS OF ZIMBABWE

Ecoregion (linked to FEOW)	Major Habitat Type	Known Species	Known Endemic	Summary Description
Upper Zambezi Floodplains	Floodplain rivers and wetland complexes	?	?	More than 1,220 m above sea level, the huge shallow Zambezi river basin is lined by extensive swamps and floodplains that provide breeding and feeding grounds for a moderately rich fish fauna including a near-endemic radiation of large riverine cichlids. Cyprinids, cichlids, and mochokid catfishes dominate the fish fauna, which includes several threatened species of fish.
Middle Zambezi - Luangwa	Floodplain rivers and wetland complexes	61	1	Of the two main rivers that define this ecoregion, the middle Zambezi has been extensively modified by two hydroelectric dams. The resulting reservoirs have drowned about 60% of the main river; their regulating effects dominate the ecology of the river -- floodplains are limited, and no extensive wetlands remain. By contrast, the unregulated Luangwa River experiences flash flooding, rising rapidly to full flood during heavy rains. Its catchment area of 165,000 km ² remains relatively pristine. Important riverine habitats include oxbow lagoons, <i>dambos</i> , and the riparian fringe. Extensive populations of crocodiles and hippopotami occur in the rivers and lagoons of the river basin.
Zambezi Highveld	Upland rivers	39	0	Situated on the great Southern African central plateau, the Zambezi Highveld includes the headwaters and highland streams of the Zambezi River basin in the north, the Save River in the east, and the Limpopo River in the south. Aquatic habitats consist of large and small rivers, <i>dambos</i> , a few artificial reservoirs, and isolated floodplains. The headwater streams are small and clear but revert to swollen and turbid rivers after the rains. While several of the river systems of this ecoregion have an impoverished fish fauna, overall the region is moderately high in aquatic species.
Eastern Zimbabwe Highlands	Montane freshwaters	32	4	Headwaters of numerous rivers dissect this ecoregion. The high altitude streams are narrow mountain torrents, with rapid flow and rocky substrata that cut through deep ravines and gorges separated by steep valleys. <i>Dambos</i> are found in the valley bottoms of many of the streams. Numerous springs and small lakes are also found at high altitudes.
Kalahari	Xeric (very dry) freshwaters	?	?	This ecoregion includes the endorheic (closed) systems of the northern portion of the Kalahari desert that sometimes flow into the numerous small pans in the

	and endorheic (closed) basins			south, the Makgadikgadi salt pan complex, and the Okavango river. Following heavy rainfall rivers with small catchments flow briefly and the numerous pans, normally bare or covered with sparse grass and herbs, retain water for a short time. Fish enter the pans only with the floodwaters, and generally die upon the desiccation of the pans. These harsh conditions and scarcity of freshwater results in limited fish fauna.
Zambezian Lowveld	Coastal rivers	120	22	The perennial and seasonal rivers and associated floodplains, swamp forests, swamps, seasonally inundated pans and grasslands, and coastal lakes of this coastal plains ecoregion support an extremely rich and diverse biota. The major rivers include the lower Save, Pungwe, and Limpopo. The northernmost Pungwe and Save are seasonal rivers with winter low-flows. The flow of the historically perennial Limpopo ceases periodically as a result of water abstraction in the upper catchments. Many species of fish are found in fresh, brackish and saline waters and several catadromous species spend part of their life cycle in the freshwater coastal rivers and streams. About 120 freshwater fish species inhabit these waters, of which 22 are endemic.

Source: WWF/TNC, 2008: Freshwater Ecoregions of the World, (FEOW) <http://www.feow.org/index.php>

SPECIES DIVERSITY

Zimbabwe has an abundant flora and fauna of diverse resources consisting of hundreds of thousands of species of plants, mammals, birds, reptile, butterflies, amphibians and invertebrates, with a high number of endemic species giving the country's biological resources global importance. As of 2011, the IUCN Red List identified 38 species found in the country as vulnerable, 15 as endangered, and three as critically endangered. One fish, the Kariba Tilapia, (also called Mozzie) is critically endangered, along with one bird, the Cave Squeaker, as are the Black Rhinoceros. See Appendix I for the complete Red List of threatened species.

Mammal diversity. Counts of species in different classes may differ widely by source, date, and criteria used in the enumeration process. WRI EarthTrends estimates that only 2% of all the world's species are listed in the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC) upon which much of its count is based. In Zimbabwe, this discrepancy appears most forcefully with regard to mammals. The Government of Zimbabwe's 4th National Report to the CBD (2010) indicates that 175 mammal species inhabit the country, while the 2003 WRI EarthTrends count, which draws on a wide range of sources, reports 270.

This discrepancy does not indicate a growth in population numbers. Indeed, the government's report to the CBD states that the diversity of mammal species has not changed since the 1998 study, and that, to the contrary there is a general decrease in the populations of many species, especially the large mammal species that are most economically important, such as the rhino, antelope and lion. Species that appear on the IUCN Red List as threatened are the Arend's golden mole, African wild dog, cheetah, black-footed cat, African lion, hippopotamus, east African little collared fruit bat, and the African elephant. The black rhino (*Diceros bicornis*) is classified as critically endangered.

The worldwide population of the black rhino reaches just over 4,000. Zimbabwe, which holds the fourth greatest concentration of this species, has seen populations slowly rise since the late 1990s. The 2008 population of 490 was up from 320 when the country's State of the Environment Report was conducted in 1998. The government's creation of intensive protection zones in low elevation wooded savannahs in the southeast of the country was important in supporting this growth. Poaching, nevertheless, continues, especially in private conservancies where as much as a fifth of the black rhino population continues to live. The International Rhino Foundation reports that between 2007 and 2008 poaching of black and white rhinos in Zimbabwe doubled, with more than ten percent of the population of 800 killed by organized poachers for their horn (International Rhino Foundation, n.d.).

Eastern Afromontane Hotspot

Stretching over a curving arc of widely scattered but biogeographically similar mountains running from Saudi Arabia to Zimbabwe this biodiversity hotspot is home to about 110 endemic birds, 100 endemic mammal species, and more than 2,350 endemic plants. Only 10.5 percent of the hotspot's original vegetation remains more or less intact and only about 15 percent of the total area is under some level of official protection despite the massive ecosystem services it provides to the countries in which it is found (BirdLife International, 2011)

The current population of elephants in Zimbabwe is a matter of debate, as the last aerial census was conducted in 2001, and estimates – determinant in discussions concerning culling and ivory trade – are open to debate. Despite this controversy, in Zimbabwe, restrictions on the ivory trade have resulted in a dramatic resurgence in populations over the past 50 years, and there is general agreement that they currently surpass the number the government has identified as the optimum number given the available habitat, 35,000.

The government also reports that the population of cats and Sable Antelope are on the increase while Cape buffalo has been decreasing (GOZ, 2010).

Bird diversity. Zimbabwe's diverse habitats support a wide range of bird types. Over 600 species occur in Zimbabwe, 229 of which breed in-country. The families with the largest numbers of species are: the *Sylviidae* (warblers) with 53 species; the *Charadriidae* (plovers, turstones) with 34 species; the *Ploceidae* (queleas) with 27 species; the *Estrildidae* (finches) with 22 species; the *Hirundinidae* (swallows, martins) with 20 species; the *Turdidae* (trushes, chats, robins) with 20 species; and the *Lonidae* (storks) with 20 species; and the *Ardeidae* (herons, egrets) with 17 species (USAID Zimbabwe, 2007).

The monitoring of important bird areas contributes significantly to biodiversity assessment. Birdlife Zimbabwe identifies 20 important bird areas (IBAs) of international significance in the country. Of the 20, 17 are in protected areas. According to a 2008 study, 64% of the IBAs are in poor state and 36% are in moderate state. IBAs that deteriorated between 2001 and 2008 are Nyanga Mountains; Chimanimani Mountains; Robert Mcllwaine Recreational Park and Save-Runde junction, Batoka. The statuses of Hwange National Park and Chizarira National Park have improved (Mukwashi, 2007).

The IUCN identifies fourteen threatened bird species in Zimbabwe, four of which are endangered. These are the Madagascar pond-heron, hooded vulture, Egyptian eagle, and the white-winged crane. The government reports, however, that the Madagascar pond heron and the white winged crane are rarely seen in Zimbabwe (GOZ, 2010). Important bird areas that support breeding and migration cluster in the Eastern Afromontane hotspot along the eastern frontier, as well in national parks along the border to the west and north west of the country. The government has identified 25 bird species as protected.

TABLE 4: SPECIES DIVERSITY AND THREATENED SPECIES IN ZIMBABWE

	Total recognized species	Number of threatened species
Mammals	270	9
Breeding Birds	229	14
Reptiles	180	3
Amphibians	31	6
Fish	122	3
Higher Plants	4,440	16

Sources: WRI EarthTrends 2003, based on the UNEP-WCMC dataset. Threatened species source: IUCN Red List.

species include the *Boaedontinae* (12 species), the *Gekkonidae* (10 species), the *Corylinae* sub family (nine species), the *Calubrinae* sub family (nine species), the *Atractaspidinae* (nine species), and the *Nnajiinae* (10 species) (USAID Zimbabwe, 2007). The *Python sebae* (African Rock Python) is the most commonly known endangered species (GOZ, 2010).

Aquatic diversity. Zimbabwe is home to 122 fish species. Only a few commercially and biologically important species have been monitored and the status of their populations known (See Table 3 for species distribution by freshwater ecoregion.) The government reports that species diversity and population numbers of some of fish in some of the country's major bodies of water are on the decline due to over fishing, pollution, lowering of water levels, and invasive species (GOZ, 2010).

Aquaculture production is carried out for both domestic consumption and sale. Varieties of tilapia (*Oreochromis mossambicensis*, *O. macrochir*, and *O. Andersoni*) are farmed, along with the kariba bream (*Oreochromis motimeri*), catfish (*Clarias gariepinus*), prawn and crayfish (USAID Zimbabwe, 2007). Commercial production relies primarily on the Nile tilapia (*Oreochromis niloticus*), and the rainbow trout (*Oncorhynchus mykiss*). Lake Kariba supports an important fishery based on introduced sardine, (*Limnothrissa miodon*), which yields about 20,000 tons per year. Exotic fish species have also been introduced in Zimbabwe by angling societies.

Invertebrate diversity. Zimbabwe has not conducted an inventory of insect species. The Natural History Museum in Bulawayo and insect collection at the plant protection research institute in Harare indicate that the country has a rich diversity of insects. Representatives of all 29 insect orders have been found in Zimbabwe. Grasshoppers and locusts constitute an important widely distributed economic invertebrate order with nearly 300 species. Most of the species are defoliators with seasonal abundance. Four families of termites have been recorded. Termites are both important as a food source and in nutrient recycling and at least 45 species have been documented in Zimbabwe (GOZ, 2010).

Plant diversity. Over 4,440 higher plant species are recognized in Zimbabwe. The IUCN Red List reports 16 threatened species. Over 230 endemics or near endemics have been identified. (Mapaura, A., 2002, cited in Hyde, 2012). The Chimanimani mountains with over 70 endemics or near-endemics is home to the greatest number in Zimbabwe. The Great Dyke area also supports an important number, and there are many endemics in the more broadly defined Eastern Highlands, the central watershed, northwest Zimbabwe and the Limpopo escarpment (Hyde, 2012). Collectors threaten a number of rare endemics, such as the three endemic orchids.

Amphibian and reptile diversity. The government reports 57 species of amphibians in Zimbabwe, seven of which considered endemic, (GOZ, 2010), and six of which are found on the IUCN Red List as threatened: the cave squeaker, *Probreviceps rhodesianus* (no common name), the chirinda toad, inyanga toad, inyangani river frog, and the chimanimani stream frog.

About 400 reptile species have been reported in Southern Africa (USAID Zimbabwe, 2007). The government's most recent national report to the CBD reports that 180 of these occur in Zimbabwe. Families with large numbers of

AGRO-BIOLOGICAL GENETIC DIVERSITY

No thorough study of the diversity of cropped plants has been conducted in Zimbabwe. Nor are the trends in this diversity well understood. It is nevertheless believed that the introduction of hybrid seed for crops maize has significantly reduced the level of species diversity in that crop. For the past twenty years the Government of Zimbabwe has promoted the use of hybrid seed over local landraces. This policy resulted in increased production of maize but reduced diversity of varieties planted. According to Zimbabwe's Fourth National Report to the Convention on Biological Diversity, most of the farmer varieties are now extinct and can only be found in *ex situ* collections (GOZ, 2010).

While there are still areas where sorghum, millet and legume diversity remains, there has also been considerable genetic erosion across traditional crops. Formal and informal seed systems support the continuation of the remaining genetic diversity. Seed companies coordinated by the Zimbabwe Seed Trade Association (ZSTA) compose the formal system. Farmers and friends saving and sharing seed and selling them at markets comprise the informal system. Some NGOs support this informal system. The 1998 National Biodiversity Strategy Action Plan reported that at that time the conservation and sustainable utilization of plant genetic resources for food and agriculture was supported through the 'Zunde RaMambo' (The Chief's Silo) concept or the chief's seed and food security program that relies on traditional leaders to support grain storage schemes, and that the concept was being extended to tree planting programs through which local leaders encouraged local communities to leave seed trees or seed stands in their natural habitats (Ministry of Agriculture, 2009). The current status of this institution is unknown.

The Genetic Resources and Biotechnology Institute (GRBI) heads a decentralized network of organizations and institutions that manage *ex situ* collections of plant genetic resources (PGR), including the public sector, parastatals, private sector, NGOs and farmers. The incomplete nature of the characterization and documentation of these holdings limits their usefulness. For its part, as of 2009, the GRBI held 3,464 accessions of plant genetic resources (Ministry of Agriculture, 2009).

It is also believed that the genetic resources of indigenous livestock herds have been contaminated through the indiscriminate introduction of exotic breeds. Breeds threatened with extinction include Nguni cattle and Sabi sheep (Feresu, 2010).

The use of biotechnology and genetically modified organisms is accepted in Zimbabwe, but little practiced (Feresu, 2010).

ECOSYSTEM SERVICES

Zimbabwe's ecosystems serve important ecological functions that underpin much of the country's local livelihoods and national economy, such as the provision of natural products (such as wild foods and traditional medicine), fuelwood, fresh water, fodder and forage. Forests protect important watersheds which feed dams, irrigation and water courses. Forests also provide habitats for wildlife that forms the foundation of the country's tourism industry, the third highest foreign currency earner after agriculture and mining. Rural livelihoods depend on natural products, and fuelwood is the primary source of energy. Fodder and forage maintain the country's livestock and dairy industries. In addition to these provisioning services, ecosystems also serve regulating functions, such as the maintenance of soil fertility, water regulation and flood control. For example, the wetlands of Zimbabwe play an important role in absorbing pollutants and siltation, and regulating flooding, reducing the downstream threat, and releasing an ongoing flow after the flood has abated. They also provide habitat for migratory birds and serve as

TABLE 5: LAND USE SYSTEMS

Land use	Area (000 ha)	% of total area
Woodland	20,804.5	53.61
Cultivation	10,742.7	27.68
Bushland	4,974.6	12.82
Wooded grassland	1,204.9	3.11
Grassland	688.7	1.77
Plantation	156.9	0.4
Settlement	140.8	0.36
Rocky outcrop	78.6	0.2
Natural moist forest	12.2	0.03
Total	38,803.8	100

Source: FAO 2010

percent of the total land area of the country. A further 13 percent is covered by bush lands. Over a quarter of the woodland area is found on state lands namely National Parks, Wildlife Reserves and Forest Reserves. Exotic plantations cover less than one half of one percent of the land. Rainforest covers slightly more than a quarter of one percent of the country's surface area (See Table 5).

Indigenous woodland types. Zimbabwe's indigenous forests fall into two classifications: Flora Zambesiaca and Afromontane phyto. The Flora Zambesiaca comprises five types:

- Miombo woodland is dominated by *Brachystegia spiciformis* in association with *Julbernardia globiflora*. It covers most of the highveld at altitudes above 1200 m. The woodland is normally associated with sandy soils.
- Mopane woodland is characterised by the species *Colophospermum mopane* and occurs at low altitudes below 900 m, where the climatic conditions are hot and dry. The woodland is normally associated with clay soils.
- Teak woodlands are found on the aeolian Kalahari sands in the north west of the country. The woodlands are characterised by *Baikiaea plurijuga* which grows in association with *Pterocarpus angolensis* and *Guibourtia coleosperma* mainly. These species are the main sources of commercially exploitable timber.
- *Acacia* woodlands are dominated by various acacia species, depending on soil type.
- *Terminalia combretum* woodlands are characterised by *Terminalia sericea* and *Burkea africana* species (Bradley, 1993).

The Afromontane phyto-region has four vegetation types that are based on elevation and tree species composition: Montane forest above 1650 masl, submontane forest at 1350 to 1650 masl, medium altitude forest from 850 to 1350 masl, and lowland forest at 350 to 850 masl (Bradley, 1993).

Plantation forest is planted with exotic species, 69% of which are pines (*Pinus spp.*), 16% eucalypts (*Eucalyptus spp.*), and 15% black wattle (*Acacia mearnsii*). The plantations are found in the eastern part of the country where rainfall is high enough to sustain tree growth and productivity.

Zimbabwe's indigenous woodlands are found in the country's communal areas, resettlement areas, large scale commercial farming area, and gazetted state forests, with the majority falling in communal areas. They provide rural households with firewood, merchantable timber, construction timber, browse, fruits, medicines, mushrooms, bark and many other non-timber products. The quality of these woodlands

fish breeding grounds. Conserving wetlands and forests that provide ecosystem services will be important to maintaining the country's resilience to climate change (Unganai, 2009, Shackleton, 2008).

STATUS OF FORESTS

Zimbabwe's forest resources include natural moist forests, woodlands, and plantations. Forest (both natural and plantations) and woodlands in Zimbabwe cover about 54

varies greatly, although most consist of little more than remnants of scattered trees in what has effectively become open land. The resettlement areas were once commercial farms endowed with tree resources.

The Government of Zimbabwe has set aside two percent of the country (832,662 ha) as protected forest. These reserves are divided into two categories. The first consists of the woodlands found on the Kalahari sand formation in the north western. These woodlands contain commercially productive species such as Mukwa (*Pterocarpus angolensis*) and Red Mahogany (*Baikiaea plurijuga*).

The other category of gazetted forest is the remnant mid-altitude montane forests found in the Eastern Highlands. These are currently protected for biodiversity, cultural and scientific values. The Forestry Commission, through its Research and Development Division, also manages the Chirinda Forest which is a mid-altitude afro-montane forest located in the south Eastern Highlands. It is about 700 ha in size and is a centre of endemism for many plants and animal species.

Forest cover trends and threats. The proportion of total land area covered by forest has been falling significantly across the past two decades, due primarily the expansion of cultivated land. Between 1990 and 2005, Zimbabwe lost more than 20 percent of its forest cover, with an average loss of 312,900 hectares per year (FAO, 2010), compared to 70,000 ha per year a few decades earlier. The resettlement on large-scale commercial farms and some designated state lands associated with the land reform program drove much of this deforestation. Other causes deforestation and forest degradation include: population pressure in communal areas, effects of fires, collection of non-timber products for medicinal purposes, commercial timber and tobacco curing (GOZ, 2010).

TABLE 6: FOREST COVER TRENDS

Land Cover Category	Area (1000 ha)			
	1990	2000	2005	2010
Forest	22 164	18 894	17 259	15 624
Other land	16 521	19 791	21 426	23 061
Inland water bodies	391	391	391	391
Total	39 076	39 076	39 076	39 076

Source: FAO, 2010.

Interviews conducted for this assessment and news reports indicate the use of wood to cure tobacco by farmers newly engaged in tobacco farming has resulted extensive destruction of indigenous forest. The number of small holders engaged in tobacco has jumped significantly in recent years. The Voice of America reports that about 3,500 persons farmed tobacco in 2007 and over 45,000 in 2011. In the three years before 2011, an estimated 300,000 hectares of indigenous forests were destroyed annually as a result (Thornycroft, 2011).

TABLE 7: FOREST OWNERSHIP

Ownership Type	Area (1000 ha)		
	1990	2000	2005
Public Ownership	13 852	11 828	10 804
Private Ownership	8 312	7 066	6 455
Total	22 164	18 894	17 259

Source: FAO, Global forest resources assessment 2010.

Table 7 presents the decline in forested land since 1990. These figures do not take into account the large-scale clearing that has accompanied the recent resettlement program.

ECONOMIC IMPORTANCE OF BIODIVERSITY AND FOREST CONSERVATION

FOREST RESOURCES IN THE NATIONAL ECONOMY

TABLE 8: HOLDERS OF MANAGEMENT RIGHTS TO PUBLIC FORESTS

Forest Type	1990	2005
Public Administration	3 695	5 613
Communities	6 690	2 714
Other	2 518	1 996
Private Corporations and Institutions	949	481
Individuals	0	0
Total	13 852	10 804

Source: FAO, 2010

The commercial forestry industry based on exotic trees constitutes about four percent of the GDP. The commercial plantation-based industry employed an average of 14,600 people between the period 2005 and 2010. The indigenous hardwood industry based on *B. plurijuga* and *P. angolensis* employs an additional 2,000 people directly, and a significant number in the downstream furniture industry.

WILDLIFE RESOURCES IN THE NATIONAL ECONOMY

Zimbabwe's parks and conservancies play an important role in the country's economy. Between 2006 and 2010, tourism contributed between four and a half to five percent to the country's economy, and represents just below 10% of formal employment. While over the past decade, small-scale community ecotourism projects and the tourism industry overall, (with the exception of safari hunting), have sharply declined, recovery in recent years has been strong. Earnings jumped 47 percent in 2010, and visitors increased 15 percent, with over 2.2 million tourists visiting the country, rising above the previous high of 2.1 million in 2000 (Zimbabwe Tourism Authority, 2011 and 2001).

Although many game ranches have been destroyed in the resettlement process, Zimbabwe has a proven potential for this industry. The country experienced massive growth in the game ranching industry in the post 1970 period, and by 1994 a fifth of white commercial farms incorporated wildlife into their systems (Mavedzenge, 2006). Zimbabwe's Commercial Farmers Union (ZCFU) considers game ranching an underexploited sector in which it saw significant growth potential as recently as 2004 (IRIN, 2004). Wildlife species are evolutionarily adapted to arid environments and thus more resilient in times of drought (Mavedzenge, 2006). Extensive game ranching can preserve habitat for wildlife, and provide incentives against converting arid lands and unsuitable soils to cropped agriculture. It also holds certain economic and environmental advantages when contrasted to cattle raising (Ntiamoa-Baidu, 1997).

On a much smaller scale, ranched crocodiles are raised from eggs collected in the wild. CAMPFIRE programs provide local communities revenue from crocodile sport hunting and levies from egg collection.

The Parks and Wildlife Management Authority considers both game hunting and crocodile ranching lucrative businesses that can generate income to private safari operators, landowners, crocodile farmers and the rural communities (PWMA, 2006).

THE IMPORTANCE TO AGRO-BIODIVERSITY TO THE NATIONAL ECONOMY

Zimbabwe's food production depends on the diversity of cultivated species. Agro-biodiversity consists of the species diversity found in crops, farmed fish, livestock varieties, as well as associated pests, pollinators, and predators. Small scale farmers nurture and maintain their bank of genetic resources; they use their different characteristics to manage risk in varied and changing ecological zones and

climatic conditions. Continuing access to this diversity will maintain food security as Zimbabwe's farmers employ a diverse array of crops and livestock strains to create resilience to climate variability (Shava, 2009).

THE ROLE OF GENETIC RESOURCES IN THE NATIONAL ECONOMY

The Government of Zimbabwe has promulgated regulations under the Environmental Management Act to endure fair and equitable sharing of benefits derived from the use of genetic resources. It has also established the Medical Traditional Practitioners Council and enacted the Traditional Leadership Act to ensure and facilitate access and benefit sharing arrangements between the communities and other stakeholders (GOZ, 2010). Interviews conducted for this assessment indicated that the effectiveness of these acts has yet to be put to the test.

THE IMPORTANCE OF FOREST RESOURCES AND BIODIVERSITY TO LOCAL LIVELIHOODS

Zimbabwe's communities and the nation as a whole derive benefits from various timber and non-timber forest products and services not captured in the national accounts. Zimbabwe's forest and biological resources form an essential part of rural livelihoods. Firewood provides an estimated 80% of the energy used by rural households and 40% used by the urban population. Forests also provide habitat for fruits, mushrooms, honey, bush meat, edible caterpillars and insects, vegetables, medicines, poles, bark string and browse for livestock and wildlife. Even in years of successful harvests, families rely on the non-cultivated products. One study in Masvingo Province found that goods and services from ecosystems contribute two thirds of family incomes. Wild products from woodlands alone contribute 15 percent, and livestock rearing, which relies on wild forage, contributes another 21 percent (WRI, 2005). The EMA reports that in some parts of the country, forest based resources contribute up to 35% of rural incomes (Feresu, 2010). As the past decade has shown, open access natural resources also represent a means of survival in times of crisis.

MANAGEMENT AND PROTECTION EFFORTS

Historically, Zimbabwe has been an international leader in preservation through its protected areas systems and private conservancies, but the recent economic and political crisis effectively disrupted any progress Zimbabwe had been making its economic growth also environmentally sustainable (Chimhowu, A. 2009). Prior to the crisis, the country made measurable progress towards Millennium

Development Goal 7, ensuring Environmental Sustainability. Now, the country is working to rebuild the institutional capacity to achieve its former level in this regard.

Zim's Environmental Performance

According to the Yale 2010 Environmental Performance Index (EPI) of environmental public health and ecosystem vitality, Zimbabwe ranks 127 out of 163 countries ranked, with a score of 47.8. The average score for sub-Saharan countries is 47.3. Zimbabwe's scores are pulled up by the extent of its protected areas and governmental protection of endangered species. Factors that pull the overall score for the country down include the country's limited provision of sanitation infrastructure, high levels of indoor air pollution, water stress, and non-participation in treaties on pesticides (Yale, 2010).

LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

Laws governing environmental management. The Environmental Management Act No.13 of 2002 provides the institutional and legal foundation for sustainable management of natural resources and the protection of the environment. The Act addresses the prevention of pollution and environmental degradation, the preparation of a national and sub-national environmental management plans, as well as the establishment of an Environmental Management Agency and an Environment Fund (MoMET, 2002). It also requires environmental impact assessments for all projects affecting the environment.

At sub-national levels, the district councils are empowered to make by-laws, including environmental regulations. However these institutions are generally recognized to lack the power and resources to effectively implement this mandate. For example, experiences with CAMPFIRE programs indicate that the councils are given to predatory behavior, capturing revenue from local wildlife programs. Table 9 presents the suite of laws that most directly influence environmental management.

TABLE 9: LAWS INFLUENCING BIODIVERSITY AND FOREST RESOURCE MANAGEMENT

Law	Main themes and provisions
Land Apportionment Act of 1930 and Land Tenure	Created the Communal areas on marginally productive land.
Natural Resources Act of 1942 (and multiple amendments)	Regulates use of natural resources. The Act is administered by the Natural Resources Board. Provides for the establishment of intensive conservation areas in commercial areas. Not applicable on lands without title, such as communal areas.
Forest Act of 1948 (amended 1982)	The Act mandates the Forestry Commission as the Forestry Authority to protect and conserve indigenous forests, and to regulate the harvesting of indigenous trees on private and communal lands. The Act mandates the Forestry Commission in its role as the State Forestry Enterprise to undertake plantation development and sawmilling.
Communal Land Forest Produce Act of 1987	The Act vests the commercial utilization of forest products on communal areas in the hands of the Rural District Councils, and allows only subsistence utilization of forest products by local people and communities.
National Parks and Wildlife Act of 1975, amended 1982	Designates ownership of wildlife to owners and occupiers of alienated land (e.g. communal people).
Communal Land Act of 1982, amended 1985	Allocates control of land under the President through the Rural District Councils rather than Chiefs.
Rural District Councils Act of 1988	Provides for the Rural District Councils to enact by-laws to regulate natural resources use and issue licenses for commercial exploitation of wood products.
National Water Act No.31 of 1998	Provides the legal foundation for the water sector. Establishes authority for time-bound water permits, their administration by catchment councils, the polluter-pays principle, allocation of water for environmental purposes and drought preparedness.
National Water Authority Act No.11 of 1998	Established the Zimbabwe National Water Authority (ZINWA).
Land Acquisition Act of 1993	Provides for the designation of under-utilized land.
Mines and Minerals Act of 1961	Confers priority to mining in state land tenure allocations. However,

	legal provisions of the Environmental Management Act require that mining projects are subjected to full environmental impact assessments and follow the environmental monitoring and mitigation plans developed.
Environmental Management Act of 2002	The Act makes provision for regulations to promote the sustainable use of the environment through environmental impact assessment, environmental audits and penalties for those who pollute the environment. With the National Water Act, forbids the cultivation of wetlands and stream banks.

Harmonization of legislation. Conflicts exist among a number of laws pertaining to environmental management and regulation. The 2002 Environmental Management Act both overrides and conflicts with earlier law. The central concept of the Forest Act, which has pre-independence origins, precedes the concept of sustainable, participatory forest management. The Communal Land Forest Produce Act also conflicts with this newer environmental law. With regard to the use of forest products by rural communities, the Communal Land Forest Produce Act conflicts with the Communal Lands Act, the Rural District Council Act, and the Forest which themselves provided different and conflicting rights to community members intending to use natural forest products (interviews conducted for this assessment).

Implementation of laws influencing environmental management. Weaknesses do exist in the current legal framework. For example, although the Environmental Management Act of 2002 requires Environmental Impact Assessments, the statutory instruments enacted under the Act contain ambiguities and loopholes that limit their effectiveness (Chimhowu, 2009). Nevertheless, government, donor, and NGO experts interviewed for this study confirm the conclusion that Zimbabwe’s legal framework for environmental management is relatively sound, complete, and progressive. More important are the severe challenges that remain in the implementation the law. The key governmental institutions lack resources, both human and financial. For example, the Environmental Management Authority requires that Environmental Impact Assessments be conducted on new mining sites, yet the EMA is unable to regularly monitor and enforce the implementation of the environmental monitoring and mitigation plans developed. Nor is their implementation impervious to financial and political pressures (See, for example, Chimhowu, 2009 and, with regard to water permits, Chagutah, 2010. Also see the discussion of the Forestry Commission and PWMA in this document).

Policies influencing biodiversity and forest management. The National Environmental Policy and Strategy of June 2009 serves as the principle guidance regarding governmental actions concerning biodiversity and forest management. It identifies the main policy goal for the environment sector as: “to avoid irreversible environmental damage, maintain essential environmental processes, and preserve the broad spectrum of biological diversity so as to sustain the long-term ability of natural resources to meet the basic needs of people, enhance food security, reduce poverty, and improve the standard of living of Zimbabweans through long-term economic growth and the creation of employment.” With regard to biodiversity, the policy articulates the goal to “develop and coordinate the implementation of an integrated strategy for biodiversity conservation in Zimbabwe”. The document recognizes PAs as crucial for “protecting the full range of biodiversity of the country”. It also notes the need to “promote and support community-based initiatives, including the formation of community conservation areas and conservancies, to protect biodiversity outside the Parks and Wild Life Estate and State Forests” (World Bank, 2011).

Other, older, national policies and action plans that relate to the management, conservation and utilization of forest resources include the Forest Based Land Reform Policy, the National Conservation

Strategy, and the National Action Plan on the Desertification Convention as well as the National Biodiversity Strategy and Action Plan. The Forestry Commission currently targets a completion date beyond 2014 for a new National Forestry Policy. Although Zimbabwe has developed a National Communication on the Climate Change Convention, as of 2010, little progress had been made on policy dialogue concerning climate change adaptation and biodiversity (Chagutah, 2010).

National policies and objectives for the agricultural sector also define the nation's approach to irrigation and water resource development. Found in Zimbabwe's Agricultural Policy Framework (ZAPF) 1995-2020 national policy objectives include:

- Growth in the irrigated area particularly in the smallholder sector with minimal negative impacts on the environment and human health;
- Equitable allocation and efficient use of scarce water resources;
- Establishment of a water pricing structure which is consistent with cost and social efficiency;
- Establishment of an effective institutional structure;
- Implementation of drought mitigating strategies (FAO, 2005)

International environmental conventions. Zimbabwe has either ratified or is a party to the following conventions:

- Cartagena Protocol on Biosafety -- party
- Convention Concerning the Protection of the World Cultural and Natural Heritage -- party
- Convention on International Trade in Endangered Species (CITES) -- ratified
- United Nations Convention on the Law of the Sea (UNCLOS) -- ratified
- Vienna Convention for the Protection of Ozone Layer -- ratified
- Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal protocol) -- ratified
- United Nations Framework Convention on Climate Change (UNFCCC) --party
- Kyoto Protocol -- ratified
- UN Convention on Biodiversity (CBD) -- party
- United Nations Convention to Combat Drought and Desertification (UNCCD) -- ratified
- Ramsar - ratified³

Zimbabwe participates in the following regional multilateral environmental agreements:

- Bamako Convention on the ban of the importation into Africa of hazardous waste Southern African Convention for Wildlife Management
- Lusaka Agreement on Co-Operative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora
- Protocol on Wildlife Conservation and Law Enforcement in Southern Africa
- Protocol on Shared Watercourse Systems in the Southern African Development Community
- Agreement on the Action Plan for the Environmentally sound Management of the Zambezi River System (ZACPPLAN)
- Great Limpopo Trans-frontier Park which covers Gonarezhou National Park in Zimbabwe, Kruger in South Africa and Limpopo, Zinave and Banhine Parks in Mozambique.

³ Although the country is not currently listed as a contracting party to Ramsar, in interviews EMA staff confirmed that Zimbabwe has ratified the convention. The government is currently working on the accession process.

These multi-lateral environmental agreements create obligations on governments to develop and enforce coherent and complete environmental legislation and policy. In Zimbabwe, the government has developed a number of strategies and action plans. These include the National Biodiversity Strategy and Action Plan, the National Conservation Strategy, the national communication on the Climate Change Convention and the National Action Plan on the Desertification Convention.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As a party CITES to Zimbabwe enforces quotas on the export of four species. In January of 2011, the following CITES national export quotas were established for the year: 50 live and trophies for Cheetahs (*Acinonyx jubatus*); 1000 tusks as trophies from 500 African Bush Elephants (*Loxodonta Africana*); 500 trophies and skins of leopards (*Panthera pardus*); and 200 sports-hunted crocodiles (*Crocodylus niloticus*). Quotas for cheetahs and panthers, both of which are Appendix I species threatened with extinction, were established by the CITES Conference of the Parties.⁴

The government, in its most recent report to the CBD reports that the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has played a significant role in the conservation and protection of various wildlife species, and that through adherence to CITES rules and regulations, Zimbabwe has, within the country’s budgetary constraints and the low revenue drawn from the wildlife sector, maintained a functioning and effective system of wildlife management (GOZ, 2010). However, with regard to the impact of these international conventions, some observers are less than positive. Chimhowu concludes that that little “substantial or sustainable” has resulted from the country’s adherence to international treaties (Chimhowu, A. 2009).

TABLE 10: PROTECTED MAMMAL SPECIES

Local Names	Scientific Names
Aardwolf	<i>Proteles cristatus</i>
Bat-eared fox	<i>Octocyon megalotis</i>
Cheetah	<i>Acinonyx jubatus</i>
Gemsbok	<i>Oryx gazelle</i>
Lichtenstein’s hartebeest	<i>Alcelaphus lichsteini</i>
Pangolin	<i>Manis temmincki</i>
Black rhinoceros	<i>Diceros bicornis</i>
White rhinoceros	<i>Ceratotherium simun</i>
Roan antelope	<i>Hippotragus simum</i>

Source: (USAID, 2007)

BODIVERSITY AND FOREST MANAGEMENT INSTITUTIONS AND ORGANIZATIONS

A wide range of institutions and organizations influence the management of Zimbabwe’s biodiversity and forests. The lists below are indicative and non-exhaustive.

Government institutions

The Ministry of Environment and Natural Resources executes its mandate principally through its departments and parastatals. At the district level, District Development Committees comprised of elected leaders and ministry technical officers are responsible for environmental management. Weaknesses in this structure include a lack of coordination among line ministries and parastatals, and limited capacity at the rural district level (Chimhowu, 2009, confirmed in interviews).

⁴ Appendix I: species threatened with extinction and may be affected by trade. Appendix II: species not necessarily threatened with extinction, but may become so unless trade is strictly regulated. Appendix III: species that are listed after one member country has asked other CITES Parties for assistance in controlling trade in a species. The species are not necessarily threatened with extinction globally.

- Ministry of Environment and Natural Resources (MENR)
 - Environment Management Authority (EMA)
 - Parks Wildlife Management Authority (PWMA)
 - The Forestry Commission (FC)
- Ministry of Lands and Agriculture Technical and Extension Services (Agritex)
 - National Herbarium and Botanic Garden (NHBG)
 - Department of Research and Specialist Services (DRSS)
 - The Agriculture and Rural Development Authority (ARDA)
- The Office of the President
 - Biotechnology Research Institute of SIRDC
- Ministry of Local Government, Rural and Urban Development and Housing
 - Rural District Councils (RDC)
 - Association of Rural District Councils of Zimbabwe (ARDC)
- Ministry Of Water Resources Development and Management
 - The Zimbabwe National Water Authority (ZINWA)

Non-governmental organizations

- Association of Participatory, Ecological, Land Use Management (PELUM)
- Association of Zimbabwe Traditional Environmental Conservationists (AZTREC)
- Biotechnology Trust of Zimbabwe (BTZ)
- BirdLife International Zimbabwe
- CARE International in Zimbabwe (CARE)
- Communal Area Management Programme for Indigenous Resources (CAMPFIRE)
- Community Technology Development Trust (CTDT)
- Environment Africa (EA)
- Environmental Development Activities Zimbabwe (ENDA)
- Fambidzanai Permaculture
- Gender and energy network of Zimbabwe (GENEZ)
- Southern Alliance for Indigenous Resources (SAFIRE)
- The African Wildlife Foundation (AWF)
- The Frankfurt Zoological Society (FZS)
- Wildlife and Environment Zimbabwe (WEZ)
- World Wildlife Fund (WWF).
- Zambezi Society
- ZERO Regional Environment Organization (ZERO)
- Zimbabwe Environmental Law Association (ZELA)
- Zimbabwe National Traditional Healers Association (ZINATHA)

Universities, research and training institutions

- Africa University (AU)
- University of Zimbabwe (UZ)
- University of Science and Technology

Regional and international institutions active in Zimbabwe

- International Crop Research Institute for Semi-Arid Tropics (ICRISAT)
- Maize and Wheat Improvement Centre (CIMMYT) - Zimbabwe
- International Centre For Research in Agro-forestry (ICRAF) Southern Africa
- Farm Level Applied Research Methods For East and Southern Africa (FARMESA)

- Southern African Development Community Tree-Seed Centre Network
- Southern African Development Community - Seed Security Project

Donor Organizations

- AUSAID
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- European Union
- FAO
- The World Bank
- United Nations Development Programme (UNDP)
- USAID

MANAGEMENT OF PROTECTED AREAS

Protected areas. The Parks and Wildlife Act of 1975 sets out six types of protected areas: national parks, safari areas, sanctuaries, botanical gardens, botanical reserves and recreational parks, which are managed by the Zimbabwe Parks & Wildlife Management Authority (Table 11). At present, the Parks and Wildlife Estate constitutes 13% of the total land mass of the country, a higher percent of the country than either the average of Sub-Saharan Africa (10.9%) or the world (10.8%) (WRI, 2003). The purposes of these parks include the preservation and protection of the natural landscape, scenery of wildlife and plants and the natural ecological stability of wildlife and plant communities found therein. The Parks and Wildlife Estate is scattered throughout Zimbabwe. A significant portion of Zimbabwe's rainforests fall in these areas and are protected by the Parks and Wildlife Authority. (See Figure 3.)

FIGURE 2: PROTECTED AND WILDLIFE AREAS



Source: PWMA, n.d.

Historically, Zimbabwe has been recognized around the world for its network of protected areas and the diverse mega fauna and rare floral populations found in them. Unfortunately, the events since 2000 have produced a considerable deterioration in the government's capacity to maintain this system. Substantial PWMA resources derive from tourism, which, as noted above, has dropped in recent years. A large portion of the Authority's experienced staff left during the crisis and is only now beginning to return. Currently, two thousand field agents with less than 50 vehicles patrol the country's 450 square kilometers of protected areas. Functioning vehicles are scarce. Funding of the country's national parks

TABLE II: NATIONAL PARKS AND OTHER PROTECTED AREAS

National Parks	Area (000 ha)
Chimanimani	17.1
Chizarira	191.0
Gonarezhou	505.3
Hwange	1,465.1
Kazuma Pan	31.3
Mana Pools	219.6
Matopos	42.4
Matusadona	140.7
Nyanga	47.2
Victoria Falls	2.3
Zambezi	56.0
Subtotal	2,703.8
Other Protected Areas	
Safari Areas	2,367.0
Recreational Parks	308.6
Botanical Reserves	7.0
Botanical Gardens	0.5
Sanctuaries	18.6
Subtotal	2,701.7
Grand Total	5,403.5

Source: GOZ, 2010

pales in comparison to that of nearby countries. The average funding of parks in Zimbabwe is 10 USD per km² while funding for Kenya's Kruger National Park is 1,700 USD per km² (World Bank, 2011).

While the capacity of the PWMA to manage the vast territories for it is responsible has degraded over the past decade some threats have become more severe. Poaching of both commercial timber and wildlife has risen, and farmers have attempted to clear and inhabit portions of certain parks. The PWMA has been unable to provide sufficient water for animals in some cases. In November of 2011, water shortages in conjunction with a heat wave drove 100 to 200 elephants to die of thirst in Hwange National Park. A concentration of waterholes, and the PWMA's inability to either properly maintain existing water points or construct new ones, also results in a destruction of the habitats in the surrounding areas. Other ongoing threats include the spread of invasive species; community slaughter of animals in response to conflict; and the progressive degradation of land, forest, and wetlands. To address the increase in commercial poaching, the PWMA has been forced to resort to draconian measures, such as \$20,000 fines and seven year sentences for poaching elephants, and a "shoot to kill" policy.

FOREST MANAGEMENT

The Forestry Commission derives its authority to regulate the use of gazetted forests through the Forest Act of 1948. On the basis of this act it oversees the intensive management of state owned exotic plantations located in the Eastern Highlands, and, to comply with the needs of the export markets, a certification process. On privately owned forest, the Forestry Commission establishes quotas and monitors harvesting, while owners determine the management and marketing of the products.

The Forest Commission has not developed an overarching management strategy for indigenous forests because over nine tenths of them have little or no commercial timber (Shumba 2001). Management efforts that do exist focus largely on fire management. To clear the limited commercial grade timber, the Forestry Commission establishes contracts with national logging companies who harvest and market it under the Commission's direction.

The Forestry Commission derives its authority to manage forests in communal areas through the Communal Land Forest Produce Act of 1987. On the basis of this act, the Forestry Commission advises Rural District Councils as they draw up concession agreements, and provides overall supervision with regard to forest management. Local communities are seldom involved in this process, and receive only limited benefits. Nor do they influence the allocation or management of concessions. Forests in

communal areas that are not considered to be of commercial timber value (most of the wooded area) are exploited by local populations for timber and non-timber products. The Communal Land Forest Produce Act authorizes local populations to exploit these products for domestic use, a right which constrains enforcement of forest regulations and the regulation of small scale harvesting on communal lands. In practice, traditional authorities and local rules dominate the use of these woodlands, rather than national government regulation or even Rural District Councils. Demand has overtaxed this mixed management system and forests in communal areas have seen steady degradation across several decades. Pressure to find new fields pushes rural poor to illegally clear demarcated forest areas, which has led to conflict with the Forestry Commission (Shumba, 2001).

As with the PWMA, the twelve years since 2000 have resulted in a grim deterioration of institutional capacity in the Forestry Commission, including steep drops in staff and funding. A parastatal partially funded through revenues it collects, the Forestry Commission's budget has been weakened by the economic crisis, a drop in tourist revenues, and general institutional deterioration. In the western part of the country visited for this assessment, 100 security guards, with no vehicles and limited radio, patrol 800,000 hectares. District officers themselves do not have access to reliable vehicles.

The GOZ is developing a number of regulations to address causes of the decline of Zimbabwe's forests, including two threats to indigenous forest that have risen precipitously since 2000: clearing to cure tobacco and the urban fuelwood market compensating for erratic electricity access in cities. Proposed regulations include the Tobacco Wood Energy Regulations, Plantation Timber Industry Regulations, Firewood Trading Regulations and the Movement of Timber Regulations. These regulations would enable the Forest Commission to better enforce the 2007 ban on the movement of wood without a permit and give legal tools to agents manning roadblocks and patrolling for transporters of firewood. They would also provide the legal framework for a chain of custody for commercial timber. And the Tobacco Wood Energy Regulations will require farmers to present proof that they have a gum tree plantation before they are authorized to auction tobacco. It may also be expected that the enforcement of fines and permits authorized by these regulations would increase revenue to the Forestry Commission.

CONSERVATION OUTSIDE OF PROTECTED AREAS

Private Conservation Parks. Prior to 2000, Zimbabwe received worldwide recognition for the important role played by its private conservancies in the resurgence of populations of endangered large mammal species. The 1975 Parks and Wildlife Act gave landowners rights to manage wildlife on their land. Commercial farmers used these new rights to turn what had been considered nuisance animals into a source of profit, creating co-management entities, often covering vast areas, tapping into the eco-tourism and safari hunting markets. Protecting the critically endangered black rhino was the focus of much of this work, and in this regard the approach proved to be a significant success.

The unregulated land invasions associated with the Fast Track reforms have resulted in a destruction of this system as owners have been evicted, trees harvested, and fires set. Fences have been cut to produce snares that have wounded and killed the wildlife once protected on those lands. Even some of the largest, most established conservancies have not been spared. Although information remains limited and anecdotal, eye witnesses accounts portray a wholesale slaughter of wildlife. Of over 600 wildlife ranches, only five now remain (IRIN, 2004).

In response to increased poaching in recent years, the remaining intact conservancies have dehorned black rhinos, and transported them out of heavily poached areas, and in the past five years, poaching has

slowed. The International Rhino Foundation reports that 71 rhinos were poached in Lowveld conservancies in 2008, 64 in 2008, and 18 in 2010.

Conservancy on communal lands. Much of the management of Zimbabwe's environment falls to the country's more than 676 community-based organizations (World Bank 2011). A number of national NGOs also support environmental management, principally at the local level working with these CBOs. In 1992, the Parks and Wildlife Act was amended to extend usufruct rights to residents of communal lands, giving a legal foundation to an approach first demonstrated through a USAID grant in 1989, the largest and best known initiative to take advantage of this new enabling condition, CAMPFIRE. Through CAMPFIRE, local communities are able to manage their natural resources, principally wildlife, and reap financial rewards. With regard to wildlife, for example, communities establish and enforce hunting quotas, and share in the profits gained by private safari enterprises. By 1997, 200,000 people from 185 community's households were participating in CAMPFIRE projects, which resulted in a significant positive impact on wildlife populations. Between 1990 and 2003, the population of elephants on communal lands doubled, even though human population doubled at the same time. Other wildlife populations increased by fifty percent (CAMPFIRE association website, accessed February 22, 2012). According to CAMPFIRE Program Manager Cecil Machena, in 2003, CAMPFIRE programs managed wildlife in 28 districts, and had programs covering a total area of 56,000 sq km.

Interviews suggest that the decline in both tourism and donor support over the past decade has vastly decreased the capacity of local CAMPFIRE communities to manage their programs.

The CAMPFIRE association has extended its approach to non-timber forest products, and intends to also be applied to timber products, and mining. Other organizations have also developed and promote approaches providing incentives to local communities for the sustainable management of natural resources through commercialization. The Southern Alliance for Indigenous Resources (SAFIRE), one example, focuses on forestry and forest products. Working with 20,000 households, they develop management plans, develop enterprises and products, extend technical knowledge and create the necessary institutional arrangements. Products include herbal teas, masau jam, baobab pulp and oil, marula jelly and oil, mazhanje by-products, kigelia extract and honey (Interview with SAFIRE Deputy Director Peter Gondo, and SAFIRE website, accessed February 22, 2012).

Freshwater management. The eight major dams and over 8,000 impoundments in the Zimbabwe have modified the country's natural habitats while creating new ones. The most important single modification of a freshwater system in the country has been the construction of two hydroelectric dams placed on the Zambezi river, which drowned about 60% of the main river and created the world's largest freshwater lake, Kariba (5,364 km²). The regulation of river flow, a reduction in flood volume, and the deposition of sediments have modified the composition of fish populations and promoted the proliferation of aquatic weeds. The north-eastern portion of the affected area falls in the 40,000 km² Middle Zambezi Biosphere Reserve formalized in June of 2010. Ecosystems of the biosphere continue to be managed and modified through safari sport hunting, park management, CAMPFIRE communities, and an important fishery industry.

CURRENT PROGRAMS AND PROJECTS IN BIODIVERSITY AND FOREST CONSERVATION

A number of donors provide support to projects that directly impact the country's biodiversity and forests. An incomplete yet illustrative list of ongoing and proposed funding follows:

Australian AID. Agriculture and food security. AUSAID supports a range of projects including agri-business and financial services, and support to NGOs implementing activities to support climate-smart food security activities at the community level.

Australian AID. Water and Sanitation. AUSAID also supports water and sanitation activities in urban areas and rural water systems, including support for decentralized water management institutions.

European Union. In recent years, the European Commission has provided €90-100 million per year in development assistance in food security and agriculture, social sectors and the promotion of governance. Current projects include three CBNRM projects, two of which are in protected area buffer zones; four projects focusing on food security; and support for sustainable medicinal plants promotion with Organic Africa. The EU no longer supports agricultural projects in natural regions IV and V.

FAO and partners, Irrigation. The FAO, the International Fund for Agricultural Development (IFAD), New Partnership for Africa's Development (NEPAD), the European Union (EU), the Japan International Cooperation Agency (JICA) and other partners have joined in a 5-year (2010–2015), US\$ 900-million project to develop and rehabilitate Zimbabwe's irrigation systems and institutions (USAID, 2010).

FAO, Promotion of Conservation Agriculture (CA) and Coordination of Agricultural Activities in Zimbabwe. Investment to date, USD \$ 9.5 million. (See lessons learned in Gasana, 2011.)

SADC, Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA). Located along the Zambezi river, the goal of the KAZA TFCA, is to sustainably manage the ecosystem applying conservation and tourism models and the harmonization of policies, strategies and practices. The project is owned and led by the governments of Angola, Botswana, Namibia, Zambia and Zimbabwe. It covers an area just smaller than that of Italy.

United Nations Development Programme (UNDP), Coping with Drought and Climate Change in Zimbabwe Project. This project promotes coping mechanisms for reducing the climate related vulnerability of small-holder farmers and pastoralists including actions to conserve wetlands and forests that provide ecosystem services and increase community resilience to climate variability.

United Nations Development Programme (UNDP), GEF Small Grants Programme, Zimbabwe. In operation since 1993, the program provides financial and technical support to community-based activities focused on biodiversity, climate change, international waters, land degradation and chemicals. USD\$ 1,930,000 has been invested to date. There are many lessons to be learned from this broad range of activities.

WASH. USAID and partners. In conjunction with the Office of U.S. Foreign Disaster Assistance (OFDA), the European Commission, the United Nations Children's Fund (UNICEF), the Department for International Development (DFID), New Zealand Aid, the Swedish International Development Cooperation Agency (SIDA), the German Government and others were providing water and sanitation support to Zimbabwe as of 2010 (USAID, 2010).

World Bank, Environment Management and Conservation Project in the Hwange-Sanyati Biological Corridor (HSBC). The GEF-funded project is being designed to take a landscape/ecosystems approach. Expected outcomes include improvements in the land, forest, and park management in this critical biological area.

THREATS TO BIODIVERSITY AND TROPICAL FOREST CONSERVATION

INDIRECT DRIVERS

Population growth. Population growth will drive biodiversity and forest cover loss over the long term. Between 1983 and 2000, Zimbabwe's population grew over fifty percent, from 8.2 million to 12.5 million. Total fertility rate, although on the decline since the mid-1970's, remains high, at 3.36 births per woman (2009 estimate). Because the country experienced significant out-migration,

(between 2007 and 2011, for example, net outmigration equaled 900 thousand), the total population has remained virtually constant over the past decade. Nevertheless, over the long run the "natural" increase in population, combined with the return of migrants, will assert an increasing pressure. (Statistics from: World Bank Development Indicators, accessed February 13, 2012)

TABLE 12: AGRICULTURAL POPULATION PER HA OF ARABLE & PERMANENT CROPS LAND⁵

Region or Country	2000-2002 (person/ha)	2006-2008 (person/ha)
Zimbabwe	2.1	1.7
Zambia	2.7	2.6
Tanzania	2.7	2.8
Uganda	2.6	2.7
Developing World	2.7	2.7

Source: FAO Statistics Division

As the country's total population begins once again to grow, the distribution of people in rural agricultural areas and the use to which they put land will gain importance. In recent years, agricultural population density in Zimbabwe has dropped significantly. In 2008 it was considerably lower than in many of the surrounding countries (See Table 12⁵). Additionally, the most densely farmed areas, the communal lands, have seen over 141,600 households depart since the beginning of the land reform program, resulting in a decline in the population density in these areas by an average of 10 percent, and an increase in land availability per household by 1.5 hectares (Feresu, 2010). Nevertheless, given the fragile soils and marginal rainfall patterns, and continued dense population levels in much of the communal areas, as well as the dominant farming methods and reliance of firewood for energy population pressure will continue to result in progressive deterioration of soils, water stress, wetland encroachment, and forest degradation as people continue to cultivate riverbeds, wetlands, and mountain slopes.

Land reform and land tenure. The transfer of over 10 million hectares of land to new owners not only resulted in a catastrophic drop in production, but the turning over of lands to persons unfamiliar with sustainable agriculture practices appropriate to their new lands. Reportedly, the majority of the new owners of the A2 commercial farms derives from urban backgrounds and is new to commercial farming and farm management. One study found that up to half of the resettled people were employed business people and civil servants (Marongwe n.d., cited in USAID 2010). Many of the newly settled small holders on the A1 lands are also new to the agro-ecological zones in which they have found themselves, and have cleared forests and begun cultivating maize on grasslands with fragile soils more appropriate to grazing, or established fields in the low, moist areas on the banks of rivers. As noted above, sources indicate that the game populations previously ranged on the some of the resettled lands have been eliminated.

⁵ In this table, agricultural Population = all persons actively engaged in agriculture, hunting, fishing or forestry for their livelihoods and their non-working dependants. Arable land = land under temporary crops (double-cropped areas are counted only once), temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category.

In addition to this wholesale degradation of the resettled lands, the sense of insecure tenure felt by the remaining white land holders, as well as the newly settled commercial farmers and small scale farmers limits investment in the natural resources of their lands. The resettlement and associated insecurity of tenure in natural resources has driven a decrease in the productive investment in natural resources, which will only be restored as land tenure security increases (GOZ, 2010). Nor, as we have seen above, do the compromised “traditional” tenure systems that share authorities with the Rural District Councils in the communal areas provide secure tenure or promote effective land use planning and the sustainable use of natural resources (Integrated Regional Information Network, 2009, and USAID, 2010).

Poverty and food insecurity. The economic crisis and food shortage also drove a dramatic rise in the uncontrolled harvesting of natural resources. Following the crushing 48% drop in GDP and failed harvest of 2008, as much as 70 percent of the country received food assistance. As noted by several of the experts interviewed for this assessment, when poor people’s crops fail, they fall back on the environment. The rural poor turned to such activities as hunting wildlife, harvesting and selling firewood to urban markets, gold panning, and poaching timber from plantations (Chimhowu, 2009, Chagutah, 2010). Pressure from this driver continues. Even as the country pulls out of the most recent crisis, Zimbabwe’s poverty rate remains high and the rural population continues to mine their environmental safety net.

Government capacity. Limited reach and effectiveness has long constrained the government’s capacity to manage the tension between conservation of environmental resources and economic growth. In addition to limited finances to staff and resource agencies, incomplete and inconsistent laws, weak coordination among governmental agencies rendered governmental response less efficient. The social breakdown resulting from the land reform process and the resultant economic crisis accentuated this weakness. Not only have governmental resources been limited, but in recent years donors have withdrawn funding or diverted it to humanitarian activities. Much of Zimbabwe’s once highly trained and experienced technical staff left for work outside of the government and outside of the country. Staff loss contributed to a collapse in enforcement capacity and a consequent rise in poaching, forest encroachment, and gold panning. The rise in violence and insecurity in rural areas further undermined the government’s capacity to enforce environmental laws. At the peak of the crisis, few civil servants remained in post (Chimhowu, 2009).

Climate change and severe weather. Much of the impact of climate change on Zimbabwe’s biodiversity and forest cover will be mediated through changes in agricultural systems, and farmers in marginal areas will feel the impact most intensely. Changes in average annual rainfall amounts and rainfall patterns have already pushed communities to farm wetlands more intensively. As the crops of the poorest farmers fail, they may be expected to fall back on environmentally detrimental coping mechanisms such as firewood harvesting for sale, gold panning, and overstocking of herds. Within farming systems, floods and droughts will continue to impact agro-biodiversity, further reducing the number of crop species (GOZ, 2010). And whole species are expected to be lost as groundwater replenishes more slowly and water use for irrigation increases (World Bank, 2011).

In addition to its impact on agriculture, climate change will shift flora and fauna ranges. The impact will strongly affect trees, whose populations are unable to rapidly migrate. Some studies suggest that the commercially valuable exotic forest species will be the most susceptible (Matarira and Mwamuka 1996).

Climate change may also increase the frequency, intensity and timing of fire. Although a number of factors have been involved, forest fires have increased dramatically. Fire took an annual average of 4500 ha of indigenous forest from 1998 to 2002, and an annual average of over 11,000 ha between 2000 and 2007 (FAO, 2010).

DIRECT THREATS

Biological Resource Use

Deforestation. Unsustainable harvesting of timber reduces forest cover and transforms habitats. As indicated in a previous section, between 1990 and 2005 Zimbabwe lost more than a fifth of its forest cover. While the government of Zimbabwe regulates logging on national forest land and manages protected areas, there has been little management of trees for timber, fuel wood, and other uses found on other lands. Experts both within and outside of the government interviewed for this assessment expressed particular concern regarding the use of indigenous trees, by newly settled farmers in particular, without replenishment, to feed the needs of the expanding tobacco industry. They also noted that poachers continue to remove valuable hardwoods within and outside of national forests, and that urban centers consume substantial amounts of firewood in periods of electricity deficit. In addition to firewood, within local forests, plants are overexploited to serve a range of purposes. Over 500 plants with medicinal value are found in Zimbabwe and number of these has been harvested to the brink of extinction (GOZ, 2010). For example, the medicinal properties of muranga (*Warburgia salutaris*), have led to its elimination from some parts of the country (USAID/Zimbabwe, 2007). The country's commercial timber plantations remain largely intact.

Wildlife poaching. The hunting of wildlife for resale continues both within the country's protected areas, and on private conservancies. Although complete counts do not exist, rates of both appear to have jumped dramatically across the past decade. The greatest loss has come on private conservancies. Of over 600 such wildlife ranches, only five now remain. Resettlement, the "land invasions" that followed, and the loss of capacity and control by the government resulted in the wholesale slaughter of those game population (IRIN, 2004). Claims that the past ten years have seen the slaughter of all threatened large mammals on game ranches and up to 60% on protected areas are not backed with inventories and strongly contested by the government. Nevertheless, interviews conducted for this assessment with government officials and other interested parties indicated that all sectors of the society have been involved in the massive reduction of the country's large mammal herds. Interviews also suggest that eradicating poaching will be much more difficult now that syndicates have been established, powerful national actors engaged, and the links forged to the huge international demand for rare animal products. The issue came to world attention when the secretary-general of the U.N. Convention on International Trade in Endangered Species, (CITES), accused Zimbabwe's security forces of killing about 200 rhinos in 2008 and 2009 (Heath, 2011b, IRIN, 2004).

Within communal areas, food insecurity and poverty also pushed rates of bushmeat harvesting.

Poaching has also affected fish populations of the Zambezi River (Phiri, 2011).

Agriculture

Conversion of forests and grasslands to fields contributes heavily to forest and habitat loss. Forest land has been put to plow by both small holders and commercial farmers. Between 1990 and 2009 farmed land went from 3 million ha to 4.3 million ha, or an increase of 43%. (FAOSTAT, accessed Feb 5, 2012). Overgrazing, as well as the expansion of crop cultivation, both changes the composition of local flora, and can vastly intensify erosion. Driven by population pressure, farmers in communal areas have moved to cultivate wetlands and stream banks to take advantage of the moisture and fertile soil (Chagutah, 2010). Resettled farmers have not only cleared and planted forests, but interviews conducted for this assessment also indicate that the past decade has seen settlement and farming on areas designated as biological corridors established to facilitate the migration of animals between protected areas.

Erosion produced through agricultural practices also constitutes a threat to Zimbabwe's biodiversity. Many of the farmers in the communal areas farm maize on lands unsuited for that crop, and, given the agricultural methods available to them, produce erosion more quickly (van Engelen, 2004). Not only does the nutrient status of the soils now seriously limit crop productivity and threaten the viability of farming, and raising the risk of crop failure, food insecurity, and poverty, but sediment produced through this erosion is rapidly filling reservoirs and threatening domestic and irrigation water supplies. Parks and Wildlife personnel who regularly assess the country's major rivers consider siltation to be a major concern (GOZ, 2010).

The intensification of agricultural production through the increased use of fertilizer may also impact biodiversity. Data on water analysis of agrochemical levels are not available, so the extent of the impact has not been measured. The risk of contamination of surface and ground water resources nevertheless exists (FAO, 2005). Assessments by the government of fertilizer run-off into the Chiredzi, Save, and Runde rivers have identified agrochemical contamination as a major concern (GOZ, 2010).

Invasive species

A total of 26 invasive alien plant and animal species (IAS) have been reported in Zimbabwe. Given the constraints to data collection by the government and partners over the past decade, this number likely under-represents the extent of the problem (IUCN 2004, cited in Birdlife International, 2011). The government nevertheless reports that IAS have weakened native biodiversity in almost every ecosystem in the country (GOZ, 2010). Of particular concern to the experts interviewed for this assessment is the proliferation of species, such as water hyacinth, water lettuce, the Redwater fern, and Kariba weed, promoted by the pollution and the eutrophication of water sources (Feresu, 2010).

TABLE 13: THREATS TO ENDANGERED SPECIES

Threat	Number of Species	Examples
Biological Resource Use	38	Hunting and logging
Agriculture and Aquaculture	28	Land conversion
Invasive Species	20	
Natural Systems Modification	18	Fire, fire suppression, dams
Residential and Commercial Development	16	
Human Intrusion, Disturbance	16	Civil unrest and recreational activities
Climate Change and Severe Weather	9	Of which: Habitat shifting and alteration – 3 Drought – 4 Other -- 2
Transportation and Service Corridors	7	
Pollution	6	
Energy Production and Mining	4	

Source: IUCN Red List, 2011

The problem posed by invasive alien tree species in Zimbabwe was realized as early as the 1980s, yet very little work has been done identifying major invasive tree species and their distributions. Exotic species were initially planted as a deliberate policy to provide fuelwood and construction timber and provide ornamentals for parks. Invasions have been observed inside conservation zones in national forest estates, along watercourses and outside timber estates. The major invasive alien species identified belong to *Pinus* and *Acacia* genera. Among the pines, *Pinus patula* is the most aggressive invader of afro-montane forests and grasslands and miombo woodlands. Among the acacias, *Acacia mearnsii* is the most aggressive invader of stream banks, forest margins and miombo woodlands in the mist belts of the

eastern highlands. With *A. melanoxylon*, it is an aggressive invader of the montane grasslands. As a result of this invasion, the montane grassland ecosystem is rapidly disappearing under a blanket of invaders and is generally considered to be the most threatened habitat or landscape in the area. The most invasive species countrywide, *Jacaranda mimosifolia* and *Melia azedarach*, have also been recorded as invaders in Matopos, Hwange and Kyle National Parks (Nyoka, 2003).

Of concern in the nation's waterways are the introduced species such as the Tanganyika sardine and the Nile tilapia that have displaced indigenous fish species in the country's rivers and dams and threaten such species as the Kariba bream and purple labeo with extinction (Feresu, 2010).

Natural systems modification

Drawing down of water resources. Water stress now exists in most of Zimbabwe. As noted above, in some estimates, demand already surpasses supply. Impoundment and abstraction will only increase as the country's population and irrigation and dam systems continue to expand. Conflicts over water in rural areas have been reported in newspapers, especially in areas where former commercial farms have been resettled and water infrastructure, such as boreholes, have not been maintained, resulting in an increase in demand on local rivers (Banda, 2008). Reduced water availability has contributed to the drying up of rivers and surface waters, as have the recent years of drought. Both have impacted both aquatic life and terrestrial biodiversity (GOZ, 2010).

Fire. Fire took an annual average of 4,500 ha of indigenous forest from 1998 to 2002. This number rose to over 11,000 ha between 2000 and 2007 (FAO, 2010). The EMA reports a "massive increase" in the incidence of uncontrolled veldt fires since 2002. These fires have resulted in part from the discontinuation of fire management systems on resettled commercial farm lands, such as the practice of suppression burning, cutting fire breaks, and organized monitoring and response to fires. The Forestry Commission reports that anthropogenic fires also result from field clearing, bee hunting, protest over land allocation decisions, and attempts to divert attention from poaching activities. Fire has damaged National Park areas, indigenous forests, commercial timber plantations, rangelands and grazing areas, destroying plant resources, habitat and, at least temporarily, changing species composition on these lands (Feresu, 2010). Some studies question, however, the long term impact of fire on Zimbabwe's forests, arguing that forests are protected by a dense belt of edge vegetation (See Muller, 2006).

Wildlife management. Elephants have had profound impacts on the ecosystems they occupy in the country. They roam over vast territories – across borders and outside parks and other protected areas. When there are too many elephants for the available vegetation, they destroy habitat. It has been reported that high elephant densities lead to shifts in plant species composition in teak and mopane woodlands. Elephants also forage outside parks and destroy woodlands in communal areas. Unfortunately, elephants often range directly through human settlements and crops, resulting in conflict with members of local communities. While elephant population numbers are in dispute, there has clearly been a resurgence over the past 50 years, and there is general agreement that they currently surpass 35,000 the number the government has identified as the optimum number given the available habitat.

Siltation of rivers. Soil erosion is an extremely complex phenomenon and varies greatly both spatially and temporally.⁶ Annual soil loss rates range from over 100t/ha in some parts of the country, to less than

⁶ This is in part because the five principal contributing factors to erosion vary so significantly across Zimbabwe's landscape: the intensity and quantity of rainfall impact; relief; vegetation cover, which varies by season; erodibility of the soil, as determined by soil grain size and chemical composition; and land use (Karlsson, 1999). Even different portions of the same field may experience vastly different rates of erosion. Activity design decisions should be informed by the characteristics of the target location.

five t/ha in others (FAO, 2004). Communal fields experience a higher rate of erosion than Zimbabwe's commercially farmed lands. One study in 1988 found contrasting rates of 75t/ha of soil per year as compared to 15t/ha (Whitlow, 1988 cited in Government of Zimbabwe, 1998).⁷ At least ten percent of all communal areas are seriously to very seriously eroded (van Engelen, 2004).

This high rate of erosion has seriously impacted most of Zimbabwe's rivers, whose siltation has been long recognized as an issue. Major reaches of the Limpopo and many of its tributaries experience water flow on fewer than 40 days in dry years, and on those days it does flow, it can contain up to 30% sand and silt (CGIAR, 2012). The continued siltation of the Runde River is also a cause for serious concern, particularly because of its importance to the Gonarezhou National Park. Disrupted flow regimes resulting from siltation and upstream impoundments have enormous impacts on the dependant wildlife. A spokesperson for the PWA reported in 2012 that the "death" of the Runde River would have "earth-shattering environmental effects" on the wildlife and plant species in the southeast Lowveld (Maponga, 2012). The total capacity of Zimbabwe's dams has fallen by about 29 million m³ in the three years prior to 2003 as a result of siltation, (FAO, 2004), and a high proportion of the medium- and small-sized dams face operational difficulties because of high levels of siltation (African Development Bank Group, 2011). The environmental impact of the resulting reduction in the production of hydropower has been noted elsewhere in this assessment.

Many factors contribute to erosion. Relatively high population densities, lack of investment, marginal agricultural terrain and stream bank cultivation push levels in communal areas. Studies have also linked deforestation, including the loss of trees to drought, to erosion and subsequent river siltation. On cropped soils, tilling practices may significantly impact erosion. For example, studies have found that conservation agriculture can increase infiltration rates by up to 87% over conventional practices, thus reducing runoff and, in turn, erosion (Thierfelder, 2009).

Residential and commercial development

As Zimbabwe's population grew by over fifty percent since the early 1980's, the population of the capital Harare doubled. Urban infrastructure did not keep up with this massive population growth. Accentuated by the drop in the government's capacity over the past decade, rapid unregulated urban expansion has produced ineffective sewage systems, air pollution and construction on wetlands near urban centers. Informal agriculture in unique urban wetland habitats not only degrade the habitat but also reduce the wetland's capacity to play its role in the purification of pollution. Pollution of Lake Chivero to the south west of Harare has resulted in dense blooms of blue-green algae and fish-kills (Feresu, 2010). Zimbabwe's second city, Bulawayo, has experienced similar issues, also resulting in the destruction or pollution of nearby freshwater sources and wetland habitats. In rural areas, settlement has accompanied the growth of lands converted to agricultural use discussed above.

Human intrusion, disturbance

As noted above, the mass resettlement of the land reform program, accompanied by the economic crisis, insecurity, and the breakdown of the government's capacity to enforce laws resulted in extensive destruction of the country's natural resource base, forest cover, and wildlife populations.

⁷ More recent studies indicate the much lower average annual soil loss rate on arable fields in the Communal Lands of 43t/ha. (Grohs and Elwell, 1993, cited in van Engelen, 2004).

Transportation and service corridors

Interviews suggest that the primary driver of new roads in recent years has been the growth in the mining sector, and that these roads, which typically open up previously remote areas, have had the most significant impact on biodiversity and forest cover. Roads in remote areas, and the settlement and development that follow, fragment ecosystems, and obstruct migratory routes (GOZ, 2010). Settlement may also result in the unsustainable harvesting of resources such as bushmeat and timber, as well as other causes of degradation to surrounding ecosystems.

Pollution

In 2001, Zimbabwe was the second most industrialized country in South African Development Community (SADC), after South Africa. The country's industries are concentrated around the capital, with ore smelters located close to the ore sources (principally along the Great Dyke). Pollution in the larger cities derives from a combination of vehicle emissions, dust and smoke from domestic fires (FAO, 2001). As noted, the maintenance of water quality is a serious issue. Zimbabwe's larger cities see the direct discharge of raw municipal sewage into streams, frequent sewer bursts, and the discharge of untreated effluent from industries and mining (GOZ, 2010). Tests have found that the water of the dams that serve Harare, Bulawayo, Khami, Rufaro and others are highly polluted (Feresu, 2010).

Energy production and mining

Zimbabwe has an important percentage of the world's known reserves of metallurgical-grade chromite and significant deposits of coal, platinum, asbestos, copper, nickel, gold and iron ore. The importance of mining in the economy has surged in the past decade, jumping from a tenth of total merchandise exports in 2000 to over one third in 2010 (World Bank data, accessed 6 February, 2012). Twenty different mining companies have recently been given concessions to prospect and mine for coal in Matabeleland North (Heath, 2011). Reportedly, the government of Zimbabwe is counting on this sector to generate the resources needed to relieve the country's debt and drive growth (USAID, 2010).

Despite its importance to the national economy, in its most recent national report to the Convention on Biological Diversity, the government identifies mining a major threat to biodiversity, especially open cast methods that involve stripping large pieces of land to remove the soil (GOZ, 2010). Mining may impact biodiversity through the permanent transformation of the landscape, the release of pollutants into waterways and soils, increased erosion silting waterways, increased access for poachers, and the impact of increased populations into areas that are often remote relatively undisturbed habitats. Reports indicate that mines in Matabeleland North have increased the pollution of bore holes and wildlife water holes (Heath, 2011). Birdlife International reports that gold mining in the Chimanimani Mountains in neighboring Mozambique is destroying riparian systems that provide habitat for endemic species and is increasing the risk of invasive plants becoming established (Birdlife International, 2011). Protected areas themselves are threatened by new mining. In 2011 coal mining was reported to be newly established near and within the Hwange National Park in the Sinamatella area which is a rhino intensive protection zone (Sokwanele, 2011).

As noted above, small scale mining also threatens Zimbabwe's biodiversity and forest cover. A common coping strategy, the practice of gold panning has exploded since 2000. An estimated one million people currently practice unregulated gold panning along the country's rivers, clearing trees and digging pits in riverbeds causing erosion and siltation. Artisanal gold miners also employ mercury and cyanide which pollute water sources of downstream inhabitants (Chimhowu, 2009 and Feresu, 2010).

Zimbabwe's struggle to manage the tension between economic growth and preserving its environmental resources comes in direct conflict through mining, as much of the country's coal reserves are found in protected areas. And when coal is not provided to generate electricity for the country's urban centers, people will harvest and transport wood from the country's forests to provide energy for the city's consumers.

ANALYSIS

ACTIONS NEEDED TO CONSERVE BIODIVERSITY AND FORESTS

Improve the collection and management of information concerning Zimbabwe's biodiversity and forests

Reinforce existing systems and conduct long-neglected inventories and studies necessary to create comprehensive and current inventory and monitoring programs for forests and biodiversity. This would include reestablishing systems tracking populations of important mammals and the status of critical biodiversity hotspots, as well as completion of the national Red List. It would require strengthening of national capacity to conduct appropriate research in biodiversity conservation and sustainable use. Focal areas would include the impact of recent population resettlement and the potential impact of climate change.

Strengthen community authority and capacity to effectively and equitably manage natural resources

Improve incentives for local communities to undertake biodiversity conservation and sustainable use initiatives in both protected and non-protected area, including the introduction of affordable alternatives to natural resource extraction. CAMPFIRE and similar approaches would be reinforced and extended beyond wildlife management to a range of natural forest products. This would include clarification of community rights with regard to tenure and property rights regarding the broad range of natural resources, and extend to the designation and protection of local forests, grasslands, and wetlands for community use. Such an effort would require the engagement of all local institutions and eventually extend to support to strengthen Rural District Councils in the development and enforcement of by-laws strengthening environmental management.

Update legislation and harmonize conflicting laws and policies regarding environmental management

Conflicting legislation concerning community management of natural resources and products as well as forestry legislation conflicting with the Environmental Management Act needs to be updated and harmonized. Legislation will also be required to reinforce the sustainable management of both the communal and newly resettled lands. A presidential review committee has recommended that a wildlife-based land reform policy and a forest-based land reform policy be developed to address resettlement patterns in some parts of the country to facilitate game ranching, safaris and plantation forests (Feresu S.B., 2010).

Include sustainable development considerations in the revision of Zimbabwe's land use, land tenure and property rights regime

The substantial effort that will be required to develop and implement the policies and institutions to effectively and efficiently manage rights in the nation's land and natural resources following the upheaval

of the past decade holds the potential for an enormous impact on the country's biodiversity and forests. Legal and policy mechanisms are necessary to facilitate the use of land in accordance with its limitations, manage water resources efficiently and equitably while preserving water quality, and safeguard potentially open access resources such as grasslands and forests. On both newly settled lands and communal areas, tenure reform is required to clarify and secure tenure in a way that is equitable and encourages the conservation and investment in natural resources.

Build national government institutional capacity in environmental management

Robust national institutions will be necessary to address the growing challenges of indigenous forest loss, wildlife poaching, poor water quality and inefficient use, and environmentally destructive mining practices. State environmental institutions must regain their visibility, vision, and capacity to achieve their mandates and effectively enforce enacted legislation and promulgated regulations in a transparent and accountable manner.

Raise public awareness of the economic, social, and cultural importance of biodiversity and healthy forests

Increase individual and community capacity to address threats to biodiversity and forests and adopt practices more consistent with sustainable development and environmental management through education and training in schools and through public media. Ideally, environmental compliance will be recognized as a positive contribution to economic, environmental and social goals, as well as the environment.

Reinforce rural extension of sustainable land use practices

Farmers in newly settled areas require support in practices that support sustainable agriculture and natural resource management to reduce the impact they are having on the forests, grasslands, soils, and water sources. Of priority are smallholders farming tobacco who require technical support to adopt less destructive energy sources for curing their harvest. On all agricultural lands, extension support should prioritize land use practices that stimulate practices that aim at increased water use efficiency and balanced nutrient management. National government institutions, local NGOs, local level institutions, and community-based organizations will all need to be engaged to effectively undertake this effort.

Promote targeted activities in critical protected areas and hotspots

Targeted efforts will be necessary to conserve both threatened areas identified as biological hotspots and healthy representative examples of each of the distinct forest types found in Zimbabwe. This would include complementary activities to the Hwange-Sanyati Biological Corridor Project currently being planned, in the same or other hotspots, and the protection of the few remnants of medium and low altitude forest on communal lands.

USAID CURRENT PROGRAM AND PROPOSED STRATEGY

Summary of ongoing USAID/Zimbabwe programs. The USAID/Zimbabwe portfolio currently includes programs in four sectors: Health, Economic Growth, Humanitarian Assistance, and Democracy and Governance. Due to the current political context, USAID neither directly funds the Government of Zimbabwe, nor undertakes activities on lands that have been reallocated as a result of the land reform program. Briefly, current programming activities are as follows:

Health. The bulk of the USAID/Zimbabwe's funding in health targets HIV/AIDS. Lesser amounts target Tuberculosis, Malaria, Maternal and Child Health, and Family Planning. The mission also provides support for the Demographic Health Survey. FY 2011 funding: \$64 million.

Economic Growth. The key objectives of the USAID/Zimbabwe economic growth portfolio are to reduce poverty, increase household resilience and incomes and increase food security. To achieve these objectives, the portfolio currently contains seven elements: the Livelihoods, Income Generation and Employment program; the Zimbabwe Agricultural Income and Employment Development Program (Zim-AIED); the Agricultural Competitiveness Program (ACP); macroeconomic policy support; support to the Comprehensive African Agricultural Development Program process (CAADP); Agricultural Finance; and the Development Credit Authority Loan Guarantee Program.

A Feed the Future aligned-country, USAID/Zimbabwe is currently developing their FtF strategy. As currently proposed, it would include support for livestock, irrigation and high value horticulture in the marginal lands of agro-ecological areas IV and V. In the more fertile soils of agro-ecological zone III, the program will focus on high value horticulture, maize, and dairy.

Humanitarian Assistance. The mission is addressing Zimbabwe's significantly diminished but ongoing vulnerability through emergency food assistance and agriculture and food security activities. As feasible, activities lay the foundations for longer term development and food-security. Promoting Recovery in Zimbabwe (PRIZE), the Single-Year Assistance Program through which the mission provides much of its humanitarian support includes training in conservation agriculture; the promotion of seed security; improvements to livestock production; increasing farmer access to agriculture price information; and the formation of village savings and loan associations. Specific farming system activities mentioned by mission staff include the rehabilitation of small dams, local markets, and livestock dip-tanks and pens. In the new CDCS, this sector is expected to be folded into the food security activities. FY 2011 funding: FFP, \$50.8 million; OFDA, \$13 million. Of the OFDA funding, \$5.4 supported WASH activities to improve access to clean water and mitigate the risk of waterborne disease.

Democracy, Human Rights and Governance. The mission is promoting more democratic practices through support to the constitution-making process and parliamentary reform, as well as targeted assistance to improve the electoral process and strengthen the capacity of civil society. Activities have included a national all-stakeholder's conference sponsored by the National Constitutional Assembly, and a People's Constitutional Convention. USAID/Zimbabwe has recently discontinued activities on the sub-national level supporting local governmental institutions and officials. FY 2010 funding: \$20.6 million.

Draft Country Development Cooperation Strategy. Zimbabwe is currently in a period of transition from non-democratic authoritarian rule, to what will presumably be a more democratic and peaceful state. Due to this uncertainty of the current context, USAID/Zimbabwe is developing a shorter, three year "transition" Country Development Cooperation Strategy (CDCS) to guide its bilateral programs for the FY 2013 – 2015 period. The strategy takes an approach that leverages short-term stabilization efforts with longer term assistance; it is intended to enable USAID/Zimbabwe to remain flexible and responsive to changing conditions. The proposed goal will be achieved through work in four strategic areas: democracy, rights and government; food security; economic growth; health. Major changes from current programming are not expected. The Results Framework reads as follows:

Goal: *Strengthened Democratic systems of governance contributing to Sustained Recovery*

DO 1: Advanced transition to a more accountable and democratic system of governance.

IRs:

- I. More open and neutral electoral process

2. Citizens are mobilized to make their voices heard
3. Democratic parties are better prepared to compete and govern
4. More effective advocacy to regional bodies on democratization progress
5. Strengthened performance of target committees in parliament

DO 2: Increase Food Security

IRs:

1. Improve enabling environment for food security
2. Increased productivity of household and small and medium-sized enterprises in targeted areas
3. Increased resilience of vulnerable households and communities in targeted areas

DO 3: Increase stability through inclusive growth and development

IRs:

1. Improved evidence-based research and analysis informing policies
2. Greater employment opportunities for marginalized groups (those with large de-stabilizing potential)

DO 4: Reduce morbidity and mortality related to HIV, TB, malaria, reproductive health and maternal, neo-natal and child health

IRs:

1. Improved health services delivery
2. Strengthened health systems

EXTENT TO WHICH ONGOING AND PROPOSED ACTIVITIES MEET NEEDS

Neither USAID/Zimbabwe's current portfolio of activities, nor the Results Framework include activities specifically targeting Zimbabwe's biodiversity and forests. Mission programming has understandably forgone long term development goals for an exclusive focus on crisis management, national stability, basic economic needs, food security and the HIV/AIDS epidemic. Although economic growth, food security, and political calm have returned to the country, they remain precarious. The proposed CDCS reflects in the inclusion of short-term stabilization efforts, and longer term assistance that focuses on agricultural growth, food security, HIV/AIDS and other diseases, and national governmental stability.

Current restrictions on working directly with the government also limit the potential for support to building national capacity to address threats in biodiversity and forestry. Similarly, because USAID currently does not work in the contested resettlement areas, USAID/Zimbabwe is unable to support activities addressing some of the greatest threats to biodiversity and forests

Mission activities have, nevertheless, indirectly eased certain drivers of deforestation, wildlife loss, and natural resources degradation. Through food assistance programs, USAID/Zimbabwe has reduced the dependence of rural populations on unsustainable coping strategies, such as hunting bushmeat, harvesting remnant firewood, gold panning, and poaching hardwoods. Efforts to strengthen the agricultural livelihoods of the rural poor reduce the risk of a return to these practices. To the extent USAID/Zimbabwe's democracy and governance activities help stabilize the political context and promote progress towards effective and equitable governance, these activities have also hastened the return to effective, transparent and accountable environmental management institutions. In the health sector, because people struggling with poor health and nutrition often resort less sustainable livelihood practices, support targeting specific diseases, especially HIV/AIDS, has reduced the impact of disease on people's management of natural resources.

THREATS FROM ONGOING USAID/ZIMBABWE PROGRAMS⁸

Sector	Ongoing mission activities	Threats
Democracy and Governance	<p>Support to the constitution-making process and parliamentary reform.</p> <p>Improved electoral processes</p> <p>Strengthened capacity of civil society organizations</p>	None
Economic Growth	<p>Macro-economic policy/trade and investment policy</p> <p>Legal and regulatory reform/activities to improve ease of doing business</p> <p>Capitalization, training, and technical assistance to micro-finance institutions, group savings and loan schemes, and development credit authority</p> <p>Promotion of agricultural production activities</p> <p>Agribusiness development and food processing</p> <p>Support to use and procure</p>	<p>Support for activities that may directly or indirectly result in the depletion of water sources, erosion of soil, introduction of invasive species, or pollution of water through increased pesticide and fertilizer use.</p> <p>Increases in agricultural production and productivity may also result in the opening of slopes, wetlands and woodlands to farming.</p> <p>An increase in the number and functioning of micro and small enterprises may draw down water resources and produce air and water pollution.</p> <p>Maize seed procurement and use support may increase the dominance of hybrid seeds to the exclusion of local land races of other crops, such as sorghum and millet.</p> <p>Note: The June 2011 IEE identifies implementation conditions with regard to these threats which, if adhered to, will conform to a standard stricter than existing norms and likely have a net positive impact on areas and institutions over which Implementing Partners have direct influence.</p> <p>However, programs are expected to expand agriculture beyond the specific regions and institutions over which USAID/Zimbabwe and Implementing Partners have influence.</p>

⁸ This activity list and discussion draws on the Mission's June 16 IEE for the Economic Growth Portfolio. Greater detail on potential environmental impacts is presented in that document.

	<p>seeds</p> <p>Support to use and procure fertilizers</p> <p>Construction/rehabilitation of dams and irrigation systems</p> <p>Small grants</p>	<p>Given that unsustainable agricultural practices are the norm in Zimbabwe, this spread effect will likely result an increase in agriculture-related threats. (Also see the June 2011 IEE topic "Production Activities," described on page 18 but not addressed in the summary Matrix of Activities.)</p>
Humanitarian Assistance	<p>Extension in conservation agriculture</p> <p>The promotion of seed security</p> <p>Improved livestock production</p> <p>Improved water sources</p> <p>Increased farmer access to price information</p> <p>The formation of village savings and loan associations</p>	<p>Direct support for agricultural activities which potentially deplete water sources, erode soil, and introduce invasive species.</p> <p>Increases in agricultural production and productivity may also result in the opening of slopes, wetlands and woodlands to farming.</p> <p>Note: The March 2010 PRIZE IEE and EMMP identifies implementation conditions with regard to these threats which, if adhered to, will conform to a standard stricter than existing norms and likely have a net positive impact on agricultural systems over which Implementing Partners have direct influence.</p> <p>Seed security activities, especially maize seed, may increase the dominance of hybrid seeds to the exclusion of local land races of other crops, such as sorghum and millet.</p> <p>Support to agriculture in marginal areas may strengthen livelihoods in agro-ecological regions susceptible to drought and increasingly ill-suited to agriculture as the climate changes in the long term. As crop agriculture becomes less viable, communities may fall further into a state of structural poverty and food insecurity as well as an increasing reliance on mining degraded natural resources.</p>
Health	<p>Support to the health delivery system focused on HIV/AIDS and Tuberculosis, Malaria, Maternal and Child Health, and Family Planning.</p>	<p>None, assuming USAID/Zimbabwe complies with the IEE and program EMMPs.</p>

OPPORTUNITIES FOR LINKAGES WITHIN PROPOSED ACTIVITIES

Development Objective	IR	Opportunity
1. Advanced transition to a more accountable and democratic system of governance.	<ol style="list-style-type: none"> 1. More open and neutral electoral process 2. Citizens are mobilized to make their voices heard 3. Democratic parties are better prepared to compete and govern 4. More effective advocacy to regional bodies on democratization progress 5. Strengthened performance of target committees in parliament 	Deliberate inclusion of CBOs/CSOs that support voicing of environmental concerns, especially mobilization around rights in water, forest, grasslands, soils.
2. Increase Food Security	<ol style="list-style-type: none"> 1. Improve enabling environment for food security 2. Increased productivity of household and small and medium-sized enterprises in targeted areas 3. Increased resilience of vulnerable households and communities in targeted areas 	<p>Conduct a climate change vulnerability assessment to develop an adaptation and resilience strategy tailored to specific locations, livelihoods and value chains.</p> <p>Introduce stand-alone and integrated programming elements that promote sustainable agriculture and practices designed to conserve and restore soil and water resources and increase the use of trees in agriculture and horticulture.</p> <p>Introduce a sustainable land management approach in extension activities, integrating crop, livestock, and tree production. This would include improved management of common access resources, such as stream and waterway protection through the creation and protection of buffer areas and other means.</p> <p>Explore, and if viable, support value chains of indigenous horticultural products. Support networks preserving indigenous horticultural plant genetic resources.</p>

		<p>Prioritize protected area buffer zones in local site selection.</p> <p>Support organic certification schemes and producers.</p>
3. Increase stability through inclusive growth and development	<p>1. Improved evidence-based research and analysis informing policies</p> <p>2. Greater employment opportunities for marginalized groups (those with large de-stabilizing potential)</p>	<p>Include sustainable agriculture, biodiversity, and forestry considerations in policy development, such as planned work on land tenure.</p>
4. Reduce morbidity and mortality related to HIV, TB, malaria, reproductive health and maternal, neo-natal and child health	<p>1. Improved health services delivery</p> <p>2. Strengthened health systems</p>	<p>Expand support for family planning.</p> <p>Expand support for urban and rural water and sanitation activities.</p>

APPENDIX I: IUCN RED LIST OF CRITICALLY ENDANGERED, ENDANGERED, AND VULNERABLE SPECIES

Phylum	Class	Order	Family	Genus	Species	Common names (Eng)	Red List status	Population trend
ANIMALS								
CHORDATA	ACTINOPTERYGII	PERCIFORMES	CICHLIDAE	Oreochromis	andersonii	Threespot Tilapia	VU	decreasing
CHORDATA	ACTINOPTERYGII	PERCIFORMES	CICHLIDAE	Oreochromis	macrochir	Greenhead Tilapia	VU	unknown
CHORDATA	ACTINOPTERYGII	PERCIFORMES	CICHLIDAE	Oreochromis	mortimeri	Kariba Tilapia, Mozzie	CR	decreasing
CHORDATA	AMPHIBIA	ANURA	ARTHROLEPTIDAE	Arthroleptis	troglydotes	Cave Squeaker	CR	decreasing
CHORDATA	AMPHIBIA	ANURA	BREVICIPITIDAE	Probreviceps	rhodesianus		EN	decreasing
CHORDATA	AMPHIBIA	ANURA	BUFONIDAE	Mertensophryne	anotis	Chirinda Toad	EN	decreasing
CHORDATA	AMPHIBIA	ANURA	BUFONIDAE	Vandijkophrynus	inyangae	Inyanga Toad	EN	decreasing
CHORDATA	AMPHIBIA	ANURA	PYXICEPHALIDAE	Amietia	inyangae	Inyangani River Frog	EN	decreasing
CHORDATA	AMPHIBIA	ANURA	PYXICEPHALIDAE	Strongylopus	rhodesianus	Chimanimani Stream Frog	VU	decreasing
CHORDATA	AVES	CICONIIFORMES	ARDEIDAE	Ardeola	idae	Madagascar Pond-heron, Madagascar Pond-Heron, Madagascar Squacco Heron, Malagasy Pond Heron	EN	decreasing
CHORDATA	AVES	CICONIIFORMES	ARDEIDAE	Egretta	vinaceigula	Slaty Egret	VU	decreasing
CHORDATA	AVES	CORACIIFORMES	BUCORVIDAE	Bucorvus	cafer	Southern Ground-hornbill, Southern Ground Hornbill, Southern Ground-Hornbill	VU	decreasing
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Gyps	coprotheres	Cape Griffon, Cape Vulture	VU	decreasing
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Necrosyrtes	monachus	Hooded Vulture	EN	decreasing
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Neophron	percnopterus	Egyptian Eagle, Egyptian Vulture	EN	decreasing

Phylum	Class	Order	Family	Genus	Species	Common names (Eng)	Red List status	Population trend
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Sagittarius	serpentarius	Secretarybird, Secretary Bird	VU	decreasing
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Torgos	tracheliotos	Lappet-faced Vulture	VU	decreasing
CHORDATA	AVES	FALCONIFORMES	ACCIPITRIDAE	Trigonoceps	occipitalis	White-headed Vulture	VU	decreasing
CHORDATA	AVES	GRUIFORMES	GRUIDAE	Balearica	regulorum	Grey Crowned-crane, Grey Crowned Crane, Grey Crowned-Crane, Southern Crowned Crane	VU	decreasing
CHORDATA	AVES	GRUIFORMES	GRUIDAE	Grus	carunculatus	Wattled Crane	VU	decreasing
CHORDATA	AVES	GRUIFORMES	RALLIDAE	Sarothrura	ayresi	White-winged Crake, White-winged Flufftail	EN	decreasing
CHORDATA	AVES	PASSERIFORMES	HIRUNDINIDAE	Hirundo	atrocaerulea	Blue Swallow	VU	decreasing
CHORDATA	AVES	PASSERIFORMES	MUSCICAPIDAE	Swynnertonia	swynnertoni	Swynnerton's Forest Robin, Swynnerton's Robin	VU	decreasing
ARTHROPODA	CRUSTACEA	ANOSTRACA	STREPTOCEPHALIDAE	Streptocephalus	zuluensis		EN	
ARTHROPODA	INSECTA	HYMENOPTERA	FORMICIDAE	Tetramorium	microgyna		VU	
ARTHROPODA	INSECTA	ODONATA	COENAGRIONIDAE	Africallagma	cuneistigma		VU	unknown
ARTHROPODA	INSECTA	ODONATA	COENAGRIONIDAE	Pseudagrion	vumbaense		VU	unknown
ARTHROPODA	INSECTA	ODONATA	SYNLESTIDAE	Chlorolestes	elegans	Elegant Malachite	VU	unknown
CHORDATA	MAMMALIA	AFROSORICIDA	CHRYSOCHLORIDAE	Carpitalpa	arendsi	Arend's Golden Mole	VU	unknown
CHORDATA	MAMMALIA	CARNIVORA	CANIDAE	Lycaon	pictus	African Wild Dog, Cape Hunting Dog, Painted Hunting Dog, Wild Dog	EN	decreasing
CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	Acinonyx	jubatus	Cheetah, Hunting Leopard	VU	decreasing
CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	Felis	nigripes	Black-footed Cat, Small-spotted Cat	VU	decreasing

Phylum	Class	Order	Family	Genus	Species	Common names (Eng)	Red List status	Population trend
CHORDATA	MAMMALIA	CARNIVORA	FELIDAE	Panthera	leo	Lion, African Lion	VU	decreasing
CHORDATA	MAMMALIA	CETARTIODACTYLA	HIPPOPOTAMIDAE	Hippopotamus	amphibius	Hippopotamus, Common Hippopotamus, Large Hippo	VU	decreasing
CHORDATA	MAMMALIA	CHIROPTERA	PTEROPODIDAE	Myonycteris	relicta	East African Little Collared Fruit Bat, Bergmans's Collared Fruit Bat	VU	decreasing
CHORDATA	MAMMALIA	PERISSODACTYLA	RHINOCEROTIDAE	Diceros	bicornis	Black Rhinoceros, Hook-lipped Rhinoceros	CR	increasing
CHORDATA	MAMMALIA	PROBOSCIDEA	ELEPHANTIDAE	Loxodonta	africana	African Elephant	VU	increasing
CHORDATA	REPTILIA	SQUAMATA	CHAMAELEONIDAE	Rhampholeon	marshalli	Marshall's African Leaf Chameleon, Marshall's Pygmy Chameleon, Marshall's Stump-tail Chameleon	VU	unknown
CHORDATA	REPTILIA	SQUAMATA	CORDYLIDAE	Platysaurus	imperator	Emperor Flat Lizard, Imperial Flat Lizard	VU	unknown
CHORDATA	REPTILIA	SQUAMATA	LAMPROPHIIDAE	Lycophidion	nanus	Dwarf Wolf Snake	VU	unknown
PLANTS								
TRACHEOPHYTA	CYCADOPSIDA	CYCADALES	ZAMIACEAE	Encephalartos	concinnus	Runde Cycad	EN	decreasing
TRACHEOPHYTA	CYCADOPSIDA	CYCADALES	ZAMIACEAE	Encephalartos	manikensis	Gorongongwe Cycad	VU	decreasing
TRACHEOPHYTA	LILIOPSIDA	LILIALES	ALOACEAE	Aloe	ballii		EN	
TRACHEOPHYTA	MAGNOLIOPSIDA	EBENALES	SAPOTACEAE	Synsepalum	kassneri		VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	EBENALES	SAPOTACEAE	Vitellariopsis	ferruginea		VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	EUPHORBIALES	EUPHORBIACEAE	Euphorbia	lividiflora		VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	EUPHORBIALES	EUPHORBIACEAE	Tannodia	swynnertonii		VU	

Phylum	Class	Order	Family	Genus	Species	Common names (Eng)	Red List status	Population trend
TRACHEOPHYTA	MAGNOLIOPSIDA	GENTIANALES	LOGANIACEAE	Strychnos	mellodora		VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	LAURALES	LAURACEAE	Ocotea	kenyensis		VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	MAGNOLIALES	CANELLACEAE	Warburgia	salutaris	Muranga, Pepper Bark Tree	EN	
TRACHEOPHYTA	MAGNOLIOPSIDA	ROSALES	ROSACEAE	Prunus	africana	Red Stinkwood	VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	SAPINDALES	MELIACEAE	Khaya	anthotheca	African Mahogany, White Mahogany	VU	
TRACHEOPHYTA	MAGNOLIOPSIDA	SAPINDALES	MELIACEAE	Lovoa	swynnertonii	Brown Mahogany, Kilimanjaro Mahogany	EN	
TRACHEOPHYTA	MAGNOLIOPSIDA	SAPINDALES	MELIANTHACEAE	Bersama	swynnertonii		EN	
TRACHEOPHYTA	MAGNOLIOPSIDA	SAPINDALES	SAPINDACEAE	Allophylus	chirindensis		VU	
ACHEOPHYTA	MAGNOLIOPSIDA	SCROPHULARIALES	OLEACEAE	Olea	chimanimani		VU	

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APPENDIX III: ASSESSMENT STATEMENT OF WORK

Statement of Work Zimbabwe Biodiversity and Tropical Forestry Assessment

I. Introduction

USAID/Zimbabwe is preparing a new Country Development Cooperation Strategy (CDCS) to guide its bilateral programs in Zimbabwe. To inform this process and ensure that USAID investments across its entire bilateral portfolio address Zimbabwe's conservation and sustainability challenges to the maximum productive extent, USAID/Zimbabwe will conduct a Biodiversity and Tropical Forestry Assessment from January 2012 to March 2012. The assessment should be relevant to the CDCS process, offering strategic recommendations across sectors, as well as adhere to the requirements of sections 118 and 119 of the Foreign Assistance Act. It should also address threats posed by climate change, with a particular focus on when and how USAID Development Objective (DO) teams can productively integrate understanding of climate change impacts into their programs and the extent to which existing programs can engage in techniques and programmatic approaches that will help mitigate the effects of Global Climate Change by incorporating mitigation and adaptation needs and opportunities. The Mission also requests that practical approaches be provided that will assist technical teams to include mitigation and adaptation strategies into the early stages of program design, for a strategic, coordinated approach to reducing the impact of climate change, especially on vulnerable populations. The Mission would like the Assessment to examine the possible climatic conditions and effects of where the country is likely headed.

II. Background

A. Policies Governing Environmental Procedures

USAID environmental compliance is directed by U.S. policy and law. The Foreign Assistance Act (FAA) of 1961, Section 117, requires that the President take fully into account the impact of foreign assistance programs and projects on environment and natural resources (Sec 117 (c)(1)).

Section 118 states that each country development strategy statement or other country plan prepared by the U.S. Agency for International Development shall include an analysis of (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

Section 119 of the FAA relates to Endangered Species. It states that "the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems and through the protection of wildlife habits should be an important objective of the United States development assistance" (FAA, Sec. 119(a)). Furthermore it states, "Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve biological diversity and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified" (FAA, Sec. 119(d)).

22CFR216 relates to environmental compliance issues related to USAID's development programs.

B. USAID's Program in Zimbabwe

A high-level overview of USAID/Zimbabwe's bilateral programs is provided in this section. A more detailed overview will be provided to the assessment team once selected, and this information will be supplemented through in-country meetings with team leaders from each relevant USAID/Zimbabwe office. Current programs within key focus areas include:

Economic Growth Program:

Key objectives of the USAID Zimbabwe Economic Growth program over the next five years are to reduce poverty, increase household resiliency and incomes and increase food security. The gradual recovery of the agriculture sector in Zimbabwe has allowed us to focus our efforts on transitional programming, through which agricultural programs move towards market-oriented livelihood activities, as humanitarian interventions become more acute and focused on truly vulnerable populations. As an Aligned country under Feed the Future, the USAID Zimbabwe agricultural and food security programming is designed to meet FtF requirements and support Zimbabwe in the CAADP process. Projected FY2011 funding provides opportunity to leverage donor funding, engage the GOZ on CAADP and deepen economic policy development activities.

Specifically this program is being implemented through:

- Livelihoods, Income Generation, and Employment
- Zimbabwe Agricultural Income and Employment Development (Zim-AIED) Program
- Zimbabwe Agricultural Competitiveness Program (ACP)
- Macroeconomic Policy
- Support to the Comprehensive African Agricultural Development Program (CAADP) Process
- Agricultural Finance Activity
- Development Credit Authority Loan Guarantee Program

Health Program:

The basic goal of the Mission's health sector assistance is to reduce mortality and morbidity in Zimbabwe, with a particular focus on women and children. Objectives related to this goal are to: increase the availability of and public access to basic health services; and, improve health outcomes resulting from those essential health services selected for assistance. In particular, this strategy addresses the health challenges faced by Zimbabwean women and their families. The strategy was formulated under the principles of the Global Health Initiative and is fully oriented to helping Zimbabwe improve health outcomes through strengthened health systems, with a particular focus on improving the health of women, newborns and children through the national, country-led programs for infectious diseases, maternal, neonatal and child health.

Humanitarian Assistance Program:

The humanitarian situation in Zimbabwe has continued to improve in 2011. Key policy changes in 2009, including the introduction of a multi-convertible currency regime and import liberalization have had a profoundly positive impact on the economy and humanitarian situation. During the height of the crisis in 2008/09, 7 million people required food aid. In 2011 only 1.3 million Zimbabweans depended on food aid, a significant decrease within two agricultural seasons. Although, humanitarian needs in the food security and health sectors have dramatically declined, pockets of extreme vulnerability still exist and the political situation remains fragile. Since Fiscal Year (FY) 2002, USAID's Office of Food for Peace (USAID/FFP) and Office of U.S. Foreign Disaster Assistance (USAID/OFDA) have provided more than \$1 billion in humanitarian assistance to vulnerable Zimbabweans.

Democracy and Governance Program:

The overall focus of the Mission's democracy and governance programs is to promote more democratic processes and respect for rule of law. In FY 2009, USAID provided funding for programs that would assist the Transitional Government to achieve the provisions of the GPA, as agreed to by the three parties to the Agreement. A principal area of USG assistance was support for the constitution-making process. Because of slow progress by the parties in reaching agreement on key aspects of the GPA, the constitution-making process did not proceed as quickly as expected. Nonetheless, the USG successfully facilitated the development of a common vision amongst civil society for the constitutional process and various related key issues. In addition, USAID provided capacity building assistance to Parliament and local government administrations to enable them to better perform their core business.

III. Statement of Work

The Assessment Team shall perform the following activities:

- I. Pre-travel informational meetings and information gathering. Prior to traveling to the field, the Assessment Team Leader is expected to:
 - a. Hold meetings with the Bureau Environmental Officer (BEO) and Bureau Environmental Policy Advisors in the appropriate USAID/Washington bureau to ensure full understanding of USAID environmental procedures, the role of the regional bureau in environmental compliance, and purpose of this assignment. Additional meeting with the with the Disaster, Conflict and Humanitarian Assistance Environmental Officer and Food For Peace Officers at USAID Washington are also recommended.
 - b. Gather and get acquainted with existing background information on Zimbabwe, such as the country's natural resources, geographical, ecological and biological specificities, current status of environment and biodiversity, institutional organization on entity and state level, key stakeholders and donors in environment, tropical forestry and biodiversity, legislation related to the environment, climate change, forestry and biodiversity, and other relevant information required for the country assessment.
 - c. Review copies of project documents including the Initial Environmental Examination and the Environmental Mitigation and Monitoring Plan. Assess key programmatic potentials for environmental impact, both positive and negative.
 - d. Meet or speak with key stakeholders or managers at the World Bank, USDA Forest Service, and U.S.-based NGOs including World Wildlife Fund, Conservation International, US FWS, and Wildlife Conservation Society, or other organizations involved in biodiversity conservation in Zimbabwe or relevant regional efforts. A List of suggested contacts will be provided.
2. Coordinate a team to conduct an overview and general analysis of the country's biodiversity, potential impact of climate change, tropical forestry and current status. Upon arriving in Zimbabwe the team will:
 - a. Meet with USAID/Zimbabwe staff to get a solid understanding of Mission program goals and objectives under its proposed updated strategy; perspectives of this assignment and specific interests for the team, including advice and protocol on approaching USAID partners and host country organizations with respect to this assignment. The team shall be aware of

- sensitivities related to an assessment exercise (i.e., the potential for raising expectations, and the need to be clear about the purpose of the assessment) and respect Mission guidance. The team will discuss organizations to be contacted and any planned site visits with the Mission and coordinate as required.
- b. Hold meetings with donor organizations, universities, NGOs, Community-based Organizations (CBOs) relevant government agencies, UN Agencies, and other international or global organizations that are knowledgeable about biodiversity and tropical forestry conservation or are implementing noteworthy projects and gather information locally.
 - c. Conduct no more than two priority site visits, which would supplement understanding of USAID's programs, or of biodiversity, tropical forestry, and environmental issues that arise in interviews and literature, or would confirm information in previous assessments. Site visit locations will be determined in consultation with core technical staff members from the USAID/Zimbabwe staff prior to the assessment team's arrival.
3. Prepare a report on the status of biodiversity, tropical forestry and conservation efforts in Zimbabwe and potential implications for USAID or other donor programming and environmental monitoring which shall define the actions necessary for conservation. The report shall include:
- a. The current status of biodiversity, tropical forests, and natural resources in general in Zimbabwe based on current and available information.
 - b. Major ecosystem types, highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats.
 - c. Descriptions of natural areas of critical importance to biodiversity conservation, such as forests, wetlands, and coastal areas critical for species reproduction, feeding or migration, if relevant. Particular attention should be given to critical environmental services and non-commercial services they provide (watershed protection, erosion control, soil, fuel wood, water conservation and amenity and recreation). It will also summarize how current land tenure arrangements affect conservation in Zimbabwe.
 - d. An overview table and map of the status and management of protected area system in Zimbabwe including: an inventory of all declared and proposed areas (national parks, wildlife reserves and refuges, forest reserves, marine reserves, sanctuaries, hunting preserves and other protected areas) including marine and coastal areas. The inventory will identify the institution responsible for the protection and management of each decreed area, its date of establishment, area, and the protection status of each (i.e., staff in place, management plan published, etc.). In addition to this summary of the current protection and management status of each park, an overview of the major threats and challenges facing protected areas in Zimbabwe, including vulnerability of areas to predicted changes in climate, and a brief summary of any recognized economic potential of these areas (including productive assets, environmental services and recreation and tourism opportunities) should be provided.
 - e. Descriptions of plant and animal species that are endangered or threatened with extinction. Endangered species of particular social, economic or environmental importance should be highlighted and described, as should their habitats. Technical information resources such as the IUCN red list and their websites should be referenced for future Mission access as required. This section should not emphasize species counts, but look at the relation of endangered species and important habitat conservation areas and issues, and evaluate the

- pressures on those areas, including vulnerability to predicted changes in climate, and current efforts to mitigate pressures, including the participation and compliance with CITES and other international efforts. Particular attention should be paid to vulnerability to predicted changes in climate, both terrestrially and in marine environments.
- f. Recent, current, and potential *primary* threats to biodiversity, whether they are ecological (i.e., fire, pests), related to human use (i.e., agriculture, irrigation, contamination, climate change), or institutional (i.e., inappropriate policies) or transboundary issues, as appropriate. These should emerge from a general assessment of national policies and strategies and their effectiveness, issues related to institutional capacity, trade, private sector growth, participation in international treaties, and the role of civil society in the protection of biodiversity and environmental advocacy.
 - g. Conservation efforts, their scope and effectiveness. This section also should include recent, current, and planned activities by donor organizations that support biodiversity and tropical forestry conservation, identification of multilateral organizations, NGOs, universities, and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions, and activities to achieve biodiversity conservation should be included. Priority conservation needs that lack donor or local support should be highlighted.
 - h. Analysis of the current legislation related to the environment, biodiversity and climate change. This section should include identification of laws related to protection and management of biological resources and endangered species. It should also point out any differences in laws that require further harmonization. This section should also review international treaties signed and ratified, as well as those that Zimbabwe needs to sign in order to conserve and manage its biological resources more efficiently (if applicable).
 - i. An overview of the major biodiversity and tropical forest conservation activities of the commercial private sector to identify ways to better foster private sector alliances. Of interest are the norms and standards followed by those commercial entities most engaged in management and use of Zimbabwean forests and tracts near protected areas. Consideration of policies promoted by the Minister of Agriculture, the Minister of Economy, the Minister of Planning and other key relevant governmental ministries should also be included.
 - j. An assessment of how USAID's current programs and proposed country strategy (based on the CDCS draft as it stands at the time of the assessment) meets the needs for biodiversity and tropical forestry conservation. This should include potential opportunities for USAID to contribute to mitigation activities related to climate change as they relate to biodiversity and tropical forestry conservation, consistent with Mission program goals and objectives, through strategic objectives other than environment. The assessment shall include recommendations on where U.S. comparative advantages and capabilities are likely to have the greatest impact. These issues and recommendations should be prioritized to identify those requiring the most immediate attention and based on the level of influence USAID can exert.
 - k. An analysis of threats posed by climate change, with a particular focus on when and how USAID Development Objective (DO) teams can productively integrate understanding of climate change impacts into their programs by incorporating mitigation and adaptation needs and opportunities. The analysis should address how climate change may exacerbate other

stressors, if and when climate change will threaten USAID investments in key sectors such as health, and strategies USAID programs could employ to productively incorporate mitigation and adaptation concerns into programming outside the environment sector.

On the basis of the lessons learned summarized below, USAID envisions that the assessment team should expend only 20-40% of its effort on the baseline environmental components of the assessment (Sections 1 and 2 and sub-elements A-I of Section 3 in the above Scope). These components should be kept brief and can draw from the 2007 118/119 previously completed, as well as the very wide range of existing syntheses.

The remaining 60-80% of effort should be devoted to sub-elements J and K of Section 3. These two components are the most relevant to the CDCS process the 118/119 Assessment is meant to inform and should therefore constitute the primary focus area of the assessment.

In conducting its assessment, the Assessment Team shall seek to answer the following key questions:

1. What would be the benefits of actions identified as necessary to conserve biological diversity offer in regard to key development sectors and indicators such as economic growth, human health, and employment?
2. What specific actions can USAID undertake across sectors to better protect biodiversity while at the same time improving (or at least not prejudicing) the overall development impact of the investment?
3. What specific actions can USAID undertake across sectors to better address projected climate change impacts and/or reduce associated greenhouse gas emissions while at the same time improving (or at least not prejudicing) the overall development impact of the investment?

Additionally, the Assessment Team should bear in mind the following lessons learned:

- a. In the past, some assessment teams have dwelt primarily on conveying purely geographic and biological environment information (e.g., endemism, protected area coverage, or species representation); however, the most effective data in assisting USAID to better understand and improve its conservation role is most often economic indicators (e.g., ecotourism employments, natural product sales or trade, and especially effects on human health) or civil society parameters. In a country like Zimbabwe, where purely biological information is abundant, a complementary focus on the benefits of addressing conservation and climate concerns becomes particularly relevant.
- b. While some degree of focus on environmental background information is necessary and useful, the assessment should pay particular attention to a careful determination and analysis of USAID's own program strategy. Prior 118/119 experience has that spending too much time on the collection of ecological information can be detrimental if it comes at the expense of working closely with each DO team to understand their programs and identify concrete interventions.
- c. The importance of providing constructive, program specific recommendations cannot be overstated. Boiling down the assessment team findings to the very specific conclusions and recommendations that are directly relevant to each DO team is critical for ensuring the assessment will have at least the potential to lead to concrete programmatic actions.

Finally, if any perceived areas of concern related to USAID’s program and its contribution or impact arise during the assessment, the USDA Forest Service shall provide views and suggestions directly to the Environment Team Leader or her designee(s) in a separate briefing.

IV. Timing, Staffing and Illustrative Level of Effort

The Biodiversity and Tropical Forest Background Assessment Study will be carried out to inform the USAID/Zimbabwe CDCS to be finalized by early mid-2012 and, therefore, should be completed no later than March 16, 2012. USAID anticipates that the entire assessment can be completed in approximately six weeks by a team of at least three members. The team leader shall have USAID experience, with hands-on experience conducting assessments and be familiar with USAID environmental regulations and strategic planning processes. The team members should have a combination of skills and knowledge in biodiversity, natural resources management, institutional development, policy, and economics, in order to address issues affecting Zimbabwe. At least one team member shall be a host-country national. USAID/Zimbabwe staff will also contribute.

The assessment process should broadly adhere to the following timeline and approximate levels of effort:

Component	Timeframe	Approximate LOE	Responsible Team Member(s)
Itinerary Development and Site Visit Identification	Jan. 2 – Jan 20	5 person days	USDA Forest Service Team Leader and Forestry Specialist: 1 person days USAID staff: 4 person days
Desk analysis	Jan. 23-27	10 person days	USDA Forest Service Team Leader and Forestry Specialist
Field visits and USAID interviews	Jan. 30 - Feb. 10	24 person days	USDA Forest Service Team Leader and Forestry Specialist: 24 person days USAID staff: 12 person days
Report preparation	Feb. 13-24	12 person days	USDA Forest Service Team Leader and Forestry Specialist to a limited extent, USAID staff
Report revision following USAID review	Mar. 12-16	5 person days	Team leader with support from USDA Forestry Specialist
		Total approx. LOE: 56 person days	

V. Relationships and Responsibilities

The USDA Forest Service shall report to the USAID/Zimbabwe. USAID/Zimbabwe’s Economic Growth and Humanitarian Assistance offices will serve as a resource group and will be actively involved in the compilation of the report. The USDA Forest Service will be responsible for identifying and obtaining the majority of the reference materials needed for this study with only minimal interventions on the part of USAID/Zimbabwe. However, USAID staff will be available to assist with certain elements of the assessment, including in particular coordinating field visits; interviews with USAID staff; and helping answer the key questions identified in the Statement of Work. The Regional Environmental Advisor

(REA) based in Pretoria and the Bilateral Mission Environmental Officer (MEO) will have an advisory role. USAID/Zimbabwe staff will comprise part of the assessment team.

VI. Deliverables

There shall be five deliverables under this Scope of Work:

1. To ensure that USAID programming (both current and planned) is adequately understood by the Assessment Team, as well as to engender Mission buy-in, the Assessment Team Leader shall meet with each relevant Office Director and other staff members on at least two occasions. The Assessment Team shall also meet with the Program Officer, and possibly the Mission Director on at least one occasion, aside from the exit briefing.
2. Draft Report: The USDA Forest Service shall submit a draft report to USAID no later than February 24, 2012. The draft report shall follow the generic outline provided in Annex D of the attachment to this SOW, as refined during the course of the assessment in consultation with USAID. The report shall not exceed forty pages in English, excluding suitable annexes and pertinent figures (maps, institutional charts, & tables) and references. Among the expected appendices is a briefly annotated bibliography of the most important current reference materials related to the topic and a contact list for each of the organizations discussed in the report.
3. Final Report: The final report is due no later than two weeks after receiving USAID/Zimbabwe's comments on the first draft report.
4. In-Country Mission Exit Briefings: The team shall meet with USAID/Zimbabwe to provide them with a brief of the report findings. The exit brief shall be accompanied by a two-page written executive summary of key findings and recommendations.
5. USAID/Washington De-brief: The Team Leader (or his/her designee if the Team Leader does not have immediate plans to return to Washington) shall provide a de-brief for the Bureau Environment Officer, Environment Policy Advisors and other interested parties.

The USDA Forest Service will furnish electronic version of all submissions in both Word and PDF formats. In addition, a PDF version of the approved final report should be sent to the Development Exchange Clearinghouse.

APPENDIX IV: ASSESSMENT TEAM BIOGRAPHICAL SKETCHES

Dr. David M. Miller, Team Leader

David M. Miller has supported environment, NRM, and agriculture development projects in Africa for over 25 years. He has researched, assessed, developed, and managed a wide range of programs. An experienced trainer, he has developed and implemented distance and face-to-face adult learning. Miller has produced sector and office-level strategic plans and coordinated programs with stakeholders, government representatives, and other donors. He works comfortably with diverse groups, including local leaders, federal government representatives, private sector actors, NGOs, universities, and donor agencies. He has led multi-sector teams, and managed an office of 12 technical specialists. Miller holds a PhD in Development Anthropology; his technical specialties include land tenure and institutional development. He is fluent in French.

Dr. David Gwaze

David Gwaze is the National Silviculturist, USDA Forest Service. He has BS and MS degrees in Forestry, and a PhD in Quantitative Genetics. David has worked as a Research Officer, Policy Coordinator, and Manager of Research and Development, for the Zimbabwe Forestry Commission. He was a Post Doctoral Research Associate and Research Associate for the Texas Forest Service, Texas A&M University System, and a Resource Scientist for the Missouri Department of Conservation. David holds adjunct positions at the University of Missouri Columbia: Assistant Professor of Forestry and Professor of Civil and Environmental Engineering. His experience includes silviculture, forest genetics, tree improvement, water quality, human dimensions and ecosystem management. In Missouri, he coordinated a complex multidisciplinary, landscape, long-term ecosystem project. David has published over 60 papers, and presented over 70 papers at professional conferences.

APPENDIX V: PERSONS INTERVIEWED

USAID

Melissa Williams	Mission Director
Julie Chen	Program Development Officer/PRM
Ephraim Chabayanzara	Agriculture/Agronomy, USAID-EG
Fanuel Cumanzara	Humanitarian Food Security Specialist, USAID-HA
Hamfreys Sanhokwe	Deputy Mission Environmental Officer/Health
Loli Filmeridis	Program Development Officer/PRM
Otto Saka	Senior Advisor/ DRG
Sheryl Stmbras	Team Leader/ DRG
Taurai Kambeu	Development Program Specialist/MEO PRM
Tina Dodey Jones	Team Leader, USAID-EG
Vera Musara	Advisor/DRG

Government of Zimbabwe

Antony Mapauka	Research Officer, National Herbarium and Botanic Garden
Armstrong Tembo	Chief Conservator of Forests, Forestry Commission
Charles Mashingaidze	District Coordinator, Forestry Commission
Chemist Gumbie	Deputy General Manager, Forestry Commission
Edward Mufandaedza	Policy Coordinator, Forestry Commission
Felix Murindagomo	Principal Ecologist, National Parks and Wildlife
Hilary Madzikanda	Head, Research, National Parks and Wildlife
Maxwell Maturure	Principal Environment Planning and Monitoring Officer, EMA
Member Mushingahande	National Biodiversity Coordinator, Zimbabwe Forestry Commission
Michael Nyika	Head, National Herbarium and Botanic Garden
Mthelisi Sebele	Forest and Wildlife Ecologist, Forestry Commission
Never Muboko	Principal Ecologist, National Parks and Wildlife
Shakie Kativu	Chair, Depart. of Biological Science, University of Zimbabwe

Other organizations

Allain, Chimankire	Director, Forum for Environment Education
Cecil Machena	Program Manager, CAMPFIRE & Coordinator, CBNRM
Daisy Mukarakate	Environment Specialist, UNDP
Eliphas Masukume	Project Field Agent, CARE Zimbabwe
Emelda Berejena	Project Manager, FINTRAC
Fadzai Mukonoweshoro	Senior Program Manager, AUSAID
Faith Choga	Intern, Food Security Section, EU
Gilbert Manicore	Project Coordinator, Zimbabwe Environmental Law Association (ZELA)
Kudzanayi Gwande	Team Leader, Northern Branch, Environment Africa
Lilian Goredema	Program Manager, WWF
Milward Kuona	Miombo Program officer, WWF
Peter Gondo	Deputy Director, SAFIRE
Samuel Taffesse	Senior Operations Officer, World Bank
Severin Mellac	International Aid/Cooperation Officer, Food Security Section, EU
Shamiso Mtisi	Head of Research and Publication, ZELA
Tendayi Bobo	M&E Officer, Zimbabwe Environmental Law Association (ZELA)
Tsitsi Wutawunashwe	Small grants program manager, UNDP
Willie Nduku	Director, Wildlife and Environment Zimbabwe

APPENDIX VI: OVERVIEW OF LIVESTOCK AND THE ENVIRONMENT IN ZIMBABWE⁹

Since 1975, Zimbabwe's total national cattle herd has fluctuated between five and six million head. The war for liberation and droughts in the early eighties and nineties resulted in the biggest temporary decreases in this population (Mavedzenge, 2006). According to the FAO, in 2010 Zimbabwe's indigenous cattle meat production valued more than any other commodity (99500mt, valued at \$269m), and after tobacco, fresh whole cow milk followed as the third most valued (\$153m). Game meat (\$76.5m) and indigenous goat meat (\$30.8m) were the seventh and eleventh most valued commodities that year (FAOSTAT, accessed March 19, 2012).¹⁰ The country's livestock sector includes both large-scale commercial and smallholder production. Commercial producers raise cattle primarily for beef and dairy products, while smallholders integrate cattle into mixed farming systems to produce for domestic consumption and local markets. Following independence, cattle have become increasingly concentrated in communal and resettlement farms, a trend increased by the decimation of white commercial farm production since 2000, resulting in the almost total concentration of the national herd on small scale farms in 2005 (Mavedzenge, 2006). Also since 2000, formal sales of cattle have dropped, as producers in the communal areas have been unable to take advantage of the export market.

Critical to smallholder production systems, cattle serve to provide draught power, manure, milk, and cash income. Smallholder livelihood systems also depend on small ruminants, such as goats, sheep, and donkeys, with small ruminant ownership being greatest among poorer households, women, and women-headed households (Mavedzenge, 2006). In more humid zones farmers pen-fatten stock while in arid zones cattle and small ruminants graze natural pasture during summer and in winter feed on crop residues, waterway vegetation, and fallow land and uncultivated areas within arable lands. Goats represent a larger proportion of herds in these zones than they do in the humid areas, and as Zimbabwe's climate changes, farmers are likely to increase their livestock holdings relative to investments in crops, and simultaneously increase proportions of small ruminants in herds as they adapt to hotter, more arid conditions (Gambiza, 2000).

Impact on biodiversity and forests

In areas where livestock graze, they can have both positive and negative impacts on plant cover and diversity and on wildlife biodiversity. This depends largely on the density and duration of herds in a particular location. Livestock may stimulate seed germination and plant growth through the provision of manure, dispersal of seeds, and by breaking up compacted soil. As they graze they reduce potential fuel for bush fires and control the growth of shrubs. As they trample grass they stimulate dense stem clusters. Mixed grazing systems (cattle, small ruminants, and wildlife) in particular may help maintain a wide range of plant diversity (Haan, 1996). Without livestock, the overdevelopment of tree and shrub canopies may create plant communities less resilient to fire, flood and other unfavorable natural events.

At the other extreme, prolonged heavy grazing may result in the disappearance of forage species, the dominance by other, less palatable, herbaceous plants or bushes, and a localized reduction in biodiversity. Restoration of such overgrazed lands may take up to thirty years (Haan, 1996). In extreme cases, overgrazing may increase erosion and in turn impact waterways.

⁹ A complete overview of the livestock sector is well beyond the scope of this assessment, nevertheless upon USAID/Zimbabwe's request, we have developed this brief overview of the sector and its relationship to the environment. It is based strictly on the limited resources available addressing the topic.

¹⁰ These data are FAO estimates.

The high rainfall variability in Zimbabwe's arid zones makes it difficult to precisely determine the point where overgrazing begins. This is in part because the rate and nature of regeneration in these zones are not well understood. Recent research has argued that the threat of erosion by livestock has been overstated in the past; it has also thrown into doubt the idea that there are specific identifiable limits in the numbers of animals that a particular range can support (Dijkman, 1998, Campbell, 2006). Various studies argue that semi-arid rangeland systems have been found to be much more resilient over time than previously believed, and what have historically been perceived as high stocking rates for commercial herding may be ecologically sustainable for the multi-purpose herds of the communal areas. Continued increases in farm productivity on communal areas further throw into question the relationship between livestock numbers and land degradation (Campbell, 2006).

Nevertheless, while the question of the extent and impact of overgrazing continues to be debated, it is clear that in specific locations it has starkly reduced the viability of lands for grazing, at least for the foreseeable future. In Zimbabwe, small holders on communal lands seeking to maximize the number of heads, are limited principally by grazing area; the quality of the beef produced is a secondary concern, to say nothing of remote impacts on rivers (Mavedzenge, 2006). Although numbers and productivity fluctuate, largely as a result of annual rainfall, in some areas small scale farmers on communal land graze cattle at ten times the recommended norm for commercial beef in arid areas, at rates that rise to almost one livestock unit to the hectare in some areas (Gambiza, 2000, and Mavedzenge, 2006).

ANNEX VII: CONDENSED EXECUTIVE SUMMARY

USAID/Zimbabwe has undertaken this Biodiversity and Tropical Forestry Assessment to inform the process of preparing their FY 2013 – 2015 transitional Country Development Cooperation Strategy and ensure that investments across its entire bilateral portfolio address Zimbabwe's conservation and sustainability challenges to the maximum productive extent. The assessment was conducted by a two person team and included interviews over two weeks in Zimbabwe and adheres to the requirements of sections 118 and 119 of the Foreign Assistance Act.

Zimbabwe's five distinct ecoregions provide habitats for an abundant and diverse flora and fauna. This biodiversity and the country's forests serve as the foundation for rural livelihoods, and to an extensive tourism industry. As in other countries, the ecosystem services associated with biodiversity and healthy forests underpin the national economy. However, in the past twelve years, plunging funding, staff exodus, and weakened credibility have severely undermined the capacity of the government and civil society institutions to responsibly manage the environment and address the principle indirect drivers of biodiversity and forest decline, including: population pressure, poverty and food insecurity, land reform, and climate change. Nor have they been able to adequately manage direct threats, which include uncontrolled deforestation, poaching, inefficient water use, fire, alien species invasion, mining, and the agricultural conversion of grasslands, wetlands, forests, biological corridors and even protected areas.

Some of these threats have been eased by the activities of USAID/Zimbabwe. The stabilization of the political context and progress towards effective and equitable governance have hastened the return to effective, transparent and accountable environmental management institutions. Food assistance programs have reduced the dependence of rural populations on unsustainable coping strategies. Because people struggling with poor health and nutrition often resort to less sustainable livelihood practices, support addressing disease has improved the management of natural resources. In collaboration with other donors, USAID/Zimbabwe also provides support to family planning activities, thus addressing a long term indirect driver of environmental degradation in Zimbabwe.

Threats from ongoing USAID/Zimbabwe programs

The assessment identifies no threats stemming from current USAID/Zimbabwe democracy and governance and health programs, assuming the effective implementation of their respective environmental monitoring and management plans. However, ongoing direct support for agricultural activities in the humanitarian assistance and economic growth sectors may increase activities that deplete water sources, erode soil, and introduce invasive species. Agricultural production and productivity increases may also result in the opening of slopes, wetlands and woodlands to farming. Seed security activities, especially maize seed, may increase the dominance of hybrid seeds to the exclusion of local land races of other crops, such as sorghum and millet. Further, an increase in the number and functioning of micro and small enterprises may draw down water resources and produce air and water pollution. That said, if existing IEE and EMMP conditions are adhered to implementation of these activities will conform to stricter environmental standards than existing norms and likely have a net positive impact on agricultural systems and associated environments over which Implementing Partners have direct influence. However, EG programs (more so than activities in the humanitarian assistance sector) are expected to expand agriculture beyond the specific regions and institutions over which USAID/Zimbabwe and Implementing Partners have influence. Given that unsustainable agricultural practices are the norm in Zimbabwe, this spread effect will likely result an increase in agriculture-related threats.

Opportunities for linkages within proposed USAID/Zimbabwe activities

The assessment identifies the following opportunities to support Zimbabwe's biodiversity conservation and forestry efforts in the proposed Results Framework:

DO 1. Advanced transition to a more accountable and democratic system of governance

Deliberate inclusion of CBOs and CSOs that support the voicing of environmental concerns, especially mobilization around rights in water, forest, grasslands, and soils.

DO 2. Increase Food Security

- Conduct a climate change vulnerability assessment to develop an adaptation and resilience strategy tailored to specific locations, livelihoods and value chains.
- Introduce stand-alone and integrated programming elements that promote sustainable agriculture and practices designed to conserve and restore soil and water resources and increase the use of trees in agriculture and horticulture.
- Introduce a sustainable land management approach in extension activities, integrating crop, livestock, and tree production.
- Explore, and if viable, support value chains of indigenous horticultural products. Support networks preserving indigenous horticultural plant genetic resources.
- Prioritize protected area buffer zones in local site selection.
- Support economically viable organic certification schemes and producers.

DO 3. Increase stability through inclusive growth and development

Include sustainable agriculture, biodiversity, and forestry considerations in policy development, such as planned work on land tenure.

DO 4. Reduce morbidity and mortality related to HIV, TB, malaria, reproductive health and maternal, neo-natal and child health

- Continue to support family planning activities to reduce unintended pregnancies and reduce the level of unmet need for family planning.
- Expand support for urban and rural water and sanitation activities.