



REVIEW OF WILDLIFE ISSUES ASSOCIATED WITH THE LAND
REFORM PROGRAMME IN ZIMBABWE

Compiled by R. du Toit

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TABLE OF CONTENTS

1	SUMMARY	1
1.1	RATIONALE FOR THIS REPORT	1
1.2	THE NEED FOR VARIED APPROACHES TO EMERGE THROUGH A FORMALIZED NEGOTIATIONS APPROACH	1
1.3	DIMENSIONS OF THE ENVIRONMENTAL PROBLEMS THAT HAVE ARISEN	1
1.4	POLICY CONSIDERATIONS	3
2	KEY ISSUES IN WILDLIFE-BASED LAND REFORM	4
2.1	REQUIREMENTS FOR SOCIO-POLITICAL VIABILITY	4
2.2	BUSINESS COMPLEXITY WITHIN THE WILDLIFE INDUSTRY	4
2.3	SCALE ISSUES WITHIN THE WILDLIFE INDUSTRY	4
2.4	THE COMPLEXITY OF HUMAN FACTORS IN WILDLIFE OPERATIONS	5
2.5	PROJECT REVIEW PROCESS TO DEAL WITH THE COMPLEXITY OF WILDLIFE PROJECTS	6
2.6	FURTHER POINTS	6
3	REVIEW OF THE ENVIRONMENTAL IMPACTS OF THE FAST-TRACK RESETTLEMENT PROGRAMME	8
3.1	CONSTRAINTS ON INFORMATION	8
3.2	TRENDS IN WILDLIFE PRODUCTION WITHIN ZIMBABWE PRIOR TO FAST-TRACK RESETTLEMENT	9
3.2.1	Comparative economic advantage of wildlife production as a land-use in Zimbabwe	9
3.2.2	Components of Zimbabwe's wildlife industry on private land	11
3.2.3	Complementarity between state, communal and private sectors	13
3.2.4	Legal provisions	13
3.3	LAND-USE OBJECTIVES OF THE FAST TRACK RESETTLEMENT PROGRAMME	13

3.4	REVIEW OF IMPACTS WITHIN DIFFERENT ECOREGIONS OF ZIMBABWE	16
3.4.1	Central Plateau	17
3.4.1.1	Major biodiversity features of relevance to fast-track resettlement	17
3.4.1.2	Impacts of fast-track resettlement on the Central Plateau	18
3.4.2	Save-Limpopo Lowveld	21
3.4.2.1	Major biodiversity features of relevance to fast-track resettlement	21
3.4.2.2	Impacts of fast-track resettlement in the Save-Limpopo Lowveld	21
3.4.3	Kalahari Ecoregion	26
3.4.3.1	Major biodiversity features of relevance to fast-track resettlement	26
3.4.3.2	Impacts of fast-track resettlement in the Kalahari Ecoregion	27
3.4.4	Eastern Highlands	28
3.4.4.1	Major biodiversity features of relevance to fast-track resettlement	28
3.4.4.2	Impacts of fast-track resettlement in the Eastern Highlands	28
3.4.5	Zambezi Ecoregion	29
3.4.5.1	Major biodiversity features of relevance to fast-track resettlement	29
3.4.5.2	Impacts of fast-track resettlement in the Zambezi Ecoregion	29
3.5	IMPACTS ON SOIL RESOURCES	31
3.6	WILDLIFE DISEASE IMPLICATIONS	32
3.6.1	Summary of diseases of major importance at the wildlife/livestock interface	32
3.6.2	Foot-and-mouth disease	33
3.6.3	African swine fever	34
3.6.4	Theileriosis	35
3.6.5	Anthrax	35
3.6.6	Tsetse fly and trypanosomiasis	36
3.6.7	Malignant catarrhal fever	36
3.6.8	Bovine tuberculosis	36
3.6.9	Rabies	37
3.6.10	Newcastle disease	37
3.6.11	Brucellosis or contagious abortion	38
3.6.12	Constraints within the Department of Veterinary Services	38

3.7	ECONOMIC IMPLICATIONS	38
3.7.1	Impacts on the livestock sectors	38
3.7.2	Impacts on the tourism and safari hunting sectors	39
4	POLICY CONSIDERATIONS	41
5	REFERENCES	44
ANNEX A	WILDLIFE SCIENTIFIC NAMES	46
ANNEX B	THE ECOLOGICAL RATIONALE FOR THE FORMATION OF LARGE-SCALE CONSERVANCIES IN THE SAVE-LIMPOPO ECOREGION	47
ANNEX C	POSITION PAPER ON LAND REFORM OPTIONS FOR LARGE-SCALE WILDLIFE OPERATIONS IN THE LOWVELD	51
ANNEX D	COMMUNITY-BASED WILDLIFE OPERATIONS (CAMPFIRE)	57
ANNEX E	LESSONS LEARNED FROM COMMUNITY BUSINESS PARTICIPATION IN MADIKWE GAME RESERVE, SOUTH AFRICA	60

1 SUMMARY

1.1 RATIONALE FOR THIS REPORT

Land reform in Zimbabwe is currently being implemented through a fast-track programme in accordance with political and social factors that are beyond the role of WWF to comment upon. However, arising from this programme are serious environmental impacts, including some in WWF project sites such as the Lowveld conservancies, where WWF and partner organizations have invested heavily in rhino conservation since 1990. In view of these environmental concerns, and in response to a recent call for information by the Zimbabwe Parliamentary Portfolio Committee on Mines, Energy, Environment and Tourism, WWF has compiled the following report to highlight the wildlife impacts.

Early in this report, some general comments are made on issues that appear to WWF to be central to the implementation of wildlife-based land reform, and a process is suggested whereby meaningful steps can be taken to achieve this reform. These comments arise from and are informed by constructive discussions between WWF and the Parks and Wildlife Management Authority, and will therefore not be new to some of the senior officials involved in the land reform programme. The general impression that WWF has gained from these discussions is that official policy on wildlife-based land reform remains sufficiently flexible to accommodate suggestions from stakeholders and technical agencies, and it is with this understanding that this document has been prepared.

WWF hopes to contribute to the development of solutions to the environmental and socio-economic problems that are associated with the land reform programme, through the provision of impartial technical advice to all stakeholders.

1.2 THE NEED FOR VARIED APPROACHES TO EMERGE THROUGH A FORMALIZED NEGOTIATIONS APPROACH

The flexibility that is referred to above is indeed important to maintain, because blanket implementation of a rigid, centrally-managed approach could stifle a range of site-specific options (some of which have already been proposed by stakeholders), which have to be refined in accordance with local variations in ecological and socio-economic circumstances. On the other hand, because of the rapid attrition of the nation's wildlife resources through fast-track and "informal" resettlement, a broad policy framework is urgently required so that stakeholders have some parameters within which to negotiate acceptable responses to the challenges of wildlife-based land reform. It is also important that the policy specifies a process whereby the outcomes of such negotiations can be formalized; a problem to date is that a variety of ministries, task forces, provincial and local government authorities and land committees, etc., have been involved in resettlement. Therefore, stakeholders have found it difficult to achieve alignment of all these agencies in order to get their proposals reviewed and approved. An example of such proposals (from Lowveld conservancies) is included as Annex C.

1.3 DIMENSIONS OF THE ENVIRONMENTAL PROBLEMS THAT HAVE ARISEN

The central section of this report gives the background to the wildlife industry in Zimbabwe. Through enlightened policies and conservation awareness within the commercial farming sector (facilitated by the Intensive Conservation Area system), this industry expanded rapidly until 2000. Notwithstanding the deep socio-political flaws within this industry, arising from racial imbalances, the industry was robust in other respects and earned international recognition, which has turned into international concern as the land crisis gripped the industry. Immediately before this crisis, at least 20% of the country's commercial farmland (or about 5% of the entire country) was managed for wildlife

production and tourism. The safari hunting on this land (quite apart from ecotourism) earned Zimbabwe at least US\$12 million per year.

The report goes on to present an overview of each of Zimbabwe's ecoregions, outlining the major biodiversity features of relevance to fast-track resettlement, and indicating the nature of the problems that have arisen. These varied problems include the following.

- The biodiversity of Zimbabwe's Central Plateau suffered from initial fragmentation as large-scale commercial farming was established, but the losses were stabilized and often reversed (especially through wildlife restocking). By 2000, the landscape of the Central Plateau was a diversified one with numerous wildlife refuges nestled within farms, and with individual farms united within Intensive Conservation Areas (and often also within conservancies) to maximize wildlife production without reducing crop production. With land reform and the decline in formal employment now leading to much more small-scale commercial and subsistence farming, the fragmentation process will re-commence. This time the much higher human pressures on the biodiversity resources, and the reduced investment capital, will severely limit the potential for a second phase of extensive environmental rehabilitation. Nonetheless, some sites for new wildlife projects can and must be found.
- The fast-track resettlement programme has severely impacted the rapidly developing wildlife industry within the Save-Limpopo Lowveld, where the largest conservancies were established to provide crucial, self-sustaining refuges for endangered species such as rhinos and wild dogs. Despite policy statements to the effect that conservancies would not be resettled but would instead have to develop plans for indigenization at a business level, the Lowveld conservancies have been extensively occupied by subsistence farmers and poachers. Even a section of Gonarezhou National Park has been invaded. The immediate consequence of these invasions has been an unprecedented level of poaching, through snaring (including the killing of 15-25 black rhinos); the longer-term risks to biodiversity are the loss of connectivity between wildlife reservoirs and an inappropriate scale of land-use (management units becoming too small, and too fragmented, to maintain ecological and economic viability). Zimbabwe's participation in the Great Limpopo Transfrontier Conservation Area will be constrained by these problems.
- In the Kalahari ecoregion (north-western Zimbabwe), much adverse international publicity has arisen since 2001 because of allegations of over-hunting, improper allocations of hunting quotas, illegal hunting by non-registered operators, slaughter of animals for meat sales, etc. Evidence of ongoing misconduct within these hunting operations could prejudice Zimbabwe's entire safari hunting industry by leading to trophy import prohibitions by countries such as the USA. In addition to controversial hunting operations, invasions of subsistence farmers and poachers into parts of the Gwayi and Matetsi areas have followed the same pattern as has been seen in the Save-Limpopo Lowveld, leading to localized wildlife population declines of 90% or more.
- Biodiversity within the two remaining ecoregions of Zimbabwe, being the Eastern Highlands and the Zambezi ecoregions, has been less adversely affected by resettlement pressures. In the Eastern Highlands, the main problem has been patchy slash-and-burn clearance of medium-altitude and low-altitude forests, which are already much depleted and which provide tenuous refuges for some rare bird species and other biota. In the Zambezi Ecoregion, the lack of commercial farmland has largely precluded direct impacts arising from the resettlement programme, but indirect impacts have become apparent in the form of displaced farm-workers occupying important wildlife refuges and corridors. Conversion of wildlands to subsistence agriculture is also stimulated by other pressures arising from the current economic frailty of Zimbabwe; this process will significantly reduce income from the CAMPFIRE programme.

The fast-track resettlement programme has created conditions that have been highly conducive to the spread of diseases at the wildlife-livestock interface. Foot-and-Mouth disease has been the major problem and has spread widely within Zimbabwe due to loss of controls (such as fencing), thereby curtailing Zimbabwe's access to the lucrative European Union beef export market, as well as a number of other important markets. Other wildlife diseases that have major economic implications for livestock production, and which are exacerbated in various ways by the breakdown of veterinary controls during the land disturbances, are: African swine fever; theileriosis; trypanosomiasis; anthrax; malignant catarrhal fever; bovine tuberculosis; rabies; Newcastle disease; and brucellosis.

1.4 POLICY CONSIDERATIONS

The following factors will be crucial to the success of wildlife-based land reform.

- Issues of appropriate spatial and economic scale have to be given due consideration when redesigning commercial wildlife operations. Large areas are required to meet the varied ecological requirements of a spectrum of wildlife species, many of which need to roam widely in order to find patchy food resources. Tourists and safari hunters wish to experience a wilderness atmosphere. Economies of scale are required to develop marketable lodges, to maintain reliable fleets of vehicles, to provide professional guiding services for international clients, etc., in the face of strong regional competition. The marketing of wildlife operations and the provision of essential services such as air transport are dependent upon the attainment of a critical scale of operations. Therefore, it will be easier to set up wildlife-based land reform projects where these can be interfaced with established wildlife operations in state-protected areas or conservancies.
- Considerable capacity-building, institutional costs (defined in Section 4) and investment will be required to develop and maintain wildlife businesses that enable meaningful black participation. Arrangements for significant black entrepreneurial involvement in the wildlife industry as well as community participation (both of which are essential, with the first never substituting for the second) will be easier if they entail businesslike adjustments within existing operations. This will allow management and marketing skills to be retained for the mentoring of new participants, and the confidence of the existing investors in these operations need not be lost.
- For effective, sustainable and equitable use of wildlife resources, a fundamental requirement is to establish a legally delimited authority (made up of genuine stakeholders or acceptable external partners) for the use, management and control (jurisdiction) over a defined project area and the wildlife within that area. Devolution of wildlife management authority and security of tenure over wildlife assets within this jurisdiction must be ensured through full expression of the spirit of proprietorship that is embodied in current Zimbabwean wildlife legislation.
- The compulsory incorporation of additional beneficiaries into each commercial wildlife operation can only take place up to a limit beyond which the financial returns to investors will be too low to attract or retain their investments. In addition, the larger and more diverse the group of participants becomes, the greater the transaction costs become in holding this group together.
- Spatial planning of land-use, especially in semi-arid landscapes (such as the Save-Limpopo Lowveld) where wildlife potential is crucial to economic development, must be undertaken on a broad ecoregional basis. Fragmentary and agriculturally-orientated planning exercises (which dominate the current resettlement approach) will foreclose options to maintain wildlife reservoirs and linkages, will reduce opportunities to develop transfrontier conservation areas and biosphere reserves, and will also make it more difficult to implement cost-effective controls for diseases such as Foot-and-Mouth.

2 KEY ISSUES IN WILDLIFE-BASED LAND REFORM

The following issues and suggestions have arisen from discussions with officials of the Parks and Wildlife Management Authority and other relevant agencies, and with other stakeholders.

2.1 REQUIREMENTS FOR SOCIO-POLITICAL VIABILITY

Commercial wildlife operations in Zimbabwe have demonstrated their viability in ecological and economic terms, but they cannot attain long-term socio-political viability without the following.

- Mechanisms for ensuring that more benefits flow to local communities, through creation of employment, capacity-building, resource-sharing, etc.
- Indigenisation at a business level, to achieve greater black entrepreneurial involvement in the wildlife industry.

The second step is no substitute for the first, because unless local people feel that they are deriving benefits, they will poach wildlife regardless of who owns the land.

2.2 BUSINESS COMPLEXITY WITHIN THE WILDLIFE INDUSTRY

A major challenge for wildlife-based land reform is how to maintain the business viability of wildlife operations while indigenising them to a greater extent and at the same time increasing local benefits. The situation is more complex than with agricultural operations. Commercial wildlife operations depend heavily upon overseas markets and often entail external investment. These international linkages and investment interests will be very sensitive to indigenisation processes. Therefore these processes have to be implemented in a transparent way and in accordance with sound business principles.

In a number of cases, it will be possible to combine the requirement for greater community benefits and the requirement for indigenisation at an entrepreneurial level. This will be achievable where local communities can become genuine business partners within joint ventures with commercial operators, instead of being viewed merely as external beneficiaries. Some successful CAMPFIRE joint ventures have demonstrated this approach.

Although, as noted above, the international components of the wildlife industry mitigate against quick measures to enforce indigenisation, at the same time there is international appreciation of the need to promote racial equity in this industry, for moral reasons as well as for long-term sustainability. This international awareness (and, in some cases, donor support) will push even the less willing Zimbabwean wildlife operations towards "win-win" indigenisation options, particularly if these options are clearly linked to local community development.

The current slump in Zimbabwe's tourism industry, and the depletion of wildlife on commercial ranches during the phase of informal resettlement, mean that new wildlife projects will take some years to achieve viability. This must be clearly understood by new entrants into this industry, to avoid unrealistic expectations.

2.3 SCALE ISSUES WITHIN THE WILDLIFE INDUSTRY

The diversity of ecosystems within Zimbabwe gives rise to a diversity of wildlife operations, ranging from intensive production systems for semi-domesticated animals, to the very extensive operations that are required in semi-arid regions such as the south-east Lowveld. The extensive nature of the operations in Agro-ecological Regions 4 and 5 arises because of the following factors.

- Large areas are required to meet varied ecological requirements of a spectrum of wildlife species, many of which need to roam widely in order to find patchy food resources.
- Tourists and safari hunters wish to experience a wilderness atmosphere.
- Economies of scale are required to develop marketable lodges, to maintain reliable fleets of vehicles, to provide professional guiding services for international clients, etc., in the face of strong regional competition.

The marketing of wildlife operations and the provision of essential services such as air transport are dependent upon the attainment of a critical scale of operations. Therefore, it will be easier to set up wildlife-based land reform projects where these can be interfaced with established wildlife operations in state-protected areas or conservancies. Small, isolated wildlife projects will only be able to carry a limited range of species, and will require intensive management (including genetic management to prevent inbreeding).

2.4 THE COMPLEXITY OF HUMAN FACTORS IN WILDLIFE OPERATIONS

Apart from inherent ecological variability (giving rise to the different scales of wildlife operation in different ecosystems), there are several human factors that also vary greatly from one area to another.

- The management capacity and previous experience of new participants in the wildlife industry are make-or-break factors in the success of new projects. The lack of these factors often leads to over-expectations of the financial returns to be derived from the wildlife industry, and subsequent disillusionment. As with most if not all primary industries, the resource base of the wildlife operations will have to be managed for sustainability, and not merely used. Therefore considerable capacity-building and mentoring will have to be arranged .
- For community participation, a strong degree of community cohesion is crucial to reduce uncontrolled exploitation of communally managed wildlife resources. The strength of community cohesion is particularly uncertain when new settlers from different areas are brought together.
- Opportunities for technical support and donor involvement vary, depending upon factors such as whether an area has particular biodiversity values (such as rare animals) that will attract conservation funding.
- In some areas, stakeholders have already developed appropriate institutional arrangements and have developed ideas on resource-sharing and indigenisation, making it easier to identify suitable projects than in other areas where stakeholder dialogue has been limited.

2.5 PROJECT REVIEW PROCESS TO DEAL WITH THE COMPLEXITY OF WILDLIFE PROJECTS

Although urgent, the need to develop indigenisation and community benefits from commercial wildlife operations will not be achieved in the long-term unless the land reform arrangements are tailored to suit the varying circumstances in different areas.

There are no generic models for wildlife-based land reform that will be applicable across the full range of ecological and economic conditions within Zimbabwe. Therefore, the concept of a wildlife-based resettlement model, or of a wildlife production unit of a stipulated size, will be more difficult to apply than in the agricultural sector.

To maximize opportunities under these variable circumstances, the following steps seem appropriate.

- A national board of relevant Government officials and technical advisers (including professional expertise in community-based natural resource management and wildlife production) might be constituted to review these opportunities, on a case-by-case basis.
- Wildlife operations, at either the conservancy level (groupings of operations) or at the level of individual companies or ranches, could be required to submit proposals for indigenisation and community participation, to this board.
- To avoid confusion with investors, the requirement by the Zimbabwe Investment Centre for 30% local participation might be a logical basic requirement for the level of indigenisation in wildlife businesses, with provisions for expansion of this participation (see below).
- The geographical boundaries of each wildlife production unit need to be decided upon as the first step, because all further plans will depend upon the size of each unit and on the ecological and infrastructural features that remain within that unit.
- From a review of the proposals that pertain to each defined wildlife project site, and from dialogue with relevant stakeholders, the board could determine whether the proposals warrant official endorsement as starting points for wildlife-based land reform. Once a set of initial proposals has been reviewed, the process will speed up since the fundamental issues to be considered in reviewing proposals will become clearer to all parties, and some precedents will be set.

2.6 FURTHER POINTS

- If the indigenisation strategy is to be based on sound business principles, shareholdings must be based on capital, assets or other inputs that the new shareholders can bring into the wildlife venture, either individually or jointly. To achieve a stakeholding for poor communities, the inputs would have to be achieved through donor or state support (although in a few cases, these communities might have unutilised land to incorporate in the projects). The allocation of wildlife by the state, from the National Parks estate or from resettled areas where smallholder farming will exclude wildlife, will be one way to create an asset base for indigenous shareholders.
- The beneficiary communities must have clearly defined obligations as well as rights, within sustainable, businesslike and legally-binding agreements for their wildlife projects.
- There is a limit to how far the benefits can be spread, in terms of the number of shareholders, while still creating meaningful returns per household. Commercial investors will simply

disinvest if the number of beneficiaries inflates to an extent that the return on the investment is unattractive.

- "Appropriate Authority" provisions for the utilisation of wildlife resources must apply in full to the shareholders within the wildlife projects.
- The 30% level for initial indigenisation must be seen as a start rather than as an upper limit. The business arrangements must clearly specify how this shareholding will grow. For instance, the level of indigenous shareholding could be linked to the growth in wildlife populations, thus providing incentives for careful husbandry of these resources and for the control of poaching.
- Considerable donor support will be required to implement projects for wildlife-based land reform. This will be easier to secure if donor and development agencies (UNDP, IUCN, WWF, etc.) are involved in the review and planning process from the outset.
- Some existing wildlife operations (such as Lowveld conservancies) will be able to offer a package of land reform arrangements that include the allocation of land for habitation (to decongest adjacent Communal Lands), the creation of business ventures such as fencing companies, and non-wildlife opportunities such as irrigation schemes for smallholders. These package arrangements could be considered by the review board as an overall proposal.
- Some wildlife operations already entail non-profit trust arrangements or Zimbabwe Investment Centre projects, which will therefore require special consideration (this again emphasizes the difficulty of attempting to impose any standard wildlife model for land reform).
- Compensation for wildlife, infrastructure and other components of wildlife operations that are incorporated into new land reform arrangements could be considered by the review board on a case-by-case basis. This review should take into account the previous levels of investment by landholders in developing wildlife resources, rather than assuming that these are invariably "free resources".

3 REVIEW OF THE ENVIRONMENTAL IMPACTS OF THE FAST-TRACK RESETTLEMENT PROGRAMME

3.1 CONSTRAINTS ON INFORMATION

Land reform policies that have been implemented since 1999 by the Zimbabwean Government have entailed major environmental side-effects. This review indicates the nature of the wildlife costs ensuing from the fast-track resettlement programme, but does not attempt to weigh the impacts against any social, economic or political gains that are intended from the programme, because these socio-political components go beyond the scope of WWF's activities. The assessment of anticipated costs and direct benefits should have been undertaken within a comprehensive Environmental Impact Assessment before the programme was implemented, so that mitigation measures could be specified (to reduce costs and to enhance benefits) and monitoring systems put in place. Because the relevant monitoring systems are not in place, there is a dearth of organized data for this review. The management of numerous land units has been changing from previous owners to new occupants, who often have unclear or transient rights and responsibilities to manage the wildlife and other natural resources. Under these unsettled circumstances, information on the previous as well as the current state of these resources is rapidly dissipated.

Even if it were possible to derive data through ongoing monitoring systems within the land reform process, a problem arises with the adequacy of baseline information on the status of wildlife resources in commercial farming areas prior to the implementation of fast-track resettlement. The Wildlife Producers Association of the Commercial Farmers Union is partly at fault for not establishing adequate databases. Relevant government agencies also deserve criticism for not setting up systems for natural resource accounting. A UNDP-funded review of "The State of Zimbabwe's Environment" in 1998 (Chenje *et al.*, 1998) does not constitute a useful baseline assessment of the national status of wildlife resources because the mammalian population information within this report is clearly erroneous; although the sources of the information are not specified, the "national" population estimates for several key species (e.g. sable antelope, eland) appear to have been derived from aerial surveys of state-land areas only. Consequently, these data are not nationally representative because a.) significant populations existed outside state-land areas, and b.) aerial surveys tend to undercount populations.

Some commercial farmers and wildlife businesses were reluctant to give detailed information for the present review, and virtually all requested that sources of information be kept confidential, because of the political sensitivities associated with the process of compulsory land acquisitions. Most of the information in this report was acquired in late 2002 and cannot be fully updated because of the fluid situation and lack of reliable data sources.

Apart from insufficient data, another major constraint on the present review is that it is often impossible to separate the environmental impacts of the fast-track resettlement programme *per se* from the impacts arising from other political and economic perturbations over the past four years. Impacts are often indirect and compounding, such as the adverse international publicity on the current Zimbabwean situation, which cannot be ascribed to the land issues alone. The consequent tourism marketing problems, along with other factors such as depletion of wildlife resources, eviction of established operators and fuel shortages, undermine the viability of wildlife businesses and therefore impair wildlife management and protection. As the ability to maintain anti-poaching effort declines, and as greater unemployment leads to more poaching, wildlife resources are further depleted and the wildlife industry falls to even lower levels of profitability and conservation effort; hence a downward spiral of resource degradation becomes inevitable.

Since available information is not adequate to quantify total environmental losses at a national level, and since these impacts are ongoing, this review constitutes no more than a general indication of the nature and scale of the major problems. To ensure that the scope of impacts is adequately

assessed, this review stratifies Zimbabwe in geographical and ecological terms into five major ecoregions. Within each of these, an attempt is made to identify the major biodiversity features of relevance to land-use, and to outline salient impacts that have become apparent or are looming. Some specific examples are elaborated.

A consistent emphasis on environmental costs rather than benefits is inevitable; it is clear from the ecoregional analysis that the environmental impacts of fast-track resettlement are overwhelmingly negative. An assessment of the extent to which these massive environmental costs might be socially and politically justifiable in terms of the objectives of the fast-track resettlement programme would be highly contentious and, as noted above, is outside the scope of the present review.

Some of the information in this review was collated in early 2003 for an updated report on the State of the Environment in Zimbabwe (awaiting publication), for which UNDP funding support is gratefully acknowledged but with no suggestion that this information is necessarily corroborated by UNDP.

3.2 TRENDS IN WILDLIFE PRODUCTION WITHIN ZIMBABWE PRIOR TO FAST-TRACK RESETTLEMENT

3.2.1 Comparative economic advantage of wildlife production as a land-use in Zimbabwe

In order to promote real growth, all activities (either industrial or agricultural) undertaken in an economy need to be both financially and economically viable. Financial viability, based upon market prices, is generally measured at the level of the producer. However, economic viability, using corrected market prices or shadow prices, is measured at the national or societal level. The financial viability of any unit of land is largely determined by its biophysical characteristics such as area, climate, soil types and terrain. In addition, there are several economic variables that interface with the biophysical attributes to determine the overall financial viability of each unit of land.

Among the most crucial of these economic variables are international commodity prices. With the rapid growth of the global economy in the last 40 years, agricultural producers have generally experienced significant declines in the terms of trade for agricultural products. This has been caused by: changing consumer priorities as real household income has increased (income elasticity); technological changes which mean that some agricultural products have been superseded by synthetics; and, in some cases, trade protection measures. Close to Zimbabwe, the effect of these influences is demonstrated by the fact that the debt/income ratio for commercial farming in South Africa recently rose to 38%, with an increasing rate of bankruptcies as net farming income has declined by 5.3% per annum, in real terms, over the past decade (Absa Group Economic Research, 2002).

Owing to the non-consumptive value of wildlife (tourism) and the low offtakes required for trophy hunting, wildlife production systems are less dependent on primary rangeland production than livestock and are more resilient during droughts. However, the extent to which wildlife producers are affected by the vagaries of the market for wildlife products is an important consideration. In Zimbabwe, wildlife-based tourism, which encompasses both safari hunting and photographic tourism, is a luxury product with a high income-elasticity. Similarly, intensive single-species production units have been producing hides (crocodile and ostrich) primarily for the international fashion industry, which is highly susceptible to changes in taste and is also characterised by high income-elasticity. Globally it is widely accepted that tourism is the world's largest single sector and furthermore it is one that has demonstrated sustained growth. Although the tourist markets are characterised by extreme diversity (and some volatility, depending upon international security fears), it has been argued that in general they have not been subject to declining terms of trade in contrast to the situation with most if not all agricultural products.

The impacts of international commodity prices (both for agricultural products and inputs) to the producer are modified by a country's domestic economic policies. Therefore policies on, for example,

the rate of exchange for foreign currency, levels of taxation (and subsidies) and local energy prices will obviously affect the viability of an agricultural product and producer.

In comparison to conventional agriculture, the production of wildlife as a land-use option is less sensitive to some of these factors because the natural adaptability of wildlife to local environments obviates the need for as many inputs. For instance, disease resistance and a higher tolerance of parasites mean that the imported chemical inputs needed to sustain domestic livestock are generally unnecessary in wildlife production systems. Thus both at the national level and at the farm level, imported inputs are greatly reduced, conferring upon wildlife production systems a significant financial and economic advantage over livestock. Typically, large-scale wildlife production systems require less capital investment than equivalent commercial livestock or arable production systems.

The fact that livestock farming in the relatively arid southern African region is well below the levels of production that are achieved in temperate Europe is illustrated in the following table. This suggests that, notwithstanding the need to consider food security, southern African governments must focus on the comparative advantage that lies in their indigenous wildlife resources, with their international ecotourism values, instead of concentrating so heavily on domesticated livestock in their rural development policies for semi-arid zones.

Comparative animal production indices for tropical and sub-tropical southern Africa and two temperate, developed countries in Europe
(AU = Animal Unit of 450 kg)

PRODUCTION INDEX	SOUTHERN AFRICA	UNITED KINGDOM	NETHERLANDS
Animal Units/person	0.49	0.32	0.53
Meat (kg/person/annum)	14.19	59.24	168.51
Milk (kg/person/annum)	20.05	259.23	760.14
Meat (kg/AU/annum)	28.88	179.91	317.29
Milk (kg/AU/annum)	40.82	787.21	1431.22

(Cumming and Bond, 1991)

Within Zimbabwe, safari hunting and ecotourism developed as the two main sectors of the wildlife industry, with various sub-sectors. Extensive multi-species production systems involving either cattle and wildlife or wildlife alone were typically developed in the semi-arid areas of the country (Natural Regions IV and V) on both alienated and communal lands (CAMPFIRE projects – see Annex D). In both tenure systems the major source of income was, and continues to be, safari hunting. This is largely because trophy hunting can be developed at lower wildlife population densities, and at lower levels of capital investment. Consequently, it is usually the entry point for wildlife producers into the market.

It is clear that the gross number of tourists visiting a developing country is determined primarily by social, economic and political stability within that country, rather than by changes in disposable income in the major source markets. Thus Zimbabwe's stable political situation between 1987 and 1997 resulted in annual numbers of visitors to the country increasing to over 1 million, of which approximately 13% were from the OECD countries. This stimulated investment in tourism and between 1980 and 1994, the total beds available increased by 63%, while employment in the sector was estimated to have increased to over 36,500 persons (Bond, 1999). These employment opportunities were, on average, at higher wages than in the agricultural industry and entailed more capacity-building and variation in employees' roles, especially at the level of junior staff.

3.2.2 Components of Zimbabwe's wildlife industry on private land

Although Appropriate Authority (significant legal power for a landowner to manage and use wildlife on private land) was granted to large-scale commercial farmers in 1975, it was only during the 1980s that a dynamic and diverse wildlife sector became firmly established. The following sub-sectors developed within this industry.

Non-commercial. This applies to land where the occupiers tolerate a limited range of wild animals on the property. These animals moving between properties may be regarded as having an aesthetic value at a local community level. There may be a limited offtake for home consumption, but the animals tended to be protected by unwritten social ethics amongst the farming community (i.e. if a member of the community takes unfair advantage of having these on his/her property, then the farming community will regulate this situation internally through peer pressure). This situation was characteristic of small- to medium-sized properties in crop-farming areas, with Intensive Conservation Area committees in a watchdog role.

Intensive single-species production systems. Both crocodiles and ostriches have been produced in captivity for their leather with meat as a by-product. The semi-industrial approaches that developed meant that these units were land-, capital- and management-intensive. Availability of large quantities of affordable protein limits the expansion of crocodile farming, as does access to breeding stock. World markets are highly specialised and can be fickle depending on fashion trends and world supplies.

Intensive to semi-extensive multi-species production systems. These evolved on private land mainly close to urban centres. "Game-farming" includes a selection of "plains game" species (sable, impala, waterbuck, warthog, zebra, etc.) in an enclosed area, and usually is not the primary form of income for the land occupier (in fact it is doubtful whether these units could be financially self-sufficient, but they do enhance the revenue streams of multifaceted agricultural enterprises). The animals produced under these conditions may be used for low-key hunting operations (usually bow-hunting), limited venison production, production of animals for live sale or may be part of an ecotourism venture that complements farming activity (e.g. a lodge built on a farm dam that was originally constructed for irrigation purposes). The land used for this activity is generally unsuitable for agriculture (hilly, poor soils, etc.) or is fallow. The area of land devoted to this form of wildlife utilisation generally varies from 200 ha to 1,000 ha, and is "game-fenced" to prevent animals from moving off the property. In many instances wild animals have been purchased from other producers to stock these areas. Animals kept under these circumstances require a moderately high level of management if they are to thrive. This will typically involve fence maintenance, anti-poaching operations, supplementary feeding, habitat management (usually through the use of controlled fires), game water supplies, tick control and manipulation of animal numbers to avoid overstocking. These operations were common in the intensive agricultural areas, and there was a trend in the late 1990s towards amalgamation into conservancies made up of mixed-farming enterprises.

Extensive multi-species production systems. On private land, large game ranches are characteristic of the low rainfall areas of the country. Property sizes are typically 10,000 ha to 30,000 ha. Generally these properties have converted from extensive cattle ranching to more lucrative wildlife operations. Safari hunting is the primary form of income generations but in some cases, such as the large conservancies, ecotourism operations have been developed. These properties require professional levels of management, including fence maintenance, anti-poaching, fire control, game water supplies, road maintenance, habitat management, etc. Managers with training and experience in wildlife management are therefore essential for such operations. In addition, skills in marketing sport hunting to the international hunting fraternity are vital to the success of these operations.

Service sectors and the multiplier effects. In parallel with the development of the core wildlife production systems, numerous secondary industries developed to service the wildlife sector, such

as taxidermists, wildlife capture units, and providers of tourism goods and services. In other countries within Africa, the proportion of payments made outside the country of destination has been a major cause for concern. In Zimbabwe this problem has been ameliorated by the fact that a highly developed tourist service sector developed within the country to provide a range of support services that would otherwise have to be paid for externally. Future policies should ensure that this local diversification of support services is encouraged in order to avoid foreign currency leakage. Security of investment and sound macro-economic policies have been shown to minimise the desire of service providers to externalise foreign currency payments.

In 1990 an analysis of the relative viability of cattle and wildlife production systems in Natural Regions III, IV and V was carried on more than 150 ranches (Jansen *et al.*, 1992). This study showed that the financial profitability of wildlife enterprises increased from Natural Region III to Natural Region V. However, only in Natural Region V did the average return on investment across all ranches exceed 10%, the level considered by the survey as profitable. Importantly, the average return on investment to cattle was below 5% in all Natural Regions (Bond, 1993). The economic analyses showed that both wildlife and livestock enterprises were negatively affected by the Government's economic policies of the time, namely those of a managed exchange rate and producer price controls. In the absence of these policies, both wildlife and cattle would have been profitable land-uses in all three natural regions although wildlife would have been the most profitable. The subsequent significant changes in land-use, when a number of ranchers de-stocked cattle in favour of wildlife during the period 1990 to 2000, fully substantiated the results of the survey.

Although safari hunting has been established on commercial ranches in Zimbabwe for several decades, often in conjunction with cattle ranching, the non-hunting wildlife operations have been established relatively recently. Studies of land-use economics to date, such as the survey described above (Jansen *et al.*, 1992) to assess the viability of game ranching in Zimbabwe compared to cattle ranching, have dealt primarily with the safari hunting economics rather than with the economics of embryonic non-hunting tourism operations on commercial ranchland.

With increasing economic potential, wildlife operations in the Lowveld (including the large conservancies of Save Valley, Chiredzi River, Bubiana and Buby River) expanded rapidly and became a focus for foreign investment. In higher rainfall areas, wildlife operations on private land fell into the category of "semi-extensive to intensive production", described above, and were generally mixed with livestock or crop production. Many of the game parks or conservancies that developed in the Highveld (Central Plateau) were adjuncts to the tobacco industry, employing business capital that was surplus to the actual crop production costs, and land that was generally unsuitable for cropping or was fallow. These were long-term investments that were steadily gaining economic significance, partly through the development of short-stay tourist facilities for nearby urban communities and international visitors, and partly as breeding areas for valuable species (notably sable) for the live-sale and safari hunting markets. Because wildlife exports have been severely constrained through government policy over the past decade, the highly lucrative export markets for these species could not be accessed and therefore the foreign exchange earnings of the Highveld and Middleveld were significantly suppressed.

The net result of the expansion of wildlife production in its various forms and at its different scales throughout Zimbabwe was that by 2000 at least 20% of the country's commercial farmland (or about 5% of the entire country) was managed for wildlife production and tourism. Accurate estimates of the contribution of this sector to the national economy are impossible because of the diversity of operations within, and limitations of data on, Zimbabwe's tourism and hunting industry. Some 40% of Zimbabwe's safari hunting industry was based on private land and was estimated to generate direct earnings of about US\$8 million per year. This amount is increased to at least US\$12 million per year when an economic multiplier effect is applied to incorporate indirect earnings. These estimates are based on the NP9 forms that safari hunters returned to the Department of National Parks and Wildlife Management. Non-hunting tourism added considerably to the overall earnings from wildlife on private land.

3.2.3 Complementarity between state, communal and private sectors

Access to wildland is the fundamental requirement for a flourishing wildlife industry. The Parks and Wild Life Estate of Zimbabwe, which covers some 12% of the country, has played a key role in the development of a wildlife-based tourism sector that dominated by local investors and entrepreneurs, rather than externally-based operations. The State's relatively liberal and market-based approach to the use of the protected area system by entrepreneurs provided opportunities and experience that were carried over into the private sector and the CAMPFIRE operations. This enlightened approach needs to be maintained and even developed as it recognizes that stateland, communal land and private land tourist ventures are not competitors for clients, but are part of a mutually beneficial system.

An important example of economic synergy between CAMPFIRE project areas and private land operations is the fact that safari hunting quotas for buffalo and elephant in the communal lands have been complemented by plains game (antelope) hunting quotas on private land, to create balanced hunts that can be sold for more than either category sold separately, thereby maximising foreign currency generation. Effective marketing is a sophisticated and expensive exercise requiring considerable upfront capital outlay prior to generating income. This can be difficult for CAMPFIRE projects to achieve and generally the private concessionaires do this on their behalf.

In the current land reform context, the main lesson to emerge from past experience is that new wildlife operations cannot be developed in isolation but have to be linked with other sectors of the wildlife industry and to established marketing systems in order to ensure complementarity and to build "critical mass".

3.2.4 Legal provisions

Commercial ranchers in Zimbabwe have had the advantage of decentralized authority for managing wildlife resources. The stifling bureaucratic controls that afflict private wildlife operations in many other countries are largely obviated in Zimbabwean legislation (Parks and Wild Life Act, 1975, and updated subsequently) by the identification of each landowner as the "appropriate authority" for many aspects of wildlife management on his or her land. Self-interest in maintaining wildlife resources for sustainable financial gain, and a high level of conservation awareness amongst Zimbabwe's commercial ranchers, generally served to prevent over-exploitation. A watchdog and enforcement role was been performed over several decades by Intensive Conservation Area Committees (ICAs) appointed within ranching communities in terms of the Natural Resources Act of 1941 and by Rural District Council Conservation Committees appointed in terms of replacement legislation within the Rural District Council Act of 1988. This legislative framework provided a strong foundation for landowners to build upon in reaching agreements with their neighbours on the management of shared wildlife resources, to whatever extent they felt was appropriate to their particular circumstances. The net result of economic incentives, conservation awareness and a sound legislative framework was that Zimbabwe's commercial farming sector incorporated wildlife management practices extremely effectively, and at significant gain to the national economy and environment, within diversified production systems.

3.3 LAND-USE OBJECTIVES OF THE FAST-TRACK RESETTLEMENT PROGRAMME

The programme is aimed at achieving the widespread transfer of commercial farming land from white landowners to black landholders, who are to operate at both subsistence and commercial levels. Zimbabwe's economy is agro-based, with the agricultural sector (around 1999/2000) contributing about 33% of formal employment and accounting for over 40% of the value of national exports. With the majority of Zimbabweans being rural-based and deriving their livelihood from agriculture and related activities, the outcome of land reform will be a determining factor, one way or another, in poverty alleviation and overall economic development.

In the current fast-track phase, there are two main resettlement models. Model A1 is for the majority of land-hungry people, with 20% of the land being reserved for war veterans; this model is essentially one of subsistence farming, with “villagized” and “self-contained” variants, and the emphasis can be either on cropping or livestock production (the latter being known also as the “three-tier model”). Model A2 replaces the previous Commercial Farm Settlement Scheme as the indigenization model for commercial farming and includes small, medium and large-scale commercial settlement.

The amount of land allocated per A1 settler in the different agro-ecological zones of Zimbabwe is planned as follows.

Land allocations for each A1 settler in Zimbabwe’s agro-ecological zones

<i>AGRO-ECOLOGICAL ZONE</i>	<i>HECTARAGE</i>
<i>I</i>	<i>12</i>
<i>IIa</i>	<i>15</i>
<i>IIb</i>	<i>20</i>
<i>III</i>	<i>30</i>
<i>IV</i>	<i>50</i>
<i>V</i>	<i>70</i>

In the A1 model, settlers are allocated individual residential and arable plots, but share common grazing, woodlots and water points. Each household is allocated a minimum of 3 hectares as arable land with the remainder being pooled for communal grazing. The land tenure system offers each family a 99-year lease with option to purchase.

A livestock-based variant of the A1 model is intended for the drier parts of the country where ranching is the only suitable form of land use in the absence of irrigation development. The land is divided into three tiers as follows:

- First Tier is a cluster of dwellings, some arable land and social services;
- Second Tier, also known as the near-grazing area, is a zone in which each benefiting household keeps five livestock units;
- Third Tier is a communal grazing area that is intended for commercial livestock production.

Model A2 resettlement is aimed at increasing the participation of black farmers in commercial farming through the provision of easier access to land and infrastructure on a cost-recovery basis (i.e. beneficiaries are expected to pay into the scheme and to cover their farming costs while producing above subsistence levels). A2 beneficiaries are also granted 99 year leases with option to purchase, and are supposed to show proof of experience and/or resource availability and entrepreneurship. It is envisaged that the small-, medium- and large-scale commercial farmers will engage in either crop or livestock farming or a combination thereof, while peri-urban farmers are expected to concentrate on horticulture and market gardening.

The land allocation parameters (see table below) demonstrate the clear intention of the Zimbabwean Government to have many smaller-scale farmers on the land, rather than the previous pattern of relatively few but larger-scale farmers. The agricultural planning basis for the specification of these units is unclear and questionable. As far as wildlife operations are concerned, there is currently no professional basis for deciding upon suitable farm sizes, although District Land Committees are often applying the agricultural farm size limits to wildlife operations in the drier agro-ecological zones; this will soon lead to major ecological and economic problems.

Maximum farm sizes intended for A2 farmers

AGRO- ECOLOGICAL ZONE (Natural Region)	SMALL-SCALE COMMERCIAL FARMS (ha)	MEDIUM-SCALE COMMERCIAL FARMS (ha)	LARGE-SCALE COMMERCIAL FARMS (ha)	PERI-URBAN COMMERCIAL FARMS (ha)
<i>I</i>	20	100	250	<i>2 to 50</i>
<i>IIa</i>	30	200	350	
<i>IIb</i>	40	250	400	
<i>III</i>	60	300	500	
<i>IV</i>	120	700	1 500	
<i>V</i>	240	1 000	2 000	

3.4 REVIEW OF IMPACTS WITHIN DIFFERENT ECOREGIONS OF ZIMBABWE

Summarized biophysical descriptions of ecoregions of Zimbabwe

ECO-REGION	AREA (sq km; % of Zimbabwe)	SURFACE GEOLOGY	GENERAL TOPOGRAPHY	GENERAL SOIL TYPES	ANNUAL RAINFALL (mm; coefficient of variation)	MAJOR VEGETATION TYPES
Central Plateau (also known as Highveld and Middleveld)	195,379 50%	Basement complex, with ultramafic (Great Dyke) and doleritic intrusions.	Undulating, with kopjes and ridges.	Deep, leached granitic sands. Clays on intrusive rocks and in drainage lines.	700-1,000 20-35%	Miombo woodland, grading into Acacia-Combretum woodland and grassland.
Save-Limpopo Lowveld	78,151 20%	Mainly paragneiss. Also basalt plains, Karoo sedimentary rocks, and alluvium along large rivers.	Relatively flat, but with a band of kopje terrain along the northern margin. Some large river systems.	Varied – less leached than on Central Plateau and therefore relatively fertile. Sodic patches.	300-600 40-45%	Mopane woodland. Riverine woodland. Kopje woodland. Acacia-Combretum woodland.
Zambezi	62,521 16%	Mainly Karoo sandstones, with some metamorphosed igneous terrain, and alluvium along large rivers.	Graben trough, with a flat sedimentary floor bounded by escarpments.	Varied textures. Often fertile but sometimes sodic, and prone to erosion.	500-700 20-35%	Xerophytic. Mainly mopane woodland, with riparian woodland along rivers.
Kalahari	46,891 12%	Deep aeolian sands, Karoo sedimentary rocks, basalt intrusions.	Relatively flat with vlei lines between low sand ridges.	Mainly deep sands. Also duricrusts, and clays in pans and vleis.	500-700 30-40%	Dry teak forest on sands, mopane vegetation on Karoo rocks and basalt, Acacia woodland, vlei grassland.
Eastern Highlands	7,815 2%	Umkondo sedimentary rocks. Granites. Doleritic intrusions.	Mountains rising from dissected plateaux.	Deeply weathered, leached, acidic.	>1,000 20-30%	Patchy moist montane (high altitude) forest, lower altitude forest and woodland, grassland.

These ecoregions are described more fully in the 1998 report on "The State of Zimbabwe's Environment" (Chenje et al., 1998).

3.4.1 Central Plateau

3.4.1.1 Major biodiversity features of relevance to fast-track resettlement

As Zimbabwe's main zone of diversified agricultural potential, with a healthier and cooler environment for settlers than the lower-lying regions, the Central Plateau was the focus of agricultural development during the colonial era. This phase of initial agricultural development reduced the extent of woodland and also reduced animal species diversity, with various wildlife species being systematically eradicated because they destroyed or competed with crops and livestock, or transmitted livestock diseases. Medium-sized and small dams were extensively developed on farms.

The initial environmental shocks of commercial agriculture were significantly ameliorated through the functioning of Intensive Conservation Area (ICA) committees, acting as local watch-dogs to ensure that erosion control terraces were maintained, overstocking was avoided, and other measures were implemented to conserve soil and water resources. These measures were guided by detailed land capability planning that was undertaken for individual farms by agricultural extension staff in the 1950s, 1960s and 1970s. Destructive clearance of woodland to supply woodfuel for flue-curing of tobacco in barns was reduced during the 1980s by the use of coal in more efficient tunnel-curing facilities. Fire was used as a grazing management tool, and wild fires were controlled. This led to improved pastures and the recovery of woodlands in fire-protected sites.

By the 1990s the agricultural landscape of the Central Plateau was diversified, with a range of crops (tobacco, maize, soya beans, wheat, coffee, citrus, etc.) being produced in fields that were used under rotation, amongst grazing areas, drainage lines, kopjes and other patches of relatively natural vegetation. It became apparent that significant wildlife resources could be accommodated within this landscape, not simply for aesthetic or sentimental reasons but also because these resources could be sustainably utilized for significant financial gain. The costs of wildlife management (including some crop damage) were compensated for by earnings from live wildlife sales and safari operations. Wildlife species long extinct in some areas were reintroduced (e.g. nyala, tsessebe, eland, giraffe, impala, waterbuck and zebra), increasing biodiversity and giving better species mixes for consumptive and non-consumptive wildlife utilisation. Under the Intensive Conservation Area (ICA) system, farmers utilizing wildlife for consumptive activities were obliged to obtain ICA approval so that neighbouring property owners could regulate the utilization of wildlife within their districts.

During the 1990s, the wildlife operations that became well established on the Central Plateau ranged from intensive single-species production systems (crocodiles and ostriches) to intensive and semi-extensive multi-species production systems. A number of landowners came to appreciate that their farms were relatively small in terms of land areas required to provide sufficient habitats for viable populations of wildlife. In response to this understanding, an increasing number of mixed-farming conservancies (e.g. Ntabeni Conservancy, Mashonaland West; Musengezi Conservancy, Mvurwi; Mtepatapa Conservancy, Bindura) were constituted by progressive landowners to co-manage wildlife resources over a number of properties. This increased the network of protected habitats over a larger area, an important factor for biodiversity (specifically genetic) conservation. With the integration of wildlife farming into mixed farming operations, further jobs were created (game scouts to monitor and patrol the farms with wildlife; safari field staff such as trackers, skimmers, drivers, kitchen and lodge staff, etc.).

To an agriculturalist, the Central Plateau may appear to have significant amounts of "unutilised" or "unproductive" land, but an ecologist or wildlife producer would argue that these "unutilised" areas have indeed been productive in supplying a wide range of ecological "goods" (e.g. wildlife for live sales, ecotourism and safari hunting, woodland resources for local consumption) and "services" (notably water catchment functions). Miombo woodlands and associated habitats are fairly susceptible to overgrazing, soil loss, and nutrient depletion. The use of appropriate agricultural machinery and tillage practices, adequate investment in chemicals, certified seeds and other inputs, and careful planning of crop rotations therefore have to be ensured if agriculture is to be expanded or intensified on the Central Plateau without causing land degradation problems.

There is a strong sense in current agricultural planning that wildlife production in agro-ecological regions I, II and III somehow undermines “food security”. Yet these regions are not uniformly suitable for conventional agriculture, and provide non-competitive opportunities for wildlife production on non-arable sections of the landscape. On the arable land, wildlife production could not generate greater profits for the landowner than efficient crop production, which therefore prevailed as the primary land-use. Over a large portion of the Central Plateau, this crop production has concentrated on tobacco, which is not a food crop and therefore should be even less desirable than wildlife production in terms of “food security”. The fact that tobacco generates foreign currency is stated as the rationale for official support for tobacco farming. In contrast, foreign currency earnings from ecotourism and safari hunting on the Central Plateau (and the major potential earnings from exports of animals such as sable) have tended to be overlooked by policy-makers.

Apart from the Great Dyke, which constitutes a “centre of plant endemism” within southern Africa (van Wyk and Smith, 2001), the Central Plateau is not particularly rich in biodiversity when compared with a number of other ecoregions within southern Africa. Its main attribute in terms of the conservation of biodiversity before fast-track resettlement was not the richness of its biodiversity, but rather the sound land management system that was applied to the remaining biodiversity. In general, the commercial farmland was being well managed within a relatively sophisticated, economically productive, diversified and ecologically sustainable land-use pattern that was partly depending upon, rather than excluding, an assemblage of indigenous animals and plants. Since only a small proportion of the Central Plateau is under formal protection (i.e. being part of the National Parks estate), the maintenance of biodiversity by commercial farmers has been particularly significant to Zimbabwe’s national conservation goals. The fact that relevant land-use lessons from the past five decades (notably, concepts of integrated environmental management that fuse agricultural production with other land-use opportunities such as wildlife production, and that achieve economies of scale) are not reflected in the planning of the fast-track resettlement programme is now a fundamental threat to the biodiversity of the Central Plateau.

3.4.1.2 Impacts of fast-track resettlement on the Central Plateau

Habitats that have been partly fragmented through large-scale commercial farming are now at risk of being much more fragmented as the pressure on the land increases through unsophisticated small-scale farming and subsistence farming activities, and as general extraction of resources increases to meet the basic human needs of resettled communities.

Given that the fast-track resettlement programme on the Central Plateau is a combination of A1 (mainly subsistence farming) and A2 (small-scale commercial farming), and given also that the extent to which A2 beneficiaries are utilizing their allocated land is unclear at present, it is impossible to determine the full range and scale of environmental impacts. In many areas (but not all), the current process appears to be a superimposition of these farming systems on what was a more intensive commercial farming system. Thus the general situation is patchy cultivation within existing fields rather than a systematic process of woodland clearance to create new large fields. There is a strong possibility that the displacement of large labour forces has resulted in a decline rather than an increase in the human population density in some farming areas. However, this does not mean that the woodland and other natural habitats are escaping serious environmental impacts; fuelwood extraction (often on a commercial scale, to supply urban markets), hut building, poaching of wildlife, etc., are inevitable as the formal economy declines and as law-enforcement remains weak.

To illustrate the trend of wildlife losses on the Central Plateau during the fast-track resettlement process, information was obtained from 10 farms from a typical mixed-farming area, within Mashonaland West Province. This information was derived through the Commercial Farmers Union and was corroborated by a survey that was undertaken by the Department of National Parks and Wildlife Management in June 2002. These annual population estimates (tabulated below) will be subject to some inaccuracies because of the difficulties in enumerating wild animals that roam over a number of farms.

Annual wildlife counts on 10 farms in Mashonaland West Province

SPECIES	YEAR		
	2000	2001	2002
<i>Bushbuck</i>	188	154	81
<i>Duiker</i>	625	515	335
<i>Eland</i>	643	637	292
<i>Impala</i>	1792	2086	905
<i>Klipspringer</i>	35	40	24
<i>Kudu</i>	701	684	293
<i>Oribi</i>	142	147	110
<i>Reedbuck</i>	120	100	66
<i>Sable</i>	646	782	406
<i>Steenbok</i>	85	80	35
<i>Tsessebe</i>	51	77	69
<i>Waterbuck</i>	57	94	55
<i>Wildebeest</i>	667	702	249
<i>Zebra</i>	632	653	257

The sampled farms were: Binge, Momba, Mcherenji, Madoda, Highbury, Grand Parade, Colenso, Chisanje, Bitten and Biri. The total area covered by these farms is approximately 21,000 ha (an average of 2,100 ha per farm).

Notwithstanding the inherent inaccuracies in these annual wildlife surveys, exacerbated by the breakdown of wildlife monitoring during 2002, the data for these ten farms indicate that wildlife populations declined by at least 50% between mid 2001 and mid 2002. A similar estimate of population decline has been made for 29 farms comprising the former Ntabeni Conservancy, in the same province, and is widely suggested for other commercial farming areas within the Central Plateau. During 2003, further declines will have been inevitable since there is no evidence of ameliorating factors and the national economy has continued to deteriorate, with unemployment rising.

One of the main economic opportunities for conservancies on the Central Plateau has been the production of sable antelope. This species has been in general decline in national parks in southern Africa, apparently because of reducing rainfall exacerbated by competition from "coarse" grazers such as zebra and wildebeest, as well as excessive bush fires and elephant impacts on miombo woodlands. However, sable populations were able to expand on the Central Plateau, particularly in north-western Mashonaland, because of good protection and because a diversity of grazing opportunities arose on woodland patches, on contour ridges, firebreaks, margins of dams, improved pastures, etc. The trophy fee paid for a sable antelope by safari hunters has been around US\$ 2,000, and a significant proportion of the hunting market was comprised of foreign bow-hunters who were willing to hunt in farming areas, with very low offtakes (under 0.5% of the population) and with minimal disturbance. A survey of the status of the species in 1992 (du Toit, 1992) showed that of the national total of approximately 21,000, at least half were on private land and about 15% were on the Central Plateau; by 2001, the proportion on the Central Plateau is likely to have increased to over 25% of the national total. If recent poaching losses have removed at least 50% of the sable population of the Central Plateau, which appears feasible from the limited information that is available for 2002, then this constitutes an economic loss to the country of US\$5-8 million in terms of the live-sale and safari trophy values of this species alone.

Another antelope of concern with regard to fast-track resettlement is the tsessebe, a medium-sized grazing antelope that shows a strong preference for green grass leaf. This species reaches its highest densities on moist grasslands, particularly floodplain grasslands. In Zimbabwe, tsessebe occur mainly on the Central Plateau, particularly in areas where high levels of soil moisture prevent the establishment of shrubs and trees. During 1998, there were estimated to be ca. 4,260 tsessebe in

Zimbabwe (East, 1999), with 92.5% of these animals occurring on private land and only 7.5% occurring in protected areas such as national parks. The largest subpopulations of tsessebe occurred on three commercial ranches situated to the north-east and east of Bulawayo, with sub-populations of ca. 2000 animals on De Beers Block and ca. 800 animals on Essexvale Ranch. By the end of 2002, approximately 60% of De Beers Block had been occupied by subsistence farmers and poachers. There has been no formal wildlife survey since the land invasion, but anecdotal evidence suggests that the numbers of tsessebe and other wildlife have declined dramatically. Tsessebe on De Beers Block are now estimated to number under 600 animals, which represents a population decline of approximately 70% since 1998. On Essexvale Ranch, which is now entirely invaded by new settlers, the decline in tsessebe number is likely to have been even greater, although no figures are available. Even if this population has not yet been eliminated, it will probably not survive in the long-term.

The declines on just these two ranches represent a decrease of at least 50% in Zimbabwe's entire population of tsessebe. Meanwhile, the country's smaller sub-populations of tsessebe have also suffered as a result of the land invasions. For instance, sightings of tsessebe and other antelopes in Ngezi Recreational Park, which is managed by the Parks and Wildlife Management Authority, have declined dramatically since 1999 due to poaching pressures and illegal grazing of cattle within this protected area.

While the declines in valuable antelope species entail an obvious economic loss to Zimbabwe, there will be a range of less obvious impacts on a wide range of the wildlife species of the miombo and associated habitats of the Central Plateau, some of which will be of regional conservation significance even if they are not economically important. The bird community of the wetland and grassland habitats of the Central Plateau warrants consideration as one of the less obvious examples of inevitable biodiversity consequences arising from fast-track resettlement. Although much of the central watershed is wooded, there are extensive grasslands in the Felixburg and Somabhula areas that are integrated within a unique grassland/wetland/woodland ecosystem. This system is the catchment for Lake Mutirikwe that ultimately irrigates the sugar cane fields of the Lowveld. Felixburg/Driefontein has been listed an internationally Important Bird Area (Fishpool and Evans, 2001), highlighting the global conservation importance of these habitats. Smaller grasslands and wetlands (known as "vleis" or "dambos") form a complex network between the woodlands on the central watershed of the Zimbabwe, and are crucial for water conservation at the national scale.

Until recently the wetlands and grasslands were adequately protected by commercial farmers who fenced off the wetlands, controlled bush fires, restricted tree cutting and controlled the numbers of domestic dogs. It is inevitable that resettled farmers, operating at subsistence and small-scale production levels, will have to intensify the use of these habitats, as sources of water and grazing for their livestock and for cultivating crops. Trees will be felled (for housing, fencing and firewood) from the woodland along the interfluvies of the catchment, increasing runoff and decreasing ground water supplies. As outlined by Cizek (in prep.), the Wattled Crane, the Grass Owl, the African Marsh Harrier and the Melodious Lark are particularly vulnerable to these problems of environmental degradation.

The Wattled Crane is internationally listed as "Critically Endangered", and in Zimbabwe has the status of a Specially Protected Bird Species. There are less than 200 Wattled Cranes in Zimbabwe, most of which do not breed. These large but very shy birds have specialised habitat requirements for both feeding and breeding, selecting open wetlands. There are only approximately 50 breeding sites (i.e. for 100 birds) in the country, mostly on privately-owned farms in the Felixburg area. Wattled Cranes are very sensitive to human disturbance and readily abandon their nests. The eggs and young chicks then become vulnerable to predation, particularly from domestic dogs. Cultivation and drainage of wetlands, overgrazing, trampling of nests by livestock and late hot fires that burn nests, eggs and chicks are other factors threatening the population. The Melodious Lark is also "Critically Endangered", with less than 50 birds in the country. Whilst little is known about this species, bush encroachment caused by overgrazing is believed to be its main threat. Maintenance of suitable habitat (grassland) requires moderate to low stocking densities, no gully erosion and occasional fires. A higher frequency of bush fires will also destroy nesting sites for the Grass Owl and the African Marsh Harrier.

3.4.2 Save-Limpopo Lowveld

3.4.2.1 Major biodiversity features of relevance to fast-track resettlement

The Save-Limpopo Lowveld is the section of south-eastern Zimbabwe that lies below an altitude of 600 m above sea-level. It has an unreliable annual rainfall of 300-600 mm, which has restricted the land-uses to irrigated crop production, commercial cattle and game ranching on extensive privately-owned ranches, safari hunting on concessions on state land and in Communal Lands land, and dryland subsistence farming in the overcrowded Communal Lands; the latter form of land-use has become both unproductive and environmentally destructive under the semi-arid conditions (du Toit, 1985; Campbell *et al.*, 1989). One of Zimbabwe's largest national parks, Gonarezhou N.P. (5,050 km²), is also situated in this region but has a very low level of tourist visitation.

Characteristic woody plants are *Colophospermum mopane* and a variety of *Acacia* species. The grass component of this semi-arid savanna tends to have less lignin and a higher nutritional value and palatability for grazing stock than is the case in the moister savanna (Rutherford and Westfall, 1994), and the browse quality of woody plants is also higher than in the slower growing and more chemically defended savanna woodland communities on upland dystrophic soils (Bell, 1986). Notwithstanding the forage quality, livestock production in the semi-arid savanna is checked by the high annual variability in primary production which tracks the unreliable rainfall regime.

One of the most significant land-use developments within the Save-Limpopo Lowveld has been the formation of large conservancies. The first three Lowveld conservancies were formally established in 1991, being: Chiredzi River, approximately 800 km²; Bubiana, 1,200 km²; and Savé Valley, 3,400 km². The rationale for these conservancies (which is based on the need to create land/wildlife management units of an appropriate ecological scale in this semi-arid environment) is explained in Annex B. Black rhino conservation needs, being addressed under Zimbabwe's innovative rhino custodianship scheme, catalysed the formation of these conservancies (under this scheme, the conservancies act as guardians of the rhinos but with no ownership rights). Subsequently, the Bubyé River Conservancy (previously Liebigs Ranch, in the Mwenezi-Beitbridge area) was constituted in the mid 1990s, and other conservancies have been under consideration or are in initial stages of establishment at Mateke Hills and elsewhere in Mwenezi District.

At a regional level, liaison between Zimbabwe, South Africa and Mozambique on the formation of transfrontier conservation areas (TFCAs) was facilitated by various international NGOs and by the World Bank. From this dialogue, plans emerged for the Great Limpopo Transfrontier Conservation Area to assimilate Kruger National Park in South Africa, the newly created Limpopo National Park in Mozambique, Gonarezhou National Park in Zimbabwe, and adjoining wildlife conservancies and communal wildlife projects. The concept of a similar TFCA to link Botswana, Zimbabwe and South Africa (the Tuli-Shashe-Dongola complex) was also developed, although in less detail. Thus, at various management levels, the Save-Limpopo Lowveld is poised for major development of its wildlife industry, but with an ongoing emphasis on irrigated cropping in areas that had sufficient water sources.

The biodiversity and land-use features of this ecoregion, of relevance to fast-track resettlement within former commercial ranches, are outlined in more detail in Annex B.

3.4.2.2 Impacts of fast-track resettlement in the Save-Limpopo Lowveld

It is within the Save-Limpopo Lowveld that the current and potential impacts of the fast-track resettlement programme on wildlife are most severe. Despite policy statements to the effect that conservancies would not be resettled but would instead have to develop plans for indigenization at a business level, the Lowveld conservancies have been heavily impacted by invasions of subsistence farmers and poachers. Even Gonarezhou National Park was invaded, in a section of 11,000 ha on its northern boundary. The immediate consequence of these invasions has been an unprecedented

level of poaching, through snaring; the longer-term risks to biodiversity are the loss of connectivity between wildlife reservoirs and a reversion to inappropriate spatial scales of land management.

The immediate impact of poaching can be illustrated through poaching statistics from the largest conservancy, Save Valley Conservancy (3,400 km²). From 1 August 2001 to mid May 2003, this conservancy recorded 823 poaching incidents in which wild animals were killed, and recovered 23,253 wire snares (manufactured from the previous foot-and-mouth disease control fence that extended around the conservancy). The 2,103 animals that are known to have been poached amounted to a total value (based on South African auction prices) of over US\$0.5 million (see table below). However, these figures represent an unknown fraction (probably only a third) of the total numbers of poached animals because many have been removed clandestinely by the poachers, whose activities have reached commercial rather than subsistence poaching levels. The pressure has been concentrated on peripheral ranches, some of which have lost over 90% of their wildlife resources. Included in this peripheral loss will be some proportion of animals that would have responded to the poaching and agricultural disturbance by moving to interior portions of the conservancy. Similar severe poaching has been experienced in the other Lowveld conservancies.

The fact that approximately one-third of Save Valley Conservancy has been occupied by subsistence farmers (whose crops have largely failed due to poor rains during the recent rainy seasons) is aggravated by the fact that the geographical pattern of these settlements obstructs corridors between remaining wildlife areas. A map (see below) produced from an aerial survey of Save Valley Conservancy in September 2002 shows the distribution of huts in relation to the distribution of impala, with a clear negative spatial correlation that indicates the scale of poaching and displacement of this formerly well-distributed species. The map also shows how unplanned settlement is spreading across the middle of the conservancy to split the northern half from the southern. In addition, the intended connection between Save Valley and the Great Limpopo Transfrontier Conservation Area (TFCA) is at risk of being foreclosed because of unplanned settlement at the point of potential linkage, Mkwesine Ranch, in the south-eastern extremity of the conservancy.

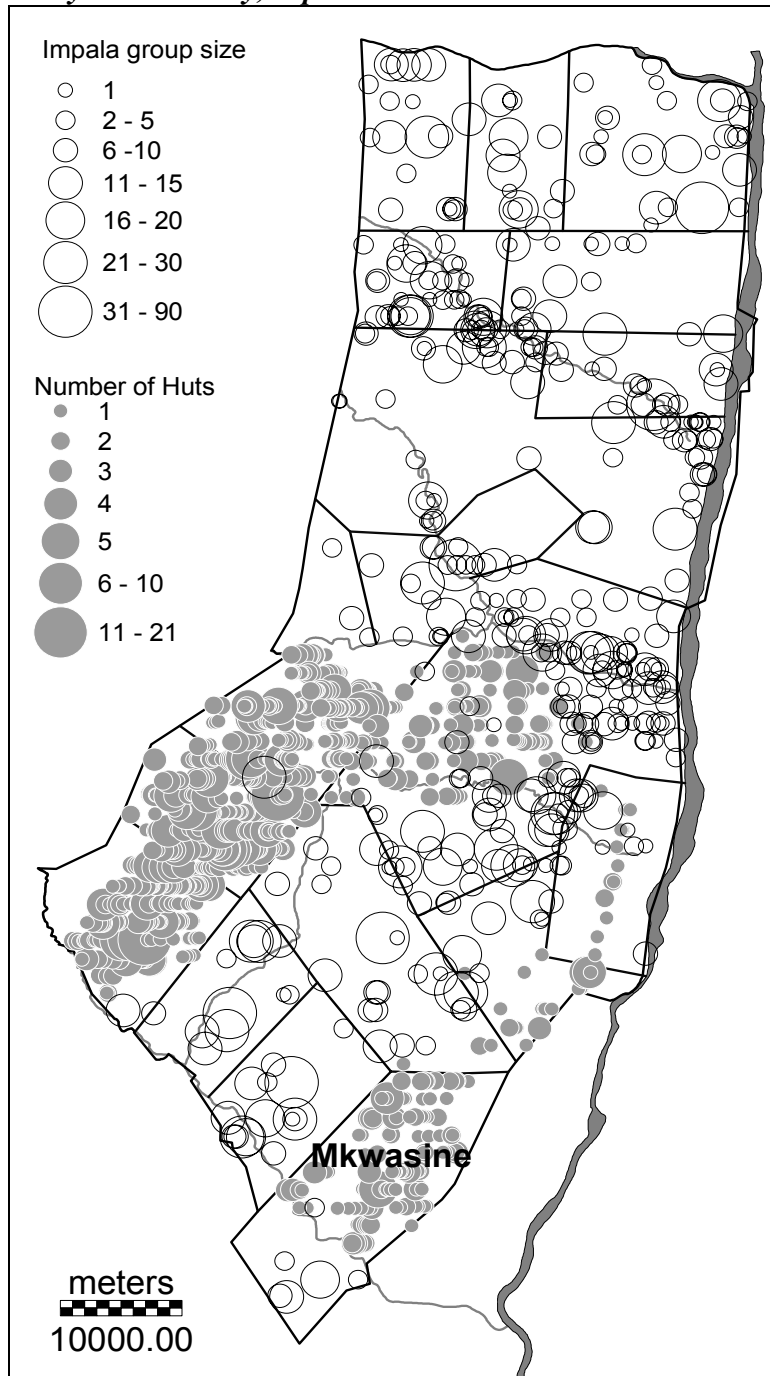
Similar problems of reduced connectivity are apparent in other invaded areas, and have seriously compromised plans for the creation of another TFCA in the Tuli-Shashe-Dongola area at the confluence of the Shashe and Limpopo Rivers, linking wildlife areas of Zimbabwe, South Africa and Botswana.

Recorded poaching losses within Save Valley Conservancy, 1 August 2001 to mid May 2003

SPECIES	NUMBERS RECORDED POACHED	MEAN AUCTION VALUE (US\$) IN SOUTH AFRICA, 2002	ECONOMIC LOSS AT AUCTION VALUES (US\$)
<i>Black Rhino</i>	1	\$40,650.03	\$40,650
<i>Buffalo</i>	3	\$3,000.00	\$9,000
<i>Bushbuck</i>	14	\$254.34	\$3,561
<i>Bushpig</i>	21	\$27.00	\$567
<i>Cheetah</i>	1	\$2,857.00	\$2,857
<i>Duiker</i>	5	\$93.15	\$466
<i>Eland</i>	102	\$1,071.63	\$109,306
<i>Elephant</i>	6	\$900.00	\$5,400
<i>Giraffe</i>	7	\$1,330.20	\$9,311
<i>Impala</i>	728	\$66.60	\$48,485
<i>Kudu</i>	401	\$214.20	\$85,894
<i>Leopard</i>	1	\$2,143.00	\$2,143
<i>Nyala</i>	3	\$759.96	\$2,280
<i>Ostrich</i>	1	\$102.60	\$103
<i>Pythons</i>	4	\$10.00	\$40
<i>Sable</i>	9	\$8,421.48	\$75,793
<i>Small Animals</i>	376	\$10.00	\$3,760
<i>Warthog</i>	236	\$79.56	\$18,776
<i>Waterbuck</i>	33	\$562.95	\$18,577
<i>Wild dog</i>	9	\$2,857.00	\$25,713
<i>Wildebeeste</i>	64	\$209.16	\$13,386
<i>Zebra</i>	78	\$410.76	\$32,039
Total	2103		\$508,108

These animal values are derived from mean South African wildlife auction prices for 2002 (Safari Club International data; combined with Absa Group Economic Research, 2002) since the collapse of the Zimbabwean live sale-market meant that no realistic values could be derived within Zimbabwe. The total value derived from these auction prices amounts to approximately half the amount that would be derived if hunting trophy values were applied. There are no auction values for wild dog hence for the purpose of this evaluation, the same value as cheetah was applied. The value of the pythons and small animals is also assumed. Added to these losses are the poached animals not detected by the Conservancy, and the loss of reproductive capacity.

Map showing distribution of recent settlement in relation to the distribution of impala antelope, Save Valley Conservancy, September 2002



The Save-Limpopo Lowveld had become a haven for black rhinos. By the end of 2003 the total number within Lowveld conservancies amounted to about 260, representing more than 50% of the national total. These rhinos have come under threat not only from non-selective snaring, but also from disturbance due to land invasions, leading to shifts in the rhinos' home ranges and consequent fighting between rhino bulls. Press reports (e.g. *The Herald*, 10 December 2001) have suggested a loss of 50-100 black rhinos due to poaching on private land during the farm invasions, mostly in the Lowveld. However, these reports are somewhat alarmist; the number confirmed to have died due to snaring or other causes related to farm invasions within Lowveld conservancies is 15, with possibly another 5-10 undetected deaths. Drug-darting of rhinos to remove wire snares, some of them creating deep wounds, has been required (with WWF support) for another 20 rhinos in Bubiana, Save Valley and Chiredzi River Conservancies; and 30 rhinos have had to be translocated, at considerable cost, from areas of snaring risk to safer areas.

Although the scale of rhino poaching to date is less than has been feared by the local and international conservation communities, the situation is critically poised for commercial poaching of rhinos to flare up. In late 2003, two black rhinos were shot by subsistence farmers who have settled in Save Valley and the horns were taken, representing an alarming step towards local commercial poaching of rhinos, and demonstrating the problems of co-existence of people with wildlife within a conservancy that is officially recognized as a rhino breeding area. The other side of this problem is that rhinos have killed at least two settlers in Bubiana Conservancy.

Judicial officers are not considering the threat to state-owned and endangered rhinos when they impose sentences on poachers who are apprehended with snares; for instance, the Gwanda Magistrates Court has typically been imposing a sentence of a few hours of community service, or only a suspended sentence, on a "subsistence" poacher despite evidence that such a poacher has set up to 45 steel wire snares of the type that could kill rhinos.

Opportunistic South African hunters operating in the Gwanda and West Nicholson areas have been implicated, through eye-witness accounts, in the shooting of a black rhino in Bubiana Conservancy in June 2003 and in the killing of at least two elephants near Gwanda, as well as hundreds of zebras, wildebeeste, antelope, etc. This problem of unscrupulous foreign-based hunters taking advantage of the lack of monitoring and confusion over hunting rights on properties that are informally settled is discussed further in the section dealing with the Gwayi-Matetsi region (Kalahari ecoregion).

Although there is widespread recognition, amongst officials and politicians involved in the land reform programme, of the ecological and economic rationale for wildlife production in place of subsistence farming in the Lowveld, the options for wildlife-based land reform remain unclear. Some District Land Committees, notably the Gwanda District Land Committee, have tended to carve up conservancies for A2 beneficiaries in accordance with the stipulated "maximum farm sizes", which are far too small (2,000 ha per unit in agro-ecological region V) to be viable for wildlife operations. These A2 units demarcated within Bubiana Conservancy, near West Nicholson, have been heavily stocked with cattle, causing wildlife species to be out-competed for grazing resources. Thus there is an urgent need for integrated land-use planning to guide land reform in the Lowveld. This planning must include consideration of realistic options ("win-win" solutions) to indigenize conservancies and other wildlife properties through shareholder arrangements in accordance with sound business principles, and must be accompanied by a clear specification by the Zimbabwean Government of the boundaries of the remaining conservancies, which at present are blurred by uncontrolled resettlement.

In view of the recurrence of low-rainfall years in the Lowveld, the fact that influxes of cattle into former wildlife ranches are depleting the grazing resources undermines the region's resilience to support wildlife populations during droughts. This problem is exacerbated by the reduced ability of the Central Plateau to act as a "fodder bank" for crisis responses to Lowveld droughts, in the form of voluntary mass shipments of baled grass, etc., as was done during the 1991/1992 drought.

3.4.3 Kalahari Ecoregion

3.4.3.1 Major biodiversity features of relevance to fast-track resettlement

The Kalahari ecoregion of north-west Matabeleland is largely composed of regularly spaced, undulating dunes interspersed by narrow drainage lines. The dune ridges are formed from deep, infertile, wind-deposited sands with a very low water-holding capacity, yet support a dense woodland, dominated by *Baikiaea plurijuga*. Most of the nutrients in the system are bound up in the woody plant biomass and the recycling of nutrients from the upper organic layer in the soil is critical to the maintenance of the system. The tree species in this system are slow growing: *B. plurijuga* takes about 300 years to reach mature size. With the exception of the core of Hwange National Park, much of the woodland has been exploited for timber: mainly *B. plurijuga*, *Pterocarpus angolensis*, and *Guibourtia coleosperma*. It is now apparent that the timber cutting cycles in the woodlands are too frequent and have led to a decline in the quality of timber produced. This is because any action that removes plant material on a large scale (e.g. large-scale felling for timber, clearing woodland for cultivation, frequent fires, extensive firewood collection) will ultimately lead to a loss of nutrients and consequently poor regeneration of the trees (Childes, 1984).

A recent study (Environmental Specialist Report, Victoria Falls Master Plan, 2001) of the typical subsistence farming system near Victoria Falls showed that after clearing the land of all but the most resistant and sturdy tree stumps, the branches and trash are usually burnt (releasing valuable nutrients into the atmosphere). Crops such as maize, sorghum and millet are planted and, if the rains are favourable, a crop is harvested. The extremely limited nutrient reserves in the soil are taken up in this first crop, and from then onwards crop yields decline sharply. This necessitates the clearing of more woodland for cultivation. The absence of nutrients, combined with the dryness of the exposed soil in the abandoned fields, makes regeneration of all but the hardiest woody plants very difficult. Whilst there is some immediate short-term gain from the sale of carvings from felled trees, firewood, and the reaping of a first crop, in the long-term this form of agriculture is not sustainable in this ecosystem.

The drainage lines at the bases of the sand ridges support hydromorphic grassland on grey, sandy clay soils. The grasses are perennial and heavily grazed, particularly during the dry season when the higher moisture content of the soils (relative to the sands of the ridges), means the grass remains greener. The soils are high in sulphates and salts, attracting wild and domestic animals that scrape and dig up soil to eat, creating hollows that accumulate rainwater and ultimately form mud wallows and pans. The pans hold water for a few months into the dry season, forming foci for animals, with associated hoof pressure. Fire is obviously an important factor in these grasslands, but too-frequent fires, coupled with the increased grazing pressure from animals attracted to the "green bite", has led to nick-point and gully erosion: for example in Chamabonda, Likunkuni and Dibudibu vleis near Victoria Falls. As a vlei dries out, *Terminalia sericea* and *Dichrostachys cinerea* scrub vegetation encroaches, reducing the available grazing area. These drainage lines form part of the catchments of the Matetsi and Gwayi rivers. Any overgrazing pressure resulting from resettlement will constitute a serious environmental impact on this fragile system.

The dystrophic nature of the soils, coupled with the hot climate and erratic low rainfall, makes this area unsuitable for cropping and intensive livestock production. Wildlife-based industries (hunting and photographic tourism) and forestry are clearly the most ecologically sustainable and therefore economically sustainable forms of land use. Accordingly, in both the Matetsi and Gwayi areas, wildlife production became the primary land-use of most farmers and cattle production was virtually abandoned. Fences were removed to allow free movement of wildlife. Water supplies, camps and roads were developed to cater for the safari industry (involving both hunting and photographic safaris, and aimed primarily at foreign markets).

3.4.3.2 Impacts of fast-track resettlement in the Kalahari Ecoregion

Within the Matetsi and Gwayi areas, virtually all properties have been taken over for re-allocation. On a number of these farms, particularly those adjoining communal lands, uncontrolled clearing and burning is being undertaken and significant numbers of livestock have been brought in. With this change from wildlife-based land-use, and with ongoing poaching, wildlife populations have been drastically reduced (crude but credible estimates suggest declines in wildlife numbers of 90% or more on several properties). On the properties that have remained allocated to wildlife operations, new entrants to the safari hunting industry have rapidly expanded their operations, sometimes in alliances with South African or other foreign operators.

This situation is very controversial and has given rise to adverse international publicity, with reports of over-hunting, improper allocations of hunting quotas, illegal hunting by non-registered operators, slaughter of animals for meat sales, etc. These reports prompted the Parks and Wildlife Management Authority to impose a hunting ban in the Gwayi area in October 2003, but compliance with this ban remains dubious and certainly does not extend to the slaughter of wildlife for bushmeat markets. Ongoing negative reports on the hunting operations in this region risk the imposition by the United States Government of a ban on trophy imports from Zimbabwe, in terms of the US Endangered Species Act, which would have a devastating impact on Zimbabwe's safari hunting industry.

The friction within Zimbabwe's hunting industry arising from foreign-based (mainly South African) commercial hunters taking advantage of confusion over Appropriate Authority and access to wildlife extends from the Gwayi and Matetsi areas to southern Matabeleland. These operators allegedly bribe land occupiers and other individuals who have some role in allocating hunting opportunities. There are two levels to these exploitative hunting operations:

- a.) safari hunts with fee-paying clients (these are the most controversial, because they are often undertaken in concert with emergent Zimbabwean hunting companies on properties that are in the process of compulsory acquisition, where friction and sometimes legal action develops between these new companies and the established operators and/or previous landholders);
- b.) cropping hunts undertaken to acquire meat and hides. The volume of illegal exports of commercially-valuable hides, notably those of zebras, and biltong across the Limpopo River is alleged to be considerable. South African authorities commenced investigations into these activities after a black rhino was shot, reportedly by a South African hunter, in Bubiana Conservancy in mid 2003.

A particular conservation attribute of the Hwange-Matetsi wildlife complex has been the buffering effect that was created by the commercial game ranches that adjoined Safari Areas and Forest Areas, reducing the human-wildlife conflict between Hwange National Park and the Hwange and Lupane Communal Lands. The land allocation plans for many of the acquired properties remain unclear at present. Where invading subsistence farmers are permanently allocated land, the buffering effect will be lost and the National Park will create greater problems for its neighbours (through the outward movement of wildlife) and will in turn be impacted through increased poaching. A combination of this proximity of human populations, economic hardships, and reduced law-enforcement is a serious threat to the northern section of Hwange National Park. The loss during 2003 of approximately 25 rhinos in the Sinamatella area of the park has been ascribed to Zambian poaching gangs but these cross-border forays into the park could easily ignite local commercial poaching in this volatile situation.

Another endangered species, vulnerable to current human pressures in the Kalahari ecoregion, is the endangered wild dog (also known as the painted hunting dog or African hunting dog). The area of north-west Matabeleland extending from the Victoria Falls south-eastwards to Umgusa and Nyamandhlovu is a crucial range for this highly mobile species; packs on the periphery of Hwange National Park also utilise adjacent Forestry Areas and commercial farm and ranch land. The dogs move their territories (of 600 – 800 km²) on a regular basis. The territories of the peripheral packs “drift” and often become centred outside the park. If a pack is then eliminated from a preferred habitat adjacent to the Park, the next adjacent pack will leave the sanctuary of the Park to take up

part of the home range, only to suffer the same fate as the previous pack. This “vacuum effect” (G. Rasmussen, pers. comm.) leads to high turnover of packs and an unstable population. Snaring and other human-induced causes of mortality increase the risk that a pack will be reduced below the critical size of six dogs and there will be no recruitment. Since 2000, about ten packs have been lost due to these effects in the areas outside the Hwange National Park (G. Rasmussen, pers. comm.) and thus the “vacuum effect” combined with greater poaching pressures outside the park is clearly a serious threat to the population of dogs within this region of Zimbabwe, which has until now been one of the key refuges for the species.

One positive feature of the declining tourism industry that is likely to have become apparent (but has not yet been researched) is a reduction in the harvesting of slow-growing hardwood trees to carve curios, which were sold in very large quantities in the Victoria Falls area. This positive effect is diluted by the increase in firewood sales, with bundles of wood being displayed along the road verges between Bulawayo and Victoria Falls.

3.4.4 Eastern Highlands

3.4.4.1 Major biodiversity features of relevance to fast-track resettlement

The Eastern Highlands form a chain that extends for some 250 km along the international border between Zimbabwe and Mozambique. The highlands are characterised by dramatic climatic variation, which results from the diverse topography; generally, there is a gradation from the upland areas that are cooler and moister, down to the warmer, drier, lowland regions. Suitability for agriculture is largely determined by soil depth, which relates directly to the topography. Much of the area is covered by highly leached sandy lithosols, with only occasional pockets of deeper soils. The deeper soils show good structural properties, being strongly permeable and also stable. However, these favourable properties are counterbalanced by poor chemical characteristics, particularly conditions of high acidity, extreme chemical inertness, and infertility. Livestock carrying capacity is low and cropping is specialised: deciduous fruit, flowers, potatoes.

The great variation in climate and topography has led to the development of high altitude grasslands and moist forest communities, forming part of an Afrotropical floral community that occurs patchily along the discontinuous belt of highlands, extending from the Drakensberg into East Africa. From a conservation perspective, the grasslands are particularly important in that they contain a number of herb and shrub species of restricted and localised distributions, some of which are endemic to Zimbabwe. The Chimanimani Mountains have a high level of endemic species (van Wyk and Smith, 2001). Vast areas of the montane grasslands have been transformed into pine and wattle plantations, reducing the grassland habitats to isolated fragments and making their conservation even more important. Most of the moist evergreen forests of the lowlands and lower mountain slopes have been cleared for commercial tea and coffee plantations, and for subsistence agriculture, e.g. in Honde Valley. The few isolated patches of this forest type that remain, and even those in nominally protected areas (e.g. Rusitu, Haroni), are threatened by clearance. Whilst the local people have tended to regard the forests as sacred and have therefore protected them, new immigrants from outside areas have little respect for these beliefs.

3.4.4.2 Impacts of fast-track resettlement in the Eastern Highlands

The higher altitude habitats are at little risk of impacts from the resettlement programme, especially where quartzitic soils give rise to unfertile, shallow, sandy soils with no cropping potential (such as in the Chimanimani Mountains). However, medium- and low-altitude forest patches are at significant risk of slash-and-burn clearance. Sites of recent clearance are particularly evident in Rusitu Valley and on the north-western side of Honde Valley. In the lower Chimanimani area, clearance of forest patches is taking place not only on privately-owned forestry estates and farms along the Chisengu River but also on land within the Rusitu Valley that is managed by the Agricultural Development

Authority, and is therefore not designated for resettlement. The traditional leader in this area, Chief Ngorima, has voiced his concern over the destruction of sacred forest sites but the land invaders show a lack of respect for traditional and legal controls on land occupation; this can presumably be ascribed to a “free-for-all” attitude that has arisen during the process of farm invasions. A similar problem is evident in the Nyanga mountains, between the Nyanga National Park and Honde Valley. Patches of mature lowland forest have been felled, together with less valuable regrowth forest (dominated by *Newtonia buchananii* with 20 m canopy height), along the Chitema and Nyamingura rivers, and along a road extending northwards through the Eastern Highlands Tea Estates, parallel to the Nyamkombe River (T. Muller, pers. comm.).

Although these patches of forest destruction are relatively small, and although the problem does not arise directly from resettlement that has been authorized by District Land Committees, attention must be drawn to the issue because the total remaining extent of these forest habitats is very limited. The remaining forest patches are refuges for a variety of rare wildlife species, for instance Swynnerton’s Robin, which is listed as Globally Vulnerable because of its very small, declining area of occupancy. Besides the isolated population of these birds on Mount Gorongosa, Mozambique, the nominate race is restricted to medium-altitude forest at Chirinda, Bvumba, and Stapleford and was recently discovered in similar forest on private land in the Honde Valley (Jana, 2002).

3.4.5 Zambezi Ecoregion

3.4.5.1 Major biodiversity features of relevance to fast-track resettlement

The Zambezi Region, incorporating the low-lying terrain along the northern margin of Zimbabwe, might not warrant consideration in as much detail as the other ecoregions because it does not include significant areas of commercial farming land and therefore is not impacted directly by fast-track resettlement. However, some issues relating to community-based wildlife projects are highlighted in this region.

The ecoregion includes a complex of National Parks and Safari Areas. Adjacent to these wildlife reservoirs, sections of Communal Lands have relatively high densities of wildlife that on the one hand can be destructive to crops and livestock but on the other hand constitute a valuable resource base for community wildlife (CAMPFIRE) projects. A delicate balance exists between various socio-economic factors that influence the extent to which biodiversity is conserved under a community-based resource management system (see Annex D). Indirect impacts of the fast-track resettlement programme can easily tip the balance away from sustainable wildlife use in some communal areas, and thereby adversely impact the ecoregion’s biodiversity. Staffing levels in state-protected areas are insufficient to withstand determined poaching of commercially valuable species such as rhinoceros and elephant, should this “worst case” scenario arise through a breakdown of law-and-order and through economic hardships that drive people into illegal occupations.

3.4.5.2 Impacts of fast-track resettlement in the Zambezi Ecoregion

The following comments have been made by the Zambezi Society as a contribution to this review.

“Our perception is that the Zambezi ecoregion has been relatively lightly impacted by the fast-track resettlement programme. Compared with areas such as the south-east Lowveld, relatively little land has historically been devoted to formalised conservancies. We are, however, aware of several commercial farms within which introduced wildlife populations have either been abandoned, or translocated elsewhere in advance of resettlement. To the best of our knowledge, most of the species concerned are relatively abundant elsewhere, and we are therefore unaware of significant impacts on vulnerable or endangered species”.

“Broadly similar observations apply to the protected areas. There has always been some ‘background noise’ in this respect, either of subsistence poaching often confined to the area immediately adjacent to communal land, and of commercial ivory poaching deeper within protected areas such as the Matusadona National Park or the Middle Zambezi Valley wildlife complex. There may have been some localised increases in these activities but, as far as we are aware, they are not significant in terms of overall populations. These occurrences could be attributable as much to economic circumstances as to fast-track resettlement”.

“The major exception to this is the poaching during 2002 of two black rhinoceros in the Matusadona National Park. Again, though, the root cause is impossible to determine, largely because the reasons for the abrupt cessation of rhinoceros poaching during the 1990s have never been clearly identified. So far as we are aware, the market forces involved in the rhinoceros horn trade are materially unchanged; and, at the risk of repetition, the Zambezi Society considers populations of rhinoceros species to be highly vulnerable, regardless of the land reform programme”.

“Safari hunting operators in some communal land areas report similar increases in poaching activity. However, similar observations apply”.

“The major impact of the fast-track resettlement programme has been on levels of tourism, both within and outside the protected areas, due to perceptions resulting from media coverage that has at times been grossly exaggerated in several respects including the countrywide loss of wildlife. This has in turn impacted on the management authorities involved, including the Parks and Wild Life Management Authority and Rural District Councils. In both cases, this loss of income is resulting in decreasing capacity to manage wildlife and habitats, and therefore increasing vulnerability to illegal hunting and other activities”.

“The longer-term impacts on tourism are more difficult to assess. It seems valid to conclude that the impact of land reform and the consequent loss of both wildlife and tourism facilities on private land will lead to a net loss in tourism income at national scales. However, one might at least conjecture that a reduction in competition from private land operators may ultimately benefit ecotourism, and therefore the management of wildlife and habitats, within State-protected areas and communal lands”

“Unfortunately, the fast-track land reform programme appears to have ignored the opportunity it presented for the relocation of human populations settled in biologically sensitive areas. So far as we are aware, there has been no co-ordinated resettlement of such populations in the course of the land reform programme. Though not an impact as such, this may be worth noting as a related issue”.

“We are unable to offer useful insights into future management practices. The implementation of CAMPFIRE-style management schemes has been suggested, and may prove practical. However, it is a truism that such schemes often require a rapid demonstration of their benefits to participants, and this may be extremely difficult to achieve under present circumstances and market conditions”.

“This is not to say that the search for effective management strategies should not be vigorously pursued. However, the Society also believes that recent events serve to highlight the crucial importance of a well-managed and financed State system of protected areas. Such areas have more than purely local value: they are of global biological and aesthetic importance. The present scenario, in which a high level of threat is accompanied by donor withdrawals, is a matter of grave concern”.

The above suggestion that the weakening of established wildlife operations on private land may be advantageous for similar operations within the Zambezi Region, due to reduced competition for

clients, is questionable. In fact, Zimbabwe's biggest challenge in developing its ecotourism industry is to build "critical mass", i.e. to develop more tourist niches throughout the country, in order to expand tourism services such as airlines and to become more familiar to international travel agents as a major, diversified destination for their clients. Thus the operations on private land, which have been very adversely impacted by fast-track resettlement were complementing, rather than confounding, the long-term development of similar operations within the wildlife complexes of the Zambezi Region. For safari hunting, the "plains game" quotas on private land were often combined with "big game" quotas in the Zambezi Region, so that hunting clients were sold package hunts that covered both sectors. Because CAMPFIRE projects in many areas demonstrate marginal socio-economic viability in the face of competing land-uses (e.g. cotton production) that generate greater financial returns to individual households (at least in the short-term), a slump in CAMPFIRE income can soon become irreversible as the wildlife is marginalized.

This process of land-use conversion and exclusion of wildlife is of course accelerated when the human populations of CAMPFIRE areas increase through in-migration; previously undisturbed waterpoints, alluvial habitats and other key wildlife resources become the foci for new settlements. The early loss of these key resources, in semi-arid landscapes, means that the inverse relationship between human population densities and wildlife densities is not a simple linear one. In the lower Guruve and Muzarabani areas of the Zambezi Valley, large mammals such as elephants found corridors of low human population density, within the Dande Communal Land. This enabled north-south movements of elephants from Mavuradonha Wilderness Area to community wildlife areas that have been created in Mozambique, between Zimbabwe and Lake Cabora Bassa. During 2001-2003, some important corridors were disrupted due to a significant influx of farm workers and their families, who have been displaced from farms in northern Mashonaland (Centenary, Guruve, Mvurwi, etc.).

A further shift in the delicate balance that maintains community-based wildlife projects can be anticipated through a reduction in the CAMPFIRE earnings that go to the wards that generate these earnings. This is to be expected not only because of the current decline in ecotourism and (to a far lesser extent) in safari hunting, but also because Rural District Councils are likely to retain a greater proportion of these earnings. The greater retention of CAMPFIRE earnings by the councils arises from the fact that the councils are likely to want to use these earnings, over which they have primary control, to compensate for rates that were paid to them by commercial farmers (which have diminished, at least in the short-term while the allocation of farms remains unsettled).

Whereas the Zambezi Society suggests (above) that recent increases in poaching are localised and do not constitute major reductions of wildlife populations when viewed at a broader geographical scale, reliable reports indicate that the general trend of poaching offtakes increased significantly since 2000 in National Parks such as Chizarira and Matusadona, and in Safari Areas such as Chirisa and Doma. The diverse causes of this trend include crop failures within Communal Lands during the prevailing droughts, increases in the prices of basic food commodities and agricultural inputs, declining expenditure on anti-poaching, and lapses in general law-and-order and community cohesion in rural areas (especially in politically volatile areas, such as Gokwe District within the Zambezi Region). As immediate consequences of fast-track resettlement, declining employment on farms and reduced crop production from these farms (leading to general food shortages) are undoubtedly combining with these other factors to stimulate poaching. If the rural development objectives of the fast-track resettlement programme are attained in due course, then some of these negative influences should be reversed, but in the meanwhile biodiversity losses will be severe and, in some areas, irreversible.

3.5 IMPACTS ON SOIL RESOURCES

The ongoing and very serious national problem of soil erosion has been outlined in the 1998 review of the State of Zimbabwe's Environment (Chenje *et al.*, 1998). Considering the additional impacts of fast-track resettlement, the first point to note is that a direct correlation has been shown between human population density and soil erosion in Zimbabwe's Communal Lands (Whitlow, 1988), hence

the intention of spreading Zimbabwe's population more uniformly will inevitably increase erosion in commercial farming areas. Any "decongestion" of Communal Lands will not have a long-term impact in reducing population densities in these areas below the threshold level for significant ongoing erosion, with unchanged agricultural practices. A second major point (correlated with the first) is that on a per hectare basis, a national survey (Whitlow and Campbell, 1989) found signs of significant erosion five times more frequently in peasant farming areas than in commercial farming areas. This is partly because some of the most densely populated Communal Lands are located in areas of low, unreliable rainfall and extensive rock outcrops (increasing the inherent erosion risk), but nonetheless the land tenure pattern had a statistically significant influence on the level of erosion in all the agro-ecological regions.

To date, the pattern of resettlement is largely one of subsistence farming being superimposed over what was a commercial farming landscape; farming by A2 small-scale commercial farmers is still of limited extent compared to previous production levels on the land that they have been allocated. In the main crop-producing areas (Central Plateau), the fact that the new settlers' croplands are patchy and are often superimposed on what were larger fields with existing erosion-control contours means that soil loss is considerably less than it is in areas where virgin woodlands and grasslands are being cleared. However, low availability of inputs (fertilizer and certified seed) means that not all the ploughed areas have had crops planted in them during the growing seasons, and where crops are in place they are often of poor quality. These factors, combined with poor rains, lead to reduced plant cover, therefore greater rainsplash and reduced root-binding of the surface layer of the soil, giving rise in turn to greater runoff and erosion.

In what were areas of extensive cattle or wildlife production, notably the Save-Limpopo Lowveld, there are few existing large fields for subsistence farming to be superimposed upon. Instead, woodlands are being extensively cleared, with devastating consequences for soil resources. The soils under mopani (*Colophospermum mopane*) woodlands are particularly prone to gully erosion because of their inherent physical and chemical properties. The poor crop cover achieved in these low-rainfall areas aggravates the erodibility of the soil. No land husbandry measures are evident in these areas to ameliorate these problems; indeed, the compulsory construction of erosion-control terraces was regarded as a form of colonial oppression within Communal Lands during Zimbabwe's pre-independence era and is therefore not promoted during the current "land revolution". This lack of terraces, combined with the fact that soil loss is particularly high in any agricultural system during the early phase of land clearance, means that it is not possible to extrapolate rates of soil loss from previous studies that were undertaken in Communal Lands in order to quantify the problem within areas under fast-track resettlement. All that can be said is that the rates of soil loss are undoubtedly at a level that is already seriously compromising the development potential of newly resettled areas, particularly in agro-ecological regions IV and V. Siltation of irrigation reservoirs, which are of strategic economic importance to Zimbabwe, will be an increasing problem.

3.6 WILDLIFE DISEASE IMPLICATIONS

3.6.1 Summary of diseases of major importance at the wildlife/livestock interface

Diseases posing a serious risk at the wildlife / livestock interface in Zimbabwe are as follows.

Endemic diseases that have a major economic implications for livestock production:

- Foot-and-mouth disease (FMD);
- African swine fever (ASF);
- Theileriosis;
- Tsetse fly and Trypanosomiasis;
- Anthrax (this can cause mortality in both livestock and wildlife);
- Malignant catarrhal fever (MCF).

Alien diseases that can be introduced to wildlife:

- Bovine Tuberculosis (BTB);
- Rabies;
- Newcastle disease (ND);
- Brucellosis or Contagious Abortion (CA).

These diseases, and influences of fast-track resettlement on their occurrence, are elaborated below.

3.6.2 Foot-and-mouth disease (FMD)

FMD is caused by a number of different viruses worldwide. In southern Africa three distinct types of virus are present (SAT 1, 2 and 3). Within these three types, numerous sub-types exist, which bear a varying relationship to other sub-types within each type, to the extent that vaccine which is effective against one subtype may not work against another.

The viruses are completely adapted to the African buffalo, and most wild populations of these animals are carrying all three FMD virus types. The virus has no effect on buffalo, but from time to time the virus circulates actively in buffalo herds, especially in young animals that are losing their maternal immunity to the disease; much like childhood diseases circulate in humans. When this occurs, antelope (especially kudu and impala), as well as cattle that are closely associated with the buffalo, can become infected. In these animals the disease is more severe causing lameness, loss of appetite and general loss of condition. In some outbreaks, mortality in kudu and bovine calves can be quite high. However the main implications of the disease are the cessation of exports of live animal and fresh animal products (meat, milk etc), since no country will allow imports from areas of a country where FMD infection is active.

In the early 1980s, Zimbabwe was permitted to commence the export of beef to the lucrative European Union market, despite the fact that there are infected, wild buffalo in the country. This is because stringent controls were put in place. These controls relied on cordon fences to prevent any association between buffalo and cattle and the vaccination of cattle in areas adjacent to Wildlife Zones (i.e. the Vaccination Zone). Outside this zone was another Buffer Zone where cattle movement was restricted.

These measures generally operated successfully in controlling the disease and between 1990 and 2000 there were only six outbreaks of FMD, all but two of which were in the vaccinated zone, where outbreaks of the disease are not unexpected. All these outbreaks were rapidly brought under control by vaccination of cattle at risk and the imposition of strict control of cattle movement.

In recognition of the economic importance of buffalo, FMD-free herds of buffalo were established from 1975 in areas well removed from wild, FMD-infected buffalo. The initial stock was derived from calves that were removed from their mothers before becoming infected, and Zimbabwe pioneered this technique. By 2000, some 32 commercial farms had received permits from the Department of Veterinary Services (DVS) to hold such buffalo. Conditions for keeping these animals included the restriction that they must not be kept in areas used by cattle and that they either be herded by day and kraaled at night, or that they be maintained behind a double fence. Relatively few farmers chose the latter restriction. Some of the FMD-free buffalo herds have come under threat from the land crisis and at least six of the farms have had to dispose of their animals to other areas, in some cases leaving a few behind which are no longer maintained according to the veterinary conditions.

If FMD-free buffalo are exposed to the disease, they become infected and are likely to remain long-term carriers of the virus. This has happened to one herd close to the initial August 2001 outbreak of FMD and all the animals had to be captured and returned to an FMD-infected area. The financial cost of this exercise was considerable. The status of all the remaining FMD-free herds after the land crisis is resolved will have to be ascertained when resources become available.

There are approximately 1,000 km of game (buffalo-proof) fence and a further 3,000 km of cattle fence, which are under the control of, and maintained by, the DVS. These are cordon fences erected mainly for the control of FMD. The Annual Report of the Department of Veterinary Services for 2000 reported the following:

“Vandalism and theft of fences remain a big problem in Mashonaland West and Masvingo provinces. All cases were reported to the police but few arrests were made. Effective maintenance of cordon fences was to a large extent affected by shortage of vehicles, fuel and casual manpower. Farm invasions by communal farmers onto commercial farms where people move with their animals across cordon fences have resulted in extensive fence damage particularly in Masvingo province. It has been very difficult in most instances to conduct patrols, effect fence repairs and control animal movements in these areas as some groups were very hostile and unpredictable.”

This situation has now deteriorated further and at least half of the game fence is now in a very poor state, allowing FMD-infected buffalo and cattle to come into close contact, while much of the official cattle fence line is ignored as a control of cattle movement.

In 1999 there were seven major wildlife conservancies in Zimbabwe. By the end of 2003, one of them had virtually ceased to exist (Gwayi Valley) and three were under considerable threat from the land crisis (Save Valley, Chiredzi River and Bubiana). Four of the original conservancies had received permission to hold FMD-infected buffalo, as one of the most important species in terms of economic return. The conditions under which the buffalo could be held were set by the DVS, and included the erection of game-proof, double fences around those areas of the conservancies in which the buffalo were held, and that were not already bounded by an FMD-infected wildlife zone. In addition, no cattle were permitted within the fenced area. Generally, these fences were maintained and monitored by each conservancy rather than by the DVS. The risk of keeping FMD-infected buffalo behind game fences, but adjacent to cattle, was assessed by independent experts, for the EU, and adjudged to be acceptably low. However, this evaluation was totally dependent on the maintenance of the integrity of the fences to keep separated cattle and buffalo, as well as species of antelope that could temporarily carry FMD-virus.

The fence around the Save Valley Conservancy has been of particular concern, and prior to the year 2000 this was generally in a good state of repair, though improvements were being undertaken to increase the fence's capacity to stop the movement of antelope, as well as buffalo. At present, at least 80 km of the fencing on the 350 km perimeter of the conservancy is totally destroyed (along the boundaries of six of the 21 properties that border on the edge of the conservancy) while along the border of another three properties the fence is very poorly maintained and porous. An aerial survey conducted in September 2002 proved that there were some 3,000 head of cattle in the conservancy that could, illegally, be moved in and out at will.

With the loss of control on cattle movements and the destruction of FMD fences, it came as no surprise to the veterinary authorities that in August 2001, infection was detected in cattle in the FMD-free beef export zone. Subsequent to this there have been numerous other foci of infection and the disease has become widespread in Zimbabwe as a result of illegal movement of cattle and shortage of vaccine. Most of these recent outbreaks have been outside the previous traditional cattle vaccination zone. In addition, the disease spread to neighbouring areas of Botswana and Mozambique. Exports of beef to most importing countries have ceased as a result, although exports of pork emanating from high-security production facilities have continued. However, these exports will also be threatened if the disease spreads much more widely in Zimbabwe.

3.6.3 African swine fever (ASF)

ASF is another endemic African disease caused by a virus. It is fatal to domestic pigs. The source of the virus is ticks that feed on warthogs which then become infected and can carry the virus for some time, but never show any signs of the disease. Bushpigs can also play the same role but are rarely

exposed to the virus. Domestic pigs become infected either by being bitten by infected ticks or by contact with infected pigs or carcass material, including warthogs.

Commercial pig producers who slaughter their animals through an export abattoir must have fences and other bio-security measures around their premises to prevent the introduction of ASF virus.

Associated with the increase in the wildlife production on commercial farms in the 1980s and 1990s, warthogs also became more widespread. Generally this expanded population was ASF-free, though areas of endemic infection in warthogs remained. In Communal Lands, pigs are usually allowed to free-range and are not pen-fed. This population of pigs would be expected to be at considerable risk from ASF infection. However, warthogs are usually rare or absent in these areas. With changes in land occupancy it is possible that there may be increased possibilities for contact between free-ranging, domestic pigs and infected warthog ticks or infected material in areas where ASF remained endemic.

The last outbreak of ASF in Zimbabwe occurred in 1992 and involved only six pigs. Any new outbreak would probably result in a cessation of exports of pork products from this country.

3.6.4 Theileriosis

This is a disease of cattle caused by protozoan blood parasites which are transmitted by two species of brown ear-tick. There are two forms of the disease in cattle in Zimbabwe. The first is called January disease; this occurs in highveld areas in the absence of buffalo and has relatively low mortality; the other is corridor disease which is dependent on the presence of buffalo (including FMD-free buffalo) as source of infection for ticks and has nearly 100% mortality. A third form of theileriosis, east coast fever, exists in countries north of Zimbabwe. It is also transmitted in the absence of buffalo and has mortality similar to corridor disease. East coast fever was eliminated from the country in 1955.

Zimbabwe has lived with its two forms of theileriosis for many years. However, since the separation of cattle and buffalo by fences as part of the FMD control measures implemented for export of beef to the EU, there have been few outbreaks of corridor disease. Where FMD-free buffalo have been moved because of changes in land occupancy, ticks infected with corridor disease parasites have remained. Cattle are now being exposed to these ticks and are developing disease.

This problem is in addition to any increase in incidence of January disease that has resulted from reduced dipping of cattle for ticks in resettled areas, or elsewhere, as a result of economic constraints.

3.6.5 Anthrax

This disease is caused by the anthrax bacillus which is highly resistant in the environment in its spore form. It fatally affects all mammals but in Zimbabwe, cattle make up most of the victims. Humans become infected from handling infected meat. In South Africa and Namibia, some wildlife areas are endemic for anthrax, and periodic outbreaks occur under conditions of drought and other environmental factors. This endemic wildlife form has never been recognized in Zimbabwe for reasons that are not clearly understood because it occurs in areas of Kruger National Park very close to Gonarezhou National Park in Zimbabwe. Control measures in wildlife areas include the burning of anthrax-infected carcasses.

Zimbabwe experienced a massive pandemic of anthrax in cattle in Communal Lands during the war of independence in the late 1970s. This was subsequently brought under control by annual vaccination of cattle undertaken by the DVS. In the past four years, there has been an increasing incidence of anthrax in Communal Lands. It is possible that this could result in endemic anthrax in wildlife areas where any control measures would be difficult to implement.

3.6.6 Tsetse fly and trypanosomiasis

More than half of Zimbabwe's land area, being frost-free, is suitable for the survival of tsetse flies, which carry the disease trypanosomiasis, caused by a protozoan parasite in the blood. If untreated, this disease is fatal for cattle. Antelope and other wildlife species that can carry the parasite are generally resistant to the disease. An important exception appears to be white rhinos which have had no previous exposure to trypanosomes and which can die from the infection.

For two decades, Zimbabwe had an active, but expensive, donor-supported programme of surveillance and control of tsetse fly. Over the years the country has developed innovative measures for control that have much less environmental impact than widespread application of chemicals. One of these is the use of insecticide-treated "targets" which, when placed in at a density of about one per square kilometre in the bush, form a barrier against the spread of tsetse fly out of the limited, mostly wildlife, areas to which it has now been confined. This control programme has suffered in the last four years from under-funding, and tsetse fly numbers have increased on the borders of the fly-free regions.

Tsetse flies have been spreading from Mozambique into the east of the Zimbabwe, in Gonarezhou National Park, albeit in low numbers to date. The species was eradicated from south-eastern Zimbabwe in the 1960's. There are presently no tsetse targets in this area and at this time there is little to prevent the spread of fly further westwards into areas of cattle production. There are two additional concerns. Gonarezhou National Park makes up Zimbabwe's component of the Great Limpopo Transfrontier Park (GLTP). Any uncontrolled movement of fly could spread into Kruger and Limpopo National Parks, in South Africa and Mozambique respectively. This is likely to be unpopular with tourists and would thus reduce tourism in all of the Parks. Also, there is a very large white rhino population in Kruger National Park with a smaller one in Malilangwe Conservancy bordering on Gonarezhou National Park in Zimbabwe. These populations are likely to be threatened by trypanosomiasis, and the outcome of this potentially new exposure to tsetse fly is uncertain.

3.6.7 Malignant catarrhal fever

This is a viral disease of cattle that is derived from wildebeest. It can only be transmitted through direct contact between the species when wildebeest calves, which show no signs of illness, are under three months old. It does not spread between cattle; once infected, they invariably die. There may be increased risk of contact between wildebeest and cattle belonging to new, un-informed land occupants. However, compared to the risks posed by other endemic wildlife diseases, this is unlikely to create a major threat.

3.6.8 Bovine tuberculosis (BTB)

BTB is a bacterial disease introduced into southern Africa by livestock. It usually presents as an erosive disease of cattle and is most important in the dairy industry. Other species of livestock can be also be infected by the bacteria which can spread to humans who eat contaminated meat or drink milk from infected dairy cows. Immuno-suppressed humans are particularly susceptible, especially if infected by HIV/Aids. Human TB is presently a very serious problem in Zimbabwe.

BTB has not been recorded in Zimbabwe in the past four years, despite thousands of meat inspections of carcasses at abattoirs all over the country. Since the 1960s the prevalence of the disease had been low, following a vigorous test-and-slaughter campaign conducted by the DVS over decades.

BTB can also be a serious problem in wildlife; control measures are almost impossible to implement successfully in wildlife. The disease was introduced into the south of Kruger National Park around 1960 when cattle were allowed to mix with buffalo. However it was only recognized to be a serious

problem 10 years ago when it was discovered that many of the buffalo herds in the south of the Park were infected. Since then the disease has spread inexorably northwards and is now as close as 50 km from the Zimbabwe border. Although infection has been found in 13 species of larger mammals, it is only in buffalo and lions that the prevalence is high. Lions get the disease by eating buffalo. TB can become generalized in their bodies and cause mortality, to the extent that there is concern over the long-term future of the lion population in the Park. BTB appears to create a less serious risk for the buffalo population, though its effects are likely to be more severe when this species is stressed by drought.

At present there are no measures in place that will stop the spread of wildlife BTB into Zimbabwe, especially with the projected Sengwe corridor, allowing the free flow of animals from Kruger National Park into Gonarezhou, as part of the Great Limpopo Transfrontier Park initiative. Without some form of barrier it is certain that infection will reach Zimbabwe in buffalo.

With regard to the present land crisis and BTB, there are two major concerns. Firstly there are no resources to institute adequate surveillance for the disease in wildlife, and cattle. Secondly, large numbers of cattle are already moving illegally into Gonarezhou National Park, and between Zimbabwe and Mozambique. The National Parks warden at Chipinda Pools in the Park estimates that 1,000 head are moving each month through the area under his control into Mozambique. Because BTB is present in cattle in adjacent areas of Mozambique it may be more probable that illegally-moved cattle will introduce the disease into Gonarezhou before buffalo do so from South Africa.

Once in place, BTB will be very difficult to again eradicate from Zimbabwe cattle, and impossible to eradicate from wildlife, unless new technology is developed.

3.6.9 Rabies

This is a fatal viral infection of the nervous system which is widespread in Zimbabwe and some major epizootics have occurred in the past as a result of disruption of vaccination campaigns in dogs, a species in which vaccination is compulsory. Dogs and jackals are the principle vectors and victims of the disease, and made up more than two-thirds of the total cases in 2001. Human rabies has remained at a low level of around 6 cases per year.

The classical rabies virus (termed "street" rabies) was introduced into Zimbabwe in 1950, and although there is some evidence to suggest that endemic mongoose and bat strains were present before this, these have remained cryptic. Rabies in wildlife is therefore a spill-over of "street" virus. This poses a particular problem with the introduction of dogs into conservancies since these dogs are usually unvaccinated and can readily introduce the disease. Of special concern is rabies in African hunting dogs because this threatened species is very susceptible to die out from the disease as a result of its social behaviour and easy transmission of the virus between members of a pack. The Save Valley Conservancy population of African hunting dogs has grown tenfold in as many years, and this has proved to be a great attraction for tourists.

3.6.10 Newcastle disease (ND)

ND is a viral infection of birds, particularly chickens, that varies in its ability to cause disease and mortality, depending on the strain of virus involved. The most virulent, or velogenic, strains of virus can cause massive mortality after very acute illness which usually involves the nervous system. It is spread by close contact, and wild birds and farmed ostriches are susceptible to this disease, which was introduced into southern Africa within the last 50 years.

Since 1994, velogenic ND has been present continuously in Zimbabwe and it has proved impossible to contain the disease because this involves widespread vaccination and controlling movement of poultry which the DVS is unable to adequately ensure at the present time.

The effect of the land crisis on ND has been the movement of poultry onto farms within the prescribed exclusion zone for ostrich farm registration, as well as an increase in outbreaks of ND.

3.6.11 Brucellosis or contagious abortion (CA)

This is an introduced bacterial disease of cattle that causes abortion. Infection enters the body when cattle eat infected material, often deposited in the pasture in aborted fetuses or afterbirth and foetal fluids. The disease has been widespread in commercial herds in particular, though in recent years there has probably been under-reporting (13 outbreaks recorded in DVS annual report of 2001). Humans are also susceptible, especially from drinking infected milk and a control programme has been in place for dairy herds for many years. Heifer cattle that are vaccinated at a young age become immune to the disease.

Serological surveys in many species of wildlife, in which it can also cause abortion, have shown a very low prevalence of the disease in the past. No surveys have been conducted for the last six years. The principal concern is that cattle that have been moved into wildlife areas may take the disease with them and establish new foci of infection. Wildlife could then form a reservoir for the disease that would be difficult to control.

3.6.12 Constraints within the Department of Veterinary Services (DVS)

The DVS has suffered from lack of adequate funding for many years. However this has become more acute in the last three years. The Annual Report of the Department of Veterinary Services for 2001 reported:

“The staff situation in the Department of Veterinary Services was a cause for concern as the vacancy rate continued to grow from 29.7% in 2000 to 33.6% in 2001. This represented 847 vacant posts. Shortages of financial and material resources, high inflation, devaluation, and freezing of all vacant posts except Veterinary Officer positions, and lack of foreign currency had a negative influence on the Department’s performance in 2001.”

In 2001 a total of 97,800 vaccinations for FMD cattle were done by the DVS. There were also some 291,000 rabies vaccinations, as well as 602,000 anthrax vaccinations. In 2002, because of FMD outbreaks, the requirement for FMD vaccine increased nearly five-fold from the traditional 500,000 doses used routinely every year in the south-east of the country. The cost of this vaccine is around US\$2.8 million.

3.7 ECONOMIC IMPLICATIONS

3.7.1 Impacts on the livestock sectors

Census figures from the Department of Veterinary Services (DVS) show that in 1999 there were 1.68 million head of cattle in the commercial farming herd, which was the major source of export beef, and 4.39 million head in the communal/small-scale/resettlement area herd. In 2001 these figures had changed to 1.30 million and 5.13 million respectively. In March 2002 the commercial herd had reduced to 0.70 million, while by July 2003 it was estimated to be only around 0.21 million (figures obtained from the Cattle Producers Association). Press reports (e.g. *The Independent*, 2 January 2004) suggest that the commercial herd may now be as low as 120,000. Zimbabwe exported 8,200 tonnes of beef to the EU in 2000 and another 4,500 tonnes to South Africa, which was the other export major market. The value of these exports was US\$ 55 million. In 2001 these exports were stopped by the importing countries because of disease outbreaks in Zimbabwe and towards the end of 2002, beef was being exported only to Mozambique, Angola, Democratic Republic of Congo and Libya. The total of these exports is likely to be less than 1,000 tonnes per annum, at prices

considerably less than those realised in the EU. The export of dairy products, either fresh or processed, has similarly fallen well below the level of 15 million litres of milk that was taken up by external markets in 1999.

The recent epidemic of FMD in Zimbabwe has had serious economic impacts in neighbouring countries. The National Red Meat Producers Association of South Africa has voiced concerns that the European Union might reduce imports from countries adjacent to Zimbabwe because of the FMD risk; if this happens, more meat from Namibia and Botswana will be marketed in South Africa, reducing the sale prices for South African producers.

Zimbabwe's ostrich industry showed rapid development from 1985 to 1995. At that stage there were some 110 producers, of varying capacity. With changes in the world markets this number had fallen to around 70 at the time when Zimbabwe gained official entry into the European markets following a visit by European Commission Veterinary Inspectors in April 2001. By this stage, the total value of the Zimbabwean ostrich industry had declined from US\$9 million in 1997, but nonetheless remained high at US\$5.94 million (I. Bond, pers. comm.). In order to export meat, farms must be registered by the DVS and are inspected every six months to check that the conditions of registration are being fulfilled. The level of bio-security required is stringent, including the exclusion of poultry within one kilometre of any ostrich facilities. All poultry within 10 km of a registered ostrich farm must be vaccinated against Newcastle disease at least twice annually. The onus to ensure that this is done has usually rested with individual ostrich producers, because the DVS does not have resources to undertake this task. If an outbreak of this disease occurs within 10 km of a registered ostrich farm, that farm is barred from exporting ostrich meat for a period of three months. By November 2002, there remained only 38 registered ostrich farms. Some farmers had moved off their properties while others had been unable to continue production because of the unavailability and expense of ostrich feeds. The main threats to the ostrich industry continue to be the uncontrolled movement of poultry, Newcastle disease and the poor supply of ostrich feeds.

3.7.2 Impacts on the tourism and safari hunting sectors

Zimbabwe's wildlife industry had been in a phase of strong growth prior to the fast-track resettlement programme. Booth (2002) provides statistics that are quoted below. The number of registered safari operators increased from a few in the 1960s to 150 companies by 2000. Gross national earnings from international safari hunting increased from US\$2 million in 1984 to US\$22 million in 1998, and were approximately US\$22.3 million in 2000. Importantly, there were also real increases in trophy fees for all key species. The strong international demand for safari hunting in Zimbabwe has been attributed to the near monopolistic control that the country held over elephant hunting in Africa, the wide range of species that can be hunted within the country and the secure political environment that existed during the 1990s.

Assisted by a pro-active marketing strategy co-ordinated by the Zimbabwe Tourism Authority, the tourist industry expanded after 1989 to reach 2.2 million tourists in 1999. The number of bed-nights doubled from approximately 2.5 million in 1989 to 5.4 million in 1997. Between 1989 and 1998, foreign currency tourism receipts (quite apart from Z\$ receipts) increased at an annual rate of 25% in real US\$ terms, from US\$38 million in 1980 to US\$202 million in 2000 (according to data reported by the Reserve Bank of Zimbabwe).

The growth in tourism did not occur gradually but rather in a burst of investment beginning in 1995. This suggests that the tourism industry is far more cautious than the hunting industry when it comes to making the large-scale investments needed to drive the industry. It required a period of political stability of several years (1990 – 1994), and the demonstration of bed occupancy levels above 40%, before major investors could be attracted to the industry.

The total contribution of the wildlife industry to the formal sector is difficult to ascertain. Multiplier effects of tourism have been strong, and have been important contributors to foreign exchange

earnings. A multiplier estimate of 1.67 was estimated by MEC Consultants (Pvt) Ltd for foreign currency tourism earnings in 1999, in an analysis that was produced for the Zimbabwe Tourism Authority; this suggested that tourism contributed 6% of Zimbabwe's GDP in that year and made up 18% of Zimbabwe's total "exports", immediately before the land crisis.

Zimbabwe now faces two threats to its wildlife industry. Firstly, the political and economic instability that prevails in Zimbabwe and gives rise to adverse international publicity. Secondly, with specific reference to the CAMPFIRE concessions and the resettlement programme in commercial farming areas, the resources are still perceived as open access and are being over-harvested as people are hungry and relevant law-enforcement is weak. Rapid changes in land-use are occurring in the Communal Lands, despite the limited "decongestion" achieved through the resettlement programme, and are sometimes aggravated by influxes of displaced farm-worker families. These land-use impacts are eroding the wilderness habitats that support the wildlife populations in these areas. Loss of habitat is therefore likely to have the most significant negative impact on the sport hunting industry in these areas. The rapid resettlement in the former commercial sector has virtually destroyed the wildlife industry in many of these areas. The rebuilding of this industry is compromised by the lack of coherent policies as to how wildlife will be managed under the resettlement programme.

The Zimbabwe tourism industry is highly sensitive to political instability (whether real or perceived). After Zimbabwe gained independence in 1980, the tourist industry boomed until the political insurrections in Matabeleland in the mid-1980s. This caused a dramatic decline in tourist arrivals, and it took until the early 1990s for the industry to recover and regain confidence in Zimbabwe as an international tourism destination. A similar trend was witnessed in 2000 as a result of the political instability in the country leading up to the general elections. The available bed-nights dropped from 5.5 million in 1998 to 2 million in 2000, mostly as a result of facilities closing down due to the dramatic decline in occupancy levels (down to 30% in 2000). Many of tourist operations closed altogether in 2002 (only four of 22 ecotourism lodges on Lake Kariba remained open by the end of 2003, operating at sub-economic levels and remaining open only to protect their long-term investments). Most major international airlines that previously operated into Zimbabwe have ceased doing so because of the low volumes of tourist traffic.

Recovery from the current downturn in the tourism industry can only be expected if political trends within Zimbabwe accord more with the expectations of the countries that constitute affluent ecotourism markets, and negative publicity therefore gives way to more positive reporting

In contrast to ecotourism, the sport hunting industry has proved to be remarkably resilient in the face of political instability both nationally and internationally, and has not been significantly affected in State Land and Communal hunting areas. However, the safari hunting industry on private land, with few exceptions, has been very adversely affected since 2000 for a variety of factors:

- Operators on private land have been displaced and/or prevented from operating hunting safaris on the properties;
- Clients are reluctant to travel to these areas where there is a perceived threat of violence;
- Professional guides and operators have left the country;
- There has been a high incidence of poaching on the properties;
- Uncontrolled settlement and the invasion of the properties by domestic livestock have destroyed the "wilderness" quality of many properties as a hunting destination.

The full scale of the economic impacts on the safari hunting industry can only be established if hunt return forms ("NP9 forms") that have been submitted by safari operators for 2002 and 2003 are professionally analysed.

4 POLICY CONSIDERATIONS

Zimbabwe's wildlife industry is in the inevitable throes of change towards a significantly greater level of black participation, along with the correction of the racial imbalance in the ownership of commercial farmland.

The fact that Zimbabwe's wildlife industry has been dominated by white landowners and operators has been due not only to the racially-skewed ownership of commercial farmland, but also to a range of other factors. Some of these factors have complicated cultural, historical and socio-economic origins, but the bottom line is that even since national independence, many indigenous operators have faced problems of access to wildlife resources, access to capital and access to information. These obvious problems must now be addressed in an orderly way to carry Zimbabwe's wildlife industry through the process of indigenisation. Unless these needs are attended to, the people will suffer from ongoing economic inequities. The nation's wildlife resources will be depleted in or adjacent to resettled areas because people will not have the incentives or skills to utilize these resources sustainably. Soil and water resources will be degraded in marginal agricultural zones, and this degradation of the environment will lead to further poverty and socio-political friction.

Authors such as Murphree (2000) and Martin (2002) repeatedly point out that for effective, sustainable and equitable use of wildlife resources, a fundamental requirement is to establish a legally-defined authority for the use, management and control (jurisdiction) over a prescribed area and the wildlife within that area. It is the role of the State to impartially arbitrate boundary disputes and confer jurisdictions, from which it should become clear who has the responsibilities to manage and the rights to benefit from the wildlife management system. Good policy requires the alignment of authority, responsibility and incentives, since authority without responsibility is meaningless or obstructive, responsibility without authority cannot be effective and without responsibility or authority, there is no incentive to invest in or manage the wildlife system.

First steps in implementing a new policy for wildlife under land reform in any area are to define the boundaries of that area and to specify those authorised to use and manage the resources. In other words, jurisdictional boundary-setting involves deciding: the entitlement (the group of stakeholders); the territory over which they will have authority; and the resource(s) that they will manage and benefit from. Management institutions need to be matched to the specific requirements of resources to be managed and should be no more complex than is necessary.

The relationship of group size to the resource base is critical. A real danger under land reform is that too much may be expected from a limited resource base. Large groups with weak resource bases are unlikely to succeed. Any safari hunting operation needs to have a wildlife resource base sufficient to generate about 100 hunter-days per annum, if it is to be viable. The compulsory incorporation of additional beneficiaries into a commercial wildlife operation can only take place up to a limit beyond which the financial returns to investors will be too low to attract or retain their investments. In addition, the larger and more diverse the group of participants becomes, the greater the transaction costs become in holding this group together (see below). Therefore there must be some balance determined by the spatial scale below which a wildlife operation is no longer ecologically and economically viable, and the number of participants above which the operation loses institutional viability due to mounting transaction costs and other economic brakes. This balance will vary greatly according to ecological and other factors, therefore a standard model for wildlife-based land reform would be inappropriate.

The difference between decentralisation and devolution of power needs to be clearly understood. A common reason for failures in the CAMPFIRE Programme and other community-based resource management programmes is that responsibility has become separated from authority and entitlement. Indeed, within the entire southern African region there are few genuine examples of devolved power – most community-based natural resource projects can be simply described as “co-optive

decentralisation". Some planners and bureaucrats see devolution of authority as a step-by-step process where the new local jurisdictions are granted powers incrementally as they demonstrate the ability to manage. This approach is structurally flawed, since authority is a pre-requisite for responsible management and should not be held out as a reward for it (Martin, 2002, and Murphree, 2000, are sources throughout much of this section). Devolution carries with it the responsibility for organisation, management, control, self-sufficiency and, above all, for developing resourcefulness. Wildlife management systems with these attributes cannot be imposed, but must develop experimentally and flexibly in the local setting, and with appropriate capacity-building by supporting agencies.

For wild animals to constitute genuine economic assets within wildlife operations that are to be encouraged under the land reform programme, security of tenure over these assets must be ensured through full expression of the spirit of proprietorship that is embodied in current Zimbabwean wildlife legislation (see Section 3.2.4). As a matter of normal business practice, shareholders would be required to add assets or capital to a company in order to acquire shares. Therefore some donor or state subsidisation of economically disadvantaged stakeholders may be required (e.g. by transferring wildlife assets from stateland or from resettled areas that can no longer support wildlife, into viable wildlife companies or conservancies where these assets can create new shareholdings).

The costs of setting up appropriate institutions for wildlife management should not be underestimated. There are three categories of costs, namely: transaction costs (meetings, training, workshops, etc.); management costs (wildlife monitors, law enforcement, management, etc.) and the opportunity costs of options forgone (cattle production, increased human population, etc.). Unfortunately, few if any of the economic analyses of the CAMPFIRE Programme have included estimates of the costs of institutional change. This might be attributed to the significant levels of donor funding that have subsidised many of the initial transaction and management costs. Equivalent donor support to facilitate the development of appropriate institutions for community wildlife projects in resettled wildlife ranching areas cannot be so easily obtained and allocated under the current political circumstances. Hence, where there are existing institutions such as conservancies it will be sensible to achieve black business participation and plans for sharing resources with local communities through businesslike adjustments within these institutions, rather than trying to create alternative institutions. Minimizing bureaucracy, and allowing stakeholders to negotiate management arrangements to suit their particular circumstances, will reduce transaction costs considerably.

Through business negotiations in terms of criteria that could be outlined in official policy (which would have to remain attractive to foreign investors and donors), black entrepreneurs could enter wildlife operations in partnership with or in place of existing white operators. Partnerships and joint venture arrangements could help to retain skills, capital, equipment, marketing networks, etc., of established operators, without which new entrants to the industry may struggle. Once a legally delimited authority (company, conservancy, resource management board, co-operative, trust, etc.) is established or restructured by a set of relevant stakeholders, these stakeholders will obviously have to share costs as well as benefits from wildlife operations, if they are to operate according to normal business principles. "Free-loading" or "hand-out" situations would lead to unrealistic expectations, social friction, management "from a distance", financial imbalances and over-exploitation of the wildlife resources.

Alongside individual entrepreneurs, rural communities could achieve group participation in wildlife operations through defined institutions such as community trusts (e.g. the existing Save Valley Conservancy Trust) which have legal standing to conclude the necessary contracts, shareholding agreements, etc. Whether or not local communities are integrated at a business level, and whether or not black businessmen control the wildlife operations, the socio-political sustainability of these operations will only be assured if they maintain significant community outreach programmes. Local employment must be maximized, and access must be permitted whenever feasible for local people to extract thatching grass, dead firewood, medicinal plants, etc., under controlled and sustainable resource-sharing arrangements.

Annex E shows that some of these policy options have already been tested in innovative schemes such as the Madikwe initiative in South Africa, so we must absorb the lessons from such experiments.

In acknowledgement of biological realities, planning for wildlife-based land reform must recognize the importance of developing projects at an adequate spatial scale. On smaller units, the limited range of species that can be carried, and the requirements for intensive management (including often-overlooked needs for genetic management to prevent inbreeding) constitute significant constraints to wildlife production, in both biological and economic terms. It was because of these constraints that landowners in mixed-farming areas such as the Central Plateau amalgamated into conservancies within which populations of commercially valuable species such as sable and waterbuck could attain viable sizes. It is unrealistic to expect that "mini-conservancies" can be established to hold small pockets of wildlife amidst an agricultural landscape that will ultimately be resettled to a higher human density than was the case during the large-scale commercial farming era. Therefore, even if more sensitive environmental planning of the land reform programme is implemented, an overall decline in Zimbabwe's wildlife resource base is inevitable.

The loss of habitats and wildlife through an expansion of settlement could be argued to be an inevitable process in a developing country. However, through a lack of spatial planning at the level of ecoregional landscapes, the loss of wildlife has been unnecessarily exacerbated during the land crisis (which, to conservationists, does therefore indeed constitute a "crisis"). Resettlement has often been haphazard or unplanned ("informal") therefore leading to the foreclosure of some options for wildlife production zones and corridors that could have been maintained through more strategic planning of resettlement. The Save-Limpopo Lowveld, in particular, requires a planning process to review the pattern of "informal" settlement and to adjust this pattern, wherever feasible, to fit better with options to maintain important refuges and connections for wildlife populations. Such options would reinforce the Great Limpopo Transfrontier Conservation Area and thereby maximize the economic and conservation advantages of this scheme for Zimbabwe. Planning at a regional landscape level would also allow foot-and-mouth disease fencing and other controls to be aligned better with wildlife production potential in the Lowveld, and would lead to more cost-effective control of this disease than was possible when the control measures were superimposed over, rather than harmonized with, the ecoregional features.

A general theme that will be apparent in the above review is the need for more flexibility, and greater sensitivity to ecological constraints, than has been apparent to date in the land reform programme. This theme embodies concern over rigid concepts such as maximum farm sizes and specified models for wildlife-based land reform. It is urgent that a policy framework for wildlife-based land reform is finalized rather than being left unresolved, but it is also crucial that this policy framework is designed to accommodate innovation and varied approaches, rather than being totally prescriptive.

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ANNEX A

WILDLIFE SCIENTIFIC NAMES

MAMMALS

Baboon (chacma)	<i>Papio ursinus</i>
Buffalo	<i>Syncerus caffer</i>
Bushbuck	<i>Tragelaphas. scriptus</i>
Bushpig	<i>Potamochoerus porcus</i>
Caracal	<i>Felis caracal</i>
Cheetah	<i>Acinonyx jubatus</i>
Duiker (common)	<i>Sylvicapra grimmia</i>
Eland	<i>Taurotragus oryx</i>
Elephant	<i>Loxodonta africana</i>
Giraffe	<i>Giraffa camelopardalis</i>
Hyaena (spotted)	<i>Crocuta crocuta</i>
Impala	<i>Aepyceros melampus</i>
Kudu	<i>Tragelaphus strepsiceros</i>
Leopard	<i>Panthera pardus</i>
Lichtenstein's hartebeest	<i>Alcelaphus lichtensteinii</i>
Lion	<i>Panthera leo</i>
Monkey (vervet)	<i>Cercopithecus pygerythrus</i>
Nyala	<i>Tragelaphus. angasii</i>
Oribi	<i>Ourebia ourebi</i>
Reedbuck	<i>Redunca arundinum</i>
Sable	<i>Hippotragus niger</i>
Steenbuck	<i>Raphicerus campestris</i>
Tsessebe	<i>Damaliscus lunatus lunatus</i>
Warthog	<i>Phacochoerus aethiopicus</i>
Waterbuck	<i>Kobus ellipsiprymnus</i>
Wild dog (also Painted/African Hunting Dog)	<i>Lycaon pictus</i>
Wildebeest (blue)	<i>Connochaetes taurinus</i>
Zebra (Burchells)	<i>Equus burchelli</i>

BIRDS

African Marsh Harrier	<i>Circus ranivorus</i>
Grass Owl	<i>Tyto capensis</i>
Melodious Lark	<i>Mirafra cheniana</i>
Swynnerton's Robin	<i>Swynnertonia swynnertonii</i>
Wattled Crane	<i>Grus carunculatus</i>

ANNEX B

THE ECOLOGICAL RATIONALE FOR THE FORMATION OF LARGE-SCALE CONSERVANCIES IN THE SAVE-LIMPOPO ECOREGION

The following notes are extracted from du Toit (1998).

The fact that the rainfall regime of the semi-arid savanna biome of southern Africa is so unpredictable has led savanna rangeland scientists to question the management concepts upon which the biome's monospecies livestock industries were established during the colonial era. Until the 1980s, rangeland science was dominated by the belief that the plant communities of the semi-arid savanna show predictable successional dynamics that are largely within the limits of control of ranchers. It was therefore expected that modern ranching practices could keep these communities in an optimum state for the consistent production of livestock year after year. Rangeland management tools that are used in accordance with this equilibrational paradigm include burning, bush clearance, water reticulation systems, compartmentalization through fencing and a variety of rotational grazing schemes that are made possible through this ongoing investment in ranching infrastructures. The invention of relatively cheap PVC piping was a crucial technological step, along with the invention of galvanized fencing wire, that enabled the compartmentalization of the dry savanna landscape into ranches and paddocks since without the means to distribute drinking water the ranchers could not confine their cattle within fences.

In recent years, there has been a growing appreciation of the fact that savannas with a high coefficient of variation in annual rainfall (this coefficient being more than 33% in Zimbabwe's Lowveld) are disequilibrational, boom-and-bust systems whose livestock carrying capacity is controlled by stochastic processes and not simply by deterministic ranching practices (Walker *et al.*, 1982; Westoby *et al.*, 1989). Combinations of these stochastic and deterministic factors, notably overstocking combined with two or more years of below-average rainfall, can alter a savanna ecosystem to an extent that often exceeds the ability of entrenched, capital-intensive livestock enterprises to respond efficiently with managerial and financial adjustments, especially on the smaller ranches. The disequilibrational paradigm therefore suggests that ranching practices should remain as flexible as possible, to follow the dips and surges in primary productivity from year to year rather than striving to maintain fixed stocking rates.

Before the era of majority rule, the governments of southern Africa strongly encouraged the investment of commercial ranchers in livestock infrastructures, through direct financial assistance in the form of subsidies, soft loans, tax concessions and the like, through support services such as efficient marketing facilities, technical advice (following the equilibrational paradigm), veterinary control measures, etc., and through pervasive political influences in favour of beef production. The scale of this support was such that it was possible for monospecies livestock enterprises to become financially profitable without necessarily being economically efficient or ecologically sustainable. Since wildlife entailed costs for cattle ranchers in terms of predation, disease transmission, grazing competition and damage to fencing and water systems, the offending species (notably carnivores, elephant and buffalo) were systematically eradicated from many ranching areas.

The post-independence government policies within the region (with the exception of those in Botswana) have become considerably less conducive to commercial ranching operations. Not only have the ranchers in the semi-arid savanna of Zimbabwe lost their former political influence with the advent of majority rule, but they have also lost economic influence within the cattle industry because of the beef export conditions that have been established by the European Community. These conditions favour producers in the moister savanna zones, at the expense of the producers in the semi-arid zone, because they entail severe marketing restrictions for beef from the latter zone which is prone to foot-and-mouth disease. Over the past two decades, the difficulties that ranchers have experienced due to the waning economic incentives for beef production have been compounded by

the cumulative ecological costs of monospecies ranching in the disequilibrium savanna. The primary cause of the ecological damage is overgrazing due to the following practices.

Firstly, ranchers sought excessive advantage from the nutritious grass cover ("sweetveld") during the dry season, when cattle are able to maintain condition by feeding not only the remaining grass but also on pods and palatable browse (as compared with the less palatable, chemically defended browse of dystrophic "sourveld" areas). Secondly, ranchers also allowed persistent grazing during the growing season. Thirdly, stocking rates were been set in accordance with the carrying capacity of the savanna in years of "average" rainfall, so that there have generally been too many cattle (supported by artificial water points) on the range during the lower rainfall years. Fourthly, the period during which government technical services were most active in planning and advising on stocking rates and other aspects of cattle ranching coincided with a trend of higher annual rainfalls during the 1960s and 1970s compared to the depressed trend of annual rainfalls since then. And fifthly, the grazing and browsing requirements of indigenous ungulates (i.e. those species that were not eradicated, and which sometimes remained in significant numbers) were invariably ignored when cattle stocking rates were set.

A particular consequence of these exploitative tendencies in the semi-arid savanna was widespread sheet and gully erosion, particularly along fence lines and at water points, due to removal of surface cover, concentrated hoof pressure, soil capping and increased run-off of rainfall. Grass communities retrogressed to states with lesser productivity, nutritional qualities and palatability compared with the pre-ranching communities. This trend was reflected in the disappearance of the more selective grazing ungulates (e.g. sable antelope and Lichtenstein's hartebeest) while ungulates that are tolerant of degraded rangeland (e.g. impala and kudu) thrived in many ranching areas. Invasive woody species encroached upon soils that maintained open grassland thirty years ago (e.g. *Acacia* and *Dichrostachys* on siallitic and fersiallitic soils, and scrub *Colophospermum mopane* on vertisols).

Along with a growing appreciation by ranchers of these problems has been greater recognition of the economic potential of multispecies animal production systems in place of monospecies livestock enterprises. Cumming (1990) has outlined the emergence of "game ranching" in Zimbabwe with a progression from cropping schemes involving impala and other common antelope, yielding venison, in the 1960s to more lucrative safari hunting which became well established on extensive ranches, particularly in the Lowveld region, during the 1970s. With the exception of a few pioneering wildlife-production ventures that excluded cattle, the expanding game ranching operations in Zimbabwe entailed the mixture of domesticated livestock and wildlife to the extent that it was possible to manage them compatibly (buffalo, carrying foot-and-mouth disease, elephants and large carnivores remaining unacceptable within these multispecies operations).

Jansen *et al.* (1992) obtained information for the 1989/90 financial year from 89 ranches in Zimbabwe's semi-arid savanna, of which 45 had only cattle enterprises, 12 had only wildlife enterprises (mainly adjacent to state protected areas) and the remainder had mixed cattle/wildlife enterprises. This sampling, a decade after Zimbabwe's political transition to majority rule, showed that most of the ranchers who were producing cattle were doing so at a loss or were at best breaking even. However, the wildlife operations that were being run together with or in place of the cattle operations were virtually all profitable, in both financial and economic terms. The survey highlighted the vulnerability of the cattle industry to government pricing, marketing and exchange rate policies.

At the time of this survey, non-consumptive tourism ("camera safaris") involving international tourists was an embryonic component of the wildlife industry on Zimbabwean ranches, and the earnings within this industry came mainly from safari hunting. Since this time, non-hunting operations expanded considerably in Zimbabwe although safari hunting remains of pivotal importance on private ranches in the semi-arid savanna. The major factors that encouraged the growth of tourism during the 1990s were: firstly, the regional political stability that ensued since the advent of majority rule in South Africa; secondly, a growing international interest in ecotourism; and thirdly, a shift in the focus of up-market tourists away from eastern Africa and towards southern Africa where tourist services are often more refined and where security risks have generally been lower.

These incentives for wildlife production therefore constituted a growing commercial rationale for a land-use transition within the ranching areas of the semi-arid savanna which was reinforced by the ecological rationale of restoring ecosystem resilience through two processes. The first of these processes is an increase in both the diversity and the total biomass of indigenous wildlife, while the populations of domesticated livestock are reduced. The second process is an increase in soil moisture and herbaceous cover, these factors being synergistic since greater infiltration of the limited rainfall will boost grass growth and the greater grass cover will then intercept rainfall and reduce surface runoff. Once soil moisture is increased, the improved quantity and quality of the grass cover should enable the successful re-introduction of a full spectrum of indigenous ungulates including the more selective grazers (e.g. sable antelope) that could not survive drought years when facing competition from cattle.

The attainment of the full economic potential of multispecies production systems in the semi-arid savanna will require not only that these rehabilitation processes come into effect and that wildlife species are restocked, but also that lessons on managing this disequilibrium Lowveld ecosystem are learned. Landholders and land-use planners must not fall into the trap of restocking and managing wildlife in accordance with the equilibrium paradigm, as the former cattle ranchers managed their livestock. Although there is widespread awareness amongst the commercial ranching community and land-use planners of some of the negative ecological trends that have been associated with monospecies livestock operations, there is only limited appreciation of the need to follow adaptive coping strategies rather than intransigent "control-over-nature" strategies in an environment that is prone to episodic droughts.

In particular, there is a lack of understanding of the fact that the long-term viability of animal production systems in this environment depends upon their operation over a larger spatial scale than is generally allowed for. Southern African ranches are of an average size that is convenient for the management of cattle, over the short-term at least, but which is too small for the sustainable, cost-effective production of wildlife at optimum levels of biomass and biodiversity. Large African mammals (particularly the more selective grazers) must be able to roam, without the obstruction of fencing or other barriers to their foraging, in order to make efficient use of patchy resources that are temporarily available to them.

In Zimbabwe, South Africa and Namibia, the term "conservancy" is usually applied to an amalgamation of units of land, under the control of two or more landholders who agree to mutually manage some or all of their wildlife and other natural resources (du Toit, 1994). In Namibia, the term has been extended to include cooperative wildlife ventures within the traditional land tenure system. A conservancy may also consist of more than one tenure system; it might for instance be a fusion of adjacent private properties, state land and communally owned units. The first three Lowveld conservancies were formally established in 1991, being: Chiredzi River, approximately 800 km²; Bubiana, 1,200 km²; and Savé Valley, 3,400 km². Savé Valley is not only the largest but has also gone the furthest in developing wildlife operations in place of cattle ranching and has, in effect, become the largest private wildlife reserve in Africa. The fact that it is comprised of 24 different properties (including some state land) means that it embodied a considerable diversity of attitudes and aspirations amongst its members, who had to agree on the balance between individual and cooperative activities as they undertook their land-use transition.

In 1992, the Lowveld experienced its lowest recorded annual rainfall. The lack of precipitation was compounded by the widespread ecological degradation that had arisen after two to three decades of monospecies livestock production. Having implemented a massive programme to destock cattle and to set up feed points to keep the indigenous ungulates alive, the members of Savé Valley Conservancy questioned their future as cattle ranchers. Their positive experience in working together in a conservancy arrangement for a couple of years prior to the drought motivated them to undertake a detailed evaluation of the option of reducing or even abandoning cattle production in favour of the expansion of mutual wildlife production and ecotourism. A detailed review of the two major land-use options was completed in 1994 by a firm of land-use consultants and by various individuals or

technical agencies who had relevant contributions (Price Waterhouse, 1994). This report included economic, social and ecological considerations; some significant conclusions were as follows.

From a financial perspective, wildlife operations would generate about US\$ 8 per hectare in gross annual revenue, compared to less than half of this from cattle operations, and the wildlife revenue could increase fivefold as the area becomes an established tourist destination. The return on capital employed would be 1-3% for cattle operations, compared to 10-22% for wildlife operations. Over half the wildlife revenues would be in the form of foreign currency, whereas veterinary constraints on the export of Lowveld beef would not allow for the direct generation of foreign currency from cattle operations.

From a socio-economic perspective, wildlife operations (based on low-volume tourism) would double employment in the short-term, quadruple employment in the long-term, and generate higher average wages than the cattle industry. With wildlife, local economic linkages (with impoverished Communal Land communities) could be strongly developed whereas cattle operations do not stimulate secondary industries such as curios and crafts, cultural tourism, etc. Although cattle operations produce more meat (3.6 kg/ha compared to half this amount of venison), the beef is almost entirely marketed in urban centres whereas the venison would be more available to local communities.

The findings of this report were endorsed by relevant government technical agencies (including Zimbabwe's agricultural planning and extension service). A particularly significant result of this official acceptance of the report was the development of agreement between the Department of Veterinary Services (DVS) and the Savé Valley Conservancy over the conditions that would pertain to the re-introduction of buffalo. In view of the change in land-use economics, DVS was prepared to allow buffalo to be released (as a key species for both ecotourism and safari hunting) while establishing stringent requirements for perimeter fencing to minimize the foot-and-mouth disease risk. In 1998, the conservancy negotiated a US\$1 million loan from the International Finance Corporation (IFC) for restocking with wildlife, with a particular emphasis on restocking with buffalo over a 5-10 year period. This restocking programme was curtailed by IFC because of concerns about the viability of the project once the poaching and loss of habitat within the conservancy increased markedly during the land crisis.

ANNEX C

POSITION PAPER ON LAND REFORM OPTIONS FOR LARGE-SCALE WILDLIFE OPERATIONS IN THE LOWVELD

Submitted jointly by:

Bubiana Conservancy

Bubye River Conservancy

Chiredzi River Conservancy

Save Valley Conservancy

in collaboration with Malilangwe Trust and with the assistance of WWF-SARPO

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INTRODUCTION

The large Lowveld conservancies developed because wildlife production is the most rational commercial activity to undertake in Zimbabwe's semi-arid regions, and because wildlife operations are more productive, both ecologically and economically, at a large scale rather than at the scale of individual ranches. However, commercial wildlife operations occupying large areas of land now face difficulties in terms of socio-political viability. Therefore the Lowveld conservancies have presented proposals on land reform, with a genuine commitment to ongoing constructive negotiations to refine these proposals in accordance with relevant government policies, in order to maintain and indeed enhance the potential of the conservancies to contribute to rural development.

It is appreciated that these proposals have to go beyond simply giving up some peripheral land units for occupation; some kind of sustainable resource-sharing and joint venture business arrangements need to be established. The challenge is to find new but durable ways to create equity for indigenous participants, at a community level as well as at an individual level, despite the fact that these potential stakeholders do not have access to capital. The existing conservancy members are prepared to consider innovative joint ventures provided these demonstrate commercial viability; donor or state support will initially be required to help achieve equity for poor communities, but thereafter the joint ventures must run themselves profitably.

In this spirit, this document is presented to suggest some directions for ongoing planning of wildlife-based land reform in Bubiana, Save Valley, Bubye and Chiredzi River Conservancies. Malilangwe Trust, being operated on philanthropic rather than totally commercial lines, must be viewed as an alternative (and not necessarily replicable) arrangement for spreading benefits from the Lowveld wildlife industry to local people.

BROAD OPTIONS

If it is the intention of the Government of Zimbabwe to maintain sites for wildlife production within the semi-arid Lowveld, then there are several options that arise. Two options that might be considered in theory but which would give rise to crippling problems of economic viability, are:

- The conversion of most or all of the current commercial operations into a CAMPFIRE-type programme of community-based natural resource management, around new settlements (the track record of the Doddieburn scheme needs to be considered, as an example of this approach);
- The splitting of properties within conservancies into significantly smaller land units that are allocated to new settlers according to the A2 model, for them to attempt to establish small-scale wildlife operations.

Other options that would maintain an appropriate ecological and economic scale for ecotourism combined with safari hunting, game cropping, etc., are:

- The input of major donor funding to create local trust arrangements (similar to Malilangwe Trust), that benefit local communities whilst also meeting conservation objectives;
- The retention of large-scale commercial wildlife operations while setting up joint ventures that diminish the extent of white economic dominance, and which spread significant benefits to neighbouring communities.

It is last of these options that is considered as the basis for elaborating land reform plans, since the input of massive allocations of donor support is an approach that remains feasible at Malilangwe but does not have general applicability within the wildlife sector of the Lowveld.

GUIDING PRINCIPLES

1.) To be viable, wildlife-based operations in the Lowveld have to take place on large land-units in order to:

- meet the ecological requirements of a spectrum of wildlife species;
- maintain the atmosphere of wilderness that is sought by tourists and safari hunters;
- establish the economies of scale that are necessary in order to run marketable lodges, to maintain reliable vehicles, to provide professional services for international clients, etc.

2.) Linkages are required:

- in an economic sense, because the marketing of wildlife operations and the provision of essential services such as air transport are dependent upon the attainment of a critical mass of operations; therefore new land reform projects cannot be set up as small, isolated projects but must instead be interfaced with established wildlife ventures in state-protected areas and private wildlife areas;
- in an ecological sense, because certain large, wide-ranging animal species need to move from one area to another via wildlife corridors.

3.) Land reform arrangements have to address two main socio-political requirements, whilst also ensuring the ongoing economic and ecological viability of the conservancies:

- the arrangements must ensure tangible benefits for local communities;
- the arrangements must constitute significant opportunities for indigenous business creation in the commercial activities within the conservancies.

4.) If the indigenisation strategy is to be based on sound business principles, shareholdings must be based upon capital or assets that the various parties bring to the table (recognizing the need for innovative approaches to make this possible for stakeholders who do not have ready access to financial capital).

5.) Properties and companies under Zimbabwe Investment Centre agreements will not automatically fall under the range of indigenisation offers being made by the conservancies because the interests of each foreign investor will have to be respected. However, these investors are committed to facilitate

the indigenisation process while maintaining their original aspirations for their investments in Zimbabwe, including their opportunities to derive reasonable returns from these investments.

STAKEHOLDER INTERESTS

The existing or potential stakeholder groups are as follows.

1.) Existing conservancy members, who want to:

- resolve the current land dispute through a fair indigenisation strategy, in recognition of the great potential to enhance the conservancies through the development of new partnerships;
- maintain business viability, and/or transfer assets to new shareholders according to rational business arrangements;
- maintain the long-term conservation opportunities that they have helped to create through the formation of the conservancy.

2.) Neighbouring communities, who want to:

- gain some additional land for basic habitation and subsistence land-uses (“decongestion” of Communal Lands);
- also gain land for commercial land-uses, which would be based upon wildlife in the conservancy context but in certain areas may also include other opportunities, such as irrigated cropping where water resources are sufficient;
- be provided with development assistance for community services and infrastructure;
- be allowed access to natural resources (e.g. thatching grass, medicinal plants, honey) within the conservancy – this would have to be under a controlled and sustainable extraction programme;
- be provided with greater opportunities for employment and for generation of income from informal sectors (cultural tourism, manufacture of crafts and curios, etc.).

3.) Potential new investors, being:

- Black entrepreneurial participants, operating either individually or in community groups, who wish to take advantage of investment opportunities within the conservancy according to sound business principles;
- Other commercial investors, for instance farmers wishing to move their wildlife into the conservancy because of land designations elsewhere, or Rural District Councils also wishing to “invest” wildlife derived from their CAMPFIRE programmes;
- Non-profit investors, such as donor agencies or trusts, who wish to channel their investment gains into local community or conservation schemes once convinced that such schemes are commercially viable and financially transparent.

LAND ALLOCATIONS

The apportionment of land within each conservancy to meet the needs of the above stakeholders is suggested as follows.

- A habitation zone (of a size that does not undermine the ecological and economic integrity of each existing conservancy), acting as a “pressure-release valve” for the population congestion within the Communal Lands;
- A larger community “equity zone” which is allocated for commercial land-use activities that will be undertaken primarily for the benefit of local communities but also yielding returns for the potential external investors; this zone would be fully integrated within the rest of the conservancy, comprised of individual business operations;
- The remainder of each conservancy, in which ongoing commercial wildlife operations would be undertaken by companies in which indigenous shareholders would be welcomed, or by trusts whose beneficiaries would be local communities;
- Any units of contiguous land, such as existing resettlement schemes, that are not fully occupied and which therefore have sections that might be included within the conservancy as part of the community landholdings.

Important points relating to this apportionment of land:

- The conservancy members do not waive their rights to eventual compensation for land that is allocated for the habitation zone and for the community equity zone;
- Shareholding arrangements, while specifically tailored to ensure significant opportunities for indigenous participation, would be in accordance with normal business principles;
- The habitation zone has to be on the periphery of the conservancy, adjacent to Communal Land or existing resettlement, in order to share community services, to maintain social cohesion, to reduce the amount of perimeter fencing and to maintain the ecological integrity of the remaining conservancy;
- The habitation zone will have to be fenced out of the remaining conservancy (for veterinary reasons as well as problem animal control) but the community equity zone will be fenced within the conservancy and, in fact, need not be comprised of a contiguous block of land or of land that is only on the periphery - it could be made up of various land units, anywhere in the conservancy.

INSTITUTIONAL ARRANGEMENTS

The institutional arrangements are suggested as follows.

- Each conservancy will continue to operate as a voluntary association (*universitas*) of members with a constitution that need not necessarily change from its present form. The conservancy will own the wildlife within the perimeter fence, which will be constructed to a standard sufficient to show that the conservancy has acquired control (*occupatio*) over these animals and therefore does have legal ownership
- Community trusts will operate as fiduciary instruments through which funding (e.g. donor contributions) will be received and income derived for the local communities will be passed back to these beneficiaries (the beneficiaries would be the communities in the wards)

immediately adjacent to the conservancy, including the habitation zone). This type of trust could derive income from wildlife operations that are undertaken within the equity zone and some individual companies, operating on individual ranches, could convert themselves into trusts.

- One or more joint venture companies could be established within the conservancy, as the need arises, to combine the business interests of indigenous stakeholders, external investors, individual conservancy members and any trusts that are formed. Such a company could, for instance, run business operations within the equity zone, or could lease properties or hunting/tourism rights from other members within the conservancy in order to expand these operations.

POTENTIAL JOINT VENTURE BUSINESS ACTIVITIES

The following business activities could be expanded within the conservancy or, in some cases (e.g. irrigation schemes, micro-industries) would be located outside the wildlife area:

- wildlife and tourism businesses;
- irrigation schemes (where water and suitable soils are available);
- tanneries and other micro-industries.
- venison marketing to provide meat, sourced in the conservancy, to local communities at reasonable prices (this could also encompass fish-netting in dams for which concession arrangements are negotiated);
- marketing of crafts, curios, clothing, etc., produced within the informal sectors of the surrounding wards;
- provision of support services on a commercial basis for the conservancy as a whole, e.g. fence maintenance, security, bus shuttle service;
- breeding schemes for valuable wildlife species, notably foot-and-mouth-free buffalo.

WILDLIFE ENDOWMENT SCHEME

In addition to developing the above businesses, the trust and other investors and indigenous participants can build up a commercial investment in wildlife in the conservancy as a whole, by releasing animals (of species and in numbers to be agreed to by the conservancy) within the conservancy. These will be contractually recognized by the conservancy as constituting breeding stock for which payment for progeny will be made annually by the conservancy. An annual auction will be held during which animals belonging these stakeholders will be sold in lots equivalent in number to the surviving calves that are estimated to be produced by the introduced breeding herds, less poaching losses. This estimation may need independent professional auditing or arbitration. If the conservancy wishes to keep the animals within the conservancy rather than having them purchased by external buyers then it will have first option to purchase them, at the top bid.

The sale of progeny is the most straightforward way to yield a return from the wildlife investment to the stakeholders, but other options (such as allocation of trophy hunting quotas) can also be considered.

The government could be one of the donors to the trust, providing animals that are derived from state wildlife areas, resettled areas, etc. Indigenous entrepreneurs with access to such wildlife on a preferential or subsidized basis could similarly develop wildlife stake-holdings within conservancies, which would give a very strong return on investment since the biological growth rate (“interest” rate) will certainly exceed normal bank interest rates, in real terms, on invested capital.

Landowners whose properties are designated for resettlement elsewhere in Zimbabwe could be invited to move their wildlife assets into the conservancy according to some form of investment scheme. This scheme could include a requirement for the investors to allocate a certain proportion of the animals to the trust (as a kind of investment fee) and might also have to include stipulations by which such investors would relinquish their shares in due course after they have derived a reasonable return (e.g. equivalent to slightly more than the total value of all the animals that they introduce). A similar type of arrangement might be developed as an interim compensatory mechanism for landowners who give up their land, and the wildlife assets on it, in order to create the habitation and equity zones (equivalent to paying interest on an outstanding payment, until such time as final compensation is arranged).

NEXT STEPS

The next steps appear to be:

- For the conservancies to elaborate and quantify these options in order that the potential economic advantages for local communities and indigenous participants can be assessed.
- For the Ministry of Lands, Agriculture and Rural Resettlement and the Ministry of Environment and Tourism to elaborate the official policy framework for wildlife-based land reform in order that the conservancies’ proposals can be refined in accordance with this policy framework.

ANNEX D

COMMUNITY-BASED WILDLIFE OPERATIONS (CAMPFIRE)

Between 1989 and 2001, Rural District Councils earned a total of US\$20.29 million from wildlife-based activities (see following table), of which almost 90% was from leases with private sector safari operators. Of the revenue earned from safari hunting, at least 60% can be attributed to elephant hunts (Bond, 1999). The development of photographic tourism within the communal lands has been constrained by the fragmented nature of most of the wildlife habitat and, relative to the protected areas of Zimbabwe, low wildlife population densities. For the foreseeable future, income will continue to be dependent on safari hunting. During 2000, over 19,000 days of sport hunting were sold (a decline of 3,000 from 1999) at an average daily rate of US\$421/day. Estimated gross revenue from safari hunting in CAMPFIRE areas decreased from US\$21.1 million in 1999 to US\$18.5 million in 2000.

Income accruing to the Rural District Councils from wildlife concessionaires has varied significantly between the 16 wildlife producer districts. Over the period 1989-2001, five districts (Nyaminyami, Guruve, Binga, Chiredzi and Gokwe North) accounted for about 75% of the income earned. Since 1989, districts have moved towards open, accountable and (most importantly) competitive mechanisms for allocating safari hunting leases to private sector operators. This has significantly increased the real income earned from wildlife (Bond, 1999).

Income earned by RDCs with Appropriate Authority between 1989 and 2001

	<i>Safari hunting</i>	<i>Tourism</i>	<i>Hides and ivory</i>	<i>Other</i>	<i>Total</i>
<i>Income (US\$ million) by activity</i>	18.15	0.46	1.17	0.51	20.29
<i>% of income by activity</i>	89%	2%	6%	3%	100%

(Source: WWF-SARPO; using official exchange rates)

Wildlife revenue is allocated annually, in arrears, to: wildlife producer wards as per household payouts or as community project development funds; to wildlife management activities; and to a council levy. In 1991, as a response to highly variable sub-district allocations by district councils, the DNPWLM issued the "CAMPFIRE Guidelines." These recommended that at least 50% of wildlife revenues should be allocated to producer wards, up to 35% should be retained by each RDC for wildlife-specific activities and 15% could be appropriate by the council for general revenues. At a national level, the guidelines have been implemented (see following table). At district level however, the disbursement of wildlife revenue has been characterized by a high degree of variability both within and between districts. This has led to the conclusion that the weak and unenforceable policy framework is allowing RDC's to control and opportunistically allocate wildlife revenue (Bond, 1999). In addition, about 19% of the total income earned has remained unaccounted for under the CAMPFIRE Guidelines.

The allocation of wildlife revenue earned by RDCs between 1989 and 2001

	<i>Producer wards</i>	<i>Wildlife management</i>	<i>Council levy</i>	<i>Other, and not recorded</i>	<i>Total</i>
<i>Revenue (US\$ million)</i>	9.89	4.08	2.51	3.81	20.29
<i>% of total revenue allocated</i>	49%	20%	12%	19%	100%

(Source: WWF-SARPO; using official exchange rates)

Since the start of CAMPFIRE, the method of allocating wildlife revenue between wards has been extremely contentious. Overall, there has been evolution towards the implementation of the “producer ward principle” so that the bulk of the disbursement goes to the ward in which the animal was killed (Bond, 1999). The increasing use of the “producer ward principle” can be considered as an indicator of increasing proprietorship over wildlife at sub-district levels. However, RDCs still retain a high degree of control over the revenue earned from wildlife. The financial incentives derived from wildlife plus the high degree of control have resulted in a significant change in the attitudes of RDCs to wildlife, who now see it as a major source of council revenue.

Since 1989, the number of wards that receive wildlife revenues annually has risen from 16 to approximately 100. Within each ward, the gross annual benefit per household at ward level has been highly variable (see following table). The expansion of CAMPFIRE from 2 to 16 districts, and therefore the inclusion of lower potential wildlife areas, was one cause of the median benefit per household by ward declining from US\$19.60 in 1989 to US\$2.95 in 1994. Between 1995 and 1999 the median benefit has varied between US\$2.20 in 1998 and US\$5.80 in 1999. This means for example, that in 1999 the gross benefit per household was US\$5.78 or less in 50 of the 100 wards for which data are available. These figures demonstrate two important facts: the significant variability of the wildlife benefits between wards (i.e. the range) and that in most wards the gross benefit per household appears to be low. In most wards, the income per household from wildlife is purely supplementary to income from other sources (Bond, 1999); remittances from family members in employment elsewhere invariably dominate household incomes.

Household level benefits (US\$) from wildlife revenue, 1989-1999

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<i>Number of wards</i>	14	40	56	73	97	98	103	92	96	86	100
<i>Median benefit per household</i>	19.60	6.10	5.80	5.70	4.70	3.00	5.00	4.90	3.50	2.20	5.80
<i>Minimum benefit per household</i>	2.40	0.60	0.20	0.40	0.10	0.20	0.10	0.20	0.20	0.20	0.20
<i>Maximum benefit per household</i>	234	263	198	450	590	648	503	549	494	252	197

(Source: WWF-SARPO; using official exchange rates)

The low benefits earned from wildlife are a function of both biophysical and institutional factors. A model of human population density and wildlife production shows that, as is to be expected, a negative exponential relationship exists, such that at low human population densities the potential to earn income from wildlife is highest (Bond, 1999). However, very small increases in human population density exacerbate the competition for key resource areas (such as dambos and riverine soils) and result in substantial declines in wildlife production. More families have to share the reducing wildlife revenue. Within the overall CAMPFIRE programme there are only handful of wards that can still be considered high potential areas or significant producers of wildlife. Institutionally, producer wards are frequently constrained by the opportunistic attitudes of RDCs to wildlife revenue, since wildlife revenue constitutes a significant proportion of locally generated and total district income and is therefore susceptible to diversion into RDC activities outside the producer wards.

As noted in Section 3.4.5.1, a delicate balance exists between various socio-economic factors that influence the extent to which biodiversity is conserved under a community-based resource management system.

These factors include:

- the balance between the allocation of land for wildlife schemes, which tend to produce benefits at a community level, and competing agricultural land-uses that produce more direct benefits at the level of individual households;
- the balance between the proportion of CAMPFIRE earnings retained by Rural District Councils and the proportion returned to producer communities for their local development needs or for per household dividends;
- the balance between the inherent human desire for individual gain from wildlife resources (through poaching and habitat degradation), and the cohesion of the community in resisting this tendency.

In various Communal Lands of Zimbabwe, it can also be anticipated (perhaps paradoxically) that this problem of wildlife displacement will generally be accelerated through the resettlement programme, rather than alleviated. Given the land pressure that already exists within most of these areas (being the main driving force for fast-track resettlement), it is inevitable that any in-migration of people (losing work on farms, or on mines and in cities due to Zimbabwe's economic downturn) will have to be absorbed on sites of relatively low agricultural potential that are not already settled. It is those areas that constitute the remaining refuges and corridors for wildlife within Communal Lands.

It is still debatable how the land reform programme will change overall human population densities in Communal Lands, which are generally already populated well above the threshold level of human density that excludes large mammals; it is highly unlikely that the resettlement process could decongest any of these areas to below this threshold. Where farm-worker communities are displaced into relatively uncongested Communal Lands, even slight population increases may push the human densities above the threshold that excludes large animals. Communal Lands that have low agricultural potential (agro-ecological region V) are the least populated and therefore the ones that are most likely to absorb displaced communities. They are also the ones with the highest remaining wildlife potential, as well as being the most arid. The latter characteristic means that new residents will inevitably put pressure on a limited number of water sources and on habitats that maintain grazing for livestock during the dry season. Thus the wildlife exclusion process will be particularly dramatic in such areas, which include not only the Muzarabani and lower Guruve areas (see Section 3.4.5.2), but also extensive Communal Lands in the Zambezi Region, south of Lake Kariba.

ANNEX E

LESSONS LEARNED FROM COMMUNITY BUSINESS PARTICIPATION IN MADIKWE GAME RESERVE, SOUTH AFRICA

Madikwe is a 58,000 ha state-land Game Reserve located in the North West Province of South Africa, and managed by the North West Parks and Tourism Board. Prior to its establishment in 1991, most of the land consisted of degraded cattle farms. It was developed after detailed studies of land-use options showed conclusively that wildlife-based operations would be more profitable, and would be a greater stimulus to the development of local communities, than alternative land-uses such as cattle production. These economic studies were a major source of reference material for an equivalent study (Price Waterhouse, 1994) that was undertaken to investigate the rationale for a transformation of the Lowveld conservancies in Zimbabwe from cattle ranching to wildlife-based operations.

Madikwe has been an innovative and very successful partnership between the State (represented by the North West Parks and Tourism Board), local communities and the private sector. Since the socio-economic and ecological factors pertaining to this scheme are very similar to those that pertain to the large Lowveld conservancies, there is much that can be learned from the experiences at Madikwe, and applied to land reform in commercial wildlife areas of Zimbabwe. Plans for a "Madikwe Peoples Park" (also known as the Dwarsberg Joint Venture Conservancy), linked to the Game Reserve but including settlement, are also highly relevant.

The following sections of relevance to community development and small-business involvement are extracted from: Davies, R. (compiler) and Brett, M. (editor). 2003. Madikwe Game Reserve: A Decade of Progress. North West Parks & Tourism Board, Mmabatho, South Africa.

MAXIMIZING THE FLOW OF BENEFITS TO THE RURAL POOR

Strategies adopted for optimizing the flow of benefits from the park to the rural poor were based on the findings of a major research programme conducted by Mafisa Planning and Research at some 36 game lodges in six southern African countries. This study found that the main channels through which benefits from the industry flow into the local economy are the following:

- Wages earned from formal employment of local people in the lodge industry at various levels of the enterprise ranging from manual labour to senior management positions;
- Revenues earned by outsourcing various services to local small businesses located in the local area;
- Benefits derived from the key role played by lodge management and staff in terms of helping to plan and implement development projects in surrounding rural area;
- All of the above benefit flows, and especially the ability of the rural poor to command the lion's share of the wage bill, are enhanced by skills development and training programmes;
- Leases and rentals that rural communities earn from making communal land and its wildlife resources available to private sector lodge developers;
- Dividends or rents that rural people can derive from owning a share (equity) in lodge enterprises.

The case studies indicated that where there is a devolution of land or other resource rights, local residents have an important bargaining platform from which they are able to structure employment and other arrangements for their greater benefit. In the case of Madikwe, local residents have no formal land or use rights in the game reserve. Thus the option to collect leases or rentals from conservation or tourism agencies, or to use such rights to bargain for a greater flow of benefits does not exist. However one of the key innovations at Madikwe was to create a situation in which the local residents were able to acquire long-term commercial rights inside the game reserve thus allowing them to own lodge enterprises in partnership with private sector companies. The Madikwe Initiative

attempted to optimize the flow of benefits from the game reserve to the rural poor via four main mechanisms:

- Increasing the amount of the lodge industry's wage bill captured by local households;
- Increasing the ability of local people to take up employment at all levels of the lodge industry through skills development programmes;
- Stimulation of a variety of small businesses capable of taking up contracts inside the game reserve and its lodges;
- Creating the conditions for local residents to develop their own lodges in the reserve in partnership with professional operators and lodge developers from the private sector.

LINKAGES BETWEEN THE GAME RESERVE AND SMALL BUSINESSES

A major thrust of the programme was to set up and support a number of small businesses in the villages capable of taking advantage of contracts for work that was required by the lodges or the reserve itself. The achievements of the small business programme have been mixed with patchy performance and a number of significant problems encountered.

The initial programme design placed considerable emphasis on the training of community members in small business and relevant technical skills. A number of business opportunities were identified including:

- Brick-making to supply the villages and also the lodges;
- Bush-clearing (to remove invasive plants that had colonized many parts of the old cattle farms in Madikwe);
- Various cultural tourism activities such as the formation of a theatre group to perform in the lodges;
- The creation of a village-based film group capable of participating in professional documentaries at Madikwe and also designed to film local village events.

A number of failures occurred in the early years of the initiative. Firstly, it was originally assumed that small businesses could be started as collectives, and individuals were recruited into these businesses almost on a voluntary basis and without the strict screening and selection that took place in the skill development programme. In the early stages, many of the businesses were marked by much internal rivalry and poor performance by many of the members. Significant amounts were spent on training individuals who were either not committed to the business or not suited to the type of work required.

Secondly, businesses were initiated, and training begun, before firm contracts and fixed sources of demand for the work of these businesses were in place. Thus the theatre group did a couple of fine performances for some of the lodges, but dissipated when the managers of many lodges debated about whether it was worth employing the group. The film group made two films in partnership with professional documentary companies for which the members were well-paid, but was unable to get offers of work within the villages to film weddings and other communal events, resulting in the eventual disbanding of the group.

Thirdly, not enough attention was paid to the possibility that the new businesses would compete with and threaten existing entrepreneurial activities in the village. Thus the theatre group was actively opposed by senior leaders in one of the villages who had plans to set up their own dance and gum-boot dancing troupe. The brick-making business was actively undermined in another village by the owner of an existing general dealing who sold bricks and building material, and had strong connections with members of the traditional authority.

Fourthly, it was assumed that members of the new businesses would be motivated by the opportunity to make a profit from contracts secured that they would share among themselves. In fact, many of the members of these businesses indicated a strong preference to earn a regular wage, even if this

was less than the potential profit-share, and were unwilling to take the risks required to make a profit-orientated small enterprise work. Many of the businesses were constantly plagued by an abiding demand from the members for wage contracts rather than profit share arrangements.

The most successful small businesses were the brick-making teams that secured steady and regular contracts from the North West Parks and Tourism Board for the making of drifts across sections of roads in the reserve prone to flooding, and the bush-clearing teams that were employed to remove invasive species. These businesses earned substantial revenues for the families whose members worked on these public works programmes. This points to the vital importance of state agencies exercising their obligation to adopt procurement policies that favour the small emerging businesses in disadvantaged sections of the rural economy. However it is also true that none of these businesses went on to sustain themselves by procuring new sources of work after the contracts from Parks Board expired.

CONCLUSION

A number of important lessons regarding the Madikwe Game Reserve in particular, and efforts to link conservation and tourism with local development and poverty alleviation in general, arise from the above analysis.

These indicate, firstly, that wages from the formal lodge industry in a protected area remain the single most significant contribution to poverty alleviation. The mechanism for optimizing this flow of rural benefit, by means of a skills development programme that maximizes the ability of the local people to take up all levels of employment in the industry, is a relatively cost-effective and efficient project partly because it works in partnership with the private sector. And the subjective benefits that are derived from confidence and capacity gained by local residents remain very high.

Secondly, revenues earned by small businesses taking up opportunities to supply the game reserve and lodges with goods and services were relatively small in quantity and irregular, despite large amounts of effort and money spent on support for such businesses. And the demoralising effect of failure or stop-start performance was high. However as the level of development escalates – a process which is currently underway in Madikwe – an economy of scale will emerge that could support a wider range of business linkages between the core tourism industry and small rural suppliers. It is likely that such a programme could draw on business linkage models that have been applied successfully in other sectors. Questions of scale (the need to ensure ongoing and sufficient demand to underpin the businesses of local suppliers) and symmetry (matching the requirements of the tourism industry with the productive capacity of the local economy), will be crucial to such a programme.

Finally, the Lekgophung Lodge, along with the Molatedi Lodge in progress, demonstrates that it is possible for rural people, even those without formal land rights in a protected area, to acquire significant revenues from the formal tourism sector. This will be possible if they are granted formal concession rights, and receive appropriate support in setting up a business partnership around these rights with the private sector and the conservation agency. In addition the granting of these commercial rights to people formerly excluded from the mainstream economy can have significant impacts along the other two main flows of benefit to the poor. The demonstration that the local villages can collectively own their own high value business, can significantly boost the performance of small businesses in the villages, overcoming many cultural and historical obstacles that exist. And ownership makes it much easier to structure employment and skills development programmes that favour residents of the village that collectively owns the lodge.

The seed of a rights-based approach was sown by the management of Madikwe in 1991 through its theoretical commitment to a partnership between the state, private sector and communities. It is only through the Lekgophung and Molatedi lodge initiatives some 10 years later that the mechanisms for translating those good intentions into practice have come to fruition.

A summary of the key lessons learnt at Madikwe, lessons that can be replicated in other integrated conservation and development projects only on condition that they are not applied as a blueprint, are as follows:

- Local communities near protected wildlife areas can maximize benefits from park development sustainably through community-owned enterprises with long-term concession rights and by using some capital subsidy and private partnerships, even under the new cost-recovery paradigm of wildlife estate management by conservation authorities;
- Learnership-style interventions to advance local residents to senior employment in the conservation tourism industry is a highly effective way to increase local participation in the industry, and the percentage of income captured by local communities;
- A steering committee, or other form of strong and stable local governance, led by an appropriately mandated and resourced leading stakeholder, and established with good consultation with key stakeholders, can coordinate development processes, build trust, mediate and resolve conflicts, and serve as an effective monitoring and evaluation mechanism;
- In situations of high unemployment, with competitors paying exploitative wages, and the presence in communities of anti-entrepreneurial local cultural traits, basic entrepreneurial training and mentorship with access to support services is unlikely to achieve improved livelihoods of trainees. State and private-sector agencies involved in contracting out for services of small businesses need to be prodded into adopting procurement policies that provide local small businesses with stable and long-term contracts. Provided such procurement policies and economies of scale are in place, business linkage programmes may bring significant benefits to local suppliers;
- The Lekgophung Lodge (and the Molatedi Lodge in progress) indicate that a dynamic integrated intervention programme focused on an economically viable and technically sound anchor project, with good multi-stakeholder process management and capacity building inputs, can achieve significant community-affirmative policy shifts on the part of the conservation authority. The capture of economic benefits by local communities can be optimised through a viable lead or anchor project, which also generates many spin-off secondary enterprise and self-employment opportunities;
- A significant level of support from an "outside" agency can generate a "critical mass" of multi-faceted and layered support to generate momentum in an initiative, and provide for increased stability and mediation of conflicts;
- In building social capital in integrated development initiatives, it is necessary to develop focused partnerships between well-positioned and equipped partners for support service delivery (traditionally NGO activities), enterprise development (normally private sector partners), and for multi-stakeholder development coordination (ideally through mandated state authority body), ensuring the inclusion of mechanisms to optimise negotiating power parity of community partners.