

CARR FOUNDATION PROPOSAL FOR GORONGOSA NATIONAL PARK BUFFER ZONE DELIMITATION AND MANAGEMENT OF THE GREATER GORONGOSA ECOSYSTEM

Prepared by
Dr. Richard Beilfuss
Director, Gorongosa Research Center

Presented at the Fourth Gorongosa National Park Stakeholders Meeting
January 2006

1. Introduction

At the third Gorongosa NP stakeholders workshop held in September 2005, participants sought to create a common vision on the buffer zone of Gorongosa NP among the major stakeholders who work in and around the park. The main questions debated during the workshop were:

- What is the objective of a buffer zone?
- How big should the buffer zone be? and
- What type of activities should be promoted or prohibited in the buffer zone?

Results from previous stakeholder meetings:

- While most participants, especially those working in the district administration and agriculture offices uniformly agreed that the buffer zone is a zone where human activities have to be limited to provide a protective zone around the park, the vision on exactly what human activities should be allowed in this zone varied very much.
- The communities living in areas adjacent or in the park must be included in the process (stressed particularly by the Governor of Sofala Province)
- GTZ/PRODER and ORAM have started a process of CBNRM by assisting communities to delimitate their areas; many valuable experiences are already existing
- The Gorongosa Mountain and surrounding areas, especially those including major rivers which feed the park with water throughout the year are vital to preserve, in order to maintain the ecosystem balance and biodiversity in the park in the future
- Areas around the mountain and rivers are heavily populated as they represent land favourable for agricultural production
- The legal procedures for communities to benefit from the 20% contribution to Government imposed taxes on economic exploitation of natural resources has been approved by the Council of Ministers (March 2005)

The Carr Foundation agreed to conduct background research on buffer zones to further the discussion and provide recommendations for buffer zone delimitation and management for Gorongosa National Park. This presentation describes our findings and provides our recommendations for establishment of management zones around Gorongosa NP.

At the fourth Gorongosa NP stakeholders workshop held in January 2006, a draft proposal for buffer zone delimitation and management was presented to participants. This revised draft proposal incorporates key findings from these discussions.

I wish to acknowledge and thank the following people for their assistance in the preparation of this presentation:

Carlos Bento (Museum of Natural History-Maputo)
Bridget Conneely (Carr Foundation—see also appendix to this report)
Yvonne Doerffler (CDS-RN)
Carrie Gross (Carr Foundation)
Jean-Paul Vermeulen (GTZ)

2. Economic considerations for buffer zone delimitation and management: a brief literature synopsis

Ebregt and Greve (2000) provide the most comprehensive overview of buffer zones and their management in developing countries. They conclude:

“No blue-print model exists for the development of buffer zones. Establishing buffer zones is highly situational and can only be achieved successfully through a process approach that includes all stakeholders and integrates ecological, social and economic, and institutional aspects.” (Ebregt and Greve 2000)

However, we can learn valuable insights from the collective experience with buffer zone delineation and management, including community demarcation, community-based conservation, and revenue-sharing in Africa (Kenya, Uganda, Zimbabwe, Zambia, Namibia, Malawi, Tanzania) and even Mozambique (including Tchuma Tchato Programme, Limpopo NP, Niassa Game Reserve, Zambezi Delta Ramsar Site).

Achievements of Community Conservation in Africa (Barrow and Murphree 2001)

1. *Environmental conservation*—CC has helped shape behaviors to be more compatible with conservation; as long as targets are realistic—not a 19th century preservation utopia, but a scenario of environmental change in which resource users are motivated to include wildlife and wildlife habitats as assets available for present or future benefit rather than liabilities
2. *Economic efficiency*—CC has helped integrate natural resources into local, national, and international markets so that values can be realized—expand the high value-added activities of safari hunting and tourism)
3. *Poverty reduction*—CC has been associated with poverty reduction activities and has realized some benefits, but except where very low population densities, benefits are only small (though welcome) increments to livelihoods at best.
4. *Institutional development*—CC has contributed for capacity building for sustainable development and conservation

Communities have intrinsic cultural and religious values for wildlife (conservation ethic) but wildlife and tourism must be economically competitive because increased human population and alternative land uses are resulting in increased competition for land and resources (Jones 2001)

The benefit-sharing model (Emerton 2001)

Wildlife generates multiple economic benefits to the national economy and to the global community but few of the benefits from wildlife accrue to local communities, which are economically marginalized.

Therefore communities have little incentive to conserve the wildlife on their lands, and may not be able to afford to do so. However, if wildlife revenues are redistributed to communities through the provision of development benefits such as infrastructure, water, employment, livestock, enterprise development, education, then wildlife is seen to generate local benefits and community welfare increases, and landholders have an economic incentive to conserve wildlife

Benefit distribution is a necessary, but in itself not sufficient, condition for communities to engage in wildlife conservation around protected areas. Additional conditions that must be fulfilled for the benefits-sharing to work include:

- Community economic benefits from wildlife conservation are as a whole greater than the total costs incurred to communities by wildlife
- The net benefits accruing to participants from complying with a community approach to wildlife conservation exceed the transaction costs of their forgoing other productive opportunities in order to allocate time to wildlife-related activities
- Community wildlife benefits accrue as real financial and livelihood benefits to households (such as income, consumption goods, employment)
- No community member whose economic activities impact on wildlife is made tangibly worse off as a result of conservation

The four “capitals” required for community mobilization for buffer zone management (Budhathoki 2005)

1. *Social capital*--developing cohesive and self-reliant organizations – user groups -- at the grassroots levels to empower communities to undertake sustainable community development and conservation activities—motivating, organizing, and mobilizing all households to engage in decision-making

2. *Financial capital*--promoting community savings schemes to mobilize financial capital resources for community projects—user groups utilize internal capital fund for the provision of small credit facilities to its own members—credit cooperatives

3. *Human resources/capital*--enhancing capacity through training and skills development—including foundation for grassroots institutional development, improving service delivery, improving capacity and efficiency of user groups to carry out economic activities

4. *Environmental capital*--entrusting resource users the rights to manage natural resources/environmental governance—thereby encouraging investment in conservation and sustainable use

Private sector involvement in community conservation

The private sector can play an important and positive role in community conservation, provided the power relations can be equalized as far as possible. For this to succeed, however, there is a need for capacity building within communities and in the private section, especially with respect to managerial style.

Communities must develop capacity to negotiate better deals with the private sector and to regulate them more effectively. Those working in private sector must understand that the pace at which communities make decisions is much slower than they are used to. There is need to foster a more socially-responsible private sector by ‘educating’ private operators and by encouraging self-regulation (both as a moral argument and a bottom-line argument for long-term agreements). When communities have legal status as proprietors of wildlife and associated habitats, they also are in a much stronger position to negotiate with private sector (Jones and Murphree 2001).

Incentives for conservation at the individuals, households, and community level

Communities are highly heterogeneous, distinguished by age, gender, ethnicity, socio-economic status and other factors. These groups compete in different ways for the rights, revenue, and resources which are available. Can be difficult to reconcile these differences and have equitable distribution of benefits towards broad-based creation of a social fence for conservation.

In most cases in Africa, the financial benefit per household from wildlife revenue is low, in most years constituting less than 10 percent of gross agricultural production. Where wildlife only contributes marginally to the local and household economies, doubtful that individuals will be motivated to manage the wildlife beyond a certain minimal threshold. This is exacerbated because increased wildlife as a result of community efforts and park rehabilitation may result in increased competition between wildlife and livestock for water and grazing, increased damage to water points by elephants, and stock losses to predators. These increasing costs of conservation may require compensating increase in benefits (Jones and Murphree 2001).

Ultimately, providing communities with economic incentives to conserve wildlife means ensuring that they are better off in financial and livelihood terms with wildlife than they would be without it, at the same time as overcoming the root economic factors which cause them to engage in economic activities which threaten or deplete wildlife resources (Emerton 2001).

4. Review of types of buffer zones

There are many different ways to categorize resource management zones around protected areas, including

- Core zone
- Buffer zone
- Transition zone
- Multiple use zone
- Traditional use zone
- Wildlife corridor
- Riparian buffer

Core Zone

The core zone must be state owned and the landscapes, ecosystems and species within it must be legally protected for long-term conservation of natural resources. The management of this area generally ranges from pristine wilderness with no human use, to areas with infrastructure to support park management, ecotourism, and scientific monitoring.

We propose that the core zone for Gorongosa is the official Gorongosa NP park boundaries, based on the most current, legally-accepted delimitation (1967).

Buffer Zone

The buffer zone is an area surrounding or adjacent to the core area where land use activities are managed for the further protection of the core area. The boundaries of the buffer zone are clearly defined and land use practices within it are strictly managed. One of the most widely accepted and comprehensive definitions of a buffer zone is:

“Any area, often peripheral to a protected area, inside or outside, in which activities are implemented or the area managed with the aim of enhancing the positive and reducing the negative impacts of conservation on neighbouring communities and neighbouring communities on conservation”. (Wild & Mutebi 1997)

We will discuss buffer zones recommendations for the Greater Gorongosa region below.

Transition Zone

The transition area is an area adjacent to the buffer or core areas in which the sustainable use of resources is encouraged. This area is managed according to local laws and customs but there is a partnership between the communities, park stakeholders, and donors in which sustainable resource use is promoted through educational outreach and various community programs and investments.

Transition zones are often vital for protecting large areas such as catchments or wildlife corridors, that are cannot be strictly managed as buffer zones, through outreach and incentive programs. We will discuss transition zones for the Greater Gorongosa region below.

Multiple Use Zone

A multiple use zone is any area which is managed for distinct land uses in different parts of the zone. This zone is divided into specific areas that allow for such activities as farming, fishing, hunting, forest use, tourism, infrastructure development, or others. These activities are closely monitored by the communities, agencies, or other organizations responsible for managing the zone to ensure that regulations are being adhered to. Buffer zones and transition zones may be considered multiple use zones.

The community demarcation process is creating multiple use zones for the lands around Gorongosa NP. For example, Canda and Nhambita each defined three land use zones:

- agriculture and settlement zone
- forest extraction zone
- conservation of natural resources zone

Traditional Use Zone

A traditional use zone is an area, either inside or outside of a reserve, which is protected for the purpose of conserving traditional knowledge and land use practices in a sustainable way. The land use in this zone is generally low intensity subsistence use. The goal is to allow these practices to continue, and the needs of the people met, in such a way as to preserve the natural integrity of the area. In some cases traditional land use practices may have to be restricted or modified to meet this goal. The size and design of this zone depends largely upon land use and community structure. For instance, if shifting cultivation is allowed, the area should be large enough to allow crop rotation.

Wildlife Corridor

A wildlife corridor generally forms a link between two reserves for the purpose of providing the habitat necessary for wildlife to move safely between the two areas. In order to establish a wildlife corridor, the species of concern must be identified and ecological information gathered. The size and shape of the corridor is dependent largely on the migration pattern, home range and habitat requirements of the species

There are several important wildlife corridors connecting to Gorongosa NP. For example, the Cheringoma escarpment is a corridor for wildlife movement between Gorongosa NP and the Marromeu Buffalo

Reserve. We will discuss wildlife corridor management recommendations for the Greater Gorongosa region below.

Riparian Buffer

A riparian buffer is a strip of natural vegetation on either side of a stream which is of a designated width. The purpose of this buffer is to protect the stream from outside pollution and erosion, as well as to support the biodiversity of the stream ecosystem. The width of the strip is generally determined by the slope of the land, size of the river, and land use adjacent to the river.

The Mozambique 10/1999 Forest and Wildlife Law mandates a 50 meter riparian buffer strip along each side of a rivers or streams. Agricultural development and settlement is prohibited in the riparian buffer.

5. Zonation within Gorongosa NP

In the pending Agreement for the Long Term Administration of Gorongosa National Park, the boundaries of the Park were proposed as follows:

- The boundary of the Park established in Legal Diploma number 27/50 of 1967;
- The boundary of the area demarcated in terms of article n.º 2 of Legislative Diploma 29/35 dated as of 22nd of November 1969 (*Regime de Vigilancia da Extinta Coutada No. 1*).

With this definition, Gorongosa NP – the Core Zone – covers 5250 km². We are in the process of defining Park Management Zones for this area, including:

- The Special Protection and Wilderness Zone;
- The Tourism Recreation Zone;
- The Tourism Lodging Zone;
- The Park Administration Zone;
- The Human Settlement Zone.

Through the Gorongosa Steering Committee and stakeholder processes, we will define policies and strategies addressing human settlements and for resource use inside the park, including fishing, wildlife, water, grazing, and vegetation such as firewood, medicinal plants, thatch grasses, reed mats, and palm wine.

6. Gorongosa NP Buffer Zone

In the pending Agreement for the Long Term Administration of Gorongosa National Park, the process of buffer zone demarcation for the Park is described. It is noted that:

- The applicable laws provide that every national park shall be surrounded by an area adjacent to the national park that shall form the transition area between the national park and areas of multiple utilization, and this transition area shall be designated as the Buffer Zone;
- Such Buffer Zone shall serve to control and reduce the impact resulting from human activity upon the respective protected area;
- The applicable laws provide only for the criteria to be followed in determining the extension of the Buffer Zone, and attribute the competence for the creation of the said Buffer Zone to the Council of Ministers;
- There is no legally established Buffer Zone yet defined for the Park; and

It is also noted that there is currently insufficient technical information to allow for the establishment of the boundaries of the geographical area that shall constitute the Park's Buffer Zone, and it is agreed that the establishment of the geographical area that constitutes the Buffer Zone of the Park will be carried out

after due proper studies and evaluations of the surrounding areas of the Park have been conducted and it is possible to establish which of these areas surrounding the Park require to be managed with the aim to reduce the negative impact on conservation and to reduce the impact of human activities. It is further noted that for the purposes of defining the Park's Buffer Zone, the Park Management Team is responsible for ensuring the conduction of all necessary studies and evaluations to determine the geographical area of the Park that shall constitute the Park's Buffer Zone.

Upon the completion of such studies and evaluations the Park Management Team will present a proposed demarcation of the Park's Buffer Zone to the Oversight Committee for approval and upon such approval of the proposed demarcations the Minister of Tourism (which powers to do so have been delegated by the Council of Ministers in terms of the Decree) will issue the necessary relevant law to create the Park Buffer Zone.

The Buffer Zone of the Park will include but not be limited to (unless otherwise established by the studies and evaluations to be conducted):

- Designated portions of land attributed to the Communities;
- The boundary of the area demarcated in terms of article n.º 2 of Legislative Diploma 27/67 dated as of 29th of July 1967 (*Regime de Vigilancia da Extinta Coutada No. 3*);
- Designated portions of land within the jurisdiction of the Districts of Gorongosa, Nhamatanda, Cheringoma, Muanza and Dondo;
- The entire area of the Gorongosa Mountain occurring above 700 (seven hundred) meters of elevation;
- The riparian corridor of 50-meter width on each bank along the Nhandugue, Vunduzi, and Mucoza Rivers between the Gorongosa Mountain and the Park;
- The floodplain of the Púngue River extending from the southern border of the Park to the National Road number 6 (six)”

As noted, we propose that the Gorongosa NP Buffer Zone be defined with the engagement of local communities through the District land use planning processes for Gorongosa, Muanza, Cheringoma, Nhamatanda, and Dondo. The buffer zone might be derived in part from the conservation zones (*Zonas de Conservação*) proposed by each community for the demarcation process. To date, conservation zones have been recommended for two of the communities (Nhamatanda and Canda) around Gorongosa NP, but these may need to be reevaluated in this current context of buffer zone planning.

The community demarcation process, facilitated by GTZ and ORAM, will take several more years before all the communities are completed. The Carr Foundation will provide extensive technical support and other assistance to communities and districts during the planning process.

Community-based buffer zone management must be hand-in-hand with law enforcement.

7. Recommended land use in the Buffer Zone

The goal for the buffer zone is first and foremost to create and sustain a “social fence” around the core zone, Gorongosa National Park. We recognize that in some communal lands outside the park, this may best be accomplished by having a buffer area between intensive land use areas and the park. In other areas, especially those where the majority of community land holdings occur inside the park, the extent of buffer zone may be minimal with emphasis on reducing human activities inside the core zone.

Recommended land uses in those areas designated as buffer zone include:

- controlled hunting by community members for home consumption*

- communities may enter into negotiations with hunting operators for trophy safari hunting as wildlife populations recover
- collection of fire wood for local consumption
- bee-keeping and collection of other non-forest products such as medicinal plants
- controlled ecotourism activities, such as camps from local materials (no permanent structures), hiking trails, and other ecologically-compatible activities
- no social infrastructure development
- no agriculture
- no mining
- no commercial exploitation of forests
- no adverse impact on water quality or quantity
- stringent fire control systems implemented by the communities
- control of alien invasive species

*Note: park management will be responsible for controlling problem animal species in this zone (for example, in cases of human death or injury, damage to perennial crops such as bananas on communal lands, etc).

8. Revenue-sharing associated with buffer zone management and park protection

We propose that park revenues will be shared with each of the communities associated with Gorongosa NP. Each community is responsible for:

- A. engaging community members in activities that are beneficial to the park:
 - controlling fire
 - reducing "poaching"
 - restricting illegal entry and use of natural resources in the park
 - controlling alien invasive species
- B. meeting the requirements of buffer zone restrictions (described above) where applicable

Staff of the Community Relations Department of Gorongosa NP will work with community representatives and other NGOs to define cooperative arrangements for revenue sharing that meet these responsibilities/requirements. For example, negotiations are currently underway with Canda community for ecotourism development on Gorongosa Mountain. Payments may take the form of "Payments for Environmental Services," and/or compensation for economic damages associated with park protection. Communities will determine how funds are allocated internally.

Our baseline research will assist community leaders in identifying areas within the communities where households perceive they are affected negatively by the park (the zone of economic opportunity cost) and where revenue sharing should address those concerns in order to most effectively build social support for conservation.

9. Other benefits associated with the buffer zone and park protection

In addition to revenue-sharing, Gorongosa NP offers the potential for numerous benefits to the communities living around the park. These may include:

- Employment opportunities
- Revenue from ecotourism operations
- Revenue and wildlife products from sustainable community-based safari hunting operations
- Additional funding support for community development projects from donors attracted to region

- Farming contracts for producing vegetables, honey, and other local products for tourists and park employees
- Agricultural outreach to promote sustainable land use projects such as permaculture, bee-keeping, and value-added forestry.
- Education and outreach, including the children’s education camp at Chitengo and outreach to local schools
- Increased availability of consumer goods
- Improved roads and transportation opportunities
- Improved health care provision
- Ecosystem services associated with park protection such as clean water, clean air, erosion control
- Maintaining wildlife populations and ecosystems for possible future uses
- Preserving the intrinsic values of wildlife (cultural, religious, aesthetic)
- Control of problem animal species causing human injury or significant damage to crops or livestock

We seek to link all community benefits to the presence of Gorongosa NP, directly or indirectly, towards building strong social support for the park.

10. Catchment Protection Zone

In addition to the Buffer Zone, we propose a second Buffer Zone (essentially a Transition Zone) for assuring the sustainable management of water resources in the Greater Gorongosa region.

The survival of Gorongosa NP depends on the sustainable management of water resources throughout the entire catchment of the park. We propose a “Catchment Protection Zone” to preserve the quality and quantity of water entering into Gorongosa NP, including but not limited to:

- The entire Urema Catchment including all waters draining to the Nhandugué, Vunduzi, Mucoza, Mapuaze, Púngue, Nhanssenguere, Nhandinde, Cundue, Muanza, Muaredze and Muassapassua Rivers, all local runoff draining directly to Lake Urema and its outflow channel;
- The entire area of the Gorongosa Mountain occurring above 700 (seven hundred) meters of elevation;
- All catchment areas lying within 10 (ten) kilometers of the boundaries of the Park;

The Catchment Protection Zone is a vast area, densely populated in parts, that includes both community lands and concessions for forestry, farming, hunting, and tourism. Given its size and complex land tenure arrangements, the area therefore cannot be managed as a proper Buffer Zone with meaningful land use regulations and revenue-sharing arrangements, although some activities are expressly prohibited:

- Mining activities, including prospecting;
- Large scale water resources development or extraction projects that result in a significant adverse change in the quantity or quality of inflows to the Park;
- Land use practices that may result in a significant adverse change in the quantity or quality of inflows to the Park;
- Agricultural developments and settlements in the 50 meter strip along rivers and streams flowing to the Park; and
- Any other activities that may result in a significant adverse change in the quantity or quality of inflows to the Park.

We propose the following management activities in the Catchment Protection Zone:

- work in partnership with communities, agencies, NGOs, and other park stakeholders to promote sustainable water resource management through educational outreach and various community programs and investments
- work with agencies to enforce legal restrictions on land use affecting water resources, especially the requirement for 50 m buffer strip along rivers and streams under the Forest and Wildlife Act (Riparian Buffer)
- explore opportunities for “Payments for Environmental Services” to provide incentives for catchment conservation
- attract donors and private sector to invest in sustainable water resources development projects
- restore vegetation on riverine reaches and eroded slopes where catchment degradation has occurred

“Thresholds of Potential Concern” for water resources exploitation and water quality will be defined by research in the catchment to provide protocols for water management and development projects in this zone.

11. Sustainable wildlife management zone

In the future, we may also consider a third buffer zone, the "Sustainable Wildlife Management Zone," that includes the important corridors and linkages that are needed to sustain wildlife numbers in the park and enable wildlife movements between the park and surrounding protected areas. This zone would effectively create the “Mountain to Mangrove” linkage between Gorongosa National Park and the Marromeu Special Buffalo Reserve of the Zambezi Delta.

The "Sustainable Wildlife Management Zone" might include the following areas:

- The Rift Valley extending north from Gorongosa NP to the Zambezi River, including hunting concessions, extinct vigilancias, and community lands.
- Parts of the Cheringoma escarpment connecting Gorongosa NP to the Zambezi Delta and Cheringoma coast, including hunting and forestry concessions, Nhamitanga forest reserve, and community lands.
- The Pungue River floodplain south of Gorongosa NP—formerly included within Gorongosa NP in 1960 and currently including forestry concessions and community lands
- Parts of the Midlands connecting Gorongosa NP to Gorongosa Mountain, including community lands

Note that the "Sustainable Wildlife Management Zone" would include areas designated as Buffer Zone by the community and district land use planning process, and areas that occur within the catchment of Gorongosa NP covered by the Catchment Protection Zone (overlapping zones).

"Sustainable Wildlife Management Zone", as with the Catchment Protection Zone, is a large area that cannot be managed as a proper Buffer Zone with meaningful land use regulations and revenue-sharing arrangements.

We propose designation of this area as a Transition Zone with the following management activities:

- work in partnership with communities, agencies, NGOs, and other park stakeholders to implement community-based natural resource management (CBNRM) regimes to enable local use of natural resources while protecting vital wildlife areas
- work with agencies to enforce legal restrictions on land use affecting wildlife resources, especially rules governing concessions for forestry and hunting.

- work with concession operators to promote sustainable wildlife management practices, including science-based wildlife quotas
- explore opportunities for “Payments for Environmental Services” to provide incentives for wildlife corridor conservation
- attract donors and private sector to invest in sustainable land management projects, promoting wildlife conservation, permaculture, bee-keeping, and value-added forestry, for example

12. Other considerations

Due to population growth in the region, extractive activities will likely intensify in areas outside whatever resource management zones are established; with increasing pressure on the park, buffer zone, catchment, and wildlife corridors.

The successful conservation and management of GNP will result in ever-increasing wildlife-human conflicts. The current levels of impact and problem species identified in the community delimitation process reflect only the present, wildlife depauperate condition. In 10-20 years time, the impact zone will be greater with a higher diversity of problem species.

Perhaps the biggest challenge will be to adapt buffer zone programs in the face of the dynamic relationship between the park and people, the changing balance between the benefits and costs of living with wildlife, changing cultures, and changing land use patterns (Kangwana and Mako 2001)

13. Summary of key points

- A. GNP will provide important, diverse benefits to the communities
- B. The future of the park depends on social support for the park, and protection of the catchment and other surrounding areas
- C. There are no official mechanisms and no exact rules for buffer zone delineation or management, so we need help to develop a strategy together
- D. Issues that must be resolved include:
 - Internal zoning to address border settlements, internal settlements, resource utilization in park (as well as wilderness, recreation, lodging, and management zones)
 - Process by which communities and districts assist in the definition of the buffer zone, including assistance and capacity building needs
 - Additional areas added to community/district-defined buffer zone (ex. Coutadas, Vigilancias, concessions)
 - Resource management in the buffer zone
 - Strategies to protect the Urema catchment (and perhaps Upper Pungue catchment)
 - Strategic to protect wildlife corridors connecting to adjoining areas

14. References

Barrow, E. and M. Murphree. 2001. Community Conservation: from concept to practice. Pages 24-37 in D. Hulme and M. Murphree. African Wildlife and Livelihoods: the promise and performance of community conservation. James Currey Ltd, Oxford.

Budhathoki, P. 2005. Buffer zone initiatives in Nepal – balancing the scales. Paper presented at the Semioar on Buffer Zone Management – Ecology versus Economy. 7 November 2001, Wageningen, The Netherlands.

Ebregt, A. and P. De Greve. 2000. Buffer Zones and their Management: Policy and Best Practices for terrestrial ecosystems in developing countries. National Reference Center for Nature Management, International Agricultural Centre. Wageningen, the Netherlands.

Emerton, L. 2001. The nature of benefits and the benefits of nature: why wildlife conservation has not economically benefited communities in Africa. Pages 208-226 in D. Hulme and M. Murphree. African Wildlife and Livelihoods: the promise and performance of community conservation. James Currey Ltd, Oxford.

Jones, B. and M. Murphree. 2001. The evolution of policy on community conservation in Namibia and Zimbabwe. Pages 38-58 in D. Hulme and M. Murphree. African Wildlife and Livelihoods: the promise and performance of community conservation. James Currey Ltd, Oxford.

Wild, R.G. and J. Mutebi. 1997. Bwindi Impenetrable Forest Uganda: conservation through collaborative management. *Nature and Resources* 33(3/4):33-51.

Appendix

Background information prepared by Bridget Conneely - Carr Foundation

IUCN Protected Areas

A protected area is an area of land or sea which is legally protected for the preservation of natural and cultural resources. The IUCN's WCPA (World Commission on Protected Areas) has established six categories of protected areas. This categorization was designed to provide a consistent framework for establishment and management of protected areas worldwide. Each area that has been nationally designated as a protected area must be placed into one of these categories.

Protected Area Category	Description
Ia: Strict Nature Reserve	Managed mainly for science
Ib: Wilderness Area	Managed mainly for wilderness protection
II: National Park	Managed mainly for ecosystem protection and recreation
III: Natural Monument	Managed mainly for conservation of specific natural features
IV: Habitat/Species Management Area	Managed mainly for conservation through management intervention
V: Protected Landscape/Seascape	Managed mainly for landscape/seascape protection and recreation
VI: Managed Resource Protected Area	Managed mainly for the sustainable use of natural ecosystems

Gorongosa National Park is defined as a Category II Protected Area (National Park) and Marroneu Buffalo Reserve is defined as a Category IV Protected Area (Habitat/Species Management Area).

Buffer zones most commonly fall under category VI Protected Areas, however they can also include areas which fall under different categories. An area defined as a Managed Resource Protected Area (Category VI) can be further zoned based on land use regulations determined by the state (i.e. agriculture, timber extraction, fishing etc).

Managed Resource Protected Area (Category VI):

Definition

“[An] area containing predominantly unmodified natural systems managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.” (IUCN 1994)

Guidance for Selection

- “The area should be at least two-thirds in a natural condition, although it may also contain limited areas of modified ecosystems; large commercial plantations would *not* be appropriate for inclusion.” (IUCN 1994)
- “The area should be large enough to absorb sustainable resource uses without detriment to its overall long term values.” (IUCN 1994)

UNESCO MaB Biosphere Reserves

UNESCO launched the MaB (Man and Biosphere) program to establish a world network of protected areas designated as biospheres. There are currently 67 UNESCO recognized Biosphere Reserves in Africa. In order for a biosphere to be recognized by UNESCO, the core area must be state owned, and a nomination process must be undertaken by the national government. Once an area is designated as a biosphere, it becomes part of UNESCO’s World Network of Biosphere Reserves and is subject to a review every five years. The management and funding of the biosphere remains under the jurisdiction of the state, however, UNESCO offers scientific advice and technical guidance on the state’s conservation initiatives as well as assistance in locating funding sources.

Definition

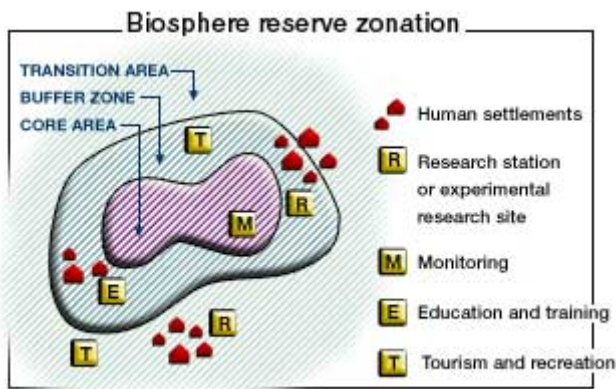
“Biosphere Reserves are areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use.” (UNESCO 2005)

Biosphere Reserves must be organized into three zones: core area, buffer zone and transition area.

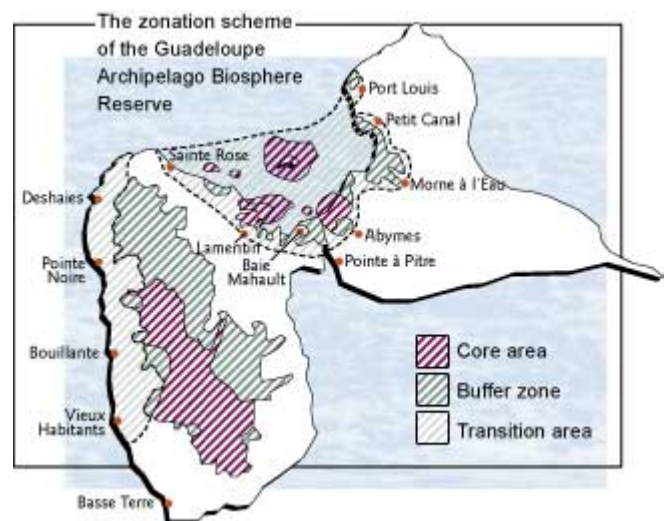
Core Area: The land must be state owned and the landscapes, ecosystems and species within it must be legally protected against outside threats. The core area is not generally subject to human activity except for research and monitoring, and in some instances traditional uses by local communities. There may be more than one core area in a biosphere reserve.

Buffer Zone: Must be clearly delineated and surrounds or is adjacent to the core area. The land may be private or state owned but there must be a certain amount of state jurisdiction over land use practices. Activities in this area must help to conserve the core areas rather than threaten conservation objectives by complying with regulations for the sustainable use of resources. Activities such as education, training, tourism and recreation are most commonly found in buffer zones.

Transition Area: This is an “area of cooperation extending outwards” from the buffer zone. The boundary of this zone may be flexible or may not be formally defined. In this area local communities, NGO’s, government organizations and private organizations work together to promote sustainable development. In contrast with the buffer zone, the focus in this area is economic and social development of communities with concern for the natural resources of the area. The activities in this area are defined by local regulations or customs.



Zonation Model of UNESCO Biosphere Reserve



Zonation from Guadeloupe Archipelago Biosphere showing two core areas

The IUCN's Categories of Protected Areas are compatible with UNESCO's Biosphere Reserve concept and the zones within a biosphere may be assigned one or more Protected Areas Categories. These categories are meant to further define management practices within each of the biosphere zones and only certain IUCN categories are compatible with each of the three zones.

IUCN Category	Biosphere Reserve Zones		
	Core	Buffer	Transition
Ia Strict Nature Reserve	✓	x	x
Ib Wilderness Area	✓	x	x
II National Park	✓	x	x
III Natural Monument	✓	x	x
IV Habitat/Species Management Area	✓	✓	x
V Protected Landscape/Seascape	x	✓	?
VI Managed Resource Protected Area	?	✓	?
✓ = compatibility of management purposes x = incompatibility of management purposes ? = management purposes may be compatible			

There are no guidelines for the area, width or shape of each zone within a biosphere reserve. The delineation process is dependent on the environmental, political and social attributes of the area. The only size criterion is that the entire biosphere reserve should be large enough to serve the three functions of a biosphere reserve: conservation of landscapes, ecosystems, species and genetic variation; sustainable economic and human development; and logistic support for education, research and monitoring projects.

Additional Zone Models

Many parks and reserves have created buffer zones independent of IUCN and UNESCO's framework. Most models for protected areas follow similar principles but are expressed in slightly different ways. The following are some examples:

1.) Reserve Network Concept

The Reserve Network Concept was formulated in the 1980's by Noss and Harris. It combines species conservation, land conservation and resource management with the overall goal of sustaining the area's species and ecological processes.

- The core "Conservation Areas" can be made up of publicly or privately owned land which must be in a natural state. There are strict restrictions to prohibit development and land use which may be detrimental to the ecology of the system.



- The “Habitat Linkage Areas” connect conservation areas and act as a corridor for the movement of wildlife. These areas must be a sufficient size and shape to allow dispersal of species of concern. The land may include both converted landscapes and wild habitat.
- The “Buffer Zone” consists of a mosaic of low intensity land uses which are well managed to support the ecological goals of the Conservation Areas.
- Some examples of suitable land uses for the buffer and linkage areas are community forests and Forest Stewardship Council (FSC) certified forests.
- The “Matrix” is the area outside of the Reserve Network which often consists of areas of human-dominated land cover types, including plantations, crop fields or towns. The land uses within the matrix have the function of meeting the needs of people, while also supporting the conservation goals of the Reserve Network.

2.) WWF Conservation Landscape Design

The WWF has published a report on how to design conservation landscapes. This approach is largely ecological and provides steps on how to delineate a “priority area” for conservation on the ecosystem level.

- To define a priority area you must first identify the key biodiversity features, such as species habitats or processes, which you are trying to conserve.
- It is the ecological requirements of these biodiversity features which will determine the size, configuration and potential land uses of the priority area.
- The core area of this “priority area” should include the features which are critical to the survival of key species or underlying processes.
- The outer boundaries of the priority areas should ideally follow natural boundaries such as watersheds. If the watershed approach is chosen, the entire drainage basin is often included.
- In some cases it may be necessary to use political units for boundary delineation.

3.) Mangroves on the Columbian Coastline

The need to preserve the unique mangrove forests on the coast of Columbia resulted in the delineation of zones of protection for the forest. An in depth analysis of the ecological and social

factors affecting the forest led to the creation of 3 zone types:

Preservation Zone	Determined solely on an ecological basis, no community use allowed
Restoration Zone	Determined based on the area’s degree of degradation. Only active restoration is allowed in this zone. If the area is restored this zone may be reclassified as either a preservation zone or a multiple use zone.
Multiple Use Zone/ Zone of Sustainable Use	Determined based on the presence of land use activities by the community and the presence of an ecological structure which is both ecologically important and able to sustain extraction of resources.

- Preliminary zoning was based on field work on community land use and ecological systems.
- Community field work studied social organization within communities, ethno cultural relations between communities, and land use practices.

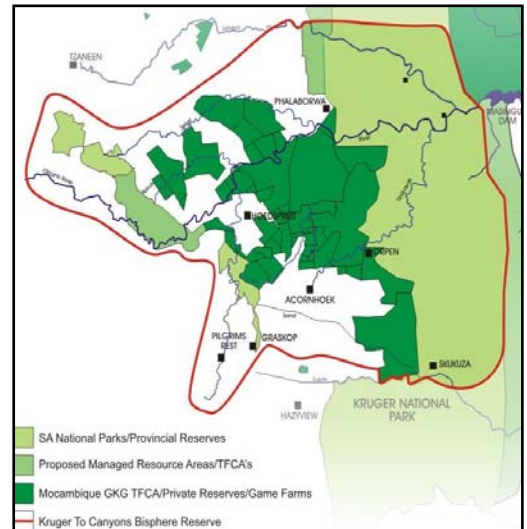
- Ecological field work studied species, abundance, relative density, frequency, dominance, value index of importance, and basal area of mangrove trees.
- Once preliminary zones were proposed, the Ministry of the Environment made a “Definite Zonification” in conjunction with the local people.

African Parks

Kruger to Canyons Biosphere Reserve, SA

The Kruger to Canyons Biosphere Reserve stretches from Kruger National Park westward to the Blyde River Canyon. This biosphere reserve forms a part of the larger “Great Limpopo Transfrontier Conservation Area” which includes areas in South Africa, Mozambique and Zimbabwe.

- The largest core area is Kruger National Park and there are smaller core areas to the west of the park.
- The buffer zone currently consists of private reserves and game farms.
- There is a proposal for two Managed Resource Areas to be added to the buffer zone.
- A majority of the area of the biosphere outside of the core area makes up the transition zone.
- More than 1.5 million people live in the transition zone which is made up of communal land.



Serengeti-Ngorongoro Biosphere Reserve, Tanzania

The Serengeti-Ngorongoro Biosphere Reserve consists of one core area, Serengeti National Park, and a string of buffer areas that surround the park.

- The buffer areas are comprised of pre-established conservation areas (Ngorongoro Conservation Area and 4 Game Reserves) as well as 4 Wildlife Management Areas (WMA's) which were established for the purpose of this buffer zone.
- The WMA's were formed as a pilot program to create a sustainable, community run model striving to accomplish the joint goals of conservation and socio-economic development of communities.
- The 18 communities surrounding Serengeti NP collaborated to submit proposals for the establishment of each of these WMA's to the park managers and local government. Legal boundaries were established around each WMA many of which include multiple communities.
- The size and shape of each of these WMA's were based on ecology, wildlife densities and other natural resources, the proposed form of land use for the area, and the cohesiveness of the communities.
- All WMA land must be leased, entrusted or owned through customary or titled systems of land tenure by villagers.
- Prior to establishment of the WMA's, park officials completed a Participatory Rural Assessment (PRA) of all villages, an aerial survey to assess resources, awareness

workshops in villages, and conducted various meetings with villagers, district authorities, and stakeholders.

- After this process, village representatives met with park officials to discuss boundaries and zoning of each potential WMA, which laid the groundwork for the “requests for establishment” which were submitted by villagers.
- Management of the WMA’s is based on the area’s land use plan which is made in consultation with community committees called “Authorized Associations”

Kogelberg Biosphere Reserve, SA

The Kogelberg Biosphere Reserve consists of multiple core areas, clearly defined buffer zones and transition areas. To establish the Biosphere Reserve they used the following criteria:

Core Area

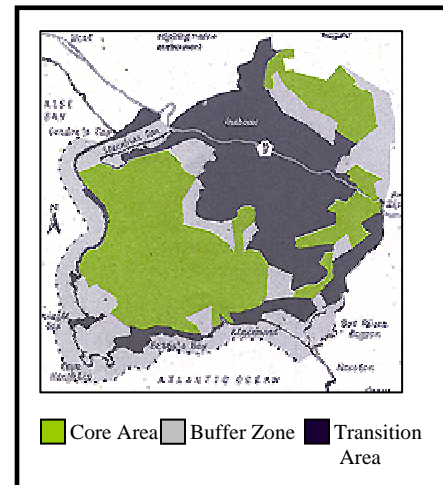
- Consists of land owned by public entities (e.g. nature reserves, national parks, state forest) which must be in a natural state.

Buffer Zone

- Consists of land owned by private, corporate or state owners which may have been transformed or developed but which could be restored to a natural or near natural state.
- The size and design of the buffer zone is dependent on the land use and ecology of the land available.
- Certain types of developments can be accommodated but the land use should be sustainable (e.g. small resorts, environmental education facilities, recreation, sustainable resource use)
- The buffer zone has a clearly defined legal boundary and strict regulations on land use.

Transition Area

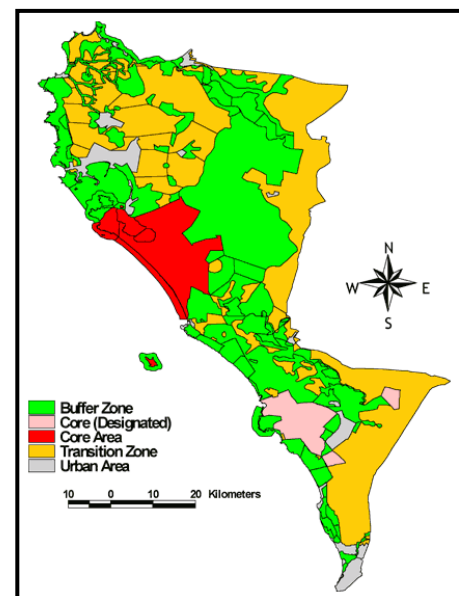
- This is the area around the buffer and is usually private or commercially owned. The land can be transformed or intensively modified.
- The focus of this area is development, as long as development is sustainable. Some examples of land uses are: agriculture, sustainable resource use, settlements, dams and estuaries for recreation.
- The boundary is not strictly defined but the transition area should correspond with important bioregions (watersheds, drainage basins etc.) wherever possible.



Cape West Coast Biosphere Reserve, SA

Cape West Coast Biosphere Reserve consists of core areas, with surrounding buffer and transition zones.

- There are two major core areas, a northern area and a southern area.
- The buffer zones are present throughout the reserve and the activities allowed in these zones include: sustainable harvesting of natural resources, eco-tourism, recreation, education and research.
- The provincial government and local authorities are responsible for enforcing restrictions on land use in the buffer zone.
- The transition area is an “area of cooperation” where the natural resources are developed sustainably for the benefit of the



Areas that are highly developed, such as towns, and areas where the land has been drastically modified, such as large plantations, are often omitted.

- Political Boundaries – It is often logical or even necessary to use a political boundary as the boundary of the buffer zone. This could mean anything from an established national border to a community border which may not be well defined. An advantage of using a political boundary is to make management of the buffer zone less complicated by not having to work with multiple governments and by not splitting communities in half.
- Ecological Features – The main purpose of the buffer zone is to protect the ecological integrity of the park, therefore, it is most important to include areas which are ecologically vital to the park ecosystem. These are most commonly major river drainages, wetlands or mountains which affect the park's water supply. These areas are often included regardless of any other social or political attributes if they are necessary for the health of the park ecosystem.
- Physical Boundaries – Depending upon the circumstances, physical boundaries such as rivers, gorges, and roads may be used as a border for the buffer zone. This makes it easier for people to differentiate between areas that are inside or outside of the buffer. One issue with this approach, however, is that these natural boundaries may split a community which makes community management more complicated.

References

Borner, Markus. *Conservation with the People – For the People*. Serengeti Park.

Burgers, Chris and Ruida Pool (1997). *Framework for Zonation Pertaining to Biosphere Reserves*. Kogelberg Biosphere Reserve Project.

Cape Nature Conservation. *What is a Biosphere?* Retrieved October 7, 2005.
<http://sacoast.uwc.ac.za/education/resources/reserves/kogelberg.htm>

Cape West Coast Biosphere Reserve. *Spatial Planning*. Retrieved October 4, 2005.
<http://www.capebiosphere.co.za/75.html>

Conservation International. World Database on Protected Areas. CD-ROM. IUCN. 2005.

Dudley, Nigel and Sue Stolton. (2003). *Draft Case Study Using the IUCN Categories – From management plan zones to bioregional planning*. IUCN. Cambridge, UK and Gland, Switzerland.

Ebregt, Arthur and Pol De Greve (2000). *Buffer Zones and their Management: Policy and Best Practices for terrestrial ecosystems in developing countries*. National Reference Center for Nature Management, International Agricultural Centre. Wageningen, the Netherlands.

IUCN (1994). *Guidelines for Protected Areas Management Categories*. IUCN, Cambridge, UK and Gland, Switzerland.

IUCN WCPA (2003). *About Protected Areas*. Retrieved October 4, 2005.
<http://www.iucn.org/themes/wcpa/wcpa/protectedareas.htm>

Kruger2Canyons (2005). *Kruger to Canyons Biosphere Reserve*. October 7, 2005.
www.kruger2canyons/biosphere.htm

Limpopo National Park (2004). *Proposed Zoning Map*. Retrieved October 11, 2005.
<http://www.limpopopn.gov.mz/maps/maps.asp>.

Limpopo National Park (2004). *Resettling Residents of Limpopo National Park*. October 11, 2005. <http://www.limpopopn.gov.mz/templates/programs.asp?articleid=25&zoneid=22>

Loucks et. al. (2004). *From the Vision to the Ground: a guide to implementing ecoregion conservation in priority areas*. WWF US Conservation Science Program. Washington, DC.

Martino, Diego (2001). *Buffer Zones Around Protected Areas: A Brief Literature Review*. Electronic Green Journal. Issue 15, December 2001. University of Idaho Library. Moscow, Idaho.

Sanchez, Heliodoro (2003). *Experiences on Planning and Restoring Mangrove Ecosystems in the Columbian Caribbean Coastline and the Role Played by the Protected Areas*. Vth World Parks Congress. Durban, SA.

Serengeti Park (2000). *Park Management, Conservation and Research - answers to the conflict between Man and Wildlife?* October 7, 2005. http://www.serengeti.org/main_serengeti.html

UNESCO (2005). *Frequently Asked Questions on Biosphere Reserves*. Retrieved October 5, 2005. <http://www.unesco.org/mab/nutshell.htm>

Van Wyk, Arrie (2005). *Great Limpopo Transfrontier Park: Progress and News*. October 11, 2005. <http://www.peaceparks.org/>