

A PROPOSAL FOR A GREATER ADDO NATIONAL PARK

**A Regional and National Conservation and
Development Opportunity**

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Captions for frontispiece: the diversity within the proposed

Greater Addo Nation Park

The diversity of vegetation in Valley Bushveld: aloes and euphorbias in the foreground and a shepherd's bush in the background (Photo: G Kerley)	Bird Island – the largest gannetry in the world, with the historic lighthouse in the background (Photo: ECSL)
A group of the world famous Addo elephants at Hapoor waterhole: the major attraction to the Addo Elephant National Park (Photo: G Kerley)	The Alexandria coastal dunefield and the mouth of the Sundays River estuary (Photo: G Kerley)
Fynbos and forest in the valleys of the Zuurberg mountains (Photo: ECSL)	The unique Alexandria forest in the Woody Cape Nature Reserve (Photo: ECSL)

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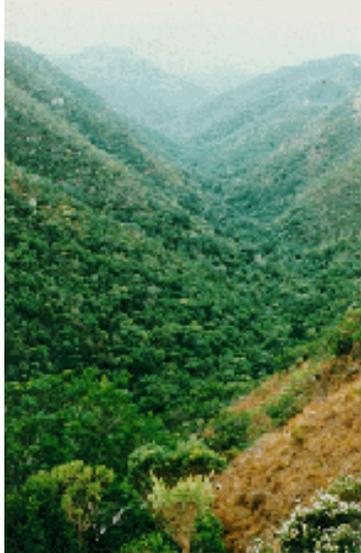


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Executive summary

This report proposes the amalgamation of two large existing conservation areas and their expansion to create a Greater Addo National Park, thereby providing an opportunity for a viable regional and national development and conservation initiative. This independent proposal is based on 11 recognised criteria and on national and international environmental legislation and treaties. It is fully motivated on the basis of sound conservation, ecotourism and economic principles, perspectives and information.

There is growing acceptance that ecotourism/conservation, as a recognised form of land-use, can play a major role in promoting development and community upliftment, through the sustainable use of natural resources. The issues of land ownership and land-use, and the need to accelerate socio-economic development, especially amongst the rural and poorer sections of the population, feature prominently in the government's strategies and plans.

The proposed Park is some 398 000 ha in size, consisting of a 341 000 ha terrestrial zone and a 57 000 ha marine zone (see map). The former includes the Darlington Dam and almost 90 km of the Sundays River, and the latter includes the Bird and St Croix island groups. The Park, which forms a continuous conservation area of over 200 km in length, will be the third largest in South Africa.

Three existing conservation areas form the core of the proposed Park, namely the Addo Elephant National Park (60 000 ha) and the Woody Cape (24 142 ha) and Tootabie (343 ha) Nature Reserves.

The proposed Park will be geomorphologically and biotically the most diverse conservation area in South Africa, and probably one of the most diverse in the world. In addition it will create enormous potential for socio-economic development in the economically depressed Eastern Cape, a province identified by the government as a priority for development.

In terms of its conservation value, the proposed Park will contribute significantly to South Africa's conservation requirements. It would be unique through the inclusion of examples of six of the seven biomes that occur in South Africa, as well as a diverse marine component. Major landscapes included are the Zuurberg Mountain range, part of the former African land surface, the Alexandria coastal dunefield, fossil dune ridges and karstic landforms. The Alexandria coastal dunefield is the largest, most impressive and least degraded coastal dunefield in South Africa, and one of the most spectacular in the world. The Park will also offer some protection to fragile and threatened river systems, with the Sundays River estuary being of particular conservation significance.

The Bird and St Croix island groups are of immense conservation value; for example, they support the largest population of the threatened jackass penguin, and the largest gannet colony, in the world, as well as a range of

other species of special conservation significance, e.g. Cape fur seals. The marine zone also supports populations of threatened and ecologically and economically important species, e.g. reef and game fish, bottle-nosed and humpback dolphins, southern right and Bryde's whales, and great white sharks, which are all important ecotourism resources.

The proposed Park and its surrounds have an important and interesting palaeontological record, consisting of a range of plant and animal fossils. These include dinosaur bones and unique fossil fish deposits.

A particular attraction in the proposed Park will be the megaherbivores (elephant, rhino) and other charismatic animals, ranging from the large predators such as lion and cheetah, to the flightless dung beetle. The Park will ultimately be able to carry genetically viable populations of the large species. At over 400 species it will provide habitat for almost half of the bird species recorded in South Africa, and it will play a significant role in conserving the region's reptiles and amphibians. The proposed Park will also contribute significantly to the conservation of a range of threatened freshwater and estuarine fish species, and also to the conservation of a number of threatened invertebrates, e.g. two rare butterfly species, an endemic grasshopper and a flightless dung beetle.

The proposed Park will conserve an impressive array of plant species, ranging from the desert-adapted succulents in the Karoo, to the stately trees of the coastal forest. It is characterised by a wide range and high diversity of plant species, and by the close proximity of several very different and unrelated vegetation types. It will also provide increased protection for 25% of South Africa's cycad species.

The fact that the proposed Park includes areas of six biomes ensures that at least some of these bioclimatic regions will persist there in the face of global climate change.

The proposed Park provides opportunities for linkages with private conservation areas, within the context of the creation of a biosphere reserve.

The proposed Park is located in an area with an extensive and interesting archaeological and historical record; this includes an important Late Stone Age site, remains of Khoi/San settlements, sites of conflict between early African and European pastoralists, and between the Boers and the British. The two island groups also have a particularly interesting and valuable history.

All of the above features and attractions will combine to ensure the success of the proposed Park as national and international ecotourism destination.

Evidence is provided that ecotourism/conservation is an ecologically sustainable form of land-use and that it is successful in terms of wealth generation, economic activity and job creation. It is thus obvious that the Park would be a highly desirable form of land-use and development in the region.

In terms of its economic role, the proposed Park has enormous potential and it would be ideally placed to exploit the fast growing ecotourism market. It will provide a wide and exciting range of attractions, from lions to penguins, from forests to deserts and from mountains to beaches. The climate of the region is ideally suited to ecotourism, the area has a good tourist safety record, and is malaria free. The Park would be well serviced in terms of tourism infrastructure.

The proposed Park will undoubtedly provide a number of socio-economic benefits for the local community, and especially the previously disadvantaged segment. For example, permanent and casual jobs will be created within the Park, and also within the service and peripheral industries. The potential for the long-term viability of these jobs is considered to be good.

The successful Mayibuye Ndlovu Project involving the neighbouring communities has laid a solid foundation for further community relationships in terms of the proposal for an expanded Park.

It is recommended that there be a single management authority and structure for the proposed Park, but that the details of this be left to the relevant conservation agencies and other stakeholders. The proposed Park should be accorded National Park status, and should be nominated as a World Heritage site.

A number of issues relating to the establishment, management and potential for success of the proposed Park are discussed, namely the cost of the purchase of land, relationships between the National Parks Board and the provincial conservation authority, effects on local communities, road and rail servitudes, electricity transmission lines, the proposed Coega harbour and IDZ development, the quality of services and facilities, the presence of alien vegetation, and predators and stock farmers.

Given the increasing pressure on the environment from government-backed development initiatives, the expectations of the people regarding employment opportunities, and the fragility of the environment regarding its ability to provide basic resources on a sustainable basis, the window of opportunity presented by this proposal is unlikely to remain open for long. It is therefore crucial that the desirability, feasibility and benefits of the proposed Park be discussed and acted upon without delay.

It is recommended that a Working Group, comprised of key stakeholders, be created to take this proposal further.

Introduction

In the three years since the ground-breaking election in April 1994, the issue of land-use and land ownership, as well as that of socio-economic development, has emerged as a major component of government strategies and plans e.g. the Reconstruction and Development Programme (African National Congress 1994) and the Growth, Employment and Redistribution (GEAR) plan. Recent government initiatives have, inter alia, targeted the country's natural resource base as a key foundation for these strategies and plans, for example to provide the basis for a vibrant and wealth-generating ecotourism industry. A good example of this is the recent launch of the Wild Coast and Fish River Spatial Development Initiatives (SDIs) in the Eastern Cape Province, both of which are heavily reliant on existing conservation areas (protected areas). Unfortunately, these initiatives are hampered by an apparent shortage of carefully considered opportunities and their implications.

Because of limited resources, programmes for development and upliftment need to be focused where most required. The South African government has identified the Eastern Cape as one of the provinces most in need of socio-economic development. The Eastern Cape is the second largest province in South Africa and the third largest in terms of its total population. Its population growth rate, at nearly 3% per annum, is above the country's annual mean: one of the reasons for this being the high proportion of young people in the population (43% are below the age of 15). There is also a particularly high degree of poverty in the province, which has the second lowest Human Development Index of the nine provinces (Erasmus 1996). In addition, only 3 % of the province falls within formal conservation areas (Wahl & Naude 1996).

A key aspect of ecotourism/conservation as a means of providing development opportunities, is that natural resources are used in a sustainable manner. In addition, ecotourism/conservation also allows threatened species, which cannot coexist within other developmental frameworks, to survive.

There is potential for conflict between development and conservation. However, the contribution that well planned and executed conservation initiatives can and do make to development, for example through ecotourism, is well proven (Hugo 1992, Kerley, Knight & de Kock 1995).

Our proposal is a contribution to the above debate and presents an option for a viable regional and national development and conservation opportunity. It presents a proposal for the amalgamation of two large existing conservation areas, and for their expansion to create a proposed Greater Addo National Park. It is based on a number of recognised criteria, and is fully motivated on the basis of sound conservation, ecotourism and economic principles, perspectives and information.

We choose to refer to the proposed conservation area as the "Greater Addo National Park", without inferring any management authority or structure, specifically due to the relevance of these names: "Addo" (derived from a Khoi word meaning "river ford" or "drift" - Meiring 1959) is appropriately indigenous,

already projects a strong image in terms of conservation and also has assumed "brand name" status in the ecotourism market. The value of its retention in the name of the proposed Park is therefore obvious. The inclusion of the word "National" refers to fact that this Park qualifies for National Park status in terms of the IUCN (1994) definition, and should also be seen as both a regional and a national asset.

Criteria

A number of basic criteria were used in order to make our recommendations for the boundaries of the proposed Park; these relate to the potential of the proposed Park to achieve certain conservation and development goals. The 11 criteria that we used (see below) are also firmly in line with South Africa's developing policies and strategies on the environment, especially as these relate to sustainable economic development. They are spelt out in detail in the international conventions to which South Africa is a signatory, namely the Convention on Biological Diversity and the Convention on the Combating of Desertification, as well as in the country's White Paper on National Environmental Policy, the ANC's (1994) Reconstruction and Development Programme and the South African government's GEAR initiative.

1. *Biodiversity* The potential to improve the conservation of biodiversity (species), locally, regionally and nationally.
2. *Spatial complexity/representativeness* The potential to increase habitat diversity within the Park by increasing: the number of biomes represented, the altitudinal and latitudinal gradients represented and the diversity of landscapes.
3. *Ecosystem functioning* The potential to improve the genetic viability of populations of certain species (elephants, black rhino), reduce the impact of megaherbivores (esp. elephant) on botanical diversity, improve or re-establish functional predator-prey systems, allow for seasonal movements of wildlife to utilise the land in an ecologically viable manner, and to cope with Global Climate Change.
4. *Naturalness and uniqueness* The potential to conserve areas that are still in a natural or mostly natural state, or which can be rehabilitated. Thus, irreversibly transformed areas, areas used for intensive agricultural purposes (e.g. cultivated lands), industrial areas and areas of dense human habitation are avoided, other than for strategic and practical purposes.
5. *Protection of flagship species* The potential to offer increased habitat and protection to flagship conservation species e.g. elephant, black rhino, lion, hyaena, wild dog, cycads. (Flagship species are popular, charismatic species that serve as symbols to stimulate conservation awareness and action).
6. *Multi-purpose zones (buffer zones)* The potential to apply the widely accepted principle of biosphere planning, namely a core conservation area, surrounded by or associated with areas where varying forms of

conservation/utilisation take place. In addition, the potential to link to other existing or planned developments and conservation areas.

7. *Financial viability* The potential to utilise the land in a financially more viable manner than is the general case at present.
8. *Economic potential* The potential of an extended Park to increase income generation from tourism - to plough back into the Park (for land purchases and management) and for community development.
9. *Ecotourism* The potential to significantly increase benefits to the ecotourism industry, in an environmentally responsible manner.
10. *Management factors* The potential to control management costs and infrastructure requirements by including existing conservation areas within a single conservation management unit and structure.
11. *Practical boundaries and physical characteristics* The potential to use, wherever possible existing physical features as boundaries, e.g. roads, railway lines.

In addition to the above, we were guided by the definition, objectives and criteria for the selection and management of Category II Protected Areas (National Parks and Equivalent Reserves), as outlined in the schedule classification in the Government Gazette of 9 May 1994, Notice 449 of 1994 (see Appendix).

The proposed Greater Addo National Park

The proposed Greater Addo National Park (see map) comprises a 341 000 ha terrestrial zone and a 56 500 ha marine zone. The terrestrial zone extends north and eastwards from the R75 road near Wolwefontein, in the west, to include most of the Zuurberg mountain range and the plains which abut it to the north, a section of the coastal plateau between the Zuurberg Mountains and the coast and, further to the east, a coastal strip, from the Sundays River mouth to Cape Padrone, which includes the Alexandria coastal dunefield and the Alexandria forest. The proposed Park also includes two sections of the Sundays River, namely about 85 km in the hinterland, including the Darlington Dam (Lake Mentz), and 5 km of the lower part of the Sundays River estuary at the coast. The marine zone stretches from the mouth of the Sundays River to beyond Cape Padrone, and seawards to include the Bird Island group. The St Croix Island group, which already falls within a proclaimed marine reserve, is also included.

The proposed Greater Addo National Park forms a continuous terrestrial conservation area of almost 200 km in length, being about 30 km at its widest part and about 10 km at its narrowest.

The proposed Park is traversed by four public roads, namely (a) the Port Elizabeth-Grahamstown surfaced N2 highway in the south, (b) the unsurfaced Addo Heights road linking the town of Addo to the R32 highway in the southerly section, (c) the surfaced Addo-Paterson road and railway in the central section, and (d) the original and unsurfaced Zuurberg Pass road between Addo and Cradock. The Port Elizabeth-Alexandria railway that traverses the Greater Addo National Park in the south is no longer in use (per Spoornet, September 1997).

At its nearest point, the Greater Addo National Park will be 35 km from the centre of Port Elizabeth and only 15 km from its outskirts (Coega area).

The proposed boundaries for the Greater Addo National Park in this report are not meant to be final - they are intended to indicate the types of areas which should be considered for inclusion into the Park and as such are flexible. The boundaries will ultimately be dictated by factors such as land price and availability, physical features and political perspectives.

The proposed Park would be the third largest in South Africa, and one of only seven conservation areas larger than 100 000 ha in South Africa (Wahl & Naude 1996).

Background: the core conservation areas

Addo Elephant National Park

The Addo Elephant National Park (AENP) was proclaimed in 1931 to protect the last remaining eastern Cape elephants which were living in the Addo bush (Hall-Martin 1980). At that stage there were only 16 elephants remaining and the number subsequently dropped to 11. The proclamation of the park also protected the last remaining buffalo in the then Cape Province. Initially the elephants were not confined to the park and they made regular forays into neighbouring farmland. These movements ceased in 1955 when the Armstrong fence successfully confined them to an elephant camp of 2270 ha (Hall-Martin 1980). Parts of the park have remained closed to elephants as botanical reserves to provide witness stands and to protect plant diversity. Since 1955 the elephant camp has been expanded a number of times (Novellie 1991) and additional land purchases have substantially increased the size of the park.

The summarised objectives of the AENP (after Novellie 1991) are:

- To preserve intact a viable example of Valley Bushveld (= Valley Thicket).
- To preserve viable populations of Addo elephant, African buffalo and East African rhino *Diceros bicornis michaeli* in a reasonable balance with their environment. (Note: This objective has subsequently been amended to conserve the desert-adapted rhino species *D. b. bicornis* in the park).
- To preserve a population of the flightless dung beetle *Circellium bacchus*. To preserve other fauna characteristic of the Addo area, subject to the constraint that the above conservation objectives are not compromised.

The Zuurberg National Park (ZNP), a section of which has been under protection since 1896, was proclaimed in 1985 and managed by the National Parks Board, prior to which it was managed by the Directorate of Forestry (Novellie 1991). Subsequently, the area of the ZNP (20 777 ha in 1984) was increased by the addition of various tracts of land. The unique feature of the ZNP is its intricate mosaic of different vegetation communities: forest, fynbos, grassy fynbos, grassland and Valley Bushveld. The proposed conservation objectives of the park have been stated as follows (after Novellie 1991):

- To maintain the mosaic of different plant communities.
- To maintain the diversity of both plant and animal species within each community.
- To maintain stable populations of threatened and endemic plant species, e.g. *Oldenburgia grandis*, *Encephalartos* spp., *Euryops latifolius*.

- To maintain populations of large herbivores characteristic of the area.

Through land purchases, a link between the ZNP and the AENP was achieved and in 1994 they were amalgamated into a single park - the Addo Elephant National Park - with a current size of 60 000 ha. During the 1990s the National Parks Board has been pursuing options to expand the AENP southwards in order to achieve a link with the coast in the vicinity of the Sundays River mouth. Land purchase negotiations are at an advanced stage and this link has effectively been made.

Woody Cape Nature Reserve

The 24 142 ha (plus) Woody Cape Nature Reserve comprises six separate pieces of land, of which the Woody Cape section is the largest at 15 460 ha (Briers & Powell 1994). Five of the six areas are declared State Forest, and one is allocated State land; as such they have been largely protected since 1896. The reserve is characterised by the Alexandria coastal dunefield, consisting of about 14 000 ha of unvegetated, and about 1 800 ha of vegetated, sand and by the Alexandria forest which is represented by a large forest block of 5 600 ha and four smaller fragments. At present the only connection between the forest and dunefield components is a narrow (300m) corridor.

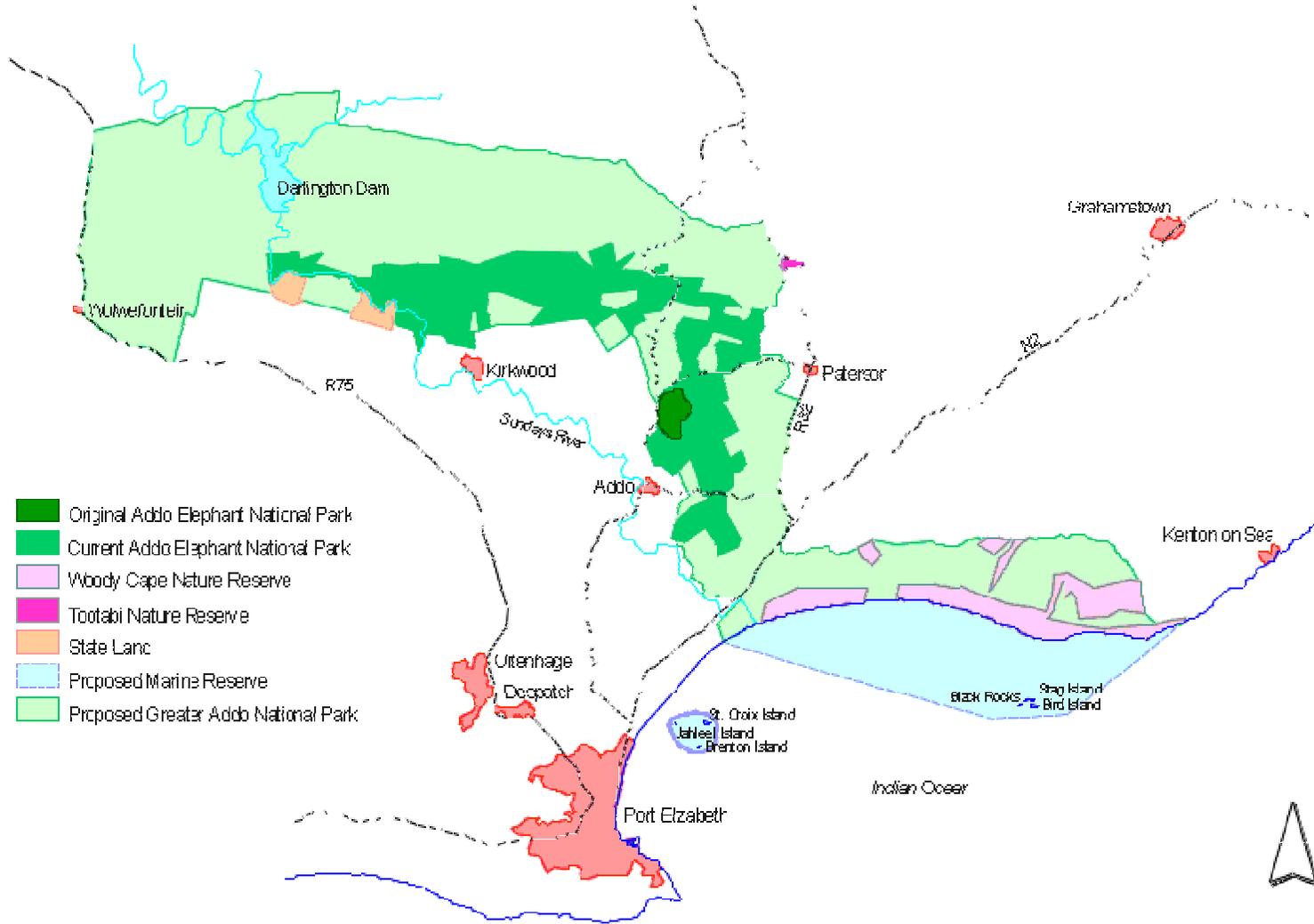
Although the forest component was fenced earlier in the century, the dunefield was not fenced until around 1950, an action which allowed the vegetation on the slipface to recover from the presence of cattle. Small-scale stabilization of driftsand, especially in the area east of the Sundays River mouth, through the planting of alien trees commenced in 1950 and was continued in the late 1950s and early 1960s. Large-scale stabilization took place from 1970 to 1979, when this practice was stopped.

The Woody Cape Nature Reserve was managed by the Department of Forestry until 1987 when its management was transferred to the Chief Directorate: Nature and Environmental Conservation of the Cape Provincial Administration. One of the stated management projects for the Woody Cape Nature Reserve is the establishment of a link with the Addo Elephant National Park (Briers & Powell 1994).

Tootabie Nature Reserve

The proposed park will also include the 343 ha Tootabie Nature Reserve on Olifantskop on the national road 13 km north of Paterson. The Afromontane forest in this unmanned reserve is under some threat due to bark collecting activities (La Cock & Briers 1992).

PROPOSED GREATER ADDO NATIONAL PARK



Conservation Value of the proposed Park

The following section highlights the conservation value of the proposed Greater Addo National Park, in terms of its biomes and landscapes and certain species of particular conservation (and ecotourism) significance.

At a national and international level, the proposed Park will contribute significantly to South Africa's commitment as a signatory of the Convention on Biological Diversity. South Africa currently has only 5.5 % of its area conserved (Wahl & Naude 1996), and the proposed Greater Addo National Park will increase this to 5.7 %. This is still well short of the internationally accepted figure of 10 % to which South Africa is committed as a signatory to the above convention.

Biomes

At the broadest level, the conservation value of the proposed Park is assessed in terms of bioclimatic communities. These are the Biomes (a distinctive vegetation and climatic region) and their constituent Vegetation Types, following Low & Rebelo (1996). Reference is also made to Acocks' (1988) Veld Types, as these have been used extensively in the past to assess conservation efforts.

The proposed Greater Addo National Park would include examples of six of the seven biomes which occur in South Africa (Low & Rebelo 1996), namely Nama Karoo, Fynbos, Forest, Thicket, Savanna and Grassland, lacking only the Succulent Karoo. It would also include a marine (coastline and offshore islands) and an estuarine component. This would undoubtedly make the proposed Park the most diverse conservation area in South Africa, and probably in the world.

Nama Karoo

The Nama Karoo Biome comprises the semi-arid, summer rainfall dwarf shrublands of the central plateau of South Africa. With 0.6 % in protected areas, the Nama Karoo is very poorly conserved (Table 1), and therefore increasing the area of this biome under conservation management is a priority (Siegfried 1989, Hilton-Taylor & Le Roux 1989). Although it has not been well quantified, the plant diversity and degree of endemism (species which are restricted to a particular region) of the Nama Karoo may be relatively high (Hilton-Taylor & Le Roux 1989). Overgrazing by domestic livestock is the major threat to the Nama Karoo.

The Eastern Mixed Nama Karoo vegetation type (Table 1) was considered by Acocks (1988) to be the most degraded of all vegetation types in South Africa, and has been at the centre of the debate regarding desertification in South Africa (Hoffman 1996). Paradoxically, this area also supports the highest diversity of plant species that Acocks recorded in the Karoo (Powrie, Rutherford & O'Callaghan 1997). None of the Central Lower Karoo veld type

is formally conserved (Table 1). The incorporation of a significant area of Nama Karoo into the proposed Greater Addo National Park will not only increase the area conserved, but will also provide an important benchmark site which can be used to evaluate the recovery of degraded veld and the relevance of the desertification model to changing veld condition. This would be in accordance with South Africa's commitment as a signatory of the Convention to Combat Desertification.

Fynbos

The Fynbos Biome comprises the well known heathlands of the south western sector of South Africa. Fynbos is famous for its exceptionally high plant diversity (over 7000 species) and endemism (about 68 %). Agriculture and alien invasive plants are the biggest threats to this biome (Hilton-Taylor & Le Roux 1989), which is relatively well conserved, particularly the two forms (Mountain and Grassy Fynbos) occurring in the current AENP (Table 1). Fynbos generally has low commercial potential for conventional agriculture and pastoralism (Acocks 1988, Rebelo 1996), and conservation/ecotourism and water catchment are recognised as being valid forms of sustainable use (Rebelo 1996, 1997).

Forest

The Forest Biome is dominated by tall trees, and occurs as scattered areas or patches throughout South Africa, principally on the south coast and along the eastern escarpment. This biome is generally considered to be well conserved (Table 1). However, this is an illusion brought about through conflicting definitions of forest, and low conservation efficiency of various forms of management (Castley & Kerley 1996a). For example, most forests are used for the commercial extraction of indigenous timber, and are threatened by invasive alien plants and the extraction of animals and plants for subsistence or traditional purposes (Castley & Kerley 1996a,b, Simelane 1996a). There is therefore a need to increase active conservation management of indigenous forests.

The proposed Greater Addo National Park will afford National Park status to the important Alexandria forest. This forest is unique, being endemic to the Eastern Cape and phytogeographically distinct. It is distinguished from other forest types by the low proportion of shade-loving tree species. Outside of formal conservation areas, these forests are being cleared at an alarming rate to make way for pastures (Castley 1997) and protecting the remaining fragments of forest is a high priority. The proposed Park will consolidate the remaining fragments of the Alexandria forest in conservation areas and private land into a well managed conservation area, which will also include areas of Afromontane forest in the Zuurberg Mountains.

Thicket

The Thicket Biome is characterised by dense thicket vegetation, with a broad range of plant growth forms (succulent, deciduous and evergreen shrubs, lianas, herbs, geophytes and grasses) and high diversity of woody shrubs and succulents. The phytogeographical origin of this vegetation is varied, and the plant communities are considered to be transitional in nature. This has led to a very high diversity, particularly of woody shrubs, but endemism is also high, particularly of geophytes and succulent forbs.

The Thicket Biome is under severe threat, particularly due to degradation through unsustainable pastoralism and other farming practices (Kerley et al. 1995). Nationally, 4.5 % is conserved, while the conservation status of the constituent vegetation types ranges from 1.8 to 14.5 % (Table 1), which is generally below the accepted minimum of 10 %. Of particular concern is the fact that there are currently no areas of the unique Noorsveld (a subdivision of Xeric Succulent Thicket) conserved anywhere (Hilton-Taylor & Le Roux 1989). In addition, the Spekboomveld on the northern slopes of the Zuurberg Mountains (and not included in the current Addo Elephant National Park) differs significantly in terms of plant species composition from that south of the Zuurberg Mountains (Desmet & Ellis 1997).

The proposed Greater Addo National Park would include areas of all these vegetation types, as well as an important area of Noorsveld.

Savanna

The Savanna Biome is the largest biome in South Africa, and is characterised by the combination of trees and grasses that are so typical of African scenery. The biome is used extensively for pastoralism and ecotourism, with a relatively large proportion of the biome being conserved (Table 1). However, the vegetation type representative of this biome which is included in the proposed Greater Addo National Park, namely Eastern Thorn Bushveld, is particularly poorly conserved (0,45 %). This vegetation type is restricted to the Eastern Cape.

The proposed Park will therefore play a significant role in increasing the conservation status of this vegetation type. This Park will also be one of the few conservation areas that include examples of this biome without the attendant tropical diseases of malaria and sleeping sickness.

Table 1: Summary of bioclimatic communities to be included within the proposed Greater Addo National Park. The proportions currently conserved within South Africa are given. Biomes and Vegetation Types follow Low & Rebelo (1996) and Veld Types follow Acocks (1988) and Wahl & Naude (1996). The Vegetation Types and Veld Types do not necessarily correspond.

Biome	% conserved in South Africa	Vegetation type	% conserved in South Africa	Veld type and number	% conserved in South Africa
Forest	17.9	Afromontane forest	17.6		
		Coastal Forest	9.5	Alexandria Forest (#2)	38.5
Nama Karoo	0.6	Eastern Mixed Nama Karoo	1.1	False Karoid Broken Veld (#37)	0.8
				Central Lower Karoo (#30)	0
Fynbos	11.8	Mountain Fynbos	26.1	False Machia (#70)	16.2
		Grassy Fynbos	16.1		
Thicket	4.5	Dune Thicket	14.5		
		Mesic Succulent Thicket	5.3		
		Spekboom Succulent Thicket	1.8	Spekboomveld (# 25)	4.2
		Valley Thicket	2.1	Valley Bushveld (#23)	3.5
		Xeric Succulent Thicket	8		
Savanna	9.9	Eastern Thorn Bushveld	0.5	Eastern Province Thornveld (#7)	0.2
Grasslands	2.2	Coastal Grasslands	1.1		

Grassland

The Grassland Biome is characterised by a dominance of grasses, with few trees. Agriculture, pastoralism and urbanization are the major land-uses, resulting in extensive transformation of the habitat, and it has been shown that the Grassland Biome is the biome most in need of conservation (Rebelo 1997). The particular vegetation type to be included in the proposed Greater Addo National Park, Coastal Grassland, has only 1.1 % conserved, is limited to the Eastern Cape Province, and is under significant pressure from the development of coastal resort towns.

Landscapes

The macro-geomorphic elements represented in the proposed Park are the mountainous areas (Zuurberg mountain range) above the African erosion surface, the Post-African surface (south of the Zuurberg Mountains) and neogene marine and coastal aeolian sediments down to the coast (Partridge & Maud 1987). The mountainous areas referred to above represent the eastern extension of the Cape Fold Belt, a major geological and geomorphological feature in the southern and southwestern part of the sub-continent.

The Alexandria coastal dunefield is the best example of an accretionary sheet dunefield in the Eastern Cape, as well as in South Africa. It is the largest coastal dunefield in South Africa, and one of the largest in the world. It is characterised by a well developed precipitation ridge or main slipface along its landward margin. The fossil dune ridges in the Woody Cape area are also a prominent and interesting geomorphological feature (Illenberger & Burkinshaw 1996).

Another interesting geomorphological feature in the area of the present Woody Cape Nature Reserve is the presence of karstic landforms (Marker 1996). Karst is a landscape created by a solution of various minerals (principally calcium carbonate) and expressed in the form of limestone. The karstic landforms in the area are dominated by dolines (hollows up to about 100 m in diameter) and poljes (enclosed hollows with flat floors); dry valleys and blind valleys are also present.

Catchments

Entire river drainage systems or catchments are recognized as ideal conservation units, as they comprise discrete ecosystems and allow management of most ecological processes. Incorporating entire catchments into conservation areas is however rarely feasible, and the proposed Greater Addo National Park is no exception. The Sundays River, which is of great value for irrigation in the lower Sundays Valley, extends well beyond the boundaries of the proposed Park. However, significant tributaries or at least their headwaters will be within the proposed Park. These include the Coerney,

Krom, Wit and the Klein Uie Rivers. The proposed Park includes part of the Bushmans River catchment (Rowntree & Dollar 1996). If these drainage systems are to be conserved as a sustainable resource then the geohydrological processes must be managed in such a way that human impacts on them are minimised. The proposed Park will therefore provide some protection for these fragile and threatened river systems.

The Darlington Dam (previously Lake Mentz) is a large (4 350 ha) impoundment within the proposed Park and is managed by the Sundays River Irrigation Board. Besides damming the Sundays River, the dam receives water from the Orange River as an interbasin transfer.

Islands

The two island groups within Algoa Bay (Bird Island and St Croix Groups) are of great historical and conservation value. The St Croix Island group currently supports the largest population of the vulnerable (Brooke 1984) jackass penguin *Spheniscus demersus* in the world. This is also one of the few populations of this species to be showing an increase in numbers, emphasizing the conservation significance of this site.

The colony of South African gannets *Morus capensis* on Bird Island is the largest colony of this species, and the largest gannetry in the world. These birds provided the basis for a lucrative (but ecologically devastating) guano harvest until recently. The penguin and gannet colonies on the islands of the Bird Island group also represent the easternmost colonies of these species. Likewise, the colony of Cape fur seals *Arctocephalus pusillus* breeding on Black Rocks of the Bird Island group represents the easternmost breeding range for this species. Other seabirds of conservation significance which occur on both island groups include South Africa's most threatened marine bird, the endangered (Brooke 1984) roseate tern *Sterna dougallii* and the South African endemic African black oystercatcher *Haemotopus moquini*. Both island groups are currently Provincial Nature Reserves, forming part of the Woody Cape Nature Reserve. Due to capacity constraints, Bird Island is no longer manned by a Nature Conservation officer, and both island groups are being increasingly targeted by poachers of shellfish and fish.

The Alexandria Coastal Dunefield

The Alexandria coastal dunefield is the largest, most impressive and least degraded coastal dunefield in South Africa, and one of the most spectacular in the world (McLachlan, Sieben & Ascaray 1982). The dunefield comprises 120 km² of open sand, is 50 km long and averages 2.2 km in width, with dunes rising from the beach to heights of 150 m. The dunefield is a classic example of the dynamic nature of geological processes, and it also provides for a unique set of habitats which are not found in other landscapes, these being the open sand, bushpockets and duneslacks, all of which support a range of specialist organisms (Kerley, McLachlan & Castley 1996). The

Alexandria coastal dunefield also supports two endemic animals, the dune grasshopper *Acrotylos hirsutus* and the dune hairy-footed gerbil *Gerbillurus paeba exilis*, i.e. they are not found anywhere else.

The Alexandria coastal dunefield also provides breeding habitat for rare (Brooke 1984) Damara terns *Sterna balaenarum* and African black oystercatchers. The population of Damara terns breeding in the Alexandria Coastal Dunefield represents nearly 25 % of the total South African population (Watson & Kerley 1995) of this highly threatened species (Brooke 1984), and is the only such colony in the Eastern Cape, the next closest colony being at De Hoop, in the Western Cape.

The Alexandria coastal dunefield is largely administered as a Provincial Protected Area, being part of the Woody Cape Nature Reserve. However this dunefield is currently under threat due to invasive alien plants stabilizing the dunes. Although attempts have been made to control this threat, the resources and focus of the Eastern Cape Ministry of Economic Affairs, Environment and Tourism are not adequate to deal with the problem. In addition, there are two private landholdings in the centre of the dunefield, and one of these landowners is successfully stabilizing large areas of the dunes, using agricultural waste and alien plants. This presents a massive threat to the remainder of the dunefield. A third threat to the dunefield is that it is managed in isolation from the hinterland, whereas it has been clearly shown that the area inland of the dunefield is a crucial source of plant propagules, nutrients and migrant animals (Bruton 1992, Castley 1992, Kerley et al. 1996). It is therefore imperative that the dunefield is managed as an integral unit, as well as part of the larger landscape. The proposed Greater Addo National Park will address these issues by increasing management resources, consolidating ownership of the dunefield, and managing the dunefield together with the hinterland.

The Schelmuhoek dunefield, to the west of the Sundays River, is functionally part of the Alexandria coastal dunefield in terms of sand dynamics. This dunefield has recently been purchased by PPC Cement (Pty) Ltd for the purposes of lime extraction; this company committed itself to making this dunefield available to National Parks Board (M Drewell, PPC Cement) on the occasion of the launch of the Open Africa Initiative at the Addo Elephant National Park in 1993.

Sundays River Estuary

The proposed Greater Addo National Park would include at least 2 km of the Sundays River Estuary which is relatively pristine, unlike most other large estuaries in the Eastern Cape which have been extensively developed. Estuaries are widely recognised as being crucial breeding and nursery areas for a wide variety of fish species of commercial and recreational value, and the proposed Park would therefore provide an opportunity to manage such a resource in a sustainable manner.

The Sundays River estuary is of particular conservation significance. Of the 289 river mouths along the southern African coast, the Sundays River is one

of only 37 (or 12.8%) which maintain a permanent connection with the sea (Reddering & Rust 1990). The Sundays River estuary is also important in that it is one of a limited number of South African estuaries where the energy transfer through the food web is associated with the water column, rather than with the benthic environment (Prof. T Wooldridge, Zoology Department, University of Port Elizabeth - pers. comm.). The proposed Park will therefore act to conserve an important estuary, of which there are very few conserved in South Africa.

From another perspective, in a study which used waterbirds to prioritize South African estuaries for conservation, the Sundays River estuary is ranked eighth out of the 42 estuaries studied in terms of diversity (Turpie 1995). In addition, this estuary is well recognised for its recreationally important fish fauna (Marais 1988).

Marine Province

The proposed Park includes the coast from Cape Padrone to the Sundays River mouth, a distance of over 55 km, which represents a large portion of the northern shores of Algoa Bay. The potential to create a marine reserve along this stretch of the coast and to link up with the two offshore island groups is highly significant. Algoa Bay is recognised as being part of the South Coast marine biogeographical province (equivalent to the terrestrial biomes - Hockey & Buxton 1989) of South Africa.

A Committee for Coastal and Marine Systems, established by the Council for the Environment, recommended 12 marine and adjacent onshore areas as candidates for special protection and management by a conservation body; one of these areas is the Woody Cape coast from the mouth of the Sundays River eastwards to Kenton-on-Sea and including the Bird and St Croix island groups (Payne & Crawford 1989). Between 1991 and 1996, Eastern Cape Nature Conservation attempted to have part of this area proclaimed as a marine reserve (A. Struwig, Eastern Cape Department of Economic Affairs, Environment & Tourism, pers. comm.).

Besides the important seabirds and seal populations (see section on Islands), the area also supports a range of threatened and ecologically and economically important species. These include populations of humpback *Sousa plumbea* and bottle-nosed dolphins *Tursiops truncatus*, both these species occurring at higher densities than elsewhere in their range (Dr VG Cockcroft, Curator of Marine Mammals, Port Elizabeth Museum, pers. comm.). During spring a large population of threatened southern right whales *Eubalaena glacialis* enter the bay and calve in the inshore waters of the proposed marine reserve. The proposed marine reserve will therefore play an important role in the conservation of these threatened species. The area between the Bird Island group and the St Croix Island group also contains a resident group of the Bryde's whale *Balaenoptera edeni* and it thus provides an important habitat for this species (V.G. Cockcroft, pers. comm.). The proposed marine reserve is a particularly good place to view these whales and dolphins, and as such will present a major tourist attraction.

The seas around Bird Island are famous for their populations of the threatened great white shark *Carcharodon carcharias*. In addition, the reefs around the islands support populations of reef fish which have been decimated by overfishing in more accessible areas, and could act as important foci for the recolonization of overfished areas. Similarly, these reefs have until recently supported virtually unexploited populations of abalone *Haliotis midae*: these are now however being subjected to increasing illegal harvesting and therefore protecting these populations is a high priority.

Palaeontology

The proposed Park and its surrounds has an important and interesting palaeontological record. For example, there is a diverse mollusc fauna in the extensive and often exposed Late Pleistocene marine deposits which occur in the coastal area (Kilburn & Tankard 1975). There are also extensive and mostly undescribed plant and animal fossil deposits in the Sundays River and Kirkwood Formations of the Uitenhage Group from the Cretaceous period (McLachlan & McMillan 1976). These deposits contain much reptilian material, with the Kirkwood Formation containing the fossilized remains of dinosaur bones. In the vicinity of the Darlington Dam there are unique fossil fish deposits (Jubb & Gardener 1975). These fish fossils have been severely damaged by collectors and the remaining deposits are badly in need of protection (Prof. R Shone, Head: Department of Geology, University of Port Elizabeth, pers. comm.).

The Addo Elephants

The Addo elephants *Loxodonta africana* are extremely important in conservation terms, representing one of only four elephant populations (Addo, Knysna, Kruger, Zululand) in South Africa which survived into the present century. The Addo elephants were nearly exterminated in a government sponsored programme in 1919, but fortunately a remnant herd of 16 elephants survived, and were later protected through the establishment of the Addo Elephant National Park (Hall-Martin 1980, Hoffman 1993). Although not genetically distinct from other elephant populations in South Africa (Essop, Hall-Martin & Harley 1996), this herd is unique in being characterised by a very low frequency of tusk-bearing females.

The elephants are also of a high conservation status in that they are hypothesised to be keystone species in Valley Thicket (Kerley et al. 1995), indicating that their presence is essential to maintaining the structure and function of this ecosystem. Elephants play a crucial role as herbivores, nutrient dispersers, seed dispersers and as disturbance agents creating habitat patches. Within the current AENP elephant enclosure, elephants comprise 78 % of the large herbivore biomass (Stuart-Hill 1992), indicating their important position in this ecosystem.

A further reason for the high conservation status of the Addo elephants is that they act as "flagship" species in attracting the tourists to the Park. All visitors

express a desire to see the elephants, and 84 % are successful (Geach 1997). The elephants are undoubtedly the key attraction to the Park. Based on the current estimate of R360 million being spent by visitors in getting to the Park per annum (Geach 1997), this would suggest that each elephant is generating R1.5 million in economic activity per annum.

However, elephants need to be carefully managed in enclosed nature reserves because, by virtue of their size and longevity, these megaherbivores are able to severely degrade their habitat. Within the AENP, elephants have been shown to cause a reduction in plant biomass, a decrease in the abundance of *Aloe africana*, various mistletoe species as well as a variety of endemic succulent and geophyte (bulb-forming) plant species (Penzhorn, Robbertse & Olivier 1974, Hall-Martin & Barratt in press, Midgley & Joubert 1991, Moolman & Cowling 1994). These plant species can only be maintained through keeping the elephants at low densities (to reduce their impact) or through the establishment of botanical reserves protected from elephant browsing (Moolman & Cowling 1994, Hall-Martin & Barratt in press). It has been suggested that a stocking rate of 2 elephants/km² would be low enough to maintain the abundance of food plants (Barratt & Hall-Martin 1991). However, Moolman & Cowling (1994) suggest that this stocking rate may be too high to maintain the rich suite of endemic succulent plants. Given that the elephants are currently stocked at a density of about 2.2 elephants/km², it is obvious that the currently increasing population will lead to degradation of the available habitat. The only options are therefore to increase the availability of habitat to the elephants, or to cull the elephants. The current sentiment against elephant culling, suggests that increasing the availability of habitat is the immediate short term solution.

The above argument in favour of reducing elephant density conflicts with the demands of the tourists, who specifically require high densities of elephants to achieve gameviewing satisfaction (Novellie 1991). This problem can however be overcome to some extent through the management of information to the tourists in terms of providing the location of elephant concentrations.

There are two additional arguments in favour of increasing the availability of habitat to the elephants, these being in terms of the social interactions of the elephants and the genetic considerations of elephant conservation. Although the current area of elephant habitat appears sufficient to provide food and other resources, it would appear that this area is too small in terms of the social interactions of the elephants. Adult bulls are frequently found dead within the AENP, with indications that they were killed by other bulls (Dr. A. J. Hall-Martin, National Parks Board, pers. comm.). The hypothesis is that there is not enough space within the currently constituted AENP to allow the bulls to avoid the dominant bull, and they are subsequently killed in the ensuing fight. This is supported by the observation that few bulls live beyond the age of 40. This therefore suggests that the only way to maintain a socially viable herd of elephants is to increase the amount of habitat available.

Small populations of animals are vulnerable due to the potential for an increase in genetic problems arising from inbreeding, as well as due to the

increased chance of extinction due to low numbers (demographics). It has been suggested that South African elephant populations of less than 400 individuals should be considered to be vulnerable to demographic processes (Van Jaarsveld, Nicholls & Knight in press), while populations of 2500 individuals should be viable in demographic and genetic terms (Armbruster & Lande 1993). The immediate goal of managing the AENP elephants should therefore be to increase the population to at least 500 elephants, thereby achieving demographic viability.

The proposed Park would provide habitat for an elephant population in the region of 2 700 animals, thereby achieving demographic and genetic viability. This would constitute one of the largest elephant populations in the world, emphasising its importance in terms of elephant conservation and megaherbivore-based ecotourism.

The Addo Black Rhinos

The black rhinoceros, originally represented by the arid-adapted western ecotype *Diceros bicornis bicornis*, was extirpated from the Eastern Cape when the last individual was shot in the vicinity of Coega in 1858 (Skead 1987). In 1961, seven black rhinos of the East African ecotype *D. b. michaeli* were introduced from Kenya, where the populations were under considerable threat (Hall-Martin & Penzhorn 1977). These rhinos have been managed as a metapopulation through the introduction of individuals from other populations for genetic purposes. These animals have flourished, increasing at a rate of 9.9 % per annum, and the current population of 38 animals (Dr M.H. Knight, National Parks Board, pers. comm.) makes this the fifth largest population of the ecotype in Africa (Hall-Martin & Knight 1994). Animals from this population have been made available for repatriation to East Africa (Tanzania), demonstrating the important role that the Addo Elephant National Park has played as a rhino refuge.

In 1995, black rhinos of the indigenous ecotype *D. b. bicornis* were reintroduced into the AENP as part of National Parks Board's commitment to the maintenance of the ecologically correct species in the Park, as well as out of concern arising from the conservation threat (poaching, loss of habitat) to this ecotype. This population is kept separate from the *D. b. michaeli* in the Park, and is managed as a metapopulation which includes the rhinos of the Augrabies, Vaalbos and Karoo National Parks (Hall-Martin & Knight 1994). It is planned that eventually all of the *D. b. michaeli* will be removed from the AENP through a repatriation and sales programme, and replaced with *D. b. bicornis*. This will be funded through the income derived from the sale of the *D. b. michaeli* (Hall-Martin & Knight 1994). The rhinos of Addo are currently carefully monitored and all are individually known.

The dense, highly nutritious and evergreen nature of Valley Thicket vegetation provides ideal black rhinoceros habitat, both in terms of food requirements as well as limiting aggression between these irascible animals. The Addo rhinos have therefore shown a very high rate of increase, while being maintained at high densities, which are the highest recorded for free-ranging populations

(Hall-Martin & Knight 1994). Despite the generally positive outlook for the AENP black rhino population, its future is not guaranteed as Knight, van Jaarsveld, Hall-Martin & Nichols (in press) point out that this population is under a risk of extinction through chance affecting population processes. The only mechanism to reduce this risk of extinction is to increase the size of the population, which would require a greater area of appropriate habitat. In terms of genetic problems arising from inbreeding of the population, it would also be desirable to increase the available habitat for the AENP black rhinos and thereby boost the population. In the interim, genetic problems can be alleviated to some extent through metapopulation management.

The AENP black rhinoceros populations are therefore recognised as being very important to the Rhino Management Group's black rhinoceros conservation initiative, the goals of which are to increase the conserved populations to at least 2000 individuals of each ecotype as rapidly as possible (Emslie 1994). The status of the AENP as a black rhinos conservation site is further enhanced by the lack of poaching in the AENP.

Black rhinos are also important to the success of the tourism aspect of the AENP, being one of the species which tourists stated that they wanted to see (Geach 1997). Although infrequently seen during the day, black rhinos are routinely located on tourist nightdrives (Kerley, Nel & Geach 1997).

The recommended stocking density of black rhino in the AENP thicket habitat is 0.5 rhino/km² (Hall-Martin & Knight 1994). This indicates that the currently configured AENP can support a maximum of 60 black rhino. Within the proposed expanded park, the Valley Thicket habitat will have the highest carrying capacity, but rhinos will also use the Karoo and Savanna habitat. It is estimated that a population of at least 750 black rhino could be maintained in the expanded Park.

The proposed Park would unquestionably contribute to global conservation efforts aimed at black rhinos, and allow this species to continue to play its important role as a tourist attraction.

Lions and the potential for the Big Five

The term Big Five refers to elephant, rhinoceros, buffalo *Syncerus caffer*, leopard *Panthera pardus* and lion *P. leo*, which were traditionally recognised as being the most dangerous and therefore sought-after species for safari hunting. This term now epitomises the African ecotourism experience, and the Big Five suite is recognised as being a crucial drawcard in the tourism industry.

Historically, the Addo area supported all of the Big Five (Skead 1987), but they were almost entirely eradicated in the last century, with only small populations of leopard, elephant and buffalo remaining. The AENP already supports four of the Big Five, namely elephant, black rhinoceros, buffalo and leopard, but lion are absent. In order to make the proposed Greater Addo National Park a true African ecotourism experience, it would therefore be

necessary to establish populations of free-ranging lions.

The lions should be truly free-ranging to fulfil two requirements. Firstly, as representatives of the indigenous fauna they should contribute to natural ecosystems processes (particularly predation). Secondly, there is considerable ecotourism market and moral resistance against "canned lions", indicating that artificially maintained populations of lions kept in small enclosures and fed domestic livestock are not acceptable to the ecotourism market, and detract from the "African" experience.

The major factor constraining the reintroduction of lions is the availability of prey species in sufficient numbers to maintain viable populations of lions. It is estimated that this would require at least 20 000 ha per pride. There are two areas within the proposed Greater Addo National Park which could support large populations of game as prey for lions; the Karoo habitat north of the Zuurberg Mountains, and the coastal grasslands east of the Sundays River. Providing that additional requirements of fencing security were met, it would therefore be feasible to maintain lion populations in these two areas. The establishment of these lion prides and their food base should be seen as a priority in the management of the proposed Park.

Other mammals

The African wild dog *Lycaon pictus* managed to survive into the 20th century in the Addo Bush before being extirpated in 1919 (Skead 1987). This species is under considerable threat throughout its range and is accorded endangered status in the South African Red Data Book - Mammals (Smithers 1986). Given their predatory habits and large home range requirements, the conservation of wild dogs is dependent on large conservation areas. It would be possible to establish and maintain wild dog populations within the proposed Park.

Both the spotted hyaena *Crocuta crocuta* and the brown hyaena *Hyaena brunnea* were recorded in the area by early travellers but were eradicated by farmers to protect their livestock (Skead 1987). It would be feasible to introduce both species into the extended Park. Brown hyaena are listed as rare in the South African Red Data Book (Smithers 1986), and would represent the only viable population within the Eastern Cape. These species would also act as ecologically important scavenging predators within the ecosystem. An additional role for spotted hyaena would be as competitors for and predators of the lion population, thereby reducing the need for intensive management of the lions; they would also help to manage the warthog population.

Serval *Felis serval* are extinct within the Eastern Cape, but their reintroduction into parts of their former range is the recommended conservation procedure for this rare species (Smithers 1986). Historically, serval were recorded within the area of the proposed Greater Addo National Park. However, serval have specific habitat requirements for areas of tall grass, reeds and thickets typical of riverine or vleis areas and the availability of such habitat is crucial for the success of any reintroduction attempts (Henley 1997). Such areas do occur

within the proposed Park (along the banks of the Sundays River, and inland of Woody Cape), and it is therefore likely that serval could be reintroduced into the proposed Park.

Early records of cheetah *Acinonyx jubatus* are sparse in the Eastern Cape, possibly due to confusion over identity and common names (Skead 1987). However, they were recorded to the north of the proposed Greater Addo National Park (Rookmaker 1989). There are currently no free-ranging populations of cheetah in the Eastern Cape. The proposed Greater Addo National Park would include suitable cheetah prey and habitat in the area north of the Zuurberg Mountains, and could play an important role in the conservation of this species.

Birds

The proposed Park will provide conserved habitat for the following species which appear in the South African Red Data Book - Birds (Brooke 1984) in the listed categories; an indication of breeding status within the Park is given:

Endangered

Roseate tern *Sterna dougalli*: breeds (see section on the islands)

Vulnerable

Jackass penguin *Spheniscus demersus*: breeds (see section on the islands)

Cape vulture *Gyps coprotheres*: presently an occasional visitor to the area but could re-establish in the Zuurberg Mountains

Martial eagle *Polemaetus bellicosus*: probable breeder; occurs throughout

Stanley's bustard *Neotis denhami*: probable breeder; occurs throughout

Ludwig's bustard *Neotis ludwigii*: probable breeder; mainly north of the Zuurberg Mountains

Kori bustard *Ardeotis kori*: possible breeder; mainly north of the Zuurberg Mountains

Ground hornbill *Bucorvis leadbeateri*: former resident, could re-establish

Rare

Damara tern *Sterna balaenarum*: breeds in the Alexandria coastal dunefield

Caspian tern *Hydroprogne caspia*: resident

Peregrine falcon *Falco peregrinus*: possible breeder

Indeterminate

Grass owl *Tyto capensis*: possible breeder, especially in coastal grasslands

Cuckoo hawk *Aviceda cuculoides*: possibly resident.

To the above list may be added the blue crane *Anthropoides paradiseus*, a species which is now considered to warrant inclusion in the Red Data Book due to its threatened conservation status (Allan 1997); the species breeds within the proposed Park. Similarly, three raptor species which occur, and probably breed, within the proposed Park deserve special conservation attention; these are the secretary bird *Sagittarius serpentarius* (Boshoff &

Allan 1997), the African fish eagle (Boshoff 1997) and the African marsh harrier (Simmons 1997).

The avifauna of the proposed Park will provide a number of special ecotourism attractions, for example:

- there is a wide range of species which reflect the high diversity of habitats that occur in the proposed Park (arid species to forest species to shorebirds and seabirds).
- in excess of 400 species can be seen in the proposed Park (Harrison et al. 1997).
- the population of jackass penguins on the islands, and the world's largest gannetry on Bird island.
- the occurrence, as likely breeding species, of four of southern Africa's Big Five of the eagle world, namely the black eagle *Aquila verreauxii*, the crowned eagle *Stephanoaetus coronatus*, the martial eagle *Polemaetus bellicosus* and the African fish eagle *Haliaeetus vocifer*; the fifth species - the bateleur *Terathopius ecaudatus* - no longer occurs in the area.
- the occurrence of the three large bustard species - Kori, Ludwig's and Stanley's bustards.

Herpetofauna

The proposed Park will play a significant role in conserving the region's herpetofauna (reptiles and amphibians). For example, the mosaic of habitats in the Zuurberg area carries a particularly high diversity of snakes, whilst the Park falls within the Port Elizabeth-Grahamstown-King William's Town corridor which is known to have a high diversity of reptiles and amphibians (Branch 1988a,b). Two of the six species of herpetofauna which are endemic to the Eastern Cape occur within the current Addo Elephant National Park, namely Tasman's girdled lizard *Cordylus tasmani* and the Cape legless burrowing skink *Scelotes anguina*. The Eastern Cape has the most diverse land tortoise fauna in the world (Branch 1988a) and five species occur, or potentially occur, in the area of the proposed Park (after Baard 1994): mountain tortoise *Geochelone pardalis*; angulate tortoise *Chersina angulata*; tent tortoise *Psammobates tentorius tentorius*; common padloper *Homopus areolatus*; Karoo padloper *H. boulengeri*.

Fish

The freshwater mullet *Myxus capensis*, which is listed as vulnerable in the South African Red Data Book for Fishes (Skelton 1987), has been recorded in the Sundays River (Skelton 1988). The life cycle of this species is characterised by its breeding in the sea adjacent to estuaries, with juveniles entering the estuaries and remaining in the up river freshwater habitat for between four and seven years before returning to the sea. The proposed Park contains populations of two minnow species, the goldie barb *Barbus pallidus* and the chubbyhead barb *B. anoplus* (Mrs P Black, Department of Ichthyology, Albany Museum, pers. comm.). These indigenous minnows are recognised as

being in need of conservation attention. In particular, *B. pallidus* has a restricted range (Skelton 1987, 1993).

The proposed marine reserve falls within an area which is recognised as having a high diversity of marine fish species, including sharks, rays, reef fish and game fish. This is caused in part by the juxtaposition of warm subtropical waters on the cooler coastal waters. Juveniles of tropical reef fish are consequently found, especially in summer. Many of the fishes which are found throughout the year are endemic and merit special protection from overexploitation and environmental degradation (Smale 1988).

Invertebrates

Our understanding of the conservation status and ecological significance of our invertebrate fauna is woefully inadequate. The general conservation model has therefore been to focus on the larger species of vertebrates such as elephants and rhinoceros, and allow them to act as flagship species for the conservation of the invertebrates. However, this approach has not always been successful, as evidenced by the 11th hour actions to ensure the conservation of the Brenton blue butterfly *Orachrysops niobe*.

In the absence of detailed invertebrate surveys and assessments of the proposed Greater Addo National Park, a blanket approach of conserving the larger species and their habitats and hoping that this will be adequate for the invertebrates will have to be adopted. There is some evidence that this is effective, as Fabricius (1997) showed that the abundance and diversity of weevils, spiders and ants is much higher in conserved areas of Valley Thicket in the Fish River Valley than in adjacent areas which support pastoralism.

Two butterfly species which are considered to be threatened (and therefore comparable to the Brenton blue butterfly) and which may be protected by the proposed Greater Addo National Park are the rare *Aloeides clarki* and *Lepidochrysops bacchus* (Henning & Henning 1989). *Aloeides clarki* is endemic to the lower Coega and Sundays River valleys, and will be severely threatened by the proposed Coega development.

Two other invertebrate species which will be conserved in the proposed Greater Addo National Park are worth mentioning, these being the dune grasshopper *Acrotylos hirsutus* and the flightless dungbeetle *Circellum bacchus*. The dune grasshopper is only found in the specialised habitat of the open dunes of the Alexandria coastal dunefield (Callan 1964), and stabilisation or destruction of these dunes will lead to the extinction of this species. The flightless dungbeetle is specially adapted to be able to exploit the faeces of large herbivores in the dense vegetation of the Thicket Biome, and plays an important role in the dispersion and recycling of nutrients in this habitat. There are two known populations within the Algoa Basin, one in the currently constituted AENP, and a second population near the mouth of the Sundays River in the Woody Cape Nature Reserve. The proposed Greater Addo National Park will increase the availability of habitat for this species and

allow these two disjunct populations to be joined, thereby providing for a larger population and the evolutionary important process of geneflow.

Plants

The proposed Greater Addo National Park will conserve an impressive array of plant species, ranging from the desert adapted succulents of the Nama Karoo Biome to the stately trees of the Forest Biome. The proposed Park is located at the junction of three (Karoo-Namib, Tongaland-Pondoland and Cape Regions) of southern Africa's six phytogeographical regions (Cowling & Hilton-Taylor 1997), which, combined with the range of landscapes and climates, results in six biomes within the boundaries of the Park. This does not only reflect a sub-continental level of diversity to be found in the proposed Park, but the Park will also fall within the Albany and Cape "hotspots" of plant species endemism (Cowling & Hilton-Taylor 1997). These hotspots are identified as crucial areas for effective conservation attempts to maintain plant diversity (Cowling & Hilton-Taylor 1997).

The former Zuurberg National Park is characterised by the close proximity of several very different and unrelated vegetation types (Van Wyk, Novellie & Van Wyk 1988). A total of 1037 indigenous plant species were recorded in this Park, with a high number of species per square km (Van Wyk, Van Wyk & Novellie 1988). The diversity of the flora of the Zuurberg National Park is ascribed not so much to endemism and high species richness, as to the presence of five vegetation types and the large number of higher order taxa.

The Willowmore cedar *Widdringtonia nodiflora* occurs in the proposed Park. Accessible specimens of this tree have all been burnt or cut down within its limited range, and the relatively few specimens which remain are confined to remote and inaccessible ravines (Coates-Palgrave 1983).

A total of 511 species of plants have been recorded in the elephant enclosure and the associated botanical reserves of the current Addo Elephant National Park (Geach 1997), while 350 species have been recorded in the Woody Cape Nature Reserve (Briers & Powell 1994). A large proportion of these plant species are recognised as being of conservation significance, ranging from the variety of endemic succulent shrubs and geophytes of the Valley Thicket (Moolman & Cowling 1994) to the heavily exploited trees of the Forest Biome. Some particular examples are worth mentioning, but it must be stressed that considerable research needs to be conducted before the full botanical wealth of the proposed Greater Addo National Park can be appreciated. In addition, many of these species are of significance in terms of traditional medicines (Simelane 1996b) or may be a source of new compounds of medicinal or industrial value. There is good evidence that stripping of bark for traditional medicines is already occurring within the area of the proposed Park (La Cock & Briers 1992).

The Alexandria forest has a distinct flora and of its 167 species of woody plant (trees, shrubs and woody climbers), eight species (4.8%) occur only in this forest, and a further 19 species are recorded only in this and one other forest

region (Phillipson & Russell 1988). Of the eight species, five are marginal to the forest habitat while the remaining three species (*Atalaya capensis*, *Smelophyllum capense*, *Sterculia alexandri*) are endemic to the Alexandria Forest.

The cycads *Encephalartos* sp. are considered to represent "living fossils" with a long history in the geological record. These species are much sought after by collectors, with a lucrative illegal trade threatening the remaining populations in the wild. *Encephalartos arenarius* (classified as rare), *E. latifrons* (extremely rare and in need of hands-on conservation management), *E. caffer*, *E. longifolius*, *E. altensteinii*, *E. horridus*, and *E. lehmanni* are all expected to occur (Giddy 1974) within the proposed Greater Addo National Park. The proposed Park will therefore provide increased protection for seven (25 %) of South Africa's 28 species of cycads as well as providing an opportunity for botanical enthusiasts to appreciate them in their natural setting, thereby acting as an additional ecotourism opportunity. The proposed Park will also include other plants of interest, for example the thicket or mountain hunchback tree *Oldenburgia grandis* which is endemic to the Zuurberg mountain range, where it typically grows on rocky outcrops.

Conservation and Global Change

It is accepted that the process of global change (global warming, climate change, sea level rise, reduction of ozone levels, etc.) is inevitable, and that this will have profound effects on our attempts to conserve biodiversity. However there have been few attempts to allow for the effects of global change in national conservation strategies, in part because of the uncertainties regarding the effects of global change, but also due to the relatively short term perspective of the conservation policies of most governments.

There are however some emerging principles to guide conservation efforts in the face of global change. It is recognised that altitudinal and latitudinal shifts in the habitats of species will occur as temperature regimes shift. This suggests that conservation areas should include large altitudinal and latitudinal ranges in order to allow organisms to shift their habitats in response to climate changes. Similarly, it is recognised that biomes will shift in response to climate change, therefore conservation areas should not be confined to a single biome as the habitat (biome) for key species may shift beyond the boundaries of the conservation area, thereby leading to the extinction of those species.

While the impacts of global change are not yet clear in this region, the proposed Greater Addo National Park would conform to the above principles, ranging in altitude from sea-level to 1010 m in the Zuurberg Mountains, and with a latitudinal gradient from Waterford in the north to Woody Cape in the south. In addition, the fact that the proposed Park includes six biomes will ensure that at least some of these bioclimatic regions will persist within the

Park in the face of global change. Further research will however be needed to understand and minimise the impacts of global change on biodiversity, and the proposed Park will be able to play an important role by providing a site for this research.

Linkages with other conservation areas

It is important to try to establish linkages with other conservation areas, to allow for ecological and evolutionary processes such as gene flow, dispersal and migration. Possible links with the Groendal Wilderness Area to the west and the Karoo Nature Reserve and Mountain Zebra National Park to the north need to be investigated. Some areas which could be linked are described by Haschick & Kerley (1995).

In the context of the creation of a biosphere reserve (core conservation area with peripheral multipurpose zones - UNESCO 1984), existing and potential private conservation and ecotourism ventures in the vicinity of the proposed Park need to be identified and integrated into the planning framework. For example, Shamwari Game Reserve near Paterson, already has well developed tourist infrastructure and capacity and would further benefit from being included in this framework. This proposal will allow private ecotourism operators to identify potential opportunities linked to the expanded Park.

The Historical, Cultural and Archaeological Environment

The proposed Greater Addo National Park is located in an area with an extensive and interesting archaeological and historical record, going back to humans of the Early Stone Age. There is an important Late Stone Age archaeological site at Melkhoutboom Cave in the Zuurberg Mountains within the proposed Park. Excavations have uncovered artefacts dating from 15 000 years Before Present, and have shed much light on the life and times of the prehistoric hunter-gathers (Deacon 1969, 1976).

More recently, the area was the focus for bitter conflicts between pastoralists of European and African origin. There were extensive populations of Xhosa settled in the area when the trekboers arrived in the late 1700s, and the conflicts between these groups, and the later settlers, make for a variety of interesting historical sites. During the Anglo-Boer War, a boer commando, led by General Jan Smuts, entered the Zuurberg Mountains in September 1901. The following day, the commando being severely pressed for food, cooked and ate the fruit of a cycad *Encephalartos longifolius*. About 80 men were poisoned, and 20 were very ill, some becoming unconscious, but fortunately all survived. The sick men made a dramatic escape from the advancing British forces (Ferreira 1980, Reitz 1929). Some of the British troops were apparently billeted at Bedrogfonteinpoort, where their names can still be seen carved into a fig tree in the poort (Desmet & Ellis 1997).

The Zuurberg Pass, built in the 1850s and not subsequently re-engineered, was the main access route into the hinterland until the new route was built over Olifantskop to the east. Some of the coach stops, such as Ann's Villa and the Zuurberg Inn, are still in existence and could be developed as historical tourist attractions and hospitality facilities.

The two island groups within Algoa Bay (Bird Island and St Croix Groups) are of great historical value. Bartholomeu Diaz, in the first recorded rounding of the Cape of Good Hope, landed on St Croix Island in 1488 and erected a wooden padrao. The St Croix seal population was exterminated by sealers in 1825 and the island served as a whaling station in the 19th Century. There were brief but unsuccessful attempts to harvest guano on St Croix earlier this century. Bird Island is the location of at least 29 shipwrecks, including that of the Doddington in 1755. The exploitation of guano occurred on Bird Island until recently and the facilities could be used for tourist accommodation. The lighthouse, built in 1873 and still in use, is of historical significance (Urquhart & Klages 1996).

In addition to its geological and ecological significance, the Alexandria coastal dunefield also has much archaeological significance. The dunes act as an unconsolidated aquifer, and were used by early man as a source of water, a process which continues today. Thus a number of sites of Khoi/San settlements have been found in the dunefield, including material such as stone tools, pottery, ornaments, food remains and human skeletons. Unfortunately, this material has not yet been well-studied.

A comprehensive survey of the archaeological and historical significance of the area of the proposed Greater Addo National Park is required. This will not only be essential for the conservation of these sites, but will be invaluable in developing them as tourist attractions.

Ecotourism/Conservation as a sustainable form of Land-use

There is an emerging demand for sustainability of all forms of natural resource use, in order to provide for quality of life for current and future generations. This has been expressed in a host of policy documents, internationally including the Rio Declaration (June 1992) and more explicitly in the Convention for the Conservation of Biodiversity. Within South Africa, sustainability was stated to be one of the keys of the Reconstruction and Development Programme (African National Congress 1994) and features prominently in the White Paper on "An environmental policy for South Africa" (DEA&T 1997). However, the implementation of sustainable forms of land-use has proved elusive, largely due to a lack of understanding of the implications of the various forms of land-use.

Pastoralism has been clearly shown to be unsustainable within Valley Thicket, apparently due to the tendency of domestic herbivores to prevent regeneration of the vegetation, even at low to moderate stocking rates (Stuart-Hill & Aucamp 1993). This is further exacerbated by the farmers' need to maintain cashflow in an unpredictable environment (Stuart-Hill & Danckwerts 1988, Birch 1991). In contrast, game ranching and ecotourism/conservation are ecologically sustainable, although it has been shown that numbers of megaherbivores have to be carefully managed to prevent their degradation of the habitat (Kerley et al. 1995). Although goat pastoralism may generate more income than gameranching, in financial terms, this is not sustainable due to the degradation of the resource base, and the income derived is less than that provided by ecotourism/conservation (Kerley et al. 1995).

It is therefore obvious that in the Valley Thicket, ecotourism/conservation is ecologically and economically sustainable. These studies need to be expanded to other vegetation types and land-use options to confirm these findings. There are, however, indications that fynbos cannot sustain conventional agriculture or pastoralism, but that ecotourism, water catchment and flower harvesting are sustainable forms of land-use in this biome (Rebelo 1996). Similarly, forests cannot sustain pastoralism (Castley & Kerley 1996b), and are destroyed by clearing for crops. The highly threatened nature and extent of degradation of the Nama Karoo and grassland examples discussed earlier, suggest also that the current forms of land-use need to be reappraised in terms of their sustainability in these biomes. It may therefore be concluded that ecotourism/conservation is an ecologically sustainable, and therefore highly desirable, form of land-use.

The Economics of Ecotourism/Conservation

Although ecotourism/conservation is recognised as a valid form of land-use and a lucrative alternative to conventional agriculture and pastoralism, this category of land-use is generally ignored in economic analyses. There have also been few attempts to quantify the value of ecotourism/conservation in either financial or economic terms (Antrobus, Fraser, Levin & Lloyd 1994).

In a financial analysis, Kerley et al. (1995) clearly showed that ecotourism/conservation in Valley Thicket (AENP), besides being sustainable, also generated more income than a comparable pastoral operation and was generally profitable. In addition, the ecotourism/conservation option is ecologically sustainable (see above).

The economic perspective shows a far higher value for ecotourism/conservation derived from the AENP, with visitors spending a conservatively estimated R360 million travelling (flights, car hire, fuel, hotels, etc.) to the Park in 1996 (Geach 1997). This figure does not include what the visitors spent in the Park for accommodation, meals, supplies, gamedrives, tips, etc. The total Gross Geographic Product of the districts in which the proposed Greater Addo

National Park will fall (Alexandria, Kirkwood, Somerset East and Jansenville) is lower (R297 million in 1992, no data available for 1996) than the amount spent by visitors travelling to the Addo Elephant National Park in 1996 (Geach 1997), although it must be recognised that the tourist figure is distributed over a far wider area (Geach 1995, 1997). Thus ecotourism/conservation can clearly be seen to be a major economic role-player in the Eastern Cape.

In terms of employment opportunities, ecotourism/conservation also performs well, with the current Addo Elephant National Park employing twice as many people at four times the income of a comparable pastoralism operation (Kerley et al. 1995). Furthermore, onsite employment figures seriously underestimate the employment opportunities provided by ecotourism/conservation as a form of land-use, as tour operators, service providers and other ripple effects also generate jobs. It has been estimated that each 10 foreign tourists will create one local job (Hugo 1992). This suggests that with about 90 000 visitors, half of which are foreigners (Geach 1997), the current Addo Elephant National Park generates about 4000 direct and indirect employment opportunities.

Thus, ecotourism/conservation is clearly highly desirable in terms of wealth generation and job creation. The proposed Greater Addo National Park will therefore have the potential to significantly expand the contribution of ecotourism/conservation to the regional economy. However, it is not possible to simply extrapolate the economic contribution of the current Addo Elephant National Park to the proposed extended Park, as the value of the larger Park will depend on a host of factors. These include the nature of ecotourism developments (currently restricted to the current Addo Elephant National Park) and the size of the ecotourism market. There is therefore a need for market research and development planning for the proposed Greater Addo National Park.



The fence line contrast (centre) showing the impacts of overgrazing on Valley Thicket. The fence separates severely degraded Valley Thicket to the left, and reasonably pristine Valley Thicket to the right. This type of degradation is brought about by overgrazing by domestic herbivores, chiefly goats (bottom) while indigenous herbivores serving the ecotourism industry (top) are sustainable (Photos: G Kerley)

The Ecotourism Potential of the proposed Greater Addo National Park

In 1996, an estimated 3 million visitors came to South Africa, while the Eastern Cape Province experienced an estimated 2.5 million foreign and domestic visitors, who are estimated to have spent R3 billion in the province. The Eastern Cape is recognised as being the area with the fastest growing tourism industry in South Africa, being constrained largely by the availability of tourism options (P. Myles, Tourism 2000 Network, pers comm.).

The proposed Greater Addo National Park is therefore ideally situated to encourage and exploit this tourism market. This is to some extent already happening in the existing Addo Elephant National Park, where visitor numbers have grown from 24 781 in 1986 to 88 000 in 1996, increasing at 20 % per year over the last four years (since the 1994 elections). Thus Addo already attracts more visitors than the Serengeti, which is seen by many people throughout the world as the ultimate African experience. The increasing interest in the Addo Elephant National Park is reflected in the recent publication of two popular guidebooks on the Park (Gibson 1997, Urquhart et al. 1997).

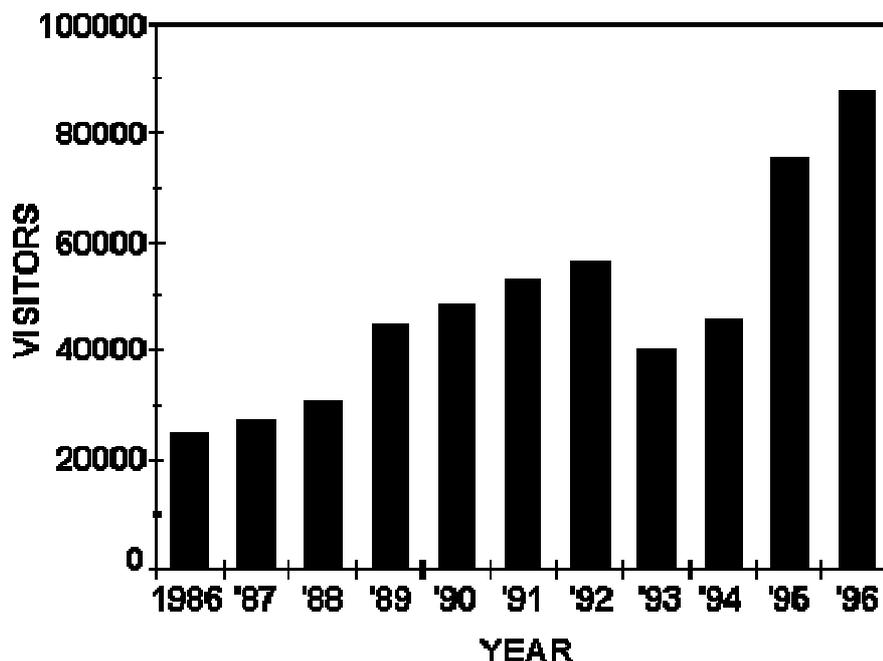


Figure 1: Trends in the numbers of visitors to the Addo Elephant National Park from 1986 to 1996. The trough in 1993/1994 is associated with the landmark election in April 1994.

There are a number of factors which contribute towards the increasing popularity of the Addo Elephant National Park, and which will apply to the proposed Greater Addo National Park. Tourists are influenced in their

decision to visit a destination by a variety of factors, including the attraction associated with the destination, the comfort and facilities offered at the destination and the safety and health threats that they will be exposed to. In all these respects the proposed Greater Addo National Park will stand out as a highly desirable tourist destination since it offers an outstanding range of attractions, with well developed facilities and low safety and health risks.

Attractions

In terms of attractive destinations, the Greater Addo National Park has an outstanding range of desirable options for tourists, which can best be elucidated in terms of the potential to have at least five (or six) rest camps offering a wide range of experiences:

- **a Karoo camp** in the plains area in the vicinity of the Darlington Dam; here plains game and large predators such as lion and cheetah will be a major attraction,
- **a mountain camp**, on the Zuurberg Mountains near the route of the original Zuurberg Pass; here mountain vistas, unique plants and scenery will be an attraction,
- **a Valley Thicket camp** which would be the existing Addo tourist camp; here the vegetation and the elephants will be an attraction,
- **a coastal camp** at the mouth of the Sundays River; here the sea, the estuary and the dunefield will be the attraction,
- **a forest camp** on the periphery of the Alexandria forest; here the forest, the dunefield and Woody Cape itself will be the attraction,
- **an island camp**, could be considered for Bird Island: here low density (10-12 people at a time) and low disturbance, overnight visits to experience the island and the seabirds will be the unique attraction.

When this range of attractions (from lions to penguins, forests to deserts, mountains to beaches) are put together as a package, the Greater Addo National Park will be able to attract visitors as a major destination in its own right, on an equal basis with the Serengeti, Kruger and other great African experiences. This will be further complemented by the proposal to build one or more casinos in the vicinity of Port Elizabeth (thereby attracting a broader range of tourists to the vicinity). The proposed Greater Addo National Park will also be complemented by the Garden Route as a tourism experience, and will no longer be seen as simply a possible overnight option at the end of the Garden Route.

The climate of the Addo region is also very well suited for tourism, being generally warm temperate, with cool winters and hot summers. Port Elizabeth was recently voted as being one of the top ten cities in the world in terms of its climate (Anon. 1996). This allows for year-round tourism opportunities, particularly exploiting the good conditions here during the northern hemisphere winter.

Tourism Infrastructure

The proposed Greater Addo National Park is extremely well located in terms of tourism infrastructure. This includes both the Port Elizabeth Airport and Harbour. Currently well served by domestic flights, there are plans to upgrade the airport to international status, allowing foreign tourists to fly directly to Port Elizabeth. The harbour is also a popular port of call for cruise liners and the proposed Park would allow these liners to visit Port Elizabeth more frequently and spend more time in port as their passengers explored the variety of options within the proposed Park. Port Elizabeth is also served by a number of national highways, and these pass close to the proposed Park. There is very good road access to all the areas of the proposed Park, and visitors will easily be able to move between the various attractions within the proposed Park.

Being close to Port Elizabeth, the proposed Greater Addo National Park is also well serviced by other essential tourist infrastructure, including travel agents, hotels, car-hire facilities, banks and medical facilities. The area is also well serviced in terms of local and international communications, a distinct advantage over many other African tourism attractions.

Tourist Safety

The international tourism market is recognised as being very sensitive to safety and health risks. South Africa's political background tended to discourage tourists who were concerned about being caught up in domestic political violence. However, the new political dispensation has largely removed this threat. In addition, traditional destination countries in the rest of Africa, such as Kenya, are currently undergoing political upheaval. These factors have therefore combined to make South Africa a highly desirable African tourism destination. The Eastern Cape Province has largely been excluded from the strife in Kwazulu-Natal, but there have been a number of criminal incidents affecting tourists, particularly in the larger cities. The area in and around the proposed Greater Addo National Park has an excellent security record for tourists. This safety aspect will therefore be an important selling aspect for tourism to the proposed Park, and maintaining tourist safety must become a key focus of law and order agencies.

Malaria is recognised as a major threat to tourism, particularly in terms of the emergence of highly virulent strains which are resistant to both prophylactics and to subsequent medication. The proposed Greater Addo National Park is a malaria free area, and tourists will be able to experience a comprehensive suite of African experiences, including the Big Five, without the attendant risk of malaria, or a host of other tropical diseases.

Only about 12 000 ha of the current Addo Elephant National Park is developed and accessible for tourists. This is a relatively small area for the current load of nearly 100 000 tourists per annum, and it is essential that tourism opportunities should be expanded in order to benefit from the international tourism market. The proposed Greater Addo National Park will

be in an ideal position to capture further tourists, as the idea of Addo is already entrenched in the international tourism trade, and the idea of expanding the Park to become one of the most diverse parks in the world, and offering the full African experience in safety and comfort, will in itself act as a magnet in attracting further interest.

Potential Community Benefits

The proposed Park will undoubtedly provide a number of socio-economic benefits for the local community, and especially the disadvantaged segment of this community. For example:

- § A number of permanent jobs will be created within the Park, e.g. in the conservation management and the hospitality sectors.
- § A number of casual jobs will be created within the Park, e.g. for labour intensive management projects, such as game capture, alien vegetation eradication and fencing.
- § A number of jobs will be created in the service and peripheral industries, e.g. suppliers of services and materials, suppliers of skills such as builders, plumbers, caterers, tourist guides, etc. This will be particularly important during the development phase of the proposed Park, when local industries will be called upon to provide the materials for and erect hundreds of kilometres of fencing, build roads, restcamps and other infrastructure.

Due to the sustainable nature of the proposed land-use, the potential for the long-term viability of the jobs created will be good, or at least better than in the agricultural industry.

Tourism can be one of the most effective means of spreading wealth from affluent people to rural communities (Hanekom & Liebenberg 1994). The proposed Greater Addo National Park will be very well placed to fulfil this role.

Crucial to the process of upliftment of neighbouring communities through ecotourism/conservation is the sound working relationship and mutual trust between the management authorities and the community. The present Addo Elephant National Park has a good and established relationship with the neighbouring community of Nomathamsanqa, through the Mayibuye Ndlovu (Let the Elephant Return) Project. This organization was established to plan and implement conservation-based community development projects, with the active support of the National Parks Board (Geach 1997). Since 1993, the AENP has provided the community of Nomathamsanqa with several benefits, including unneeded building material, firewood from exotic trees, craft materials from within the Park (e.g. reeds) and educational opportunities. In addition, the residents of Nomathamsanqa have benefited from game culling within the Park, whereby proceeds from venison sold to tourists in the restaurant have been deposited in a Trust Fund to use as they wish. The success of the Mayibuye Ndlovu Project is reflected by the fact that 68 % of

the Nomathamsanqa community supports conservation as a form of land-use, and there is a strong awareness within this community of the benefits to be gained from ecotourism (Geach 1997).

The successful Mayibuye Ndlovu Project provides a sound basis for further community relationships in terms of this proposal for the Greater Addo National Park.

Management of the Proposed Park

It would be highly desirable to have a single management authority and management plan for the proposed Park. This will have obvious advantages for the relationship between the Park management authority and local, regional, national and international governments and conservation and tourism agencies. As mentioned earlier, we recommend that the proposed Greater Addo National Park be accorded National Park status.

The development of appropriate and effective strategies, structures and plans for the day to day management of the proposed Park as a significant conservation and tourism site is best left to the conservation agencies concerned.

Issues relating to the Establishment of the Greater Addo National Park

There are a number of issues relating to the establishment, management and potential for success of the proposed Greater Addo National Park. Some of the more important issues are discussed here.

Cost of purchase of land for the Park

The full cost implications of the purchase of the land to create the Greater Addo National Park still need to be investigated. They will depend on a number of factors and a generalisation can not be made here. While the cost of the land will be high, this should be seen in the perspective of the projected costs of other proposed developments in the area. For example, we predict that the cost of the land purchase for the proposed Park will be a fraction of the projected costs of R1.5 billion for the proposed Coega harbour and industrial development zone. We contend that the cost of the purchase of the land is justifiable in terms of the sustainability of the proposed land-use type and the associated long-term socio-economic benefits. Furthermore, some of the cost can be recovered from the income generated, and possibly from

funding applications to national and international conservation agencies, such as the WorldWide Fund for Nature (South Africa), the Leslie Hill Succulent Karoo Trust, the Global Environment Facility (GEF) and the International Fund for Animal Welfare (IFAW).

According to Geach (1997) visitors to the AENP generally agree that they would be willing to contribute to the expansion of the Park. A fund-raising drive, targeting these visitors, should therefore be set in motion as soon as possible.

Relationships between the National Parks Board and the provincial conservation authority

The Woody Cape and Tootabie Nature Reserves are presently under the custodianship of the Chief Directorate: Environment in the Ministry of Economic Affairs, Environment & Tourism of the Eastern Cape Provincial Administration, whereas the Addo Elephant National Park is under the custodianship of the National Parks Board, a statutory body within the national Department of Environment & Tourism. The proposed Greater Addo National Park undoubtedly warrants National Park status and therefore the issue of how the two custodians should approach the issue of an appropriate and effective management structure will have to be handled in a sensitive manner. We do not envisage insurmountable obstacles as mechanisms exist to deal with this situation, and we foresee that a "win-win" situation for all concerned can be achieved.

Effects on local communities

A perception could arise that the proposed Park may contribute to the depopulation of the rural area through the displacement of local people. We do not see this as a major problem since there are actually very few people living in the area of the proposed Park. Throughout the process of the creation of the proposed Park it is vital that jobs and livelihood be created rather than destroyed. The change in land-use must therefore be subject to thorough socio-economic research and every effort must be made to find adequate alternative livelihoods for those people who are displaced.

Since most of those who would be displaced will be in the older age groups, it is particularly important that actions be taken to provide them with settlement opportunities with appropriate infrastructure (e.g. serviced sites, clinics, schools, etc.). This will also improve the efficiency of the delivery of essential services to these communities.

While not all of the displaced people will be able to find employment in Park-related jobs, the proposed Park will require considerable staff, and there will also be ripple opportunities in associated service industries (see earlier).

Road and rail servitudes

Four roads and two railway lines bisect the proposed Park and the management plan for the Park will have to take this into account. The most prominent are the N2 between Port Elizabeth and Grahamstown, and the Addo-Paterson road and rail link. Since it will not be possible to have these routes deproclaimed or re-routed, the use of culverts to allow movement of game will need to be investigated. There are historical records of the elephants using the railway culvert as an underpass for the railway line immediately north of the current Park headquarters (Dr A J Hall-Martin, National Parks Board, pers. comm.). This suggests that culverts will be a feasible option to maintain game movement across road and rail barriers. There is already a substantial culvert (for the disused railway line) under the N2 east of Colchester which could be used by both tourists and wildlife.

A third road - the Addo Heights road, between Addo and the R32 could be investigated with a view to deproclamation; the full co-operation of the neighbouring farming community will be essential before this can be achieved. The fourth road, the old Zuurberg Pass between Addo and Ann's Villa to the north of the Zuurberg Mountains, could probably be deproclaimed as a public thoroughfare but retained as a tourist road within the proposed Park, i.e. it should be seen as an asset to the proposed Park, particularly in terms of its historical background. The second railway line, between Colchester and Alexandria, is no longer in use and therefore does not present a management problem.

Electricity transmission lines

A major electricity transmission line runs over the Zuurberg Mountains to Addo and along part of the western boundary of the proposed Park. There are three other 220 kV lines across the proposed Park. In addition, there are numerous minor transmission lines serving farms in the area. We do not consider the electricity transmission lines to be a fatal flaw, and the minor lines can be dismantled, or retained to service Park infrastructure.

Proposed Coega harbour and Industrial Development Zone

The proposed industrial development and harbour at Coega will have serious negative consequences for the Park. First, there is the issue of visual pollution, since it will be visible from a large part of the Park, especially from the summit of the Zuurberg Mountain range. This will inevitably detract from the natural experience for tourists, who will also have to drive through a heavily industrialized area to reach the Park. Second, there is the risk of pollution from toxic waste generated by the industries. The prevailing winds blow from a SSW direction and will inevitably blow this pollution over the Park. For example, the level of fluoride emissions (from the Gencor and Kynoch

plants) will definitely have a negative impact on the vegetation in the Coega area, as well as the area several km downwind of Coega (Botha & Olbrich 1997). In addition, it is likely that the bird populations on the St Croix island group will be severely affected by the Coega harbour development (Wooldridge, Klages & Smale 1997). Unfortunately, it is not possible to evaluate the impact of the proposed Coega developments as there is currently insufficient information on their environmental impact. The Park management must be identified as an "Interested and Affected Party" in the Integrated Environmental Management of the Coega IDZ.

Quality of service and facilities

The service and some facilities within the Addo Elephant National Park are below international standards and are the source of considerable dissatisfaction among tourists (Geach 1997). These will have to be considerably improved for the proposed Greater Addo National Park to be able to compete as an international tourism destination. Facilities within the Woody Cape Nature Reserve are either very primitive or non-existent and will require major development, as will facilities in the areas of the proposed Park which must still be acquired.

Invasive alien vegetation

There are local patches and scattered individuals of various species of alien plant within the proposed Park. Naturalized exotic species make up 5.6% of the 1100 species recorded within the former Zuurberg National Park (Van Wyk, Van Wyk & Novellie 1988). The most prominent and extensive of these are:

- Prickly pear *Opuntia ficus-indica*: Mainly occurring in parts of the Valley Thicket south of the Zuurberg Mountain range, and rapidly eradicated by the elephants for which it is a preferred food item.
- Jointed cactus *Opuntia aurantiaca*: Scattered populations in the areas historically and currently used for pastoralism. This species is a major threat to pastoralism, and the extent of the threat within the proposed Greater Addo National Park is unknown. It is also not known how the expansion of the elephant's range will affect this species, i.e. whether the elephants will eat it or disperse it.
- Rooikrans *Acacia cyclops*: Used extensively to stabilize coastal dunefields, and represents a major threat to the integrity of the Alexandria and Schelmhoek dunefields.
- Black wattle *Acacia mearnsii*: Occurs in dense thickets along the old Zuurberg Pass, and some scattered populations. This species can be physically controlled, with a biocontrol agent currently being investigated.
- Bluegum *Eucalyptus* spp.: A few stands and scattered individuals in and around the Zuurberg Mountains and around old homesteads. Not a major problem.
- Tamarisk *Tamarix* sp. cf. *ramosissima*. Fairly heavy infestation on the northern shores of the Darlington Dam and along its three main inlets.

A survey of the extent of invasion and an appropriate management programme to eradicate these and other invasives is required. Whilst some of the prominent aliens may present ecological problems, all of them could be seen as potential economic opportunities through the provision of employment to local people in a programme based on the highly successful "Working for Water Project".

Some of the properties identified for inclusion into the proposed Greater Addo National Park are currently stocked with game species which are not indigenous to the area (e.g. impala *Aepyceros melampus*, nyala *Tragelaphus angasi*, lechwe *Kobus lechwe*, fallow deer *Cervus dama*, hog deer *Axis porcinus*). These should be removed before the properties are incorporated within the proposed Park (Boshoff, Kerley & Castley 1997).

Predators and stock farmers

Stock farmers sometimes raise concerns that conservation areas harbour predators of their domestic livestock. Research, however, indicates that densities of predators within conservation areas may actually be lower than those on surrounding stock farms (Moolman 1986). We recommend that the full suite of indigenous predators be introduced within the proposed Park in order to maintain the predator/prey interactions of the ecosystem. There are indications that predators keep their own numbers down by preying upon each other, for example the brown hyaena is a well-known predator of black-backed jackal and caracal (Mills 1984). Most of the predators will be contained within the park by the fence. Neighbouring stock farmers will also benefit from the anti-poaching patrols and wildlife management expertise provided by the proposed Park.

Conclusions

We consider that our report demonstrates that the proposed Greater Addo National Park clearly achieves all of the *a priori criteria* which we used to evaluate the concept.

The proposed Greater Addo National Park will be geomorphologically and biotically the most diverse conservation area in South Africa. In addition, it will create immense potential for socio-economic development in the economically depressed Eastern Cape.

Given the increasing pressure on the environment from government-backed development initiatives, the expectations of the people regarding employment opportunities, and the fragility of the environment regarding its ability to provide basic resources on a sustainable basis, the window of opportunity presented by this proposal is unlikely to remain open for long. It is thus absolutely crucial that the discussion around the desirability, feasibility and benefits of an extended Park be expedited. If supported by key stakeholders, the proposal should be implemented without delay.

The proposed Greater Addo National Park would qualify for World Heritage Site status in terms of the high diversity of plant and animal species, geology and landscape features, palaeontological and cultural history features. These all contribute to its outstanding conservation value. This would place it on a par with other World Heritage Sites being proposed for South Africa.

Recommendations

We recommend that the concept described in this proposal be taken further through the setting up of a Working Group or Task Team comprised of representatives from the full range of stakeholders, including inter alia (in alphabetical order):

Citrus Forum, Coega IDZ Initiative, Department of Water Affairs & Forestry (National), Department of Agriculture & Land Affairs (National and Eastern Cape Province), Eastern Cape Tourism Board, Fish River Spatial Development Initiative, local Community Based and Non-Government Organizations, local Farmers Unions, Ministry of Economic Affairs, Environment & Tourism (Eastern Cape Province), National Parks Board, PPC Cement (Pty) Ltd, Sundays River Irrigation Board, Tourism Port Elizabeth.

The Working Group should be tasked with the responsibility of further evaluating this proposal and for drawing up a plan to implement the proposal to establish a Greater Addo National Park.

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Appendix

Extract from the Government Gazette of 9 May 1994, Notice 449 of 1994
(from Wahl & Naude 1996)

CATEGORY II - NATIONAL PARKS AND EQUIVALENT RESERVES

Definition A national park or equivalent reserve is a relatively large, outstanding natural area of land and/or sea designated to protect the ecological integrity of one or more ecosystems for this and future generations, to exclude exploitation or intensive occupation of the area and to provide a foundation for spiritual, scientific, educational, recreational and cultural opportunities for visitors.

Objectives To protect natural and scenic areas of national or international significance for spiritual, scientific, educational, recreational and tourism purposes. The area should perpetuate, in a natural state, representative samples of physiographic regions, biotic communities and genetic resources and species, to provide ecological stability and diversity. Cultural resources which may occur in these areas will also be protected.

Criteria for selection and management National parks and equivalent reserves encompass outstanding and extensive samples of at least one of the recognised biomes of the country in a near natural state or which has potential to be rehabilitated to such a state.

These are of sufficient size to sustain viable, free-living populations of all wild plant and animal species which occur naturally or which occurred in historical times, including predators, without requiring unrealistic control measures to safeguard adjacent farming practices or other developments.

Preservation of the natural environment will at all times receive the highest priority. Only development which is reconcilable with the objectives of the area, will be allowed.

These areas are open for controlled access by all members of the public.

These areas are managed by either the National Parks Board or a competent nationally recognised authority.

Figure 1: Trends in the numbers of visitor to the Addo Elephant National Park from 1986 to 1996. The trough in 1993/4 is associated with the landmark election in April 1994.

TERRESTRIAL ECOLOGY RESEARCH UNIT REPORT SERIES

* Reports available at client's discretion

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