



Management & Development Plan
for the
Gondwana Cañon Park



- to guide its management, monitoring and development -

For the Period of 2008-2013

First draft: September 2008

Second draft: October 2008

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Authority of the Management & Development Plan

This Management and Development Plan (MDP) sets out the vision, objectives and guidelines for the management and development of the Gondwana Cañon Park (GCP). As such, it represents the policies and intentions of the shareholders and directors of Nature Investment (PTY) Ltd. The MDP is accepted as the ultimate authority for the Park. All involved with the Park, including shareholders, directors, staff, contractors, partners and others, must ensure that any actions and decisions relating to the Park are in strict accordance with this document.

Senior staff appointed to run the Park, i.e. the Park Warden(s), is/are ultimately responsible for ensuring that the MDP is implemented in effective and efficient ways. They are also responsible for ensuring effective day-to-day park management, dynamic, responsive and pro-active rolling planning as well as contributing to longer-term planning.

No other staff members may implement park actions of any nature, or any activity likely to have an impact on the integrity of the park and its biota, without prior discussion with and approval from the Park Warden(s). The Warden(s) currently report directly to the Managing Director of the Gondwana Group for line function purposes. In future, a senior Parks & Environment Manager should be appointed at Head Office (equivalent to the Operations & Human Resources Managers), at which time the Park Warden(s) would report directly to that position. The Warden(s), together with the MD (and in future with the Parks & Environment Manager), liaise closely with the Parks Committee on all issues of policy, planning, new developments and issues not covered by the MDP that may have significant implications for the Park, as well as any issue on which assistance and guidance is required.

This MDP will be thoroughly reviewed and, if necessary, revised, every five years. The next review shall be done in 2012 for implementation in 2013. Any changes that must be made in the interim to Parts 1-4 and 7 must be approved at a formal Directors' meeting and reflected in the minutes. These approved changes must be appended to the two master copies of the MDP, one held within the Park, the other held at the Gondwana House in Windhoek. Changes must be made to Parts 5 & 6 as new information becomes available, the MD and Parks Committee informed and the two master copies updated.

The MDP should be seen as a valuable and central document by directors and staff. Relevant staff must be familiar with its contents and new staff should be made familiar with the aims, objectives and policies of the park as part of their induction training.

It is part of every staff member's job to help implement this MDP. It is also every staff member's responsibility to propose improvements to the plan, as well as improvements in how the plan may be implemented. Park management is a team effort. The future well-being and development of the Park depends on this team approach.

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Managing Director
Gondwana Desert Collection

Windhoek,October 2008

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Director: Parks
Gondwana Desert Collection

Windhoek,October 2008

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Chairperson of Board
Gondwana Desert Collection

Windhoek,October 2008

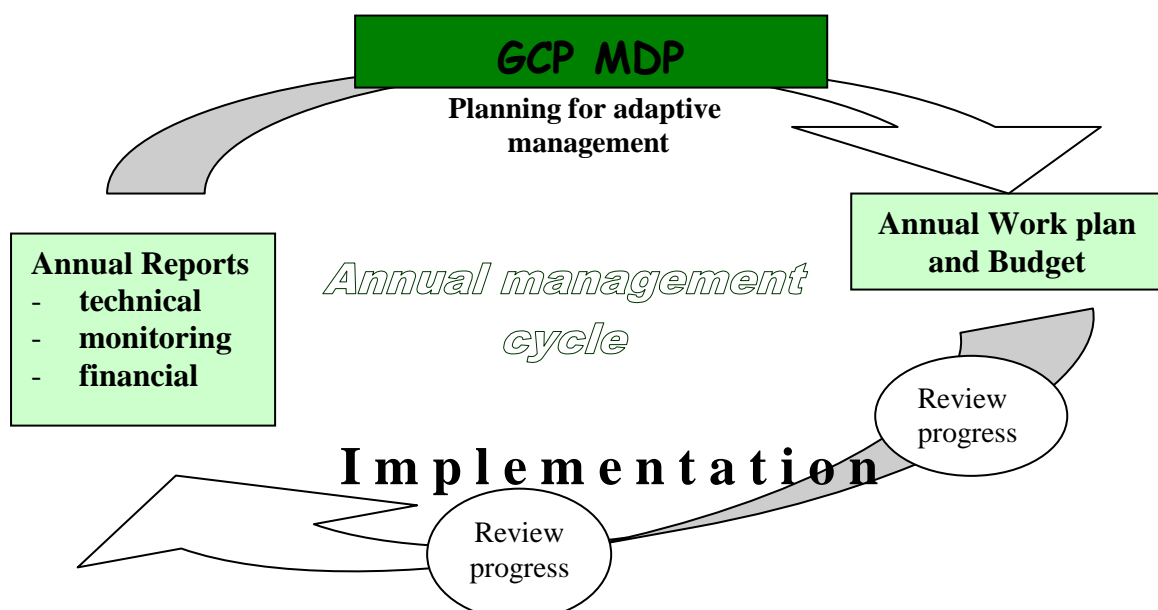
Management System

The purpose of this management system is to implement the MDP of the Gondwana Canon Park in an efficient and systematic way. For each annual cycle, an *Annual Work Plan* and a *Budget* will be prepared. This work plan will, as far as practical, follow the sequence of topics listed under parts 3 & 4 in the MDP. The work plan should cover:

- **Routine management issues**, such as managing water points, maintaining roads and fences, law enforcement, etc;
- **Development issues**, such as new waters, wildlife reintroductions, establishment of new partnership arrangements with neighbours, new park policies, etc;
- **Monitoring aspects**, such as collection, storage and analysis, and providing essential information for adaptive management; covering such things as rainfall, veld condition, wildlife numbers, distribution & age/sex ratios, etc;
- **Research needs**, identifying important information and knowledge gaps; and
- **Administration**, including work plan & budget preparation, reporting and meetings.

Progress on the implementation of the annual work plan and a financial reporting against the approved budget should be provided at each Parks Committee meeting. These will be standing agenda items, and the reporting format should follow the sequence of issues and timing of the work plan. Highlights and issues requiring Board notice or approval will be tabled as necessary at Director's meetings of the Board.

At the end of each annual cycle, an *Annual Report* and *Financial Report* will be prepared. This will follow the format of the work plan, and include cumulative (time-series) information from the monitoring programme. The cumulative information, showing trends over time, will be used to adaptively manage the park. This information will also be used, together with the direction provided by the MDP, to prepare the next Annual Work Plan and Budget, both of which will be tabled for review by the Parks Committee and adoption by the Board of Directors.



Part 1: Vision, Goal and Objectives

1.1 Vision

To develop the *Gondwana Cañon Park* as a conservation area of international significance within a larger co-managed transboundary landscape of global renown.

1.2 Goal

To wisely manage and rehabilitate the land and natural resources of the *Gondwana Cañon Park*, and to pass these on to future generations in productive, diverse, aesthetically attractive and healthy condition, on an economically sound footing and as part of a larger co-managed landscape that is contributing significantly to the sustainable development of the region and nation.

1.3 Objectives

- ❖ To conserve and wisely manage the landscapes, ecosystems and biological diversity of *Gondwana Cañon Park* and, where necessary, to restore and rehabilitate degraded systems to their natural and productive states.
- ❖ To manage wildlife populations and ecosystems as may be necessary and appropriate to maintain optimal biological diversity, ecosystem stability and resilience under highly variable climatic conditions, and to reintroduce and rebuild populations of plants and animals indigenous to the area within historic times, as appropriate under current and changing conditions.
- ❖ To promote and support appropriate land and natural resource uses that are compatible with the above objectives, including consumptive and non-consumptive utilisation, research, environmental education, awareness and outreach initiatives, and to strive for financial viability without compromising on sound conservation principles and practices.
- ❖ To establish partnerships and co-management approaches for landscape level conservation with neighbouring landowners, administrators and custodians to enhance the diversity, viability and competitiveness of the greater area within the Nama Karoo and Succulent Karoo ecosystems.

- ❖ To demonstrate the ecological, social and economic viability, sustainability and competitiveness of land used for wildlife and tourism within arid and semi-arid areas, and to use the *Gondwana Cañon Park* approach, in conjunction with other parks in the *Gondwana* collection, as a model that may be further replicated elsewhere.

- ❖ To link the *Gondwana Desert Collection* under a management and marketing umbrella that cumulatively and synergistically promotes the conservation of Namibia's arid and semi-arid ecosystems and creates a *Four-Deserts* experience for visitors and scientists.

Part 2: Zonation Plan and Management Units

2.1 Area Background

The Gondwana Cañon Park is located between 27°17'S and 27 °56'S and between 17°38'E and 18°02'E. It falls within seven Quarter Degree Squares (2717Bc, 2717Bd, 2718Ac, 2717Da, 2717Db, 2717Dc, 2717Dd) in the Nama Karoo Biome and, in the south, straddles the transition area into the Succulent Karoo Biome. The median annual rainfall is less than 100 mm, falling mainly between January and April, and highly unpredictable, with a coefficient of variation of approximately 70%. Ecologically significant falls of winter rain occur on average about every fourth year.

The park is bounded to the north-east by the Klein Karas mountain escarpment, made up of black limestone and shales belonging to the Schwarzrand Subgroup of the Nama system. The central and eastern parts of the park consist largely of sand and gravel plains formed by sedimentary depositions of the Nama Group, laid down between 600 and 530 million years ago, interrupted by older granite intrusions ('koppies') formed in the Namaqua times (1250 to 600 MYA). Towards the south-western border of the park are found the oldest rocks in the area: remains of dark-coloured basaltic lavas with an age of 2000 million years.

The western side of the GCP shares a common border with the Fish River Canyon section of the Ai-Ais/Hunsberg/Fish River Canyon National Park for a distance of about 70 km. Its other boundaries are shared with freehold farms and a communal settlement farm occupied by the Klein Karas community (see Figure 1). The current land uses by neighbours are shown on the map.

The GCP, before its purchase into the Gondwana Collection, comprised nine separate multiple-purpose farms - mainly small-stock, some small-scale tourism, and some wildlife utilisation (trophy hunting, biltong hunting, own use). Since its inception the focus of the Gondwana Desert Collection has been to manage the land for biodiversity and landscape conservation and to use the land primarily for low impact tourism.

2.2 Habitats

The following habitat types have been identified in the GCP:

Habitats	Descriptions
Sandy plains	Extensive, flat or slightly sloping landscape, with a sandy substrate and numerous drainage lines. Vegetation consists mostly of <i>Stipagrostis</i> grasses with <i>Euphorbia gregaria</i> , <i>Parkinsonia africana</i> , and <i>Sisymbrium spartea</i> , with some small shrubs and herbs, and occasional stands of <i>Acacia mellifera</i> , <i>Acacia erioloba</i> , <i>Aloe dichotoma</i> or <i>Aloe claviflora</i> .
Gravel plains	Extensive, flat or slightly sloping landscape, with a gravel surface substrate, often interspersed with sandy patches, and crossed by numerous drainage lines. Vegetation consists of <i>Stipagrostis</i> grasses, <i>Rhigozum trichotomum</i> , <i>Zygophyllum</i> species, <i>Sarcoculon</i> species, and other dwarf shrubs and succulents.
Granite and dolorite inselbergs	Distinct rocky outcrops; largely devoid of vegetation, with the exception of occasional <i>Aloe dichotoma</i> trees, and <i>Rogeria longiflora</i> ,
Incised rocky hills	Surface substrate dominated by dolomite bedrock. Highly irregular surface, with the hills being incised by many valleys and 'kloofs'. Grass is sparse, and vegetation consists mostly of spiniferous shrubs, small and large (e.g. <i>Aptosimum spinescens</i> , <i>Rhigozum trichotomum</i> , <i>Catophractes alexandrii</i> , small <i>Commiphora</i> species), and stem- and leaf-succulents, such as <i>Sarcocaulon</i> species, <i>Zygophyllum</i> species, etc.
Smooth gravel hills	Undulating or steeply-sloped landscape, with a gravel surface substrate, often underlain with sand. Vegetation consists mostly of grasses and small shrubs, with <i>Euphorbia gregaria</i> , and at higher elevations, <i>Euphorbia virosa</i> or <i>Euphorbia avasmontana</i> , as well as <i>Boscia foetida</i> , <i>Commiphora</i> species and <i>Cadaba aphylla</i> .
Mountain escarpments	Represented largely by the Klein Karas escarpment. Consists predominantly of loose scree slopes and cliffs, with scant vegetation, including <i>Aloe dicotoma</i> .
Ephemeral rivers	Sandy or gravel river beds and banks. Vegetation consists of a wide diversity of large shrubs and trees such as <i>Acacia erioloba</i> , <i>Acacia karoo</i> , <i>Ziziphus mucronata</i> , <i>Gymnosporia</i> species, <i>Euclea pseudebenes</i> , as well as sedges and annual herbs.

2.2.1 Actions	Timing	Record of progress
1. Full description and map of habitat units with dominant vegetation	By end 2009	
2. Prepare poster for staff and visitors on habitats and dominant vegetation	By mid-2009	

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Zonation

2.3.1 Principle: Landscapes and ecosystems are optimally planned, managed, protected and used within the GCP by means of a zonation plan, also taking into account ecological fragility, past and present land uses, the greater context of neighbouring land uses and landscape matrixes, and the potential for future partnerships, linkages and corridors.

2.3.2 Vision: To zone the GCP for enhanced conservation management and appropriate utilisation, to minimise potential conflicts between activities and to facilitate potential "bigger picture" conservation goals for the area.

2.3.3 Zones:

The following zones could be identified and mapped:

GCP Zones		IUCN Categories	Activities
a)	Tourism and management infrastructure development areas	Category VI Managed Resource / Protected Areas - for sustainable management in development areas	<ul style="list-style-type: none"> Accommodation and amenities for tourists Accommodation for lodge and park staff Workshops, offices, research facilities and other management facilities Gardens, which shall be dominated by plants indigenous to the biomes in the GCP. No potentially invasive species will be permitted.
b)	Main tourism use areas (higher impact)	Category II National Park - for ecosystem conservation & tourism	<ul style="list-style-type: none"> Game drives, including night drives - no off-road driving Self-drive routes, private rustic camp sites Walking trails and mountain-biking trails Horse and mule trails
c)	Light tourism use areas (low impact)	Category Ib Wilderness Area - for low impact, no permanent infrastructure	<ul style="list-style-type: none"> Limited vehicle access (management, research) Walking trails and Mountain-biking trails Horse and mule trails
d)	Areas of special importance	Category Ia Strict Nature Reserve - for scientific purposes	<ul style="list-style-type: none"> Limited vehicle access (essential management and research only) No independent tourist access Sites of archaeological, scientific, geological, and biological importance, e.g. bushman engraving areas, breeding areas of rare and threatened species, etc.

2.3.4 Actions	Timing	Record of progress
1. Firm up areas and boundaries of zones	By end 2009	
2. Finalise Areas of special importance	By end 2009	
3. Complete list of allowable activities per zone	By end 2009	
4. Prepare posters on zonation and activities	By end 2009	

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Part 3: Management and Development Targets

3.1 Landscape Approach

3.1.1 Principle: Open, contiguous landscapes of sufficient size are secured to ensure that there are protected, open corridors between resources (water, grazing), habitats, landscapes and biomes.

3.1.2 Vision: To increase the area of land available for indigenous biodiversity and landscape conservation, ecosystem function and resilience and economic development and diversification, through either purchase or partnerships with neighbours, with particular emphasis on:

- (i) higher production areas, mainly to the east, and catchments and ephemeral rivers running across the Park, e.g. Gaap River;
- (ii) creating a matrix of habitats and including habitats and micro-habitats not adequately represented in the current Park, or in other Parks;
- (iii) making critical resources accessible to nomadic species, particularly during times of stress and in anticipation of deteriorating climatic conditions, and re-establishing key movement corridors for wildlife;
- (iv) opening up landscapes with the Ai-Ais/Huns Mountains/Fish River Canyon National Park and with partners of the Greater Fish River Canyon Complex and beyond;
- (v) areas of potential tourism development, particularly those offering innovative low impact diversification opportunities;
- (vi) areas where present park width and shape is hampering optimum conservation and tourism developments;
- (vii) areas where present land use is a threat to wildlife conservation.

3.1.3 Strategies:

- a) Where possible acquire or open up land (through fence-removal) for conservation through partnerships.
- b) Where necessary acquire land for conservation through direct purchase.
- c) Be flexible and opportunistic so as to secure land for conservation as soon as the appropriate opportunity presents itself.

3.1.3 Actions	Timing	Record of Progress
1. Update map of existing land extent, and prioritise land for future acquisition and partnership collaboration	By end 2008	

2. Pursue dialogues with neighbouring land owners to consider partnerships and potential joint venture agreements, e.g. <i>GFRCC</i>	Ongoing	
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3.2 Park-neighbour Collaboration

3.2.1 Principle: The security and integrity of the park is protected and where possible, enhanced, by pro-active, effective and collaborative activities with and by neighbours, to ensure compatible land use practices, and cost-effective management and development initiatives to the mutual benefit of the broader area and all collaborating partners.

3.2.2 Vision: To establish good working relations with all neighbours in the target areas of collaboration and co-management, to enter into open-ended discussions and plans on ways to enhance collaborative management, monitoring and development and, where appropriate, to engage in joint and/or assigned implementation for enhanced conservation and sustainable development of the area.

3.2.3 Strategies:

- a) To engage pro-actively with selected neighbours, to share GCP's MDP to build confidence and transparency, and to build a coalition of the willing.
- b) To identify a few collaborative initiatives, such as larger-scale zonation, boundary fence removals, co-management, joint monitoring (e.g. game counts), wildlife re-introductions, etc.
- c) To continue engaging with MET across the Ai-Ais/Huns Mountain/Fish River Canyon National Park boundary.

3.2.4 Actions	Timing	Record of progress
1. Maintain regular contact with neighbours, and host workshops, presentations and meetings for them within the Park. Explore option of an annual "Open Day" for neighbours and families	Ongoing	
2. Explore option of joining local Farmers Associations	Ongoing	
3. Maintain regular contact with MET, and pursue collaborative ventures with them	Ongoing	
4. Pursue the Greater Fish River Canyon Complex co-management initiative	Ongoing	

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3.3 Biodiversity Conservation

3.3.1 Principle: The diversity of indigenous habitats, plants and animals to the Nama Karoo and Succulent Karoo are protected and where necessary and feasible reintroduced, and both ecosystem functioning and evolutionary processes occur optimally.

3.3.2 Vision: To protect and conserve the diversity of landscapes, habitats and biota within the Gondwana Cañon Park in a healthy, productive and resilient condition.

3.3.3 Strategies:

- a) Manage the arid ecosystems for optimal diversity, health and productivity by ensuring that they are not over-utilised.
- b) Allow and promote adaptiveness in management and "patchiness" in ecosystem expression in response to variable climatic and other conditions.
- c) Build and maintain a good monitoring record of ecological and bio-climatic information, including the diversity and abundance of various species in different taxa, including lower plants, invertebrates, etc.
- d) Manage for healthy populations of indicator species high up in the food chain - if these species prosper it follows that the base of the food chain is diverse and in good condition.
- e) No poisons or pesticides (or other toxic chemicals) will be used in the park.

3.3.4 Actions	Timing	Record of progress
1. Compile inventories of all natural resources (habitats, plants, animals) occurring on the Park	Ongoing	In progress
2. Ensure an appropriate monitoring system for ecosystem health (including indicator species such as large predators and birds of prey) is in place and its use is reinforced	Ongoing	Monitoring system established; use of system continually being reinforced
3. Ensure routine recording of climatic data is carried out	Ongoing	Recording of data being carried out
4. Ensure that no toxic substances, poisons or pesticides are used in the park, except for enclosed nurseries and Self-Sufficiency Centre where absolutely necessary; use short-life environmentally friendly chemicals	Ongoing	

3.4 Wildlife Population Management

3.4.1 Principle: Viable populations of indigenous wildlife prosper sustainably within an open, dynamic and resilient ecosystem.

3.4.2 Vision: Wildlife population numbers will be encouraged to increase up to levels where biomass carrying capacity is considered conservatively appropriate and sustainable, per species and for the total wildlife population, under different rainfall and range conditions. Mass mortalities during droughts will be avoided, and the numbers of a particular species will not be allowed to adversely affect long-term population stability of any other species. Minor population fluctuations due to good breeding and slow attrition during wet and dry cycles, or due to predation, will not be cause for concern or intervention.

Whilst the emphasis will be on non-consumptive utilisation for tourism, sustainable utilisation through live capture, harvesting or trophy hunting may be employed as appropriate, with careful zonation (space and/or time), for management purposes.

3.4.3 Strategies:

- a) Population trends, health (age and sex structures and body condition) and distributions will be monitored, and informed decisions will be taken based on these data in combination with variables such as rainfall and veld condition.
- b) Annual game counts will be undertaken in a systematic, efficient and repeatable manner.
- c) Smaller-scale game censuses will be undertaken on a regular basis to add value and as a backup to the annual game counts.
- d) Special focal studies and monitoring will be undertaken on selected species, including plants (e.g. high value reintroduced species, rare and endangered species, little know species, iconic species) where considered necessary.
- e) Game management decisions will be taken in an adaptive manner, to enhance or dampen population growth rates and to manage population biomass in accordance with changes in estimated carrying capacity.
- f) Decisions on the consumptive and non-consumptive uses of wildlife will be taken from time to time, based on consideration of the above strategies and other pertinent issues and based on a clear decision-making process.

3.4.4 Actions	Timing	Record of progress
1. Implement integrated monitoring systems for rainfall, veld condition and game population status & health	Ongoing	Monitoring systems in place

(age & sex classes and condition).		
2. Plan and carry out on an annual basis a one-day game count across the whole Park	Annually to twice annually	Game counts being carried out
3. Support annual game counts with more regular, smaller-scale game trend patrols	At least twice a year	Currently carried out in between game counts
4. Plan and conduct focal species monitoring activities where necessary	Start 2008 and ongoing	Monitoring started on Mountain Zebra, Quiver tree and Leopard
5. Develop a clear decision-making process and scientifically robust quota-setting basis for any consumptive-use off-takes using annual and time-series assessments of herbivore biomass, rainfall (and grass biomass) to determine changing carrying capacity.	By end 2009	
6. Proactively and adaptively manage wildlife and arid ecosystems for its health, resilience and productivity, using monitoring information and appropriate adaptive management tools with minimalist intervention.	Ongoing	

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3.5 Wildlife Introductions

3.5.1 Principle: The historic diversity of indigenous wildlife and their full suite of interactions are reinstated, as far as is practically possible under prevailing conditions.

3.5.2 Vision: Re-introduce and/or augment as appropriate a suite of species that were locally indigenous within historic times, provided these have a reasonable chance of survival under current conditions and are practically and socially acceptable (see Brown 2000 - Historic distribution of large mammals in the Gondwana Cañon Park).

3.5.3 Strategies:

- a) Augment populations of those species that are currently low in number, such as Red Hartebeest, Blue Wildebeest and Burchell's Zebra.
- b) Where species are likely to re-colonise, or existing populations are likely to augment naturally by in-migration and breeding, allow this to happen rather than active re-introduction (e.g. Kudu, Springbok, Oryx, Black-backed Jackal, Brown Hyaena and Leopard).
- c) Once the more common, hardy and inexpensive game species are well established, begin re-introductions of more valuable species, e.g. Giraffe.
- d) Acquire and monitor a small population of Black Rhino through the MET custodianship system.
- e) Wherever possible, acquire game from similar habitats (arid parts of Namibia) and local sources for genetic integrity and optimal chances of success.
- f) Be prepared to be opportunistic in acquiring target species should any become available at the right time, from appropriate areas and at good prices.
- g) Introduce game in sufficient numbers to be viable, rather than having small token introductions.
- h) Introduce game in suitable habitats with a bias towards those areas that are utilized by tourists.
- i) Specific larger predators (Spotted Hyaena and possibly Cheetah) will only be considered for introduction at a later stage if: the land area extent is sufficiently large, perimeter boundary fences with livestock farms are secure, all land partners are happy, measures are in place to provide reasonable protection for guests and staff, in the view of the National Carnivore Forum the introduction has a reasonable chance of success and, importantly, game populations have had an opportunity to recover sufficiently to support such predators without them requiring supplementary feeding.

- j) Where appropriate and practical explore joint introductions in partnership with neighbours (e.g. Giraffe with MET).
- k) Predators that naturally re-colonise or use the area will not be persecuted or disturbed, and will be protected where possible against persecution by neighbouring land-owners (through maintenance of the Park boundary fences).
- l) No species exotic to the southern Nama Karoo and Succulent Karoo areas of Namibia will be introduced.
- m) No subspecies or components of populations from elsewhere will be introduced if there is any risk of genetic pollution to the indigenous populations' genetic integrity, and where suitable animals can be acquired from within the relevant gene pool.
- n) In the case of introductions that have a potential impact on neighbours (e.g. Blue Wildebeest), full consultations will take place with neighbours prior to any introductions.

3.5.4 Actions	Timing	Record of Progress
1. Meet all requirements and deadlines for the Black Rhino custodianship, and establish a reliable monitoring system to ensure the safety and long-term survival of black rhinos in the Park	During 2008 and 2009	
2. Review success of past introductions, and, if appropriate, boost small populations (e.g. Burchell's Zebra, Red Hartebeest)	2009 - 2010	
3. Review, and, if appropriate, carry out Phase II species introductions - Giraffe, Eland, Spotted Hyaena	2009 - 2012	
4. Monitor introduced and augmented populations - numbers, distribution, breeding, sex and age ratios, condition.	From each introduction and Ongoing	

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3.6 Alien Species

3.6.1 Principle: The GCP is free of all invasive alien plants and animals, and non-invasive alien species are confined to, or based at, the Tourism and Infrastructure Development Areas and are clearly justifiable with there being no viable indigenous alternative.

3.6.2 Vision: No feral populations of alien plants and animals are to be living within the park. Alien and domestic species will only be permitted where these are a restricted, intensively managed and integral part of the operation of the park (e.g. horses for transport, farm-animals, vegetables and fruit for production and in-park consumption), and where they pose no threat to the conservation of indigenous species and the integrity of the park (e.g. non-invasive aliens around habitation), and these only within the Tourism and Management Development Areas.

3.6.3 Strategies:

- a) Eradicate feral populations of alien plants and animals in the GCP, with priority placed on the most invasive species (e.g. *Datura* species, *Prosopis*, *Opuntia*) and species likely to pollute genetic integrity of wild populations (e.g. un-neutered domestic cats).
- b) Eradicate all invasive alien species within the Tourism and Management Development Areas, e.g. *Melia azedarach* (Seringa), *Opuntia* species.
- c) Cultivate a wide diversity of local indigenous plants that can be used to replace alien plant species in the income-centre gardens, with a focus on rare and endemic species, or distinctive species such as the quiver tree (*Aloe dichotoma*).
- d) Implement a policy for staff on domestic pets, keeping both conservation objectives and tourist expectations in mind.
- e) Assess all alien species to be brought into the park for possible impact prior to import. The default position should be "no aliens".

3.6.4 Actions	Timing	Record of progress
1. Compile and continually update a list and map all known alien species occurrences in the Park	Ongoing	Complete but being updated
2. Eradicate all invasive alien species in the Tourism and Management Development Areas	By end 2009	Begun
3. Establish and carry out a program to eradicate and control spread of all	2008 - 2010	

alien plants (invasive or non-invasive) outside of the Development Areas, with a priority on invasives such as <i>Datura</i> , <i>Prosopis</i> , and <i>Flaveria</i>		
4. Follow up on cleared areas and remove re-growth/new seedlings	Ongoing, to be checked every year	
5. Establish a list of appropriate garden trees and shrubs, drawing from indigenous species occurring within or near to GCP, and use these for garden development - implement a "Go Indigenous" campaign	2009 - 2010	
5. Increase cultivation of local indigenous plants for the gardens	Ongoing	
6. Ensure the Park staff policy on domestic pets is fully implemented	Ongoing	
7. Assess all alien species before import	Ongoing	

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3.7 Tourism Management

3.7.1 Principle: Tourism is planned and managed to ensure that the character, beauty, diversity and integrity of the GCP is maintained, and that visitors have a high quality experience that includes a sense of place and isolation.

3.7.2 Vision: To provide a diverse and exciting, high quality, eco-friendly tourism experience to visitors through good planning, management and the use of best practices, and to help raise awareness and educate visitors about desert systems, water scarcity in arid zones, conservation and sustainable development.

3.7.3 Strategies:

- a) Carry out focussed "Tourism Activities and Development" planning exercises from time to time to keep tourism within the GCP dynamic, diverse and exciting, and to make good appropriate use of the land within the goal and objectives of the Park.
- b) Ensure that the zonation plan is implemented correctly, and that it is reviewed and updated from time to time.
- c) Develop, test and implement new tourism activities that have low environmental impact, in appropriate zones as per the above two points, such as mountain biking, horse and mule trails, walking trails, self-drives and remote individual and rustic camping sites.
- d) Explore the introduction of a Park Fee.
- e) Incorporate results from tourism impact monitoring into adaptive management of the Park.
- f) From time to time carry out "tourism satisfaction surveys" that assess tourist's views on the quality of their experience, and encourages them to suggest improvement.
- g) Provide information posters and leaflets for tourists, develop information boards on roads and at water points and viewpoints, and eventually construct an information centre, to help raise awareness and interest in desert systems, conservation and sustainable development.
- h) Ensure that GCP tour guides are well trained, motivated, well tuned to visitors' needs, and aware of current conservation and management issues in the park, and that independent tour guides are also provided with information regarding the latter.

3.7.4 Actions	Timing	Record of progress
1. Carry out a tourism planning exercise and develop a dynamic and	2010	

responsive "Tourism Activities & Development Plan" for GCP		
2. Update Zonation where necessary	2009	
3. Based on the above two points, plan, develop, test and where feasible, implement other tourist activity options. Current approved options include: <ul style="list-style-type: none"> • Mule and horse trails • Walking trails • Mountain biking trails • Self-drive routes • Remote exclusive camping sites • Rhino tracking 	2008 - 2009	Begun
4. Carry out a short viability study on introducing a Park Fee	2009	
5. Increase aesthetic quality of waterhole installations, and add viewing areas or hides	2008-2011	Begun
6. Carry out tourism satisfaction surveys	Through one month per year starting 2009	
7. Increase tourist awareness of Park principles and protocol (e.g. no off-road driving, collecting fire-wood etc.) by putting up road-signs	By end-2009	Begun
8. List and map points of interest in the park	By mid-2009	Begun
9. Develop and produce information for tourists	2009	
10. Establish an information centre at the Roadhouse	2009 - 2010	
11. Establish contacts with tour guides to increase flow of information between Park staff, tour guides and their clients	Ongoing	
12. Provide workshops for Park guides and other lodge staff to raise awareness about conservation and sustainable development	Ongoing	

3.8 Law Enforcement

3.8.1 Principle: Illegal use of wildlife and other natural resources within and immediately adjacent to the GCP is eliminated.

3.8.2 Vision: A zero tolerance approach to poaching and illegal use of natural resources will be followed.

3.8.3 Strategies:

- a) Ensure anti-poaching patrols are conducted at regular but unpredictable intervals and that they are highly visible.
- b) Develop an attractive reward system and let it (and the zero tolerance approach) be widely known in the area.
- c) Develop active anti-poaching relationships with MET, neighbours and the police.
- d) Ensure rangers and staff are trained to preserve and collect evidence so that arrests result in convictions.

3.8.4 Actions	Timing	Record of progress
1. Ensure night-patrols are carried out	Ongoing	
2. Disseminate information on zero tolerance approach and reward system	Ongoing	Initial phase complete
3. Further develop partnerships to maximise information sharing (MET, neighbours, police, etc.)	Ongoing	
4. Ensure staff are sufficiently well trained in collection of evidence	Early 2009	

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3.9 Water Management

3.9.1 Principle: A minimalist, ecologically appropriate, sustainable and tourism-friendly water plan is implemented, taking into account water scarcity, high evaporation rates, the need to maintain water quality, and neighbouring land use and water provision.

3.9.2 Vision: The provision of water will be carefully managed in order to keep water use and maintenance costs low, to ensure that rangelands are managed effectively and to maximize game viewing opportunities.

3.9.3 Strategies:

- a) Water points will be carefully planned, monitored and managed, taking into account water scarcity in arid zones, veld management, game distribution, other ecological impacts, etc.
- b) Water points will be located and constructed so that they are aesthetically pleasing (as natural an appearance as possible) and ecologically appropriate (must be suitable for use by the entire spectrum of animals).
- c) Discrete hides will be built at selected water points for both tourism and monitoring purposes
- d) Water points may be periodically closed or opened to rest veld, should this be required (e.g. as informed by veld monitoring).
- e) Water use for domestic and tourism purposes will be kept to a minimum, in line with good eco-tourism practices, and used water will be processed to acceptable quality and recycled or returned to the ground water.

3.9.4 Actions	Timing	Record of progress
1. Assess current waterhole system and make recommendations for changes as appropriate	By end 2008	
2. Map all water points on neighbouring properties that are part of the management unit	2009 - 2010	
3. Convert water points and associated infrastructure into aesthetically appealing waterholes	2008-2011	
4. Build appropriate hides at selected water points	2009-2011	
5. Replace leaking reservoirs with closed tanks, and cover remaining reservoirs with shade-netting	2008-2010	

3.10 Fencing

3.10.1 Principle: Open systems are maintained for the largest possible landscape integrity, both within and beyond the GCP.

3.10.2 Vision: To remove all internal fences excepting those fences that have strategic value (e.g. short-term holding areas for introduced game, or longer-term protection of vulnerable species such as black rhino). To remove or breach boundary fences where neighbouring land-use is compatible and where mutual agreements have been obtained. To secure boundary fences where neighbouring land use is a threat to wildlife or where secure fencing is essential for good neighbourliness (e.g. to prevent predators from crossing onto farms).

3.10.3 Strategies:

- a) Complete the removal of all internal fences, in a phased manner.
- b) Boundary fences where neighbours practice incompatible land-use will be strengthened, monitored and maintained.
- c) Negotiate with potentially sympathetic neighbours on boundary fence removals, with a priority on fences between the GCP and the National Park.

3.10.4 Actions	Timing	Record of progress
1. Assess condition, and establish an appropriate monitoring routine for boundary fences with farms	2008 and Ongoing	First assessment complete
2. Remove all remaining internal fences, except where strategic value in retaining the fence (e.g. for possible rhino re-introduction)	By mid-2009	
3. Follow up negotiations with MET with regards the possibility of removing sections of our common boundary fence.	Ongoing	
4. Liaise on fence removal / breaching with other neighbours practicing compatible land uses.	Early 2009	
5. Patrol & maintain fences as appropriate with neighbours who practice incompatible land-uses	Ongoing, on a regular basis	

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3.11 Roads

3.11.1 Principle: A minimal, practical, ecologically and aesthetically appropriate road network will be maintained to help achieve the objectives of the GCP.

3.11.2 Vision: Rationalise and maintain a road network to serve the tourism, management and monitoring needs of the park, in accordance with the Zonation plan. Close and rehabilitate obsolete roads. Exercise and enforce strict road discipline.

3.11.3 Strategies:

- a) A carefully selected network of roads will be maintained for the effective management of the park and its activities.
- b) Existing roads and tracks not forming part of the network will be closed and rehabilitated.
- c) Where possible, gravel pits for road building materials and other gravel & sand use will be carefully sited, with ecological and aesthetic considerations in mind, and be fully rehabilitated after use.

3.11.4 Actions	Timing	Record of progress
1. Develop an accurate map of current roads & tracks	By end 2008	Near-complete
2. Evaluate road system and develop a Road Network Plan	By mid-2009	
3. Close off unnecessary and badly-eroded roads (no new roads without approval of Parks Committee)	By end 2009	
4. Rehabilitate closed and badly-eroded roads	2009 - 2011	
5. Exercise and enforce strict road discipline: no off-road driving except where absolutely necessary for Park management and emergency purposes	Ongoing	

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3.12 Monitoring and Information Management

3.12.1 Principle: A limited number of carefully selected indicators are monitored to allow for timely and judicious adaptive management.

3.12.2 Vision: Minimum, regular monitoring of climate, fauna, flora and land use impacts will be conducted to help understand ecological changes and stresses. The information produced from the monitoring systems will feed into adaptive management decision-making.

Variables such as rainfall, vegetation biomass and condition, wildlife numbers and distribution, introductions, rare and indicator species, off-takes, water distribution, poaching activity and other key information for management and planning will be recorded, stored and curated as time-series data sets within a Gondwana Parks Information System.

3.12.3 Strategies:

- a) Monitoring will focus on key indicator processes and species, with an emphasis on ensuring regular data collection at appropriate intervals, cost efficiency and sustainability.
- b) Monitoring data will have both spatial and temporal components.
- c) Monitoring systems will be adapted from existing systems being used within the Gondwana collection and elsewhere in Namibia with a view to efficiency in development and ultimately regional and national integration of data.
- d) Plant resource monitoring will focus on regular estimates of rangeland condition, including veld biomass to serve as an early warning of forage restrictions, but long-term vegetation trends will also be monitored.
- e) Monitoring systems will be balanced to ensure that the entire range of critical information needs is covered.
- f) A Gondwana Parks Information System will be established to store, manage and help analyse spatial and temporal data sets as well as other pertinent information.

3.12.4 Actions	Timing	Record of progress
1. Adapt as appropriate, and implement the "Event-Book" monitoring system with appropriate staff training	2008 onwards	Initial implementation complete; training ongoing
2. Develop an accessible and user-friendly Gondwana Parks Information System and meta database (for spatial & temporal	2008 - 2009 and ongoing	Begun

<p>data and other info), that can be easily expanded and up-scaled to serve larger co-managed landscape complexes, to:</p> <ul style="list-style-type: none"> • store, manage, curate data/info • retrieve, interrogate, analyse and aggregate data/info • generate reports based on carefully designed templates for key information needs 		
3. Establish fixed photo-point monitoring of the veld, and repeat photographs at regular intervals (every 6 or 12 months)	2008 onwards	Begun; more points to be established
4. Start a photo-library of natural resources	Ongoing	Begun
5. Start a herbarium	2009 onwards	
6. Make time-series data and analysed information available for adaptive management, and for distribution to interested parties such as shareholders and researchers, and potentially to the general public	Ongoing	
7. Use above data and information to prepare an annual State of GCP Report. Establish computer-based analyses and map/figure protocols to automate this process as far as possible, with minimal explanatory text.	2009 on ongoing	

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3.13 Research

3.13.1 Principle: Management and development of the *GCP* will be information-based, drawing on good quality research and monitoring.

3.13.2 Vision: Park management will be based on good scientific information. A supportive environment will be created for visiting scientists. Two levels of research are recognized:

- i. research in support of priority park information and management needs, and
- ii. interest research identified by outside researchers.

Preferential support will be given to the former, while the latter will be supported when feasible.

3.13.3 Strategies:

- a) A prioritised and open-ended list of key research topics will be developed for the park and disseminated to appropriate research institutions.
- b) An appropriate support mechanism will be developed for visiting scientists, with emphasis on those addressing priority research topics relevant to the park.
- c) Ensure that the results and products of visiting scientists are obtained by the *GCP* and that all relevant data/info is captured into the Parks Information System.
- d) Links will be established between research activities carried out in other parks in the *Gondwana* collection, as well as with other relevant research organisations in Namibia and abroad, and comparative studies between the different desert ecosystems will be encouraged.

3.13.4 Actions	Timing	Record of progress
1. Develop an open-ended list of priority research topics based on information needs for park management	2009 - 2010	
2. Design and implement a "support package" for researchers addressing priority research topics, including establishing research facilities in the Park	2008 - 2009	Near-complete - Holoog house renovated
3. Explore possible collaborations with higher education institutions and centres of research, both nationally	2009 - 2012	

3.14 Education and Awareness

3.14.1 Principle: The Nama Karoo and Succulent Karoo Desert ecosystems offer a unique open-air classroom and laboratory on the subjects of geology, geomorphology, climatology, hydrology, zoology, botany, arid-zone ecology, adaptive evolution, palaeontology, archaeology, conservation and many other fields. The GCP thus has huge educational and awareness-raising potential, which will be exploited in the interests of ensuring that visitors and staff are well informed and enriched by associating with the Park.

3.14.2 Vision: To develop good quality, accessible and stimulating information on the key biophysical and socio-archaeological aspects of the Nama Karoo and Succulent Karoo that are represented within the GCP, and to share this information with guests, visitors, youth groups, specialist groups, decision-makers, staff and the general public in interesting and exciting ways so as to promote an understanding of and commitment to the conservation and sustainable development of the Nama Karoo desert and the arid and semi-arid zones of southern Africa.

3.14.3 Strategy

- a) Establish an Information Centre in the GCP.
- b) Prepare good quality information in different forms (posters, brochures, reports, newsletters, displays, booklets, DVDs, website, etc.), that is made available to visitors, staff and the general public.
- c) Ensure that research carried out in the GCP is translated into accessible information for the lay person.
- d) Engage local communities, schools, youth groups and decision-makers, and invite them to visit the Park and the Information Centre.
- e) Promote the concept of "sustainable lifestyles" with special attention to contextualising the concept for desert environments (links to 3.15).
- f) Ensure that all components within the GCP practices what we preach.
- g) Ensure that tour guides are well trained at national and local levels, and that they create exceptional field experiences for tourists by sharing their knowledge in interesting and stimulating ways.

3.14.4 Actions	Timing	Record of progress
1. Establish an information centre at the Roadhouse	2009 - 2010	
2. Compile good quality information on different aspects of the geology, biology, ecology, archaeology, etc. of	Ongoing	

3.15 Development Guidelines

3.15.1 Principle: All management and development activities within the GCP shall be based upon the principle of sustainability.

3.15.2 Vision: All developments and activities within the Gondwana Cañon Park will be guided by the sensitivity of the environment and by the unique and unusual opportunities that the environment offers for innovative developments and services (activities).

In addition, such developments and activities will be conducted in an environmentally sensitive manner according to best available practices as required by national law and high environmental ethics.

3.15.3 Strategies:

- a) Continue to foster an environment in which all players (staff, directors, shareholders, neighbours and visitors) are encouraged to be innovative and fully committed to the highest ideals of sustainable development and creating the lightest possible environmental "footprint".
- b) Apply existing published EIA materials for Namibia to all developments in the park that are likely to have a significant impact.
- f) Apply Namibia's EcoAwards guidelines and criteria to the development and management of the park and its infrastructure, and prepare for submission to EcoAwards.
- g) Develop a list of priority issues (e.g. waste disposal, water and energy use) for which specific guidelines (policies) should be systematically developed, and ensure that they are fully understood and implemented by relevant staff.
- h) Prior to any development or any action that may cause environmental damage, liaise with the Park Committee.

3.15.4 Actions	Timing	Record of progress
1. Locate, be familiar with and use policies and guidelines from EIA and EcoAwards materials	2008 - 2009	
2. Prepare for submission to EcoAwards	2009 - 2012	
3. Develop specific guidelines and policies for priority issues	2009 - 2010	
4. Ensure staff are familiar with and effectively implementing the	Ongoing	

3.16 Rehabilitation

3.16.1 Principle: Natural landscapes are, as far as possible and practical, restored to an unpolluted, aesthetically-pleasing, and ecologically near-pristine condition.

3.16.2 Vision: To remove all unnecessary evidence of human occupation from the Park (e.g. rubbish dumps, agricultural infrastructure that is not usable), to rehabilitate landscapes from past use and misuse (e.g. erosion gullies, scars on the landscape), and to convert usable infrastructure to be aesthetically appealing and to conform with the wildlife and conservation ethics of the Park (e.g. artificial water points converted into natural-looking waterholes).

3.16.3 Strategies:

- a) Develop a log and map of areas in the Park that are scarred, eroded or are in some way damaged and require rehabilitation, and prioritise these. Systematically address the problems in order of priority.
- b) Clear up all rubbish dumps by separating components that (i) have a market value, (ii) can be recycled and (iii) are dangerous and/or toxic (e.g. batteries) and transport them to the respective sale/collection points. All remaining rubbish (e.g. building rubble) to be deep-buried in carefully located site(s) away from drainage and tourism areas, covered and the surface(s) rehabilitated.
- c) Systematically remove all evidence of farming and other human activities from the Park by clearing up old unusable infrastructure, old buildings, fence posts, rubble (infrastructure that still has a use or value, such as windmills, may be retained).
- d) Convert domestic stock water-troughs to aesthetically-pleasing, natural-looking waterholes, and extend this principle to other facilities in the Park.

3.16.4 Actions	Timing	Record of progress
1. Revisit all infrastructure and review best use	2008	Near-complete
2. Document, map, prioritise and address all sites to be rehabilitated: rubbish dumps, farming debris, significant landscape scars, erosion, and report on progress	2008 Onwards	Begun
3. Clear all rubbish dumps	By end 2009	
4. Clear Park of all loose farming debris (not infrastructure)	By end 2010	

5. Demolish all unused water reservoirs, sheep troughs etc.	By end 2011	
6. Convert livestock water troughs to appropriate waterholes for game	2008-2011	
7. Demolish all unused buildings/ outhouses	By end 2012	
8. Restoration of bare and scarred areas	2009-2012	

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Part 4: Record keeping

4.1 Annual work plans

Each year's work plan must be filed under this section.

The annual workplan consists of a simple matrix that states:

- What should be done
- When should it be done, and
- Who should do it

These activities are derived from the Management & Development Plan and follow the sequence of actionable topics under Part 3. They are best divided into five categories

- *Routine management issues,*
- *Development issues,*
- *Monitoring requirements,*
- *Research priorities and*
- *Administration of work plan*

Gondwana Cañon Park - Annual Work Plan for 200__													
Activities	J	F	M	A	M	J	J	A	S	O	N	D	Responsible
Routine management													
1.													
2.													
3.													
4.													
Etc.													
Development issues													
1.													
2.													
3.													
4.													
Etc.													
Monitoring aspects													
1.													
2.													
3.													
Etc.													
Research priorities													
1.													
Etc.													
Administration of work plan													
1. Park Committee meeting - progress report		*					*				*		Committee
2. Adopt work plan & budget for next year										*			Committee
3. Annual technical report from past year	*												Committee
4. Annual monitoring report (feed into work plan)							*						Committee

An example of an annual work plan is shown above. The work plan activities, in conjunction with Part 3 of the Management & Development Plan, form the body of the Agenda for the Park Committee meetings.

4.2 Annual budget

Based on a "zero budget" approach, and aimed at making maximum sustained impact in most cost effective and efficient ways. The budget should closely follow the contents of the Annual Work plan. It essentially aims to allocate financial resources to ensure that the work plan is effectively implemented. A standard budget format should be developed that allows for smooth and simple integration with the budgets for other components of the Gondwana Cañon Park operation.

Below is an example of an annual budget for the Gondwana Cañon Park:

<i>Gondwana Cañon Park - Annual budget for 200_</i>				
Budget line items	Unit cost (N\$)	No. Units	Total (N\$)	Notes
1. Staff remunerations				
1.1 Park Warden	Xxx/month			1
1.2 Ranger	Yyy/month			2
1.3 Labourer x 3	Zzz/month			3
1.4 Casual labour	Aaa hours	Bb hours		4
1.5 Social Security				5
1.6 Medical aid				6
1.7 Rations				7
1.8 etc				8
1.9 Consultancy services	Xxx/days	Yy days/yr		9
2. Transport				
2.1 Vehicle fuel	Xxkm/mnth@yy/km	12		10
2.2 Vehicle maintenance				11
2.3 Licence, etc,				12
3. Equipment				
3.1 Chainsaw	xxx	1		13
3.2 etc				14
4. Building materials				
4.1 Cement				15
4.2 etc				16
5. Administration				
5.1 Computer expenses				17
5.2 Telephone & fax				18
5.3 Stationery & printing				19
5.4 etc				

No.	Budget Notes
1	Monthly salary of N\$xxx, bonus cheque, annual increase from 1/xx each year of x% (the last two based on performance, the performance of the company and the approval of the Board)
2	As above
3	Labourers' salaries split 50/50 with lodge - water points & fence maintenance, building of "natural" water holes & hides, general maintenance
4	etc
13	Chainsaw for control of invasive alien <i>Prosopis</i> trees
15	Cement for building of "natural" water holes to replace stock troughs
Etc	Etc

A copy of each annual budget should be filed under this section.

4.3 Agendas and Minutes of Park Committee meetings

The agenda and minutes for each Park Committee meeting must be filed under this section.

4.4 Annual reports

Each annual report should be filed under this section.

4.5 Amendments/changes to the Management & Development Plan

Any changes to Parts 1-4 of the Management & Development Plan must be approved at a formal Directors' meeting and such changes must be formally reflected in the minutes. Copies of the relevant sections of the minutes must be filed under this section of the Plan.

All changes must be entered into the "Record of Management Plan Updates" (see below) and the amended section(s) circulated to the people/offices listed below, with a completed Record of Management Plan Updates form.

4.6 Original copies of the Management & Development Plan

Two Master Copies of MDP will be held: (i) at head office at Gondwana House in the office of the Managing Director, and (ii) at GCP Headquarters in the office of Warden(s). All approved changes and additions to the MDP will be contained in these Master Copies.

In addition, the following will be provided with original copies of the MDP and its updates:

- Board of Directors
- Parks Committee
- Operations and HR Managers
- Lodge Managers in the GCP
- Senior Park staff
- Any other person or institution approved by the Managing Director.

Part 5: Inventories and background information

This is a very dynamic part of the Management & Development Plan, and should be added to and updated as information becomes available. The following topics are relevant:

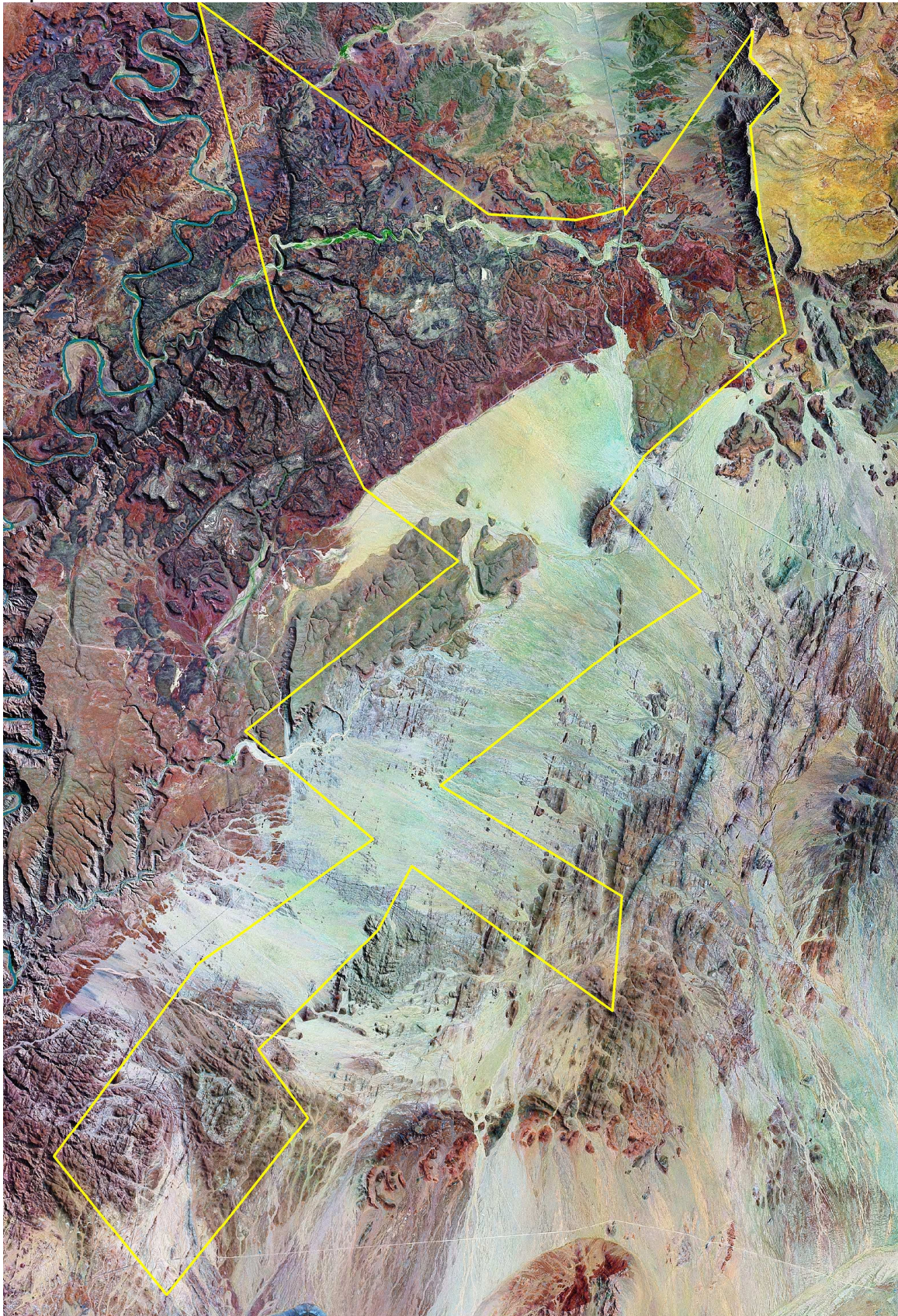
- 5.1 Geographic location, coverage and topography (maps)
- 5.2 Climate
- 5.3 Water
- 5.4 Flora
- 5.5 List of plants for lodge gardens
- 5.6 Mammals
- 5.7 Birds
- 5.8 Reptiles & lower vertebrates
- 5.9 Invertebrates
- 5.10 Alien species
- 5.11 Infrastructure
- 5.12 Appropriate indigenous plants for garden use
- 5.13 Geology & geomorphology
- 5.14 Archaeology & history
- 5.15 Administration
- 5.16 Legal issues

Information for this section should be obtained opportunistically, by Park staff, informed visitors, by attracting visiting scientists, and by working with universities and other interested organisations and individuals.

New information may have conservation and management implications. Such information, where relevant, should be tabled at Park Committee meetings. New information may lead to changes in aspects of monitoring and management.

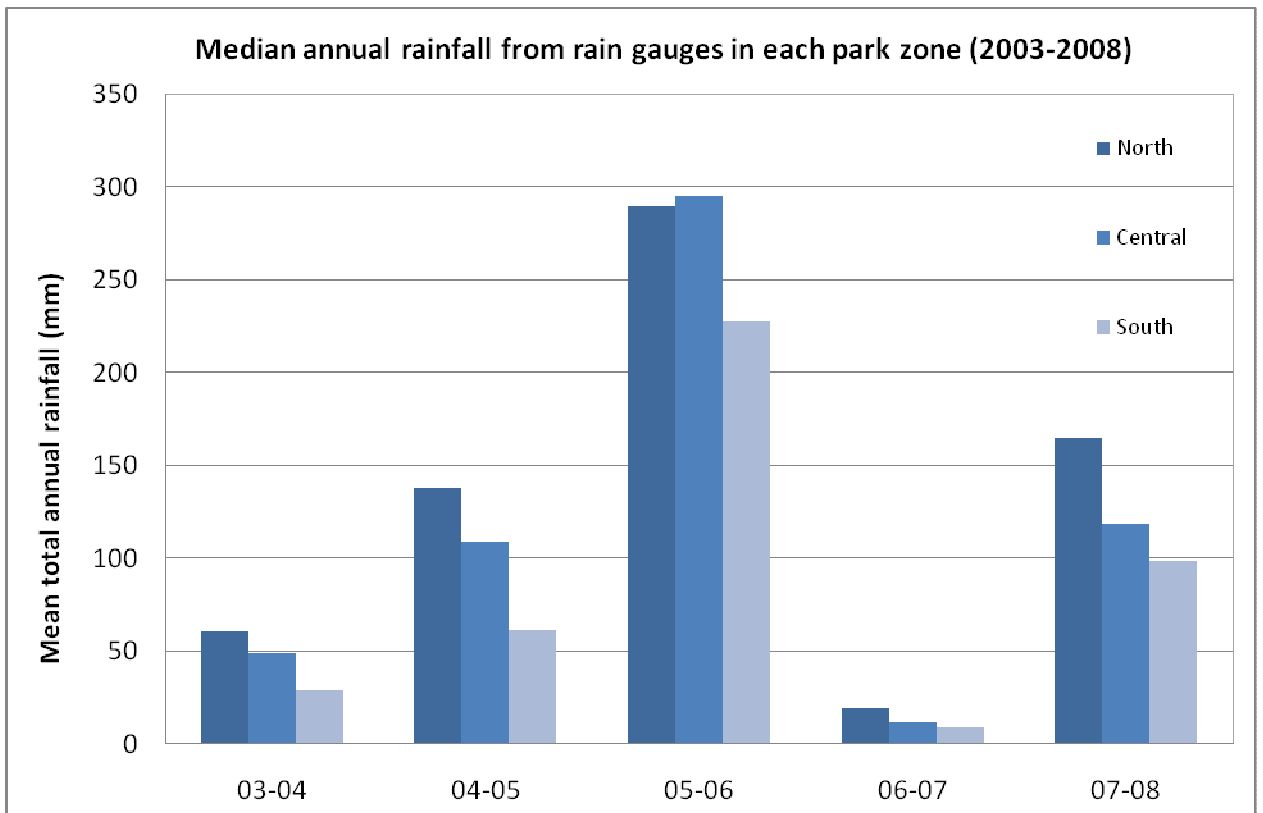
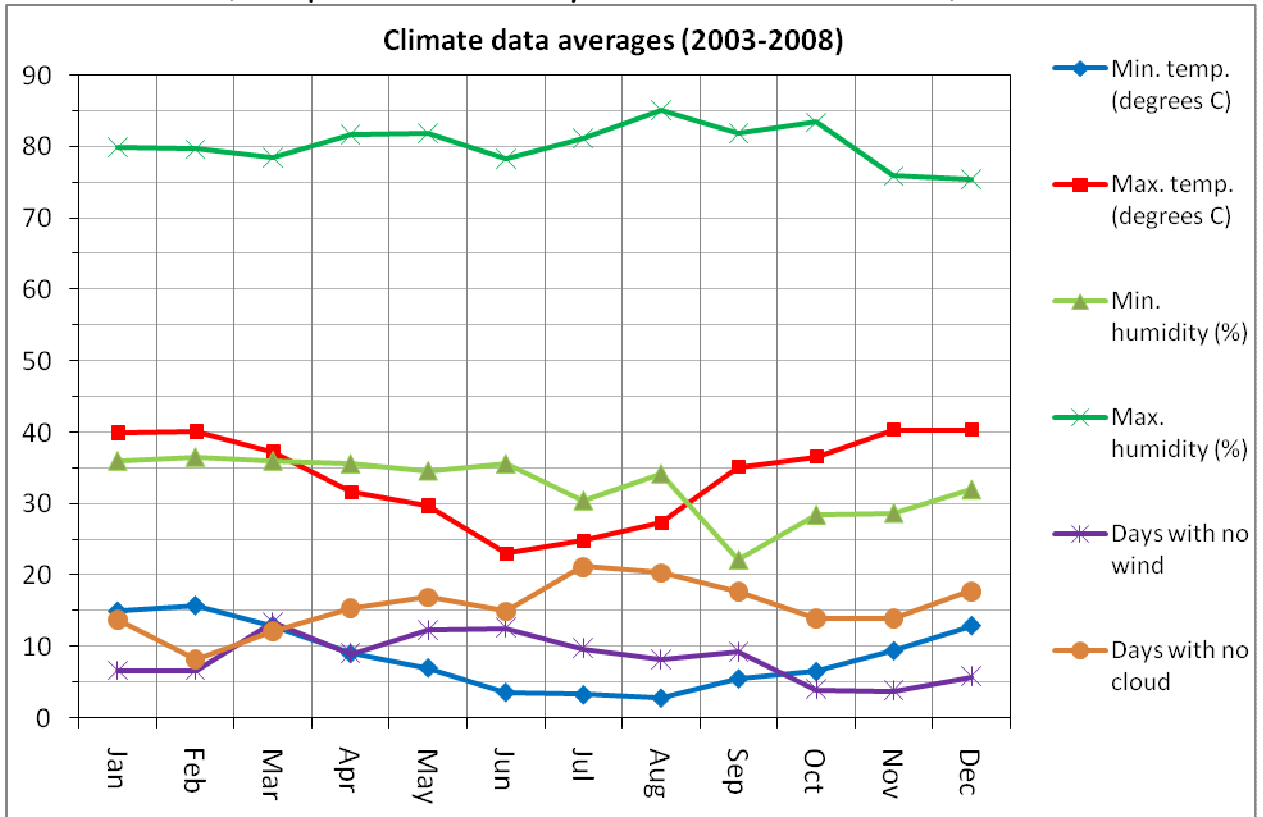
5.1 Geographic location, coverage and topography (maps)

The location of the Park boundary in relation to topography (satellite image) is represented below:



5.2 Climate

Results of climate data collection from 2003 to 2008 are represented in the two charts below: 1) temperature, humidity, wind and cloud cover; 2) rainfall.



5.3 Water

The current situation regarding currently and recently active boreholes, and existing waterhole infrastructure, is summarised in Table 5.3.1, below.

Table 5.3.1
Inventory of main borehole and waterhole installations in Gondwana Canyon Park
 (As at September 2008)

Borehole/ Waterhole	Borehole ?	Used ?	Water point?	Type of pump	Reservoir?	Tank?	Sheep trough?	Other trough type?	BH Depth (m)	Water- table level (m)	Current no. of pipes
<i>Altdorn</i>	Y	N	N	None	2 Not used	None	Not used	None	65	22	N/A
<i>Augurabis</i>	Y	Y	N	Lister Mono diesel	Not used	5000L	None	None		9	N/A
<i>Brakwater</i>	Y	N	Y	Windmill (demolished)	Not used	None	Not used	None	45	30	N/A
<i>Bushman water</i>	N	N	Y	None	None	None	None	Semi-natural	N/A	N/A	N/A
Dassiepoort	Y	Y	Y	Windmill	1 Used, 1 Not used	None	Not used	Rectangular	145	109	38
Geluk	Y	Y	Y	Windmill	Not Used	1000L	Not used	Semi-natural	53	20	8
Grenspos	Y	Y	Y	Solar	Used	1000L	Not used	Oval	120	69	N/A
<i>Holoog House</i>	Y	Y	N	Electrical	Not used	2 x 5000L	None	None	>25	7	N/A
Holoog Klipdam	Y	N	Y	Fed from main Holoog borehole	Used	None	Used	None		5	N/A
Jagpos	Y	Y	Y	Windmill	Not used	5000L	Not used	Circular	100	50	20
Jakkalsdam	Y	Y	Y	Windmill	Not used	5000L	Not used	Rectangular	64	18	10
Kanebis	Y	Y	Y	Windmill	Used	5000L	Not used	Circular	60	36	10
Klipspringer	Y	Y	N	Windmill	2 Not used	None	Not used	None	30	6?	5?
Kudugat	Y	Y	Y	Windmill	2 Not used	1000L	Not used	Rubber	70	48	16
Likkewaanspos	Y	Y	Y	Windmill	1 Used, 1 Not used	None	Used	None	?	?	10
Lodge	Y	Y	Y	Electrical	None	None	None	Circular			N/A
Luiperdswater	Y	Y	Y	Windmill	1 Used, 1 Not used	None	Not used	Circular	87	36	21

Borehole/ Waterhole	Borehole ?	Used ?	Water point?	Type of pump	Reservoir?	Tank?	Sheep trough?	Other trough type?	BH Depth (m)	Water- table level (m)	Current no. of pipes
Middelpos	Y	Y	Y	Solar pump	Used	None	Used	None			(80m)
<i>Ostrich</i>	<i>N</i>	<i>N</i>	<i>N</i>	<i>None</i>	<i>Not used</i>	<i>None</i>	<i>None</i>	<i>Not used</i>	100	57	<i>N/A</i>
Porcupine	Y	Y	Y	Windmill	Not used	5000L	Not used	Circular	40	19	8
Quaggagat	Y	Y	Y	Windmill	Not used	5000L	Not used	Circular	28	21	8
Roadhouse	Y	Y	Y	Electrical	None	1000L	None	Circular			N/A
<i>Rooiberg</i>	<i>Y</i>	<i>N</i>	<i>Y</i>	<i>Windmill</i>	<i>Not used</i>	<i>5000L</i>	<i>None</i>	<i>Not used</i>	80	56	<i>N/A</i>
Scorpion water	Y	Y	Y	Windmill	Not used	5000L	None	Semi-natural	90	45	26
Springbokvlakte	N	Y	Y	Pumped from SSC	None	5000L	None	Semi-natural	N/A	N/A	N/A
SSC	Y	Y	N	<i>Electrical</i>	<i>Used</i>	<i>None</i>	<i>None</i>	<i>None</i>			<i>N/A</i>
Stamprivier	Y	Y	Y	Windmill	None	5000L	None	Circular	95	49	31
<i>Steenbokwater</i>	<i>Y</i>	<i>N</i>	<i>Y</i>	<i>Windmill</i>	<i>Not used</i>	<i>None</i>	<i>Not used</i>	<i>Circular</i>	80	42	<i>N/A</i>
Zebrawater	N	Y	Y	Pumped from Geluk	None	5000L	None	Oval	N/A	N/A	N/A
Note: In addition, 20 disused boreholes have also been mapped											

5.4 Flora

Plant species identified in the area of the BIOTA observatory on Karios farm in Gondwana Cañon Park (-27.6764 S, 17.8141 E) are listed in Table 5.4.1, below, with ranks indicating frequencies of occurrence (source: BIOTA website).

No.	Species name	Occurrence
1	Aloe dichotoma	10
2	Aptosimum spinescens	11
3	Asparagus africanus	29
4	Asparagus denudatus	20
5	Blepharis furcata	30
6	Boscia foetida	21
7	Cadaba aphylla	25
8	Cleome foliosa	8
9	Enneapogon scaber	31
10	Euphorbia gregaria	5
11	Forsskaolea candida	13
12	Galenia africana	18
13	Kissenia capensis	17
14	Kleinia longiflora	32
15	Leucophrys mesocoma	15
16	Lycium cinereum	33
17	Oncosiphon suffruticosum	14
18	Parkinsonia africana	12
19	Peliostomum virgatum	26
20	Pergularia daemia	16
21	Rhigozum trichotomum	7
22	Salsola aphylla	9
23	Sarcocaulon salmoniflorum	23
24	Schismus barbatus	22
25	Schmidtia kalahariensis	24
26	Senecio arenarius	27
27	Sisyndite spartea	19
28	Solanum dinteri	34
29	Stipagrostis brevifolia	4
30	Stipagrostis ciliata	1
31	Stipagrostis hochstetteriana	6
32	Stipagrostis obtusa	2
33	Stipagrostis uniplumis	3
34	Tripteris microcarpa	28

Notes: 'Occurrence': Species ranked according to frequency of occurrence, with rank 1 for the most common

Source of information:

http://www.biota-africa.org/1024/biota_south/structure_south.htm

Trees and shrubs recorded to date in the seven quarter degree squares (qds) into which the Gondwana Cañon Park falls, are listed in Table 5.4.2, with reporting rates (giving relative abundance) from the National Tree Atlas dataset.

<p align="center">Table 5.4.2 Trees and shrubs recorded to date in the seven quarter degree squares (qds) into which the Gondwana Cañon Park falls, from the national tree atlas dataset. Squares included are 2717Bc, 2717Bd, 2718Ac, 2717Da, 2717Db, 2717Dc, 2717Dd.</p>		
Scientific Name	Common Name	No. QDS's (of 7)
<i>Acacia erioloba</i>	Camel-thorn	7
<i>Acacia haematoxylon</i>	Vaalkameel	1
<i>Acacia karroo</i>	Soetdoring	6
<i>Acacia mellifera</i>	Swarthaak	5
<i>Acacia nebrownii</i>	Slapdoring	1
<i>Adenolobus garipensis</i>	Omukandakanda	5
<i>Adenolobus pechuelii</i>		1
<i>Aloe dichotoma</i>	Kokerboom	6
<i>Boscia albitrunca</i>	Witgat	4
<i>Boscia foetida</i>	Noeniebos	6
<i>Cadaba aphylla</i>	Swartstorm	5
<i>Calicorema capitata</i>		2
<i>Catophractes alexandri</i>	Ghabbabos	3
<i>Ceraria fruticulosa</i>	Slender Ceraria	2
<i>Ceraria namaquensis</i>	Wolftoon	2
<i>Commiphora cervifolia</i>	Antler-leaved Corkwood	1
<i>Commiphora namaensis</i>	Nama Corkwood	4
<i>Cryptolepis decidua</i>		1
<i>Diospyros lycioides</i>	Bluebush	1
<i>Ehretia alba</i>	White Puzzle-bush	3
<i>Euclea pseudebenus</i>	Wild Ebony	5
<i>Euclea undulata</i>	Common Guarri	2
<i>Euphorbia avasmontana</i>	Slender Candelabra-euphorbia	2
<i>Euphorbia gregaria</i>	Karas Euphorbia	6
<i>Euphorbia virosa</i>	Candelabra Euphorbia	4
<i>Ficus cordata</i>	Herzfeige	5
<i>Ficus ilicina</i>	Rock-splitting Fig	2
<i>Gomphocarpus fruticosus</i>		1
<i>Grewia tenax</i>	Small-leaved Cross-berry	3
<i>Gymnosporia linearis</i>	Smalblaarpendingoring	2
<i>Gymnosporia senegalensis</i>	Bloupendoring	5
<i>Gymnosporia sp. A</i>	Orange River Spikethorn	2
<i>Haematoxylum dinteri</i>	Blutholzbusch	1
<i>Hermbstaedtia glauca</i>		3

<i>Leucosphaera bainesii</i>		1
<i>Lycium bosciifolium</i>	Wolfdoring	2
<i>Lycium cinereum</i>	Boksdoring / Kriedoring	3
<i>Lycium eonii</i>	Broad-leaved Honey-thorn	1
<i>Lycium hirsutum</i>	River Honey-thorn	1
<i>Maerua schinzii</i>	Lammerdrol	5
<i>Montinia caryophyllacea</i>	Omutete	3
<i>Neoluederitzia sericeocarpa</i>	Silk-seed Bush	1
<i>Nicotiana glauca</i>	Wild Tobacco	1
<i>Nymania capensis</i>	Klapperbos	3
<i>Ozoroa concolor</i>	Green Resin-tree	1
<i>Ozoroa crassinervia</i>	Namibian Resin-tree	2
<i>Ozoroa dispar</i>	Namaqua Resin-tree	2
<i>Ozoroa namaensis</i>	Nama Resin-tree	4
<i>Pappea capensis</i>	Jacket-plum	6
<i>Parkinsonia africana</i>	Green-hair Tree	7
<i>Pechuel-Loeschea leubnitziae</i>		2
<i>Phaeoptilum spinosum</i>	Brosdoring	7
<i>Prosopis glandulosa</i>		1
<i>Prosopis spp.</i>	Mesquite	5
<i>Rhigozum trichotomum</i>	Driedoring	7
<i>Rhus burchellii</i>	Karoo Kuni-bush	1
<i>Rhus lancea</i>	Karee	1
<i>Rhus tenuinervis</i>	Kalahari-taibos	2
<i>Rhus populifolia</i>	Poplar-leaved Karee	4
<i>Ricinus communis</i>	Castor-oil Bush	1
<i>Salsola spp.</i>	Gannabos	1
<i>Salvadora persica</i>	Mustard bush	1
<i>Sisyndite spartea</i>	Desert Broom	6
<i>Tamarix usneoides</i>	Wild Tamarisk	4
<i>Tetragonia schenkii</i>	Kinkelbos	3
<i>Ziziphus mucronata</i>	Buffalo-thorn	6

5.5 List of plants for lodge gardens

5.6 Mammals

The historic occurrence of large mammals in the park has been reviewed by Chris Brown (1990).

The expected and known occurrences of medium to large-sized mammals is summarised in Table 5.5.1. That of small mammals is summarised in Table 5.5.2 (derived from expected and known occurrences in the neighbouring Hunsberg/Ai-Ais National Park (Griffin, 2004)). No work on the small mammals of the area has yet been undertaken.

Table 5.5.1
Checklist of medium to large mammals recorded at Gondwana Cañon Park

(as at September 2008)

Species	Latin name	Local status	Notes
Chacma Baboon	<i>Papio ursinus</i>	Uncommon	Seen mostly in northern rocky parts of Park
Cape Ground Squirrel	<i>Xerus inaurus</i>	Common	Widespread
Springhare	<i>Pedetes capensis</i>	Uncommon	Restricted to dunes and some sandy areas
Southern African Porcupine	<i>Hystrix africaeaustralis</i>	Common	Widespread on sandy terrain close to water
Scrub Hare	<i>Lepus saxatilis</i>	Common	Widespread
Jameson's Red Rock Rabbit	<i>Pronolagus rupestris</i>	Uncommon	Seen most often on black-lime rocky hills
Wild Cat	<i>Felis lybica/sylvestris</i>	Uncommon	Widespread
Small-spotted (Black-footed) Cat	<i>Felis nigripes</i>	Rare	Vulnerable (Red Data List 2007). Adults with two young seen in Gaap river
Caracal	<i>Caracal caracal</i>	Uncommon	Mostly in rocky terrain
Leopard	<i>Panthera pardus</i>	Uncommon	At least 4 individuals known
Cheetah	<i>Acinonyx jubatus</i>	Rare	Vulnerable ; Nomadic visitor
Small-spotted Genet	<i>Genetta genetta</i>	Uncommon	Seen at Lodge and near Roadhouse
Slender Mongoose	<i>Galerella sanguinea</i>	Common	Widespread; Edge of range; grey morph
Small Grey Mongoose	<i>Galerella pulverulentus</i>	Uncommon	Seen mostly in riverine areas
Brukkaros Mongoose	<i>Galerella swalius</i>	Expected?	Endemic ; Not yet observed
Water Mongoose	<i>Atilax paludinosus</i>	Expected?	Not yet observed
Yellow Mongoose	<i>Cynictis penicillata</i>	Common	Widespread on sandy plains
Brown Hyaena	<i>Hyaena brunnea</i>	Rare	One seen in 2008; Nomadic visitor
Spotted Hyaena	<i>Crocuta crocuta</i>	Marginal	Not yet confirmed in the area

Aardwolf	<i>Proteles cristatus</i>	Common	Widespread on sandy terrain
Cape Fox	<i>Vulpes chama</i>	Rare	One road-kill found near Roadhouse
Bat-eared Fox	<i>Otocyon megalotis</i>	Uncommon	Four dens known on sandy plains
Black-backed Jackal	<i>Canis mesomelas</i>	Common	Widespread
African Clawless Otter	<i>Aonyx capensis</i>	Marginal	Comes up Gaap river in high flood? Marginal
Striped Polecat	<i>Ictonyx striatus</i>	Common	Seen regularly at Roadhouse
Ratel / Honey Badger	<i>Mellivora capensis</i>	Marginal	One recorded at Jakkalsdam
Steenbok	<i>Raphicerus campestris</i>	Common	Widespread
Common Duiker	<i>Sylvicapra grimmia</i>	Rare	Three sighted in Gaap river near Augurabis
Springbok	<i>Antidorcas marsupialis</i>	Very common	Widespread
Gemsbok	<i>Oryx gazella</i>	Very common	Widespread; Edge of range
Kudu	<i>Tragelaphus strepsiceros</i>	Very common	Widespread; Edge of range
Hartmann's Mountain Zebra	<i>Equus zebra hartmannae</i>	Common	Near-Endemic; Endangered (Red Data List 2007); Widespread, especially in rocky areas
Burchell's Zebra	<i>Equus burchelli</i>	Uncommon	Re-introduced; only 30 individuals
Red Hartebeest	<i>Alcelaphus buselaphus caama</i>	Uncommon	Re-introduced. Mostly occupying sandy plains near Middelpos; Edge of range
Klipspringer	<i>Oreotragus oreotragus</i>	Common	Widespread on rocky outcrops
Giraffe	<i>Giraffa camelopardalis</i>	Rare	4 individuals introduced in 2003; One female remains on neighbouring farm
Antbear / Aardvark	<i>Orycteropus afer</i>	Common	Widespread on sandy terrain
Rock Dassie	<i>Procavia capensis</i>	Common	Widespread on rocky outcrops
The information has been compiled from sightings by CB, OvK, RB, DB and augmented from the literature (e.g. Mammals of the southern African Subregion by Smithers, 1990; Occurrence of frogs, reptiles and mammals by Mike Griffin, 2004) of what is expected to occur.			

Table 5.5.2
Checklist of Small Mammals expected and known to occur in Gondwana Canyon Park

Species	Latin name	Local Status	Notes
Reddish-Grey Musk Shrew	<i>Crocidura cyanea</i>	Expected	
Straw-Coloured Fruit Bat	<i>Eidolon helvum</i>	Marginal	
Common Slit-Faced Bat	<i>Nycteris thebaica</i>	Expected	
Ruppell's Horseshoe Bat	<i>Rhinolophus fumigatus</i>	Expected	
Geoffroy's Horseshoe Bat	<i>Rhinolophus clivosus</i>	Expected	
Darling's Horseshoe Bat	<i>Rhinolophus darlingi</i>	Expected	

Cape Horseshoe Bat	<i>Rhinolophus capensis</i>	Expected	
Dent's Horseshoe Bat	<i>Rhinolophus denti</i>	Expected	
Sundevall's Horseshoe Bat	<i>Hipposideros caffer</i>	Expected	
Flat-Headed Free-Tailed Bat	<i>Sauromys petrophilus</i>	Expected	
Little Free-Tailed Bat	<i>Chaerephon pumila</i>	Expected	
Egyptian Free-Tailed Bat	<i>T. aegyptiaca</i>	Expected	
Namibian Gland-Wing Bat	<i>Myotis seabrai</i>	Expected	Near-Endemic
Namib Long-Eared Bat	<i>Laephotis namibensis</i>	Expected	Endemic
Long-Tailed Serotine Bat	<i>Eptesicus hottentotus</i>	Expected	
Cape Serotine Bat	<i>Eptesicus capensis</i>	Expected	
Schreibers' Long-Fingered Bat	<i>Miniopterus schreibersi</i>	Expected	
Yellow-Winged Bat	<i>Lavia frons</i>	May occur	
Pouched Mouse	<i>Saccostomus campestris</i>	Expected	
Berseba Rock Mouse	<i>Petromyscus monticularis</i>	May occur	Near-Endemic
Namibian Rock Mouse	<i>Petromyscus collinus</i>	May occur	Near-Endemic
Brukkaros Rock Mouse	<i>Petromyscus bruchus</i>	Expected	Endemic
Bushveld Gerbil	<i>Tatera leucogaster</i>	May occur	Confirmed (Giere & Zeller, 2005)
Highveld Gerbil	<i>Tatera brantsii</i>	May occur	Confirmed (Giere & Zeller, 2005)
Short-Tailed Gerbil	<i>Desmodillus auricularis</i>	Expected	Confirmed (Giere & Zeller, 2005)
Pygmy Gerbil	<i>Gerbillurus paeba</i>	Present	Confirmed (Giere & Zeller, 2005)
Namaqua Brush-Tailed Gerbil	<i>Gerbillurus vallinus</i>	Expected	Confirmed; Near-Endemic
Large-Eared Mouse	<i>Malacothrix typica</i>	Expected	
Pygmy Mouse	<i>Malacothrix minutoides</i>	Expected	
Striped Mouse	<i>Rhabdomys pumilio</i>	Present	Confirmed - Common
Bush Karoo Rat	<i>Otomys unisulcatus</i>	Present	
Social Whistling Rat	<i>Parotomys brantsii</i>	Present	
Solitary Whistling Rat	<i>Parotomys littledalei</i>	Present	
Tree Rat	<i>Thallomys paedulus</i>	Expected	
Black-Tailed Tree Rat	<i>Thallomys nigricauda</i>	Expected	
Orange River Tree Rat	<i>Thallomys shortridgei</i>	Expected	
Namaqua Rock Rat	<i>Aethomys namaquensis</i>	Present	
Namibia Rock Doormouse	<i>Graphiuru rupicola/ platyops</i>	Expected	Near-Endemic
Nokkie (Dassie Rat)	<i>Petromus typicus</i>	Present	Confirmed; Near-Endemic
Round-Eared Senghi	<i>Macroscelides proboscideus</i>	Present	

Rock Elephant Shrew	<i>Elephantulus rupestris</i>	Expected	
Bushveld Senghi	<i>Elephantulus intufi</i>	Expected	Near-Endemic
Cape Rock Senghi	<i>Elephantulus edwardi</i>	May occur	
Local status based on neighbouring Hunsberg/Ai-Ais National Park records, except where specifically indicated			
"May occur" implies extreme rarity or marginality (Griffin, 2004)			
Sources of information:			
<p>This list of mammals for the Gondwana Cañon Park was obtained from the following sources (a) species expected to occur in the park, based on data for the neighbouring Hunsberg/Ai-Ais National Park, as derived from "Occurrence of Frogs, Reptiles and Mammals in Namibian Protected Areas" by Mike Griffin, 2004; (b) observations by CB, OvK, RB and DB in Gondwana Canyon Park.</p> <p>The present list should be viewed as preliminary.</p>			

5.7 Birds

Birds sighted to date within Gondwana Cañon Park are listed in Table 5.6.1, below. Birds recorded to date in the seven quarter degree squares (qds) into which the Gondwana Cañon Park falls, are listed in Table 5.6.2, with reporting rates (giving relative abundance) from the national bird atlas dataset.

To date 162 species have been recorded in the seven qds into which the Gondwana Cañon Park falls. Of these, seven are Red Data species and two are endemic/near endemic species to Namibia. By comparison, some 202 species have been recorded in the greater Ai-Ais/Hunsberg National Park, with some 181 species recorded from the Fish River Canyon section of the Ai-Ais/Hunsberg Park. It is anticipated that, with increased interest, many additional species will be recorded in the Gondwana Cañon Park. Where there is good evidence of the validity of these records, they should be recorded, as should information on sightings of Red Data species.

Table 5.6.1
Checklist of birds recorded at Gondwana Cañon Park
(as at September 2008 - 112 species)

Roberts' No.	Species	Latin name	Local status	Notes
1	Ostrich	<i>Struthio camelus</i>	CRes	Breeding Resident
8	Dabchick	<i>Tachybaptus ruficollis</i>	UCVag	Single record
49	Great White Pelican	<i>Pelecanus onocratalus</i>	RVag	Two records
55	Whitebreasted Cormorant	<i>Phalacrocorax carbo</i>	UCVag	Single record
71	Cattle Egret	<i>Bubulcus ibis</i>	UCVag	
81	Hamerkop	<i>Scopus umbretta</i>	UCVag	
83	White Stork	<i>Ciconia ciconia</i>	UCVag	
95	African Spoonbill	<i>Platalea alba</i>	UCVag	
102	Egyptian Goose	<i>Alopochen aegyptiacus</i>	CRes	
103	South African Shelduck	<i>Tadorna cana</i>	UCRes	
105	African Black Duck	<i>Anas sparsa</i>	UCVag	
108	Red-billed Teal	<i>Anas erythrorhynca</i>	UCVag	
118	Secretarybird	<i>Sagittarius serpentarius</i>	UCVag	
124	Lappetfaced Vulture	<i>Torgos tracheliotus</i>	RVag	Vulnerable (RDL 2007)
127	Blackshouldered Kite	<i>Elanus caeruleus</i>	UCVag	
131	Verreaux's Eagle	<i>Aquila verreauxii</i>	UCRes	Breeding resident
136	Booted Eagle	<i>Hieraaetus pennatus</i>	UCRes	
140	Martial Eagle	<i>Polemaetus bellicosus</i>	UCRes	Breeding resident
143	Black Chested Snake Eagle	<i>Circaetus pectoralis</i>	UCRes	
149	Steppe Buzzard	<i>Buteo vulpinus</i>	UCMig	Summer Migrant
152	Jackal Buzzard	<i>Buteo rufofuscus</i>	UCRes	
162	Southern Pale Chanting Goshawk	<i>Melierax canorus</i>	CRes	Breeding Resident
172	Lanner Falcon	<i>Falco biarmicus</i>	UCRes	
181	Rock Kestrel	<i>Falco tinnunculus</i>	CRes	

182	Greater Kestrel	<i>Falco rupicoloides</i>	UCVag	Summer Vagrant
186	Pygmy Falcon	<i>Polihierax semitorquatus</i>	UCRes	
200	Common Quail	<i>Coturnix coturnix</i>	UCRes	
226	Common Moorhen	<i>Gallinula chloropus</i>	UCRes	Breeding Resident
230	Kori Bustard	<i>Ardeotis kori</i>	UCVag	
232	Ludwig's Bustard	<i>Neotis ludwigii</i>	UCVag	
235	Karoo Korhaan	<i>Eupodotis vigorsii</i>	CRes	Breeding Resident
239	Northern Black Korhaan	<i>Eupodotis afraoides</i>	UCVag	Single record at Holoog
249	Threebanded Plover	<i>Charadrius tricollaris</i>	CRes	
255	Crowned Lapwing	<i>Vanellus coronatus</i>	CRes	
258	Blacksmith Lapwing	<i>Vanellus armatus</i>	UCVag	
295	Blackwinged Stilt	<i>Himantopus himantopus</i>	UCVag	
297	Spotted Thick-knee	<i>Burhinus capensis</i>	CRes	
299	Burchell's Courser	<i>Cursorius rufouf</i>	UCNom	Single record of pair
301	Doublebanded Courser	<i>Smutsornis africanus</i>	RVag	Breeding resident
344	Namaqua Sandgrouse	<i>Pterocles namaqua</i>	CRes	Breeding Resident
347	Doublebanded Sandgrouse	<i>Pterocles bicinctus</i>	UCVag	
349	Speckled Pigeon	<i>Columba guinea</i>	CRes	Breeding Resident
354	Cape Turtle Dove	<i>Streptopelia capicola</i>	CRes	Breeding Resident
355	Laughing Dove	<i>Streptopelia senegalensis</i>	CRes	Breeding Resident
356	Namaqua Dove	<i>Oena capensis</i>	CRes	Breeding Resident
367	Rosy-faced Lovebird	<i>Agapornis roseicollis</i>	UCRes	Near-Endemic
373	Go-away Bird	<i>Corythaixoides concolor</i>	UCRes	
392	Barn Owl	<i>Tyto alba</i>	CRes	Breeding Resident
395	Marsh Owl	<i>Asio capensis</i>	UCVag	
401	Spotted Eagle Owl	<i>Bubo africanus</i>	UCRes	Breeding Resident
406	Rufous-cheeked Nightjar	<i>Caprimulgus rufigena</i>	CMig	Summer Migrant
411	Common Swift	<i>Apus apus</i>	UCVag	Summer Vagrant
413	Bradfield's Swift	<i>Apus bradfieldi</i>	CRes	
417	Little Swift	<i>Apus affinis</i>	CMig	Summer Migrant
418	Alpine Swift	<i>Apus melba</i>	UCVag	Summer Vagrant?
425	Whitebacked Mousebird	<i>Colius colius</i>	CRes	
426	Redfaced Mousebird	<i>Urocolius indicus</i>	UCVag	Single record at Holoog
445	Swallowtailed Bee-Eater	<i>Merops hirundineus</i>	UCRes	
447	Lilac-breasted Roller	<i>Coracias caudata</i>	UCVag	
454	Common Scimitarbill	<i>Rhinopomastus cyanomelas</i>	UCRes	Breeding Resident
465	Acacia Pied Barbet	<i>Tricholaema leucomelas</i>	CRes	Breeding Resident
498	Sabota Lark	<i>Certhilauda sabota</i>	CRes	
500	Karoo Longbilled Lark	<i>Certhilauda curvirostris</i>	CRes	Breeding Resident
511	Stark's Lark	<i>Spizocorys starki</i>	UC	
516	Greybacked Finchlark	<i>Eremopterix verticalis</i>	CRes	
517	Black-eared Finchlark	<i>Eremopterix australis</i>	CVag	
518	European Swallow	<i>Hirundo rustica</i>	CMig	Summer Migrant
529	Rock Martin	<i>Hirundo fuligula</i>	CRes	
541	Fork-Tailed Drongo	<i>Dicrurus adsimilis</i>	UCVag	Single record at Holoog
548	Pied Crow	<i>Corvus albus</i>	UCVag	
551	Southern Grey Tit	<i>Parus afer</i>	UC	
567	African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>	CRes	Breeding Resident
	Karoo Thrush	<i>Turdus olivaceus</i>	UCRes	

583	Shorttoed Rock Thrush	<i>Monticola brevipes</i>	UCVag	Single record
586	Mountain Wheatear	<i>Oenanthe monticola</i>	CRes	Breeding Resident
589	Familiar Chat	<i>Cercomela familiaris</i>	CRes	
595	Anteating Chat	<i>Myrmecocichla formicivora</i>	CRes	
601	Cape Robin Chat	<i>Cossypha caffra</i>	UCRes	
614	Karoo Scrub-Robin	<i>Erythropygia coryphaeus</i>	UCRes	
621	Chestnut-Vented Titbabbler	<i>Parisoma subcaeruleum</i>	CRes	
651	Longbilled Crombec	<i>Sylvietta rufescens</i>	CRes	
686	Karoo Prinia	<i>Prinia maculosa</i>	CRes	
688	Rufouseared Warbler	<i>Malcorus pectoralis</i>	CRes	
689	Spotted Flycatcher	<i>Muscicapa striata</i>	UCVag	Single record at Holoog
697	Chat Flycatcher	<i>Melaenornis infuscatus</i>	UCRes	Single record
703	Pirit Batis	<i>Batis pririt</i>	CRes	
713	Cape Wagtail	<i>Motacilla capensis</i>	UCRes	
714	Yellow Wagtail	<i>Motacilla flava</i>	UCVag	Single record at Augurabis
732	Common Fiscal (Latakoo Fiscal)	<i>Lanius collaris</i>	UCRes	
746	Bokmakierie	<i>Telophorus zeylonus</i>	CRes	Breeding Resident
760	Wattled Starling	<i>Creatophora cinerea</i>	UCVag	
770	Palewinged Starling	<i>Onychognathus naboroup</i>	CRes	Breeding Resident
783	Southern Doublecollared Sunbird	<i>Nectarinia chalybea</i>	UCVag	
788	Dusky Sunbird	<i>Nectarinia fusca</i>	CRes	Breeding Resident
	Orange-River White-Eye	<i>Zosterops pallidus</i>	UCRes	
800	Sociable Weaver	<i>Philetairus socius</i>	CRes	Breeding Resident
801	House Sparrow	<i>Passer domesticus</i>	CRes	Breeding Resident
802	Great Sparrow	<i>Passer motitensis</i>	UCVag	Single record at Likkewaanspos
803	Cape Sparrow	<i>Passer melanurus</i>	CRes	Breeding Resident
806	Scalyfeathered Finch	<i>Sporopipes squamifrons</i>	CRes	
814	Southern Masked Weaver	<i>Ploceus velatus</i>	CRes	Breeding Resident
821	Redbilled Quelea	<i>Quelea quelea</i>	UCMig	
834	Green-winged Pytilia	<i>Pytilia melba</i>	UCVag	Single record at Holoog
845	Violet-eared Waxbill	<i>Uraeginthus granatinus</i>	UCRes	Single record at Porcupine
846	Common Waxbill	<i>Estrilda astrild</i>	UCRes	
856	Redheaded Finch	<i>Amadina erythrocephala</i>	UCVag	Breeding Resident
860	Pin-tailed Whydah	<i>Vidua macroura</i>	UCMig	Summer Migrant
876	Black-headed Canary	<i>Serinus alario var. leucoma</i>	UCRes	
878	Yellow Canary	<i>Serinus flaviventris</i>	UCVag	
879	Whitethroated Canary	<i>Serinus albogularis</i>	CRes	Breeding Resident
885	Cape Bunting	<i>Emberiza capensis</i>	UCRes	
887	Larklike Bunting	<i>Emberiza impetuani</i>	CRes	Breeding Resident

C = Common; UC = UnCommon; R = Rare; Res = Resident; Vag = Vagrant; Mig = Migrant

Sources of information:

This list of birds for the Gondwana Cañon Park was obtained from the following sources (a) Namibia Avifaunal database, with information for the ¼° squares into which the Park falls from (i) the Bird Atlas of Namibia, (ii) the Namibia Raptor Road Count programme, (iii) Museum specimens and (iv) the Namibia Nest Record programme, and (b) observations by CB, OvK, RB and DB in Gondwana Canyon Park. The present bird list should be viewed as preliminary.

Table 5.6.2

Birds recorded to date in the seven quarter degree squares (qds) into which the Gondwana Cañon Park falls, with reporting rates (giving relative abundance) from the national bird atlas dataset.

Squares included are 2717Bc, 2717Bd, 2718Ac, 2717Da, 2717Db, 2717Dc, 2717Dd.

Robert's no	Species	SABAP records	No SABAP cards	Rep. rate for selected QDS
1	Ostrich	22	116	0.19
8	Dabchick	3	116	0.03
55	Whitebreasted Cormorant	6	116	0.05
58	Reed Cormorant	2	116	0.02
60	Darter	22	116	0.19
62	Grey Heron	32	116	0.28
63	Blackheaded Heron	6	116	0.05
64	Goliath Heron	1	116	0.01
65	Purple Heron	1	116	0.01
67	Little Egret	3	116	0.03
74	Greenbacked Heron	1	116	0.01
76	Blackcrowned Night Heron	1	116	0.01
78	Little Bittern	1	116	0.01
81	Hamerkop	36	116	0.31
83	White Stork	1	116	0.01
84	Black Stork	16	116	0.14
85	Abdim's Stork	1	116	0.01
91	Sacred Ibis	2	116	0.02
102	Egyptian Goose	44	116	0.38
103	South African Shelduck	25	116	0.22
104	Yellowbilled Duck	1	116	0.01
105	African Black Duck	8	116	0.07
118	Secretarybird	1	116	0.01
122	Cape Vulture	1	116	0.01
124	Lappetfaced Vulture	1	116	0.01
127	Blackshouldered Kite	2	116	0.02
131	Black Eagle	37	116	0.32
132	Tawny Eagle	1	116	0.01
136	Booted Eagle	1	116	0.01
140	Martial Eagle	12	116	0.10
143	Blackbreasted Snake Eagle	3	116	0.03
148	African Fish Eagle	25	116	0.22
152	Jackal Buzzard	1	116	0.01
161	Gabar Goshawk	1	116	0.01
162	Pale Chanting Goshawk	35	116	0.30
171	Peregrine Falcon	4	116	0.03
172	Lanner Falcon	8	116	0.07
178	Rednecked Falcon	5	116	0.04
179	Western Redfooted Kestrel	1	116	0.01
181	Rock Kestrel	27	116	0.23
182	Greater Kestrel	9	116	0.08
183	Lesser Kestrel	2	116	0.02

186	Pygmy Falcon	3	116	0.03
195	Cape Francolin	1	116	0.01
215	Baillon's Crake	1	116	0.01
223	Purple Gallinule	2	116	0.02
226	Moorhen	2	116	0.02
228	Redknobbed Coot	2	116	0.02
230	Kori Bustard	6	116	0.05
232	Ludwig's Bustard	6	116	0.05
235	Karoo Korhaan	26	116	0.22
239	Whitequilled Korhaan	2	116	0.02
240	African Jacana	2	116	0.02
242	Painted Snipe	2	116	0.02
249	Threebanded Plover	33	116	0.28
255	Crowned Plover	2	116	0.02
258	Blacksmith Plover	13	116	0.11
264	Common Sandpiper	2	116	0.02
295	Blackwinged Stilt	4	116	0.03
297	Spotted Dikkop	2	116	0.02
299	Burchell's Courser	1	116	0.01
301	Doublebanded Courser	5	116	0.04
344	Namaqua Sandgrouse	23	116	0.20
347	Doublebanded Sandgrouse	3	116	0.03
349	Rock Pigeon	37	116	0.32
354	Cape Turtle Dove	23	116	0.20
355	Laughing Dove	57	116	0.49
356	Namaqua Dove	24	116	0.21
367	Rosy faced Lovebird	16	116	0.14
392	Barn Owl	2	116	0.02
401	Spotted Eagle Owl	9	116	0.08
406	Rufouscheeked Nightjar	2	116	0.02
408	Freckled Nightjar	4	116	0.03
413	Bradfield's Swift	6	116	0.05
415	Whiterumped Swift	3	116	0.03
417	Little Swift	2	116	0.02
418	Alpine Swift	26	116	0.22
421	Palm Swift	1	116	0.01
425	Whitebacked Mousebird	15	116	0.13
426	Redfaced Mousebird	3	116	0.03
428	Pied Kingfisher	22	116	0.19
431	Malachite Kingfisher	10	116	0.09
438	European Bee-Eater	5	116	0.04
445	Swallowtailed Bee-Eater	25	116	0.22
454	Scimitar billed Woodhoopoe	6	116	0.05
465	Pied Barbet	21	116	0.18
495	Clapper Lark	1	116	0.01
497	Fawn coloured Lark	1	116	0.01
498	Sabota Lark	6	116	0.05
500	Longbilled Lark	20	116	0.17
502	Karoo Lark	7	116	0.06

506	Spikeheeled Lark	2	116	0.02
511	Stark's Lark	2	116	0.02
516	Greybacked Finchlark	3	116	0.03
517	Blackeared Finchlark	1	116	0.01
518	European Swallow	2	116	0.02
529	Rock Martin	65	116	0.56
532	Sand Martin	7	116	0.06
533	Brownthroated Martin	28	116	0.24
547	Black Crow	1	116	0.01
552	Ashy Tit	1	116	0.01
557	Cape Penduline Tit	2	116	0.02
567	Redeyed Bulbul	50	116	0.43
577	Olive Thrush	12	116	0.10
586	Mountain Chat	75	116	0.65
587	Capped Wheatear	3	116	0.03
589	Familiar Chat	53	116	0.46
590	Tractrac Chat	10	116	0.09
591	Sicklewinged Chat	4	116	0.03
592	Karoo Chat	15	116	0.13
595	Anteating Chat	8	116	0.07
601	Cape Robin	10	116	0.09
614	Karoo Robin	13	116	0.11
615	Kalahari Robin	1	116	0.01
621	Titbabbler	11	116	0.09
622	Layard's Titbabbler	1	116	0.01
631	African Marsh Warbler	11	116	0.09
635	Cape Reed Warbler	8	116	0.07
651	Longbilled Crombec	17	116	0.15
653	Yellowbellied Eremomela	7	116	0.06
660	Cinnamonbreasted Warbler	2	116	0.02
665	Desert Cisticola	1	116	0.01
669	Greybacked Cisticola	3	116	0.03
685	Blackchested Prinia	23	116	0.20
686	Karoo Prinia	3	116	0.03
687	Namaqua Warbler	1	116	0.01
688	Rufouseared Warbler	2	116	0.02
689	Spotted Flycatcher	4	116	0.03
695	Marico Flycatcher	1	116	0.01
697	Chat Flycatcher	21	116	0.18
703	Pirit Batis	12	116	0.10
711	African Pied Wagtail	1	116	0.01
713	Cape Wagtail	49	116	0.42
716	Richard's Pipit	1	116	0.01
717	Longbilled Pipit	1	116	0.01
732	Fiscal Shrike	28	116	0.24
733	Redbacked Shrike	3	116	0.03
741	Brubru	12	116	0.10
746	Bokmakierie	42	116	0.36
764	Glossy Starling	1	116	0.01

770	Palewinged Starling	80	116	0.69
788	Dusky Sunbird	50	116	0.43
796	Cape White-Eye	32	116	0.28
799	Whitebrowed Sparrowweaver	2	116	0.02
800	Sociable Weaver	31	116	0.27
801	House Sparrow	18	116	0.16
802	Great Sparrow	2	116	0.02
803	Cape Sparrow	34	116	0.29
804	Greyheaded Sparrow	1	116	0.01
806	Scalyfeathered Finch	11	116	0.09
814	Masked Weaver	20	116	0.17
821	Redbilled Quelea	5	116	0.04
846	Common Waxbill	36	116	0.31
856	Redheaded Finch	3	116	0.03
870	Blackthroated Canary	10	116	0.09
876	Blackheaded Canary	2	116	0.02
878	Yellow Canary	5	116	0.04
879	Whitethroated Canary	37	116	0.32
885	Cape Bunting	27	116	0.23
886	Rock Bunting	2	116	0.02
887	Larklike Bunting	17	116	0.15
889	Roberts 889	1	116	0.01

5.8 Reptiles & lower vertebrates

The expected and known occurrences of amphibians and reptiles in the neighbouring Hunsberg/Ai-Ais National Park are summarised in Table 5.7.1, below.

Table 5.7.1			
Checklist of Amphibians and Reptiles expected to occur in Gondwana Canyon Park			
Species	Latin name	Local Status	Notes
Common Platanna	<i>Xenopus laevis</i>	Present	
Guttural Toad	<i>Bufo gutturalis</i>	May occur	
Karoo Toad	<i>Bufo garipeensis</i>	Expected	
Raucous Toad	<i>Bufo rangeri</i>	Expected	
Paradise Toad	<i>Bufo robinsoni</i>	Expected	
Marbled Rubber Frog	<i>Phrynomantis annectens</i>	Present	Near-Endemic
Tandy's Sand Frog	<i>Tomopterna tandyi</i>	Expected	
Cape River Frog	<i>Afrana fuscigula</i>	Present	
Angola River Frog	<i>Afrana angolensis</i>	Expected	
Clicking Stream Frog	<i>Strongylopus grayi</i>	Expected	
Namaqua Stream Frog	<i>Strongylopus springbokensis</i>	Expected	Vulnerable (Red Data List 2007)
Namaqua Caco	<i>Cacosternum namaquense</i>	Present	
Helmeted Terrapin	<i>Pelomedusa subrufa</i>	Expected	
Leopard Tortoise	<i>Geochelone pardalis</i>	Expected	
Bowsprit Tortoise	<i>Chersina angulata</i>	Present	
Nama Padloper	<i>Homopus</i> sp. nov	Present	Endemic
Namaqualand Tent Tortoise	<i>Psammobates tentorius</i>	Present	
Namaqua Flat Gecko	<i>Afroedura namaquensis</i>	May occur	
Striped Leaf-Toed Gecko	<i>Goggia lineata</i>	Present	
Richtersveld Leaf-Toed Gecko	<i>Goggia gemmula</i>	Present	
Namaqua Day Gecko	<i>Phelsuma ocellata</i>	Present	Low-Risk (Red Data List 2007)
Namibian Dwarf Gecko	<i>Lygodactylus bradfieldi</i>	Present	Near-Endemic
Giant Ground Gecko	<i>Chondrodactylus angulifer</i>	Present	
Cape Button-Scale Gecko	<i>Pachydactylus. bibronii</i>	Present	
Tropical Button-Scale Gecko	<i>Pachydactylus turneri</i>	Present	
Weber's Gecko	<i>Pachydactylus weberi</i>	Present	
Western Cape Gecko	<i>Pachydactylus labialis</i>	May occur	
Marico Gecko	<i>Pachydactylus mariquensis</i>	Present	
Speckled Gecko	<i>Pachydactylus punctatus</i>	Present	

Namibian Rough-Scaled Gecko	<i>Pachydactylus rugosus</i>	Present	Near-Endemic
Western Spotted Gecko	<i>Pachydactylus serval</i>	Present	
Great Namaqualand Gecko	<i>Pachydactylus haackei</i>	Present	Near-Endemic
Namaqua Gecko	<i>Pachydactylus namaquensis</i>	Present	
Common Barking Gecko	<i>Pachydactylus garrulous</i>	Present	
Festive Gecko	<i>Narudasia festiva</i>	Present	Endemic
Common Ground Agama	<i>Agama aculeate</i>	Present	
Western Rock Agama	<i>Agama anchietae</i>	Present	
Southern Rock Agama	<i>Agama atra</i>	Present	
Spiny Agama	<i>Agama hispida</i>	Present	
Namaqua Chameleon	<i>Chamaeleo namaquensis</i>	Present	
Striped legless skink	<i>Acontias lineatus</i>	Present	
Sperrgebiet Blind Legless Skink	<i>Typhlosaurus meyeri</i>	Present	Near-Endemic
Namibian Dwarf Burrowing Skink	<i>Scelotes capensis</i>	Present	Near-Endemic
Wedge-Snouted Skink	<i>Trachylepis acutilabris</i>	Expected	
Cape Skink	<i>Trachylepis capensis</i>	Expected	
Western Three-Lined Skink	<i>Trachylepis occidentalis</i>	Present	
Western Variegated Skink	<i>Trachylepis variegata</i>	Present	
Namibian Tree Skink	<i>Trachylepis spilogaster</i>	Expected	Near-Endemic
Koppie Skink	<i>Trachylepis sulcata</i>	Present	
Western Sandveld Lizard	<i>Nucras tessellata</i>	Present	
Round-Snouted Sand Lizard	<i>Meroles knoxii</i>	Expected	
Spotted Sand Lizard	<i>Meroles suborbitalis</i>	Present	
Cape Sand Lizard	<i>Pedioplanis laticeps</i>	May occur	
Ocellated Sand Lizard	<i>Pedioplanis lineocellata</i>	Present	
Namaqua Sand Lizard	<i>Pedioplanis namaquensis</i>	Present	
Namibian Sand Lizard	<i>Pedioplanis inornata</i>	Present	Near-Endemic
Dwarf Plated Lizard	<i>Cordylus subtessellatus</i>	Present	Near-Endemic
Karoo Girdled Lizard	<i>Cordylus polyzonus</i>	Present	
Gariep Flat Lizard	<i>Platysaurus capensis</i>	Present	
Veld Leguaan	<i>Varanus albigularis</i>	Expected	
Water Leguaan	<i>Varanus niloticus</i>	Present	
Slender Wormsnake	<i>Leptotyphlops gracilior</i>	Expected	
Namibian Wormsnake	<i>Leptotyphlops occidentalis</i>	Expected	Endemic
Delalande's Blind Snake	<i>Rhinotyphlops lalandei</i>	Present	
Beaked Blind Snake	<i>Rhinotyphlops schinzi</i>	Expected	Near-Endemic

Cape House Snake	<i>Lamprophis fiskii</i>	May occur	
Brown House Snake	<i>Lamprophis fuliginosus</i>	Expected	
Spotted House Snake	<i>Lamprophis guttatus</i>	Expected	
Mole Snake	<i>Pseudaspis cana</i>	Expected	
Spotted Skaapstecker	<i>Psammophylax rhombeatus</i>	Expected	
Western Whip Snake	<i>Psammophis trigrammus</i>	Present	Near-Endemic
Karoo Whip Snake	<i>Psammophis notostictus</i>	Present	
Namib Sand Snake	<i>Psammophis namibensis</i>	Present	
Cross-Marked Sand Snake	<i>Psammophis crucifer</i>	Expected	
Dwarf-Beaked Snake	<i>Dipsina multimaculata</i>	Present	Near-Endemic
Rhombic Egg-Eater	<i>Dasypeltis scabra</i>	Expected	
Spotted Bush Snake	<i>Philothamnu semivariegatus</i>	Present	
Namaqua Tiger Snake	<i>Telescopus beetzi</i>	Present	
Southern Tiger Snake	<i>Telescopus semiannulatus</i>	Present	
Twin-Striped Shovel-Snout	<i>Prosymna bivittata</i>	Expected	
Southwestern Shovel-Snout	<i>Prosymna frontalis</i>	Present	Near-Endemic
Coral Snake	<i>Aspidelaps lubricus</i>	Present	
Zebra Snake	<i>Naja nigricincta</i>	Present	Near-Endemic
Cape Cobra	<i>Naja nivea</i>	Present	
Horned Adder	<i>Bitis caudalis</i>	Present	
Desert Mountain Adder	<i>Bitis xeropaga</i>	Present	Near-Endemic
Many-Horned Adder	<i>Bitis cornuta</i>	Present	
Puff Adder	<i>Bitis arietans</i>	Present	
Additional species	1) <i>Psammophis trinialis</i> (Kalahari sand snake)	2)	3)
	4)	5)	6)
	7)	8)	9)
Notes:			
List of species and local status based on neighbouring Hunsberg/Ai-Ais National Park records, except where specifically indicated			
"May occur" implies extreme rarity or marginality (Griffin, 2004)			
Sources of information:			
This list of amphibians and reptiles for the Gondwana Cañon Park was obtained from the following sources (a) species expected to occur in the park, based on data for the neighbouring Hunsberg/Ai-Ais National Park, as derived from "Occurrence of Frogs, Reptiles and Mammals in Namibian Protected Areas" by Mike Griffin, 2004; (b) observations by CB and OvK in Gondwana Canyon Park.			
The present list should be viewed as preliminary.			

5.9 Invertebrates

Work has begun by BIOTA researchers on identifying some of the invertebrates of the area, but that information is not yet available. No other work has been undertaken to identify invertebrate species in the Park.

5.10 Alien Species

Known distributions and planned actions for alien species occurring in the park are summarised in Table 5.9.1, below.

Table 5.9.1 List of alien plant species recorded in Gondwana Canyon Park (as at September 2008)				
Scientific name	Common name	Locations	Status	Actions
<i>Datura innoxia</i>	Thorn apple	Geluk waterhole, Augurabis homestead, Salt river	Highly invasive	Eradicate throughout
<i>Eucalyptus spp</i>	Australian Gum	In Gaap river near Holoog house, in a pot at Roadhouse, at Altdorn homestead	Not invasive	OK in pots; eradicate elsewhere
<i>Melia azedarach</i>	Seringa	In front of Holoog house	Invasive	Eradicate throughout
<i>Opuntia ficus-indica</i>	Prickly pear	Abundant at Lodges; Geluk waterhole	Invasive	Eradicate throughout
<i>Prosopis sp.</i>	Mesquite	Widespread. At waterholes, gravel-pits, homesteads, and along major river courses	Highly invasive	Eradicate throughout
<i>Schinus molle</i>	Pepper tree	Canyon Lodge, Roadhouse, Holoog river	Not invasive	OK at lodges, eradicate elsewhere
<i>Cereus jamacaru</i>	Queen of the night	Canyon Lodge, Roadhouse	Not invasive?	Eradicate throughout
<i>Hyphaene spp</i>	Fan palms	Canyon Lodge, Roadhouse, Holoog house?	?	OK at lodges, eradicate elsewhere
<i>Typhus sp.</i>	Spanish reeds	Roadhouse swimming pool, Holoog house	?	OK at lodges, eradicate elsewhere
Various	Other cacti	Canyon Lodge, Roadhouse	?	OK in pots, eradicate elsewhere
Various	Exotic aloe species	Canyon Lodge, Roadhouse	?	OK in pots, eradicate elsewhere
<i>Phoenix reclinata</i>	Wild date palm	Canyon Lodge, Roadhouse, Holoog house, Augurabis homestead	Invasive. Regional alien	Eradicate small specimens – minimise spread
<i>Phragmites australis</i>		Porcupine waterhole	Invasive? Regional alien	Eradicate throughout

5.11 Infrastructure

All remaining buildings and other infrastructure in Gondwana Canon Park (excepting income centres) are listed in Table 5.10.1, below, along with current usage, if any, and suggested actions (e.g. possible uses, and whether to retain or demolish).

Table 5.10.1
Buildings and Infrastructure remaining in Gondwana Cañon Park
(as at September 2007)

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/ Demolish?	Notes; Other management/development work required
Holoog Homestead	House	10	Good	Yes	Research centre / Park office	Retain	Removal of alien plants
	Outbuilding	1	Fair	No	Storage	Retain	Need power, telephone line
	Outbuilding	2	Fair	No	Staff accommodation	Retain	Removal of scrap
	Outbuilding	1	Poor	No	Storage	Retain	
	Sheep kraals		Poor	No	None	Demolish	Demolished
	Reservoir		Poor	No	None	Demolish	
	Sheep troughs		Poor	No	None	Demolish	Demolished
	Windmill		Fair	Yes	None	Demolish	Demolished
	Reservoir		Fair	No	None	Demolish?	Removal of alien plants
	Sheep trough		Poor	No	None	Demolish	
Holoog klipdam	Windmill		Fair	No	Water-pumping	Demolish?	
	Stone reservoir		Fair	Yes	Water-storage	Retain?	
	Sheep trough		Fair	Yes	None	Replace	Replace with semi-natural waterhole
South of Holoog Homestead	Reservoir		Fair	No	Water storage?	Retain?	Retain for possible future use?
	Sheep troughs		Fair	No	None	Demolish	
	Kraal remains					Clean up	
En-route to Likkewaanspos	Reservoir		Fair	No	Water storage?	Retain?	Retain for possible future use?
	Sheep troughs		Fair	No	None	Demolish	
	Kraal remains					Clean up	
Likkewaanspos	Windmill		Fair	Yes	Water-pumping	Retain	Removal of scrap
	Reservoir		Poor	Yes	Water-storage	Replace	Replace with 10 000L tank
	Reservoir		Poor	No	None	Demolish	
	Sheep trough		Poor	Yes	None	Replace	Replace with semi-natural waterhole

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/Demolish?	Notes; Other management/development work required
Geluk	House	6	Poor	Yes	Storage in short-term	Demolish	Removal of scrap and alien plants
	Outbuilding	1	Poor	No	None	Demolish	Demolished
	Outbuilding	1	Poor	No	None	Demolish	Demolished
	Outbuilding	1	Poor	No	None	Demolish	Demolished
	Cold-room	1	Fair	No	None	Demolish	
	Outbuilding	3	Poor	No	None	Demolish	1 room demolished
	Windmill		Fair	Yes	Water-pumping	Retain	Removal of alien plants - Complete
	Reservoir		Poor	Yes	None	Replace	Replace with tank
	Sheep troughs		Poor	Yes	None	Demolish	Replaced
	Ground-dam		Fair	Yes	Water-storage in rainy season	Retain	
	Sheep trough		Poor	No	None	Demolish	Demolished
East of Geluk	Reservoir		Fair	No	Water storage?	Retain?	Retain for possible future use?
	Sheep troughs		Fair	No	None	Demolish	
Jagpos	House	3	Fair	No	Hikers' hut?	Retain	
	Windmill		Fair	Yes	Water-pumping	Replace	Replace with solar pump
	Reservoir		Fair	No	None	Demolish	
	Sheep trough		Fair	No	None	Demolish	Removal of scrap and alien plants
	Circular Trough		Fair	Yes	Water-provision	Retain	Enlarge and improve; add viewing area
Jakkalsdam	Hut	1	Poor	No	None	Demolish	
	Windmill		Fair	Yes	Water-pumping	Replace	Replace with solar pump
	Reservoir		Poor	No	None	Demolish	
	Sheep trough		Poor	No	None	Demolish	
	Square trough		Poor	Yes	None	Replace	Replace with semi-natural waterhole;
	Kraal remains					Clean up	add viewing area
Stamprivier Homestead	House	6	Fair	No	Ranger post? Mule trail base?	Retain	Removal of scrap and alien plants
	Outbuilding	3	Fair	No	Storage	Retain	
	Cold-room	1	Good	No	Cold-storage	Retain?	
	Outbuilding	2	Poor	No	None	Demolish	
	Reservoir		Poor	No	None	Replace?	Replace with a 5000L tank, if house used

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/Demolish?	Notes; Other management/development work required
Stampriver waterhole	Windmill		Fair	Yes	Water-pumping?	Replace?	Replace with solar pump?
	Circular Trough		Good	Yes	Water-provision	Retain	Improve, and add viewing area?
En-route to Augurabis	Reservoir		Poor	No	None	Demolish	
	Sheep trough		Poor	No	None	Demolish	
Augurabis Homestead	House	6	Good	Yes	Mule-trail base	Retain	Removal of scrap and alien plants
	Outbuilding	2	Fair	Yes	Staff accommodation	Retain	
	Reservoir		Fair	No	Water-storage	Retain	
	Outbuilding	1	Fair	Yes	Storage	Retain	
JagFarm	House	5	Poor	No	Hikers' hut?	Demolish?	Removal of alien plants
West of JagFarm	Reservoir		Fair	No	None	Demolish	
	Sheep troughs		Poor	No	None	Demolish	
Near Salt River (north-east of Augurabis)	Reservoir		Poor	No	None	Demolish	Borehole blocked
	Sheep troughs		Poor	No	None	Demolish	
	Windmill tower		Poor	No	None	Demolish	
	Kraal remains					Clean up	
Grenspos	Reservoir		Good	Yes	Water-storage	Retain?	Cover reservoir, or replace with tank?
	Sheep troughs		Good	Yes	None	Demolish	Replace with semi-natural waterhole, further from road, with viewing area?
	Windmill		Fair	Yes	Water-pumping	Retain	
	Reservoir		Poor	No	Water storage	Retain	Removal of alien plants
	Piggery	10	Fair	No	Mule Trails Headquarters	Retain	Converted
Ostrich	Reservoir		Fair	No	None	Demolish	Replace with semi-natural waterhole below koppies- fed from Geluk; add viewing area on koppie - Replaced
	Circular Trough		Good	Yes	None	Retain?	
Opposite Roadhouse	Reservoir		Fair	No	Water-storage	Demolish	
	Sheep trough		Fair	No	None	Demolish	Replaced with semi-natural waterhole
Middelpos-Roadhouse	Reservoir		Good	No	None	Demolish	
	Sheep trough		Fair	No	None	Demolish	
Middelpos	Reservoir		Fair	Yes	None	Replace?	Cover reservoir, or replace with tank?
	Sheep troughs		Poor	Yes	None	Demolish	Replace with semi-natural waterhole

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/Demolish?	Notes; Other management/development work required
South of Dassiepoort	Reservoir		Fair	No	None	Demolish	
	Sheep troughs		Fair	No	None	Demolish	
Dassiepoort main	Outbuilding	1	Poor	No	Storage?	Retain?	Add a picnic site?
	Windmill		Fair	Yes	Water-pumping	Retain	
	Reservoir		Poor	Yes	None	Demolish	Convert to toilet block?
	Reservoir		Good	Yes	Water-storage	Retain	Cover reservoir?
	Sheep troughs		Fair	Yes	None	Demolish	Replaced
Dassiepoort-Klein Karios Klein Karios Homestead	Reservoir		Fair	No	None	Demolish	
	Sheep troughs		Good	No	None	Demolish	
	House	4	Fair	Yes	Storage for feed for SSC	Retain	Removal of scrap
	Outbuilding	2	Fair	No	None	Demolish	
	Outhouse	1	Poor	No	None	Demolish	
	Reservoir		Poor	No	None	Demolish	
	Sheep troughs Kraal remains		Poor	No	None	Demolish Clean up	
Scorpion	Windmill		Fair	Yes	Water-pumping?	Replace?	Replace with solar pump?
	Reservoir		Poor	No	None	Demolish	
	Rocky trough		Good	Yes	Water-provision	Retain	Construct viewing area
Klipspringer	Reservoir		Fair	No	None	Demolish	
	Reservoir		Fair	No	None	Demolish	
	Windmill		Fair	Yes	None	Replace	Replace with solar pump?
	Windmill		Poor	No	None	Demolish	
NetDam	Reservoir		Poor	No	None	Demolish	
	Sheep troughs		Good	No	None	Demolish	
Bushman	Rocky trough		Good	Yes	Water-provision	Retain	Waterhole currently inactive
Porcupine	Windmill		Fair	Yes	None	Replace	Replace with solar pump?
	Reservoir		Poor	No	None	Demolish	
	Sheep trough		Poor	No	None	Demolish	Control erosion
	Circular trough		Good	Yes	Water-provision	Retain	Improve, and construct viewing area?

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/Demolish?	Notes; Other management/development work required
Springbokvlakte	Rocky trough		Good	Yes	Water-provision	Retain	Improve
Rooiberg	Windmill Reservoir Circular Trough		Fair Poor Good	No No Yes	None None Water-provision	Demolish Demolish Retain?	
Kanebis Homestead	House Outbuilding Windmill Reservoir Reservoir Sheep trough Circular Trough	5 3	Good Poor Fair Fair Poor Fair Good	Yes Yes Yes Yes No No Yes	Accommodation Storage? Water-pumping Water-storage None None Water-provision	Retain Retain? Replace? Retain? Demolish Demolish Retain	Being lived in Removal of scrap and alien plants Replace with solar pump? Cover reservoir, or replace with tank? Improve
Luiperdswater	Windmill Reservoir Reservoir Sheep trough Circular Trough		Fair Fair Poor Fair Good	Yes Yes No No Yes	Water-pumping Water-storage None None Water-provision	Replace? Retain? Demolish Demolish Retain	Replace with solar pump? Cover reservoir, or replace with tank? Improve
Steenbokwater	Windmill tower Reservoir Sheep trough Circular Trough		Good Poor Poor Good	No No No No	Water-pumping None None Water-provision	Retain Demolish? Demolish Retain	Re-open waterhole? Install solar pump? Replace with a 5000L tank if re-opened Improve
Kloofwater	Reservoir Sheep kraal		Fair Fair	No No	None None	Demolish Demolish	Borehole blocked
Brakwater	Windmill tower Reservoir Sheep troughs		Poor Poor Fair	No No No	None None None	Demolish Demolish Demolish	Waterhole closed
Kudugat	Windmill Reservoir Reservoir Sheep troughs		Fair Poor Poor Fair	Yes No No No	Water-pumping None None None	Replace? Demolish Demolish Demolish	Replace with solar pump?

Site	Structure type	No. of rooms	Condition	Currently used?	Potential future usage	Retain/Demolish?	Notes; Other management/development work required
Kudugat	Sheep kraal		Fair	No	None	Demolish	
	Dam-walls		Fair	Yes	Water-storage in rainy season	Retain	
Quaggagat	Windmill		Fair	Yes	Water-pumping	Replace?	Replace with solar pump?
	Reservoir		Fair	No	None	Demolish	
	Sheep trough		Fair	No	None	Demolish	
	Circular Trough		Good	Yes	Water-provision	Retain	
Altdorn Homestead	House	3	Fair	No	Ranger outpost?	Retain	If can get reliable water there Removal of scrap and alien plants
	Outbuilding	2	Fair	No	None	Retain	
	Outbuilding	1	Fair	No	Storage	Retain?	
	Sheep kraal		Fair	No	None	Demolish	
	Reservoir		Poor	No	None	Demolish	
	Reservoir		Poor	No	None	Demolish	
	Sheep troughs		Fair	No	None	Demolish	

Part 6: Studies and reports

This is also a potentially dynamic part of the Management & Development Plan. As the results of studies, reports and publications on the GCP are completed and become available, their full citation should be listed here, with author, date, title, journal/publisher, volume and pages. Copies of the reports and publications should be kept at:

- a) The Gondwana Collections office in Windhoek, and
- b) The Park office at the Gondwana Cañon Park.

<i>List of Reports and Publications from the Gondwana Cañon Park</i>					
No.	Author(s)	Date	Title	Journal or Publisher	Volume & pages
1	<i>Giere & Zeller</i>	2005	Small mammal diversity and reproduction along a transect in Namibia (BIOTA S 07)	<i>African Biodiversity: Molecules, Organisms, Ecosystems</i>	305-313
2			Water demand management		
3			Economics		
4			Small mammal report		
5			Museum eco-venture collecting gp		
6			Historic mammals GCP		
7			GFRCC Co-management		
8			Historic mammals GFRCC		
9			GFRCC Association		
10			Griffins mammals, reptiles, etc		
11			Anything on Fish River Canyon?		
12			Mountain Zebra reports		
13					
14					
15					
16					
17					
18					
19					
20					

Part 7: Park Policies

As the Gondwana Desert Collection and the GCP grow and develop, key issues need to be agreed in terms of short policy statements. This helps to give the Company and Park consistency and stability, and an operational framework. It allows the directors to approve the key approaches and directions to be adopted and it then empowers the Park Warden(s) and staff to move ahead with implementation within the approved policy framework.

Park policies will be developed from time to time as needed. They will be reviewed by the Parks Committee and presented to the Board for approval. Once approved, they become part of the operational framework of the Park and Company.

New approved policies should be added to this section of the MDP.

7.1 Staff safety and protective clothing

The following guidelines must be followed by all Park staff working in Gondwana Cañon Park:

Windmill work: all members of staff working on windmills and pulling borehole pipes must wear protective helmets. Safety boots must be worn at all times. A safety harness will be made available and must be used by the staff member working the pulley at the top of the windmill.

Each ranger will be provided with a safety helmet that will remain the property of the company, but the responsibility of the employee. Helmets will only be replaced at the expense of the company if they are accidentally damaged, or become unsafe due to normal wear and tear (not if they are lost). The safety harness will remain the property of the company and will be made available for whoever is carrying out work at the top of the windmill. Neither helmets nor the harness must leave the company's (park's) premises. Safety boots will be replaced annually.

Welding: Welding helmet and welding gloves must be worn by any member of staff when undertaking welding work. Other members of staff observing welding work and not equipped with a helmet or gloves, must stand at least 2m from the welder, and must not look directly at the welding point.

The welding helmet and welding gloves will remain the property of the company and must not leave the premises. Welding helmet and gloves will be replaced as they wear out.

Grinding: Grinding goggles and grinding gloves must be worn by all members of staff when undertaking grinding work. Other members of staff observing grinding work and not equipped with a helmet or gloves, must stand at least 3m from the grinder.

The grinding goggles and grinding gloves will remain the property of the company and must not leave the premises. Grinding goggles and gloves will be replaced as they wear out.

Lifting of heavy rocks/metal/wood: Work-gloves will be made available for all permanent members of staff for work entailing lifting of heavy/sharp scrap items and building material. Safety boots must be worn when carrying out such work.

Each ranger will be provided with a pair of work gloves that will remain the property of the company, but the responsibility of the employee. Work gloves will only be replaced at the expense of the company if they are accidentally damaged, or become unsafe due to normal wear and tear (not if they are lost). Work gloves must not leave the company's premises. Work gloves will be replaced annually, or twice annually if this becomes necessary.

Training: The following pieces of equipment should only be used by those members of staff who have received adequate training:

- Chainsaw
- Wire-strainers
- Grinder
- Welding equipment
- High-lift jacks
- Lister engines
- 'Vastrap' and pulley system
- Vehicles
- Rifles
- GPS handhelds
- Cameras

Staff that have not received training, but wish to be trained in the use of any of the above pieces of equipment should raise this with the Park Wardens.

Equipment concerns: All heavy equipment and borehole infrastructure must be monitored for signs of wear and tear, and must be replaced or repaired immediately at the first sign of dangerous deterioration.

Pieces of equipment of particular concern:

- Chainsaw
- 'Vastrap'
- 'Donkey' / 'Emmertjie'
- Wire-strainers
- Bench-mounted vices/clamps
- Vice-grips
- Grinder
- Welding equipment
- Electric drill
- Pliers
- Monkey wrenches
- Sledge-hammers
- 'Pangas'
- Bow-saws / Iron-saws
- Pulleys and cables
- Windmill ladders
- Windmill heads
- Windmill brakes
- Vehicles
- Jacks
- Rifles
- Pick-axes

7.2 Off-road driving

The Park will operate a policy of no off-road driving, except where absolutely necessary.

'Off-road driving' will be defined as driving off the existing and allowed roads, tracks and routes as set out in the road network plan. Some tracks will have to be re-established each year after the rainy season (e.g. tracks along and across rivers), but so long as these follow pre-defined routes as set out in the road network plan, and so long as only one track is made and kept to, this will not be considered as 'off-road' driving.

All visitors to the park and game-drive vehicles must adhere to the 'no off-road driving' policy.

Exceptions to the 'no off-road driving' policy will be allowed for park management staff only in the following cases:

- a) Whilst developing the road network plan
- b) Whilst collecting or dropping-off fence-material
- c) Whilst managing veldt-fires
- d) Whilst checking and repairing pipelines that do not run next to a road
- e) Whilst attending to genuine emergency situations such as recovering injured staff or guests.

7.3 Veldt-fire management

In so far as is practical and safe, the Park will operate a policy of managing fire as an integral part of re-establishing naturally-functioning ecosystems.

No implementation of this policy shall at any time put staff health and life at risk.

- 1) **Human-caused fires:** Fires that have undoubtedly been started by human hand will be dealt with immediately, not allowed to spread, and extinguished by all reasonable means.
- 2) **Natural fires:** Fires that have been started by natural causes (i.e. lightning) will be allowed to burn within set limits (due to the restricted size of the park), specifically up to the nearest roads or open rivers in all directions. Exceptions to this case will be where the fire threatens life or infrastructure, high value reintroduced species contained by fencing, or is close to a neighbouring farm, in which case the fire will be dealt with as above in 1).

Fires will be fought by the following means:

- a) In the case of natural fires, by back-burning from fire-breaks (roads or open rivers).
- b) In the case of human-caused fires, by using fire-fighters (water-pumps), and by beating with fire-beaters.

Off-road driving will be allowed where necessary during fire-fighting.

Fire scars will be mapped and where appropriate, monitored as part of the Parks Information System.

7.4 Wildlife Interventions

The park will operate a policy of minimal wildlife intervention when it comes to animal welfare and life/death situations (but see section 3.4 in case of severe drought significantly reducing carrying capacity).

The only circumstances in which senior Park management staff should make local decisions to intervene are as follows:

- Animals seriously injured by a road-accident or other human activity: such animals, if deemed unlikely to recover and survive, should be euthanized humanely.
- Animals caught in a fence or waterhole structure: if possible, such animals should be freed. However if they are seriously injured and unlikely to survive due to starvation or dehydration, then they should be euthanized humanely.
- Problem animals: animals repeatedly causing serious disruption to Park activities and/or park infrastructure (e.g. porcupines chewing through the irrigation system) may be trans-located if they can be trapped humanely and re-released in an environment suitable for the species. However, the primary response should always be to address the root cause which has led the animal becoming a problem.

All such interventions should only be carried out under the authority of senior Park management staff.

Circumstances where intervention is discouraged include the following

- Animals thin and weak due to old age or poor browsing/grazing and where no park response has been triggered under section 3.4. Such weak/thin animals will normally either recover as veldt condition improves, or become prey to predators, and therefore should be left.
- Infants and juveniles separated from their mother: it is not always easy to determine if the animal has been abandoned. In all cases the animal should be left other than where there are custodianship responsibilities (e.g. Black Rhino).

7.5 Social responsibility

The park will apply an approach of outreach, education, capacity building and job creation as an inherent part of its ethos. This will include:

- Providing focussed capacity building and skills development training to Park staff
- Engaging with lodge staff on issues of Park and environmental information sharing, awareness creation, education and management, including taking lodge staff on park outings
- Taking *Gondwana* staff children on Park visits, environmental education and overnight camping
- Introducing key decision-makers and stakeholders to the *GCP* and giving them the opportunity to experience the Park and its activities, including Regional Councillors, Traditional and Community Leaders, senior government officials and Park neighbours
- Creating research, monitoring and management practical experience for Interns from UNAM and the PolyTechnic, as well as for postgraduate students
- Encourage job creation in place of mechanisation where this is practical and feasible
- Look at outsourcing good and services to local Klein Karas community and BEE groups where practical and feasible.