

Forest

ecosystem management plan: western cape



Prepared for:

Western Cape Conservation Stewardship Association (WCCSA) & CapeNature

By:

The Nature Conservation Corporation

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This Ecosystem Management Plan forms part of a set of 7, with an EMP Guide Tool for the implementation of these, all available from C.A.P.E. at Kirstenbosch, Cape Town.

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NCC Environmental Services (Pty) Ltd trading as
The Nature Conservation Corporation

Reg. No.: 2007/023691/07

P O Box 30223 Tokai 7966

Republic of South Africa

Tel: 021 702 2884

Fax: 021 701 5302

info@natureconservation.co.za

www.natureconservation.co.za

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Cover photograph: A flood-scoured stream in otherwise relatively stable Southern Afrotemperate Forest creating opportunities for recruitment and dynamic interaction.

acknowledgements

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Contents

introduction.....	4
ecosystem description	4
landscape features	4
vegetation description.....	4
key issues	6
management objectives	8
site environmental management plan	8
funding.....	8
vegetation management	9
fauna management	11
access management.....	12
use of living resources.....	12
recreation & tourism management	13
road maintenance & erosion control.....	13
signage & awareness.....	13
fencing.....	14
archaeological and heritage features	15
monitoring and recordkeeping.....	15
staff training and skills development	15
ecological connectivity.....	16
voluntary conservation	16



introduction

Forests have always had a mystical appeal. One needs only wander into near-pristine forest to feel a sense of other-worldliness. Taking many decades to evolve into the many strata and intricacies they comprise, they invoke a sense of timelessness. And yet through time they have retreated to pockets of suitable habitat, where man's needs and greed further diminished their magnificence. Now, ironically they are threatened by the very exotic tree species brought in as a substitute for the timber industry. Also, the use of fire in maintaining fynbos ecosystems has restricted forests to fire-safe habitats.

In this Ecosystem Management Plan we present management actions through which we hope the grandeur of forests will persist.

ecosystem description

landscape features

Forest is the dominant vegetation type of the Knysna-Tsitsikamma area (Southern Cape), where it occurs on a variety of landforms i.e. sheltered seaward slopes, plateau and coastal scarps, and is easily recognisable. Outside of this area it occurs mostly in the Cape Fold Mountains in certain niche habitats such as the base of south- and east-facing slopes, narrow gullies, and stream banks of perennial watercourses in open kloofs or on screes.

Patches of dense forest occur along the coast from Nature's Valley, from as far west as Llandudno on the Atlantic seaboard. These are found on old, stabilised dunes or limestone outcrops and banks.

vegetation description

The table below lists the vegetation units incorporated in this Forest Ecosystem Management Plan. Vegetation units highlighted are those sampled during the biodiversity and management assessment programme.



Table 1 List of Forest Vegetation Units in the Western Cape Province

Reference ¹	VEGETATION TYPES & UNITS	Status ²	Target ³
FOz 1	Southern Afrotemperate Forest	LT	34%
FOz 6	Southern Coastal Forest Western Cape Milkwood Forest	LT	40%

Forest is defined as a multi-layered vegetation dominated by trees, whose combined strata have overlapping crowns, with crown cover of 75% plus, and where graminoids in the herbaceous stratum are not dominant overall. It varies in height from around three meters to over 30m.

FOz 1 Southern Afrotemperate Forest (SAF) has three major variants based on habitat and species composition. In its eastern limit (Knysna-Tsitsikamma) it attains its zenith regarding structure and species composition and is considered as SAF proper. Even here it can be further sub-divided into three variants based on habitat and species composition. For the sake of brevity, a generalised description will suffice. SAF is a tall forest (over 15m) dominated by a mixture of canopy tree species – amongst others ironwood *Olea capensis* subsp. *macrocarpa*, yellowwood *Podocarpus latifolius*, Outeniqua yellowwood *P. falcatus*, stinkwood *Ocotea bullata*, assegaai *Curtisia dentata* and white pear *Apodytes dimidiata*, several typically sub-canopy tree species such as kamassiehout *Gonioma kamassi* and tree fuchsia *Halleria lucida* and a sparse to dense shrub layer dominated by black witch-hazel *Trichocladus crinitus* or tree-fern *Cyathea capensis* in wet areas. There is often a well-developed herbaceous stratum with ferns such as *Blechnum tabulare* and *Rumohra adiantiformis*, bulbous plants including hens-and-chickens *Chlorophytum comosum*, wild iris *Diets iridioides* and pink sorrel *Oxalis incarnata* and graminoids represented by basket grass *Oplismenus hirtellus* and the sedges *Schoenoxiphium lehmannii* and *S. lanceolatum*. Epiphytes are present, but not common, these can include the tree orchid *Mystacidium capense*, grass-leaved shell orchid *Angraecum pusillum*, shield sorus polypody *Pleopeltis macrocarpa* and *Peperomia tetraphylla*. Lianas are also present, in the form of *Secamone alpinii*, but nowhere common.

¹ Sourced from The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford 2006)

² **Conservation Status of vegetation units defined as** LT = Least Threatened; VU = Vulnerable; EN = Endangered and CR = Critically Endangered

³ The national target for securing representative vegetation for its conservation



A variant worth mentioning is **Western Cape Talus Forests** that occurs on the riverine sediments in the upper reaches of perennial streams as well sandstone screes west of Mossel Bay. Along the streams, it is dominated by African holly *Ilex mitis*, rooiels *Cunonia capensis*, white pear *Apodytes dimidiata*, river myrtle *Metrosideros tomentosa*, wild almond *Brabejum stellatifolium* and yellowwood *Podocarpus latifolius*. The understoreys are poorly developed and there is a sparse herbaceous stratum with amongst others *Todea barbara* and *Elegia capensis*.

The **scree forests** are more uniform and are dominated by hard pear *Olinia ventosa*, Cape beech *Rapanea melanophloeos* and yellowwood *Podocarpus latifolius* or Breede river yellowwood *Podocarpus elongatus*. These trees are often somewhat stunted and gnarled. The understorey is poorly developed and even the herbaceous stratum is depauperate and often only consists of the climber *Asparagus scandens*, arum lily *Zantedeschia aethiopica* and brandblaar *Knowltonia vesicatoria*.

FOZ 6 Southern Coastal Forest occurs from the South Coast (Nature's Valley) to the Cape Peninsula (Llandudno). This western variant has been named **Western Cape Milkwood Forest**. It is a low forest dominated by milkwood *Sideroxylon inerme* with wild camphor *Tarchonanthus camphoratus*, gwarrie *Euclea racemosa* and candlewood *Pterocelastrus tricuspidatus* as the canopy subdominants in the west. The understorey is poorly developed with mostly a herb layer with phantom wood orchid *Bonatea speciosa* and katbossie *Stachys aethiopica* amongst others. In some areas the climber, bokhoring *Cynanchum obtusifolium* can be dominant. As one moves progressively east, bostaaibos *Rhus chiridensis*, white stinkwood *Celtis africana* and confetti tree *Nuxia floribunda* increase in frequency. There is a well-defined low tree and shrub layer with amongst others forest num-num *Carissa bispinosa* as well as a herb layer.

key issues

edge effect

The edge of a forest consists of pioneer species, stunted thicket tree species or sclerophyllous shrubs that form a cordon between the actual forest and the neighbouring vegetation. This ecotone retains the microclimate within the forest by suppressing the desiccating effect of the wind. This is known as the soft edge. Intrusions into the forest damage this soft edge and expose the tender understorey to the sun and wind, thereby altering the vegetation dynamics. Occasionally, this is a

natural phenomenon (e.g. where trees have fallen), but usually this damage is associated with human intrusion. Unfortunately, a hard edge exposes the forest to more than a change in vegetation dynamics – it also exposes it to fire. Scorching of the ecotonal scrub forest and occasional damage to the edge of the forest is a natural disturbance. Fire intruding into forest is not an entirely natural disturbance and should be avoided lest they become invaded by exotic *Acacia* spp. (*A. melanoxylon*, *A. mearnsii* & *A. longifolia*).

gap dynamics

Trees falling in a forest drive successional changes. Wind often causes large branches to break, but the most common cause of entire trees falling, is old age. The gap created allows light to reach the forest floor and allows succession on a very small scale to continue.

In areas where there is heavy infestation by invasive alien plants the gap is often invaded and is a locus for further infestation. For this reason, it is important to eradicate invasive species around the forest margins and not allow plantation of blackwood *A. melanoxylon* to within 100m or upstream of indigenous forest.

invasive alien vegetation

The margins of forest, upon becoming infested with exotic *Acacia* spp., become more fire prone with a tendency towards higher fire intensity. Once burned these areas become even more densely infested and clearing these areas becomes very costly. Obviously the preferred course of action would be to eradicate invasive species as soon as detected and the infestation is only light. However, in reality some areas are densely infested due to past land use and only radical means can end the constant stream of seeds deposited into the soil and watercourses.

One such method is reforestation, utilising exotic species with a lower invasive potential that can act as a nursery for indigenous forest undergrowth and pioneer species. This method should not however be used in catchment areas where it reduces the run-off.

management objectives

“Sensitive, vulnerable, highly dynamic or stressed ecosystems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure” (National Environmental Management Act, 1998).

site environmental management plan

objective: *To have a site specific Environmental/Conservation Management Plan in place, to guide management actions required on a site scale.*

management actions:

- Commission a site specific EMP to be compiled;
- Use monitoring, observations and site specific requirements to inform further management actions required;
- Make recommendations for revision and highlight areas of under performance;
- Review site EMP as/when required, as defined in the EMP.

funding

objective: *To have an environmental management budget in place that allows for the implementation of this EMP and a site-specific EMP, through the development of a site Annual Plan of Operation (APO).*

management actions:

The landowner/manager is to prepare an APO. The APO will consist of the required operating and capital expenditure as well as planned funding sources through external agencies and programmes. The APO will consist of:

- A sustainable budget that is costed annually to allow for the implementation of the EMP.
- Complete an APO, using the template provided in the EMP Guide Tool, by year end of each year.

Opportunities for external funding and assistance do exist; see EMP Guide Tool for funding opportunities.



vegetation management

alien vegetation

objective: *To remove all invasive alien vegetation from the natural areas by the most cost-effective methods with the least amount of damage to the natural environment. Invasive alien vegetation transforms and replaces indigenous vegetation, adds to the fuel load, increasing the fire frequency and intensity, transforms the riparian zones and affects the functioning of aquatic ecosystems by altering water quality and flow.*

The **Best Practice Guideline: Alien Vegetation Management** provides the information required for control of the invasive alien flora.

Before any clearing of alien vegetation is initiated, it must be understood that when the programme starts, it must be implemented until completion. There is no value in *ad hoc* clearing, with no follow-up program.

management actions:

- Obtain an aerial photograph of the area whenever an official survey is undertaken, to assess plant growth and extent of alien infestation.
- Identify areas for clearing to ensure compliance with the Conservation of Agricultural Resources Act (CARA) regulations.
- Demarcate areas that will not be cleared of alien plant species initially (ensuring that the CARA regulations are complied with at all times).
- Removal of all invasive alien plant species from the natural areas, excluding those identified above.
- Regular assessment of invasive species control and intensity of invasion.

It may be necessary to contract certain tasks such as extensive alien vegetation clearing to private contractors if there is insufficient capacity within the staff establishment or if it is economically beneficial. All private contractors on site must however be strictly controlled.

natural vegetation

objective: *To ensure that the remaining areas of natural vegetation are best managed so as to contribute towards biodiversity conservation, retaining representative samples of our natural vegetation so as to allow for biodiversity and ecological processes to persist.*



management actions:

- Identify the vegetation type/s present on your property;
- Familiarise yourself with best conservation management practices for the particular vegetation type – to burn or not to burn;

See the **Best Practice Guideline: Fire Management & Prevention** for more detail.

- Develop a plant species checklist;
- As forests are largely unexplored, there are potentially new discoveries to be made, significant observations should be recorded and submitted to SANBI (where possible comment should be made on numbers of individuals and locality);
- Map the location of rare and threatened plant species to inform management activities e.g. road/path placement;
- A reintroduction plan must be prepared if areas are to be rehabilitated, stating species to be reintroduced and the source of material.

reforestation

objective: *To establish a cover crop of timber species, notably Pinus or Eucalyptus, to act as a nucleus for indigenous forest regeneration. The cover crop can be thinned at intervals to provide financial returns to offset the cost of clearing high density invasive alien infestations.*

management actions:

- Permission must first be obtained from DWAF to establish a new plantation;
- Obtain an aerial photograph of the area whenever an official survey is undertaken, to assess plant growth and extent of alien infestation;
- Identify areas for clearing to ensure compliance with the Conservation of Agricultural Resources Act (CARA) regulations;
- All material must be clear cut and piled into wind rows and once sufficiently dry the piles should be burned;
- As soon as seedlings appear, the entire area should be sprayed with the appropriate herbicide. Alternatively, if approved, the surface should be graded and all excess soil pushed into contours if the area is on a slope;
- DWAF-approved timber species can now be planted according to prescribed methods;
- Follow-up spot spraying or hand pulling will be necessary to control germinating invasive seedlings;



- Timber crop should be thinned at prescribed intervals to allow indigenous species to remain vigorous.

fauna management

objective: *To promote the conservation of indigenous fauna (the big and hairy and small and slimy alike), as an important component contributing to and maintaining ecosystem functioning.*

management actions:

- Develop faunal species lists including mammals, birds, reptiles, amphibians, arachnids and scorpions, and other invertebrates;
- Conduct at least *ad hoc* monitoring of faunal populations and maintain recordkeeping;
- Contribute significant records and localities of fauna to the Atlas databases at the Animal Demography Unit (**ADU**) at University of Cape Town (**UCT**);
- Ensure that management and recreational activities do not impact on sensitive species;
- Implement responsible problem animal management, where necessary, ensuring to be in possession of the relevant permits;
- Eradicate invasive exotic faunal species, where necessary, ensuring to be in possession of the relevant permits;
- Limit the impact (competition and predation) by domestic animals on indigenous species. Where residential estates abut natural areas, it may be necessary to compile a policy on pets. It is preferable to be proactive in this regard.
- Compile a policy on introduction (accidental or deliberate) of potentially invasive species (e.g. wildfowl) or wild animals previously kept as pets e.g. tortoises which could genetically pollute local races or harbour geographically isolated diseases.
- Commission a reintroduction policy and plan for species that used to occur in the area and the suitable carrying capacities. Investigate the potential for reintroductions, specifically small game, which may have previously occurred naturally in the area. Herbivores are essential for biodiversity and ecosystem processes to persist.

Before **reintroduction** the following points need to be considered:

- Was the desired species naturally resident in the area?
- Why did the animal become extinct in the area?
- Is that causal factor still a threat?
- Is the habitat still suitable for the species?
- What are the potential negative effects of the reintroduction?
- Where is the nearest existing population?

The careful reintroduction of species can enhance the conservation value of the area and increase the marketability of the site. All reintroductions must be based on sound ecological principles. CapeNature must be consulted on the translocation and reintroduction of all fauna.

access management

objective: *To inform the best placement and management of access points and pathways, avoiding sensitive process areas and prevent excessive path braiding and consequent erosion.*

management actions:

- Conduct an audit of the siting and condition of existing access points and pathways;
- Identify suitable access points and pathways, and decommission those in sensitive process areas;
- Maintain pathways/boardwalks to ensure its use and not the making of alternative routes;
- Implement a rehabilitation programme, where this is required.

use of living resources

objective: *To ensure sustainable use of natural resources, minimising adverse effects on biodiversity and ecosystem processes.*

See the Best Practice Guideline: Sustainable Utilisation of Natural Resources for more detail.

recreation & tourism management

objective: *To ensure the appropriate use of natural areas for recreation and tourism, minimising detrimental impact on biodiversity and sensitive processes.*

See the **Best Practice Guideline: Recreation & Tourism Use** for more detail.

road maintenance & erosion control

objective: *To ensure that geomorphological processes and soils are adequately understood and impacts thereon duly minimised, avoiding the consequent loss of natural resources and habitat.*

management actions:

- Identify and understand erosion sources;
- Prioritise erosion problems requiring control efforts;
- Where the terrain has sustained damage due to excessive trampling and/or past access by vehicles, implement a rehabilitation programme. Have measures in place to prevent further erosion damage;
- Road and footpath erosion control must be monitored and managed on an ongoing basis;
- Records should be kept (preferably photographs) of previous erosion management, in order to measure effectivity.

See the **Best Practice Guideline: Sensitive Development** for more detail.

signage & awareness

objective: *To inform of the sensitivity and value of biodiversity features and ecosystem processes, and to facilitate the appropriate use thereof.*

management actions:

- In order to achieve the above, three types of signage need to be considered: **directional**, **informational** and **interpretational**. The first guides visitors to and around the area, while the second provides information on some aspects of the area and management (such as erosion control). Interpretation of the environment, the third form of signage, would focus on aspects such as

functioning of the ecosystem in the natural areas, emphasising the unique biodiversity and ecological processes.

- Where necessary, a signage policy and manual should be compiled;
- Signs indicating the name of the site should be erected at all vehicular and pedestrian access points;
- Signage must be set up to inform of areas being rehabilitated;
- Awareness programmes must be initiated for the purpose of informing and educating residents and visitors regarding environmental sensitivity and interaction (e.g. snake encounters, the value of biodiversity, biological monitoring and rehabilitation)

fencing

objective: *Where necessary, fence areas for access control and management.*

While a definite demarcation of the boundary of natural areas helps visually establish such areas as being of conservation value, rather than simply vacant open space, fencing also limits the natural transit of wildlife and therefore ecosystem processes. It is apparent that continuity of best practice conservation management is required across cadastral boundaries in order for the broader ecosystem to best benefit from holistic management.

management actions:

- Where possible, internal and common cadastral fencing should be removed to allow for connectivity;
- Appropriate fencing should be used, and where possible jackal-proof and electric fencing should be avoided;
- Public road-side boundaries should be well demarcated for access control and to prevent wildlife road kill;
- All roads not for public vehicular access must have locked gates;
- Stiles may be placed over fences to allow access along approved pedestrian paths;
- Where fencing hinders the natural transit of wildlife, provision must be made for thoroughfare e.g. bottom fence strand raised for tortoises;
- Fence line and access gates should be regularly inspected.

archaeological and heritage features

objective: *To ensure that the archaeological and heritage aspects of the site are protected as defined in the Natural Heritage Resources Act 25 of 1999.*

management actions:

- Inform SAHRA of potential heritage features on site and acquire advice on protection measures. These features may be of significant archaeological importance and damage to these features would lower their archaeological value and possibly their tourism value;
- Keep record of heritage features on site;
- Prevent any damage to these features.

monitoring and recordkeeping

objective: *To evaluate management actions of the site as well as monitor biodiversity components and ecological processes. Data can contribute towards regional conservation plans and initiatives and further highlight conservation priorities.*

management actions:

- It is critical that sites collect baseline information (resource inventory) as a priority;
- Establish a plan of action/objective for monitoring of specific features, components and processes;
- Describe methods used and maintain these;
- Map fixed monitoring sites or features to be monitored, preferably with a GPS;
- Keep data safe and have duplicates;
- All research activities (external studies) are to be controlled i.e. written permission granted with the condition that a copy of the final research report is provided;
- Manager to compile monthly report, incorporating all incidents, significant events and findings and operations that have taken place.

staff training and skills development

objective: *To continually capacitate and train staff in environmental knowledge and a range of skills and enhance their capacity.*



management actions:

- Staff training should include the following:
 - Regular fire training and fire exercises
 - Use of appropriate machinery, tools and technology
 - Public relations and interactions
 - Ecosystem components
 - Management training
 - Waste management & recycling
 - Use of herbicide application
 - Methods for alien vegetation control

ecological connectivity

objective: *Identify suitable corridors or expansions for connecting natural and protected areas to improve the overall resilience of the protected area and allow processes to function at an appropriate scale and so allow for holistic management of the ecosystem.*

management actions:

- Liaise with CapeNature Regional Office regarding expansion and connectivity opportunities;
- Approach and liaise with neighbours in this regard;
- Draw up a Memorandum of Understanding or contractual agreement between neighbours detailing areas of responsibility amongst others.

voluntary conservation

objective: *Consider proclaiming natural areas for conservation in perpetuity, via the CapeNature Stewardship program.*

management actions:

- Familiarise with the three levels of **stewardship options** i.e. Voluntary Conservation Site, Biodiversity Agreement and Contract Nature Reserve;
- Landowner should contact local CapeNature stewardship coordinator to discuss options and benefits.

