
GENERAL NOTICE

NOTICE 798 OF 2010

DEPARTMENT OF ENVIRONMENTAL AFFAIRS

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004)

DRAFT BIODIVERSITY MANAGEMENT PLAN FOR *ENCEPHALARTOS LATIFRONS*

I, Buyelwa Patience Sonjica, Minister of Water and Environmental Affairs hereby publish in terms of Section 43(3)(a) read with Section 100 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), a draft biodiversity management plan for *Encephalartos Latifrons* in the schedule hereto.

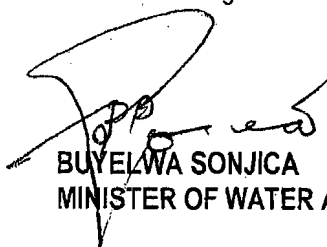
Interested persons are requested to submit written comments to the Director-General: Environmental Affairs.

By fax to: (012) 320 2844, and by e-mail to: wlutsch@deat.gov.za

Delivered to: The Department of Environmental Affairs
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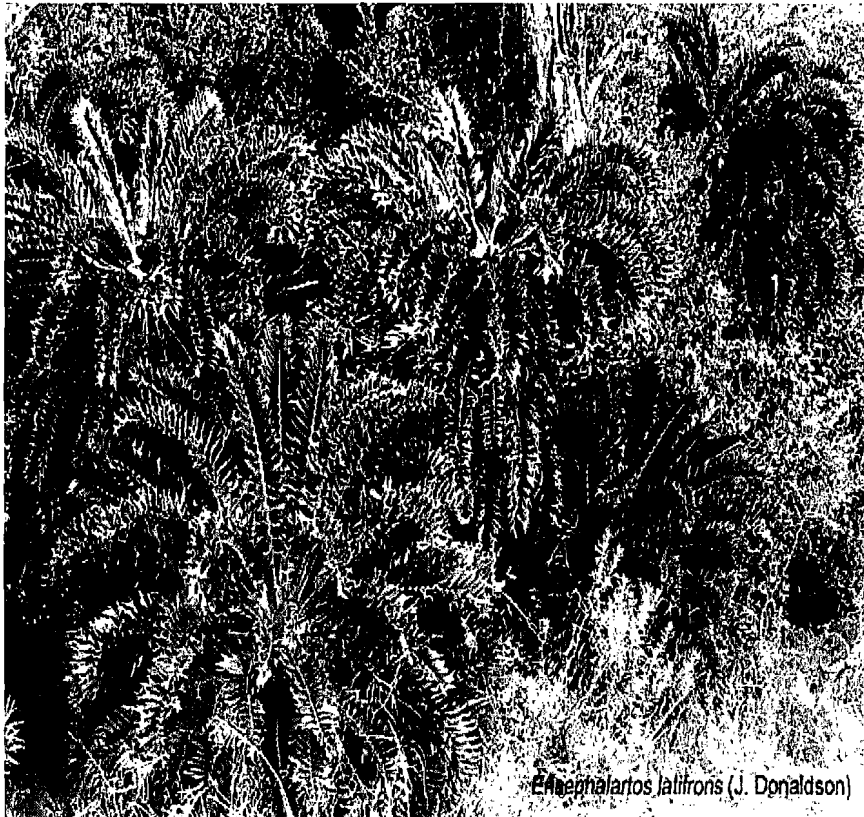
By post to: The Director-General: Environmental Affairs
Attention: Ms W Lutsch
P.O.Box X 447
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Comments must reach the department within 30 days of the publication of this notice. Comments received after the closing date may not be considered.



BUYELWA SONJICA
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

**DRAFT BIODIVERSITY MANAGEMENT PLAN
FOR
*ENCEPHALARTOS LATIFRONS***



August 2010



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

EXECUTIVE SUMMARY

Cycads are special botanical features in South Africa's rich biodiversity. They are naturally rare, relatively slow growing, attain very old age and are structurally very appealing. Many of the species that occur in southern Africa are local endemics and their reproductive ecology, i.e. the need for coning synchronicity and the presence of pollen and seed vectors within their habitat, exacerbates this naturally rare status. In addition to this they have also attracted the attention of avid collectors and traders who are not satisfied with obtaining seedlings from breeding programmes, but who prefer the immediate gratification of being able to obtain mature specimens. Due to their slow growth rates, these then tend to be removed from natural populations within their natural distribution range to satisfy this demand.

In recognition of the need for conservation action, South Africa has developed the requisite legal framework that caters for both the protection and sustainable utilisation of these important plants. The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and the Threatened or Protected Species Regulations provide for the compilation of Biodiversity Management Plans for Species (BMP-S). Significant limitations have been placed on the cycad industry subject to the compilation of BMP-S and coupled with the conservation status of these plants, the South African National Biodiversity Institute (SANBI) initiated the compilation of the first BMP-S for *Encephalartos latifrons*.

This species was selected in recognition of its status as a critically endangered local endemic found to occur primarily on private land within the local municipal areas of Ndlambe and Makana in the Eastern Cape Province, and with land owners who demonstrate a desire to contribute to secure its future in the wild. As such it was felt that the management planning process would not only address a dire need but that the environment was conducive to the compilation of a BMP-S. SANBI began the process by calling for relevant role players to contribute to a Population and Habitat Viability Assessment (PHVA) workshop that was held in Bathurst in July 2007. They then secured a service provider to facilitate the process of translating the outcome of the PHVA workshop into a BMP-S for *E. latifrons*.

The BMP-S process included key role players and produced a document that includes much of the information generated at the PHVA workshop and the proceedings of targeted role player engagements. It was subjected to a number of iterations and review processes and a final role player workshop. It follows the structure provided for by the national Department of Environmental Affairs and Tourism in their Norms and Standards for BMP-S (March 2009) with the crux of the BMP-S being a series of very specific actions that are nested in a management planning hierarchy of an aim, objectives and operational goals. The aim of the BMP-S for *E. latifrons* is to **enhance the conservation status of *Encephalartos latifrons* and secure its existence in the wild**. The objectives that are required to be met in order to achieve the aim are as follows:

- Establish and maintain the *Encephalartos latifrons* Forum (ELF) to monitor and track implementation of the BMP-S and to act as a decision support mechanism.
- Identify and undertake research to provide information relevant to answer conservation management questions, ensure the coordinated and regular monitoring of the plants both

in situ and *ex situ* and ensure that all data gathered through research and monitoring is fed back into and informs the overall coordination process.

- Create and maintain an enabling environment for a coordinated breeding programme in order to produce seedlings for reintroduction into the wild and for sale. This will include the application and fulfilment of all legal requirements.
- Create and maintain an enabling environment for the land owners, on whose properties the majority of plants occur, to carry out all appropriate management actions required to ensure necessary ecological processes are in place and to provide the level of security necessary to prevent further poaching of plants from the wild.

The specificity of the operational goals and actions that are captured under the objectives is such that progress with implementation of the BMP-S can be tracked and those, to whom responsibilities have been allocated, can hold each other accountable for delivery.

Preceding the above is a list of over-arching principles that are key to governing implementation and for the interpretation of the operational goals and actions. They have been formulated in recognition of the extremely sensitive, complex and dynamic nature of the circumstances that surround this plant.

It is recognised that this BMP-S is the first in a series of plans that will be produced for *E. latifrons* within an iterative management planning process and that implementation will provide the lessons necessary to ensure that subsequent plans are adjusted to be more realistic and relevant to the prevailing management dynamics. Considering that the latter may change in between planning iterations, it is important that those responsible for implementation of this BMP-S recognise the need for and apply active adaptive management when necessary.

DEFINITIONS

“Biological diversity or biodiversity” means the variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.

“Ex-situ or ‘off-site’ conservation” means the conservation of genetic resources and of wild animals, plants, fungi and microorganisms off-site or outside their natural habitats.

“Indigenous species” means a species that occurs, or has historically occurred, naturally in a free state in nature within the borders of the Republic, but excludes a species that has been introduced in the Republic as a result of human activity.

“In-situ - “on-site” conservation” means the conservation of biodiversity in the wild through the conservation of ecosystems and natural habitats, and the maintenance and recovery of viable populations of species in their natural surroundings.

“IUCN Red Data List” means a global or national list providing information on a species’ risk of extinction (usually by taxonomic group), and prepared under the auspices of the International Union for the Conservation of Nature.

“Natural distribution range” means the spatial extent of the historical occurrence in the wild as can be determined through all available records and publications.

“Role player” means a natural or juristic person(s) who have a direct role to play in the implementation of the Biodiversity Management Plan for the species and whose role is captured in this Biodiversity Management Plan.

“Stakeholder” means a natural or juristic person(s) that has an interest in, or may be affected by, a particular obligation or decision or activity, relating to or resulting from a management plan, either as individuals or representatives of a group, and include landowners where appropriate.

“Species” means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind, and includes any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population.

“Threat” means any action that causes a decline in populations and compromises the future survival of a species or anything that has a detrimental effect on a species. Threats can be human induced or natural. BMP-S should focus on mitigating human induced threats to species.

“Viable” in relation to a species or population means the ability to survive or persist and develop or multiply over multiple generations or a long time period.

ABBREVIATIONS

BMP-S:	Biodiversity Management Plans for Species
CITES:	the United Nations Convention on International Trade in Endangered Species of Wild Fauna and Flora
CoP:	Conference of the Parties
DEA:	Department of Environmental Affairs
DEDEA:	Eastern Cape government Department of Economic Development and Environmental Affairs
ECparks:	Eastern Cape Parks board
ELF:	<i>Encephalartos latifrons</i> Forum
HOD:	Head of Department
IUCN:	International Union for Conservation of Nature
NEMBA:	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
PHVA:	Population and Habitat Viability Assessment
SANBI:	South African National Biodiversity Institute
ToPS:	Threatened or Protected Species

ACKNOWLEDGEMENTS

The persons listed in the Stakeholder Database in Appendix A contributed to the process of compiling this Biodiversity Management Plan for *Encephalartos latifrons* by participating in targeted role player meetings, reviewing and commenting on drafts of the plan and participating in a role player workshop to finalise the draft plan. Names are captured alphabetically and the nature of the contribution is indicated.

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1 INTRODUCTION

1.1 Why *Encephalartos latifrons* requires a Biodiversity Management Plan

Encephalartos latifrons is critically endangered by virtue of the fact that there are less than 100 individual plants surviving in its natural habitat. These are now so far removed from each other that the natural processes required to support sexual propagation no longer occur and it is thus considered to be functionally extinct. The threats to its continued survival in habitat persist and most role players responsible for its conservation lack capacity to curb these threats. However, the plant's natural distribution is mainly on private land and the land owners are committed to work towards enhancing the conservation status of this species.

Considering the critically endangered status of the plant and the related provincial, national and international legislative frameworks for cycad conservation, it is essential that a comprehensive management plan captures the linkages between the role players and their various roles and responsibilities that will work together to secure its future *in situ*. Much work will also need to take place *ex situ* and the management plan will serve to highlight these requirements and how these efforts will work to rebuild the population.

1.2 The Aim and Objectives of the Biodiversity Management Plan

It must be noted from the outset that in order for a management plan to be effective it must be seen as a product of an iterative management planning process. The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) specifies that all Biodiversity Management Plans are to be revised after five years of approval. As such this plan will be the first in a series of five year iterations where the success of the previous five years is measured and adaptations are made to make the plan for the next five years appropriate to changing circumstances.

The overall aim of this management plan is:

To enhance the conservation status of *Encephalartos latifrons* and secure its existence in the wild

In order to achieve this it will be necessary to achieve a number of related objectives which are as follows:

- Establish and maintain the *Encephalartos latifrons* Forum (ELF) to monitor and track implementation of the BMP-S and to act as a decision-support mechanism.
- Identify and undertake research to provide information relevant to answer conservation management questions, ensure the coordinated and regular monitoring of the plants both *in situ* and *ex situ* and ensure that all data gathered through research and monitoring is fed back into and informs the overall coordination process.
- Create and maintain an enabling environment for a coordinated breeding programme in order to produce seedlings for reintroduction into the wild, within its natural distribution range, and for sale. This will include the application and fulfilment of all legal requirements.

- Create and maintain an enabling environment for the land owners, on whose properties the majority of plants occur, to carry out all appropriate management actions required to ensure necessary ecological processes are in place and to provide the level of security necessary to prevent further poaching of plants from the wild.

1.3 Biodiversity Justification

South Africa is regarded as one of the centres of cycad diversity and contains more than 13% of the world's 300 cycad species. It also has the highest proportion of Critically Endangered cycad species (32 %) and has the dubious distinction of being the only country in the world where there have been 3 recent species extinctions. The only other extinction in the past 100 years occurred in adjacent Swaziland, probably driven by the same factors that have caused extinctions in South Africa, i.e. collecting from the wild and habitat loss. There is a school of thought that says that cycad species are becoming naturally extinct and should be allowed to do so without people trying to prevent this from happening (e.g. Coats Palgrave, 1981). However, recent evidence has suggested an alternative viewpoint in which it appears that African cycads may be in the process of speciating, especially in grasslands and savannas, and they are most vulnerable to human influences during this period. There is certainly no doubt that the general decline in South African cycads in the past 100 years has been due to human impacts and this is one of the reasons why cycads are mentioned separately in the Threatened or Protected Species (ToPS) Regulations and why it is important to develop species management plans.

The species may also play a role in ecosystem processes although this role is not well understood. All cycads produce coralloid roots with symbiotic cyanobacteria that fix atmospheric nitrogen. However, the impact of this form of nitrogen fixation on nutrient dynamics is unknown. South African cycads are also host to the highest diversity of cycad insects anywhere in world, with some species hosting as many as 16 species of cycad-specific insects. This diversity is particularly high in the Eastern Cape where *E. latifrons* occurs and conserving the cycad hosts is essential for conserving the diversity of associated taxa. *Encephalartos* spp. produce nutrient-rich seeds and birds, monkeys, baboons, and rodents feed on either the carbohydrate rich sarcotesta or, occasionally, on the starch and protein rich gametophyte. When cycad populations are in cone, they can produce significant resources for local wildlife but it is not known to what extent animals are dependent on these resources.

Finally, there is the human interaction. Historically, species of *Encephalartos* have been used as a source of starch by indigenous people, usually in times of famine. This practice was first documented in South Africa in 1772 (Masson 1779) and explains the derivation of the Afrikaans common name (broodboom = bread tree). The current use as a source of starch seems to be very rare and highly localised. A more common local practice is the harvesting of sections of the outer bark for medicinal use. The precise medicinal purpose is not known, but an increase in this form of harvesting has been noted in numerous wild localities across South Africa, including populations of *E. latifrons*. At this stage, most (and perhaps all) of the trade is from wild plants. The proper management of the species should therefore also consider the traditional use of the species by local people.

1.4 Benefits of the Biodiversity Management Plan

There are at least ten different role player groups who are well placed to have a significant influence on the future of *E. latifrons*. Five of these groupings came together for a Population and Habitat Viability Assessment (PHVA) workshop in July 2006 and produced a report with very well thought through and detailed recommendations for the conservation of the species. Most of these recommendations, if not all of them, have not been implemented. The reasons for this are apparently because key role players were waiting for this Biodiversity Management Plan to be completed and approved before implementation of the recommendations. The primary benefit of this plan will thus be to unlock the processes needed to see implementation of the recommendations made at the PHVA workshop in July 2006. Secondly, the process that is followed to compile this plan will test the relevance of these recommendations given the time that has passed and will make the necessary amendments to ensure that this first iteration of the plan is as current as possible.

1.5 Anticipated Outcomes

The anticipated outcomes of this planning process are as follows:

- An updated database of role players and stakeholders.
- A renewed understanding of the urgency for action amongst the role players.
- An agreed structure responsible for monitoring implementation.
- Clarity and acceptance of roles and responsibilities amongst the role players.
- Acceptance and support for the plan amongst stakeholders.
- The re-evaluation of the status of the plants in the wild.
- A plan that comprehensively and concisely covers all aspects related to the conservation requirements of the species and provides realistic targets for the five year life of this iteration.
- The specification of restricted activities for which permits can be issued in terms of the Threatened or Protected Species regulations.

2 BACKGROUND

2.1 Conservation Status and Legislative Context

The conservation status of a species is an indication of the conservation attention that is required to ensure its persistence in nature, i.e. the more endangered a species, the more the conservation effort that is required. Considering that *Encephalartos latifrons* is limited to less than 100 individual plants in nature and that the threats to its persistence continue unabated, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has it listed, together with all other species of *Encephalartos*, on its Appendix 1. This prohibits the international commercial trade in any wild collected specimens of the species. The IUCN also recognised its precarious status and included it amongst the Critically Endangered species on their Red List. South Africa has also included *E. latifrons*

as Critically Endangered on the list of critically endangered, endangered, vulnerable and protected species in the Threatened or Protected Species Regulations of the National Environmental Management, Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA). Provincially the Eastern Cape has followed by listing the species as Endangered in the Provincial legislation and inserting microchips into all known plants *in situ*. The Department re-planted 17 confiscated plants, originating from the plant's natural distribution range, back into protected areas in close proximity to the range.

Currently none of the plants occurring naturally in the wild are within the boundaries of formally protected areas and only confiscated specimens and a trial seedling restoration experiment occur within reserves. The fact that the natural population of this species is not within formally protected areas increases the need for conservation action. The fact that the population is on private land means that there are more stakeholders that need to be involved and the success of any conservation action will be absolutely dependant on there being a very good and sustained relationship between the conservation agencies and the land owners.

From a legal perspective this introduces a number of complexities that relate to the permits required for the land owners and / or other individuals and institutions to carry out necessary conservation actions. This is necessary as the conservation agencies have very limited resources and are not able to take full responsibility for all the conservation actions required. The legal requirements will be spelt out in detail as they relate to each action in the management plan but at this point it is sufficient to state that the future of this Critically Endangered species requires both intensive *in situ* and *ex situ* conservation actions, most of which will require registrations and permits as specified in the NEMBA.

2.2 Information Pertinent to the Management of *Encephalartos latifrons*

2.2.1 Taxonomic Description

Encephalartos latifrons was first described by J.G.C. Lehmann in 1837 / 1838. The name *latifrons* means "with broad leaves". The current classification of *E. latifrons* is as follows:

Order: Cycadales

Family: Zamiaceae

Sub-family: Encephalartoideae

Tribe: Encephalarteae

Genus: *Encephalartos*

Species: *latifrons* (Lehmann, 1837 / 38)

Adult plants are usually unbranched but may have up to seven branches off the main-stem well above ground. More often they comprise several stems arising from the base with each stem 2.5 - 3 m tall. Heights of 4.5 m have been recorded. Stems are typically 30 - 45 cm in diameter. A skirt of old, dry leaves is often present below the crown of green leaves.

The leaves are 1 - 1.5 m long and re-curved or curled in the upper half. The petiole is 10 cm to 20 cm long and the leaf base has a conspicuous yellow-white collar. The shiny, dark green leaflets are hard and rigid, covered in fine hairs, but losing this with age. The leaflets overlap upwards in the upper half of the leaf. The leaflets are attached to the rachis in a V-form and terminate in a strongly pointed tip. The median leaflets are 10 - 15 cm long, 4 - 6 cm broad, with the attachment 1.5 - 2 cm broad. The upper margin is entire or sometimes toothed, while the lower margin has 2 - 4 triangular lobes with pointed tips. These lobes are twisted out of the plane of the leaflet. Only the lower leaflets may be reduced to prickles. The leaflets are usually prominently nerved, especially on the under-side.

Plants infrequently produce 1 - 3 dark green or dark blue-green cones. Cone scales are covered with fine hair. The male cones are almost cylindrical, 30 - 50 cm long and 8 - 17 cm in diameter. The cone tapers towards each end. The facets of the median cone scales project into a slightly de-curved beak that is about 2 cm long. The female cones are barrel shaped, up to 60 cm long and 25 cm in diameter. The facets of the median scales are wrinkled and pimply, protruding 2 - 2.5 cm. The seeds are red, about 5 cm long and 2 - 2.5 cm in diameter (Whitelock, 2002).

Encephalartos latifrons may be confused with *E. arenarius*, but can be distinguished due to the former having shiny dark-green leaves which are heavily ribbed on the lower surface, and the latter having duller green to glaucous leaves, no ribbing, and often with a blue-gray bloom. The natural ranges of the two species are not known to overlap (Whitelock, 2002).

2.2.2 Distribution and Population Status

Encephalartos latifrons occurs naturally in the Eastern Cape Province of South Africa, in the Biodiversity Hotspot region known as the Maputaland-Pondoland-Albany hotspot, which is an important centre of plant endemism, and more specifically the Albany Centre of Floristic Endemism (Victor and Dold, 2003). In addition to this it is also relevant to note that Mucina and Rutherford (2006) recognise the Indian Ocean Coastal Belt as a new biome. It is uncertain how widespread or abundant *E. latifrons* was prior to human settlement, but there are records from the earliest European settlements of populations scattered throughout the Albany and Bathurst districts of the Eastern Cape Province. Reports from the early 20th Century indicate that *E. latifrons* was always rare (Pearson, 1916; Chamberlain, 1919), with individuals "usually half a mile to a mile apart" (Chamberlain, 1919). This scattered distribution could be because these plants often grow on rocky outcrops where they are afforded some protection from fire, habitats that are naturally widely spaced within the landscape (Kemp, 1986; Norstog and Nicholls, 1997; Whitelock, 2002) or it could be an artefact of habitat transformation, i.e. the cycads have persisted in areas least affected by land-use.

The remaining wild population is estimated to number only between 60 and 100 mature individuals. The actual number is uncertain because the last official count was done more than 10 years ago, when microchips were inserted into all remaining plants. Since then, not all plants have been monitored and, in a recent survey of plants to gather DNA material, there seemed to be far fewer plants in the wild (da Silva *et al.* MS, 2006).

None of the plants currently occurring naturally in the wild are located within protected areas. However plants have been introduced to three reserves which lie between the Great Fish River and the Bushmans River in the Eastern Cape. (See Figure 1 for details).

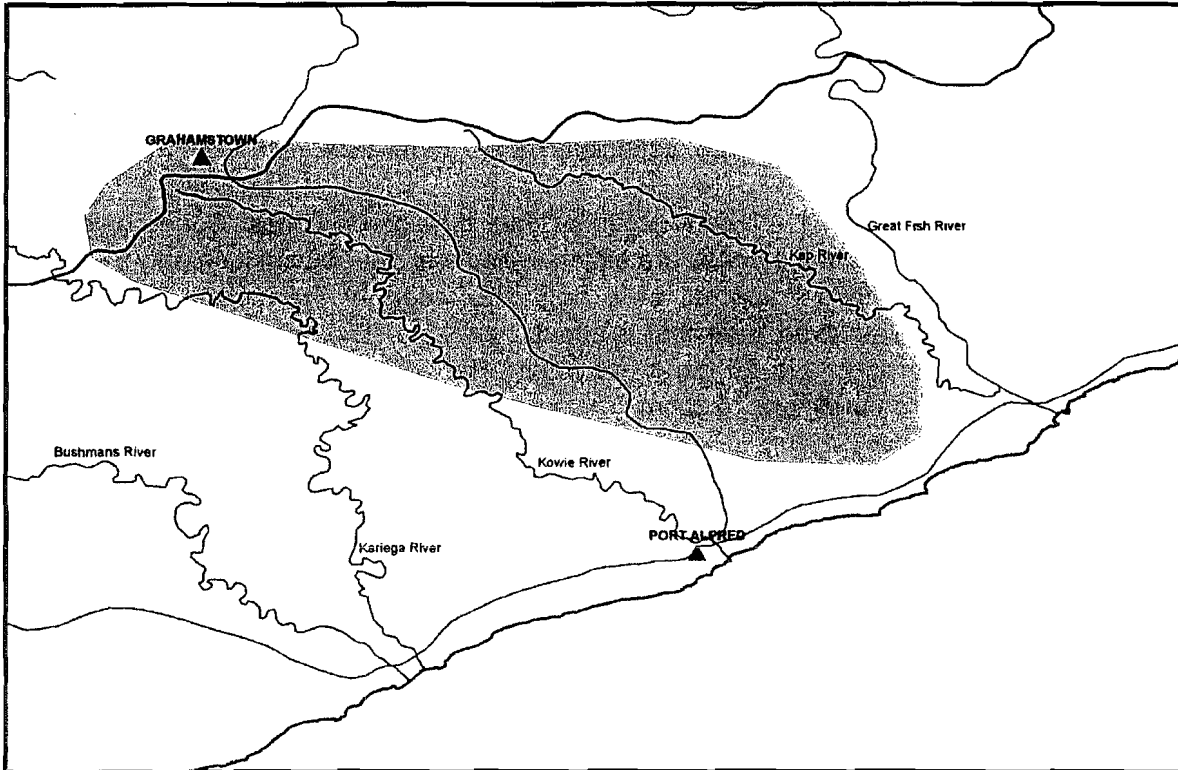


Figure 1: Current distribution of *E. latifrons* in the Bathurst district of the Eastern Cape Province (da Silva, 2005).

2.2.3 Life History

Like all cycads, *E. latifrons* is dioecious, meaning that plants are either male or female. In most cycad populations, the sex ratio is close to 1:1, but the last population count for *E. latifrons* showed a strong bias towards males (4:1). This trend has been observed in other cycads with small population sizes and means that the effective population size for *E. latifrons* is well below the actual numbers of 60 - 100 individuals.

E. latifrons has a reputation for being a very slow grower. Adults produce new flushes of leaves every 2 - 3 years, with coning being even more sporadic. The cones are produced from May - August with pollen-shedding taking place from July - August. Individual plants may cone only once in 5 - 10 years. In many cycad populations, coning is synchronised to some extent, with recorded levels of synchrony varying from 15% to 100% (i.e. all plants in a population cone in the same year). The degree of coning synchrony within *E. latifrons* populations is not known. Seeds are normally shed in January; however the female cones can take 6 - 12 months to mature. Baboons and hornbills have been observed dispersing the shed seed after having eaten the fleshy outer layer. An after-ripening period is needed

before the seed will germinate, provided the seeds were pollinated. This after-ripening period is approximately 6 months.

As a result of the large distances between plants in the wild and the infrequent coning episodes, no natural pollination seems to be taking place. There has been no evidence of recruitment in wild populations for several decades and no viable seed has been observed in the wild. However, according to a classification of cycad life histories (Donaldson, 1995), *E. latifrons* is a 'Type 2' cycad, capable of persisting over long periods by vegetative production of numerous basal suckers.

Insect pollination has been recorded in two cycad species in the Eastern Cape and is thought to occur in most cycad species in this region. Potential beetle pollinators of *E. latifrons* (species in the genus *Porthetes* together with Cucujid beetles) were until recently thought to be extinct, but beetles from pollinator groups have recently been collected on *E. latifrons* although pollination does not seem to be occurring (Donaldson *et al.*, 1995 and Donaldson, 1997). As such it is likely that these pollinators could be host-specific and thus are just as endangered as *E. latifrons* itself. Other specific relationships are not known and further work will be required in order to better understand the role of the plant in the ecology of the habitat within which it occurs.

There is currently no record of disease within the *E. latifrons* population although populations in decline, such as with this species, are very vulnerable to any environmental perturbation such as disease (Donaldson, 2006). For example, *Encephalartos laevifolius* (the Kaapsehoop Cycad), whose sub-populations are distributed in small groups from the Wolkberg in the north to the Swaziland mountains in the south, have suffered from a fungal infection of the female cones (Zunckel, 1990). This study suggested that the infections could be associated with acid rain falling on the eastern escarpment and predisposing the plants to the infection, but it has demonstrated the vulnerability of the population to disease and confirms the statement by Donaldson's (2006).

Sex reversal of male and females plants is known to occur in a number of cycad species, and has been observed at least once in *E. latifrons* in a private collection.

2.2.4 Population Genetics

A recent study of both *insitu* and *exsitu* populations of *E. latifrons* (da Silva *et al.* MS, 2006) revealed that there is a relatively high level of genetic variation within the remaining population (high proportions of polymorphic loci, moderate to high Nei's and Shannon's diversity indices, as well as moderate levels of heterozygosity) and that the variation between plants that grow close together is as great as the variation between apparently isolated subpopulations. (i.e. plants from different sites). This suggests that the current subpopulations were once part of a single large population with relatively high levels of gene flow between subpopulations. The level of genetic variation was greater than in many other cycad species where there tends to be low genetic variation within populations.

Six distinct genotypic groups were detected in the wild, with two confined to a single site. Several other genotypes were also represented at these two sites, meaning that these sites

contain the majority of the genetic variation remaining in the wild. The importance of this diversity to the survival of the species is indisputable and each genotypic group should be considered a high conservation priority (da Silva, 2005).

2.2.5 Habitat Requirements

The plants grow on rocky outcrops and hill slopes, usually amongst dense scrub bush vegetation. They also occur along dry river courses. The altitude at which the plants are found varies between 200 and 600 masl. The natural distribution range of *E. latifrons* occurs in the following vegetation units: Kowie Thicket, Suurberg Quartzite Fynbos and Suurberg Shale Fynbos (Mucina and Rutherford, 2004.)

The soils in this region are mainly Glenrosa and Mispah forms. Lime soils are rare or absent. The underlying geology of this area is quartzitic sandstone, shale and micaceous siltstone. The annual rainfall varies between 600 – 1250 mm and is fairly evenly distributed during the year although a summer peak usually occurs. Although winters are cool to cold, frost does not normally occur. The summers may be hot and fairly dry.

2.2.6 Threats

E. latifrons now occurs in areas where the predominant land-uses are cultivation (pineapples and chicory) as well as stock farming. The impact of agricultural land-use on *E. latifrons* is difficult to assess, but the early reports of Pearson (1916) and Chamberlain (1919) imply that at least some habitat was lost as a result of agricultural activity. Repeat photography, using photographs first taken between 1906 and 1945, showed that all the plants occurring at seven different sites had disappeared by 1996 (Donaldson and Bösenberg, 1999). This cannot be attributed to agricultural transformation as, in most cases, the areas in which the plants occurred were neither ploughed nor cleared.

Trade in cycads is currently the greatest threat and probably explains the decline observed in the repeat photography study (Donaldson and Bösenberg, 1999). The removal of relatively large numbers of plants by collectors has been recorded, with some plants recovered by law enforcement and conservation agencies (Eastern Cape Department of Economic Development and Environmental Affairs - DEDEA). The demand for wild-collected plants remains high because *E. latifrons* is regarded as scarce in trade. Population modelling of other species of *Encephalartos* (Raimondo and Donaldson, 2003) showed that species such as *E. latifrons* are extremely sensitive to the removal of adult plants because population persistence over long periods relies on adult survival and not seedling recruitment. By contrast, harvest of seeds has relatively little impact on population dynamics. Today, illegal harvesting of adult plants is thus undoubtedly the major cause of population decline.

2.2.7 Utilisation

The Afrikaans common name for cycads is the “broodboom” which means “bread tree” based on the fact that it was utilised by indigenous people for the making of bread. The

stems of the plant were split open to reveal the fibrous pith which was then wrapped in an animal skin and buried until partial fermentation. It was then removed and ground to a flour which was used to make bread. This was observed by Carl Thunberg between 1772 and 1779 (Coats Palgrave, 1981). It is unlikely that such utilisation takes place today and there are no known recent records of this.

Although the seeds of some of the species of *Encephalartos* are poisonous there are records of a number of animals and birds consuming them without ill effect (Coats & Palgrave, 1981). The fleshy outer layer of the seeds is eaten by large frugivorous birds such as hornbills, as well as mammals such as baboons. It is likely that the bright outer layer of the seeds acts as an attraction for the sake of seed dispersal and this phenomenon has been observed within the *E. latifrons* population whose seeds have a red fleshy outer cover. Porcupines have been observed to eat into the stem of *E. transvenosus* in order to access the moist pith during times of drought but it is traditional healers who harvest the bark of *E. latifrons*. This form of utilisation apparently causes serious damage to the plants but there is a need for further research into this aspect as little is known about the extent of use and the possibility of trade.

The illegal harvesting of mature specimens has already been alluded to as the primary cause of the decline of this population, but in response to this an intensive breeding programme has been launched where pollen is collected, stored and used to hand pollinate female cones. Seeds are then harvested and grown out in nurseries with a view to both supplying the trade and for re-introduction into the wild population. Unfortunately this process has been stalled due to the lack of a BMP-S as this is required in order to unlock the permitting process that is required to legalise the operation. The potential for the breeding programme to contribute to the achievement of the aim and objectives of this plan has already been proven through the work of the land owners on whose properties the wild population occurs.

Use Value of the Species

As already stated the value of bark harvesting to traditional healers requires further research but the value of the trade in mature plants is significant as discussed in 2.2.6 above. Considering the scarcity of the plant for the nursery and landscaping market it may be assumed that the value of the seedlings produced through the breeding programme may well be sufficient to cover the costs of the programme and possibly make sufficient profit to support additional conservation measures as spelt out in the Action Plan in section 7 below.

Monitoring of Current Use

No formal or scientifically based monitoring is taking place at the time of compiling this plan. The only current information being assimilated is through observations made by the land owners on whose property the plants occur, by researchers such as da Silva (da Silva *et al.* MS, 2006) and Donaldson (Donaldson and Bösenberg, 1999) and through the micro-chipping work that was carried out by DEDEA.

Current Quotas and Permits Issued

No information on the history of quotas and permits was available at the time of compiling this BMP-S.

Of specific relevance to the essence of this BMP-S are the permits that have been issued for the purpose of propagating seedlings derived from artificially pollinated cones of wild plants within the natural distribution range. The conditions of these permits specified that a percentage of the seedlings produced would be used for re-establishment back into the natural distribution range, while the remainder would be available for sale by the grower. These percentages were discussed in detail at the PHVA workshop and agreement was reached that 85% of the crop could be retained by the grower for sale on the open market, subject to all legal requirements; 5% are to be re-established back into the wild and within their natural distribution range by the grower; and 10% are to be utilized by DEDEA for further action related to the restoration of the species in the wild. This agreement has been ratified by senior officials of DEDEA and is to be applied to all seedlings produced prior to the agreement and will apply until reviewed through the ELF.

2.2.8 Past Conservation Measures

Current knowledge shows that the formal efforts to conserve *E. latifrons* have been limited to the confiscation of specimens that have been illegally obtained and the planting of these on to a number of protected areas in the vicinity of the plants natural distribution and at the Rhodes University, as discussed in section 2.2.2 above. A photographic census of all known plants, which led to the first successful recovery of stolen plants from the wild, was conducted by DEDEA; who have also carried out two micro-chipping operations. Other than this the land owners who have implemented habitat management, provided security and initiated breeding programmes, have contributed significantly to the conservation effort.

2.2.9 Research Inventory and Summary

Research targeting *E. latifrons* specifically has been limited with the following studies having been published:

- Population modeling (Raimondo and Donaldson, 2003)
- Repeat photography study (Donaldson and Bösenberg, 1999)
- Insect pollination study and genetics study (da Silva *et al.* MS, 2006)

It is likely that much knowledge and insight has been gained by the land owners who are actively involved in trying to conserve this plant species on their properties, but this has not been generated out of formal research and has not been captured accordingly. However, the land owners are willing to co-operate to provide all the insights and information they have towards better understanding the ecology of these plants and their habitat requirement. This is unfortunate and is an aspect that needs to be addressed in this management plan and in its implementation.

2.3 The Role Players

Role players are those who have a legal mandate and responsibility to carry out the conservation actions necessary to ensure the persistence of the plant in nature through the

implementation of this management plan. In addition to this group, there are those who, by virtue of the natural population being on their property, are in a position to play a direct role. The latter are not legally mandated to do this but in the case of *E. latifrons* they are willing and committed to be involved. As such they are important role players and it is hoped that through the management planning process and implementation of this plan, they will be positively engaged by those role players with a legal mandate.

Table 1 below includes a list of the role players and the rationale for their inclusion. Where there is more than one person in an organisation, the senior official has been listed with the assumption that they will delegate where necessary. The list is also incomplete in terms of contact details, but these have been included in the full stakeholder database that is included as Appendix A.

Table 1: A list of role players required for the implementation of this management plan together with the rationale for their inclusion

NAME	ORGANISATION	ROLE / RESPONSIBILITY
Prof. John Donaldson	SANBI	Oversee management planning process and provide and coordinate technical input into implementation and subsequent planning iterations
Ms. Wilma Lutsch	DEA	Oversee management planning process and facilitate DEA process of obtaining public comment and ministerial approval
Ms Phumla Mzazi-Geja	DEDEA	Coordinate implementation of DEDEA responsibilities and overall implementation of the plan as chair of the <i>Encephalartos latifrons</i> Forum
Mr. Div de Villiers	DEDEA	Ensure an enabling environment related to legal requirements, monitor compliance and provide protection services
Dr. Dave Belfour	East Cape Parks (ECParks)	Oversee the management of plants established on protected areas under ECP jurisdiction and cooperate according to the <i>ex situ</i> conservation requirements as detailed in this management plan
Mr. Fanie Fouche	Ndlambe Municipality	Oversee the management of plants established on protected areas under the jurisdiction of the local municipality
Mr. Kevin Bates	Makana Municipality	As above
Mr. Colin Fletcher	Land owner	Facilitate land owner cooperation with officials and other role players, ensure sound habitat management, ensure protection of the natural populations and implement breeding programme according to best practice requirements
Prof. Nigel Barker	Rhodes University	Provide technical support through facilitating research opportunities in line with requirements identified in the management plan and through its implementation

2.4 Planning Methodology

In the Norms and Standards for Biodiversity Management Plans for Species published by DEAT in March 2009 the planning process is stipulated as requiring the following steps:

- (1) Appropriate stakeholders should be invited to participate in the development of the BMP-S.
- (2) Stakeholders may be identified according to:
 - (a) The stakeholder group to which they belong; or
 - (b) Their interests and mission.
- (3) Background information on the species may be compiled and circulated to all appropriate stakeholders prior to development of the BMP-S.
- (4) The background information should contain:
 - (a) Criteria used to select the species;
 - (b) Information on the current status of the species;
 - (c) Information on known threats; and
 - (d) Their impacts on the species.
- (5) Compilation of the first draft of a BMP-S can be done by either:
 - (a) A consultant;
 - (b) An expert on the species;
 - (c) A panel of experts on the species; or
 - (d) During a stakeholder workshop.
- (6)
 - (a) The first draft of the BMP-S should be made available to stakeholders for comment;
 - (b) The comment period should be at least 30 working days;
 - (c) Relevant comments received should be included in a final draft of the BMP-S;
- (7) The final draft of the plan should be sent to all implementers of identified actions for validation within 60 days of date of notice.

The final draft of the plan should be compiled and submitted, within 90 days of receipt of comments, to the Minister for approval.

In the case of the process that has been followed for this management plan a number of key stakeholders and role players participated in a Population and Habitat Viability Assessment (PHVA) workshop that was held in Bathurst in July 2007. The proceedings from this workshop are captured in the PHVA report which is included as Appendix B and which provides a substantial amount of information as well as recommendations that will both contribute to the substance of this management plan. Upon conclusion of the PHVA process and report SANBI procured the services of a consultant to "deliver a management plan for *E. latifrons*, as required by section 43 of the Biodiversity Act. The management plan must be signed off by the relevant conservation authorities and be agreed to by the forum established after the PHVA process. It must address the following issues:

- The current status of *E. latifrons* and its continuing decline
- The re-introduction of plants into sites within its natural distribution range

- The need for artificial propagation and the roles played by land owners, conservation agencies, SANBI and other parties in this process
- Incentives for land owners
- Targets for the re-introduction of plants into sites within its natural distribution range
- Monitoring, evaluating, and reporting on the status of naturally occurring and re-introduced plants.”

The process agreed to by SANBI and the consultant was as follows:

- Consultant to review all available and relevant documentation and to compile a stakeholder engagement strategy for approval by SANBI
- All role players allocated responsibilities in the PHVA process to be interviewed by the consultant to gauge the extent to which the PHVA report requires updating
- A first draft management plan to be compiled by the consultant using the PHVA report and proceedings of the above interviews
- The first draft is to be circulated to the key stakeholders who participated in the PHVA process as well as any additional stakeholders subsequently identified during the interviews
- A stakeholder workshop to be facilitated by the consultant for the collective review of the first draft and for role players to understand and accept their responsibilities that will be specified in the management plan
- The consultant to revise the management plan according to the comments submitted during the workshop and to submit it to SANBI as a final draft
- SANBI to submit the final draft to DEAT
- DEAT to advertise for and assimilate public comment in collaboration with SANBI
- DEAT to facilitate Ministerial approval of the management plan
- SANBI, in collaboration with DEDEA, to inform stakeholder and role players of the plan's approval and to set the processes in place for implementation

3 LEGISLATIVE FRAMEWORK

Section 43(1) (b) of the Biodiversity Act provides for any person, organisation or organ of state to submit, for approval, to the Minister a draft management plan for an indigenous species (a) listed in terms of Section 56 of the Biodiversity Act; or (b) which is not listed in terms of Section 56 but which warrants special conservation attention.

Section 43 (2) makes provision for the Minister to identify a suitable person, organisation or organ of state which is willing to be responsible for the implementation of the plan.

In terms of Section 43 (3), the Minister must publish by notice the approved biodiversity management plan, determine the manner of implementation of the plan and assign the responsibility for the implementation of the plan to the person, organisation or organ of state identified.

Section 45 addresses the contents of the biodiversity management plan stating that it must be aimed at ensuring the long term survival in nature of the species to which the plan relates; provide for the responsible person, organisation or organ of state to monitor and report on progress with the implementation of the plan and be consistent with other planning tools or international agreements binding on the state.

In terms of Section 46, the Minister must review a published biodiversity management plan at least every five years and assess compliance with the plan and the extent to which its objectives are met. The Minister may also amend a biodiversity management plan either on own initiative or upon request of an interested person, organisation or organ of state (by notice in the Gazette), after a consultation process in accordance with section 99 and 100 of the Biodiversity Act.

The Threatened or Protected Species (ToPS) Regulations were published in 2007 in terms of which *Encephalartos latifrons* was listed as a critically endangered species. Regulation 25 (as amended in 2008 and 2009) of ToPS prohibits the following restricted activities involving listed threatened or protected *Encephalartos* species:

- a) any restricted activity involving specimens of any listed wild *Encephalartos* species, unless provided for in a Biodiversity Management Plan for Species,
- b) trade in specimens of artificially propagated *Encephalartos* species listed as critically endangered and endangered or the export of such specimens, with a stem diameter of 15 cm, unless provided for in a Biodiversity Management Plan for Species, and
- c) export or re-export of artificially propagated specimens of listed vulnerable or protected *Encephalartos* species with a stem diameter of more than 15 cm, except the following species which cannot be exported or re-exported if the stem diameter is more than 7 cm: *E. caffer*, *E. humilis*, *E. umbeluziensis* and *E. ngoyanus*. Unless provided for in a Biodiversity Management Plan for the Species.

The requirement of a biodiversity management plan to carry out restricted activities involving critically endangered and endangered *Encephalartos* species, resulted in a serious impediment for the cycad industry, as this implied that the industry, who does not have the necessary expertise, knowledge and financial means, should draft a document of this nature to allow them to continue the carrying out of restricted activities as part of the management of their business. This resulted in a further amendment of the ToPS regulations as follows:

“Any person, who immediately before the commencement of these Regulations legally conducted a restricted activity involving wild specimens of a threatened or protected species of *Encephalartos* or trade in artificially propagated specimens of critically endangered or endangered species of *Encephalartos*, may continue with the activity until such date as determined by the Minister by notice in the Gazette.”

3.1 Role Players Responsible for Implementation of the BMP-S

Section 2.3 lists the key role players but is not conclusive. Some of the people listed here will delegate responsibilities but they will ultimately remain accountable for implementation of the aspects of the BMP-S allocated to their particular organisation or designation. A stakeholder database is also included as Appendix A which contains a more comprehensive list together with contact details.

3.2 Assigning Priority for the Development and Implementation of this BMP-S

Cycads have been identified as a high priority group in the ToPS regulations and *E. latifrons* is one of 12 Critically Endangered species in the country. It is an excellent species to use a trial case for the development of BMP-S because it occurs primarily on private land. Although *E. latifrons* has been rare since 1916 (Kemp, 1986), its status has declined substantially since then. Studies of repeat photographs showed that subpopulations had disappeared from seven sites between 1920 and 1996 and there are documented cases of the removal of 17 mature plants from one site and 13 stems from another site since 1990. The presence of hundreds of large plants in private collections, which are suspected to be of wild origin, is also an indication of the extent of decline in the past 100 years. Considering that the threat posed by the removal of mature specimens from the wild for trade purposes continues unabated and that it is possible to ensure the persistence of the species in nature, it is important that the process to develop this BMP-S be afforded a high priority. Likewise the process to obtain Ministerial approval as required by NEMBA must also be afforded a high priority. Thereafter implementation of the BMP-S must also be afforded a high priority.

4 SPECIES DETAILS

Section 2.2 discusses all the available information on the species from taxonomy and biology through to past conservation efforts. No further discussion is thus necessary under this section.

5 SUMMARY OF PLANNING METHODOLOGY

Section 2.4 provides a detailed account of the planning process as specified in NEMBA, the terms of reference for the compilation of this plan and an outline of the process that has been followed. A list of key role players is provided in

Table 1 in section 2.3 and a list of both role players and stakeholders is captured in Appendix A.

5.1 Agreements Required for Implementation

In taking the implementation of this BMP-S forward the key role players have all accepted their various roles and responsibilities and see the plan as a document binding them to these. As such additional agreements are not required, although it will be necessary to monitor implementation very carefully and introduce relevant agreements as and when these may be deemed necessary, or when and if additional role players are brought on board. The latter may be commercial entities that can play a role but generate income at the same time. The registration and permit requirements may provide sufficient substance for agreements but this must be agreed on by the forum established to monitor and coordinate implementation of this plan.

5.2 Relevant Documents, Agreements and Policies

In addition to the literature listed in section 10 below the following are relevant:

- CITES Appendix 1
- NEMBA (10 of 2004)
- ToPS (Feb 2007) –(see section 3 above and Appendix C)
- Norms and Standards for BMP-S (March 2009)

5.3 Verification of the Integrity of the Content of the BMP-S

The compilation of this BMP-S has been overseen by Prof. John Donaldson of SANBI who may be considered one of South Africa's foremost specialists in cycad ecology and conservation. He has not only participated in every step of the process but has provided critical review and guidance and his opinion of the integrity of this work is captured in a letter addressed to DEA, a copy of which is included as Appendix D.

6 THREATS IDENTIFIED

The threats facing *Encephalartos latifrons* have been discussed in section 2.2.6 but are repeated here, in order of priority, so as to emphasize the importance and the need to address these for the sake of securing the plants persistence in nature and to try and restore the ecological processes necessary to bring it back from being functionally extinct.

6.1 The Illegal Removal and Trade in Mature Specimens from the Wild

It was first thought that habitat loss was the primary cause for the dispersed nature of the plants within their population distribution, but it has since become clear that the illegal removal of mature specimens in response to the demand for trade is the main reason for the decline in their numbers.

6.2 Traditional Use

It is apparent that the bark of *Encephalartos latifrons* is used by traditional healers for magico-medicinal purposes, but there is no definitive information on this aspect which the PHVA process identified as a need for further research. It is apparent though that medicinal use is not limited to *E. latifrons* and cycad bark is sold at all the major muthi markets around the country. The situation will be monitored and subsequent iterations of the BMP-S can be updated and adapted to include actions that are required as and when relevant.

6.3 Insufficient Research

Section 2.2.9 lists the work that has been undertaken with direct reference to *E. latifrons* and illustrates how limited specific research has been. Fortunately there are significant similarities between the species of *Encephalartos* and lessons learnt from others can be relatively safely applied to *E. latifrons* in the absence of specific studies. It is also essential that conservation efforts must not be put on hold until research has been carried out to fill the knowledge gaps identified by the PHVA workshop. Implementation of this BMP-S must be accompanied by rigorous monitoring that will help to provide the data required to fill the some of the gaps while research can be carried out concurrently. Both of these sources of data can then be fed into the review of the BMP-S and used to bring about the necessary adjustments to the next iteration.

7 ACTION PLAN

An aim and objectives have been presented in section 1.2 and discussions with the role players confirmed that these are both relevant and serve as the point of departure for the identification of further components necessary to complete the BMP-S. In recognition of the need for planning statements which increase in their level of specificity each of the objectives are broken down into a series of operational goals which have been articulated according to the "SMART" rule, i.e. specific, measurable, attainable, realistic and time-bound. Each of these are then broken down into the actions which specify the nature of the action, responsibilities, resource requirements, time frames and indicators of achievement. The latter will be used for monitoring and evaluation and to track implementation.

For ease of reference the aim and objectives have been listed here again and are as follows:

AIM

To enhance the conservation status of *Encephalartos latifrons* and secure its existence in its natural distribution range.

OBJECTIVES

- *Establish and maintain the *Encephalartos latifrons* Forum (ELF) to monitor and track implementation of the BMP-S and to act as a decision support.*
- *Identify and undertake research to provide information relevant to answer conservation management questions, ensure the regular monitoring of the plants both in situ and ex situ and ensure that all data gathered through research and monitoring is fed back into and informs the overall coordination process.*
- *Create and maintain an enabling environment for a coordinated breeding and augmentation programme, including the production of seedlings for reintroduction into the natural distribution range and for the sustainable utilisation. This will include the application and fulfilment of all legal requirements.*
- *Create and maintain an enabling environment for the land owners, on whose properties the majority of plants occur, to carry out all appropriate management actions required to ensure necessary ecological processes are in place and to provide the level of security necessary to prevent further poaching of mature plants.*
- *Specify the restricted activities that may be carried out in terms of the Threatened or Protected Species regulations and for what purpose.*

7.1 Over-arching Principles

Considering the critically endangered status of *E. latifrons* and the complex and dynamic environment within which this BMP-S is to be implemented, it is important to list over-arching principles that will be used to govern implementation and provide the context within which the planning components have been derived. The principles listed below have been subjected to review by the role players and all have accepted that they are relevant and provide an important framework for implementation.

- This BMP-S is the first version derived from an iterative management planning process that will produce a second and updated version after three to five years of implementation. It is also not a comprehensive record of all the actions that are required to achieve the aim and objectives and the ELF will need to manage an adaptive process as implementation produces more information and generates a greater understanding of the conservation management actions required.
- The primary focus of this BMP-S is actions required to secure the future of *E. latifrons* within its natural distribution range (see Figure 1), including both those specimens that have been relocated and that occur naturally in the wild. Secondary to these actions

- will be those related to plants that occur in collections and gardens outside of the natural distribution range.
- Information relating to the localities of the plants in the wild will be handled in the strictest of confidentiality to minimise the threat of illegal harvesting from wild localities.
 - Members of the ELF will only be those who are directly involved in the implementation of the BMP-S and will be required to sign a declaration to confirm no prior indiscretions related to threatened species and that there are no conflict of interests related to their roles and responsibilities as captured in this BMP-S. Likewise, any persons delegated to undertake responsibilities emanating from the BMP-S and the proceedings of ELF meetings, must be similarly screened. This and other rules governing the functioning of the ELF are captured in the Terms of Reference.
 - The ELF will be recognised as the mechanism responsible for monitoring implementation of the BMP-S and members will hold each other accountable for implementation of delegated responsibilities emanating either from this BMP-S and / or from the proceedings of ELF meetings. Decision-making forums outside of the ELF will need to be recognised where necessary, but in the interest of efficiency and security, officials delegated to attend the ELF meetings need sufficient authority to take decisions on behalf of their respective organisations and there must be consistency of representation.
 - It is accepted that land owners within the natural distribution range of *E. latifrons* and with naturally occurring plants on their properties, may participate in approved breeding programme/s that fit within the context of this BMP-S and that, subject to all legal requirements being met, seedlings can be produced for sale necessary to meet the demand for the plants in the market and to provide an income to cover management and breeding costs. It is also accepted that profit may also be made through this process. This principle also serves to address the need for maintaining the genetic integrity of the seedlings although access to breeding material from specimens that are no longer within the natural distribution range, but for which there is no doubt that they could have only been accessed from here, will need to be considered in order to enhance the genetic diversity of the seedlings.
 - Seedlings will also be produced through the breeding programme/s to provide stock to replant back into the natural distribution range. The proportions agreed to at the PHVA workshop in July 2007, namely 85% retained for sale by the land owner, 5% retained by the land owner for re-establishment back into the wild and 10% to be made available to an official conservation agency for use in restoration and related conservation actions, will apply.
 - All breeding efforts must be accurately recorded in a studbook to ensure that the genetic integrity of the natural population is not compromised in any way.
 - Plant material other than seedlings produced through the breeding programme/s recognised by the ELF may only be used for introduction back into the wild and within the natural distribution range if the origin of the material can be confirmed. The ELF will determine and implement criteria to establish the origin of these plants. These and suckers removed from them may be permitted for reintroduction.
 - The ELF will apply a set of criteria to guide the objective identification of areas within the natural distribution range into which seedlings and other plant material can be reintroduced. It may be feasible to consider areas beyond the current distribution range based on the presence of habitat requirements. Further work will be required to

confirm the extent of this area and the ELF will need to reach consensus on this work and its outcomes. The criteria referred to here are listed below:

- there must be suitable habitat in the area,
- the security risk must be considered, and
- the custodians of the potential area must guarantee that they have the capacity to carry out the reintroduction process and to provide the necessary management actions required to ensure the successful establishment of the plants.

7.2 Objective 1

Establish and maintain the Encephalartos latifrons Forum (ELF) to monitor and track implementation of the BMP-S and to act as a decision support.

7.2.1 Operational Goal 1.1

Establish the Encephalartos latifrons Forum by the end of September 2010.

Action 1.1.1: Formally invite the role players identified in section 2.3 to accept membership on the ELF and where relevant direct invitations to senior authorities requesting delegation of the responsibility to relevant officials. Invitation to include a clause that membership is subject to a code of ethics and the invitee must indicate acceptance of this requirement.

Responsibility	DEDEA Director – Biodiversity
Timeline	31 July 2010
Resources needed	Internal
Collaborators	DEDEA Deputy Director - Biodiversity
Deliverables	Copies of letters sent and responses
Measurable outcomes	Credible process for establishing the ELF

Action 1.1.2: Facilitate the screening of ELF member who has accepted membership.

Responsibility	DEDEA Director – Law Enforcement and Compliance
Timeline	31 August 2010
Resources needed	Internal
Collaborators	DEDEA Deputy Director - Law Enforcement and Compliance
Deliverables	Records of screening process
Measurable outcomes	All members of ELF security certified

Action 1.1.3: Convene the first meeting of the ELF using the Terms of Reference to guide the proceedings and the agenda.

Responsibility	DEDEA District Manager – Grahamstown (chair and secretariat)
Timeline	30 September 2010
Resources needed	Internal
Collaborators	ELF members
Deliverables	Minutes
Measurable outcomes	Constructive linkages between role players

7.2.2 Operational Goal 1.2

Manage and maintain the Encephalartos latifrons Forum on a continuous basis

Action 1.2.1: Convene subsequent meetings of the ELF.	
Responsibility	DEDEA District Manager – Grahamstown (chair and secretariat)
Timeline	At least every 6 (six) months and more frequently if needed
Resources needed	Internal
Collaborators	ELF members
Deliverables	Minutes
Measurable outcomes	Maintained and enhanced constructive linkages between role players

Action 1.2.2: Be available to address issues that may arise on an ad hoc basis in between formal meetings of the ELF, and to refer these matters to the ELF as and when appropriate.	
Responsibility	DEDEA District Manager – Grahamstown (chair and secretariat)
Timeline	As soon as possible after issues are raised
Resources needed	Internal
Collaborators	ELF members
Deliverables	Records of correspondence and ELF minutes
Measurable outcomes	Maintained and enhanced constructive linkages between role players

7.3 Objective 2

Identify and undertake research to provide information relevant to answer conservation management questions, ensure the regular monitoring of the plants in the natural population and ensure that all data gathered through research and monitoring is fed back into and informs the overall coordination process.

7.3.1 Operational Goal 2.1

Develop and maintain appropriate data bases to assist implementation on an on-going basis
It is recognised that data on the species is sensitive and must be handled with the necessary level of confidentiality, as already alluded to in the over-arching principles. All requests for access to data will be considered by the ELF, unless required for security purposes.

Action 2.1.1: Collate all available information into the appropriate data bases	
Responsibility	SANBI (John Donaldson)
Timeline	31 December 2010
Resources needed	Internal
Collaborators	ELF
Deliverables	Data base
Measurable outcomes	N/A

Action 2.1.2: Continue to populate the data base with information into the appropriate data bases as and when this becomes available	
Responsibility	SANBI (John Donaldson)
Timeline	On-going - at least annually
Resources needed	Internal
Collaborators	ELF
Deliverables	Data base
Measurable outcomes	N/A

7.3.2 Operational Goal 2.2

Undertake a research project into the restoration of E. latifrons in the wild to be completed by the end of 2012.

Action 2.2.1: Compile a project description acceptable to the requirements for a 2 or 3 year post graduate study through the Botany Dept of Rhodes University	
Responsibility	SANBI (John Donaldson)
Timeline	31 September 2010
Resources needed	Internal
Collaborators	Botany Department – Rhodes University / DEDEA
Deliverables	Project description
Measurable outcomes	N/A

Action 2.2.2: Obtain approximately R50 - 80,000.00 per year to support a post graduate student to undertake the / restoration study	
Responsibility	SANBI (John Donaldson)
Timeline	30 November 2010
Resources needed	Funds raised
Collaborators	HOD Botany – Rhodes University / DEDEA
Deliverables	Funding agreement
Measurable outcomes	Funding available

Action 2.2.3: Secure a student to undertake the restoration study and supervise implementation	
Responsibility	HOD Botany – Rhodes University
Timeline	On going until completion by 30 November 2013
Resources needed	Funds raised / provided by SANBI
Collaborators	SANBI (John Donaldson) / DEDEA
Deliverables	Registration of post graduate student, progress reports and thesis
Measurable outcomes	BMP-S and habitat management plans adapted according to enhanced understanding of the biology of <i>E. latifrons</i> , its ecology and habitat management requirements

7.3.3 Operational Goal 2.3

Derive a monitoring programme for the natural population of E. latifrons, including the re-introduced plants, by 31 December 2010 and implement on an annual basis towards the end of the growing season.

This monitoring programme is to focus on gathering information related directly to the population demographics and security of the plants. It will include the gathering of information such as localities, the numbers of stems per plant, the length and condition of the stems, sex, and evidence of sexual propagation such as the presence of cones and seedlings and the presence and the numbers of suckers. If cones are present their dimensions will need to be recorded as well as any other related observations such as the presence of insects on the cones. Officials may be provided with the necessary equipment to collect specimens of insects for identification by the Zoology and Entomology Department at Rhodes University. Fixed point photographs of the plants must also be taken for later reference.

Considering the sensitivity of this information, particularly locality data, it is absolutely essential that this be kept within the ELF and that if official reports, academic reports and publications are generated, no locality data may be included. In certain instances there may be land owners who do not want the localities of the plants on their properties known, even by the members of the ELF. In these instances the wishes of the land owners need to be respected and they must provide the other population data that is required to complete the data set. An example of the data sheet that may be used for gathering the population data is attached as Appendix E. The information gathered here may be linked to the post graduate study and other studies where possible.

Action 2.3.1: Liaise with the HOD of Botany at Rhodes University to determine the variables to be monitored to ensure consistency with the restoration study and the most useful design for deriving trends from repeated monitoring actions	
Responsibility	DEDEA District Manager – Grahamstown
Timeline	31 December 2010
Resources needed	Internal

Collaborators	HOD Botany – Rhodes University / ECparks
Deliverables	List of variables and related units of measurement
Measurable outcomes	N/A

Action 2.3.2: Produce a monitoring programme based on the information collated in 2.1 and present it to the ELF for ratification and confirmation of commitment from relevant members.	
Responsibility	DEDEA District Manager – Grahamstown (chair and secretariat)
Timeline	30 January 2011
Resources needed	Internal
Collaborators	ELF members
Deliverables	Monitoring programme and ELF minutes
Measurable outcomes	As above

Action 2.3.3: Implement the monitoring programme.	
Responsibility	DEDEA Regional Manager
Timeline	Annually at the end of the growing season (April to June)
Resources needed	Internal
Collaborators	ELF
Deliverables	Monitoring records
Measurable outcomes	As above

Action 2.3.4: Compare subsequent monitoring records, analyse trends and derive appropriate actions where necessary	
Responsibility	DEDEA Regional Manager
Timeline	Immediately after the monitoring action has been completed and at the next ELF meeting
Resources needed	Internal
Collaborators	ELF members
Deliverables	Monitoring report and ELF minutes
Measurable outcomes	Actions remain current and relevant to prevailing dynamics

7.4 Objective 3

Create and maintain an enabling environment for a coordinated breeding and augmentation programme in order to produce seedlings for reintroduction into the natural distribution range and for sustainable utilisation, and the acquisition of mature plants and suckers for reintroduction. This will include the application and fulfilment of all legal requirements.

It is generally accepted that the future of *E. latifrons* depends on the achievement of this objective. It is currently assumed that if seedlings can be made available for sale, they will contribute to satisfying the demand for plants and take pressure off the natural population, although not entirely as there will always be demand for mature plants. Secondly it is also assumed that if the land owners are able to derive an income from the breeding of the plants, they will have an additional incentive to protect them. Although it is evident that the current land owners are positively aligned towards the conservation of the plants, a healthy breeding programme that covers management costs and generates a profit is necessary to ensure that the plants continue to survive in the longer term.

7.4.1 Operational Goal 3.1

Identify and register E. latifrons growers according to the requirements of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) and ensure that they are trained and equipped to follow all legal requirements related to the breeding and sale of seedlings by 30 September 2010.

Action 3.1.1: Identify grower/s and complete the NEMBA registration process	
Responsibility	DEDEA District Manager
Timeline	30 September 2010
Resources needed	Internal
Collaborators	ELF and growers
Deliverables	Registration documentation
Measurable outcomes	Nursery/ies registered

Action 3.1.2: Ensure growers are aware of and adhere to all legal requirements related to the breeding and sale of seedlings	
Responsibility	DEDEA District Manager
Timeline	30 September 2010
Resources needed	Internal
Collaborators	ELF and growers
Deliverables	Permit requirements fulfilled and all records in place
Measurable outcomes	As above

7.4.2 Operational Goal 3.2

Immediately derive and strictly implement regular record keeping via a "Stud Book" for each grower/nursery participating in the augmentation programme.

The "Stud Book" would need to record information pertaining to the origin of breeding material, i.e. pollen and female cones, dates of acquisition, details of pollen storage (where, for how long, at what temperature, defrosting details, etc), the numbers of seeds harvested

per cone, the percentage viability at harvest (floaters/sinkers) and progressive records of germination and seedling establishment.

Action 3.2.1: Compile a "Stud Book" for each grower/nursery and ensure knowledge of its use	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	31 December 2010
Resources needed	Internal
Collaborators	SANBI
Deliverables	Stud book/s
Measurable outcomes	As above

Action 3.2.2: Monitor completion of stud book	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	At least 6 monthly at ELF meetings
Resources needed	Internal
Collaborators	ELF and growers
Deliverables	Stud books and ELF minutes
Measurable outcomes	Genetic integrity of seedlings

Action 3.2.3: Compile a register of mature <i>E. latifrons</i> outside the natural population that can contribute material to the augmentation programme	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	30 September 2010
Resources needed	Internal
Collaborators	SANBI for Botanical Gardens
Deliverables	Register
Measurable outcomes	Increased pool of plants available to contribute to breeding programme

Action 3.2.4: Investigate and implement ways in which external specimens can contribute to the augmentation programme	
Responsibility	SANBI
Timeline	31 December 2010 and on going
Resources needed	Internal
Collaborators	SANBI for Botanical Gardens and Cycad Society for private collections
Deliverables	Implementation plan
Measurable outcomes	Increased pool of plants available to contribute to breeding programme

7.4.3 Operational Goal 3.3

It is recognised that there is an immediate need to derive a planting plan based on the availability of seedlings that need to be re-established back into the natural distribution range, but that this will lack substance due to further research requirements that still need to be met. As such a preliminary planting plan will be derived to fulfil the immediate needs while a more comprehensive plan will be derived as an outcome of the combination of research results, annual population census findings and the regular deliberations of the ELF. *Derive and implement an interim planting plan for the re-establishment and maintenance of seedlings back into the wild, which will include responsibilities, time frames and budgets, by 31 December 2010 and implement accordingly.*

Action 3.3.1: Collate and analyse existing population census data and identify a target area/s for re-establishment based on the current understanding of habitat requirements, accessibility and security considerations	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	31 March 2011
Resources needed	Internal
Collaborators	ELF
Deliverables	Collated population data, record of decision-making process and recommendation re target area/s
Measurable outcomes	As above

Action 3.3.2: Given the selected area for re-establishment, generate the interim planting plan based on the site conditions, the related role players and their respective responsibilities	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	31 March 2011
Resources needed	Internal
Collaborators	ELF
Deliverables	Planting plan
Measurable outcomes	Role players resources and mandated to implement planting plan

Action 3.3.3: Implement the interim planting plan	
Responsibility	DEDEA District Manager
Timeline	31 March 2011 onwards
Resources needed	Internal
Collaborators	DEDEA District Manager and land owners (plus other role players identified in the planting plan)
Deliverables	Implementation report and ELF minutes
Measurable outcomes	Numbers of <i>E. latifrons</i> within the natural distribution range increased

7.4.4 Operational Goal 3.4

Derive and implement a comprehensive planting plan for the re-establishment of both seedlings from the breeding programme/s and other planting material acquired through the implementation of Operational Goal 3.5 by 31 December 2012.

Action 3.4.1: Gather, collate and process all information generated through research, annual monitoring and ELF meetings and produce a draft comprehensive planting plan.	
Responsibility	SANBI
Timeline	31 December 2012
Resources needed	Internal
Collaborators	ELF
Deliverables	Draft comprehensive planting plan
Measurable outcomes	N/A

Action 3.4.2: Present draft planting plan to ELF for consideration and ratification	
Responsibility	SANBI
Timeline	31 March 2013
Resources needed	Internal
Collaborators	ELF
Deliverables	Draft plan and ELF minutes
Measurable outcomes	Consensus on re-establishment process and plan

Action 3.4.3: Implement the comprehensive planting plan	
Responsibility	SANBI
Timeline	31 March 2013 onwards
Resources needed	Internal
Collaborators	DEDEA District Manager and land owners (plus other role players identified in the planting plan)
Deliverables	Implementation report and ELF minutes
Measurable outcomes	Numbers of <i>E. latifrons</i> within the natural distribution range increased

7.4.5 Operational Goal 3.5

*Using the information generated from action 3.2.3 confirm the legal status of specimens of *E. latifrons* outside of the natural population and determine which of these may be subject to confiscation or be available through donation, and derive and implement a plan to access these plants and to re-establish them into secure areas within the natural distribution range.*

Action 3.5.1: Establish linkages with colleagues in other provincial conservation agencies and secure their cooperation to follow up on the status of <i>E. latifrons</i> plants within their areas of jurisdiction.	
Responsibility	DEDEA District Manager
Timeline	31 March 2011
Resources needed	Internal
Collaborators	Relevant officials in other provincial conservation agencies and the Cycad Society
Deliverables	Copies of correspondence
Measurable outcomes	As above

Action 3.5.2: Maintain contact with above colleagues and monitor progress with accessing available plants	
Responsibility	DEDEA District Manager
Timeline	On going
Resources needed	Internal
Collaborators	Relevant officials in other provincial conservation agencies and the Cycad Society
Deliverables	Copies of correspondence
Measurable outcomes	As above

Action 3.5.3: Establish availability of mature <i>E. latifrons</i> in the Eastern Cape	
Responsibility	DEDEA District Manager
Timeline	31 March 2011
Resources needed	Internal
Collaborators	Relevant colleagues in other regions in the province and the Cycad Society
Deliverables	Copies of correspondence
Measurable outcomes	As above

Action 3.5.4: Based on information generated from preceding actions derive a plan to access the available plants and to re-establish them into the natural distribution range	
Responsibility	DEDEA District Manager
Timeline	31 May 2011
Resources needed	Internal
Collaborators	Relevant officials in other provincial conservation agencies, Cycad Society and ELF
Deliverables	Plan for the re-establishment of mature <i>E. latifrons</i> plants
Measurable outcomes	As above

Action 3.5.5: Implement the re-establishment plan	
Responsibility	DEDEA District Manager

Timeline	As per re-establishment plan
Resources needed	Internal
Collaborators	As determined by the plan
Deliverables	Progress reports and ELF minutes
Measurable outcomes	Increased number of mature <i>E. latifrons</i> plants within their natural distribution range

7.5 Objective 4

Create and maintain an enabling environment for the land owners, on whose properties the majority of plants occur, to carry out all appropriate management actions required to ensure necessary ecological processes are in place and to provide the level of security necessary to prevent further poaching of mature plants.

7.5.1 Operational Goal 4.1

*Undertake an assessment of habitat conditions and ecological management requirements on each of the properties hosting portions of the natural population of *E. latifrons* and derive ecologically based habitat management recommendations by 31 March 2011.*

Action 4.1.1: Liaise with land owners and managers and collate information pertaining to the habitat conditions and approaches to habitat management	
Responsibility	DEDEA Regional Manager
Timeline	31 December 2010
Resources needed	Internal
Collaborators	Land owners, ECP and municipal officials
Deliverables	Record of correspondence and collated information
Measurable outcomes	As above

Action 4.1.2: Obtain critical review of current management approach and relevant recommendations	
Responsibility	DEDEA District Manager
Timeline	31 December 2010
Resources needed	Internal
Collaborators	Rhodes University, DEDEA and ECP ecologists
Deliverables	Record of correspondence and management recommendations
Measurable outcomes	As above

Action 4.1.3: Present and discuss management recommendations at ELF meeting and obtain buy-in from land owners and managers	
Responsibility	DEDEA District Manager

Timeline	31 December 2010
Resources needed	Internal
Collaborators	ELF
Deliverables	Minutes
Measurable outcomes	Enhanced understanding of habitat management requirements

Action 4.1.4: Provide advice and assistance to land owners and managers to integrate habitat management requirements into their respective land use management regimes	
Responsibility	DEDEA District Manager
Timeline	31 March 2011 onwards
Resources needed	Internal
Collaborators	DEDEA
Deliverables	Progress reports
Measurable outcomes	Improved habitat conditions

7.5.2 Operational Goal 4.2

Monitor the condition of the habitat in relation to the management recommendations derived from Operational Goal 4.1 as part of the annual population census, discuss deviations from the recommendations at the ELF and negotiate compliance and adaptations where relevant.

Action 4.2.1: Review annual population census data relative to habitat management requirements and identify areas of deviation and their implications	
Responsibility	DEDEA District Manager
Timeline	Annually within one month of completion of the population census
Resources needed	Internal
Collaborators	DEDEA and ECP ecologists
Deliverables	Report for presentation to ELF
Measurable outcomes	As above

Action 4.2.2: Present findings from 4.2.1 to the ELF and identify options for addressing the management deviations	
Responsibility	DEDEA District Manager
Timeline	Annually at first ELF meeting after completion of 4.2.1
Resources needed	Internal
Collaborators	ELF
Deliverables	Minutes reflecting consensus on acceptable habitat management regimes
Measurable outcomes	Enhanced understanding of role player capacity to implement habitat management requirements and improved habitat condition

7.5.3 Operational Goal 4.3

Evaluate the benefits of stewardship agreements with relevant land owners by 30 June 2011.

The concept of Stewardship Agreements emerged within the Western Cape, has been taken on by Ezemvelo KZN Wildlife and now the Mpumalanga Parks and Tourism Agency. It is also recognised by SANBI through their National Grasslands Programme as a means to enhance the conservation status of land under tenure other than state. It is essentially a progression from the original conservancy model that depended on voluntary involvement. The crux of the Stewardship approach is to take the voluntary commitment to the next level, namely formal contracts between land owners and the relevant government department. It is possible that this could then be taken to another level with the agreement being written into the Title Deeds of the property. Negotiations with National Treasury have resulted in the realisation of tax incentives for land that is managed according to sound ecological principles, and it may well be possible for the full scope of the Stewardship concept to be realised within the natural distribution range of *E. latifrons*.

Action 4.3.1: Research the concept of Stewardship Agreements as being implemented in the Western Cape and KwaZulu Natal and assess applicability for application within the <i>E. latifrons</i> distribution range	
Responsibility	DEDEA District Manager
Timeline	31 December 2010
Resources needed	Internal
Collaborators	DEDEA Deputy Director: Biodiversity
Deliverables	Assessment report
Measurable outcomes	Enhanced understanding of Stewardship requirements

Action 4.3.2: Obtain internal DEDEA support for implementation of the concept within the context of this BMP-S	
Responsibility	DEDEA Director – Biodiversity and Coastal Zone Management
Timeline	31 March 2011
Resources needed	Internal
Collaborators	DEDEA Deputy Director: Biodiversity
Deliverables	Departmental correspondence
Measurable outcomes	Provincial governmental support for stewardship

Action 4.3.3: Present the concept to the land owners and initiate negotiations towards the establishment of Stewardship Agreements between them and DEDEA	
Responsibility	DEDEA District Manager
Timeline	31 March 2011
Resources needed	Internal
Collaborators	Land owners
Deliverables	Record of negotiations and agreements
Measurable outcomes	Enhanced conservation status of private land

Action 4.3.4: Monitor implementation of the conditions of the agreements and maintain open communication links with the land owners	
Responsibility	DEDEA District Manager
Timeline	Annually as part of population census
Resources needed	Internal
Collaborators	Land owners
Deliverables	Population data capture forms
Measurable outcomes	As above and tax incentives received by land owners

7.5.4 Operational Goal 4.4

Establish and implement a security plan including pro-active and reactive measures by 31 March 2011.

Action 4.4.1: Review all available information from initial assessment of population data from 2.1.4 in relation to security information available within DEDEA	
Responsibility	DEDEA Director: Enforcement and Compliance
Timeline	30 December 2010
Resources needed	Internal
Collaborators	DEDEA District Manager
Deliverable	Interim report
Measurable outcomes	As above

Action 4.4.2: Derive security plan based on outcome of 4.4.1	
Responsibility	DEDEA Director: Enforcement and Compliance
Timeline	30 December 2010
Resources needed	Internal
Collaborators	DEDEA District Manager and land owners
Deliverables	Security plan
Measurable outcomes	As above

Action 4.4.3: Implement, monitor and adapt security plan	
Responsibility	DEDEA Director: Enforcement and Compliance
Timeline	From 31 March 2011 and on-going
Resources needed	Internal
Collaborators	ELF
Deliverables	Progress reports and ELF minutes
Measurable outcomes	Decreased incidence of poaching

8 MONITORING

The actions captured in section 7 above clearly indicate applicable and measurable outcomes where relevant. From these it will be possible to derive an overall understanding of performance as will be determined by the ELF who is responsible for implementation and monitoring of this BMP-S. The DEDEA officials delegated with the responsibility of serving on the ELF will keep their respective supervisors informed of progress and through these internal reporting mechanisms it will be possible for the Director: Biodiversity of the DEDEA to produce an annual report reflecting the progress made within the following over-arching outcomes:

1. Enhanced and sustained cooperation between role players through the ELF.
2. Comprehensive and up to date population census and habitat condition data.
3. Enhanced conservation status of the land within the natural distribution range.
4. Increased availability of material for planting back into the natural distribution range.
5. Enhanced habitat management and conditions.
6. Increased viability of natural population through successful augmentation plantings and decreased poaching incidents through improved security measures.

On the basis of this annual progress report, relevant officials from DEDEA, DEA and SANBI must facilitate the review of the BMP-S in collaboration with the ELF and make recommendations to amend and adapt it where necessary.

9 LEGAL PROVISIONS

This Biodiversity Management Plan makes provision for the issuing of permits for the following restricted activities with respect to *Encephalartos latifrons*

- 9.1. Restricted activities involving wild specimens of *Encephalartos latifrons* for which permits may be issued,
 - i) Harvesting of pollen and seeds as part of propagation and breeding programmes under the auspices of the *Encephalartos latifrons* forum
 - ii) Artificial pollination of female cones as part of propagation and breeding programmes under the auspices of the *Encephalartos latifrons* forum
 - iii) Removal and translocation of stems or plants to create viable subpopulations as determined by the *Encephalartos latifrons* forum
 - iv) transport of specimens as part of approved breeding or translocation programmes outlined in (i) and (iii) above.
- 9.2. Restricted activities involving trade in artificially propagated specimens of *Encephalartos latifrons* for which permits may be issued
 - i) trade in artificially propagated *Encephalartos latifrons* seeds and seedlings with a stem diameter not exceeding 15 cm, including specimens that meet the CITES definition of artificially propagated (CITES resolution Conf 11.11 (rev CoP 13))
 - ii) donation of *Encephalartos latifrons* plants to registered centres participating in the approved breeding programme for this species
 - iii) Propagation of seedlings from cultivated parental stock

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