

Supporting document

NDF Assessment for *Encephalartos msinganus*

Approved by the Scientific Authority of South Africa: February 2012

Last information update: May 2015

Summary of finding

Encephalartos msinganus (Msinga cycad) is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As an Appendix I species, the export of specimens for commercial purposes is prohibited (Article III). However, specimens artificially propagated for commercial purposes are deemed to be specimens of species included in Appendix II (Article VII) of CITES and therefore may be traded. In terms of Article IV of the Convention, an export permit shall only be granted for an Appendix II species when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species. This document details the undertaking of a non-detriment finding (NDF) for *E. msinganus* and is based on the best available information, current as of May 2015.

Localized to a small area in the Msinga district of KwaZulu-Natal, *E. msinganus*, classified under *E. natalensis* prior to 1989, has been listed as Critically Endangered by the IUCN (the International Union for Conservation of Nature), meaning that it is considered to be facing an extremely high risk of extinction in the wild. Poaching of wild plants to supply the horticultural trade and private collections (and possibly also for medicinal purposes) has had a severe impact on the species. It is estimated that there are less than 200 adult *E. msinganus* plants occurring in a few scattered subpopulations. Field visits in 2011 confirmed that the plants are still targeted by poachers and all the cycads from one site had been reportedly removed.

The harvest of wild cycads has been prohibited throughout South Africa since February 2007. Prior to this, any harvesting, possession or conveyance of cycads required permits in terms of provincial legislation enacted in the 1970s. No permits were reportedly ever issued for the wild harvest of *E. msinganus* plants or seed since its description in 1996, except for the once-off collection of seed for research purposes in 2005 (although plants may have been harvested from the wild as the Msinga form of *E. natalensis* prior to the enactment of provincial legislation). In general, there has been an exponential increase in *ex situ* cultivated cycads, which are regulated by provincial conservation ordinances/Acts and the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA): Threatened or Protected Species (TOPS) Regulations. Enforcement of the strict protection measures afforded to cycads has been hampered by the human resource and budgetary constraints facing the provincial conservation authorities that are mandated to enforce provincial and national environmental legislation, and ongoing illegal harvest of wild cycads is a countrywide problem. In Gauteng for example, where the demand for illegally harvested wild cycads is ultimately centered, reportedly 40% of posts within the Biodiversity Enforcement division of the Gauteng Department of Agriculture and Rural Development were vacant in the 2011/2012 financial year.

Past ineffective implementation of conservation legislation in the provinces of KwaZulu-Natal, the Eastern Cape and particularly Gauteng, where the requirements for cycad possession permits have not been consistently enforced, has facilitated the entry of illegally harvested cycads into the legal trade. Wild-sourced plants have been and continue to be legalized and incorporated into private collections and their use as parental stock for the propagation of seedlings for both the domestic and international cycad trade cannot be ruled out. The

international trade in *E. msinganus* started in 1983 (then the Msinga form of *E. natalensis*) and by 2011 a total of 523 specimens (with an estimated total value of R418 000 and an average annual value of around R14 000 ± R11 000) had been exported from South Africa, the bulk of the trade (80%) having had occurred after 1994 when the cycad protection measures in Gauteng were particularly weak. No conservation benefit for the species or its habitat is derived from the trade *E. msinganus*.

Micro-chips inserted into wild plants have proven to be largely ineffective for establishing wild origins of cycads and have failed to deter poachers. The failure of the legal protection measures has been further exacerbated by prosecutors and magistrates who are not well informed about South Africa's cycad extinction crisis and the small fines issued and minimal jail sentences passed for cycad related offenses are ineffective deterrents.

In 2004 a management plan was developed for all cycads in KwaZulu-Natal, but it is now obsolete. A Biodiversity Management Plan for the Critically Endangered and Endangered cycads will soon be published in terms of section 43 of the NEMBA, however it will be a while before its effectiveness can be evaluated.

The species' biology, which is characterized by a poor dispersal ability and slow growing long-lived adults that regenerate predominantly from seed, renders *E. msinganus* particularly vulnerable to overutilization. This, together with the species' extremely poor conservation status, the continued poaching pressure, the capacity and budgetary constraints that prevent Ezemvelo KwaZulu-Natal Wildlife from curbing poaching, the lack of conservation incentives and the continuing ineffective implementation of the existing strict protection measures for cycads on a national basis, presents a scenario that is unfavourable for the survival of *E. msinganus* in the wild and the species is at an extremely high risk of unsustainable utilization (Figure 1). In order to decrease the risk to this species and prevent its imminent extinction, a concerted effort to address all of these factors is essential.

Trade in artificially propagated specimens of *E. msinganus* has been detrimental (Figure 2). The Scientific Authority, in reviewing the factors presented above, is unable to state with any confidence that parental stock is cultivated (as defined in the CITES Resolution Conf. 11.11 (Rev. CoP18)) in all cases of export since (1) there is uncertainty around legal acquisition of parental stock and (2) the illegal harvesting for horticultural purposes has had a detrimental impact on the wild population. It is therefore recommended that *E. msinganus* seedlings may only be exported if the nursery is registered in accordance with the CITES Resolution Conf. 9.19 (Rev. CoP15), and

- i. The seedlings are artificially propagated in accordance with the CITES Resolution Conf. 11.11 (Rev. CoP18), or
- ii. The seedlings have been grown from wild harvested seed in accordance with the conditions specified in the CITES Resolution Conf. 11.11 (Rev. CoP18) and within the framework of a Biodiversity Management Plan published in terms of section 43 of the NEMBA.

Each nursery applying for CITES registration must be audited in accordance with the decision tree approved by the Scientific Authority, and regular follow up audits must be conducted in order to monitor seedling propagation. All parental plants must

- i. Be accompanied by the relevant TOPS permit (or equivalent permit where provinces are not implementing TOPS) and affidavits from the owner stating that the plants are not of wild origin, and
- ii. Not exhibit any characteristics typical of wild origin.

The export of large artificially propagated specimens (with a stem diameter of more than 15 cm) from CITES registered nurseries can be allowed provided that the plants are marked with an acceptable method at the seedling/juvenile stage and are set aside in a separate part of the nursery where they can easily be inspected, and the nursery is contributing to/supporting *in situ* conservation of *E. msinganus* in accordance with CITES Resolution Conf 13.9 (CoP18). Large plants proven to be artificially propagated through acceptable forensic methods (e.g., stable isotopes, DNA profiling) can also be exported.

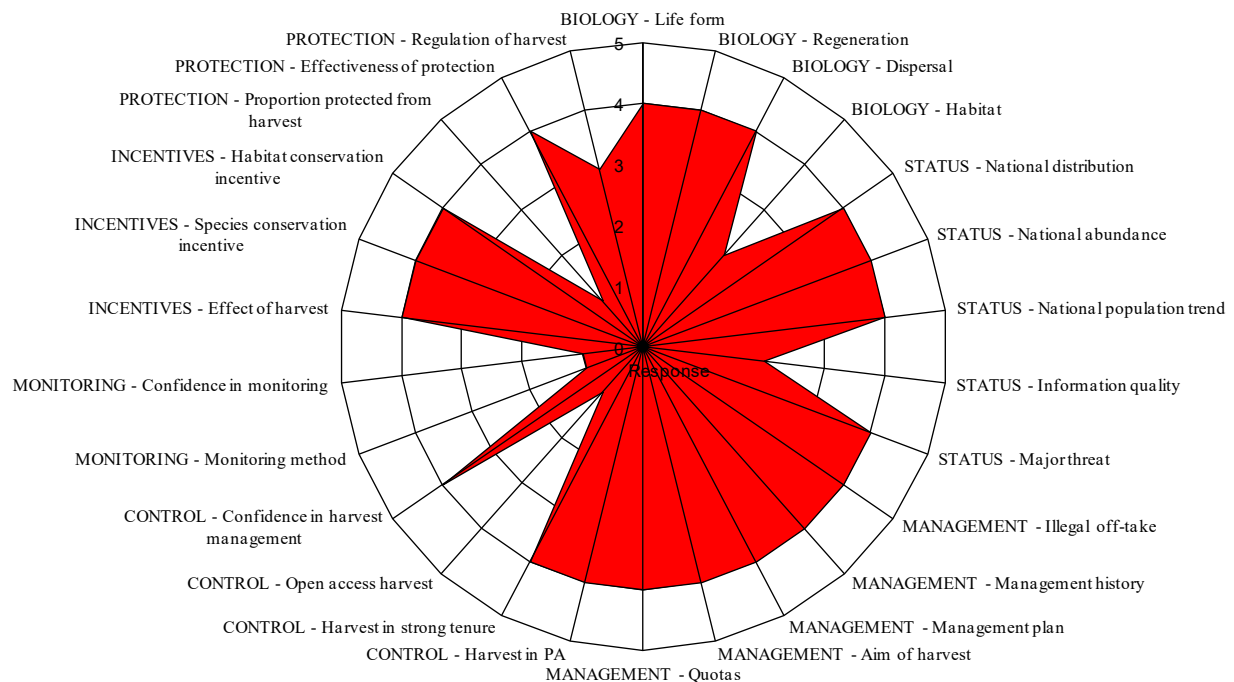


Figure 1. Radar chart summarizing the non-detriment finding assessment undertaken for *Encephalartos msinganus* in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The extensive shaded area in the radar chart demonstrates an overall high risk to the species.

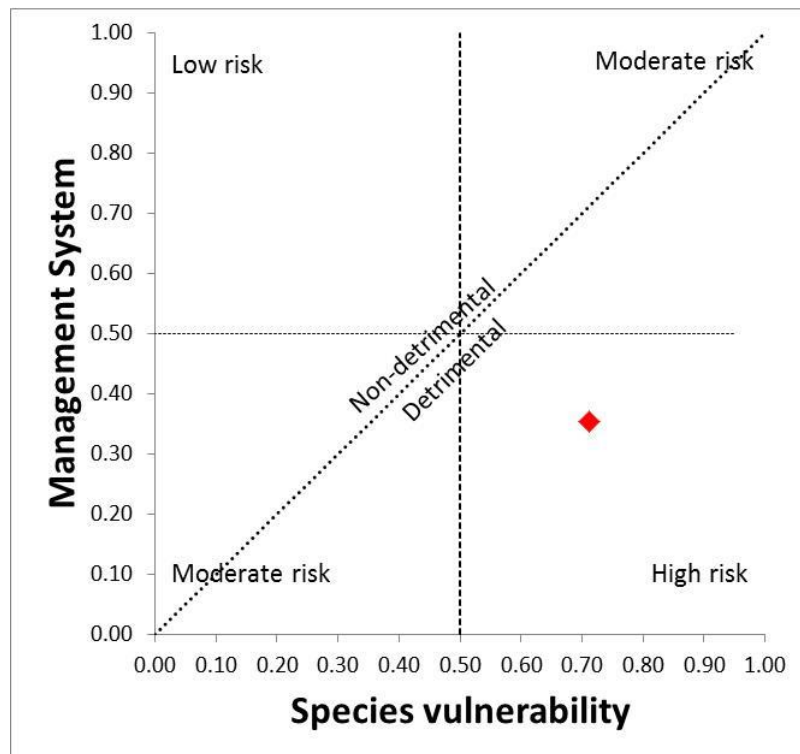


Figure 2. The risk of trading in *Encephalartos msinganus* as represented by the relationship between species vulnerability (biology and status) (0 = low vulnerability; 1 = high vulnerability) and the management system to which the species is subjected (management, control, monitoring, incentives and protection) (0 = weak management system; 1 = strong management system). The figure shows that the species is at high risk and trade is detrimental.

Table 1. Non-detriment finding assessment for *Encephalartos msinganus* undertaken in accordance with the CITES NDF checklist. Scores assigned to each question are indicated (bold text and shaded blocks) along with detailed explanations/justifications where relevant. Higher scores are indicative of higher risks to the species.

Biological characteristics		
1. Life form: What is the life form of the species?	Annual	1
	Biennial	2
	Perennials (herbs)	3
	Shrub and small trees (max. 12m.)	4
	Trees	5
2. Regeneration potential: What is the regenerative potential of the species concerned?	Fast vegetatively	1
	Slow vegetatively	2
	Fast from seeds	3
	Slow or irregular from seeds or spores	4
	Uncertain	5
The cycad life history is characterized by long-lived adults that regenerate predominantly from seed. Plants do produce suckers, but they are relatively unimportant for the regeneration of cycad populations, with 95% of species regenerating from seed only. Suckers remaining behind after the main plant has been harvested do sometimes survive.		
3. Dispersal efficiency: How efficient is the species' dispersal mechanism?	Very good	1
	Good	2
	Medium	3
	Poor	4
	Uncertain	5
The dispersal abilities of cycads are not well understood but are generally regarded as poor. Even if seed were dispersed to new sites, the concomitant dispersal of species-specific pollinators would be highly unlikely thus rendering population recovery after local extirpation impossible. Colonization of new sites is improbable due to a number of reproductive limitations, such as limited seed production or non-viable seeds, irregular coning and male biases in populations. There has been no observed change / expansion in the distribution of any cycad species.		
4. Habitat: What is the habitat preference of the species?	Disturbed open	1
	Undisturbed open	2
	Pioneer	3
	Disturbed forest	4
	Climax	5
Plants of <i>E. msinganus</i> grow in short grassland on steep north-facing slopes, usually amongst boulders in scrub clumps.		
National status		
5. National distribution: How is the species distributed nationally?	Widespread, contiguous in country	1
	Widespread, fragmented in country	2
	Restricted and fragmented	3
	Localized	4
	Uncertain	5
<i>Encephalartos msinganus</i> occurs in a small area in the Msinga district of KwaZulu-Natal.		
6. National abundance: What is the abundance nationally?	Very abundant	1
	Common	2
	Uncommon	3
	Rare	4
	Uncertain	5
Less than 200 adults were successfully located during an aerial survey in 2012, while a number of adults were found at houses and at a school nearby. <i>Encephalartos msinganus</i> is currently listed in the IUCN Red List category of Critically Endangered (B1ab(iii,v)+2ab(iii,v); C1+2a(ii) (IUCN version 3.1)).		

7. National population trend: What is the recent national population trend?	Increasing	1
	Stable	2
	Reduced, but stable	3
	Reduced and still decreasing	4
	Uncertain	5
It is estimated that less than 200 <i>E. msinganus</i> plants occur in the wild in a small number of scattered subpopulations. Field visits in 2011 confirmed that the plants are targeted by poachers. (A recently removed adult and a few juveniles all with badly damaged roots were found at a house nearby the wild population.)		
8. Quality of information: What type of information is available to describe abundance and trend in the national population?	Quantitative data, recent	1
	Good local knowledge	2
	Quantitative data, outdated	3
	Anecdotal information	4
	None	5
9. Major threats: What major threat is the species facing (underline following: overuse/ habitat loss and alteration/ invasive species/ other:) and how severe is it?	None	1
	Limited/Reversible	2
	Substantial	3
	Severe/Irreversible	4
	Uncertain	5
Despite this species growing in very high mountains that are practically inaccessible, poaching of wild plants for horticultural/ornamental purposes (and possibly also for medicinal purposes) has had a severe impact on <i>E. msinganus</i> . Since ex situ plants cone infrequently and the original wild population was small, this species is uncommon ex situ. <i>Encephalartos msinganus</i> plants are sometimes encountered in garden collections (particularly large ones) and in nurseries, but selling prices are generally low. Ezemvelo KwaZulu-Natal Wildlife has received one registration application for a nursery that has six adult <i>E. msinganus</i> plants. In general, around 30-50% of cycads removed from the wild die within a few years.		
Harvest management		
10. Illegal off-take or trade: How significant is the national problem of illegal or unmanaged off-take or trade?	None	1
	Small	2
	Medium	3
	Large	4
	Uncertain	5
Poaching of wild plants to supply the horticultural trade and private collections has had a detrimental impact on <i>E. msinganus</i> . The chief of the communal area confirmed that all the cycads had been removed from an area in the vicinity.		
11. Management history: What is the history of harvest?	Managed harvest: ongoing with adaptive framework	1
	Managed harvest: ongoing but informal	2
	Managed harvest: new	3
	Unmanaged harvest: ongoing or new	4
	Uncertain	5
Illegal harvesting of wild cycads has been occurring in South Africa for the past 40 years, becoming more prevalent from the 1990s onwards in spite of various legislative interventions. Since the 1970s all cycad species have been protected in provincial nature conservation ordinances, with the harvest of any plants or seed requiring a permit (in addition to other activities such as possessing, conveying, selling, etc.). Apart from a permit issued to collect seed for research purposes in 2005, reportedly no permits have been issued for the wild harvest of <i>E. msinganus</i> plants or seed. Plants may however have been harvested from the wild as the Msinga form of <i>E. natalensis</i> prior to the enactment of provincial legislation. In general, there has been an exponential increase in ex-situ cultivated cycads, which are currently regulated by provincial conservation ordinances/Acts and the National Environmental Management: Biodiversity Act (NEMBA): Threatened or Protected Species Regulations (TOPS). In February 2007, the harvest of cycads from the wild was prohibited nationally in terms of Regulation 25 of the Threatened or Protected Species Regulations (subsequently replaced by Government Notice 371 in May 2012). Poaching is nevertheless ongoing.		
Conservation measures to protect <i>E. msinganus</i> included the removal (air lifting) of 31 adult plants from the Msinga area		

to a nursery in Eshowe as part of an ex-situ conservation programme. At the time it was believed that this was the only way to protect these plants. This 'rescue' was conducted by the KwaZulu-Natal Nature Conservation Department.

12. Management plan or equivalent: Is there a management plan related to the harvest of the species?	Approved and co-ordinated local and national management plans	1
	Approved national/state/provincial management plan(s)	2
	Approved local management plan	3
	No approved plan: informal unplanned management	4
	Uncertain	5

In 2004 a management plan was developed for all cycads in KwaZulu-Natal with a poster that was disseminated to District Conservation Officers and to some police stations and prosecutors. The management plan is however now obsolete. A Biodiversity Management Plan for the Critically Endangered and Endangered cycads will be published in 2015 in terms of section 43 of the NEMBA.

13. Aim of harvest regime in management planning: What is harvest aiming to achieve?	Generate conservation benefit	1
	Population management/control	2
	Maximize economic yield	3
	Opportunistic, unselective harvest, or none	4
	Uncertain	5

14. Quotas: Is the harvest based on a system of quotas?	Ongoing national quota: based on biologically derived local quotas	1
	Ongoing quotas: "cautious" national or local	2
	Untried quota: recent and based on biologically derived local quotas	3
	Market-driven quota(s), arbitrary quota(s), or no quotas	4
	Uncertain	5

There are no quotas for any of South Africa's cycad species – all harvesting is illegal.

Control of harvest

15. Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5

Harvesting of wild cycads is illegal throughout South Africa.

16. Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas with strong local control over resource use?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5

Harvesting of wild cycads is illegal throughout South Africa.

17. Harvesting in areas with open access: What percentage of the legal national harvest occurs in areas where there is no strong local control, giving <i>de facto</i> or actual open access?	None	1
	Low	2
	Medium	3
	High	4
	Uncertain	5

The harvest of wild cycads is prohibited throughout South Africa.

18. Confidence in harvest management: Do budgetary and other	High confidence	1
	Medium confidence	2

factors allow effective implementation of management plan(s) and harvest controls?	Low confidence	3
	No confidence	4
	Uncertain	5
There is currently no management plan for <i>E. msinganus</i> . The provincial conservation authorities that are mandated to protect wild cycad populations from illegal harvesting are currently experiencing capacity constraints relating to shortages of human resources and budget. Frequent arrests and confiscations are indicative that the system intended to protect wild cycad populations is inadequate. Most cycad populations occur outside of state-controlled protected areas, but even those within protected areas are not secure from poaching activities.		
Monitoring of harvest		
19. Methods used to monitor the harvest: What is the principal method used to monitor the effects of the harvest?	Direct population estimates	1
	Quantitative indices	2
	Qualitative indices	3
	National monitoring of exports	4
	No monitoring or uncertain	5
Regular aerial surveys are conducted for this species.		
20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
Incentives and benefits from harvesting		
21. Utilization compared to other threats: What is the effect of the harvest when taken together with the major threat that has been identified for this species?	Beneficial	1
	Neutral	2
	Harmful	3
	Highly negative	4
	Uncertain	5
22. Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
23. Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?	High	1
	Medium	2
	Low	3
	None	4
	Uncertain	5
Protection from harvest		
24. Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	>15%	1
	5-15%	2
	<5%	3
	None	4
	Uncertain	5
Government Notice 371 published in May 2012 in terms of section 57(2) of the National Environmental Management: Biodiversity Act (NEMBA) of 2004 prohibits the harvest of wild cycads throughout South Africa, unless required for conservation or enforcement purposes. <i>Encephalartos msinganus</i> is also listed as Specially Protected in the KwaZulu-Natal Nature Conservation Ordinance (No. 15 of 1974).		
25. Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the	High confidence	1
	Medium confidence	2
	Low confidence	3

effectiveness of measures taken to afford strict protection?	No confidence	4
	Uncertain	5
The cycad trade is very complex and in order to monitor all the legal and illegal activities related to this trade, substantial resources would be required. Although providing for a solid legal framework, the Threatened or Protected Species Regulations have been difficult to implement by resource constrained provinces. The provincial conservation authorities that are mandated to enforce the strict protection measures pertaining to cycads are currently experiencing capacity constraints relating to shortages of human resources and budget. In Gauteng, where the demand for illegally harvested wild cycads is ultimately centered, reportedly four out of ten posts within the Biodiversity Enforcement division of the Gauteng Department of Agriculture and Rural Development were vacant in the 2011/2012 financial year, a vacancy rate of 40%. Even cycads within state-controlled protected areas are not secure from poaching activities, with protected areas often understaffed. Enforcement of the legislation is further weakened by inexperienced officials without the necessary skills to identify the different species. (Identification of <i>E. msinganus</i> is particularly problematic.) Prosecutors and magistrates are infrequently exposed to cycad related cases and are therefore not well informed about South Africa's cycad extinction crisis. Consequently, cases relating to cycads seldom result in large fines and/or jail sentences. Provincial conservation legislation pertaining to cycads has been ineffectively implemented in the past in both Gauteng and KwaZulu-Natal. Neither province consistently enforced the requirements for possession permits, although all adult ("size-determined") cycads exported from KwaZulu-Natal had to be micro-chipped. In Gauteng, where most cycad enthusiasts live (50% of the Cycad Society's members reside in Gauteng with between 10% and 12% of members residing in each of the Western Cape, KwaZulu-Natal and Mpumalanga provinces), possession permits were not required for cycads between 1994 and 2001, with the regulatory authority only requiring the presentation of documentary proof of legal possession. Similarly, the legal requirement for cycad possession permits was only strictly enforced in the Eastern Cape from 1 April 2004 and property owners in possession of unpermitted cycads after this date were instead issued with cycad site registration letters. Up until 31 March 2004, people in possession of unpermitted cycads were given amnesty based on submission of affidavits and documentary proof of legal origin. (<i>Encephalartos latifrons</i> and <i>E. arenarius</i> were excluded from this amnesty.) Conservation legislation in three out of the four provinces that were designated out of the former Transvaal province is weak, providing for adequate control over the possession and movement of only those cycad species indigenous to the former Transvaal province (the exception being Limpopo where all South African cycads are Specially Protected). This ineffective implementation of legislation has allowed the entry of illegally harvested plants into the legal trade. In the past, a number of syndicates involved in poaching activities moved illegally harvested cycads into Gauteng where possession permits were not required, laundering them into the trade with the required documentary proof. Such operations apparently continue until today due to the delayed implementation of new national legislation (Threatened or Protected Species Regulations). Due to the impossibility of tracing the origin of these cycads and/or proving wild origin to the satisfaction of a court (proof of wild origin over and above a reasonable suspicion is required), these plants have been and continue to be legalized through the issuing of possession permits and are subsequently incorporated into private collections. The use of these plants as parental stock for the propagation of seedlings for both the domestic and international cycad trade cannot be ruled out. The international trade in <i>E. msinganus</i> started in 1983 (then the Msinga form of <i>E. natalensis</i>) and by 2011 a total of 523 specimens (estimated total value of R418 000) had been exported from South Africa (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK), the bulk of the trade (80%) having had occurred after 1995 when the cycad protection measures in Gauteng were particularly weak. The trade in this species peaked in 1998 and 1999 (when 60 and 88 specimens were exported, respectively) then decreased steadily ($R^2 = 0.37$; $P < 0.04$), perhaps reflecting a decline in the demand for <i>E. msinganus</i> commensurate with the very low prices currently observed. The average annual value of <i>E. msinganus</i> exports is estimated at around R14 000 $\pm$ R11 000 (assuming exports of 3-year old seedlings at 2012-2013 prices). Micro-chips inserted into wild cycads as a measure of proving wild origin are often destroyed or removed and it has been suggested that they are even sometimes replaced with legal micro-chips previously inserted into legally owned ex situ cycads, effectively laundering plants of wild origin. It has also been suggested that legal micro-chips are inserted into un-chipped wild plants to prove legal ownership. Suckers are seldom micro-chipped and are therefore particularly vulnerable to poaching.		
26. Regulation of harvest effort: How effective are any restrictions on harvesting (such as age or size, season or equipment) for preventing overuse?	Very effective	1
	Effective	2
	Ineffective	3
	None	4
	Uncertain	5
Harvesting of wild cycads is prohibited throughout South Africa, yet this restriction remains ineffective.		

List of participants / contributors at cycad NDF workshop of 20 – 21 January 2011 and 11 May 2011

Name	Organization	Expertise in relation to cycads
De Wet Bösenberg	South African National Biodiversity Institute	Manages Global Cycad Red List Database
Brigitte Church	Ezemvelo KwaZulu-Natal Wildlife	Monitoring and management plans for cycads
Stephen Cousins	University of the Witwatersrand	Research on cycads in traditional medicine trade in South Africa
Mzikayise Dandala	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism	Cycad permitting
Juan de Beer	Mpumalanga Tourism and Parks Agency	Enforcement
John Donaldson	South African National Biodiversity Institute	Science/research
Cornia Hugo	Gauteng Department of Agriculture and Rural Development	Cycad inspections and law enforcement
Leon Labuschagne	Gauteng Department of Agriculture and Rural Development	Cycad inspections and permitting
Eric Mbele	Gauteng Department of Agriculture and Rural Development	Investigations related to illegal harvesting, trading and possession of cycads
Errol Moeng	Limpopo Department of Economic Development, Environment and Tourism	Cycad management
Michèle Pfab	South African National Biodiversity Institute	Scientific Co-ordinator for the Scientific Authority
Dean Ricketts	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism	Management in Alfred Nzo Region Eastern Cape
Stan Rodgers	Limpopo Department of Economic Development, Environment and Tourism	Cycad monitoring and management
Tommie Steyn	Mpumalanga Tourism and Parks Agency	Monitoring and surveys
Thembinkosi Tyali	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism	Cycad permitting and monitoring
Erich van Wyk	South African National Biodiversity Institute	SANBI <i>ex situ</i> conservation co-ordinator
Karin van der Walt	South African National Biodiversity Institute	Propagation, trade and monitoring of cycads
Phakamani Xaba	South African National Biodiversity Institute	Manages cycad collection at Kirstenbosch National Botanical Garden

References

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