

Non-detriment finding for *Encephalartos nubimontanus*

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Summary of finding

Cycads are collectively/globally the most threatened taxonomic group of organisms that have been assessed so far by the International Union for Conservation of Nature (IUCN). South Africa is one of the world centres of cycad diversity with more than 50% of the known African cycad species occurring in the country. This includes 37 species from the *Encephalartos* genus, of which 70% are threatened with extinction and 11% are presumed to be Extinct in the Wild. Targeted removals of individuals from the wild for direct use/collection and trade purposes is the primary threat to all but one of these 37 species. As such, all species of the genus are included in Appendix I to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the export of these species 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. Furthermore, in terms of CITES Resolution Conf. 11.11 (Rev. CoP18) the parental stock that is used to produce specimens for trade must have been established in accordance with the provisions of CITES and relevant national laws and in a manner not detrimental to the survival of the species in the wild. This document details the undertaking of a non-detriment finding (NDF) for *E. nubimontanus* and is based on the best available information, current as of September 2023.

Encephalartos nubimontanus (Blue cycad) is one of the rarest, and most popular blue cycads in the horticultural trade. It has been listed in the IUCN Red List as Extinct in the Wild since 2006, with specimens existing only in *ex situ* collections and in cultivation. The species was formally localised in communal areas of the Limpopo Province prior to being extirpated by collectors. Surveys conducted across the species range indicate a decline from 66 plants observed in the 1990's to eight plants in 2000, only a few remaining stems in 2003/2004, and no plants observed in 2010/11.

Since the 1970s, cycads in South Africa have received legislative protection under various provincial nature conservation ordinances, and more recently in terms of Government Notice No. 371 of 2012 which prohibits wild harvest (of plants and seed) excepting for conservation and enforcement purposes. No permits have reportedly ever been issued for the wild harvest of *E. nubimontanus* plants or seed, and the last remaining stems were removed by conservation officials into *ex situ* collections owing to the decimation of the wild population by collectors. The species has been and continues to be traded legally both domestically and internationally, and this is likely to have contributed to the illegal harvest of wild plants to establish parental stock *ex situ*.

No specific conservation plans were drafted for *E. nubimontanus* given its relatively recent description in the late 1990s and its apparent disappearance from the wild less than a decade later. As of 2014, the management and conservation of all cycad species in the country, including wild origin plants in *ex situ* collections, has been guided by the National Strategy and Action Plan for the Management of Cycads. Implementation of management plans and monitoring activities (both *in situ* and *ex situ*) is however hampered by inadequate resources across the provinces, whilst the non-compliance with and lack of implementation of Government Notice No. 371 in key trading provinces, undermines the intended strict protection measures.

There has been an exponential increase in *ex situ* propagated cycads. National trade regulated through the Threatened or Protected Species Regulations (TOPS), including the interprovincial movement of plants, remains ineffectively monitored at present despite some significant efforts to improve the effectiveness of implementation. As of 2018, a national programme to audit and monitor nurseries involved in the international trade in cycads has been established. At present, eight South African nurseries are registered with the CITES Secretariat in terms of CITES Resolution Conf. 9.19 (Rev. CoP15) to trade in *E. nubimontanus*. The species appears to be common in cultivation with many artificially propagated mother plants observed in nurseries. A little over 4000 specimens have been exported from South Africa since the species discovery in 1995 up until 2020. No conservation benefit for the species or its habitat is derived from this trade at present. The species could be re-introduced into habitat through future restoration efforts with the help of private collectors, but the risk of re-introduced plants being removed from the wild remains high.

This species is now extinct in the wild and it is highly likely that international trade contributed to the extirpation of wild populations (Fig. 1 & 2). With respect to artificial propagation (source code A), CITES Resolution Conf. 11.11 (Rev. CoP18) requires that parental plants are legally acquired and not to the detriment of the wild population, but it is highly unlikely that exports in the past met these requirements. Therefore, only nurseries registered in accordance with the CITES Resolution Conf. 9.19 (Rev. CoP15) may continue to export *E. nubimontanus* seedlings. Only seedlings that (i) are artificially propagated in accordance with the CITES Resolution Conf. 11.11 (Rev. CoP18), or (ii) have been grown from legal (TOPS possession permits issued prior to May 2012) wild origin parental plants, may be exported. For scenario (ii) a portion of the seed / seedlings must be made available for the recovery of the species.

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 TOPS possession permits and, with the exception of scenario (ii) above, affidavits from the owner stating that the plants are not of wild origin, and
- ii. Not exhibit any characteristics typical of wild origin, with the exception of wild origin parental plants considered in scenario (ii) above.

The export of large artificially propagated specimens (with a stem diameter of more than 15 cm) is prohibited (Government Notice No. 371, May 2012).

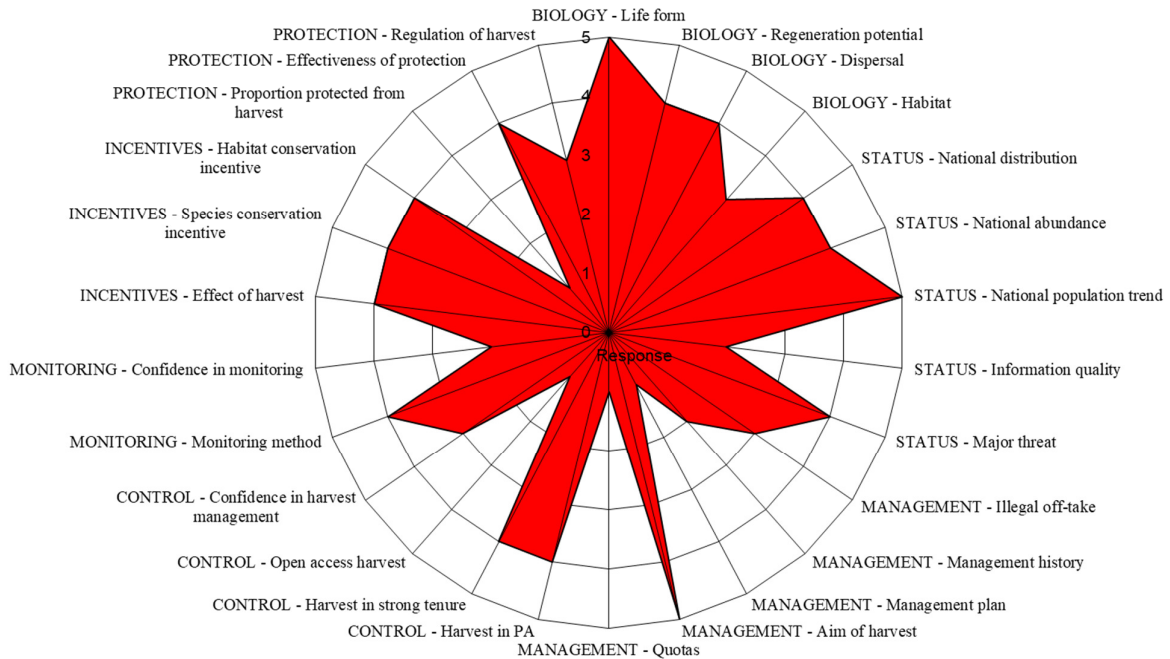


Figure 1. Radar chart summarizing the non-detriment finding assessment undertaken for *Encephalartos nubimontanus* in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The shaded area in the radar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

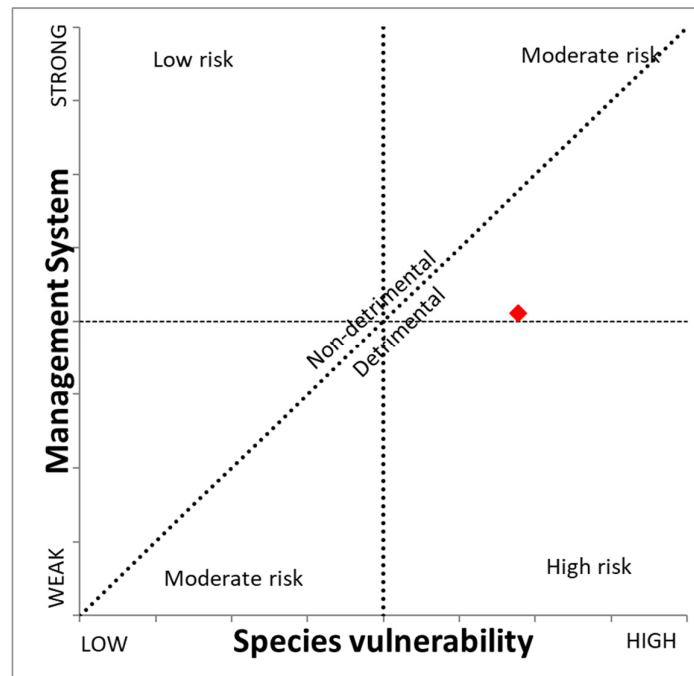


Figure 2. The risk of trading in *Encephalartos nubimontanus* as represented by the relationship between species vulnerability (biology and status) and the management system to which the species is subjected (management, control, monitoring, incentives and protection). The figure shows that the species is at a moderate to high risk and trade is detrimental.

Table 1. Non-detriment finding assessment for *Encephalartos nubimontanus* 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
<i>Encephalartos</i> (African cycads) is a genus of ancient plants characterised by their unique woody trunks, attractive crown of evergreen leaves, and large cones that appear at maturity. Although they differ in their life-history strategies, all species are generally long-lived and can survive for many decades and even centuries with adult plants playing an important role in population persistence (Golding and Hurter 2003; Raimondo and Donaldson 2003). The stems of <i>E. nubimontanus</i> plants can reportedly reach heights of more than 2 m, a feature that distinguishes it from its closest relative, <i>E. cupidus</i>, which is a dwarf species with largely subterranean stems (up to 1 m in height). The typically narrow, 35-40 cm wide stems of <i>E. nubimontanus</i> plants carry a crown of long and arching silvery-blue leaves and distinctive blue green cones (Hurter 1995; Hurter and Claassen 1996).		
		
Figure 3: <i>Encephalartos nubimontanus</i> plants pictured in a cycad nursery. Photo by Grego Riuz, https://www.flickr.com/, All Rights Reserved.		
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

Not much is known about this species as it is extremely rare and was rendered extinct in the wild shortly after being described. The cycad life history is generally characterized by long-lived (dioecious) adults. Plants do produce suckers, but they generally play a limited role in reproduction, with most species regenerating from seed only. Suckers however may aid in species persistence, particularly where they remain behind after the main stem has died or has been harvested. *Encephalartos nubimontanus* is typically single stemmed but plants sometimes form clusters of offsets at the base. The species reportedly produces two cones at a time once every five years on average (Konings 2016). *Encephalartos nubimontanus* is presumed to be extinct in the wild and there is no evidence of regeneration currently taking place in habitat.

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. Cycads have large seeds with fleshy and brightly coloured outer coats or sarcotesta, which attract animals such as birds and small mammals that act as dispersal agents. The distance that seeds disperse is limited by how far animals can carry the large seeds. Even if seed were dispersed to new sites, the concomitant dispersal of species-specific pollinators would be highly unlikely. Cycad seeds are relatively short-lived without any period of dormancy and typically only a few seeds will survive post dispersal. Colonization of new sites is furthermore unlikely due to several reproductive limitations, such as limited seed production or non-viable seeds, irregular coning, infrequent recruitment, and male plant biases in populations. There has been no observed change/expansion in the distribution of any cycad species and *E. nubimontanus* is presumed to be extinct in the wild.

4. Habitat: What is the habitat preference of the species?	Disturbed open	1
	Undisturbed open	2
	Pioneer	3
	Disturbed forest	4
	Climax	5

Encephalartos nubimontanus is a savanna species. Plants were historically found growing in low, open deciduous woodland on cliff faces and in direct sunlight. The specific name *nubimontanus* (Latin= 'growing on the cloud mountains') was given to the species in reference to the Mountains where this species was previously found.

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

The extent of the species distribution range is not known but *E. nubimontanus* formally occurred in a small area of the Limpopo Province. Wild plants still exist locally in *ex situ* collections and there may be opportunities to re-introduce the species through genetically sound artificial propagation initiatives in the future.

6. National abundance: What is the abundance nationally?	Very abundant	1
	Common	2

	Uncommon	3
	Rare	4
	Uncertain	5
The size of the <i>E. nubimontanus</i> population was originally estimated to number between 50 and 100 mature individuals. All the known subpopulations have been extirpated by collectors and whilst there have been occasional reports that some wild subpopulations persist, no validated data has been provided to support this. In the absence of ground truthing surveys, there is some uncertainty whether any more plants exist in the wild. There may, however, be plants (including females) in private collections that were removed from the wild prior to the species being formally described. Research is currently underway to determine the number of plants held in <i>ex situ</i> private collections. <i>Encephalartos nubimontanus</i> is currently listed in the IUCN Red List category of Extinct in the Wild (Bösenberg 2022).		
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
The natural population of <i>E. nubimontanus</i> has been extirpated by collectors. Surveys conducted in the Limpopo province shows a decline in the population size from 66 plants in the 1990s, to eight plants in 2001, and no recorded plants in 2004. A few remaining stems of the species were removed into <i>ex situ</i> conservation collections between 2001 and 2004. It is uncertain if any more plants exist in the wild but wild origin specimens are reportedly still present in some <i>ex situ</i> collections.		
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
The known subpopulations of <i>E. nubimontanus</i> were surveyed regularly by provincial conservation officials up until the species demise in the wild around the early 2000's. The species has been presumed extinct in the wild as of 2006. Repeat helicopter surveys conducted within the last decade over the area of known occurrence have been unsuccessful in locating any additional plants, although ground surveys are required to verify this.		
9. Major threats: What major threat is the species facing (underline following: <u>overuse</u> / habitat loss and alteration/ invasive species/ other:) and how severe is it?	None	1
	Limited/Reversible	2
	Substantial	3
	Severe/Irreversible	4
	Uncertain	5
Poaching of wild plants for horticultural and ornamental purposes caused the decline of the <i>E. nubimontanus</i> population to extinction. In general, the mortality rates of cycads removed from the wild is likely to be quite high depending on several factors such as the size of specimens harvested, the quality of aftercare, and the effects of frequent transplantation. It is thus very likely that many wild origin specimens have been and will continue to be lost over time from private collections.		
The species has also reportedly been harvested for traditional medicine purposes (Rogers and Pillay 2006). Within South Africa, cycads are a culturally important plant group (Cousins and Witkowski 2017), and harvesters and healers do not distinguish between the various species. Accessibility of the plants is the key factor determining whether a species is vulnerable to harvesting.		

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
This species was decimated due to poaching of plants from the wild. Evidence of collecting at the known occurrence site of the species, as well as at localities of related species nearby, had been observed in the early 2000's. There have since been many cases of illegal activity involving suspected <i>E. nubimontanus</i> plants in both the Limpopo and Mpumalanga Provinces but due to the close resemblance with <i>E. cupidus</i> (for which permits were issued), many loopholes to having <i>E. nubimontanus</i> were created i.e., owners of <i>E. nubimontanus</i> plants have permits for <i>E. cupidus</i> and claim to have had their plants for years without knowing it was a different species. Given that this species was discovered and described relatively recently, there is a high likelihood that all large plants in collections have been illegally sourced from the wild and have been legalized in other provinces. There are plenty of plants (including suckers) in private collections as well as in nurseries in the Gauteng province. One collector had a total of between 50 - 60 plants and suckers in his collection. Historical offtake is therefore deemed to have been significant, but since the species is now presumed extinct in the wild, there cannot be any illegal offtake at present. However, if the species were to be successfully re-introduced into the wild, the threat of illegal offtake would likely be high given the value of this species. Historically, the species has been recorded as a medicinal plant and was possibly impacted by traditional medicine harvest as well.		
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 50 years, becoming more prevalent from the 1990s onwards despite 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.). No permits have reportedly ever been issued for the wild harvest of <i>E. nubimontanus</i> plants or seed and the last remaining stems had to be removed into <i>ex situ</i> collections owing to the decimation of the wild population by collectors. In general, there has been an exponential increase in <i>ex situ</i> 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, but this was withdrawn and replaced by Government Notice No. 371 in May 2012 which prohibited the wild collection of cycads and all restricted activities for wild origin cycads excepting for possession of plants that had TOPS permits prior to the notice coming into effect.		
12. Management plan or equivalent: Is there a management	Approved and co-ordinated local and national management plans	1
	Approved national/state/provincial management plan(s)	2

plan related to the harvest of the species?	Approved local management plan	3
	No approved plan: informal unplanned management	4
	Uncertain	5
There was no management/conservation plan for the species prior to it becoming extinct in the wild. As of 2014, the management and conservation of all cycad species in the country has been guided by a National Strategy and Action Plan for the Management of Cycads. A Cycad Steering Committee/ National Cycad Task Team (consisting of representatives from local, provincial, and national conservation agencies, NGOs, and the private sector) has been established to implement the National Strategy and Action Plan through a process of ongoing, co-ordinated collaboration and monitoring.		
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
The harvest of wild cycads is prohibited throughout South Africa, except for conservation and enforcement purposes. The known population of <i>E. nubimontanus</i> was harvested to extinction between 2003 and 2004, with a few remnant stems removed by the provincial conservation authority to <i>ex situ</i> conservation collections. Whilst it is not clear what resource users aimed to achieve with these plants, genetically pure specimens in private collections and scientific collections do hold conservation value for future recovery efforts.		
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 currently zero-offtake quotas in place for all South African cycad species. Harvesting of wild plants (and seed) is prohibited under Government Notice No. 371 (published May 2012) excepting for conservation and enforcement purposes.		
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
The harvest of wild cycads (including seed) is controlled by provincial nature conservation legislation and nationally in terms of the Government Notice No. 371 of 2012 which prohibits harvest excepting for conservation and enforcement purposes. There has been no legal harvest of <i>E. nubimontanus</i> since a few remnant plants were removed by conservation officials to <i>ex situ</i> conservation collections. The known population of <i>E. nubimontanus</i> did not occur within a protected area.		
16. Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national	High	1
	Medium	2
	Low	3

harvest occurs outside Protected Areas, in areas with strong local control over resource use?	None	4
	Uncertain	5
The harvest of wild cycads (including seed) is controlled by provincial conservation legislation and nationally in terms of the Government Notice No. 371 of 2012 which prohibits harvest excepting for conservation and enforcement purposes. There has been no legal harvest of <i>E. nubimontanus</i> since a few remnant plants were removed by conservation officials to <i>ex situ</i> conservation collections. The known population of <i>E. nubimontanus</i> occurred in an area with strong local control over resource use.		
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
There are no open access areas in South Africa on which cycads occur/occurred.		
18. Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	High confidence	1
	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
<i>Encephalartos nubimontanus</i> is presumed extinct in the wild and management controls are thus not implemented <i>in situ</i> . Wild origin plants still exist in <i>ex situ</i> collections, but records and management of such collections are presently lacking. Monitoring and enforcement activities for cycads, and more particularly for rare species, require dedicated capacity and budget. The provincial conservation authorities that are mandated to conserve cycads and monitor trade continue to face severe resource constraints, both in terms of human resource capacity and budget. National funds afforded to the biodiversity sector are becoming increasingly insufficient (in relation to the scale of the challenges faced), making it difficult to effectively (and consistently) implement the strong regulatory and management frameworks needed to protect cycads.		
Table 2: Regulatory and management interventions in place for the conservation and protection of South African cycads		
Management intervention/harvest control		Effectiveness of implementation
CITES Appendix I listing (1977)		Somewhat effective
Provincial legislations		Ineffective
Threatened or Protected Species Regulations (2007)		Ineffective
Government Gazette Notice No. 371 on the Prohibition of trade in certain <i>Encephalartos</i> (cycad) species (2012)		Ineffective due to inconsistent implementation between provinces
National Response Strategy and Action Plan (2014)		Ineffective due to limited progress in undertaking activities
The non-compliance with and lack of implementation of Government Notice No. 371 in relation to the prohibition of trade in wild origin specimens in key provinces such as Gauteng, undermines the intended harvest controls, whilst implementation of management plans and monitoring activities (both <i>in situ</i> and <i>ex situ</i>) is hampered by inadequate resources.		

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																																																																																	
This species is presumed extinct in the wild, existing only in <i>ex situ</i> collections and in cultivation. Exports of <i>E. nubimontanus</i> from South Africa (extracted from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK) are monitored by the South African National Biodiversity Institute (SANBI) on behalf of South Africa's Scientific Authority. International trade in <i>E. nubimontanus</i> started in 1995 and a total of 4 092 specimens have been exported from South Africa between then and 2020 (Fig. 4). The total value of <i>E. nubimontanus</i> exports is conservatively estimated at around R1.23 million (assuming exports of 3-year-old seedlings at 2021/22 prices).																																																																																			
<table border="1"> <caption>Estimated data for Figure 4: Gross (legal) exports of <i>Encephalartos nubimontanus</i></caption> <thead> <tr> <th>Year</th> <th>Live plants</th> <th>Seed</th> </tr> </thead> <tbody> <tr><td>1995</td><td>0</td><td>0</td></tr> <tr><td>1996</td><td>40</td><td>0</td></tr> <tr><td>1997</td><td>60</td><td>0</td></tr> <tr><td>1998</td><td>60</td><td>0</td></tr> <tr><td>1999</td><td>120</td><td>0</td></tr> <tr><td>2000</td><td>70</td><td>0</td></tr> <tr><td>2001</td><td>100</td><td>0</td></tr> <tr><td>2002</td><td>40</td><td>200</td></tr> <tr><td>2003</td><td>90</td><td>0</td></tr> <tr><td>2004</td><td>90</td><td>30</td></tr> <tr><td>2005</td><td>130</td><td>0</td></tr> <tr><td>2006</td><td>100</td><td>0</td></tr> <tr><td>2007</td><td>530</td><td>0</td></tr> <tr><td>2008</td><td>500</td><td>0</td></tr> <tr><td>2009</td><td>140</td><td>0</td></tr> <tr><td>2010</td><td>240</td><td>0</td></tr> <tr><td>2011</td><td>70</td><td>0</td></tr> <tr><td>2012</td><td>110</td><td>0</td></tr> <tr><td>2013</td><td>300</td><td>0</td></tr> <tr><td>2014</td><td>40</td><td>0</td></tr> <tr><td>2015</td><td>80</td><td>0</td></tr> <tr><td>2016</td><td>470</td><td>0</td></tr> <tr><td>2017</td><td>130</td><td>0</td></tr> <tr><td>2018</td><td>300</td><td>0</td></tr> <tr><td>2019</td><td>270</td><td>0</td></tr> <tr><td>2020</td><td>40</td><td>0</td></tr> </tbody> </table>			Year	Live plants	Seed	1995	0	0	1996	40	0	1997	60	0	1998	60	0	1999	120	0	2000	70	0	2001	100	0	2002	40	200	2003	90	0	2004	90	30	2005	130	0	2006	100	0	2007	530	0	2008	500	0	2009	140	0	2010	240	0	2011	70	0	2012	110	0	2013	300	0	2014	40	0	2015	80	0	2016	470	0	2017	130	0	2018	300	0	2019	270	0	2020	40	0
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Figure 4: Gross (legal) exports of <i>Encephalartos nubimontanus</i> plants and seed from South Africa since the inception of CITES in 1975 (CITES trade statistics derived from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK).																																																																																			
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20. Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	1																																																																																	
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The quality of the CITES trade data is not always as accurate as it should be owing to errors and inconsistencies in reporting by both exporting and importing countries. Lack of monitoring across local nursery facilities has also facilitated the illegal collection and laundering of wild plants of this and other species, but the national programme established in 2018 to audit and monitor cycad nurseries should improve this situation. Local trade in cycads, including the interprovincial movement of plants, is ineffectively monitored at present.

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

Though *E. nubimontanus* is presumed extinct in the wild, the species has been and continues to be utilised (legally) for trade purposes, which is likely to have aggravated the illegal harvest of wild plants to establish parental stock *ex situ*. There are thus no incentives and/or benefits to the species accrued from utilisation at present. The possibility of unknown plants or wild populations being discovered cannot be ruled out, and the species may be re-introduced into habitat through future restoration efforts. In this scenario, a well-managed and controlled legal harvest of seed may prove to be beneficial as in the case of *E. latifrons*, although the high value of the species could also result in any newly discovered or re-introduced plants being pilfered from the wild. Nevertheless, these scenarios remain hypothetical, and the effects of any possible future harvest are largely speculative.

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 No. 371 published in May 2012 in terms of section 57(2) of the National Environmental Management: Biodiversity Act (NEMBA) of 2004 prohibits the harvest (and trade) of wild cycads throughout South Africa, unless required for conservation or enforcement purposes. (This law pertains to the wild origin specimens currently in *ex situ* collections as well). All South African cycad species are also included in Appendix I to CITES, and thus commercial international trade in wild sourced plants is not allowed.

	High confidence	1
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25. Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?	Medium confidence	2
	Low confidence	3
	No confidence	4
	Uncertain	5
<i>Encephalartos nubimontanus</i> is presumed extinct in the wild. The single known population occurred on unprotected communal lands and, despite the provincial legislation in place to protect cycads, was harvested to levels of non-viability in the early 2000's. The nature conservation legislation pertaining to cycads has firmly improved over the past two decades, with strict protection currently afforded to wild cycads (including <i>ex situ</i> cycads of wild origin) under Government Notice No. 371 on the prohibition of trade in certain <i>Encephalartos</i> (cycad) species. The Threatened or Protected Species Regulations (TOPS) further provides for a solid legal framework to promote and support the sustainable trade in artificially propagated plants. The cycad trade is however quite complex, and substantial resources are required to monitor all the legal and illegal activities related to this trade and ultimately to enforce the prohibition. Unfortunately, resource capacity deficiencies in terms of budget and staff remains a key challenge in many cycad range provinces, thus rendering strict protection measures ineffective at present. <i>Encephalartos nubimontanus</i> is endemic to the Limpopo province, where the protection of cycads remains a challenge. The laundering of illegally obtained wild plants into private collections and nursery operations is facilitated through the inconsistent and non-implementation of Government Notice No. 371 within key provinces such as Gauteng, where most of the cycad trade is centred. There has been some efforts to improve the implementation of legislative instruments, such as the development of guidelines to assist law enforcers with distinguishing wild cycads from artificially propagated specimens, as well as training sessions to educate and upskill (e.g. in relation to identifying species, see IdentifyIt Cycads app) those involved in investigations and prosecutions (including South African Police Service (SAPS) officials). Nevertheless, the illegal harvesting and movement of illegally harvested cycads across the country, and particularly into and around Gauteng, remains an ongoing problem with seemingly limited effort to address the scourge on a national level. All species of South African cycads have been included in Appendix I of CITES since 1977, thereby ensuring that international trade in cycad specimens is subject to strict regulation. However, the CITES listing has had little impact on preventing the removal of plants from the wild. Parental stock for the propagation of seedlings for both the domestic and international trade has been sourced from the wild to the detriment of the species' survival, most notably for <i>E. nubimontanus</i> which is now extirpated from its only known locality. This is primarily due to poor application of the CITES provisions by the relevant state agencies, particularly in respect of the definition of artificial propagation (source code A) as per CITES Resolution Conf. 11.11 (Rev. CoP18). Interventions to improve compliance of exporting facilities with the CITES provisions have been put in place (as of 2018), and only CITES registered facilities that meet the strict requirements for international trade are allowed to export juvenile cycads and cycad seedlings. A total of 52 artificially propagated mother plants of the species have been recorded during the national audit programme across cycad nurseries, including 37 plants within the eight registered facilities. Presently, several technological solutions are being employed to aid in efforts to curb the illegal trade in wild plants, including novel marking/tracking techniques (Williamson <i>et al.</i> 2016; Zondi 2023) and strontium isotopes (Retief <i>et al.</i> 2014), which will provide the scientific evidence needed to prove wild origin in a court of law. Law enforcement agencies have yet to take full advantage of these modern innovations in prosecuting cycad-related offences.		

The measures put in place to protect wild cycads and prevent unsustainable use have not yet yielded the desired outcomes, primarily due to a continued lack of resources in the provinces that are increasingly operating under ballooning mandates.

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

Regulatory measures are ineffective at present. Despite an exponential increase in *ex situ* propagated cycads, coupled with focused efforts in the regulatory and management space to curb the unsustainable harvest and trade of South African cycad species, wild plants continue to be illegally obtained and laundered into private collections and nursery operations.

All indigenous species of the genus *Encephalartos* are Specially Protected in the Limpopo Environmental Management Act (No. 7 of 2003). South African *Encephalartos* species are also protected in several other provinces under the respective provisional ordinances, however, most of these conservation legislations are outdated and have been inconsistently enforced. At the time of the species discovery and description, existing legislation failed to prevent the removal of most of the *E. nubimontanus* population from habitat. The protection of wild plants *ex situ* is also not adequately addressed at present.

The Threatened or Protected Species (TOPS) Regulations of 2007 provided an improved national legal framework to govern the use of all indigenous cycads. As with several other regulatory interventions, compliance with and enforcement of the TOPS regulations has been met with some challenges over the years. A revision of the TOPS regulations has attempted to address some of the implementation challenges, but this has been a long and arduous process stretching across a decade, and it will require some time to assess the effectiveness of the revised regulations once they come into effect.

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