# Non-detriment finding for *Encephalartos brevifoliolatus*

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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 *Encephalartos brevifoliolatus* and is based on the best available information, current as of September 2023.

*Encephalartos brevifoliolatus* (Escarpment cycad) is a rare, highly sought after cycad 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. Formerly localised in communal areas of the Limpopo Province, the species was known from just five to seven widely scattered individuals when first described. There has been a persistent lack of evidence for the existence of female plants since the species description in 1996 and there is no evidence of regeneration having occurred in the wild, most likely due to the predominance of male plants. Removal of individuals from the wild by collectors was the main reason for the disappearance of the species.

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. brevifoliolatus* 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. brevifoliolatus* 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, only one South African nursery is registered with the CITES Secretariat in terms of CITES Resolution Conf. 9.19 (Rev. CoP15) to trade in *E. brevifoliolatus*. The species remains rare in cultivation and less than 100 specimens have been exported from South Africa since the species description in 1996 and 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. brevifoliolatus* 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).

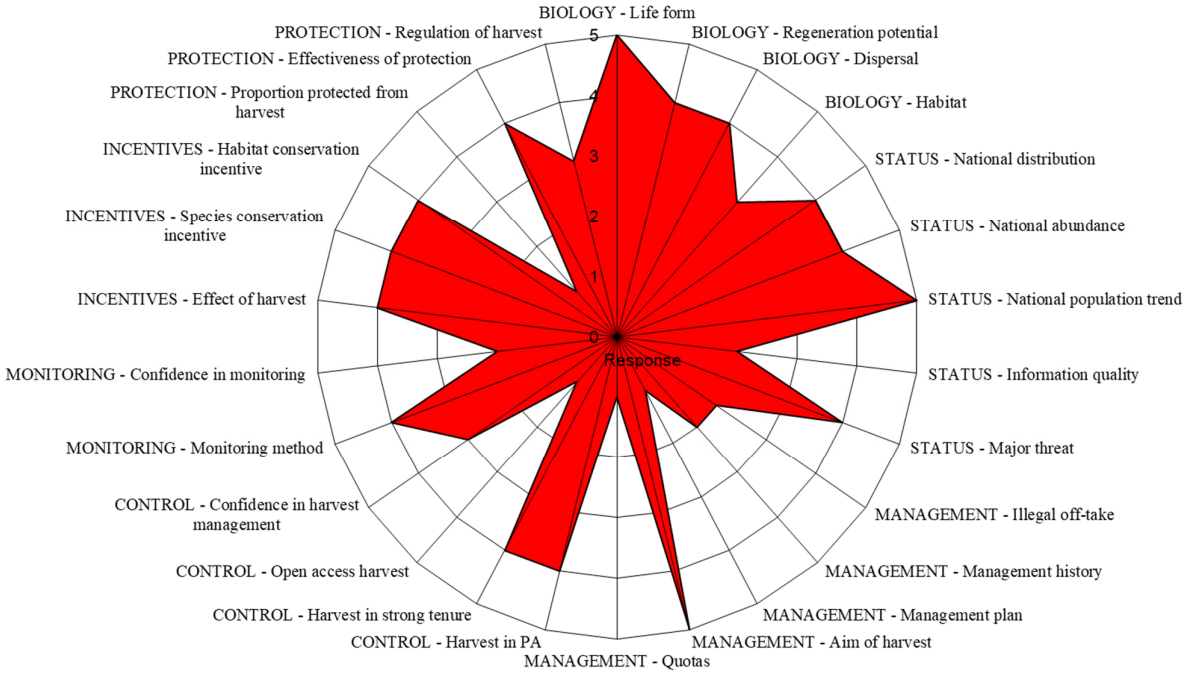


**Figure 1.** Radar chart summarizing the non-detriment finding assessment undertaken for *Encephalartos brevifoliolatus* in accordance with the CITES NDF checklist. Explanations of scores given are detailed in Table 1. Higher scores are indicative of higher risks to the species. The shaded area in the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

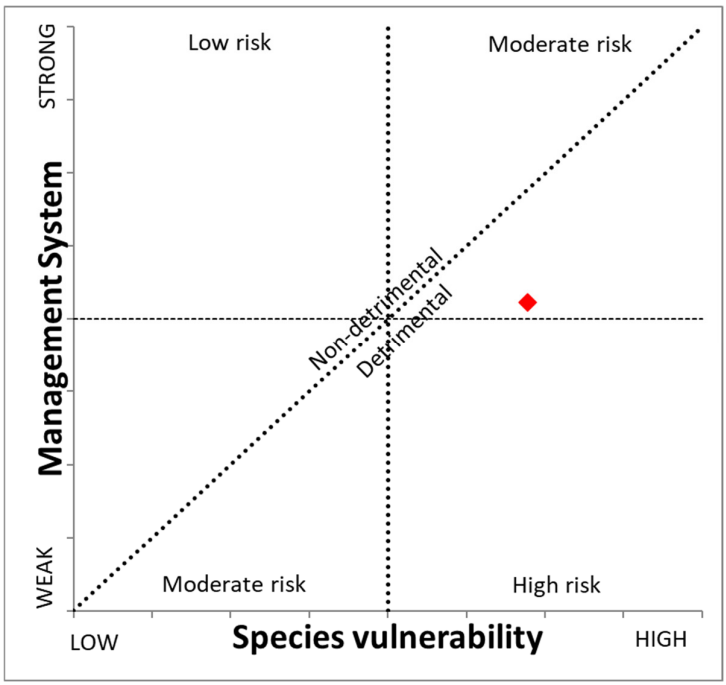


**Figure 2.** The risk of trading in *Encephalartos brevifoliolatus* as represented by the relationship between species vulnerability (biology and status) and the management system to which the species is subjected (management, control, monitoring, incentives and protection). The figure shows that the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

**Table 1.** Non-detriment finding assessment for *Encephalartos brevifoliolatus* 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** |

*Encephalartos* (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 *E. brevifoliolatus* plants are typically unbranched, up to 2.5 m tall and 25-30 cm wide, and may be procumbent (Vorster 1996). The species closely resembles *E. laevifolius*.

**Figure 3: *Encephalartos brevifoliolatus* plants pictured in habitat, 1990. Photo by Piet Voster, https://www.cycadlist.org/index.php, CC BY-NC-SA 4.0**

| | | |
|---|---|---|
| **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 brevifoliolatus* was observed to sucker from the base, reportedly forming clumps of up to 6 stems (Vorster 1996). Up to six male cones were observed on one individual when the species was first described, but no evidence of seed production in the wild has been noted for this species. There is no evidence of regeneration having occurred in the wild, most likely due to the predominance of male plants. Only a few well-known plants exist in private collections and at this stage only one has reportedly produced a female cone.

| | | |
|---|---|---|
| **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. brevifoliolatus* is presumed to be extinct in the wild.

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

*Encephalartos brevifoliolatus* is a savanna species. Plants used to occur in short grassland, in open *Protea* savanna, on quartzite-derived sandstone, or on cliffs, in direct sunlight (Vorster 1996).

**National status**

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| **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 only known population of this species was restricted to a small area (~50km$^2$) in 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.

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| **6. National abundance:** What is the abundance nationally? | Very abundant | 1 |
| | Common | 2 |
| | Uncommon | 3 |
| | **Rare** | **4** |
| | Uncertain | 5 |

The only known population of the species consisted of five to seven individual male plants and 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 *ex situ* collections. *Encephalartos brevifoliolatus* 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** |

Originally described in 1996 from a single population of five to seven male plants, several of the few remaining plants were removed by collectors over the years, and in 2004 conservation officials removed the last known stems for *ex situ* conservation. It is uncertain if any more plants exist in the wild but wild origin specimens are reportedly still present in some *ex situ* collections.

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| **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 only known population of *E. brevifoliolatus* was comprehensively surveyed in the early 2000s after which the few remaining stems were removed into *ex situ* conservation collections. The species has since been presumed extinct in the wild. 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.

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| **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 *E. brevifoliolatus* 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** | | |
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| **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 |

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| | Uncertain | 5 |

When this species was formally described in 1996, there were thought to be around five mature plants in one site in the Limpopo Province. Collectors removed most of these plants, leaving only a few damaged stems. These were removed in 2004 by conservation officials for *ex situ* conservation purposes. Prior to the species being described, individuals of *E. brevifoliolatus* may have been collected as *E. laevifolius* and there are cycad nurserymen within the country claiming to have female specimens of the species. It is highly likely that all large plants in collections have been illegally sourced from the wild. 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.

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| **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 *E. brevifoliolatus* plants or seed and the last remaining stems had to be removed into *ex situ* collections owing to the decimation of the wild population by collectors. 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, 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.

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| **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 |

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.

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| **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 |

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| | 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 *E. brevifoliolatus* was harvested to extinction between 2003 and 2004, with a few remnant stems removed by the provincial conservation authority to *ex situ* 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.

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| **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**

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| **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, excepting for conservation or enforcement purposes, is prohibited nationally in terms of Government Notice No. 371 of 2012. There has been no legal harvest of *E. brevifoliolatus* since a few remnant plants were removed by conservation officials to *ex situ* conservation collections in 2004. The known population of *E. brevifoliolatus* did not occur within a protected area.

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| **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 |

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 *E. brevifoliolatus* since a few remnant plants were removed by conservation officials to conservation collections in 2004. The known population of *E. brevifoliolatus* occurred in an area with strong local control over resource use.

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| **17. Harvesting in areas with open access:** What percentage of the legal national harvest occurs in | **None** | **1** |
| | Low | 2 |
| | Medium | 3 |

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| areas where there is no strong local control, giving *de facto* or actual open access? | High | 4 |
| | Uncertain | 5 |

There are no open access areas in South Africa on which cycads occur/occurred.

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| **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 |

*Encephalartos brevifoliolatus* is presumed extinct in the wild and management controls are thus not implemented *in situ*. Wild origin plants still exist in *ex situ* 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 *Encephalartos* (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 *in situ* and *ex situ*) is hampered by inadequate resources.

**Monitoring of harvest**

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| **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 *ex situ* collections and in cultivation. Exports of *E. brevifoliolatus* 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. *Encephalartos brevifoliolatus* remains rare in cultivation and a total of 88 live plants of the species have been (legally)

exported from the country since 1997 (Fig. 4), just one year after the species was formally described. The total value of *E. brevifoliolatus* exports (between 1997 and 2020) is conservatively estimated at around R1.76 million (assuming exports of 3-year-old seedlings at 2021/22 prices).

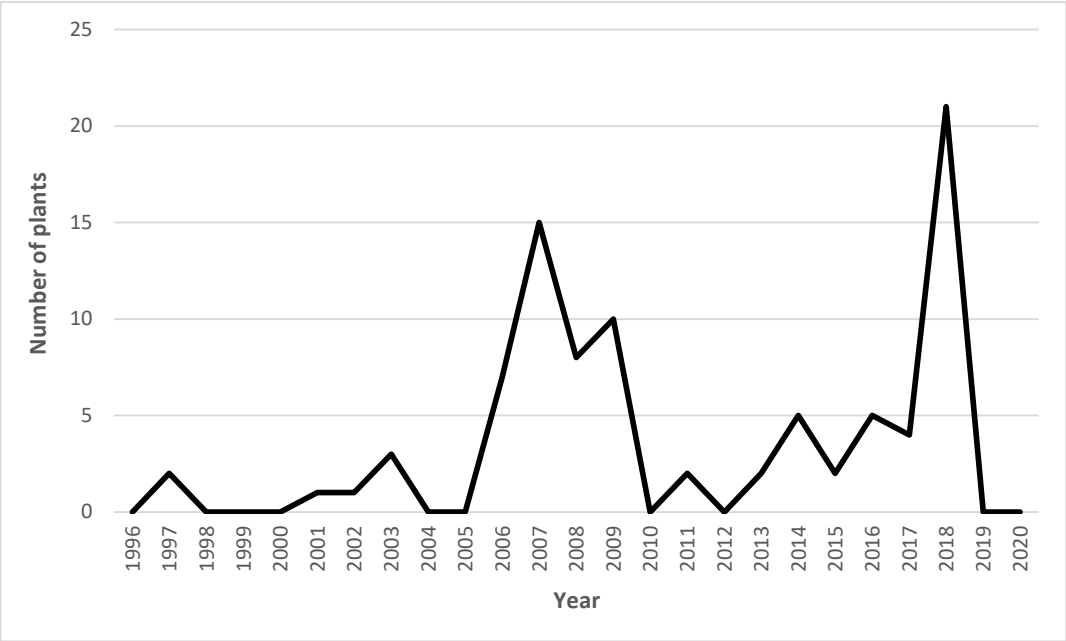


**Figure 4: Gross (legal) exports of *Encephalartos brevifoliolatus* plants from South Africa since the species formal description in 1996 (CITES trade statistics derived from the CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK).**

As of 2018, a national programme to audit and monitor nurseries involved in the international trade in cycads has been established. Only those facilities that are fully compliant with CITES Resolution Conf. 11.11 (Rev. CoP18) (Regulation of trade in plants) are allowed to export small plants and seeds. At present, only one South African nursery is registered with the CITES Secretariat in terms of CITES Resolution Conf. 9.19 (Rev. CoP15) to trade in *E. brevifoliolatus*.

| | | |
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| **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 |

The quality of the CITES trade data is not always as accurate as it should be owing to errors and inconsistences 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 | Beneficial | 1 |
| | Neutral | 2 |
| | Harmful | 3 |
| | **Highly negative** | **4** |

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| the major threat that has been identified for this species? | Uncertain | 5 |

Though *E. brevifoliolatus* 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.

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| **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.

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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? | High confidence | 1 |
| | Medium confidence | 2 |
| | Low confidence | 3 |
| | **No confidence** | **4** |
| | Uncertain | 5 |

*Encephalartos brevifoliolatus* 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 soon after the species description in 1996.

The nature conservation legislation pertaining to cycads has firmly improved over the past two decades, with strict protection currently afforded to wild cycads (including *ex situ* cycads of wild origin) under Government Notice No. 371 on the prohibition of trade in certain *Encephalartos* (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. *Encephalartos brevifoliolatus* 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 have 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 *E. brevifoliolatus* 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. To date, only two mother plants of the species have been recorded in one out of the eight registered facilities during the national cycad nursery audit programme.

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 *et al.* 2016; Zondi 2023) and strontium isotopes (Retief *et al.* 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 in 1996, existing legislation failed to prevent the removal of most of the *E. brevifoliolatus* 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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**Supporting documents**

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