DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

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

CONSULTATION ON THE BIODIVERSITY MANAGEMENT PLANS FOR ALOE FEROX AND HONEYBUSH SPECIES *(CYCLOPIA SUBTERNATA AND CYCLOPIA INTERMEDIA)*

I, Barbara Dallas Creecy, Minister of Forestry, Fisheries and the Environment, hereby publish the Draft Biodiversity Management Plans for Aloe ferox and Honeybush Species *(Cyclopia subternata and Cyclopia intermedia)*, developed under section 43 read with section 99 and 100 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), and set out in the Schedule hereto, for public comment.

Members of the public are invited to submit written representations or objections on the Draft Biodiversity Management Plans, within 30 (thirty) days from the date of publication of the notice in a *Gazette* to the following addresses:

By post to: The Director General: Department of Forestry, Fisheries and Environment
Attention: Ms Humbulani Mafumo
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By hand at: Environment House, 473 Steve Biko Road, Arcadia, Pretoria, 0083.

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An electronic copies of the Draft BMP's can be downloaded from the link:
http://www.environment.gov.za//Documents/.

Comments received after the closing date may not be considered.

BARBARA DALLAS CREECY
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

SCHEDULE

2020

DRAFT BIODIVERSITY MANAGEMENT PLAN FOR ALOE FEROX

Jointly developed by
Eastern Cape Department of Economic Development, Environmental Affairs and Tourism and Department of Environment Forestry and Fisheries

Lead Agent: Eastern Cape Department of Economic Development, Environmental Affairs and Tourism

Implementing Agencies: (Harvesters, TRAFFIC, Industry, Provincial conservation agencies, SANBI/Scientific Authority, Western Cape Department, CapeNature, DEFF, DSI, Lesotho Department of Environment, MDTPA, District and local municipalities, Tribal Authorities. Landowners, Communities, Aloe Council, Tappers &COGTA)

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LIST OF ABBREVIATIONS

ABS	Access & Benefit Sharing
ARC	Agricultural Research Council
BABS	Bioprospecting Access & Benefit Sharing
BMP-S	Biodiversity Management Plan for Species
CBD	Convention on Biological Diversity
CITES	Convention on Internationl Trade in Endangered Species
DAFF	Department of Agriculture Forest and Fisheries
DEFF	Department of Environment, Forestry and Fisheries
IUCN	International Union for Conservation of Nature
NDF	Non -Detriment Finding
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NEMPAA	National Environmental Management Protected Areas Act
NGO	Non-Government Organisation
NMU	Nelson Mandela University
NP	Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity
SABS	South African Bureau of Standards
SAHTA	South African Honeybush Tea Association
SANBI	South African National Biodiversity Insitute
SANS	South African National Standards
SMME	Small, Medium and Micro Enterprises
TOPS	Threatened Or Protected Species
UJ	University of Johannesburg

DEFINITIONS

In this BMP, unless the context indicates otherwise, a word or expression defined in the Biodiversity Act or Protected Areas Act or the Norms and Standards for the development of BMPs has the same meaning

Biome	Means a large naturally occurring community of flora and fauna occupying a major habitat, e.g. forest or tundra.
Biotrade	means the buying and selling of milled, powdered, dried, sliced or extract of indigenous genetic and biological resources for further commercial exploitation
Commercial exploitation	Means the engaging in any bioprospecting activity with the intention of making a profit.
Conservation	The management of the biosphere so that it may yield the greatest sustainable benefit to the present generation while maintaining its potential to meet the needs and aspirations of future generations. The wise use of natural resources to prevent loss of ecosystem function and integrity.
Commercialisation	In relation to indigenous biological resources, includes the following activities: (a) the filing of any complete intellectual property application, whether in South Africa or elsewhere; (b) obtaining or transferring any intellectual property rights or other rights; (c) commencing product development, including the conducting of market research and seeking pre-market approval for the sale of resulting products; or (d) the multiplication of indigenous biological resources through cultivation, propagation, cloning or other means to develop and produce products, such as drugs, industrial enzymes, food flavours, fragrances, cosmetics, emulsifiers, oleoresins, colours and extracts; (e) trading in and/or exporting of indigenous biological resources to develop and produce products, such as drugs, industry enzymes, food flavours, fragrances, cosmetics, emulsifiers, oleoresins, colours, extracts and essential oils; and (f) commercial exploitation;
Harvesters	A person or organization that collects or obtains a resource for future use.
***In-situ* conservation**	Means the conservation of biodiversity in the wild through the conservation of ecosystems and natural habitats, and the maintenance and recovery of viable populations of species in their natural surroundings.
IUCN Red Data List	Means a global or national list providing information on a species' risk of extinction (usually by taxonomic group), and prepared under the auspices of the International Union for the Conservation of Nature.

Least concern	A species is Least Concern when it has been evaluated against the IUCN Red List criteria and does not qualify for any other Red List category. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category (http://redlist.sanbi.org/redcat.php).
Long term survival	Means to ensure the survival of a species until the next human generation, approximately 30 years.
Over exploitation	The action or fact of making excessive use of a resource.
Overgrazing	Graze (grassland) so heavily that the vegetation is damaged and the ground becomes liable to erosion.
Over harvesting	Means taking more from the land (or sea) than it can replace. It includes extreme farming, grazing, fishing, and using fresh water. **Over-harvesting** is harmful in the long term.
Pollination	The transfer of pollen to a stigma, ovule, flower, or plant to allow fertilization.
Population	A group of individuals of the same species, occupying a **defined** area, and usually isolated to some degree from other similar groups.
Propagate	Breed specimens of (a plant or animal) by natural processes from the parent stock.
Regulation	A rule or directive made and maintained by an authority.
Subpopulation	A part or subdivision of a population, especially one originating from some other population
Tappers	A person that taps a tree for the sap or juice, a blast furnace, cask, or other container for their contents.
Threat	Means any action that causes a decline and compromises the future survival of a species or anything that has a detrimental effect on a species. Threats can be human induced or natural. BMP-S should focus on mitigating human induced threats to species.
Trade	The action of buying and selling goods and services.
Treaty	A formally concluded and ratified agreement between states.
Viable	The ability of a species or population to survive or persist and reproduce over multiple generations or a long time period.

ACKNOWLEDGEMENTS

Mncedisi Cindi is acknowledged for collating the background information of this species and also compiling the background information document which was synthesised for this Biodiversity Management Plan.

Neil Crouch (SANBI), David Newton (TRAFFIC) , Humbu Mafumo, Tebogo Mashua, Azwinaki Muingi (all from Department of Environemnt Forestry and Fishreries – DEFF), Tasneem Variawa (SANBI) all provided inputs and comments on the first draft background information document.

Other numerous stakeholders have contributed to the process of drafting this BMP by participating in key stakeholder consultation workshops, reviewing and commenting on the draft documents and finalization of the draft document. People and/or organizations that made invaluable contributions to the BMP included but not limited to, Industries, Communities, Eastern Cape Department of Economic Development, Environmental Affairs and Tourism, Department of Environmental Affairs, the South African National Biodiversity Institute, Department of Science and Technology, Gauteng Department of Agriculture and Rural Development, TRAFFIC, CSIR and Institute of Natural Resources. All the members of the public that participated in the stakeholder engagement workshops are acknowledged for their contributions.

EXECUTIVE SUMMARY

Aloe ferox is a long-lived, tree-like succulent plant endemic to South Africa and Lesotho. It has a restricted distribution within South Africa extending from the Western Cape Province, intermittently throughout the Eastern Cape, and up into south-eastern Free State The species also occurs in southern Lesotho. Previous records of *A. ferox* in the KwaZulu-Natal Province have been confirmed as the similar looking *Aloe candelabrum*, a species that was recently resurrected from the synonymy with *A. ferox*.

Aloe ferox plants are characterised by a single stem that is typically clothed in a dense apical rosette of large, succulent leaves as well as a persistent skirt of older, dry leaves. The rosettes of succulent leaves form the basis of a thriving *Aloe ferox* industry in South Africa where leaf material from wild plants are collected to produce bitters and gels for commercial use in the pharmaceutical and cosmetic industries. The *A. ferox* industry provides significant socio-economic benefits to many South Africans, from local communities who derive an income from harvesting of the plants, to small businesses who employ people to manufacture *A. ferox* products for both the local and international markets.

The species is included in Appendix II of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) to ensure that international trade in the plants does not threaten their survival in the wild. Large volumes of the species have been exported since the 1980s and the market for *A. ferox* products continues to grow. The ongoing extractive use of the resource requires proper in-country management of the species in terms of a Biodiversity Management Plan for Species (BMP-S) as specified in Chapter 3 of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) herein refered to as NEMBA. Furthermore, the significant financial benefits accrued from the collection, processing and sale of *A. ferox* resources; requires that the management of the resource is equal across its range and that it upholds the rights of stakeholders along the trade supply chain, whilst also ensuring the protection of customary rights and laws relating to access and benefit sharing from the resource.

In developing the BMP, stakeholders were identified and several engagements took place from 2018 to 2020. Stakeholders ranged from national government and their entities, provincial

conservation authorities, National Governmental Organisations (NGOs), Communities, and Academia

The aim of the BMP-S is to ensure the long-term survival of *A. ferox* in habitat, whilst ensuring that the livelihoods of stakeholders are respected.

To achieve this aim, seven objectives have been identified during the development of the BMP as indicated below. These are supported by several actions as per the action plan of this BMP.

- To ensure that the wild harvesting of A. *ferox* is carried out in an adaptive, practical, participatory and transparent manner that maintains the long-term survival of the species in the wild.
- To ensure that the wild collection of *A. ferox* does not adversely affect the structure and functioning of the surrounding environment.
- To establish and implement monitoring systems for *A. ferox* that provide the scientific evidence required to inform responsive management practices.
- To ensure that collection and management activities are carried out under legitimate tenure arrangements and comply with relevant laws, regulations and agreements.
- To ensure that the customary rights of local and indigenous communities 'to access their land including indigenous/traditional knowledge associated with A. ferox and to manage collection/harvesting areas are recognised and respected and integrated into the permitting process/decision making process.
- To ensure that through fair and equitable sharing of benefits derived from the biotrade and bioprospecting of *A. ferox*, the conservation and sustainable use of the species is promoted and the livelihoods of communities are enhanced.
- To promote transnational management of *A. ferox* across its natural range in South Africa and Lesotho

By implementing this BMP, a major benefit amongst others will be to obtain the support of owners, managers and occupiers of land on which *A. ferox* occurs for the implementation of conservation actions. This should ensure the species does not go extinct and instead becomes better managed over time, maintaining the status of Least Concern.

1. INTRODUCTION

Aloe ferox Mill. (family Xanthorrhoeaceae, previously *Asphodelaceae, Aloaceae* or *Liliaceae s.l.*), commonly known as the Bitter aloe or Cape aloe is a tall, single-stemmed, succulent shrub indigenous to the south-central regions of Southern Africa. It occurs most commonly in the Western and Eastern Cape Provinces, extending northwards into the Free State Province, as well as southern Lesotho (Reynolds, 1950; Smith *et al.,* 2016). These plants are a prominent feature across the landscape in these regions, particularly in the Eastern Cape Province, where they occur in many habitats, from mountain slopes and rocky outcrops to vast, flat, open areas. Apart from being able to grow in a wide variety of soil types, *A. ferox* plants thrive under the different climatic conditions prevalent across the landscape. This adaptability and robustness has allowed for the historic and ongoing utilisation of the popular indigenous aloe species.

Aloe ferox is arguably the most commercially utilized indigenous plant in South Africa and one of the most highly traded botanical species in the world. The plant is most valued for the raw materials obtained from its large succulent leaves which are wild harvested and processed in South Africa to be exported globally to be used in a number of consumer products. An average of around 300 000kg of *A. ferox* primary (bitter-sap) extract has been exported from South Africa to various countries, including Argentina, Germany, Italy, the United Kingdom, Japan and the United States of America, each year over the past three decades (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). The actual amount of raw material is probably closer to 400 000kg/annum when exports of powdered extracts are included. More recently, the aloe industry has seen an increase in the processing of secondary leaf (gel) extracts and the trade in finished products comprising these secondary extracts (Grace *et al.*, 2008). The industry has developed into a multi-million-dollar business and the market for aloe products continues to flourish as more people become aware of the natural health benefits and value of the species. In addition to revenue generated by the industry, significant socio-economic benefits also accrue to rural-based individuals and communities who derive an income from aloe leaf harvesting (Melin *et al.*, 2017).

Majority of the *A. ferox* raw materials are obtained from plants growing in the wild. Whilst the species is known to be common within suitable habitat across large parts of the country, figures on densities/relative abundance are deficient. Furthermore, estimates of harvest impact, and long-term population trends are also lacking. Current levels of offtake and commercial trade are deemed to be sustainable at present and the vested interest in keeping the plants alive has

inadvertently assured the preservation of the species for many decades and continues to do so. However, as the market continues to grow, the country may be faced with new economic and employment opportunities in the face of ongoing socio-environmental challenges, and the potential for over-exploitation of natural resources exists. Knowledge on the distribution and size of the resource base, in addition to documented levels of harvesting impacts and other notable threats across the species range, is vital for the sustainable management of its populations. Effective natural resource management of *A. ferox* is essential if a high value, sustainable local and international market is to be supported in the long term. The potential threat to the species arising from increased wild harvesting pressures and a lack of effective harvest control, as well as the subsequent bioprospecting ventures for local, national and international trade, has culminated in the development of this management plan, which will contribute to the regulation of ongoing commercial extraction in order to ensure the long-term, *in situ* survival of this valuable species.

1.2 Aim and objectives of the envisaged BMP-S

The aim of this BMP-S is to ensure the long-term survival of *A. ferox* populations in the wild, whilst also ensuring that the livelihoods of stakeholders are respected. Specific activities need to be undertaken to safeguard sustainable utilisation of the species and to establish systems to monitor ongoing impacts of commercial extraction and cultivation.

The seven objectives of the management plan are:

- To ensure that the wild harvesting of A. *ferox* is carried out in an adaptive, practical, participatory and transparent manner that maintains the long-term survival of the species in the wild.
- To ensure that the wild collection of *A. ferox* does not adversely affect the structure and functioning of the surrounding environment.
- To establish and implement monitoring systems for *A. ferox* that provide the scientific evidence required to inform responsive management practices.
- To ensure that collection and management activities are carried out under legitimate tenure arrangements and comply with relevant laws, regulations and agreements.
- To ensure that the customary rights of local and indigenous communities 'to access their land including indigenous/traditional knowledge associated with *A. ferox* and to manage

collection/harvesting areas are recognised, respected and integrated into the permitting process/decision making process.

- To ensure that through fair and equitable sharing of benefits derived from the biotrade and bioprospecting of *A. ferox*, the conservation and sustainable use of the species is promoted and the livelihoods of communities are enhanced.
- To promote transnational management of *A. ferox* across its natural range in South Africa and Lesotho

1.3 Benefits and anticipated outcomes of the BMP-S

A major benefit of the BMP-S will be to obtain the support of owners, managers and occupiers of land on which *A. ferox* occurs, for the implementation of conservation actions. This should ensure the species does not go extinct and instead becomes better managed over time, maintaining the status of Least Concern. BMP-s allow for conservation management plans to be legally gazetted under South African policy in terms of NEMBA. This will facilitate the attainment of the aim of the plan because the support of the government and the support of the role-players and stakeholders will be ensured. Participation of such a broad range of stakeholders is imperative for ensuring the success of the BMP-S process.

The anticipated outcomes of the management plan include:

- Up-to-date and detailed resource distribution and population data and maps that will provide guidance for conservation measures or management tools (such as harvest quotas, harvest areas/seasons, harvest techniques) to be developed and applied in the industry.
- Greater consistency in management of the resource base across the provinces.
- A greater awareness among landowners with *A. ferox populations*, local authorities and government bodies with regards to the threats facing the species – particularly the risks associated with unsustainable harvesting and illegal trade – as well as the socio-economic and environmental importance of maintaining the Least Concern status of the species. There needs to be a greater commitment to ecologically sustainable land use practices.
- A greater awareness and skills development among communities, traditional leaders, traditional practitioners and tappers on how to sustainably harvest the species.

Traditional Authorities need to take control of their areas and they need to be capacitated so that tapping is brought under better control.

- Empowerment of communities in general business management, how to run meetings, keep accounts etc. This would assist with improving their general skills and also increase the drive towards having communities moving up in the *A. ferox* product value chain.
- Establishment of an *A. ferox* Bioprospecting Forum with membership from industry, communities, researchers, other stakeholders and provincial government who will meet on a quarterly basis to cover all bioprospecting initiatives for the species. This forum can also discuss, develop and implement ways to control illegal tappers and buyers primarily through standard management strategies (that can include guidelines in local languages, as well as management structures for Traditional Authorities and harvesters (not all are working on tribal land)) to implement. Issues of fair and equitable sharing of benefits between the industry and communities can also be discussed in this forum.

2. BACKGROUND

2.1 Conservation Status and Legislative Context

2.1.1 Threat Status

Aloe ferox is currently classified as a Least Concern (LC) species on the national Red List of South African Plants (Raimondo *et al.*, 2012) as well as on the Lesotho Plants List (2002). Whilst the species is considered to be common and abundant throughout its range (occurring in very dense subpopulations in certain regions), exact population numbers and long-term trends have yet to be elucidated. At present, local occurrences of unsustainable harvesting and habitat loss may pose a minor threat to the species in some areas across its distribution.

The species is found in many reserves and although it is not currently afforded any special protection under National legislation, it is considered a protected species in the Free State and the harvesting of wild plants is somewhat controlled by the respective provincial biodiversity conservation authorities in the Eastern and Western Cape Provinces. Reliable estimates of population size and long-term population trends are required and there is a need for a global assessment to be carried out jointly by Lesotho and South Africa (using the International Union for the Conservation of Nature's (IUCN) Red List categories and criteria, Version 3.1).

2.1.2 Cultural / traditional status

Usage of aloe plants in Africa is an age-old practice with many cultures using plant extracts to treat a range of health problems in both humans and livestock. Leaf extracts of aloe spp. have been used to treat (amongst other things), skin and eye irritations, ulcers, digestive tract and bacterial infections, STIs, immune deficiencies as well as for hygiene purposes. *Aloe ferox* has in particular, been popular amongst indigenous people for many decades and has often been depicted in ancient Khoisan rock paintings (rock paintings of *A. ferox* have been found in a cave on the farm Pieterberg, Genadeberg, near the Orange River,

Aloe ferox included in a Bushman Rock Painting as reproduced by G.W. Reynolds (1950) from Plate 51 of Rock Paintings in South Africa (1930), with permission from Miss D.F. Bleek.

east of Zastron). Ethno-ecological records show *A. ferox* to be the most frequently cited of all the medicinal *Aloe* spp. in southern Africa amongst traditional medicine users (Grace *et al.*, 2008). The species extracts have been favoured most prominently for their potent laxative effects but its local applications are much more varied. In 1967, Dr Chris Barnard performed the first heart transplant and he drew on the traditional knowledge of indigenous people by using the sap of *A. ferox* to promote wound healing through accelerated rates of reproduction of the cells responsible for the formation of collagen. Use of the species was adopted by colonists at the Cape of Good Hope and *A. ferox* was first exported to Europe as early as the late eighteenth century (Pole-Evans, 1919). The species remains one of the most commonly used Aloe species in South African traditional medicine practices whilst the market for formal health products containing *A. ferox* extracts is also growing. The uses of Aloe spp. for preventative and rehabilitative therapy, magical and ritual purposes in southern Africa were also recorded according to Grace *et al.* (2008)

2.1.3 Applicable International Agreements

The following international treaties and conventions to which South Africa is Party are relevant and important to consider:

- **The Convention on Biological Diversity (CBD)**

South Africa has acceded to the CBD in 1995. This Convention has three main objectives, namely; the conservation of biological diversity; sustainable use of its components; and the fair and equitable sharing of benefits arising from the utilization of genetic resources. Although it is a non-enforceable Convention, becoming a Party to the CBD does entail acceptance of the Articles and Objectives of the Convention, which include *inter alia*, establishing methods to monitor and conserve biodiversity and engaging in fair and equitable benefit sharing. Accordingly, South Africa's National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) has been promulgated to enable South Africa to meet its commitments to the Convention. The Conference of the Parties (COP) is the governing body of the CBD and advances implementation of the Convention through the decisions it takes at its periodic meetings.

- **Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (Nagoya Protocol on ABS)**

The Nagoya Protocol on ABS is an international treaty adopted under the auspices of the Convention on Biological Diversity (CBD) in 2010 and has entered into force on 12 October 2014. South Africa ratified this Protocol in 2013. Its objective is the fair and equitable sharing of benefits arising from the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity and implementing the three objectives of the CBD.

The Nagoya Protocol on ABS significantly advances the Convention's third objective by providing greater legal certainty and transparency for both provider and user countries of genetic resources and their associated traditional knowledge by establishing more predictable conditions for access to genetic resources and traditional knowledge associated with genetic resources, benefit sharing and compliance.

- **Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES)**

  The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement of which South Africa is a signatory. More than 183 countries as of May 2020 are currently party to this Convention which is the largest wildlife conservation agreement in existence. The trade in wild animals and plants is a major threat to the survival of some species. The contracting Parties therefore recognize that international co-operation is essential for the protection of certain species of wild fauna and flora against over-exploitation for international trade. CITES aims to ensure international trade in specimens of wild animals and plants does not threaten their survival.

  Currently A. ferox is included on Appendix II of CITES, with an annotation excluding finished products, whereas trade in other derivatives is regulated. International trade in species listed on Appendix II must be strictly regulated in order to avoid utilisation incompatible with their survival. All aloes other than Aloe vera are included on CITES under Appendix II (with some species on Appendix I) as trade has impacted the survival of wild populations of certain species. The exclusion of finished products of A. ferox from regulation under CITES is aimed to facilitate the in-country processing of both primary and secondary extracts from leaf material, thereby promoting the sustainable and efficient use of wild harvested aloe resources whilst simultaneously enhancing benefits to community livelihoods and local economies

2.1.4 Applicable National legislation

The South African environmental policy framework is defined by the Constitution, the National Environmental Management Act 107 of 1998 (NEMA), the subsidiary National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) and the National Environmental Management: Protected Areas Act No 57 of 2003 (NEMPAA). These are introduced below.

- **The Constitution of the Republic of South Africa Act 108 of 1996**

The Constitution provides the starting point from which to consider the administration of environmental law. It is the supreme founding law of the democratic, post-apartheid South Africa, fundamentally defines the country's legal and administrative order, and enshrines a Bill of Rights which applies to all law and is binding on all organs of state. In the context of *A. ferox* harvesting, trade and regulation, section 24 of the Constitution stipulates that everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent ecological degradation and secure ecologically sustainable use of natural resources while promoting justifiable economic and social development.

- **National Environmental Management Act 107 of 1998 (NEMA)**

NEMA provides for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith.

- **The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA)**

NEMBA provides for the management and conservation of biological diversity within South Africa, as well as the use of indigenous biological resources in a sustainable manner, the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources; and gives effect to ratified international agreements relating to biodiversity which are binding on South Africa. The Minister may, in terms of Section 56 of NEMBA and by notice in the Government Gazette, publish a list of species that are threatened or in need of national protection (TOPS). Section 43 of NEMBA also makes provision for the

development of Biodiversity Management Plans for Species (BMP-S) which are not listed in terms of section 56 but which does warrant special conservation attention as a tool to manage species such as *A. ferox*.

- **National Environmental Management: Protected Areas Act No 57 of 2003 (NEMPAA)**

NEMPAA provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for intergovernmental co-operation and public consultation in matters concerning protected areas; and for matters in connection therewith.

- **Bioprospecting Access and Benefit Sharing (BABS) Regulation of 2008 as amended in 2015.**

Chapter 6 of the National Environmental Management: Biodiversity Act (2004) deals with provisions for Bioprospecting, Access and Benefit-Sharing in South Africa. Associated with the legislation, the Bioprospecting, Access and Benefit Sharing BABS Regulations of 2008 as amended in 2015, was gazetted. The purpose of these regulations is to: a) prescribe the notification process for the discovery phase of bioprospecting involving any indigenous genetic and biological resources contemplated in section 81A (2) of the Act; b) prescribe the permit system set out in Chapter 7 of the Act insofar as that system applies to bioprospecting involving any indigenous genetic and biological resources or export from the Republic of any indigenous genetic and biological resources for the purpose of bioprospecting or any other kind of research; c) set out the form and content of, and requirements and criteria for benefit-sharing and material transfer agreements and; d) set out the administration process of the Bioprospecting Trust Fund.

- **Patent Amendment Act, 2005 (Act No. 20 of 2005)**

The Patent Amendment Act provides for mandatory disclosure of information relating to any role played by an indigenous biological resource, genetic resources or traditional/indigenous knowledge in an invention, by any applicant for a Patent. These provisions are included to ensure that the indigenous peoples and local communities from where indigenous biological resources and/ or its associated traditional/indigenous knowledge originate accrue fair and equitable share of benefits.

- **Protection, Promotion, Development and Management of Indigenous Knowledge Act, 2019 (Act No. 6 of 2019) (IKS Act)**

The IKS Act provides for the protection, promotion, development and management of rights of indigenous knowledge communities. Also provides for access and conditions of access to knowledge of indigenous communities, amongst other things. These provisions are included to ensure that the indigenous communities from where natural resources and/ or its associated indigenous knowledge originate accrue fair and equitable share of benefits.

2.1.5 Applicable Provincial legislation

Whilst *A. ferox* is not listed as a protected species within the Eastern Cape and Western Cape Conservation ordinances (Cape Nature and Environmental Conservation Ordinance 19 of 1974; Western Cape Nature Conservation Laws Amendment Act 3 of 2000), the harvesting of wild plants of the species is controlled by the respective provincial biodiversity conservation authorities in these Provinces. In the Free State Province, the Nature Conservation Ordinance 8 of 1969 provides for the conservation of certain species of fauna and flora and declares all indigenous aloe species as protected under this legislation. Moreover, in the Western Cape *A. ferox* is classified in terms of Nature Conservation Ordinance as "***indigenous unprotected flora***".The species is specifically excluded for Schedule 4 (protected flora) by this annotation:' "All species of the genus Aleo except those specified in Schedule 3 and the species *Aloe ferox*." In the Eastern Cape, *A. ferox* is listed as a protected in two pieces of legislation (Transkei Decree and Ciskei Environmental Conservation Act) that are still regulating Biodiversity in the Province. Currently there are three legislations in the province and the provincial department is in the process of reviewing the Provincial Environmental Management Legislation

2.1.6 Motivation for assigning priority to the development of this Biodiversity Management Plan

Aloe ferox materials are primarily harvested from wild populations. The growing commercial value of *A. ferox* and the potential of the species to generate financial benefits for local rural communities culminates in the probability of increasing harvesting pressure on the resource base. A recent Non Detriment Finding (NDF) assessment (on the impact of international trade - gazetted in draft) has identified the need for a BMP to contribute to sustainable harvesting practices and improved monitoring and management of the resource base. The BMP is also deemed necessary under the Biodiversity Economy Operation Phakisa Laboratory initiative, concerned with the bioprospecting/biotrade economy of South Africa. *Aloe ferox* has been identified as one of the key indigenous species used in international biotrade and is one of six

primarily wild-harvested species that have been prioritised for a BMP under the biodiversity economy initiative.

2.2 Species detail

2.2.1 Taxonomy and Description

Order: Asparagales
Family: Asphodelaceae
Subfamily: Asphodeloideae
Genus: *Aloe*
Species: *ferox*
Common Names: Bitter aloe, Cape aloe, Red aloe, Tap aloe (English), bitteraalwyn, bergaalwyn (Afrikaans), ikhala (isiXhosa), inhlaba (isiZulu).

Aloe ferox Mill. was first described and figured by Dutch botanist, Casper Commelin in his *Praeludia botanica*, published in 1703, but was formally described by Scottish botanist, Phillip Miller in 1768. The latin name '*Ferox*' means ferocious referring to its spiny leaves. It is a robust, long-lived, single-stemmed plant which usually grows 2–3 m tall, but can sometimes reach up to 5 m in height (Reynolds, 1950). The stem is covered in persistent dried leaves, and the crown is a dense rosette of dull green to reddish leaves held erect to somewhat spreading. Each leaf can be up to 1 m long, with dark brown spines along the margins and often scattered on the leaf surfaces, especially on the lower surface. The flowers are borne along up to eight cylindrical racemes on a branched panicle, and are scarlet, sometimes orange, tubular and about 3 cm long with stamens protruding from the narrow mouth. Forms with white flowers are rare but are also known to occur within the distribution range (Reynolds, 1950).

2.2.2 Distribution and habitat

A. Ferox is endemic to South Africa and Lesotho and occurs in a variety of biomes such as Albany Thicket, Fynbos, Grassland, Indian Ocean Coastal Belt (Raimondo, 2013), and more specifically in the Cape Floristic Region and Succulent Karoo. The species has a wide but concentrated distribution extending from the Western Cape Province (Swellendam district), throughout the Eastern Cape Province (including the former 'homelands' Transkei and Ciskei), up into south-eastern Free State and southern Lesotho (Fig.1, Smith *et al.* 2016). Up until fairly

recently, *Aloe candelabrum*, from the East-central KwaZulu-Natal province was included in the synonymy of *A. ferox* but was reinstated owing to several morphological differences (Smith *et al.* 2016). This decreased the known range of *A. ferox* but the species remains regionally widespread and common.

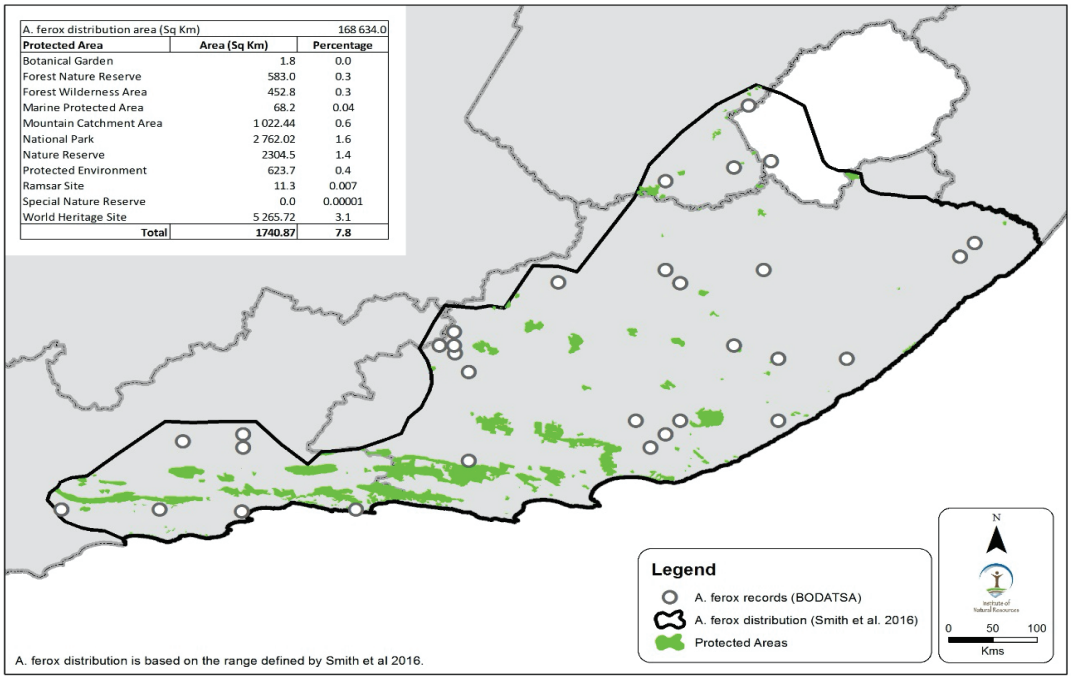

Figure 1: National distribution range of *Aloe ferox* (generated using information from the Smith *et al.*, 2016distribution map and SANBI BODATSA Data)

It is one of the dominant species in the valley bushveld vegetation of South Africa (Anjarwalla *et al.*, 2013) and can grow in a variety of habitats, soils and, under different climatic conditions in both rocky areas and flat, open lands. These plants show a remarkable adaptability in terms of rainfall and they flourish in the extremely dry areas of the Karoo but also in relatively wet areas in the eastern parts of their distribution (Van Wyk and Smith 2005). The shallow, adventitious root systems that grow only a few centimetres below the soil surface allow aloes to benefit from relatively low amounts of precipitation (Smith and Van Wyk, 2009; Jack, 2012). The species is most abundant on arid, rocky hillsides up to 1000 m altitude, where mean temperature ranges from 27-31 ºC and annual rainfall is 50-300 mm (Anjarwalla *et al.*, 2013).

2.2.3 Biology and ecology

Aloe ferox is a long-lived, slow growing, perennial species with individual specimens having an estimated life span of up to 150 years (Newton and Vaughan, 1996). Based on field observations of wild plants, Shackleton and Gambiza (2007) estimated that plants reach sexual maturity at around 0.5 m in height are likely to be around 36 years of age at a height of 1 m. They proposed an average height increase of 2.8 cm per year (ranging from 1.7 cm – 4.6 cm between different sites). Smaller plants (<6 cm) would almost double in height while taller plants (>2m) would grow by only 1% in 12 months. In the same study, the mean number of leaves per plant increased by two per plant per year. Adult *A. ferox* plants flower mainly in winter during May and June in coastal populations, although somewhat later inland (occasionally to as late as November). The flower morphology suggests pollination by birds and honey bees. It is self-incompatible and only a few flowers per raceme flower simultaneously. The fruit is an ovoid capsule up to 3 cm long and is many seeded (i.e. the plant produces large quantities of seed (Newton and Vaughan 1996)). The seeds are about 9 mm long, broadly winged and wind-dispersed (Holland 1978). Dispersal is thought to be limited at a small scale, but is medially efficient at a large scale as is evident in the large distribution range. Dispersal distance is dependent on plant height and wind speed. At a wind speed of 20 km/hour, seeds can be dispersed over 30 m from individuals that are 3 m tall. During spring winds (40 km/hour), the dispersal distance may exceed 50 m from plants that are taller than 5 m (Stokes and Yeaton 1995).

Mature seeds of *A. ferox* are orthodox, surviving in a dry state without significant reduction in their viability for a period of time. In the wild, seeds of *A. ferox* typically germinated within three weeks of dispersal, with their viability considerably reduced at least year after dispersal (Cousins and Witkowski, 2012). They are reportedly suited to long-term storage in freezers (DAFF 3013). The species is considered to be relatively easily propagated by seed (Holland *et al.*, 1977; Bosch, 2006; Bairu *et al.*, 2009) but can also reproduce vegetatively by means of cuttings, although this rarely happens in the wild and the use of cuttings for cultivation is limited by the single stem characteristic of these plants (DAFF 2015). *Aloe ferox* contributes important roles in the surrounding ecosystems. Field observations suggest that *A. ferox* are pioneer plants, and that these plants are the first to emerge when livestock are removed from heavily overgrazed land. They thus begin a chain of ecological succession that ultimately leads to a more bio-diverse steady-state ecosystem in previously disturbed areas. The species also plays an important role in supporting avian diversity as is evident from a recent study which showed that large numbers of birds (from more than 15 species) arrive to populations of *A. ferox* during the

flowering season (in winter) when other food resources are likely to be scarce (Kuiper *et al.,* 2015).

2.2.4 Population status and trends

Aloe ferox is considered to be common and abundant throughout its range, occurring in very dense subpopulations in certain regions. In 2003, Donaldson estimated the population size of *A. ferox* to be in excess of 100 000 individuals. Prior to this, Newton and Vaughan (1996) estimated that during the 1990's, 400 tonnes of dried leaf exudate was obtained from the leaves of around 10 million plants, suggesting that the population could be in orders of magnitude greater than that indicated by Donaldson (2003). Parker and Bernard (2008) suggested that the species has become synonymous with the Eastern Cape, having observed large stands of *A. ferox* reaching densities of more than 10 plants/km2. A more recent study conducted in the province, recorded higher densities of between 4.3 and 7.3 individuals/m2 in the communal area near Seymour Town (Melin *et al.* (2017). These numbers however, cannot be extrapolated to the entire range of the species owing to the differences observed in plant numbers within and between subpopulations (DEA, 2014). Nevertheless, the species is considered to be common throughout its national distribution range which is estimated to be around 168 000 km^2.

It has been proposed that the species' adaptability to various habitats and conditions, it's growing habit and, ability to colonize degraded landscapes has resulted in an increase in the population size and range over the past 30 years (Raimondo *et al.*, 2012). Aloe harvesters, industry stakeholders and management authorities in the Eastern Cape and Western Cape however, have conflicting views regarding the national population trend of the species across the country. In the Eastern Cape some subpopulations have been extirpated in certain communal areas of the province due to harvesting pressures. Aloe harvesters have observed a substantial decrease of the *A. ferox* population in the shared lands surrounding King Williams Town in particular, evident in the fact that they are having to walk longer distances (about two hours) to harvest aloes in denser thickets where their safety and security is compromised. Members of the *A. ferox* industry maintain that stable populations still occur in formally protected areas within the province (around Grahamstown). In the Western Cape, both harvesters and landowners are of the view that *A. ferox* populations are increasing. They have observed a high number of recruits in areas where harvesting occurs and believe that harvested populations have improved growth rates compared to un-harvested populations.

Impacts from previous and current land use changes have also contributed to fluctuating population patterns within areas of the Eastern and Western Cape Provinces. Subpopulations within newly converted game farms and existing poorly managed game reserves in the Eastern Cape region, are declining as a result of overgrazing by kudu, eland and other large game (Van Wyk and Smith 1996; Raimondo *et al.*, 2012; Van As *et al.*, 2016). In other areas where cattle are farmed, trampling of small plants resulting in reduced recruitment and demographic bottlenecks may be a problem but this requires further investigation (Van As *et al.*, 2016).

Current information on the status of the species is largely anecdotal and there remains a lack of robust data on the extent, size and trends of the *A. ferox* population. A comprehensive resource assessment is still required for the species.

2.2.5 Impact factors

Within its range, A. *ferox* populations may be adversely impacted by a range of threats as summarised in the table below (Table 1).

Table 1: Summary of identified known and potential threats impacting *Aloe Ferox* across its distribution range

Threat	Impact	Range
Unsustainable and destructive harvesting	Not fully known but can be severe (causing localised extinctions) in some cases. Destructive harvesting may result in reduced survivability of adult plants as well as a loss of recruitment potential in heavily harvested areas.	Within and around several communal areas across the Eastern Cape Province.
Habitat loss and degradation	Limited	Urban and agricultural development in the Western Cape is notable. Grazing by cattle and large wild animals is a problem in parts of the Eastern Cape.
Climate change	Uncertain	Drier conditions in some parts of Western Cape may impact recruitment potential

		of populations whilst cooler, frostier conditions in other areas may lead to increased plant mortality, although these hypotheses have not been scientifically tested.
Pests and disease	Uncertain	Although the species is known to be relatively resistant to insect pests and disease, the occurrence and potential impact of pathogens have not been documented in wild populations.

In some areas over-exploitation and destructive harvesting of leaves by untrained harvesters have caused localised extinctions (Van Wyk and Smith 1996). This trend has not been observed in the Western Cape, but heavy harvesting occurs throughout communal lands of the Eastern Cape including in the Ngqushwa Local Municipality – Ngqushwa (Peddie), Raymond Mhlaba L M – Seymour and Adelaide areas, as well as in some areas of the former Transkei region. Socioeconomic challenges such as poverty and unemployment in the province have resulted in many locals attempting to harvest aloe as a means of safeguarding their livelihood security (e.g. Chen *et al.*, 2012). Many of these new harvesters are not well trained and tend to neglect issues of sustainability, often removing too many leaves and harvesting young individuals (Melin *et al.*, 2017). Whilst Newton and Vaughan (1996) noted low mortality rates associated with heavy leaf harvesting, officials from the Department of Economic Development, Environmental Affairs and Tourism in the Eastern Cape (DEDEAT) have observed plants dying due to overharvesting (e.g. Booysen Park) and successive disease. Localised damage to harvested plants and low flowering occurrences in intensely harvested areas in the Eastern Cape have also been observed (DEA, 2014; Melin 2009). Whilst intense harvesting is localised, the longer-term impacts of high levels of harvesting on populations remains unknown (Melin *et al.*, 2017).

Habitat loss and degradation is thought to affect the species on a limited scale. Changing land use practices in both the Eastern and Western Cape Provinces are often associated with declining veld conditions which have potential impacts on the growth and recruitment of plants.

There has been continuing loss of habitat to cultivation and urban development, especially in the western parts of its range whilst crop farming, cattle farming and the recent establishment of more lucrative game farms (Smith and Wilson, 2002; Carruthers, 2008) have been noted to have some impact on *A. ferox* subpopulations in certain areas of both provinces. Large herbivores and wild animals such as ostrich often eat through the leaves and seeds of the plants, thereby upsetting population structure and recruitment. Demographic bottlenecks in the 0.25 – 1 m tall height class have been observed in heavily grazed populations, whilst the 0.25 – 0.5 m height class is absent from areas with large numbers of cattle (Van As *et al.*, 2016). It is postulated that this may lead to local extirpations of *A. ferox* subpopulations in the next 70 – 100 years (Van As *et al.*, 2016), excepting from rocky areas that limit herbivory. In addition, recruitment is affected in areas where aloe is harvested on steeper land, as trampling reportedly removes valuable groundcover that provides protection for young plants through moisture retention and the provision of shade. Loss of groundcover results in bare and hard surfaces, which limits new plant growth and exacerbates erosion by rainfall. Seedlings and younger plants (~10 years old) are furthermore vulnerable to fires (Holland and Fuggle, 1982), as are older plants without a protective skirt of old leaves. Harvested plants may therefore be easily killed by a blaze (Bond, 1983), though high intensity fires can also kill plants with a protective skirt of old leaves. Shackleton and Gambiza (2007) recorded a 32% mortality following an intense fire on a site with 50 individuals with the protective skirt of leaves intact. Climate change has been suggested as a potential threat to the species, with landowners advising that a drying climate along the western coast results in fewer flowers and seeds being produced whilst colder weather and frost in higher lying areas may result in plant mortality. These claims have not yet been tested.

2.2.6 Diseases

Aloe ferox is fairly resistant to diseases (Van Jaarsveld, 1996) and insect pests (Newton and Vaughan, 1996; Sachedina and Bodeker, 1999), although work by Zapata *et al.* (2013) show a strong susceptibility of the species to certain fruit pathogenic fungi *Botrytis cinerea*, *Penicillium digitatum*, *Penicillium expansum* and *Penicillium italicum*. Other studies have found that plants in cultivation may be prone to disease including aloe cancer (also called galls), leaf spots, bacterial infections and aloe rust (DAFF, 2013). A few of these lead to the rapid demise of the plants, or spoil their appearance.

2.2.7 Utilisation

- **Use Value**

Aloe ferox has a long history of use in both local and international applications. The species is most widely favoured for its purgative effects but its extracts have a much wider application. As far back as the age of exploration, European sailors who reached the Cape, reportedly adopted practices of the local indigenous communities, and used the plant to treat cuts, burns and chafing. In the late 1700's Swedish naturalists who visited the Cape including Dr Andrew Sparrman and Carl Peter Thunberg, made several references to *Aloe ferox* in their documented observations of the local indigenous flora and the communities who used them (Reynolds, 1950). Sparrman gave an account of the preparation of a drug from the sap drained from aloe leaves whilst Thunberg recorded the first commercial preparations of the aloe bitters (gum) in the Riverdale district (Reynolds, 1950).

The plants are favoured most for the primary bitter sap extract contained in the leaves (flowing between the leaf rind and inner fleshy leaf tissue) which is extracted, crystallised (sometimes ground to powder) and traded globally. These 'bitters' along with secondary extracts, including the inner leaf jelly (in juice, gel or powder form), are used in beverages, medicines, and a range of healthcare and cosmetic products (Fig. 2). To date, several studies have documented the phytochemical properties and health benefits of *Aloe ferox* leaf extracts. The bitter and non-bitter extracts are rich in polysaccharides and other plant metabolites, including nourishing amino acids and minerals that have been promoted as having anti-microbial, anti-septic, anti-oxidant, anti-inflammatory, anti-cancer, anti-tyrosinase, age-defying, moisturising and detoxifying properties Van Wyk and Gericke, 2000; Choi *et al.*, 2002; Kambizi *et al.*, 2004; Loots *et al.*, 2007; Van Wyk *et al.*, 2009; Mwale and Masika, 2010). The valuable bitter sap of *A. ferox* has also been proven to have a higher Aloin and Aloesin content than the more widely used Aloe Vera, presumably making it more effective in treating skin and health ailments. Majority of *A. ferox* extracts (~95%) comes from wild plants and this adds to the allure of *A. ferox* products in both the local and international markets.

Figure 2: Raw materials and finished products derived from the leaves of *Aloe ferox*.

- **Local use and harvesting**

  Aloe ferox has been recorded in traditional medicine applications in both South Africa and Lesotho (Hutchins, 1989; Williams, 2003; Van Wyk *et al.*, 2008; Afolayan *et al.*, 2014; Aston Philander *et al.*, 2014; Mugomeri *et al.*, 2016). Most commonly, aloe bitters are orally consumed as a purgative (laxative) medicine in humans and used for the same indication to treat cattle in both South Africa and Lesotho. Other general applications include the use of fresh leaves, juice, leaf decoctions and powder to treat a range of health problems including wounds and skin irritations (in humans and animals), eye infections, arthritis and sinusitis, ulcers, digestive tract problems, bacterial infections, sunburn as well as immune deficiencies (Van Wyk, 2008; 2011). The inner leaf parenchyma has in particular become a popular ingredient in skin and hair care products that are sold both locally and internationally. The amount of *A. ferox* used locally is considerably limited as compared to the tonnes of material traded internationally.

  Harvesting of plants primarily involves the removal of leaves to extract bitters and aloe gels which can then be utilised in cosmetics, hygiene products and as complimentary medicines. Harvesting knowledge and skills have been passed down through generations as a family custom amongst harvesters, and the harvesting practice (commonly referred to as aloe tapping) hasn't changed much over the past two centuries (Newton and Vaughan 1996). Harvesting of leaves is sustained by cutting only the older leaves (at the bottom) and preserving the younger ones around the growing tips. The leaves are manually cut with a sickle about 3 to 4 cm away from the stem to

ensure no damage to vascular tissue so that the leaves can seal properly and not incur any infection. Cut leaves are stacked in a circular pile around a plastic lined hollow and left to drain for a number of hours; piles can consist of anything between 150 and 500 leaves to 1000 leaves and draining takes between 2 – 6 hours. After tapping the bitters, the leaves are transported to factories for further processing and in some instances leaves are left behind and returned to the soil. The leaf gels are obtained by removing the outer leaf tissues and/ or by scraping it from the leaf blade cut lengthwise. On average, materials are typically extracted from plants on an 18 – 36-month cycle by full time aloe 'tappers' (i.e. those who tap/drain the leaves), farm workers and occasional labourers who wish to supplement their usual incomes (Newton and Vaughan, 1996). Reports on the number of leaves removed from individual plants differ significantly but in general, anything between 6 – 30 leaves can be harvested every 1.8 years depending on the plant's health, size of leaves and response to any previous harvesting events.

At present, only a handful of companies in South Africa are involved in the harvest and processing of A. ferox raw materials and/or secondary extracts for export and/or use in local value-adding production chains. Majority of these companies are based in the Western Cape Province where resources are obtained from privately-owned lands and informal management takes place at the behest of land owners. The industry in the Eastern Cape is much less concentrated with only three or four major processing facilities active in the province. Pressure on the resource base in some areas are however immense owing to a range factors that include ill-planned government development initiatives to address poverty and unemployment as well as a lack of concerted efforts to manage harvest practices and conserve the species. Incidences of over-harvesting in parts of the Eastern Cape Province presents challenges for the sustainability of the resource base as well as the livelihoods dependent on it.

- **International Trade**

  Aloe ferox is currently one of the most highly traded plant species in the world. The majority of the *A. ferox* material in trade is wild harvested in South Africa; minimally to completely processed; and exported to consumer countries around the world. South Africa remains the chief exporter of *A. ferox* raw materials and certain consumer goods with countries including Argentina, Germany, Italy, the United Kingdom, Japan and the United States of America accounting for a major portion of all imports. *Aloe ferox* is exported in many different forms but commodities including raw extracts and processed derivatives account for majority of the trade events

involving the species. The export of raw extracts dominates the international trade in *A. ferox* by sheer volume (Fig. 3). According to the CITES trade database the first legal international export of *A. ferox* extract from South Africa was in 1981 with annual exports of crystalline and powdered bitters averaging around 380 000kg each year over the past three decades. Whilst the use and trade of aloe bitters has been ongoing for centuries; use of the derived 'aloe gel' from the white spongy mesophyll layer of the leaf has only recently gained traction within the industry (Grace *et al.*, 2008) owing largely to an increase in the level of in-country processing in recent years (Knapp 2006). The development of new, refined *A. ferox* products has and continues to encourage the complete use of the harvested leaf material with little to no wastage of the valuable resources. These 'derived' goods account for less than 10% of the international trade with majority of exports destined for EU member states. At present, it is estimated that more than 20 local companies are involved in the domestic and international sale of *A. ferox* raw materials and/or finished products containing *A. ferox* extracts.

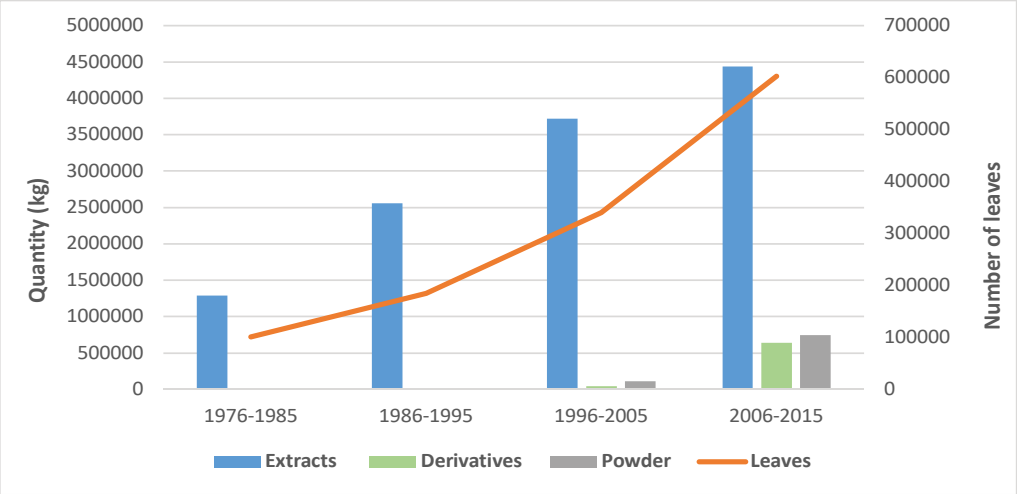

Figure 3: *Aloe ferox* material exported from South Africa between 1976 and 2015 (CITES Trade Database, UNEP World Conservation Monitoring Centre, Cambridge, UK). Trends show a steady increase in the amount of aloe materials exported as extract and powder whilst the later exports of derivatives are due largely to the development of the in-country processing and manufacturing of finished products made largely from secondary leaf materials. The market for extract has been relatively stable since the year 2000. According to the Aloe industry, any fluctuations are related to droughts i.e. when less sap can be tapped from the aloes.

Given that the large quantities of *A. ferox* extracts being exported are sourced from wild collected material, a Non-Detriment Finding (NDF) assessment for the species has recently been

conducted (in accordance with Section 60 (1) of the NEMBA) to ascertain whether or not trade in *A. ferox* has a detrimental impact to the species survival in the wild. Results from the assessment (yet to be published) indicate that there are currently no major threats imposed by legal local and international trade on the wild populations of *A. ferox* in South Africa. However, since it is not clearly known whether the national population of *A. ferox* is increasing, decreasing or stable, especially in relation to harvesting impacts, a scientifically robust resource assessment is required to assess the size of the resource base and to devise a programme for the monitoring of populations at key sites. Provincial management of the species also needs to be improved and these issues should be addressed in this BMP.

- **Impact of use and trade**

  Most *A. ferox* materials (95%) are harvested from wild populations, and a smaller percentage (5%) is harvested from cultivated stands. *Aloe ferox* responds well to harvesting where sufficient control over offtake is instituted. Sustainable harvesting is common practise over most of the species range where collection occurs. The industry is also required to comply with the South African National Standards (SANS) 368 standard for *A. ferox*, developed by the South African Bureau of Standards (SABS), which outlines the types/sizes of plants that can be harvested, as well as when and how the plants should be harvested based on historical harvesting methods used by previous generations of tappers. The harvesting and processing of the plants has been historically centred in the Eastern and Western Cape Provinces where the species occurs most widely and abundantly (Melin, 2009). The majority of the companies involved in the harvesting and export of *A. ferox* raw materials and finished products are based in the Western Cape Province. Harvesters in this province are mostly active on private farm lands between Swellendam and Uniondale where access to, and harvest of the resource is controlled by land owners. Some companies have also invested in small plantations of *A. ferox*. Only a few companies (<5) are known to be active in the Eastern Cape Province where harvesting is less restrictive, occurring on communal lands in and around some of the major towns e.g. Seymore and Uitenhage. There have been several issues raised around the management of certain populations where overharvest has been noted around some of the larger towns particularly in areas close to roads, rural settlements and processing factories (Melin *et al.* 2017). The companies active in the Eastern Cape have taken on the responsibility of providing training on sustainable harvesting methods of the resource.

It is often challenging to estimate the quantities of plants being harvested for use and trade but a previous study from the mid 1990's, estimated that the leaves of approximately 10 million plants were being harvested each year to produce some 400 tonnes of exported *A. ferox* bitters (Newton and Vaughan, 1996). Given that only the leaves of plants are harvested, and that destructive harvesting events are localised and limited, past and current levels of use and trade are considered to be sustainable. The seemingly good economic profitability of the industry has cultivated a vested interest in keeping the plants alive that has inadvertently assured the species preservation along with sustainable livelihood opportunities.

- **Monitoring and management of use**

Whilst active, ad hoc management of the species takes place across certain parts of the country, there is currently no formal management or monitoring plan in place for *A. ferox*. The development of this BMP will focus on addressing matters of sustainable utilisation and monitoring, amongst others, on a national basis.

2.2.8 Propagation

South Africa is a dry country and this species does not make large demands on the environment, for it can easily be grown organically, requires little maintenance, needs relatively little additional water and is tolerant of droughts. In relation to cultivated material, high value products from drought-resistant succulent plants such as *A. ferox* is ideally suited for future production expansion.

Aloe ferox is easy to cultivate from seed and by planting the top parts of old plants. It can also be micro propagated *in vitro* from root and embryo tissues (DAFF 2013). It grows best in free draining compost which should be soaked and allowed to dry out between watering, with only a light watering regime during winter. Waterlogged, saline and alkaline soils are an unsuitable cultivation medium for this aloe species (DAFF, 2013). The first *A. ferox* plantation was established near Albertina in the Western Cape in 1976. Several other plantations have more recently been established around the same area (Van Wyk, 2013). The exact extent of cultivated stands within South Africa is not known but industry members have confirmed that cultivated stocks account for less than 5% of harvested plant material. Large areas of abandoned wheat fields (already disturbed) are available for plantations and rapid scale-up is possible if necessary.

2.2.9 Socio-economic challenges

Majority of the tappers are drawn from predominantly poor black household and possess low levels of educational qualifications to understand the true economic benefit of the *A. ferox* value chain. Their situation is no different from practices of the mining sector in which the dangerous job of extraction of mineral resources is undertaken by miners but the greatest value is derived by processors and manufacturers;

- The tapper communities are largely price takers and have little to no negotiating power in setting prices of their hard laboured product. The current licensing regime is not developmental in nature to enforce shared economic benefit to the tappers. In addition, limited alternatives such as the lack of value add processing technologies exacerbate this problem.

- As the potential growth of the industry, the requirement for a guaranteed steady supply of raw materials, for an agro-processing facility to be economically viable, is often difficult to meet without the establishment of primary cultivation to support the supply of wild species harvesting. Most often, small scale entrepreneurs have on their own struggled to meet this requirement.
- Owing to perceived use of antiquated technologies in the harvesting of the product and at times in areas with high levels of dangers to the tapper with low rewards, this industry has failed to innovate and attract young people towards it.
- All medicinal benefits of natural plants need to be substantiated by rigourous scientific studies to gain traction to the health market. The variations in quality and the absence of standards applicable to the industry make it difficult for SMMEs to trade their products in the formal sector and export markets.
    - Research organisations such as the CSIR and Universities could play a more active role in research that will help to develop the industry as well as empower the communities of tappers to ensure ownership in the value added stages of the *A. ferox* value chain. This intervention will promote the success of SMMEs as well as ameliorate the poor conditions that many tappers live under.
- The issuance of licence on harvesting of the species by the Environmental directorate should be done in consultation with the Economic Development directorate as well as Department of Agriculture Forestry and Fisheries to ensure equitable share of species economic benefit for all involved in its value add chain as well as strong species preservation regime strategies.

2.2.10 Past conservation measures

The species has not received any formal, specific conservation interventions in the past. Resources are currently managed on an ad hoc basis by land owners and communal leaders. It is estimated that 7.8 % of the distribution of *A. ferox* occurs within protected areas. No legal harvesting takes place in protected areas and *A. ferox* is tapped primarily on privately-owned and communal land. Approximately 70% of harvesting occurs on private land, where tappers obtain permission from the landowner to harvest, and the landowner monitors access and harvest (i.e. only a certain number of leaves and plants that can be tapped over a regulated period of time). This is particularly common in the Western Cape Province. Harvest control strategies are difficult to implement in communal lands, because natural resources are viewed as public goods. In general, the Western Cape populations are reportedly better managed for sustainable utilisation than the Eastern Cape populations due to different land tenure arrangements and informal local management plans that have been passed on between harvesters from generation to generation.

3. Planning methodology

3.1 Identified role players;

Stakeholders were identified through a literature review as well as consultation with DEFF colleagues who are responsible for the implementation of Biodiversity Economy and Bioprospecting, Access and Benefit Sharing (BABS) regulations. During the stakeholder identification process, the names and contact details of stakeholders were registered to a database of interested and affected parties.

3.2 Description of the process to be followed in drawing up this BMP

The planning methodology or the processes followed in the development of the BMP-S is outlined in terms of section 5 of the Norms and Standards for BMP-S.

3.3 Process for stakeholder consultation

The stakeholder consultation workshops took place as follows; the first workshop took place on 29 and 30 November 2017, in King Williams Town (*Steve Biko Centre*), the second workshop took place on the 19 June 2019 in the Western Cape Province (George Research Farm) and the last workshop took place on the 10-11 October 2019 in King Williams Town (*Steve Biko Centre*). Various stakeholders including Industries, Government entities, NGOs, research institutions,

collectors, harvesters/tappers and landowners attended and participated in these consultation workshop.

3.4 A list of stakeholders

The following stakeholders were included in the stakeholder database:

- National Government Stakeholders (i.e. DEFF);
- Parastatals (i.e. SANBI, CapeNature, ECPTA)
- Provincial Government Stakeholders (i.e. DEDEA-EC, DEADP);
- Municipal Stakeholders (i.e. Nelson Mandela Metropolitan Municipality);
- Academic or Research Stakeholders (i.e. UJ, NMMU, ARC, CSIR);
- Industries (i.e. Parceval Pty. Ltd., Gower Enterprises)
- The Aloe Council of South Africa
- Private Conservation Stakeholders (SAHTA);
- Landowners
- Traditional Authorities
- TRAFFIC
- Tappers other Stakeholders

4. Description of Objectives

Table2: Context support for the seven objectives identified for this BMP

NO	OBJECTIVES	DESCRIPTION
1.	**To ensure that the wild collection of A. *ferox* is carried out in an adaptive, practical, participatory and transparent manner that maintains the long-term survival of the species in the wild.**	The South African Constitution (Art. 24) requires that future as well as present generations can use *A. ferox* whilst promoting justifiable economic and social development. For this reason there is a need to ensure that wild stocks of *A. ferox* are sourced sustainably.
2.	**To ensure that the wild collection of *A. ferox* does not adversely affect the structure and functioning of the surrounding environment.**	There needs to be a greater commitment to ecologically sustainable land use practices. The monitoring system established should consider *A. ferox* throughout its range, and in different ecosystems and usage regimes, under various management regimes and levels of protection. It should be able to detect changes in the quantity of plants, the structure of populations, and the overall health of the plants as affected by a range of threats. Thus ensuring the protection of the species and the environment.
3.	**To establish and implement monitoring systems for *A. ferox* that provide the scientific and trade evidence required to inform responsive management practices.**	Regular monitoring of the harvest of and trade in *A. ferox* will allow for the identification of any threats to the sustainable

		utilisation of the species thereby enabling authorities to manage offtake more effectively.
4.	**To ensure that collection and management activities are carried out under legitimate tenure arrangements and comply with relevant laws, regulations and agreements.**	Collectors, tribal authorities and conservation managers have a clear and recognised right and authority to use and manage the target resources. This include but not limited to, traditional use and practice, access rights and cultural heritage. Local communities and indigenous people with legal or customary tenure or use rights maintain control, to the extent necessary to protect their rights, traditional knowledge or resources, over collection operations.
5.	**To ensure that the customary rights of local and indigenous communities 'to access their land including indigenous/traditional knowledge associated with *A. ferox* and to manage collection/harvesting areas are recognised, respected and integrated into the permitting process/decision making process.**	To ensure that customary rights of local and indigenous communities, access to their land, traditional knowledge associated with *A. ferox* and management of harvesting areas are recognised and integrated into the decision making process.
6.	**To ensure that through fair and equitable sharing of benefits derived from the biotrade and bioprospecting of *A. ferox*, the conservation and sustainable use of the species is promoted and the livelihoods of communities is enhanced.**	In doing so, South Africa will service its obligations as a Party to both the International Convention on Biological Diversity and the Nagoya

		Protocol, which seek to ensure that equitable sharing of benefits leads to biodiversity conservation.
7.	**To promote transnational management of *A. ferox* across its natural range in South Africa and Lesotho.**	To ensure regional co-management of *A. ferox* through communication with Lesotho Department of Environmental affairs and relevant stakeholders (e.g. NGO and Industries for the effective global conservation of the species

5. ACTION PLAN FOR *ALOE FEROX*

Table 3: Detailed action plan for *Aloe ferox* (including objectives, actions, indicators and champions of the plan)

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
1. **To ensure that the wild collection of *A. ferox* is carried out in an adaptive, practical, participatory and transparent manner that maintains the long-term survival of the species in the wild.**	Management of wild collection of *A. ferox* is supported by a resource inventory assessment and monitoring programme	Undertake an adequate and practical resource assessment of *A. ferox* across its range. [**Resources: R500000]**	Evidence generated to indicate number of plants densities and the extent of protection of resource base in protected areas.	Report on *Aloe Ferox* Resource Assessment **Timeline: 14 months**	**Lead Implementing agent:** SANBI **Collaborators:** Provincial conservation agencies,
		Compile provincial operational guidelines	Baseline information is made available to provincial conservation authorities and chiefs on the population size, distribution and structure across the species range, to inform where harvesting should be permitted	Each permit evaluation application is informed by the resource assessment **Timeline: Ongoing from time resource assessment becomes available?**	**Lead Implementing agent:** Provincial conservation agencies **Collaborators:** SANBI

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
	Conservation status of *A. ferox* is assessed and reviewed periodically and/or as needed	Review national conservation assessments of *A. ferox*. **[Resources: R80 000]**	Conservation status of *A. ferox* is regularly assessed to allow for adaptive management	Revised Red list assessment on SANBI'S website **Timeline: Within one year of publishing the BMP**	**Lead Implementing agent:** SANBI
	Develop sustainable use principles and guidelines to promote the conservation of the species in the wild	Develop a sustainable harvesting protocol based on existing literature and practices of experienced harvesters.	Collection and harvest instructions and rules are produced including the establishment of a suitable frequency of return harvests that will be available to all known harvesters.	Harvesting guidelines published and distributed This will be reviewed annually and included in harvester guidelines **Timeline: Within one year of publishing the BMP**	**Lead Implementing agent:** DEFF **Collaborators:** Western Cape Department, Industry, DEDEAT, Harvesters, TRAFFIC, SANBI, District and local municipalities and Tribal Authorities
		Disseminating guidelines and train harvesters and land owners	Land owners and harvesters are fully aware of how to harvest sustainable	Number of copies of the guidelines distributed per annum Number of harvesters trained on how to use the guidelines per annum	**Lead Implementing agent:** Provincial conservation authorities (DEDEAT & CapeNature) **Collaborators** Industries (eg Aloe Council)

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
				Harnessing of local harvester's expertise to train other harvesters **Timeline: Ongoing?**	
		Augmenting the species in the wild with seeds or seedlings in areas where the resource has been depleted	Increase the number of *A. ferox* plants in the designated areas	Number of communities who have started to augment their Aloe populations	**Lead Implementing agent:** Provincial conservation authorities (DEDEAT & CapeNature), **Collaborators** Industries (e.g. Aloe Council)
2. **To ensure that the wild collection of *A. ferox* does not adversely affect the structure and functioning of the surrounding environment**.	Harvesting does not impact negatively on the surrounding environment	Determine the impact of harvest and infield processing on the surrounding environment e.g. fire wood collection for boiling of extracts	To identify alternative arrangements to mitigate impacts on the environment and integrate these into the harvesting guidelines	Results of independent research report Translating the findings of the report into the harvesting guidelines **Timeline: 36 months**	**Lead Implementing agent:** Industry (Might fund the study). **Collaborators** Provincial conservation authorities, Department of Agriculture, Chiefs, Municipalities, and SANBI
	Sensitive taxa and habitats that could be affected by collection of *A. ferox* are identified	Determine impact of harvest on the larger ecosystem and if any rare or	Spatial layer of *A. ferox* localities is overlaid with layer of threatened species using GIS maps.	Updated database and map on the distribution of *A. ferox*	**Lead Implementing agent:** SANBI **Collaborators** DEDEAT & CapeNature

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
	and adequately protected.	threatened species are being affected.		**Timeline: Within one year of publishing the BMP**	
		Develop a decision support tool for provincial conservation authorities that identifies area where harvesting should not be permitted as it would result in negative impact to the sensitive ecosystems and species	No-go areas are mapped to prevent negative impact on ecologically sensitive areas	The decision making tool and must include • Threatened ecosystem • Area where threatened species occur • Areas of exceptions and critical biodiversity **Timeline: Within one year of publishing the BMP**	**Lead Implementing agent:** SANBI **Collaborators** DEDEAT& CapeNature
3. To establish and implement monitoring systems for *A. ferox* that provide the scientific and trade evidence required to inform responsive management practices.	Based on the resource assessment, baseline information will be documented, sites can be identified for ongoing monitoring, and	Establish and implement a resource monitoring programme of *A. ferox* across its range to guide and assess impacts of ongoing wild collection.	Undertake foundational study on which future monitoring should be based	Scientifically sound monitoring programme **Timeline: 14 months after the publication of the BMP**	**Lead Implementing agent:** SANBI **Collaborators:** Provincial Conservation agencies, landowners, communities

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
	the monitoring plan will be developed.	Map all areas of the species distribution where wild harvesting is occurring.	The area where wild collection is carried out is clearly defined and its boundaries are established.	Production of harvesting maps across the South African range of the species **Timeline: 12 months and updated annually**	**Lead Implementing agent:** Eastern Cape Department & CapeNature **Collaborators** SANBI & Industries
	Monitor legal, illegal and unregulated CITES trade in *A. ferox*	Establish total quantity in trade within the region as well as internationally and cross-check against results of resource assessment and provincial harvesting permits to determine whether continued off take is sustainable.	Database of CITES trade records for South Africa maintained by DEFF.	Updated CITES Trade database **Timeline: 12 months and updated annually**	**Lead Implementing agent:** DEFF **Collaborators** TRAFFIC, Aloe Council & Provincial authorities, SANBI
			Database of provincial harvesting permits per year is created and maintained.	Annual report of provincial harvesting databases **Timeline: 12 months and updated annually**	**Lead Implementing agent:** CapeNature & Eastern Cape Department **Collaborators** TRAFFIC
			CITES Trade analysis using updated databases	Analysis report **Timeline: 18 months and updated annually**	**Lead Implementing agent:** SANBI **Collaborators** TRAFFIC

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
		To determine relevant management interventions to ensure sustainability	Harvest and trade data informs collection activities and sustainable offtake is guided by an adaptive management approach	Updated *Aloe Ferox* NDF **Timeline: 36 months**	**Lead Implementing agent:** SANBI/Scientific Authority **Collaborators** Provincial Authorities & all stakeholders
		To determine whether the amended CITES annotation #4 has impacted the international trade in *A. ferox* specimens and how, the amended annotation #4 has affected the population size, distribution, status and harvest of *A. ferox*	Provide CITES secretariat with information pertaining to Decision 18.323 - 18.326 on the Annotation of Cape aloe (*Aloe ferox*)	Report from South Africa **Timeline: CITES COP19**	**Lead Implementing agent:** SANBI & DEFF **Collaborators** Scientific Authority, Industries/Aloe council
4. To ensure that collection and management activities are carried out under legitimate tenure arrangements and comply with relevant	Tenure, management authority and land use rights are clearly defined for	Information is provided by collectors and industry to prove legal access or prior informed consent.	Ownership, tenure or land use rights of the collection area are clearly defined through documents such as land/title	Available material transfer agreement **Timeline: On going**	**Lead Implementing agent:** DEFF/BABS unit **Collaborators** Industries/Aloe council, DEDEA, CapeNature,

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
laws, regulations and agreements.	the collection of *A. ferox* in the wild.		deeds, lease agreements, collection permits, prior informed consent, letters of permission from land owners and land registry records.		Western Cape Province and tribal authorities
	Implement & enforce legislative provisions and standardisation of the 3 legislative tools for the whole of Eastern Cape	Eastern Cape to revise and standardise (merge) its existing environmental legislations.	A single piece of legislation is passed by the provincial legislature and implemented.	Updated legislation gazetted? **Timeline: 48 Months after the publication of the BMP (2022)**	**Lead Implementing agent:** Eastern Cape Department **Collaborators**

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
	Standardize as far as possible the management and control measures across the provinces in accordance with recommendations made in the Non-Detriment Finding (NDF) assessment for *A. ferox* to ensure effective conservation of the species across its range.	Establish a task team to determine where differing management, control and regulatory measures between the two provinces can be aligned.	Well managed resource base that is easy to control and monitor	Task-team established? **Timeline:48 Months after the publication of the BMP**	**Lead Implementing agent:** DEFF **Collaborators** TRAFFIC, CapeNature, SANBI, Aloe council, Tappers and Western Cape Department

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
	To make certain that all role players involved in the value-chain of *A. ferox* are well informed, equipped and trained on legislative aspects relating to the conservation and management of the species	Create awareness on the legislative provisions (compliance promotion to all relevant role players)	All roles players are aware and compliant with legislative provisions	Compliance with relevant legislation (determined by the number of reports and prosecutions) **Timeline: Ongoing**	**Lead Implementing agent:** DEDEAT & CapeNature **Collaborators** DEA&DP, Industry, Tribal Authorities and Communities
		Training and communication workshops are held at provincial level to improve the capacity of law enforcement officers and to inform traditional authorities how to report and manage non-compliance	Improved capacity of the law enforcement and compliance amongst harvesters Tribal Authorities furnished with contact details of the relevant authorities	Well-equipped law enforcers and tribal councils **Timeline: Ongoing**	**Lead Implementing agent:** DEDEAT & CapeNature **Collaborators** DEA&DP, Industry, Tribal Authorities and Communities

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
5. To ensure that the customary rights of local and indigenous communities 'to access their land including indigenous/traditional knowledge associated with *A. ferox* and to manage collection/harvesting areas are recognised, respected and integrated into the permitting process/decision making process.	Agreement with local and provincial authorities are based on appropriate and adequate knowledge of livelihoods resource tenure, management requirements and resource value *A. forex*	Establish a mechanism to facilitate community liaison	Local communities rights to use wild collected *A. Forex* and manage communal collection areas shall be recognised and respected	Mechanism established and communities capacitated to manage their resource well **Timeline: Ongoing**	**Lead Implementing agent:** Eastern Cape department & CapeNature **Collaborators** Chiefs, Tappers, DEFF-BESU, Raymond Mhlaba, and Nelson Mandela municipality
		Develop Biocultural Community Protocols	Documented customary system for accessing communal land to collect species and also obtain traditional knowledge associated with the species	The BCP developed Timeline: 36 months after the publication of the BMP	**Lead Implementing agent:** DSI & DEFF-BESU **Collaborators** Traditional Authorities supported by DEFF, DSI, DEDEAT; SANBI , COGTA, District and Local Municipality
		To ensure that ABS considerations are implemented at a community level through coordination, monitoring, compliance and enforcement of	Compliance of the ABS agreements and related regulations	Number of benefits shared for the resource Tangible benefits to communities are evident **Timeline: Ongoing**	**Lead Implementing agent:** Industry and Land Owners **Collaborators** SANBI, DEDEAT, Industry, (DEA: BABS) Local communities and tribal authorities

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
		relevant ABS regulations			
		Undertake a research project on community livelihoods and development associated with *A. ferox* and the impact on the resource.	To unlock the maximum value of the resource for the country while also promoting fair value and equitable sharing of benefits and resilient of the resource.	Recommendations on equitable pricing Recommendations for integration on BSA's to ensure fair dispensation The total turnover generated by the industry of whether the industry is growing or not **Timeline: Ongoing**	**Lead Implementing agent:** DEFF **Collaborators** Industry, BABS unit (for the implementation of a price to be paid to harvesters), communities.
6. To ensure that through fair and equitable sharing of benefits derived from the biotrade and bioprospecting of *A. ferox*, the conservation and sustainable use of the species is promoted and the livelihoods of communities are enhanced.	Implement and enforce material transfer agreements and benefit sharing agreements including permitting system provisions of NEMBA and the BABS Regulations.	Explore and implement interventions that would enhance the conservation and management of the resource through a holistic business and conservation approach with organisations such as the Cape Aloe movement	At least two business and conservation initiatives implemented	Identification of the initiatives **Timeline: 12 months after the publication of the BMP** The conservation value and benefits derived are well documented and traceable	**Lead Implementing agent:** DEA&DP and DEDEAT **Collaborators** Private land owners, DEFF, BABS Unit?, Tribal conservation authorities, Industry & Communities

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
				Timeline: Implementation starts 24 months after the publication of the BMP	
7. To promote transnational management of *A. ferox* across its natural range in South Africa and Lesotho.	To understand existing conservation measures in Lesotho and to develop a conservation plan based on the available knowledge and preliminary research findings	To work with Lesotho Government through the MDTPA structures (Biodiversity and Protected Area Working Group) to understand existing *A. ferox* harvest and conservation measures in Lesotho	Inform the MDTPA of the BMP and to understand the existing knowledge of Aloe ferox in Lesotho Obtain buy in from Lesotho for future conservation actions	Records of decisions for the MDTPA meetings **Timeline: 12 Months after the publication of the BMP**	**Lead Implementing agent:** DEFF, Lesotho Department of Environment & MDTPA **Collaborators:** DEA&DP & CapeNature
		Liaise with Lesotho Government to consider conducting preliminary research into volumes of *A. ferox* being harvested and traded from Lesotho and develop a conservation action plan for *A. ferox* to	Lesotho considers the conservation plan for *A. ferox*	Conservation action plan developed **Timeline: 36 Months after the publication of the BMP (dependent on outcome of preliminary research)**	**Lead Implementing agent:** DEFF, Lesotho Department of Environment & MDTPA **Collaborators:** Industries, TRAFFIC & NGO's

Objective	Sub-Objective	Actions/Resources	Intended Outcome	Indicators/Due Date	Implementing Party
		ensure co-management of the resource if necessary			

6. Implementation Mechanism

The Eastern Cape Department of Economic Development, Environmental Affairs and Tourism is the lead implementing agent for this BMP. An *Aloe ferox* community of practice is going to be established to assist in overseeing the implementation of the BMP.

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