Management of Commercial Harvesting of Flora in Western Australia

2023 – 2028

March 2023

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

Department of Biodiversity, Conservation and Attractions
Locked Bag 104
Bentley Delivery Centre WA 6983
Phone: (08) 9219 9000
Fax: (08) 9334 0498

www.dbca.wa.gov.au

March 2023

This report/document/publication was prepared by Species and Communities Program and Wildlife Protection Branch.

Questions regarding the use of this material should be directed to:

Species and Communities Program
Department of Biodiversity, Conservation and Attractions
Locked Bag 104
Bentley Delivery Centre WA 6983
Phone: 9219 9000
Email: SpeciesandCommunities@dbca.wa.gov.au

The recommended reference for this publication is:
Department of Biodiversity, Conservation and Attractions (2023) *Management of Commercial Harvesting of Flora in Western Australia, 2023 - 2028*. Department of Biodiversity, Conservation and Attractions, Perth.

This document is available in alternative formats on request.

Please note: urls in this document which conclude a sentence are followed by a full point. If copying the url please do not include the full point.

Cover image *Banksia hookeriana*. Photo by M. Smith

Contents

Appendices

1 Introduction

Western Australia (WA) has a rich and diverse native flora that is internationally renowned, with recognition of the Southwest Australian Floristic Region as one of the world's 36 biodiversity hotspots.

Commercial harvesting of native flora is a significant industry in WA and includes: cut flowers and foliage; whole plant salvage, seed harvesting, primarily for propagation and revegetation purposes; *Eucalyptus* species stems for production of didgeridoos; and nuts, cones and woody stems for the craft market.

The Department of Biodiversity, Conservation and Attractions (DBCA) is responsible for the administration and implementation of the *Biodiversity Conservation Act 2016* (BC Act) and *Conservation and Land Management Act 1984* (CALM Act) that together provide the legal basis for the conservation of biodiversity in WA. DBCA issues licences and authorisations under the BC Act for the take of flora, including for commercial harvest.

DBCA's objective for the management of commercial flora harvesting is to ensure commercial flora utilisation is managed in a sustainable manner both for the species involved and the environment (DPAW, 2015).

Industry regulation is based on flora conservation and appropriate land management and reservation. A system of licensing, area- and species-specific management, and monitoring has been developed to ensure the sustainable utilisation and conservation of flora being harvested.

This system complements other flora conservation initiatives being undertaken in the State, including the conduct of biogeographical surveys, the development and management of a comprehensive, adequate and representative (CAR) reserve system, the identification and conservation of threatened, specially protected and priority species, and the investigation into, and management of, key threatening processes.

This management plan describes the various elements of the management system in place for the conservation of commercially harvested flora in WA including:

- the listing of specially protected and threatened flora under the BC Act; and priority flora by DBCA;
- the CAR reserve system; and
- the licensing system under the BC Act and Biodiversity Conservation Regulations 2018 (BC Regulations) to regulate the commercial flora industry.

The plan is also an educational resource designed to raise awareness among industry stakeholders and the broader community of the range of issues affecting the management and conservation of flora in WA.

Fundamental to this plan's success is correctly identifying any flora species being harvested. Licensees, DBCA staff and the broader industry are encouraged to seek professional assistance in identifying any flora subject to this plan.

Background information regarding the biology and ecology of species listed in Appendix 1 is provided in Appendix 4. Background information regarding general threats to flora is provided in Appendix 2.

1.1 Purpose of the Plan

This plan has been developed by DBCA to satisfy the requirements for approval of a wildlife trade management plan under Section 303FO of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and to meet the legislative, policy and other requirements of the Government of Western Australia for the period from 1 July 2023 to 30 June 2028.

This plan supersedes the Management of Commercial Harvesting of Protected Flora in Western Australia 2018–2023.

1.2 Scope of the Plan

Flora may be harvested for commercial purposes in WA subject to the management controls as outlined in this Management Plan. This plan covers the commercial take (also referred to as harvest) and supply of flora on both private and Crown land, and has been specifically prepared for approval by the Commonwealth Government in relation to the export of material from the Commonwealth- and State- approved Export Flora List (refer Appendix 1).

Only species listed on the Export Flora List may be exported under this plan, unless being exported as a DBCA-approved test export (see 5.2.4). At the time of publication, the Export Flora List allows the export of specimens of:

- All Australian native plants that are not native to WA and that are artificially propagated or wild-harvested in WA;
- Flora (WA native plants) that are cultivated (artificially propagated) in WA[1]; and
- Flora species that are listed on the Export Flora List (148 species at the time of preparation of this plan) that may be taken from naturally occurring stands in WA (wild-harvested), in accordance with specified conditions.

This plan also provides for the export of commercially harvested whole plants of flora in DBCA-approved salvage operations within WA.

The Export Flora List (Appendix 1) may be updated whilst in force as set out in Section 5.

[1] Excluding any CITES I species or species listed as threatened species under the EPBC Act (Cth); or species that are listed as specially protected or threatened species under the BC Act (WA) or species that are identified as priority species by DBCA. Under the EPBC Act, such species may only be exported commercially if sourced from a separate, EPBC Act-approved artificial propagation program. CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora and a CITES I species is a species listed on Appendix I of CITES, the highest level of protection under CITES for species that are endangered by trade. Significant penalties apply for any breaches of the EPBC Act and BC Act.

This plan does not cover the export of:

- Any CITES I species or threatened species listed under the Commonwealth EPBC Act.
- Any species that are listed as specially protected or threatened species under the BC Act or species that are identified as priority species by DBCA.
- Sandalwood, *Santalum spicatum*, which is subject to export under the Commonwealth *Export Control Act 1982*.

All flora (e.g. flowers, foliage, fruits, seed and plants) lawfully taken under the appropriate BC Act licence or acquired lawfully from private property may also be traded within WA and the rest of Australia, subject to individual State and Territory controls.

Plants native to other parts of Australia (and not native to, or determined by order to be flora in WA) and that are growing in WA, are not referred to as “flora” in this plan, but as “Australian native plants that are not native to WA”. The cultivation and harvest of such plants does not generally threaten WA native flora or their habitat. As WA is outside their natural range, the taking of these plants in WA is considered sustainable and non-detrimental. While their harvest in WA is covered by this plan, this activity is generally not regulated by DBCA, depending on tenure.

This plan may be amended or varied whilst in force under the EPBC Act if the amendments or variations are endorsed by DBCA and approved by the Commonwealth Minister for the Environment and Water.

Throughout this plan the nomenclature is consistent with that published on DBCA’s Florabase website and is current at the date of publication.

1.3 Objectives of the Plan

The objectives of this management plan are to:

- meet the requirements for a wildlife trade management plan under the EPBC Act to facilitate the export of commercially harvested WA flora.
- provide for the commercial harvest of flora in WA in accordance with the principles of ecologically sustainable development as defined in section 4 of the BC Act.
- provide information to the commercial flora harvest industry regarding the management of flora harvest in WA.
- identify those species of flora, which are subject to commercial harvesting in WA.
- establish and implement an appropriate licensing regime to take flora for commercial purposes under the BC Act and CALM Act.
- ensure the harvesting of flora is done in a sustainable manner, to consider target species, non-target species, and the habitat in which they occur.

- manage access to lands and waters managed by the department, including lands managed under delegation, for harvesting of flora to ensure the access is in accordance with the CALM Act, and does not negatively impact on those lands or waters.
- undertake research as required to determine the susceptibility or response of targeted flora to their utilisation and inform the development and implementation of sustainable management strategies.

2 Legislative Basis for Management

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act, Part 13A, provides the regulatory framework for the international export of plants and animals (wildlife), wildlife specimens and products derived from wildlife.

The Commonwealth Minister for the Environment and Water may approve a wildlife trade management plan (WTMP) prepared by a State or Territory for the protection, conservation and management of a plant specimen where there is commercial harvesting of native species under section 303FO of the EPBC Act.

In order to export Australian native plant specimens for commercial purposes the specimens must be sourced legally under an approved program such as those covered by a WTMP. Exporters sourcing specimens under an approved program must also have an export permit issued under the EPBC Act, unless exempt. Further information regarding export permits and exemptions are available at https://www.dcceew.gov.au.

This management plan has been developed to meet the requirements of a WTMP under section 303FO of the EPBC Act and applies to the commercial harvest and export of plants listed in the Export Flora List (Appendix 1).

2.2 Western Australian Legislation

2.2.1 Biodiversity Conservation Act 2016

In WA all native plants that are indigenous to the State are protected under the BC Act, unless otherwise exempt by order. This applies to all members of the plant or fungus kingdoms, alive or dead, and any part, product or genetic material of the plant including roots, branches, stems, leaves, flowers, seeds, pollen and spores.

The BC Act provides for the Minister for Environment to list, by order, a flora species as a specially protected species, or as a threatened species in the categories of critically endangered, endangered or vulnerable. The order of threatened species is published in the *Government Gazette* and is published on DBCA's website. Plants that are not native to WA may be determined by order as flora under the BC Act, however at the time of publication, no species have been listed.

Under the BC Act it is an offence to take, supply, deal in, process or export flora unless it has been done with a licence or authorisation, or is subject to an exemption.

The definition of 'take' under the BC Act in relation to flora includes to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means, or to cause or allow this to be done. The supply of flora includes to sell, to give, to send or deliver for the purpose of sale or on sale, to dispose under a hire-purchase agreement, or to receive and have in possession for the purpose of sale or giving.

The BC Regulations also require that a person must have written authorisation of an owner or occupier of land to enter that land to take, possess for supply or process flora.

The BC Act and BC Regulations set out the regulatory framework for the take, supply, dealing, processing and export of flora in WA. The licensing regime as it applies to the commercial harvest of flora is detailed in Section 3.

2.2.2 Conservation and Land Management Act 1984

The CALM Act provides for the use, protection and management of certain public lands including national parks, conservation parks, nature reserves, State forests and timber reserves.

The CALM Act provides for establishment of the Conservation and Parks Commission (the Commission) as an advisory, vesting and controlling body whose functions include advising the Minister on the development of policies for conservation and biodiversity, and preparing and dealing with proposed management plans for land and water vested in or under the care, control, and management of the Commission, whether solely or jointly with a joint responsible body.

The CALM Act and Conservation and Land Management Regulations 2002 (CALM Regulations) control access and activities on CALM Act and. Authority under CALM Regulation 4 is required to access CALM Act lands for the purpose of harvesting flora, in addition to any licence required under the BC Act to take flora for commercial purposes.

2.2.3 Environmental Protection Act 1986

In WA the clearing of native vegetation is primarily regulated under the *Environmental Protection Act 1986* (EP Act) and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (Clearing Regulations).

All clearing of native vegetation requires a permit unless it is exempt or it has been referred to the Department of Water and Environmental Regulation (DWER) or Department of Mining, Industry, Resources and Safety (DMIRS) and it is determined that a clearing permit is not required because the clearing is exempt, or the clearing satisfies all the referral criteria. This referral process is only suitable for clearing activities with a very low environmental impact.

The taking of flora under a licence or authorisation issued under the BC Act is an exempt activity under Schedule 6 of the EP Act and does not require a clearing permit. Although the take of flora on private land does not require a BC Act licence, it may still be subject to a vegetation clearing permit under the EP Act.

3 Management Framework

The key measures available to DBCA to manage the commercial flora industry to ensure ecologically sustainable use of flora include:

- statutory protection of threatened flora and specially protected flora to provide in situ protection of specific species from exploitation or destruction on all lands;
- administrative protection of poorly known and near-threatened flora on the 'priority flora' list;
- a CAR reserve system to provide in situ protection of species and habitats from key threatening processes, exploitation or destruction;
- licences, including terms and conditions that can restrict:
    - what species of flora/parts of flora are taken;
    - where and when they may be taken;
    - how they are taken; and
    - the supply of flora lawfully taken;
- legislative requirement for access to land permissions;
- annual quotas to set limits on species quantity that may be taken;
- research; and
- education.

The application of these measures in managing commercial flora harvesting is outlined in the sections below.

3.1 Threatened and Specially Protected Flora

WA is renowned for its unique and diverse flora. However, the natural rarity, localised distribution and small population sizes of many species, combined with the level of disturbance that has occurred since settlement in the urban, agricultural and pastoral areas, has resulted in many flora species being threatened with extinction unless suitable management occurs.

Section 19 of the BC Act provides for the Minister for Environment to list by order native flora as threatened species in the categories of:

- critically endangered - facing an extremely high risk of extinction in the wild in the immediate future;
- endangered - facing a very high risk of extinction in the wild in the near future; or
- vulnerable - facing a high risk of extinction in the wild in the medium-term future.

The category is determined using criteria set out in *Ministerial Guideline (Number 2) – Threatened and Extinct Species Listing Specifications and Criteria* (DBCA, 2021) and adopts the internationally recognised International Union for Conservation of Nature's Red List of Threatened Species (IUCN RL) published in the IUCN Red List Categories and Criteria, Version 3.1 (IUCN 2001 and later editions).

The WA Threatened Species Scientific Committee (TSSC) appointed by the Minister for Environment, with administrative support provided by DBCA, provides advice to the Minister on the listing of threatened species, under the BC Act.

The TSSC meets (usually) annually to consider nominations received. Any person may nominate a native species for listing as a threatened species in a particular category. *Ministerial Guideline No. 1 – Procedures for making and assessing public nominations for listing species and communities as threatened species or threatened ecological communities*, *and for listing key threatening processes* (DBCA, 2018) provides further information about the procedure for making nominations, and for the Minister to assess such a nomination.

The order of threatened species is published in the *Government Gazette*. As of 30 September 2022, there were 163 flora species listed in the category of critically endangered species, 143 flora species listed in the category of endangered species, and 130 flora species listed in the category of vulnerable species and 15 flora species listed as extinct species.

It is an offence to take or disturb threatened flora on Crown or private land without Ministerial Authorisation under section 40 (s40) of the BC Act. The applicable maximum penalty is up to $500,000 for individuals and up to $2.5 million for a corporation. An authorisation under s40 is required in addition to any approvals required under other legislation including the CALM Act or EP Act.

Section 13 of the BC Act also provides for the Minister to list by order a native species as a specially protected species where it meets one or more of the following categories: species of special conservation interest, a species subject to international agreement or species otherwise in need of special protection. There are currently no specially protected flora species listed under the BC Act.

Listing as a threatened species or specially protected species under the BC Act provides greater protection, focuses attention on the need for more detailed research and management, and helps to ensure the continued survival of the species in the wild.

Further information on the listing and management of threatened species is available at www.dbca.wa.gov.au.

3.2 Priority Flora

Many WA species are known from only a small number of populations, and are suspected to potentially be rare or threatened, but there is currently insufficient evidence to demonstrate this. To provide these poorly known species with additional protection, as well as priorities for survey, DBCA maintains a Priority Flora list.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Flora Lists under priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected flora lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the WA distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Priority One: Poorly known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g., agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority Two: Poorly known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g., national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority Three: Poorly known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority four: Rare, Near threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

The Priority Flora list is updated regularly, as information becomes available on new species that may possibly be threatened, or where survey shows a listed species to be more common, or better conserved than originally thought. The current conservation status of all flora, including priority species, can be found on DBCA's Florabase https://florabase.dpaw.wa.gov.au.

Commercial take of flora listed on DBCA's Priority Flora list on Crown land is restricted to harvesting for purposes with conservation benefits. Harvest control for priority flora is implemented through licence conditions.

3.3 Conservation Reserve System

In addition to the protection afforded to WA's flora under the BC Act, the establishment and management of a CAR reserve system is a strategic approach to achieve the aim of conserving genetic resources, biological communities, and ecological processes. As of March 2022, DBCA managed lands covered an area of around 26.9 million hectares comprising 109 national parks, 12 regional parks, State forest, reserves, and other land (Parks and Wildlife Service, 2022).

Through an integrated system of conservation reserves, appropriately managed and broadly representative of the landforms, marine and inland aquatic systems, biogeographic districts and biota of WA, the aim is to maintain habitats and the necessary evolutionary processes and ecological support systems that will maximise the long-term persistence of species and communities. As well as being broadly representative, the reserve system also seeks to include "special" areas to encompass threatened species and ecosystems, geographical outliers, and unique or spectacular landforms.

WA's system of protected areas makes a substantial contribution to the conservation of flora. Large areas of land have been vested in the Conservation and Parks Commission of WA and reserved as national parks, conservation parks and nature reserves for the purpose of conserving native flora and fauna and natural ecosystems.

In exceptional cases, the commercial take of flora from CALM Act lands vested for the purpose of protection and conservation (national parks, nature reserves, conservation parks) may be licensed.

3.4 Licences

The BC Regulations provide for various licences to regulate the commercial flora industry take and supply chain. Licences authorise one or more activities including the taking, supplying, dealing, or processing of flora.

The following licences are applicable to commercial flora industry activities.

- Flora taking (commercial purposes) Crown land licence (regulation 60) to take flora from Crown land for commercial purposes.
- Private land supplier's licence (regulation 63) to supply, and possess for supply, flora lawfully taken from private property.
- Crown land supplier's licence (regulation 64) to supply, and possess for supply, flora lawfully taken from Crown land.
- Flora dealing licence (regulation 65) to deal in flora that has been lawfully taken from private land or Crown land.
- Flora processing licence (regulation 66) to process flora for commercial purposes, to deal in that flora, and to operate a flora processing establishment.

3.4.1 Licence Applications

Licence application forms require adequate information to assess the proposed activity. An application for a licence to take requires identification of proposed target species and locations of proposed activity. An application for a licence to supply requires evidence that flora to be supplied has been lawfully taken.

In considering a licence or licence renewal application the BC Regulations provide for:

- the CEO to request any further information relevant to the application;
- the CEO to take into account any matter considered relevant to the application, including;
    - whether the applicant has been involved in a ***disqualifying event***;
    - the proper conservation, protection and management of flora; and
    - the public interest (and especially the extent to which the operation of a licence would not be in the public interest); and
- the refusal of an application for licence or licence renewal based on assessment of application information provided.

Applications forms for flora licences are available on the DBCA website.

3.4.2 Licence Application Assessment

Licenses issued for the take of species of least concern for sustainability management, are drafted with standard conditions (Appendix 3). Where target species or specified locations indicate further feedback is required, applications are sent to internal DBCA subject matter experts for species management advice or district/regional officers for application of regional restrictions.

3.4.3 Licence Issue

When issuing a licence the BC Regulations provide for:

- imposing of conditions contemplated by the regulations and any other condition the CEO thinks fit, including;
    - keeping of information and records;
    - submission of returns; and
    - fixing of identifiers to flora for possession, transport or dealing;
- licence amendments on the CEO's initiative or on application by a licence holder;
- offence provisions for contravention of licence conditions; and
- the cancellation or suspension of a licence.

Licence conditions are constructed to consider restrictions required to ensure sustainable levels of harvest, and the protection and conservation of surrounding environment.

Standard licence conditions[2] (Appendix 3) outline DBCA's requirements for management of take. Conditions can include prohibition of take for certain species, requirements for areas from where flora may be taken, stated methods of operation to ensure the conservation of the flora and associated ecosystem, requirements to carry and produce the flora licence when undertaking licensed activities, and maintenance and submission of flora returns.

Licences also include a standard condition that states that the survival of any plant or population cannot be jeopardised, and that unless otherwise authorised, no more than 10% of the reproductive flora parts or 20% of any other flora part from any plant can be taken in a reproductive season, to support the primary measure of sustainable take.

Further limits or licence conditions can be applied to address conservation or management matters for a particular activity or species. For example, special licence conditions are required to authorise the take of whole plants under DBCA-approved salvage operations.

[2] Standard licence conditions may be amended, or additional conditions applied as required to align management strategies implemented to address conservation or sustainability concerns.

Measures to ensure that harvesting is sustainable may include:

- special licence conditions being included, to cover such matters as specified harvesting methods and the amount of material (both vegetative and reproductive) which may be taken from any one plant in a season;
- harvest limits through quotas;
- specific areas being closed for picking (e.g. following a fire for a specific number of years, or after a certain number of years of harvesting);
- restrictions being placed on the number of pickers permitted to harvest the species; and/or
- research and monitoring.

Under the BC Regulations, licences can be issued for up to 3 years (usually a one- or three-year period). Part 4 Division 5 provides for the common provisions for flora licences and includes the ability for an applicant or licence holder to review decisions relating to their application or licence by application to the State Administrative Tribunal.

3.5 Access to Land Requirements

Regulation 101 of the BC Regulations provides that a person who is authorised to carry out a ***designated activity*** under a licence must not, for the purposes of the designated activity, enter land that is not in the possession of or under the control of the holder of the licence without the written authorisation of an owner or occupier of the land, to enter the land and to carry out the designated activity. A designated activity in relation to flora includes the taking, possessing for supply, or processing of flora.

This requirement ensures that landowners or occupiers are aware of and must provide written authorisation for access to land for flora harvesting activities, which acts as a tool to manage these activities. It allows landowners or occupiers to provide access and authorise use in accordance with statutory or operational requirements as appropriate for the land tenure (and designated purpose), biodiversity conservation and protection, and other existing land uses. DBCA may provide advice in line with biodiversity conservation objectives on management of flora harvesting activities to other Crown land managers and private property owners for these purposes.

3.5.1 Land Managed by DBCA

CALM Act Land

It is an offence under regulation 8(1) of the CALM Regulations to take flora from CALM Act land without authority. Regulation 4 of the CALM Regulations provides that the CEO (or delegate) can authorise an act that would otherwise be unlawful under the regulations, by written notice (‘lawful authority’). A lawful authority may be expressed to operate in specified circumstances, for a specified period and subject to any specified conditions.

A lawful authority issued under CALM Regulation 4 land functions as the written authorisation required by BC Regulation 101 for CALM Act land, including private or other Crown land that the CEO has agreed to manage for a stated purpose, and other lands put under the CEO's management.

Lawful authority to take flora for a commercial purpose will be considered for CALM Act land where the vested reservation purpose is consistent with sustainable use of natural resources, and are predominately issued for State forest.

Lawful authority applications are assessed and endorsed by DBCA regional officers familiar with land available for flora harvesting and any operational or biodiversity matters that need to be considered. They can be issued for short period of time where focused management of an area is required due to harvest demand and species availability, or to manage/monitor specific licence holders and their compliance requirements. Conversely, an area can be less intensely managed where target species are abundant and are of least conservation status concern. However, an authority cannot be issued beyond the expiry date of a BC Regulation flora taking licence. Specified conditions can control species authorised, harvest methods, quantities, and harvest areas.

The number of lawful authorities issued per harvest area is determined by the demand for target species and the number of licence holders the area can sustain. Harvest areas are mapped and provided with the authority (with many now available electronically on device applications for field use) and are identifiable in the field by physical boundaries (roads, management tracks).

Licence holders applying for a lawful authority after all available harvest areas or quotas have been allocated can be put on a waiting list. A lawful authority may be amended or revoked by the CEO or delegate, providing options for management of non-compliance.

As discussed in Section 3.3, the commercial take of flora from CALM Act lands is limited to collection which directly benefits that land and it can be demonstrated that the species to be taken cannot be sourced from outside conservation estate.

Unallocated Crown Land and Unmanaged Reserves

The Department of Planning Lands and Heritage (DPLH) is responsible for unmanaged reserves (UMR) and unallocated Crown land (UCL) that has not been placed under a management body under the *Land Administration Act 1997* (LAA).

A Memorandum of Understanding (MOU) between DBCA and DPLH in relation to management of the flora industry on UCL and UMR in WA was signed in March 2000. Under this agreement DBCA has the ability to implement specific management control measures in relation to flora harvesting over all UCL and UMR in WA. This MOU is currently under review, however, under a new MOU DBCA will continue to implement specific management control measures in relation to commercial flora harvesting over all UCL and UMR in WA.

Written authorisation for the access of UCL and UMR land for the purposes of BC Regulation 101 may be provided by DBCA through delegated authority under the

LAA. This arrangement allows DBCA to regulate certain activities on UCL and UMR similarly to CALM Act lands, specifically around harvest areas and duration of authorisation. An access to land can be revoked at any time, providing options for management of non-compliance.

3.5.2 Lands Not Managed by DBCA

Other Vested Crown Lands or Reserves

The licence holder is required to obtain access to land from the relevant landowner or occupier prior to any flora taking, and this authority may specify conditions for the activity. The landowner or occupier can revoke this authorisation at any time, and may do so due to non-compliance, or due to sustainability management requirements.

Private Land

On private land, other than a section 40 authorisation to take or disturb threatened flora under the BC Act, no authorisation is required to take flora. Flora taking on private land is subject to vegetation clearing provisions under the EP Act. These provisions enhance the controls on private property flora harvesting, especially if such harvesting has the potential to result in any damage to the flora, its habitat or associated ecosystem.

In addition, under section 171(2) of the BC Act, it is an offence for a person to take flora on private land unless the person is the land owner or occupier or is authorised in writing by the land owner or occupier to take it.

Private property owners and occupiers can therefore manage flora taking activities through this written permission provided to the person proposing to take flora. It must specify the relevant land, the period during which access to the land is authorised and be signed and dated. It may also specify conditions if a property owner or occupier sees fit.

Therefore the provisions of the BC Act cannot regulate flora harvesting on these lands other than where the landowner does not give permission, or in the case of threatened flora, where the permission of the Minister is required. However, while the taking of the flora may not be able to be regulated per se, the supply is under licence, and consequently indirect regulation is provided through licence conditions where the flora is being harvested for supply. Such conditions may apply to specific areas of private property where this is necessary for the conservation of the flora.

In considering an application for a licence to supply flora lawfully taken from private property, DBCA require information to ensure that supply is only licenced where the flora was taken lawfully (requiring land owner or occupier written authorisation to be provided) and in such a manner that ensures that flora entering the supply chain has been sustainably sourced.

3.6 Quotas

If harvest levels of a particular species raise sustainability concerns DBCA can impose an annual quota on the amount of a species that can be taken for commercial purposes. Quotas may be varied from year to year according to criteria affecting species management such as rainfall, time since last fire, concurrent land use operations, the impact of past harvests and projected resource availability from field observations and research.

A quota will be set at a conservative harvest limit (i.e. applying the precautionary principle) relative to the availability and reproductive capacity of the species being considered for harvest. For example, the harvest of *Banksia hookeriana* is carefully managed through quotas as it is susceptible to intense harvesting due to popularity in domestic and international markets.

Allocation of quota is managed through the licensing process and the requirement for returns to be completed and can be implemented using a combination of strategies including limiting the number of licence holders allowed to harvest the species, and the quantity allocated to each licence holder.

3.7 Research

There are various programs designed to provide specialised scientific information which support DBCA's management of commercial flora harvesting. The main areas which are being addressed are:

- investigation and documentation of WA's flora, ecological processes and biological resources;
- conservation of threatened species and ecological communities; and,
- sustainable use of land and biological resources.

Research programs may also be initiated for specific issues relating to the sustainable harvesting of flora as identified through the monitoring and assessment of the industry. Investigations may include the assessment of the sustainability of harvesting specific species, and in specific communities, as well as development of specific harvest prescriptions for species. Recommendations from research will be considered by DBCA, with management recommendations implemented as required through licence conditions.

3.8 Education

Subject to resource and government priorities DBCA continues to develop material to educate the public on the importance of flora protection to and promote conservation.

Education of stakeholders and industry operators in matters of flora conservation, licensing, and other responsibilities under relevant legislation and departmental policy is seen as vital in maintaining a sustainable commercial flora industry.

DBCA will continue to develop guidance material to be circulated to licence holders (when required) and available on the department's website. The Department can attend industry association meetings and forums and provides information to these groups in addition to responding to general enquiries from the public.

Training of DBCA officers involved in administration, management and enforcement relating to the flora industry continues to ensure that they are familiar with DBCA's management objectives and their implementation. Avenues used for training include support for formal education and courses, seminars and workshops, authorised officer training, and on-the-job training.

4 Monitoring, Reporting and Compliance

4.1 Flora Returns

The licence condition requirements for the maintenance and submission of licence returns (records) of take and supply details allows for monitoring of commercial harvesting, and the tracking of flora movements into the supply chain. Return details required are dependent on the activity authorised by the licence.

Take licences returns require date taken, species name, quantity (including unit of measure) and part taken, whether the flora is from cultivated or wild stands, the location of take and relevant grid number from the Grid Locality Map for WA and the entity to whom the flora was supplied.

Supply licences require date supplied, species name, quantity (including unit of measure) and part supplied, and the entity to whom the flora was supplied.

Returns are assessed on receipt for accuracy (species names, unusual quantities). Administrative matters are addressed by licensing officers, and non-compliance concerns escalated to compliance officers. Non-submission of returns is followed up with the licence holder and can result in compliance action and may affect licence renewal.

4.2 Analysis of Flora Take and Supply Data

Return data is managed within a licensing system and can be interrogated to provide reports on recent harvest data, including reports specific to species or locations. In combination with information supplied by DBCA staff managing licence provisions, records from and inspections of flora dealers and observations from flora industry operators this data can be used to:

- compare levels of take from Crown versus private land, and whether harvest is from wild or cultivated flora stands;
- examine harvest levels and identify species subject to harvesting pressure;
- identify the primary uses of harvested flora, i.e. fresh or dried flowers, seed collection and banking (propagation and revegetation) or craftwoods and how this drives harvesting trends;
- Inform on-ground monitoring planning of harvest areas;

- Define priorities for research into factors influencing species biology, ecology and sustainable harvesting; and
- Assess and review species conservation status.

Information from the above is used to review procedures for sustainable species and harvest area management. It also provides information to analyse medium- to long-term harvesting trends to inform overall management strategies at a local, regional and state level.

4.3 Flora Dealer Requirements and Inspections

The State Minister for Environment has prescribed conditional exemptions for dealing in flora under the Biodiversity Conservation (Exemptions) Order 2018 (the Order). This exemption does not apply to specifically controlled sandalwood. This ensures regulatory effort is focused on sustainable harvesting activities (take and initial supply of flora) while maintaining oversight of the supply chain.

The Order provides that no licence is required for the activity of dealing in flora where the flora is purchased from the holder of a licence authorising supply, or a person who otherwise has lawful authority to supply flora. This exemption is conditional on the person who deals in flora:

a) Making a record of the flora purchased that contains the following information:

· A description of the flora

· The quantity of the flora

· The day on which the flora is purchased

· The name and address of the person from whom the flora is purchased.

b) Keeping the record:

· For at least 2 years after the day on which the flora is purchased

· At the place where the person deals flora

c) Making the record available to a wildlife officer if asked by the wildlife officer to do so.

The activity of dealing in flora is also exempt in circumstances where the flora is supplied as a living potted plant, or by retail directly to the public.

Flora dealers are identified through take and supply licence returns, and Wildlife Officers carry out routine inspection of dealers' premises. Dealer records allow for cross-checking of reported flora acquired with return details from licensed takers and suppliers and for unlawful transactions (and potential illegal harvesting) to be detected.

The frequency of inspections depends primarily on the size and nature of a dealer's operations. Information regarding unlawful activity can also trigger inspections or operational planning involving multiple operators within the flora industry.

4.4 Regional Monitoring and Reporting

4.4.1 Flora Industry Regions

For the purposes of flora industry management, WA has been divided into six flora industry management regions (Figure 1) which correspond as closely as possible with biogeographic (Figure 2), and administrative and management boundaries pertinent to the industry (Figure 3).

The six flora industry management regions (Figure 1) comprise:

- Southern Sandplain (which largely corresponds with DBCA's South Coast Region, plus the eastern part of DBCA's Warren Region);
- Southern Forest (which consists of the western two thirds of DBCA's Warren Region, and the southern half of DBCA's South West Region);
- Northern Forest (which consists of the northern half of DBCA's South West Region, with the southern half of Swan Region);
- Northern Sandplain (the northern part of DBCA's Swan Region, in addition to the sandplain north to Carnarvon);
- Wheatbelt; and
- Rangelands (including the goldfields, desert, Pilbara and Kimberley areas).

4.4.2 Regional Responsibilities

DBCA officers responsible for regional flora industry management are trained to be familiar with harvesting practices and the flora species targeted for commercial harvesting in their areas. They use a variety of methods to assist in flora industry management including:

- undertake on-ground, species and harvest area monitoring and provide relevant advice to licensing officers to ensure licences support sustainable harvesting practices;
- support licence holders with initial identification of species to inform them of their suitability for harvesting and any restrictions in place;
- maintain records of licence holders active in their areas and for lands managed by DBCA, to determine and manage licence holder numbers, species or quantity limits per area for sustainable harvesting; and
- report flora industry activities which may lead to non-sustainable to Conservation and Ecosystem Management Division and Species and Communities Program to inform management and research needs for the industry.

District officers are encouraged to raise procedural or administrative issues and provide suggestions for improving regional and state management of the flora industry.

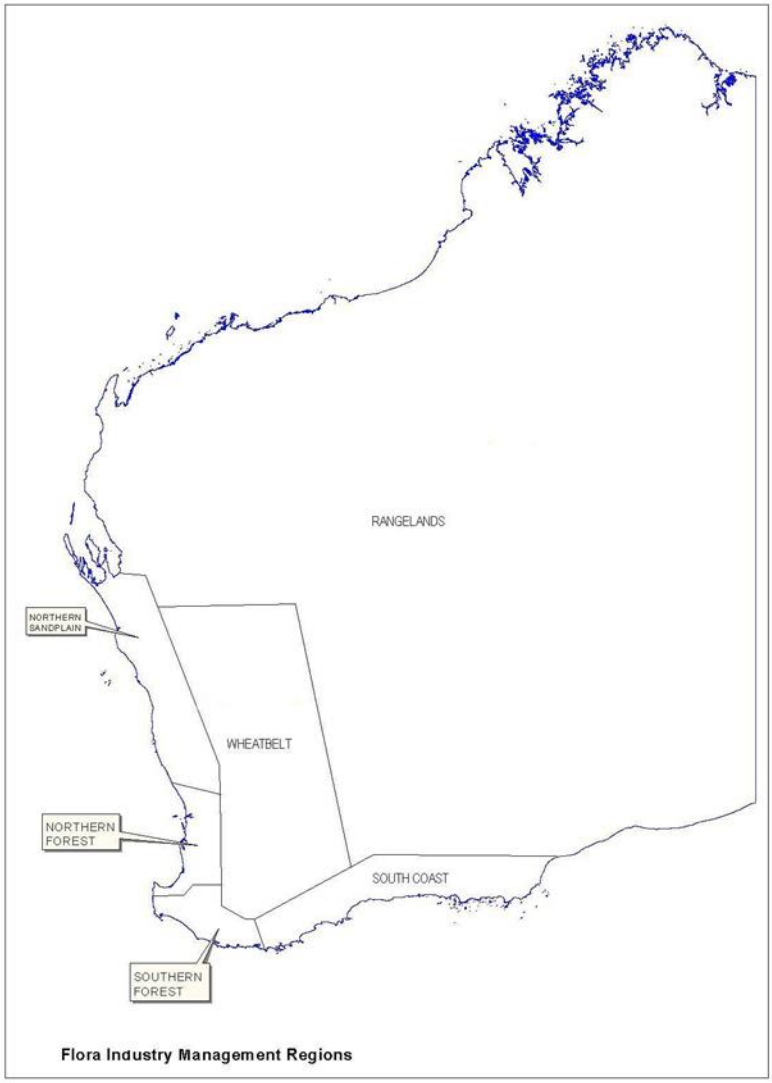

Figure 1. DBCA Flora Industry Management Regions

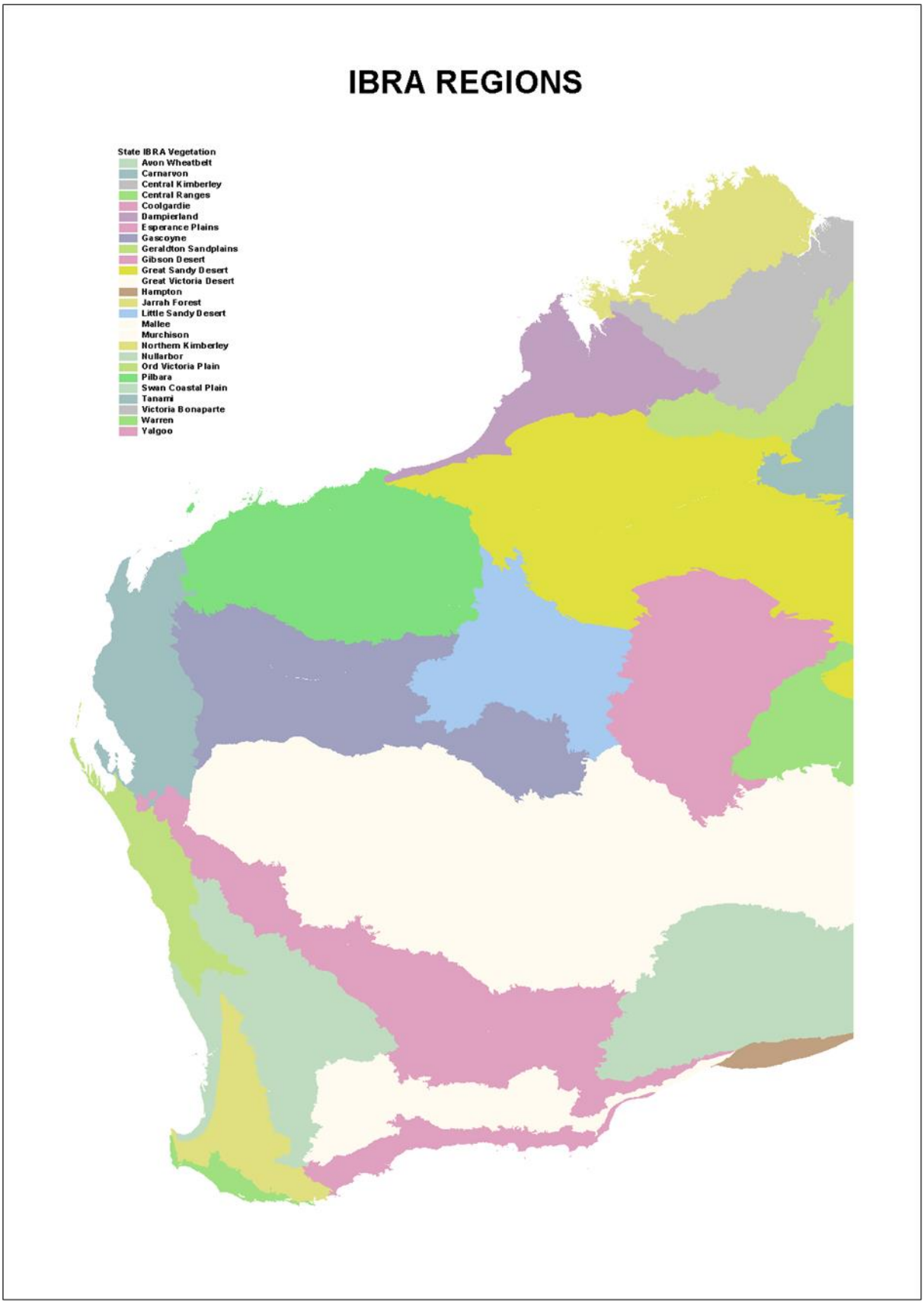

Figure 2. IBRA biogeographic regions

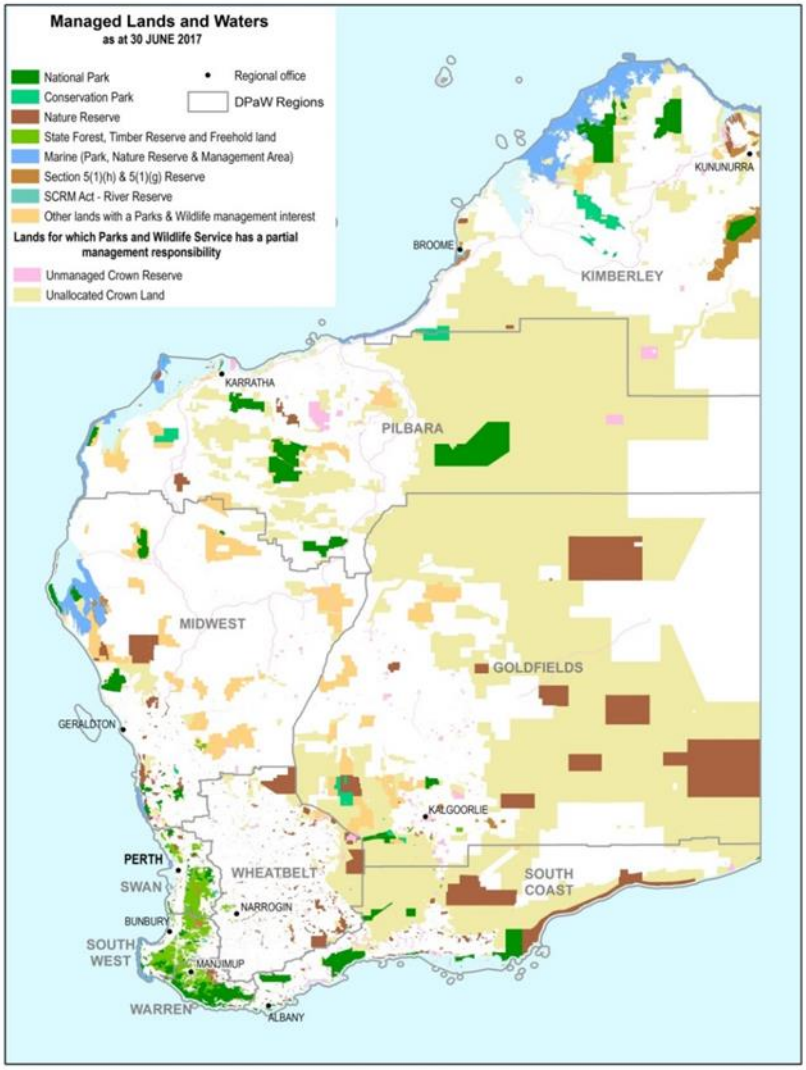

Figure 3. DBCA administrative boundaries (9 Regions).

4.5 Reporting

DBCA maintains information and reports specific to commercial flora industry activities. This information and the reports take several different forms, as outlined above and may be made available to DCCEEW on request.

4.6 Compliance

4.6.1 The Role of Wildlife Officers

Wildlife Officers have statutory appointment under the CALM Act, with powers defined under both the CALM Act and BC Act, which includes regulation of wildlife industries across all land tenures. Wildlife Officers are located at DBCA's Wildlife Protection Branch and at most DBCA Regional and district offices across the State. The primary role of the Wildlife Officers is to ensure compliance with the BC Act and BC Regulations.

Subject to resourcing Wildlife Officers plan operations for field patrols and flora industry operator inspections. More commonly, patrols or inspections are undertaken in response to specific complaints or information about alleged illegal activities. Wildlife Officers also follow-up reports of non-compliance with licence conditions identified and reported by regional DBCA and licensing officers.

DBCA officers, on completion of a course in law enforcement, as described below, may become authorised officers. These officers support the functions of the Wildlife Officers.

4.6.2 Law Enforcement Training and Operations Procedures

All DBCA personnel involved in the management of the commercial flora industry are required to understand the relevant parts of the CALM Act the BC Act and their associated regulations. Specific training on this legislation, general legal principles, gathering and presentation of evidence, and court attendance can be provided to DBCA officers who undertake compliance work, through an accredited training course. Wildlife Officers receive more detailed and extensive ‘on the job’ training in respect of the BC Act and legal procedures.

4.7 Advisory Bodies and Committees on Flora Conservation

There are several advisory bodies and committees in WA that contribute to the conservation of flora, and therefore the sustainable harvest of flora, through provision of information, advice and technical expertise to either the Department or Minister for Environment.

The Conservation and Parks Commission is established as an advisory, vesting and controlling body under Section 18 of the CALM Act and is responsible to the WA Minister for Environment. The Conservation and Parks Commission considers matters concerning conservation estate and other nature conservation issues in WA, and can provide advice to the Minister on the appropriateness of the measures contained within this management plan for the conservation of flora.

The Threatened Species Scientific Committee (TSSC) provides recovery and management advice to DBCA on threatened flora conservation. The key function of the TSSC is to provide recommendations for amendments to the schedule of threatened flora.

The Western Australian Herbarium is responsible for the description and documentation of the State’s flora. The Herbarium plays a vital role within DBCA, providing information that is essential for biodiversity conservation planning and management. The specimen collection and its data are a dynamic resource, with material continually added to the collection or reclassified in light of new scientific knowledge. Scientific research, including on the collection, and botanical field surveys result in the documentation of new species each year.

A separate, self-service Reference Herbarium is also maintained to facilitate accurate identification of botanical specimens collected by government, industry and the community, and information on the State’s flora is made freely available through

the Herbarium's portal Florabase, the Australasian Virtual Herbarium, and the journal *Nuytsia*.

The Department of Primary Industries and Regional Development (DPIRD) has a role in the development of commercial flora production on private land through developments in flora cultivation.

The Botanic Gardens and Parks Authority within DBCA also has expertise in flora cultivation, as do flora growers. These representative bodies are able to provide information on flora production.

Issues relating to commercial harvesting of flora are referred to DBCA directly by departmental staff, industry or the community. Where flora industry management issues develop, meetings have been held with specific interest groups to resolve those issues as they arise.

5 Export Flora List

Only species listed on the Export Flora List (Appendix 1) may be exported under this plan, unless being exported as a DBCA-approved test export. At the time of publication, the Export Flora List allows the export of specimens of:

- All Australian native plants that are not native to WA and that are artificially propagated or wild-harvested in WA;
- Flora (WA native plants) that are cultivated (artificially propagated) in WA[3]; and
- Flora species that are listed on the Export Flora List (148 species at the time of preparation of this plan) that may be taken from naturally occurring stands in WA (wild-harvested), in accordance with specified conditions.

This plan also provides for the export of commercially harvested whole plants of flora in DBCA-approved salvage operations within WA.

The Export Flora List (Appendix 1) may be updated whilst in force as set out in Section 5.2.

This plan does <u>not</u> cover the export of:

- Any CITES I species or threatened species listed under the Commonwealth EPBC Act.

[3] Excluding any CITES I species or species listed as threatened species under the EPBC Act (Cth); or species that are listed as specially protected or threatened species under the BC Act (WA) or species that are identified as priority species by DBCA. Under the EPBC Act, such species may only be exported commercially if sourced from a separate, EPBC Act-approved artificial propagation program. CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora and a CITES I species is a species listed on Appendix I of CITES, the highest level of protection under CITES for species that are endangered by trade. Severe penalties apply for any breach of the EPBC Act.

- Any species that are listed as specially protected or threatened species under the BC Act or species that are identified as priority species by DBCA.
- Sandalwood, *Santalum spicatum*, which is subject to export under the Commonwealth *Export Control Act 1982*.

5.1 Categories on the Export Flora List

The groupings of flora into categories within the Export Flora List (Appendix 1) reflect the structured management strategy being used in Western Australia for flora conservation and commercial flora harvesting. The Export Flora List is arranged so that the extent of specific picking or trade restrictions for any listed species can be readily identified and reflect market-driven conservation strategies.

The structured management approach of DBCA to flora conservation is, in order of descending conservation priority:

1. Specially protected or threatened flora species may not be taken without authorisation from the State Minister for Environment, and are **NOT** included on the Export Flora List.
2. Priority listed flora species may not be harvested from Crown land, but may be harvested from private property, and are **NOT** included on the Export Flora List.
3. Certain flora species identified as requiring specific management may not be harvested from Crown land, but may be harvested from private property and supplied under a private land supplier’s licence, and may be included on the Export Flora List.
4. Certain flora species with specific management requirements may be harvested from Crown land, but only under special authorisation on a collecting licence that has specific conditions imposed, and may be included on the Export Flora List.
5. Flora species that have no identified specific management requirements may be harvested from Crown land under general collecting licences with standard management conditions, and may be included on the Export Flora List.
6. All flora species native to Western Australia, except for CITES I species and threatened species listed under the EPBC Act and/or the BC Act, may be harvested from artificially propagated plants and supplied under a private land supplier’s licence, and may be included on the Export Flora List.
7. All Australian native species that are not native to Western Australia, except for CITES I species and threatened species listed under the EPBC Act, may be harvested or sold without a licence.

5.2 Amendments to the Export Flora List

5.2.1 DBCA Review

The Export Flora List may be reviewed and amended by DBCA during the life of the plan. Amendments may be related to the sustainability of commercial harvesting or to other matters, and are likely to occur due to:

- A species being listed or delisted as a specially protected or threatened species under the BC Act or EPBC Act.
- A species being listed or delisted as a priority species by DBCA.
- A species or its habitat being demonstrated to be declining significantly in the wild, either due to harvest and/or other threats and/or cause/s unknown.
- Difficulties with correct identification of a species in the field, for example species that look like a species that it listed as a threatened or priority species.
- Taxonomic changes to species, including name changes.
- A particular species no longer being required for export.

5.2.2 Requests for Addition of Species

Where a proponent wishes to add a species to the Export Flora List, the following procedure will be followed:

- The proponent/person will make a written application to DBCA and provide such information as requested by DBCA for the purpose of assessing the status of the species in the wild, the extent of its habitat, the threats to the species and the potential impacts on the species or its habitat of the proposed addition to the List.
- The proponent will provide lawfully taken voucher specimens of the species to DBCA for formal identification. DBCA will determine the distribution of the species based on herbarium specimens and expert advice.
- DBCA and the industry will collate information on distribution and population status of stands with potential for commercial use, desired end product, harvesting technique and regeneration capability of the species.
- DBCA will determine whether the species is to be included on the Export Flora List, and any restrictions on harvest that may be applicable.
- If endorsed by DBCA the proposal will then be forwarded to DCCEEW for endorsement and, if appropriate, inclusion on the Export Flora List.

5.2.3 Amended List

Amendments to the Export Flora List endorsed by both DBCA and DCCEEW during the life of this plan will be appended to this approved plan as supplements, and will be advised to persons engaged in the flora industry.

Both DCCEEW and DBCA will maintain copies of the current (at that date) approved Export Flora List during the operation of this plan and copies of the current list will be freely available to interested persons.

5.2.4 Test Exports

Where a species is requested to be exported for the purpose of evaluating commercial potential, the species may be considered for a test export of generally less than 20 specimens. Each test export will be subject to endorsement from DBCA provided:

- voucher specimens have been lodged with DBCA, and the identity of the species is confirmed;
- the species is not listed as threatened or priority flora in WA, nor listed as threatened flora under the Commonwealth EPBC Act; and
- DBCA is satisfied that there are no apparent conservation reasons for not permitting the harvest of that flora.

Such species will not be added to the Export Flora List until the formal process for adding the species has been completed.

6 Key Performance Indicators

Three annual key performance indicators (KPIs) have been set to measure the success of the management arrangements identified in the plan, through:

- a CAR reservation of lands for conservation.
- a measure of effective flora licensing arrangements; and
- the outcome of field monitoring of compliance by persons involved in the industry.

KPI 1: Proportion of land reserved for terrestrial conservation in each IBRA sub-bioregion.

KPI 2: Number of commercial flora licences issued under the BC Act.

KPI 3: Number of investigated offences under the BC Act in relation to commercial flora harvesting in WA.

Appendices

Appendix 1 Export Flora List

Flora species that may be harvested from natural stands only where a specific authority (and any standard licence conditions) is attached to the licence

Banksia grandis	Bull banksia
Banksia hookeriana	Hooker's banksia
Banksia ilicifolia	Holly-leaved banksia
Boronia megastigma	Scented boronia, brown boronia

Species that may be harvested from natural stands, subject to standard licence conditions

Acacia pentadenia	Karri wattle
Adansonia gregorii	Boab
Adenanthos cuneatus	Coastal jugflower
Adenanthos cygnorum subsp. *cygnorum*	Common woollybush
Adenanthos obovatus	Basket flower
Agonis flexuosa	Peppermint
Allocasuarina decussata	Karri she-oak
Allocasuarina humilis	Dwarf sheoak
Anigozanthos flavidus	Tall kangaroo paw
Anigozanthos manglesii	Mangles kangaroo paw, red & green kangaroo paw
Anigozanthos pulcherrimus	Yellow kangaroo paw
Anigozanthos rufus	Red kangaroo paw
Babingtonia grandiflora	Large-flowered babingtonia
Banksia attenuata	Slender banksia
Banksia candolleana	Propeller banksia
Banksia gardneri	Prostrate banksia
Banksia menziesii	Firewood banksia, Menzies banksia
Banksia prionotes	Acorn banksia
Banksia repens	Creeping banksia
Banksia sceptrum	Sceptre banksia

Banksia speciosa	Showy banksia
Beaufortia decussata	Gravel bottlebrush, decussata
Beaufortia sparsa	Swamp bottlebrush, sparsa
Beaufortia squarrosa	Sand bottlebrush
Bossiaea aquifolium	Water bush
Calothamnus quadrifidus	One-sided bottlebrush
Calytrix flavescens	Summer starflower
Calytrix fraseri	Pink summer calytrix
Caustis dioica	Chinese puzzle
Cephalipterum drummondii	Pompom head
Chaetanthus aristatus	
Conospermum amoenum	Blue smokebush
Conospermum crassinervium	Summer/tassel smokebush
Conospermum incurvum	Plume smokebush
Conospermum stoechadis	Common smokebush
Conospermum triplinervium	Tree smokebush
Corymbia calophylla	Marri, honky nuts, red gumnuts
Dasypogon bromeliifolius	Pineapple bush, drumsticks
Daviesia cordata	Bookleaf
Eucalyptus forrestiana	Fuschia gum
Eucalyptus gomphocephala	Tuart
Eucalyptus lehmannii	Bushy yate
Eucalyptus marginata subsp. *marginata*	Jarrah
Eucalyptus marginata subsp. *thalassica*	Blue-leaved jarrah
Eucalyptus patens	Swan River blackbutt
Eucalyptus preissiana subsp. *preissiana*	Bell-fruited mallee
Eucalyptus pyriformis	Pear-fruited mallee
Eucalyptus rudis	Flooded gum
Eucalyptus x *tetragona*	
Evandra aristata	
Grevillea diversifolia	Variable-leaved grevillea
Grevillea endlicheriana	Spindly grevillea
Hakea cucullata	Hood leaved hakea, scallops

Hakea lasiantha	Woolly flowered hakea
Hakea laurina	Pincushion hakea
Hakea pandanicarpa	Pandanus hakea
Hypocalymma angustifolium	White myrtle
Hypocalymma robustum	Swan River myrtle
Johnsonia lupulina	Hooded lily
Juncus caespiticius	Grassy rush
Juncus holoschoenus	Jointleaf rush
Juncus pallidus	Pale rush
Kingia australis	Kingia
Kunzea ericifolia	Spearwood
Lachnostachys eriobotrya	Lambswool, sago bush
Lachnostachys verbascifolia	Lambs tails
Lawrencia helmsii	Dunna dunna, long fingers
Lechenaultia biloba	Blue leschenaultia
Lepidosperma effusum	Spreading sword-sedge
Lepidosperma gladiatum	Coast sword-sedge
Leucopogon parviflorus	Coast beard-heath
Leucopogon polymorphus	
Leucopogon pulchellus	Beard-heath
Leucopogon verticillatus	Tassel flower
Lomandra hastilis	Mat rush
Lysinema ciliatum	Curry and rice
Macrozamia riedlei	Zamia
Melaleuca megacephala	
Melaleuca rhaphiophylla	Swamp paperbark
Olearia axillaris	Coastal daisybush
Pericalymma ellipticum	Swamp teatree
Persoonia longifolia	Snottygobble
Philotheca spicata	Pepper and salt
Pimelea suaveolens	Scented banjine
Pithocarpa cordata	Tangle daisy, seacrest
Podocarpus drouynianus	Wild plum

Pteridium esculentum	Bracken fern
Ptilotus calostachyus	Weeping mulla mulla
Ptilotus exaltatus	Tall mulla mulla
Ptilotus manglesii	Pom poms
Ptilotus obovatus	Cotton bush
Ptilotus rotundifolius	Royal mulla mulla
Rhodanthe chlorocephala subsp. *rosea*	Pink everlasting
Rhodanthe chlorocephala subsp. *splendida*	
Rhodanthe floribunda	
Rhodanthe manglesii	
Scholtzia capitata	Pom-pom scholtzia
Scholtzia involucrata	Spiked scholtzia
Stirlingia latifolia	Blueboy
Taxandria fragrans	Coarse tea tree
Taxandria juniperina	Watti
Taxandria linearifolia	Swamp peppermint
Taxandria parviceps	Fine tea tree
Triptilodiscus pygmaeus	
Trymalium venustum	Karri hazel
Typha domingensis	Bullrush
Verticordia densiflora	Compacted featherflower
Verticordia drummondii	Drummond's featherflower
Verticordia grandis	Scarlet featherflower
Verticordia nitens	Morrison featherflower, yellow or Christmas Morrison
Verticordia picta	Painted featherflower
Verticordia plumosa	Plumed featherflower
Verticordia serrata var. *ciliata*	
Verticordia serrata var. *serrata*	
Waitzia acuminata	Orange immortelle
Waitzia suaveolens	Fragrant waitzia
Xanthorrhoea preissii	Grass tree, balga
Xanthorrhoea thorntonii	Grass tree

Xerochrysum macranthum	White strawflower
Xylomelum angustifolium	Sandplain woody pear
Xylomelum occidentale	Woody pear

Species that may be harvested from natural stands, but only on private property

Acacia merinthophora	Zig-zag wattle
Andersonia caerulea	Foxtails
Banksia baxteri	Baxter’s banksia
Banksia burdettii	Burdett’s banksia
Banksia coccinea	Albany/scarlet banksia
Banksia formosa	Showy dryandra
Banksia hewardiana	
Banksia victoriae	Woolly orange banksia
Boronia molloyae	Tall boronia
Chamelaucium megalopetalum	Large waxflower
Chamelaucium uncinatum	Geraldton wax
Conospermum teretifolium	Spider smokebush
Geleznowia verrucosa	Yellow bells
Grevillea leucopteris	White plume grevillea
Hakea victoria	Royal hakea
Melaleuca nesophila	Mindiyed
Micromyrtus flava	Golden cascades
Physopsis spicata	Hill River lambstail
Scholtzia oligandra	Pink scholtzia
Verticordia eriocephala	Common cauliflower
Verticordia monadelpha var. *monadelpha*	Pink woolly featherflower
Verticordia nobilis	
Verticordia roei subsp. *roei*	Roe's featherflower

Flora species that may be harvested from cultivated (artificially propagated) plants

All flora native to Western Australia, except for CITES I species, or species listed as threatened species under the EPBC Act, or species listed as specially protected or threatened species under the BC Act, or species that are identified as priority species by DBCA.

Plant species that may be harvested or sold without a licence

All Australian native species that are not native to Western Australia, except for CITES I species or threatened species listed under the EPBC Act.

Appendix 2 Threats and Issues

Harvesting of Flora

Harvesting plants from the wild can pose risks to the long-term conservation of native flora, as well as impacting harvest sites. Some of these risks and impacts include:

- decreased reproduction or recruitment of species through the removal of plant reproductive parts
- decreased plant vigour or health through removal of or damage to plant parts
- removal of soil, nutrients, biomass and animal habitat
- introduction of pathogens and weeds
- reduction in genetic and age class diversity within harvested populations
- introduction of threats to non-target species, populations or ecological communities through habitat modification
- modification of abiotic (non-living) factors that influence a species or population.

Illegal harvesting practices can also reduce the viability of lawful harvesting practices. Sustainable harvest of flora, including compliance, is managed through the framework as described in this Plan.

Dieback Disease Caused by *Phytophthora* Species

The disease known as *Phytophthora* dieback (dieback) occurs in the south-west of WA in the vulnerable zone which receives greater than 400 mm annual rainfall and is particularly widespread in the areas of 800 mm+ annual rainfall (DBCA, 2022d).

Phytophthora dieback (dieback) attacks the roots of plants, cutting off water and nutrients to the crown (leaves and branches), resulting in plant death. The indirect effects of loss of canopy and understorey and increased area of bare ground are thought to extend to groups of fauna and non-susceptible flora, natural and cultural heritage values, carbon stores, soil microbial profiles, site hydrology, susceptibility to fire, and weed invasion (CPC 2022).

Over 60 species of *Phytophthora* have been detected in WA, with almost 40 of them detected in native ecosystems and others in agriculture and horticulture. There is significant overlap between species detected in horticulture and native ecosystems (DBCA 2022d) *Phytophthora cinnamomi* has and continues to have the greatest impact on the State's biodiversity (DBCA, 2022b)

P. cinnamomi, and the other Phytophthora species associated with disease in natural ecosystems of WA, are soil-borne and readily spread in infested water, plant material and soil. Human activities that result in unintentional (e.g. walking, driving) or intentional (e.g. road construction/maintenance or timber harvesting) soil

movement are the most significant pathways for the spread of soil-borne Phytophthora species (DBCA, 2022b).

Species adversely affected by dieback include representatives of many families of native plants. Some families and genera that contain a high proportion of WA species variously susceptible to *P. cinnamomi* are:

PROTEACEAE	MYRTACEAE	ERICACEAE	OTHER	
Adenanthos	*Agonis*	*Andersonia*	*Allocasuarina*	*Opercularia*
Banksia	*Beaufortia*	*Astroloma*	*Amphipogon*	*Patersonia*
Conospermum	*Calothamnus*	*Conostephium*	*Boronia*	*Phlebocarya*
Franklandia	*Calytrix*	*Leucopogon*	*Conostylis*	*Pimelea*
Grevillea	*Chamelaucium*	*Lysinema*	*Crowea*	*Platysace*
Hakea	*Darwinia*	*Monotoca*	*Dampiera*	*Podocarpus*
Isopogon	*Eremaea*	*Sphenotoma*	*Dianella*	*Scaevola*
Lambertia	*Eucalyptus*	*Styphelia*	*Dasypogon*	*Tetrarrhena*
Persoonia	*Hypocalymma*	FABACEAE	*Evandra*	*Tetratheca*
Petrophile	*Kunzea*	*Acacia*	*Goodenia*	*Themeda*
Stirlingia	*Melaleuca*	*Aotus*	*Hibbertia*	*Thomasia*
Synaphea	*Pericalymma*	*Bossiaea*	*Lasiopetalum*	*Thysanotus*
Xylomelum	*Regelia*	*Daviesia*	*Lomandra*	*Tremandra*
	Scholtzia	*Eutaxia*	*Loxocarya*	*Trymalium*
	Taxandria	*Gastrolobium*	*Macrozamia*	*Xanthorrhoea*
	Thryptomene	*Gompholobium*	*Olearia*	
	Verticordia	*Hovea*		
		Jacksonia		
		Latrobea		
		Pultenaea		

Many of the genera listed above include species that are amongst the most important to the flora industry, including *Adenanthos, Banksia, Hakea, Persoonia, Podocarpus, Leucopogon, Lysinema, Verticordia, Xanthorrhoea* and *Xylomelum*.

Phytophthora Disease Management

Dieback management tools are limited, and as a result the objective is to ‘contain’ the spread dieback with a focus on mapping dieback occurrence in the landscape, taking steps to minimise the chances that material (soil and organic matter) from infested areas is transported to uninfested areas. (DBCA, 2022d)

DBCA's *Corporate Policy Statement 3 – Management of Phytophthora Dieback* (DBCA, 2022b) provides guidance for managing the risk of introducing or spreading *Phytophthora* dieback on CALM Act land. DBCA has developed management procedures, manuals and supporting tools to support the implementation of this policy.

The Commonwealth Government's national threat abatement plan for *Phytophthora cinnamomi* (Commonwealth of Australia, 2018) provides a national framework to guide and coordinate Australia's response to *Phytophthora* dieback.

Control of Access

Control of access is a key element in minimising the spread of dieback by the commercial flora industry with the following strategies applied:

- Regulatory requisite requiring that licence holders must obtain written permission from the land owner or occupier to take flora.
- Lawful Authorities for CALM Act land may contain the following restrictions and advice in relation to minimising the spread of *Phytophthora* dieback:
    - all individuals accessing land must be appropriately trained in environmental biosecurity hygiene, and possess a valid Green Card;
    - harvesters may not take vehicles into disease free areas, (or areas suspected to be disease free);
    - harvesters must use existing tracks and roads as designated by the managing agency, and are not permitted to make, cut or extend new tracks by any means;
    - in general, commercial flora harvesters are restricted to all-weather access tracks and roads (i.e. those which are open to the general public) and may not use roads, or pick within areas, that are closed due to disease risk or within disease risk areas, except as prescribed in their DRA permit as described under "Hygiene Evaluation" (see below); and
- before any commercial flora harvesting proceeds that has the potential to introduce, spread or intensify the impact of *Phytophthora* dieback on lands managed by DBCA, the following factors are evaluated:
    - (i) Activity - whether the proposed activity needs to take place.
    - (ii) Hazard - site, host and climatic factors that influence the probabilities of host mortality.
    - (iii) Risk - the risk of introduction, spread and intensification of disease.
    - (iv) Consequence - the consequences of infestation on land use and ecological values.
    - (v) Hygiene - the hygiene measures required to minimise the consequences.

(vi) Evaluation - the judgement of the manager regarding the adequacy of hygiene tactics to minimise the consequences to a level that is acceptable.

This procedure referred to as the "Hygiene Evaluation" is used to determine appropriate operational hygiene considering the risk of disease introduction and spread and the consequences of hygiene failure. DBCA has also developed a Dieback Risk Assessment and Management Plan to assess and mitigate the risks of spreading dieback during planned disturbance activities or when entering lands managed by DBCA.

Phytosanitary Measures

The following phytosanitary measures aim to minimise the further spread of *Phytophthora* dieback by flora harvesters:

- all vehicles capable of carrying dieback from infested to uninfested areas should be washed down. Harvesters should wash down vehicles before moving away from a flora picking area (harvesters are urged to never assume that any vehicle is clean, or that the site does not contain *Phytophthora* dieback if it is within the vulnerable region);
- washdown should be undertaken on bridges, rocky crossings or hard, well-drained surfaces within dieback areas and the vehicle left to dry before proceeding. It is important not to wash down in dieback-free/uninfested areas, as these might then become infested from material being washed off the vehicle, unless all effluent is immediately collected (without contacting the ground) and carted away and disposed of appropriately;
- all plant, soil or slurry material that could possibly fall off the vehicle during transit must be removed from the carrier. Sterilisation agents such as PhytoClean or 70% methylated spirits may be used on carriers and equipment once larger clods of soil or slurry material has been removed.

Coordination of *Phytophthora* dieback management and research

The responsibility for implementation of policy and prescriptions that incorporate the protection of plant communities from disease caused by *Phytophthora* spp. lies with DBCA Regional and District staff, with assistance and advice from specialist staff.

The DBCA Plant Diseases Program primarily focuses on dieback due to the large impact it has on the flora and ecosystems in the south-west of WA. The *Phytophthora* Dieback Management Manual (DBCA 2020) outlines the process to complete a Dieback Risk Assessment and Management Plan to assess and mitigate the risks of spreading dieback during planned disturbance activities or when entering lands managed by DBCA.

DBCA collaborates on research with other organisations to improve dieback management options and approaches, including developing new options for sustainably sourcing uninfested (dieback-free) basic raw materials (BRM) into the vulnerable zone within WA.

Project Dieback in WA has assisted in the development of the State *Phytophthora* Dieback Management and Investment Framework. DBCA contributes to the implementation of the Framework through continued collaboration with South Coast Natural Resource Management (NRM), the provision of data, and through on-ground management of dieback in Priority Protection Areas on DBCA managed lands. The Information Delivery and Management System (DIDMS) was developed as part of this project. This system provides South Coast NRM and partner organisations with a consistent and user-friendly mechanism to record, store, share and map dieback work across the region using standardised data capture methodology.

Dieback is known to impact some species listed on the Export Flora List. When monitoring or research indicates that a species on the List is being affected, steps will be taken to ensure the species' survival. The department also undertakes monitoring and research on the impact of dieback on select populations of key flora species and on the ongoing effectiveness of phosphite application in mitigating dieback impacts.

Aerial Canker

Cankers (particularly *Cryptodiaporthe melanocraspida, Luteocirrhus, Neofusicoccum* and *Zythiostroma* species) are another group of pathogens affecting the State's flora in the south-west. Current data show that disease development can be rapid, causing plant death within 2 years. Cankers have led to rapid population collapse and local extinctions in a variety of Proteaceae species (e.g. *Banksia coccinea, B. baxteri, B. attenuata, Lambertia* spp.) in southern WA (Shearer *et al*., 1995; C. Gosper pers. comm. 19/01/2023), and are known to threaten others (Yates *et al*., 2021). Occurrence of plant disease is dependent on a combination of a susceptible host, infective pathogen, infection site and favourable environmental conditions, particularly water stress associated with heat waves and drought. Research carried out to date suggests that *Cryptodiaporthe melanocraespida* preferentially enters through wounds, although aerial dispersal of cankers by wind and rain splash is also significant, limiting the effectiveness of quarantine measures.

Aerial canker is known to impact on some species listed on the Export Flora List, particularly those that occur in southern WA (Shearer *et al*., 1995; Paap *et al*., 2017). When research indicates that there is an issue with a species, this will be taken into consideration in respect to the management of flora harvesting, including limiting harvesting on Crown land, or the removal of the species from the Export Flora List, where this is warranted. Spraying secateurs with methylated spirits before moving to a new plant or a new site will help reduce the risk of spreading canker. Host susceptibility varies within sites and is partly related to the health of an individual host, so sterilising equipment after harvesting from each individual plant within a site is highly recommended (C. Gosper, pers. comm., 2023).

Myrtle Rust

Myrtle rust is a wind-borne pathogen which has the potential to kill many plants belonging to the Myrtaceae family, including many species of value to the WA flora industry. It is not yet widespread in WA, but poses a significant threat to WA's economy and biodiversity should it become widespread, as WA is home to over 1,800 native myrtaceous species (DBCA, 2022c).

Myrtle rust originated in South America and is caused by the rust fungus *Austropuccinia psidii. Austropuccinia psidii* favours moist habitats and under current climate conditions is unlikely to be a threat in drier areas (Makinson *et al.*, 2020). The bright yellow (sometimes yellow-orange) masses of spores are a distinguishing feature of myrtle rust. Myrtle rust attacks actively growing shoots, stems and other soft young tissues such as fruits, flowers and emerging seedlings (DBCA, 2022c). Repeated reinfection of adult plants of highly susceptible species can lead to defoliation, loss of reproductive capacity, and death (Makinson *et al.*, 2020).

Myrtle rust was first discovered in Australia in New South Wales in 2010. It has now been detected in Queensland, Victoria, Tasmania, and the Northern Territory. It was detected in WA in June 2022 on a remote pastoral lease in the East Kimberley but has not yet been detected in south-west WA. Following the discovery in WA, DPIRD and DBCA are working together to determine if the disease is present in other parts of the Kimberley (DPIRD, 2022a).

Myrtle rust can be controlled by chemicals such as copper oxychloride, triforine, mancozeb, tebuconazole and trifloxystrobin in the home garden, but chemical control is not a viable option for large-scale landscapes, native forests and other natural ecosystems (DPIRD, 2022b).

The National Action Plan for Myrtle Rust in Australia (Makinson *et al.*, 2020) provides the foundation for a coordinated national environmental response to Myrtle Rust research and on-ground and ex situ actions. Its goals are to minimise declines and extinctions of native species due to Myrtle Rust and to mitigate the decline in the integrity and function of their host ecosystems.

Known susceptible species for WA can be found at the following link: Myrtle rust susceptible species list for Western Australia (dbca.wa.gov.au).

As early detection and reporting may reduce the long-term impact of myrtle rust in WA, the public are encouraged to report any suspected sighting, including photographs and location details, to DPIRD via the MyPestGuide® app or website (mypestguide.agric.wa.gov.au) or the DPIRD Pest and Disease Information Service.

If you think you have spotted myrtle rust:

1. Do not take a sample or touch it because spores can be easily spread.
2. Immediately report your sighting using the MyPestGuide® app or website (mypestguide.agric.wa.gov.au) or contact the DPIRD Pest and Disease Information Service on (08) 9368 3080 or padis@dpird.wa.gov.au.

3. Record what you see (what the infection looks like, the extent of the infection, how many plants are infected etc.). If you know the species of plant infected, record that as well.
4. Take photos of the symptoms and the plant, and precise details about the location (GPS is ideal) to provide with your report.

If you suspect your belongings have been contaminated with myrtle rust spores, leave them at the site or contain them until you are able to wash them.

Polyphagous Shot-hole Borer

Polyphagous shot-hole borer (PSHB; Euwallacea fornicatus) is an ambrosia beetle that attacks a wide range of plants by tunnelling into trunks, stems and branches.

PSHB has a symbiotic relationship with a *Fusarium* fungus, farming it inside the tree as a food source for the beetle and its larvae. In susceptible trees, the fungus kills vascular tissue causing *Fusarium* dieback and tree death.

Native to southeast Asia, PSHB has established invasive populations in California, Israel and South Africa, causing the loss of thousands of amenity street trees and impacting trees in some natural areas in California and South Africa. Establishment of PSHB in WA could have significant impact on amenity trees, native vegetation, and the fruit and nut tree industries. If left unchecked, many thousands of trees could be lost to PSHB.

PSHB was first detected in WA in August 2021 in a box elder maple in East Fremantle. To date, it has only been detected in the Perth metropolitan area, most commonly impacting mature trees. High risk hosts in WA include box elder maple (*Acer negundo*), robinia (*Robinia pseudoacacia*), fig (*Ficus* spp.) and coral (*Erythrina* spp.) trees. A Quarantine Area is currently in effect to prevent the spread of PSHB, and DPIRD is actively managing infested trees, with a view to eradication.

DPIRD are leading an eradication response to PSHB. As no known effective chemical treatment exists for PSHB, the best treatment is the removal of infested trees and tree branches. Infested plant material is treated by chipping and hot composting of waste material, and total tree removal and stump grinding for some highly susceptible species.

Known susceptible species for WA as well as training resources, what to look for and a factsheet on plant selection can be found at agric.wa.gov.au/borer.

Early detection and reporting will help eradication efforts in WA. Report suspected borer damage (or unfamiliar pests), photos and location information through the MyPestGuide® Reporter app or by contacting the Pest and Disease Information Service on (08) 9368 3080, email padis@dpird.wa.gov.au.

Chytrid Fungus

Amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) is a highly virulent pathogen that can cause chytridiomycosis, an infectious fungal disease that can cause amphibian mortality and is thought to have driven many species declines and

extinctions in the past 30 years, including in Australia (Commonwealth of Australia, 2016). ‘Infection of amphibians with chytrid fungus resulting in chytridiomycosis’ is listed as a threatening process under the EPBC Act. Chytrid fungus is known to be present in south-west WA and the Kimberley, and has been detected in populations of the threatened white-bellied and orange-bellied frogs *Anstisia alba* and *A. vitellina* (Commonwealth of Australia, 2016).

Much is still unknown about the fungus and disease in the wild, but it appears that chytridiomycosis mostly affects amphibian species that are associated with permanent water such as rivers, streams and moist bogs. The disease tends to be seasonal and is more severe in areas with cooler temperatures (Commonwealth of Australia, 2016).

Chytrid fungus is moved by direct contact between frogs and tadpoles or via zoospores in infected water (Commonwealth of Australia, 2016). Humans can spread the fungus on contaminated footwear and equipment and by illegally moving frogs from one area to another. As different strains of the chytrid fungus vary in virulence (Rosenblum *et al*., 2013), it is important to reduce the risk of spread of the fungus among sites, even in areas where it already occurs (Commonwealth of Australia, 2016).

Flora harvesting activities have the potential to spread chytrid fungus between sites in the landscape. To minimise this risk, licence conditions will be applied to the access of areas considered vulnerable to infection, particularly those where threatened or other conservation-significant species are present. Licence conditions may include seasonal or total restriction of access, and the implementation of appropriate hygiene standards such as ensuring that no soil or plant material is moved between sites, including spraying of boots and equipment with an appropriate disinfectant.

Areas that fall within the zone most at risk for chytrid spread and potential impact are indicated in Figure 4. Amphibian species most at risk are the threatened white-bellied frog (*Anstisia alba*), orange-bellied frog (*Anstisia vitellina*) and sunset frog *Spicospina flammocaerulea*, as well as the Walpole frog (*Anstisia lutea*) and roseate frog (*Anstisia rosea*). (Note that the genus *Anstisia* was known until recently as *Geocrinia*).

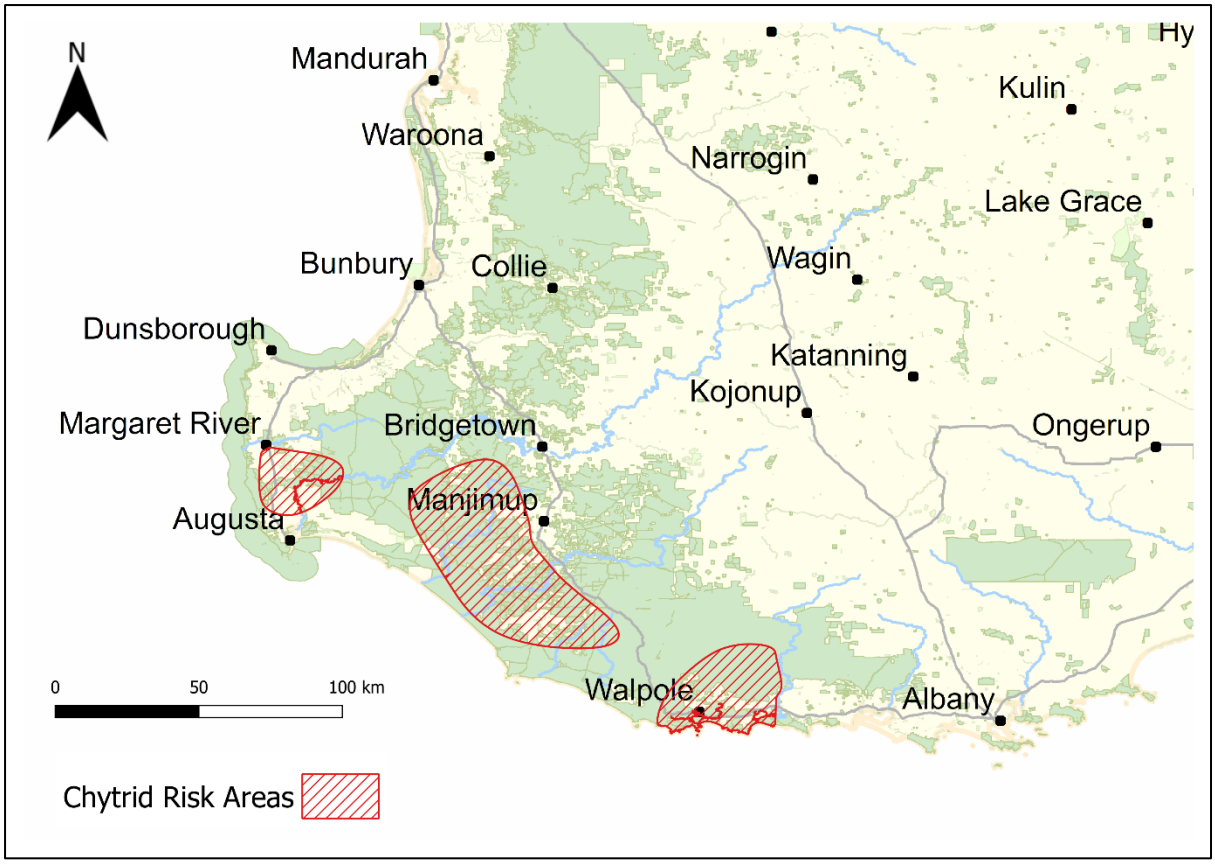

Figure 4. Areas in south-west WA that are most at risk from the spread and impact of chytrid fungus on amphibian species.

Weeds

Weeds pose a serious threat to the health and resilience of ecosystems. Many weeds have or are successfully invading natural areas, where they can degrade natural ecosystems, disrupting or modifying ecosystem processes and reducing biodiversity. The impact of weeds can be through a range of mechanisms, including: out-competing native species for resources such as water, nutrients, space and sunlight; excluding animals from their habitats with toxins or thorns or by replacing key native plants used for shelter, food and nesting; and increasing fuel loads and altering fire regimes, potentially increasing the intensity and frequency and altering the seasonality of fires.

Of the 14,106 species of vascular plants growing wild in WA (as of 2022), about 90% are native, while the rest (1355 vascular plant species) have been introduced and become naturalised in WA (Western Australian Herbarium, 1998–). While weeds are found in most parts of the State, they are most prevalent and their impacts are greatest in areas that are subject to landscape fragmentation and anthropogenic disturbance, which can provide ideal conditions for weed invasion. Hence, weed impacts typically occur in conjunction with, and may interact with, other threats.

Weeds that are considered to become, or are, a problem for the environment and/or agriculture can be listed as a declared pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Declared weeds must be controlled by

landowners and may be subject to import restrictions. The list of declared plants is updated each year. As of January 2023, 58 plants were gazetted as being Declared Pests under s22(2) of the BAM Act while a further 869 were listed as Declared Pest, Prohibited under s12 (K. Passeretto, pers. comm. 24/01/2023).

There are several pathways for weed spread into and within WA, including planned and unplanned human activities, and by vectors such as water, wind, and native and feral animals. Some of these pathways are more amenable to management intervention than others. Management measures may differ for different areas, circumstances and weed species, depending upon the potential impacts and feasibility of controlling reintroduction and spread. The department will prioritise its management efforts based primarily on the Weed Prioritisation Process which implements species-led and asset-protection-led management programs to maximise effective use of available resources. In addition, priorities may also be determined as a response to community issues and legislative requirements (DBCA, 2022a).

DBCA has responsibilities to manage weeds on land managed under the CALM Act, and on unallocated Crown land and unmanaged reserves outside the Metropolitan area, regional centres and townsites through a Memorandum of Understanding (MOU) with the Department of Planning, Lands and Heritage (DPLH), where resources are available and subject to native title considerations (DBCA, 2022a)

DBCA has responsibilities under the BAM Act with regard to declared pests and seeks to achieve weed management objectives within its available resources, working in partnership with the DPIRD and other stakeholders where relevant.

For most weed species, control or eradication is expensive. Preventing their introduction and spread is a more cost-effective option. Effective ecosystem-based management of weeds relies on suitable surveillance systems and implementation of biosecurity hygiene measures to mitigate weed threats (DBCA, 2022a).

Management of weeds in the flora industry is through education and engagement with harvesters and the industry. In addition, if the cultivation of any Australian native plant that is not native to WA poses a threat to WA native plant species, ecosystems or habitat, DBCA may restrict the utilisation of that plant by removing the species from the Export Flora List.

Harvesters can identify and report weeds using the MyWeedWatcher function within DPIRD's MyPestGuide® mobile app or website (mypestguide.agric.wa.gov.au), or by contacting the DPIRD Pest and Disease Information Service on (08) 9368 3080 or padis@dpird.wa.gov.au.

Florabase (Western Australian Herbarium, 1998–) and Hussey *et al*. (2007) are useful resources for information on weed species found in WA.

Inappropriate Fire Regimes

Fire is a natural component of the WA environment, with many native species having evolved to survive fire or depend on it for their persistence. Fire can assist in the regeneration of native vegetation and promote the germination of seed, the

maintenance or modification of habitats, release and cycling of nutrients, and plays a role in a range of other ecosystem processes, including hydrology, and in the management of certain weeds, pests and diseases (CPC 2022). Fire regimes that are characterised by an appropriate range and diversity of fire intensities, seasonality, frequency (burn intervals) and spatial heterogeneity will promote ecosystem health, however fire becomes a threat to biodiversity if it lies outside the normal range of fire regimes (CPC 2022). This can result in changes to species composition or local extinctions of flora species.

Harvesting is generally not permitted during the year before and for several years after a prescribed burn to facilitate the regeneration of species, especially species which primarily re-establish through recruitment from seed. Similarly, in the event of a bushfire on DBCA managed lands, harvesting is generally not permitted for several seasons post fire.

In issuing licences to take flora DBCA can consider the impacts of fire on relevant species and determine the need to apply management strategies to regulate harvesting.

Land Clearing

Land clearing has the potential to affect species harvested for the flora industry, for example by modifying areas that were previously available for harvesting, or by reducing the population size and distribution of a species. In WA the clearing of native vegetation is regulated under the EP Act and the Clearing Regs.

Native vegetation is defined in the EP Act as: indigenous aquatic or terrestrial vegetation, including dead vegetation unless that dead vegetation is of a class declared by regulation to be excluded from this definition, but not including vegetation in a plantation.

‘Clearing’ as defined in the EP Act is:

(a) the killing or destruction of; or

(b) the removal of; or

(c) the severing or ringbarking of trunks or stems of; or

(d) the doing of any other substantial damage to,

some or all of the native vegetation in an area, and includes the draining or flooding of land, the burning of vegetation, the grazing of stock, or any other act or activity, that causes:

(e) the killing or destruction of;

(f) the severing of trunks or stems of; or

(g) any other substantial damage to, some or all of the native vegetation in an area.

All clearing of native vegetation requires a permit unless it is exempt or it has been referred to the Department of Water and Environmental Regulation (DWER) or Department of Mining, Industry, Resources and Safety and it is determined that a clearing permit is not required because the clearing is exempt, or the clearing

satisfies all the referral criteria. This referral process is only suitable for clearing activities with a very low environmental impact.

There are two types of exemptions, those under Schedule 6 of the EP Act which apply to activities authorised under certain other legislation; and exemptions under the Clearing Regs which enable day-to-day activities that have a low environmental impact (e.g. maintenance of existing cleared areas around infrastructure, clearing firebreaks or fence lines).

Exemptions under the Clearing Regs do not apply in Environmentally Sensitive Areas (ESAs). Recent amendments to the EP Act introduced Section 51B that provides that ESAs be prescribed by regulations. While no regulations are currently prescribed, transitional provisions under s133B of the EP Act mean that ESAs declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* will continue to have effect until regulations are prescribed. As such ESAs include areas within threatened ecological communities, within 50 m of threatened flora sites.

The harvesting of flora under a licence issued under the BC Act is an exempt activity under Schedule 6 of the EP Act, and does not require a clearing permit. However, the issue of a licence that enables any such harvesting on private property must take into account the requirements of the EP Act.

Non-destructive harvesting of flora, whereby the source plants recover fully from the harvest activity, is regulated through the licensing provisions of the BC Act, while any other proposed harvest activity will require approved management strategies and may require a clearing permit under the EP Act.

Similarly, any harvest activity that includes the taking of any significant amount of non-target flora, including situations of salvage harvest from land clearing activities, may require a clearing permit under the EP Act.

Mining and Development Projects

Depending on the location of a mining or development project, there is potential to affect species harvested for the flora industry through both direct and indirect impacts (e.g. clearing or modifying vegetation, affecting hydrology, reducing the population size and distribution of a species such that it becomes of conservation concern).

Environmental approvals are required for mining (including exploration and prospecting) and other major development projects in WA, which are primarily regulated through:

- the EP Act administered by DWER.
- the *Mining Act 1978* administered by DMIRS; and
- the *Planning and Development Act 2005* administered by DPLH.

Consultation with DBCA as part of these processes provides the opportunity to provide advice to decision makers on the impacts of the project on relevant species and the flora industry. DBCA is able then to consider the impacts of these proposals,

if approved, on relevant species and apply management strategies to regulate the harvesting.

The commercial flora industry may be involved in mining through seed collection for rehabilitation which is often required for revegetation of areas after mining is completed. This activity is regulated by DBCA through a licence to take flora under the BC Act as described in Section 3. Access to survey/seismic lines for the harvest of flora is generally denied with the mining industry responsible for ensuring these lines are rehabilitated and do not become permanent tracks.

Mining and other development projects are subject to provisions of the EPBC Act. Under the EPBC Act a person must not take an action that has, will have or is likely to have a significant impact on a matter of National Environmental Significance (MNES) without approval from the Commonwealth Environment Minister.

The matters of national environmental significance include:

- World heritage properties
- National heritage places
- Wetlands of international importance; and
- Nationally threatened species and ecological communities.

Any person who proposes to take an action that has, will have or is likely to have significant impact on MNES must refer the action to the Department of Climate Change, Energy, the Environment and Water (DCCEW), for a decision on whether assessment and approval is required under the EPBC Act.

Further information on MNES as well as guidelines on referring actions, can be obtained from DCCEW at https://www.dcceew.gov.au.

Salinity

Dryland salinity, or salinity at or near the soil surface that causes reduced plant growth and reduced water quality, is a threat to WA's biodiversity. Secondary salinisation develops as a result of changed land use and management, with clearing for agriculture a major driver of this change. The removal of deep-rooted native perennial plants and their replacement with shallow-rooted annual crops and pastures allows more rainfall to pass below the root zone and accumulate as groundwater, in turn causing the water table to rise. The groundwater mobilises natural salts in the soil as it rises and carries them toward the surface, eventually degrading land and waterways.

A number of strategies to address salinity in WA have been developed since 1995. Most recently, the DPIRD commissioned the 'New Directions for Salinity management in Western Australia: A Consultative review' (GHD, 2019). The overall conclusion of this review is that salinisation of land and water remains a significant problem (DPIRD 2020). The review found that since 2006, there has been limited investment into the economic and environmental impacts of salinity and that studies of feasible and cost-effective management options have not been updated in recent times (DPIRD 2020). Following a public consultation period which closed in June

2019, DPIRD is preparing a report to Government to help target investment of public funds for improved salinity management.

Salinity may, in the longer term, affect a small number of species on the Export Flora List. If this occurs to the extent that the species becomes of conservation concern, harvesting of these species for flowers will be suspended, while seed harvest for revegetation purposes may be permitted, depending on impact.

The flora industry, through the sustainable and regulated harvesting of native seed, has a significant role to play in the revegetation of cleared land in areas affected by salinity.

Climate Change

Anthropogenic climate change poses serious risks to ecosystems in WA under all greenhouse gas emissions scenarios, with future risks particularly well documented for the Southwest Australian Floristic Region (SWAFR) (Hope *et al*., 2015). The SWAFR has already experienced significant climate change-related decreases in winter rainfall and increases in mean surface air temperatures (Bates *et al*., 2008; Hope *et al*., 2015). These trends are predicted with high confidence to continue, along with a range of other impacts including a higher frequency of hot days and longer duration of hot spells, increasing duration and severity of droughts, and increased frequency and intensity of extreme fire weather (Hope *et al*., 2015).

A range of ecological responses to WA's changing climate is likely to occur, impacting the resilience of a significant proportion of the State's flora. For individual species, these responses may include canopy die-off, increased mortality (Brouwers *et al*., 2013; Matusick *et al*., 2013; Steel *et al*., 2019), and delayed or reduced flowering, pollination, seed production and seed bank accumulation (Enright *et al*., 2014, 2015; Gosper *et al*., 2022; Souto-Veiga *et al*., 2022). The geographic distributions of many plant species are likely to alter, with ranges contracting away from hotter, drier areas (Fitzpatrick *et al*., 2008; Brouwers *et al*., 2013; Henzler *et al*., 2018), leading to local and possibly species extinctions. These processes may lead to landscape-scale changes in vegetation structure (Matusick *et al*., 2016; Steel *et al*., 2019), and SWAFR vegetation that is dependent on montane, shallow groundwater, peat systems, swamps and riparian areas is expected to dry, burn more frequently and contract. Post-fire recovery of plant populations and communities, particularly for fire-sensitive plants, is likely to be compromised by delayed and reduced reproduction as a consequence of reduced rainfall, combined with altered seasonality and increased frequency of fires (Enright *et al*., 2014, 2015; Henzler *et al*., 2018; Gosper *et al*., 2022).

Studies of *Banksia* species indicate that many species may experience reduced reproduction (Enright *et al*., 2015; Souto-Veiga *et al*., 2022), reduced germination and plant growth (Cochrane *et al*., 2014, 2015), range contraction and population decline (Fitzpatrick *et al*., 2008; Yates *et al*., 2010; Enright *et al*., 2014). These impacts are likely to vary with current distribution, plant functional traits and interaction with other threats such as past land transformation and fire regime (Fitzpatrick *et al*., 2008; Yates *et al*., 2010; Cochrane *et al*., 2014, 2015; Enright *et*

al., 2014, 2015). In areas heavily affected by vegetation fragmentation, unassisted future colonisation of new, more climatically suitable sites is unlikely to occur for many plant species, as the agricultural and urban matrix form significant barriers to seed dispersal and reduce the incidence of appropriate germination and recruitment conditions such as fire (Yates *et al*., 2010).

More research is required to determine the most effective and feasible adaptive management strategies to mitigate the effects of climate change on WA's flora. However, strategies such as assisted colonization (Hoegh-Guldberg *et al*., 2008), assisted gene migration (Aitken & Whitlock, 2013) and climate-adjusted provenancing (Prober *et al*., 2015) may be of value for key species and in restoration and revegetation projects, and have been incorporated into the draft Forest Management Plan for WA 2024-2033 (Conservation and Parks Commission, 2022).

Management of climate change in the flora industry is through education of harvesters and the industry, and monitoring the effects of climate change. If climate change is noted to be adversely impacting the viability of particular species or vegetation communities, DBCA may restrict the utilisation of those plants by imposing additional licence conditions or removing the plants from the Export Flora List.

Appendix 3 Standard Licence Conditions

FLORA TAKING (COMMERCIAL PURPOSES) CROWN LAND LICENCE

Regulation 60, Biodiversity Conservation Regulations 2018

STANDARD LICENCE CONDITIONS**

1. Unless otherwise authorised, the licence holder must not take the following flora or parts of flora:

Flora	**Part of flora**
Gazetted threatened species (section 19 of the *Biodiversity Conservation Act 2016)* *https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants*	Any part
DBCA listed 'Priority Flora List' species *https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-plants*	Any part
Xanthorrhoea and *Kingia* species (grass trees*)* *Adansonia gregorii* (boabs) *Livistona* species (fan palms) *Dasypogon hookeri* (pineapple bush) Zamiaceae (zamia palms)	Whole plants
Andersonia caerulea (Foxtails)	Any part
Banksia baxteri (Baxter's Heath)	
Banksia coccinea (Scarlet Banksia)	
Banksia formosa (Showy Dryandra)	
Banksia hookeriana (Hooker's Banksia)	
Banksia ilicifolia (Holly-leaved Banksia)	
Boronia heterophylla (Kalgan Boronia)	

Boronia megastigma (Scented Boronia)	
Cephalotus follicularis (Albany Pitcher Plant)	
Geleznowia verrucosa	
Leptocarpus scariosus (Velvet or Seeded Rush)	
Macropidia fuliginosa (Black Kangaroo Paw)	
Micromyrtus flava (Golden Cascades)	
Species of the family Droseraceae (Droseras, Sundews)	
Species of the family Orchidaceae (Native Orchids)	
Species of the genus *Banksia*	Cones, fruits
Scaevola spinescens (Currant Bush)	Any part, other than seed/cuttings for propagation
Verticordia eriocephala (Cauliflower Bush)	
Daviesia oppositifolia	Stems
Melaleuca species (paperbark)	Bark
Adansonia gregorii (boabs)	Seeds, fruits, nuts
Terminalia ferdinandiana (Gubinge)	Seeds, fruits

2. Unless otherwise authorised, the licence holder must not take the following flora/species for the purpose specified in the table below:

Flora	**Purpose**
Any species of native flora	Parts used for craftwood products including woody fruits, cones, stems, burls or woody outgrowths
Any species of native flora (including but not limited to *Agonis, Kunzea, Leptospermum, Melaleuca* species (tea tree), *Eucalyptus* species)	Parts used for garden/bean/cray sticks, brushwood or similar woody screening/fencing or support products
Any species of native flora	For firewood

3. Unless authorised under this licence, the licence holder must not take flora in a manner that constitutes clearing under the *Environmental Protection Act 1986*.
4. Unless authorised under this licence, the take of flora is restricted to:
    a) no more than 10% of the reproductive flora parts (including flowering stems, cones, fruits, seeds and spores) from any individual plant, or for an annual species, of the subpopulation of that species; or
    b) no more than 20% of any other flora part from any individual plant, or for an annual species, of the subpopulation of that species.
5. The licence holder must not take flora from any plant which has already been subject to harvesting during the previous 12 months.
6. The written authorisation of the person in possession or occupation of the land accessed and upon which flora is taken, as required under regulation 101(2) and referred to in “Additional information” below, must:
    a) state location details (including lot or location number, street/road, suburb and local government authority);
    b) state land owner or occupier name, and contact phone number;
    c) specify the time period that the authorisation is valid for;
    d) be signed and dated; and
    e) be attached to this licence at all times.
6. This licence, and any written authorisations or lawful authority must be carried at all times while conducting licensed activities and be produced on demand to a wildlife officer.
7. The licence holder must leave any land from which flora has been taken in a state that replicates natural conditions, or conditions prior to picking.
8. The licence holder must create, compile and maintain records and information as required in a DBCA approved “Return- Flora Licences” of all flora taking activities as they occur.
9. Records and information compiled as required under this licence must be retained for at least two years after the date of expiry of this licence.
10. A DBCA approved “Return of Flora Taken” and “Return of Flora Supplied” must be fully completed (including nil taking/supplying details), signed and submitted to DBCA every three months from the date this licence is valid.

** **Standard licence conditions may be amended, or additional conditions applied as required to align management strategies implemented to address conservation or sustainability concerns.**

Appendix 4 Species information for Flora on the Export Flora List

Appendix 4 is provided as a separate document.

Glossary

cultivated flora	As defined in the BC Act: flora that has been intentionally sown, planted or propagated unless — (a) it has been sown, planted or propagated as required under this Act or another written law; or (b) it is of a class declared by the regulations to be excluded from this definition.
DBCA-approved salvage operations	Salvage of whole plants where the original vegetation will be permanently destroyed under legally approved land clearing operations. Salvage operations are subject to DBCA licensing and approval based on the following considerations and conditions: • plants will only be taken from areas that are specifically designated and approved by the relevant land management authority for vegetation clearing; • the clearing activity must be unrelated to the harvest operation; and, • DBCA will assess salvage proposals, and individually endorse such areas on flora collecting licences.
disturb	As defined in the BC Act—in relation to flora: (i) to engage in an activity that has the effect, whether directly or indirectly, of altering the long term persistence of the flora in its habitat; (ii) to cause or permit an activity referred to in subparagraph (i) to be engaged in.
designated activity	As defined in the BC Regulations: means any of the following activities — (a) taking, disturbing, releasing, feeding, or processing fauna; (b) taking, possessing for supply, or processing flora.
disqualifying event	As defined in the BC Regulations: in relation to an application for a licence or the renewal of a licence, means — (a) failing to provide adequate or sufficient information in connection with the making of the application; or (b) making a false or misleading statement in, or in relation to, an application under a designated Act; or

	(c) contravening, or failing to comply with, a condition of a licence under the Act or a repealed Act; or (d) being the holder (or former holder) of a licence that has been suspended or cancelled under the Act or a repealed Act; or (e) being found guilty of a designated offence
ecologically sustainable development	As set out in Section 4 of the BC Act: (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations; (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation; (c) the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations; (d) the conservation of biodiversity and ecological integrity should be a fundamental consideration in decision-making; (e) improved valuation, pricing and incentive mechanisms should be promoted
Export Flora List	The list of species, allocated to several management categories, which have been approved for export by DBCA, and DCCEEW.
flora	As defined in the BC Act: (a) a plant that –: (i) belongs to a native species and is indigenous to the State unless the plant is determined by order under Section 9(4) not to be flora for the purposes of this Act; or (ii) is determined by order under Section 9(3) to be flora for the purposes of this Act; or (b) a native species or taxonomic grouping of native species that is determined by order under section 10(1) or (2) to be flora for the purposes of this Act.
grid locality map for WA	A reference map that is used to document location data.
harvest	for the purposes of this plan means take as defined in the BC Act.

native species	As defined in the BC Act: a species – (a) that is indigenous to Australia or an external Territory; or (b) that is indigenous to the sea bed of the coastal sea of Australia or an external Territory; or (c) that is indigenous to the continental shelf; or (d) that is indigenous to the exclusive economic zone; or (e) members of which periodically or occasionally visit — (i) Australia or an external Territory; or (ii) the exclusive economic zone; or (f) that was present in Australia or an external Territory before 1400.
plant	As defined in the BC Act: any member, alive or dead, of the plant kingdom or the fungus kingdom and includes the following — (a) any viable or non-viable ovule, seed, pollen or spore of a plant; (b) any part, product or genetic material of a plant from which another plant could be produced; (c) any other part of a plant.
precautionary principle	Consistent with the Principles of Ecologically Sustainable Development as set out in section 4 of the BC Act. (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
priority flora	Species of flora that are poorly known or are rare but not currently threatened by any identifiable factors.
specially protected flora	As defined in the BC Act: means flora that belongs to a specially protected species
specially protected species	As defined in the BC Act: means a native species that is listed as a specially protected species under section 13(1) of the BC Act

species	As defined in the BC Act: (a) a group of organisms that — (i) interbreed to produce fertile offspring; or (ii) possess common characteristics derived from a common gene pool, and (b) includes — (i) a taxonomically separate population of a species, being a population that is characterised by morphological or other biological differences from other populations of that species; and (ii) a distinct population of organisms that the Minister has determined by order under section 9(5) to be a species for the purposes of this Act.
take	As defined in the BC Act in relation to flora: (i) to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means; (ii) to cause or permit anything referred to in subparagraph (i) to be done.
threatened flora	As defined in the BC Act: flora that belongs to a threatened species;
threatened species	As defined in the BC Act: a native species that — (a) is listed as a threatened species under section 19(1); or (b) is to be regarded as a threatened species under section 26(2).

References

Aitken S.N. & Whitlock M.C. (2013) Assisted gene flow to facilitate local adaptation to climate change. *Annual Review of Ecology, Evolution, and Systematics* 44:367-388. DOI:10.1146/annurev-ecolsys-110512-135747.

Bates B., Kundzewicz Z. & Wu S. (2008) *Climate change and water*. Intergovernmental Panel on Climate Change Secretariat.

Brouwers N., Matusick G., Ruthrof K., Lyons T. & Hardy G. (2013) Landscape-scale assessment of tree crown dieback following extreme drought and heat in a Mediterranean eucalypt forest ecosystem. *Landscape Ecology* 28:69-80.

Cochrane A., Hoyle G., Yates C., Wood J. & Nicotra A. (2014) Climate warming delays and decreases seedling emergence in a Mediterranean ecosystem. *Oikos* 124:150-160. DOI:10.1111/oik.01359.

Cochrane A., Yates C.J., Hoyle G.L. & Nicotra A.B. (2015) Will among-population variation in seed traits improve the chance of species persistence under climate change? *Global Ecology and Biogeography* 24:12-24.

Commonwealth of Australia (2016) *Threat abatement plan for infection of amphibians with chytrid fungus resulting in chytridiomycosis*. Commonwealth of Australia.

Commonwealth of Australia (2018) *Threat abatement plan for disease in natural ecosystems caused by* Phytophthora cinnamomi. Commonwealth of Australia.

Commonwealth of Australia (2019) *Australia's Strategy for Nature 2019-2030*.

CPC (2022) *Draft Forest Management Plan 2024-2033*. Conservation and Parks Commission, Perth.

DPIRD (2020) A new direction for salinity management in Western Australia: a consultative review. Department of Primary Industries and Regional Development. https://www.agric.wa.gov.au/soil-salinity/new-direction-salinity-management-western-australia-consultative-review

DBCA (2018) *Ministerial Guideline No. 1 – Procedures for making and assessing public nominations for listing species and communities as threatened species or threatened ecological communities, and for listing key threatening processes.* Department Biodiversity, Conservation and Attractions.

DBCA (2020) Phytophthora Dieback Management Manual, October 2020, Department of Biodiversity, Conservation and Attractions, Perth.

DBCA (2021) *Ministerial Guideline (Number 2) – Threatened and Extinct Species Listing Specifications and Criteria*. Department Biodiversity, Conservation and Attractions.

DBCA (2022a) *Corporate Policy Statement No. 14 – Weeds Management*. Department of Biodiversity Conservation and Attractions. May 2022.

DBCA (2022b) *Corporate Policy Statement No. 3 – Management of* Phytophthora *Dieback*. Department of Biodiversity Conservation and Attractions September 2022

DBCA (2022c) *Myrtle rust – A serious disease that infects and kills many plants*. Department of Biodiversity Conservation and Attractions. Accessed February 2022.https://www.dbca.wa.gov.au/parks-and-wildlife-service/threat-management/plant-diseases/myrtle-rust

DBCA (2022d) Phytophthora Dieback. Department of Biodiversity Conservation and Attractions. Accessed February 2022. https://www.dbca.wa.gov.au/parks-and-wildlife-service/threat-management/plant-diseases/phytophthora-dieback

DPaW (2015) *Corporate Policy Statement No. 37 – Management of Wildlife Utilisation*. Department of Parks and Wildlife. October 2015

DPIRD (2022a) *Myrtle rust confirmed in the Kimberley*. Department of Primary Industries and Regional Development. Accessed February 2022. https://www.agric.wa.gov.au/news/media-releases/myrtle-rust-confirmed-kimberley.

DPIRD (2022b) *Myrtle rust – Biosecurity alert*. Department of Primary Industries and Regional Development. Accessed February 2022. https://www.agric.wa.gov.au/plant-biosecurity/myrtle-rust-threat-western-australia.

Dunstan W.A., Rudman T., Shearer B.L., Moore N.A., Paap T., Calver M.C., Dell B. & Hardy G.E.S.J. (2010) Containment and spot eradication of a highly destructive, invasive plant pathogen (*Phytophthora cinnamomi*) in natural ecosystems. *Biological Invasions* 12:913-925. DOI:10.1007/s10530-009-9512-6.

Enright N.J., Fontaine J.B., Bowman D.M.J.S., Bradstock R.A. & Williams R.J. (2015) Interval squeeze: altered fire regimes and demographic responses interact to threaten woody species persistence as climate changes. *Frontiers in Ecology and the Environment* 13:265-272.

Enright N.J., Fontaine J.B., Bowman D.M., Bradstock R.A. & Williams R.J. (2015) Interval squeeze: altered fire regimes and demographic responses interact to threaten woody species persistence as climate changes. *Frontiers in Ecology and the Environment* 13:265-272.

Fitzpatrick M.C., Gove A.D., Sanders N.J. & Dunn R.R. (2008) Climate change, plant migration, and range collapse in a global biodiversity hotspot: the *Banksia* (Proteaceae) of Western Australia. *Global Change Biology* 14:1337–52.

Gosper C.R., Miller B.P., Gallagher R.V., Kinloch J., van Dongen R., Adams E. Barrett S., Cochrane A., Comer S., McCaw L. & Miller R.G. (2022) Mapping risk to plant populations from short fire intervals via relationships between maturation period and environmental productivity. *Plant Ecology* 223:769-787.

Government of Western Australia (2000) *The Salinity Strategy*. Perth.

GHD (2019) *A New Direction for Salinity Management in Western Australia: A Consultative Review*. A report for the Department of Primary Industries and Regional Development. March 2019.

Henzler J., Weise H., Enright N.J., Zander S. and Tietjen B. (2018) A squeeze in the suitable fire interval: Simulating the persistence of fire-killed plants in a Mediterranean-type ecosystem under drier conditions. *Ecological Modelling* 389:41-49.

Hoegh-Guldberg O., Hughes L., McIntyre S., Lindenmayer D.B., Parmesan C., Possingham H.P. & Thomas C.D. (2008) Assisted colonization and rapid climate change. *Science* 321:345-346. DOI:10.1126/science.1157897.

Hope P. *et al*. (2015) Southern and South-Western Flatlands Cluster Report, Climate Change in Australia Projections for Australia's Natural Resource Management Regions: Cluster Reports, eds. Ekström, M. *et al*., CSIRO and Bureau of Meteorology, Australia.

Hussey B.M.J., Keighery G.J., Cousens R.D., Dodd J. & Lloyd S.G. (2007) Western Weeds. A guide to the weeds of Western Australia (Second edition). The Weeds Society of Western Australia.

Makinson R.O., Pegg G.S. & Carnegie A.J. (2020) *Myrtle Rust in Australia – a National Action Plan*. Australian Plant Biosecurity Science Foundation, Canberra, Australia.

Matusick G., Ruthrof K.X., Brouwers N.C., Dell B. & Hardy G.St.J (2013) Sudden forest canopy collapse corresponding with extreme drought and heat in a mediterranean-type eucalypt forest in southwestern Australia. *European Journal of Forest Research* 132:497–510. DOI:10.1007/s10342-013-0690-5.

Paap T., Burgess T.I., Calver M., McComb J.A., Shearer B.L. & Hardy G.S. (2017) A thirteen-year study on the impact of a severe canker disease of *Corymbia calophylla*, a keystone tree in Mediterranean-type forests. *Forest Pathology* 47:e12292. DOI:10.1111/efp.12292.

Parks and Wildlife Service (2022) *Managing Fire, Lands and Waters*. Accessed February 2022. https://www.dbca.wa.gov.au/parks-and-wildlife-service/managing-fire-lands-and-waters.

Prober S.M., Byrne M., McLean E.H., Steane D.A., Potts B.M., Vaillancourt R.E. & Stock W.D. (2015) Climate-adjusted provenancing: a strategy for climate-resilient ecological restoration. *Frontiers in Ecology and Evolution* 3:65. DOI:10.3389/fevo.2015.00065.

Rosenblum E.B., Voyles J., Poorten T.J. & Stajich J.E. (2010) The Deadly Chytrid Fungus: A Story of an Emerging Pathogen. PLoS Pathog 6:e1000550. doi:10.1371/journal.ppat.1000550.

Shearer B.L., Fairman R.G. & Bathgate J.A. (1995) *Cryptodiaporthe melanocraspeda* canker as a threat to *Banksia coccinea* on the south coast of Western Australia. *Plant Disease* 79:637–641.

Souto-Veiga R., Groeneveld J., Enright N.J., Fontaine J.B. & Jeltsch, F. (2022) Declining pollination success reinforces negative climate and fire change impacts in a serotinous, fire-killed plant. *Plant Ecology* 223:863-881.

Steel E.J., Fontaine J.B., Ruthrof K.X., Burgess T.I. & Hardy G.E.S.J. (2019) Changes in structure of over-and midstory tree species in a Mediterranean-type forest after an extreme drought-associated heatwave. *Austral Ecology* 44:1438-1450.

Western Australian Herbarium (1998–) *Florabase—the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au

Yates C.J., McNeill A., Elith J. & Midgley G.F. (2010) Assessing the impacts of climate change and land transformation on *Banksia* in the South West Australian Floristic Region. *Diversity and Distributions* 16:187-201. DOI:10.1111/j.1472-4642.2009.00623.x.