Abridged Threatened Species Nomination Form

For nominations/assessments under the Common Assessment Method (CAM) where supporting information is available, but not in a format suitable for demonstrating compliance with the CAM, and assessment against the IUCN Red List threat status.

Cover Page *(Office use only for Assessment)*

Species name (scientific and common name)**:**	***Myoporum turbinatum***
Nomination for (addition, deletion, change)**:**	**Deletion**
Nominated conservation category and criteria:	**N/A**

Scientific committee assessment of eligibility against the criteria:		
This assessment is consistent with the standards set out in Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding.		Yes ☐ No ☐
A.	Population size reduction	•
B.	Geographic range	•
C.	Small population size and decline	•
D.	Very small or restricted population	•
E.	Quantitative analysis	•

Outcome*:*			
Scientific committee Meeting date:			
Scientific committee comments:			
Recommendation:			
Ministerial approval:		*Date of Gazettal/ Legislative effect:*	

Nomination/Proposal summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	*Myoporum turbinatum*			
Common name:	Salt Myoporum			
Family name:	Scrophulariaceae	Fauna ☐	Flora ☒	
Nomination for:	Listing ☐	Change of status/criteria ☐	Delisting ☒	

1. *Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally?* 2. *Is it present in an Australian jurisdiction, but not listed?*	*Provide details of the occurrence and listing status for each jurisdiction in the following table*

Jurisdiction	**State / Territory in which the species occurs**	**Date listed or assessed (or N/A)**	**Listing category i.e. critically endangered or 'none'**	**Listing criteria i.e. B1ab(iii)+2ab(iii)**
International (IUCN Red List)				
National (EPBC Act)		16 July 2000	Endangered	
State / Territory	1. WA	1987	Threatened	No criteria assigned
	2. WA	2001	Critically Endangered	B1ab(iii,v)+B2ab(iii,v); C2a(i)
	3. WA	2015	None	Priority 4

Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:	
• this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria;	Yes ☒ No ☐
Comments:	
• surveys of the species were adequate to inform the assessment;	Yes ☒ No ☐
Comments:	Extensive survey undertaken between 2013 to 2014 located six new populations and six new subpopulations with the number of plants increasing from 171 plants counted in 2004 to 10,393. The range of the species was also extended by 30 km. A new population consisting of approximately 2,500 plants was located in a nature reserve.
• the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment.	Yes ☒ No ☐
Comments:	The 2015 assessment remains current . The species previously met CR: B1ab(iii,v)+2ab(iii,v); C2a(i) due to the severe fragmentation of populations and continuing decline in the area, extent and quality of habitat and the number of mature individuals. It no longer meets these criteria due to an increase in the number of subpopulations, occurrences in extensive nature reserves, number of plants and its range, including in areas that are not under direct threat.
Nominated national conservation status: category and criteria	

Presumed extinct (EX) ☐	Critically endangered (CR) ☐	Endangered (EN) ☐ Vulnerable (VU) ☐
None (least concern) ☒	Data Deficient ☐	Conservation Dependent ☐
What are the IUCN Red List criteria that support the recommended conservation status category?		
Eligibility against the IUCN Red List criteria (A, B, C, D and E)		
*Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For **delisting**, provide details for why the species no longer meets the requirements of the current conservation status.*		
A.	Population size reduction (evidence of decline)	• Surveys carried out in 2013-2014 found six new populations and six new subpopulations, with the known number of plants increasing from 171 plants counted in 2004 to 10,393 in 2013-14, as a result of increased survey effort. • The species appears to undergo population variation within individual subpopulations in response to recruitment events. In 2014, large numbers of new seedlings were found in areas previously containing low numbers of plants. The fruit is woody and indehiscent, and appears to be long-lived and requires some form of treatment to germinate. It is apparent that the species periodically undergoes a mass recruitment event, possibly after fire, followed by slow decline as the plants age. • The species grows in areas associated with salt lakes which are naturally isolated, and not productive for agriculture. Identified threats to the species are not likely to result in significant longer term population decline. • **Insufficient information to assess criteria**
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	• Extensive survey from 2013 to 2014 extended the species range by 30 km. A new subpopulation was located in a nature reserve and there is potential for more subpopulations to be found in the large area of habitat between the currently known eastern and western subpopulation areas. The EEO is approximately 420 km^2 and using the 2x2km^2 grid system the area of occupancy is 40 km^2. • There is no evidence of ongoing decline and the nature of the threats listed for the species are not likely to result in ongoing decline. The biology of the species is for populations to decline and recruit from soil seed sources, with fire frequency in that environment not likely to restrict seed production capacity after fire regeneration. Both locations have subpopulations in nature reserves which are protected, and Location 2 is showing an increase in plant numbers. The species grows in areas associated with salt lakes which are not likely to be developed for agriculture when in private ownership, and no evidence of habitat decline. • **Does not meet criteria as no continuing decline observed or projected, and the variation in population size between recruitment events is not placing the species at risk and not considered to be extreme fluctuation under the IUCN criteria**
C.	Small population size and decline	• Further surveys conducted in 2013-2014 increased the total known number of mature individuals to 10,393, located on 87 small lakes

	(population size, distribution and evidence of decline)	comprising 12 subpopulations at 2 locations. • Largest subpopulations exceeds 1000 (2500) mature individuals (refer to table at end of nomination form), and several with >1000 seedlings. • No population decline observed or projected. • **Does not meet criteria**
D.	Very small or restricted population (population size)	• 10,393 mature individuals. • **Does not meet criteria**
E.	Quantitative analysis (statistical probability of extinction)	• No data

Summary of assessment information

EOO	420 km^2	AOO	40 km^2	Generation length	-

No. locations	2	Severely fragmented	Yes ☐ No ☒ Unknown ☐
No. subpopulations	12	No. mature individuals	10,393

Percentage global population within Australia	100
Percentage population decline over 10 years or 3 generations	unknown

Threats *(detail how the species is being impacted)*

Threat *(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)*	Extent *(give details of impact on whole species or specific subpopulations)*	Impact *(what is the level of threat to the conservation of the species)*
Refer to table at end. Threats are general in nature relating to vegetation management, and do not represent targeted threats to the species.	General over vegetation in which the species occurs.	Low level impact that do not represent a threat to the conservation of the species.

Management and Recovery

Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes ☒ No ☐

List all relevant recovery or management plans (including draft, in-preparation, out-of-date, national and State/Territory recovery plans, recovery plans for other species or ecological communities, or other management plans that may benefit or be relevant to the nominated species).

- Taylor, H., Butler, R. and Brown, A. (2004) Salt Myoporum (*Myoporum turbinatum*) Interim Recovery Plan 2004–2009. Interim Recovery Plan No. 186. Department of Conservation and Land Management, Western Australia.
- Department of Parks and Wildlife (in prep) Salt Myoporum (*Myoporum turbinatum*) Draft Interim Recovery Plan 2016–2021. Interim Recovery Plan No. *. Department of Parks and Wildlife, Western Australia.

List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.

- Protect the sites from fire unless required for ecological reasons, and implement early intervention in any wildfires which may threaten the site;
- Survey for additional populations.
- Liaise with road managers to minimise disturbance to remnant vegetation when maintaining roads;
- Installation of markers on road reserves and firebreaks to protect habitat when undertaking maintenance;
- Monitor the populations for evidence of rabbits or weed impacts, or changes in plant or site health;

List further recommended management or research actions, if any, that would benefit the conservation of the species. Please ensure that this section addresses all identified threats.

Management

- Ensure protection of plants in private property from herbicide drift through planting and maintenance of an adequate vegetation buffer;
- Liaise with private land owners to protect the remnant vegetation on which the species occurs, including through the placement of covenants on properties;
- Protect private property populations from stock by ensuring installation and maintenance of fences;
- Control rabbits if evidence of a rabbit population or herbivory noted;
- Control infestations of weeds that might impact the species and its habitat if noted;
- Collect seed for storage.

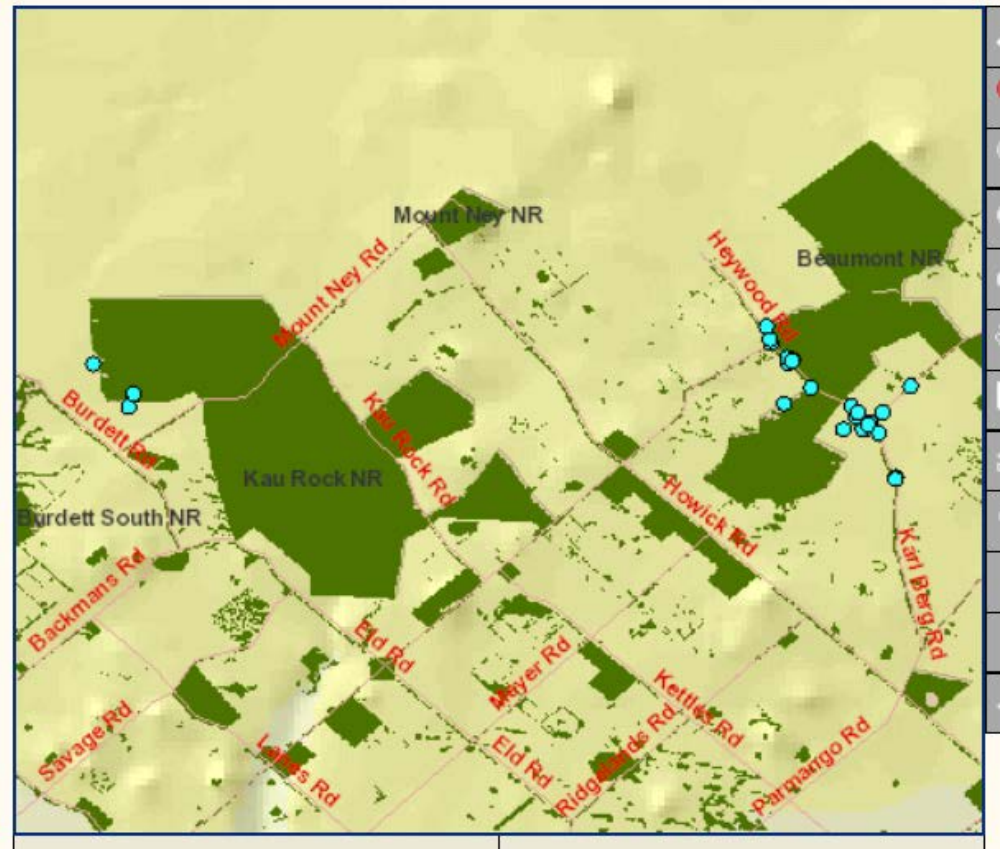
Research

- Determine species tolerance to salinity;
- Determine species pollination ecology, seed germination requirements and viability, and longevity;
- Determine disturbance response of the species.

Nomination prepared by:	
Contact details:	
Date submitted:	4/7/2016

If the nomination has been refereed or reviewed by experts, please provide their names and contact details:

***Myoporum turbinatum* occurrences with remnant vegetation and conservation estate**



Summary of subpopulation information *(detailed information to be provided in the relevant sections of the form)*						
Location *(include coordinates)*	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition	Threats *(note if past, present or future)*	Specific management actions
Private property Burdett Rd, Kau Rock NR 32776, NE of Esperance	Private property, nature reserve	2013/14: 10,090* (*includes 4 new populations)	<5 km^2 (for 2 locations)	Very good, herbicide drift from adjacent cropping operations is main threat to private property populations.	Past • Land clearing for agriculture • Habitat destruction • Grazing (stock) Current • Salinity (unknown, but assumed low risk as species grows in association of salt lakes) • Herbicide drift (potential risk for areas immediately adjacent to farmland) • Fire (low risk) Future • Salinity • Rabbits • Habitat destruction • Grazing (stock) • Fire • Climate change	As above
Heywood, Coolinup, Karl Berg Rds; private property; Beaumont NR (32130, 32783)	Private property, Shire road reserves, nature	1989: 97 2001: 55 2003: 167 2004: 267+	<5 km^2 (for 2 locations)	Generally good, most road reserves degraded and weedy; private property populations not currently stocked but is a potential	Past • Land clearing for agriculture • Habitat destruction	As above

	reserve	2013/14: 548** **includes 2 new populations		future threat	• Grazing (stock) • Road maintenance • Weeds Current • Road maintenance (minor) • Fence maintenance (minor) • Salinity (unknown, but assumed low risk as species grows in association of salt lakes) • Herbicide drift (minor potential where adjacent to farmland) • Weeds (low risk due to saline environment) • Fire (low risk) Future • Salinity • Habitat destruction • Grazing (stock) • Rabbits • Fire • Weeds • Climate change	

Threatened species nomination

For nominations to the WA Threatened Species Scientific Committee (and the Minister for Environment) to amend threatened species listings under the WA *Wildlife Conservation Act 1950* or their IUCN Red List threat status.

Cover Page *(Office use only)*

Species name (scientific and common name)**:**	*Myoporum turbinatum*
Nomination for (addition, deletion, change)**:**	Deletion
Nominated conservation category and criteria:	None – add to Priority 4

WATSSC assessment of eligibility against the criteria:		
A.	Population size reduction	• Does not meet criteria
B.	Geographic range	• There was some concern that the proposed delisting was too soon given the still relatively small number of plants and large occurrences being on private property. However there is no obvious decline or threats and so committee decided that the species no longer meets requirements for listing
C.	Small population size and decline	• Does not meet criteria
D.	Very small or restricted population	• Does not meet criteria
E.	Quantitative analysis	• Does not meet criteria

Outcome*:*			
WATSSC Meeting date:	8 May 2015		
WATSSC comments:	The WATSSC supported the nomination and recommended delisting of the species as it no longer meets the requirements for threatened listing.		
Recommendation:	Delisting and addition to Department Parks and Wildlife Priority Flora List as Priority 4		
Ministerial approval:	21 October 2015	*Government Gazette:*	3 November 2015

Department of
Environment and Conservation
Our environment, our future

Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2015.

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora ☒ | **Fauna** ☐ | as: **Threatened / DRF** ☐ **Change of category** ☐ **Delisting** ☒					
1.2. Scientific Name **This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium, if possible.**					
Myoporum turbinatum Chinnock					
1.3. Common Name **If the species has a generally accepted common name, please show it here.**					
Salt Myoporum					
1.4. Family Name					
Scrophulariaceae					
1.5. Current Conservation Status. If none, type 'None'.					
	IUCN Red List Category e.g. Vulnerable			**IUCN Red List Criteria e.g. B1ab(iv); D1**	
International IUCN Red List					
National EPBC Act 1999	EN				
State of Western Australia	CR			B1ab(iii,v)+B2ab(iii,v); C2a(i)	
State of WA Priority	1☐	2☐	3☐	4☐	5☐
1.6. Nominated Conservation Status.					
	IUCN Red List Category e.g. Vulnerable			**IUCN Red List Criteria e.g. B1ab(iv);D1**	
State of Western Australia	None				
State of WA Priority	1☐	2☐	3☐	4☒	5☐
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.					
No ☒ **Yes** ☐ **Details:**					

1.7. Reasons for the Nomination.
Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Category and each Criteria.

- The species previously met World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria B1ab(iii,v)+2ab(iii,v); C2a(i) due to the severe fragmentation of populations and continuing decline in the area, extent and quality of habitat and the number of mature individuals.
- Surveys carried out in 2013-2014 found a total of 87 subpopulations and extended the range of the species by 30km. Several populations are located in a nature reserve and there is potential for more populations to be found in the large area of habitat between the currently known eastern and western population areas.
- The fruit is woody and indehiscent, and appears to be long-lived and requires some form of environmental treatment to germinate. The species exhibits mass germination after fire and its biology appears to provide population resilience in its environment.
- Given the discovery of new populations, its extent of occurrence now estimated to be over 420km^2 and the total number of mature plants now estimated to be over 10,000, the species no longer meets IUCN criteria.

SECTION 2. SPECIES

2.1. Taxonomy.
Describe the taxonomic history, using references, and describe the key distinguishing features that can be used to separate this taxon from closely related taxa. Include details of the type specimen, changes in taxonomy, scientific names and common names used for the species.

Myoporum turbinatum is an erect shrub to 4 m tall. When young it is multi-stemmed and broom-like but when mature consists of one or a few long slender stems with leafy branches that are restricted to the uppermost part. The species has sticky branches with prominent wart-like projections. The shiny, dark green linear leaves, which are 11 to 80 mm long by 1 mm wide with a distinctly grooved midrib, also have prominent wart-like projections and are arranged alternately along the stem. The leaf margins have small conical teeth that are more obvious towards the tip. The dull, white flowers are often tinged with lilac and have four stamens that protrude just beyond the petals. Four to eight flowers are held in each leaf axil. Flattened fruits are beaked at the end and have four ribs or wings (Brown *et al*. 1998).

Myoporum turbinatum is closely related to *M. platycarpum* and have similar fruits. The fruit of *M. turbinatum* however, is not flattened in the lower half (Chinnock 1986).

Is this species conventionally accepted? If no, explain why. For example, is there any controversy about the taxonomy? For undescribed species, detail the location of voucher specimens (these should be numbered and held in a recognised institution and be available for reference purposes).

No ☐ **Yes** ☒

Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.

None known.

2.2. Description

Describe the physical appearance, habit, behaviour/dispersion and life history. Include anatomy or habit (e.g. size and/or weight, sex and age variation, social structure) and dispersion (e.g. solitary, clumped or flocks etc), and life history (eg short lived, long lived, geophytic, etc).

Prior to surveys conducted in 2013/14, the species was thought to flower between August and May with fruit maturing between November and January. Recent surveys in June/July found most plants still in flower and four collections of fruit were made also at this time. Esperance experienced a lot of early season rainfall in 2013 which may account for the extended flowering and fruiting period.

2.3. Distribution

Describe the distribution of the species in Australia and, if possible, provide a map.

Myoporum turbinatum is endemic to Western Australia where, until recently, it was thought to occur over a narrow (15km) geographic range 80km north east of Esperance. Surveys conducted in 2013 have shown the extent of occurrence to be approximately 420km².

2.4. Habitat

Describe the non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. vegetation type, associated species, sympatric species). If the species occurs in various habitats (e.g. for different activities such as breeding, feeding, roosting, dispersing, basking etc) then describe each habitat. Note if the habitat has a special defining characteristic. If possible estimate the area of habitat, or the relative abundance of the habitat, and note if a critical habitat requirement (eg breeding habitat) is restricted in its availability to the species.

Non-biological habitat

Plants grow on the margins of saline depressions occupying sandy duplex soils

Biological habitat

Mallee heath scrub with *Melaleuca*, *Hakea laurina* and *Eucalyptus* species (Brown *et al*. 1998).

Does the (fauna) species use refuge habitat e.g. in times of fire, drought or flood? Describe this habitat.

N/A

Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?

No

2.5. Reproduction

Provide an overview of the breeding system.

For fauna: Provide an overview of the breeding system and breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?

For flora: When does the species flower and set fruit? Is the seed produced viable? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, ground disturbance) in order to reproduce?

Prior to surveys conducted in 2013/14 ecological information indicated the species flowered from August to May with fruiting from November to January. Recent surveys found most plants still in flower in June and July and four collections of fruit were also made at this time. Esperance experienced a lot of early season rainfall in 2013 which may account for the extended flowering and fruiting period.

Flies were seen pollinating flowers in 2014.

Many of the eastern populations had large numbers of seedlings in 2014 after a very wet late spring in 2013.

Advice from Dr Andrew Crawford, Research Scientist with the WA Threatened Flora Seed Centre (pers comm. 14 August 2018), is that *Myoporum turbinatum* has a woody, indehiscent fruit. Collections tested may contain up to two seed per fruit, with many fruit having no seed. The fruit are permeable to water. In the laboratory, seed do not germinate from intact fruit (when tested at a constant 15°C) but do germinate when excised from the fruit. Some germination is achieved when fruit are nicked using a scalpel to reveal the seed but this germination does not appear to be as good as when the seed is fully excised.

Seed trial work carried out by Gilovitz et al (2009) and Cochrane (2005) show that seed is tolerant to salinity, but needs to be excised to germinate. Seeds did not germinate in response to heat shock or alternating temperatures.

The fruit therefore appear to require some form of environmental treatment or attenuation for germination. Andrew Brown, an expert in the related genus *Eremophila*, and previously employed as a Threatened Flora Botanist in the Department, has advised (pers comm. 10 August 2018) that the seed appears long lived, as noted by plants appearing following fire and grading in previously long undisturbed areas. Given the biology of the fruit/seed, Andrew doubts that the [soil stored] seed would all germinate at once.

2.6. Population dynamics

Provide details on ages of sexual maturity, extent of breeding success, life expectancy and natural mortality. Describe population structure (presence of juveniles/seedlings, mature and senescing individuals). Estimate generation length.

Surveys in 2014 found large numbers of seedlings which were not present 12 months previously. Some seedlings were flowering indicating that the juvenile period is <12 months.

Some plants thought to have germinated on a firebreak in Kau Rock NR in 2003 are still alive in 2014.

The biology of the fruit/seed appears to support long persistence of the fruit/seed in the soil, and mass germination after time with appropriate environmental or physical triggers. This provides for resilience in the species to variations in population numbers over time.

Questions 2.7 and 2.8 apply to fauna nominations only

2.7. Feeding
Summarise food items or sources and timing/availability.

NA

Briefly describe feeding behaviours, including those that may make the species vulnerable to threatening processes.

NA

2.8. Movements
Describe any relevant daily or seasonal pattern of movement for the species, including relevant arrival/departure dates if migratory. Provide details of home range/territories.

NA

SECTION 3. INTERNATIONAL CONTEXT

For species that are distributed both in Australia and in other countries.

3.1. Distribution
Describe the global distribution.

N/A

Provide an overview of the global population size, trends, threats and security of the species outside of Australia.

N/A

Explain the relationship between the Australian population and the global population. What percentage of the global population occurs in Australia? Is the Australian population distinct, geographically separate or does part, or all, of the population move in/out of Australia's jurisdiction? Do global threats affect the Australian population?

N/A

SECTION 4. CONSERVATION STATUS AND MANAGEMENT

Conservation status and management information is required for the national extent of the species, however, greater detail is expected for the WA occurrences. If the taxon is considered to be endemic to Western Australia, please provide supporting evidence.

4.1. Population
What is the total national/State population size in terms of number of mature individuals? Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).

> Note: The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of mature individuals of the taxon. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used. (IUCN 2001)

The species occurs on 87 small lakes with 10393 mature individuals and 5094 seedlings currently known. There are 11 populations in the eastern group and 5 populations in the western group. In most subpopulations the number of individuals count is accurate and has been done by using a GPS to mark individual plants (this has been done in all but one subpopulation where a very conservative estimate of 2500 plants was calculated based on area of occupancy and grid counts) See Appendix 1 - Table of population data.

How many subpopulations or locations do you consider the species occurs in and why?

Note: 'Subpopulations' are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less). 'Locations' are defined as a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. (IUCN 2001) Refer to Red List Guidelines 9.0

Occurs in two areas approximately 30km apart. The eastern area comprises of 11 populations made up of 50 subpopulations and the western area comprises of 5 populations made up of 37 subpopulations.

Provide locations of: captive/propagated occurrences or *ex situ* collections; recent re-introductions or introductions to the wild; and sites for proposed re-introductions or introductions. Have these sites been identified in recovery plans?

Cuttings and seed have been collected from populations 2, 4, 5 and 7.

The Botanic Gardens and Parks Authority (BGPA) currently have 13 living plants. There has been a large variation in strike rates from 6% to 100% depending on factors such as quality of material and timing. The average strike rate is around 32% (Amanda Shade pers. comm.[2])[2]

Staff from Parks and Wildlife's Threatened Flora Seed Centre (TFSC) collected approximately 372 seeds in January 1994. Staff test the viability of seed soon after collection and again after one year in storage. The initial germination rate of *Myoporum turbinatum* was 43% (unpublished data A. Cochrane[1]). Additional fruit collected between 1994 and 2009 has resulted in total storage of 297 000 fruits. More fruit was collected from western populations in 2014 but is yet to be processed.

For <u>flora</u>, and where applicable, for <u>fauna</u>, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence. More specific detail is expected for WA occurrences for taxa that are not endemic to WA.

All populations were surveyed in 2013 or 2014. See attached population table in Appendix 1.

Date of survey	Location Description (include coordinates of the site)	Land status	Number of mature individuals at location	Area of occupancy at location	Condition of site

What is the total area of occupancy (in km^2) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Where separate breeding habitat is applicable, if possible, also provide area of breeding habitat.

Lake chains make up a fairly substantial part of the landscape (>10%), however the plants are specific and grow only on the edges of lakes so the area of occupancy is likely to be <5km^2 in total.

[2] Amanda Shade, Nursery Curator, Botanic Gardens and Parks Authority (BGPA)
[1] Anne Cochrane, Senior Research Scientist, DPaW Science Division

What is the extent of occurrence (in km^2) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate.

Population extends approximately 42km east-west by 10km north- south = 420km² calculated via GIS mapping. This area includes the shortest imaginary boundary which can be drawn to encompass known and projected sites of occurrence of the species.

Identify important occurrences necessary for the long-term survival and recovery of the species? This may include: key breeding populations, those near the edge of the range of the species or those needed to maintain genetic diversity.

A large subpopulation discovered in 2014 in Kau Rock NR has >2500 plants. There are also a number of lakes on private property, each containing over 1000 plants as well as some on road reserves in the east with >1000 seedlings known. No plants have been found between the two main population groups some 30km apart.

Is the distribution of the species severely fragmented? Why?

No

Is the taxon subject to extreme fluctuations? If so, provide evidence.

In 2014, large numbers of new seedlings were found in areas previously containing low numbers of plants. It is likely that the species periodically undergoes a mass recruitment event followed by slow decline.

Has there been any known decline in the species within WA or nationally, or is this likely in the future? – provide details in relation to the elements detailed below, including how the decline has been measured or inferred. Is there a presumption of continuing decline? If so, provide details of the decline and how it relates to the specific Red List Categories and Criteria version 3.1.

Note: A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this. (IUCN 2001) Refer to Red List Guidelines 9.0

There has been an increase with new populations found (see attached table)

Has there been a decline in the size of the population (number of mature individuals)?

Fluctuation in individual populations with an increase overall due to new populations being found.

- **can the rate of population size reduction be determined over the last 10 years or 3 generations (whichever is the longer)? If so, state whether the determination is based on quantitative data (observed), estimated (provide data and calculations), inferred or suspected.**

No

- **can the rate of population size reduction be estimated for the next 10 years or 3 generations and in any 10 year or 3 generation period (up to a maximum of 100 years into the future)? If so, state how the reduction is estimated (provide data and calculations), inferred or suspected.**

No

Has there been a decline in the number of locations, extent of occurrence or area of occupancy?

No

Has there been a decline in the area or quality of habitat?

No

4.2. Survey effort

Describe the methods to conduct surveys. For example, season, time of day, weather conditions; length, intensity and pattern of search effort (including where species not encountered); any limitations and expert requirements.

A combination of mostly foot and vehicle based searches were carried out in 2013 and 2014. These covered approximately 250 individual lakes. Areas searched are limited by access issues (especially due to wet season in 2013, crops in paddocks and limited access in Nature Reserves) as well as time and staffing constraints.

Approximately 250 lakes were surveyed in 2013/14.

40 new subpopulations were discovered, comprising over 10,000 mature plants

166 of the lakes surveyed did not contain *Myoporum turbinatum.*

SUMMARY OF SURVEY EFFORT:

Approx four days survey at Neridup location 400.

Neridup locations 326 and 437. (Milne and Watkins properties) >100 lakes surveyed. Still more lakes to survey on south part of Location 326 with potential habitat.

Southern parts of Neridup Location 335 searched.

Three days spent searching all lakes on Neridup Loc 398, 285 and 399 searched no plants found.

Two lakes at top of South Burdett NR (Loc 219) searched none found – access limited due to wet conditions.

Searched one lake on Location 288 – still need owner access to search rest of lakes on this property.

Kau Rock NR has extensive lake chains and large areas of potential habitat. So far only 13 lakes have been searched due to time constraints. Mt Ney Road which intersects this reserve has also been assessed and surveyed by vehicle for plants with none found.

Previously (2008) we searched R 32783 Beaumont NR north western edge and main track through northern part of the reserve. No plants found. Esperance Wildflower Society also conducted botanical surveys on a number of Nature reserves in the Beaumont group and whilst they were restricted to the vicinity of tracks, they did not find any plants. The species was also flagged as a potential concern for Ecoscape, the consultants carrying out Level 2 botanical surveys for the Northern Mallee Declared species group's proposed extension to the State Barrier Fence. However they did not locate any plants (they were however working further north than existing populations).

The Halbert1 –Soil Land sub-unit covers both east and west populations and there are extensive areas of potential habitat between these two also lying in the same soil land unit with good lake systems showing on aerial photographic analysis.

Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.

The species appears to favour the surrounds of shallow saline depressions and lakes and often occurs on the playa between two lakes. When flowering the species is very easily seen from some distance away. Plants located on private property near farmland are often bushier and healthier than those located away from fertilizer inputs eg in Nature Reserves.

Has the species been reasonably well surveyed? Provide an overview of surveys to date (include surveys of known occurrences and surveys for additional occurrences) and the likelihood of its current known distribution and/or population size being its actual distribution and/or population size. Include comments on potential habitat and surveys that were conducted, but where the species was not present/found.

Further populations of this species may possibly be found in unsurveyed and inaccessible parts of Kau Rock NRs 32776, 32777 and 32780 and in private property between the western and eastern groups (e.g. Neridup locations 416, 417, 420, 423, 422, 427, 325, 433 and 421(especially)) as these contain likely habitat when looking at aerial photography. The species may also be present around inaccessible lakes in Beaumont NRs 32130 and 32783. There also appears to be some very good habitat further east of the known populations on Neridup Location 351 and 346.

4.3. Threats

Identify past, current and future threats indicating whether they are actual or potential. For each threat describe:

a). how and where they impact this species

b). what the effect of the threat(s) has been so far (indicate whether it is known or suspected

c). present supporting information/research

d). does it only affect certain populations?

e). what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations?).

Threats include: Spray drift from agricultural spraying, grazing (sheep and rabbits), road maintenance, weed invasion, inappropriate fire, poor recruitment. Increasing salinity may be an issue. It is unknown what tolerance the species has to salinity but it is probably quite high.

If possible, provide information threats for each current occurrence/location:

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)

Identify and explain why additional biological characteristics particular to the species are threatening to its survival (e.g. low genetic diversity). Identify and explain any models addressing the survival of the species.

**

4.4. Management

Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.

Revised IRP in preparation. Existing IRP #186 (Taylor *et al* 2004) expired in 2009.

Does this species benefit from the management of another species or community? Explain.

No

How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.

Less than ¼ of all known plants are in conservation reserves or covenanted land. Kau Rock Nature Reserve 32776 (>2500 plants, 5 subpopulations), Beaumont Nature Reserve 32130 (5 plants, one subpopulation). Beaumont Nature Reserve 32783 (13 plants, one subpopulation).

Are there any management or research recommendations that will assist in the conservation of the species? Provide details.

Yes, see Interim Recovery Plan (Taylor *et al* 2004)

4.5. Other

Is there any additional information that is relevant to consideration of the conservation status of this species?

SECTION 5. NOMINATOR

Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	29/10/2014

If the nomination has been refereed or reviewed by experts, provide their names and contact details.

Emma Massenbauer, Conservation Officer, Department of Parks and Wildlife Esperance District

Stephen Butler, Nature Conservation Coordinator, Department of Parks and Wildlife Esperance District

Wayne Gill, Land for Wildlife Officer, Department of Parks and Wildlife Esperance District

SECTION 6. REFERENCES

What references or sources did you use to prepare your nomination? Include written material, electronic sources and verbal information. Include full references, address of web pages and the names and contact details of authorities with whom you had verbal communications.

Chinnock, R.J. (2007) *Eremophila and allied genera, A monograph of the Myoporaceae,* State Herbarium of South Australia, Rosenburg Bublishing, NSW; Western Australian

Cochrane, A. (2005) *Determination of Response of Rare and Poorly Known Western Australian Native Species to Salinity and Waterlogging.* Department of Conservation and Land Management. c/o 444 Albany Highway, Albany, Western Australia, Australia 6330

Gilovitz, C., Crawford, A., Cochrane, A., and Adams, E. (2009) *Disturbance trial research on four threatened taxa from the Esperance District of Western Australia (Daviesia microcarpa, Eremophila denticulata subsp. trisulcata, Eremophila lactea and Myoporum turbinatum)* Report to the Commonwealth Government Department of the Environment and Water Resources PROJECT NO. 45054756/2, Department of Environment and Conservation

Rathbone, D., De Mey, F. and Adams E. D. (2009) *Fire Management Research Project: Myoporum turbinatum.*

Taylor, H., Butler, R., and Brown, A. (2004) *Interim Recovery Plan No.186 Myoporum turbinatum* Department of Conservation and Land Management

Apendix 1: Summary of Surveys / population numbers 2013 / 2014 (Not for Publication)

TPFL Pop #	Lat	Long	Location description	2013	2014	Condition / threat / comment
1	33° 27′ 32.6″	122° 36′ 28.6″	Junction of Heywood Road and Coolinup Road	0	0	Degraded - Road maintenance, salinity, weed invasion, inappropriate fire, poor recruitment
1 (This was previously called population 1 but its less than 500m from population 1)	33° 27′ 25.4″	122° 36′ 27.4″	Heywood road	36	29 (1387)	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
2A	33° 27′ 59.4″	122° 36′ 59.0″	Heywood Road	0	0	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
2B	33° 28′ 08.8″	122° 36′ 59.5″	Heywood Road	0	0	Degraded - Firebreak maintenance, herbicide drift, salinity, weed invasion, inappropriate fire, poor recruitment
2C	33° 28′ 03.4″	122° 37′ 08.7″	Heywood Road.	7	3 (141)	Degraded - Road maintenance, weed invasion, inappropriate fire
3A	33° 28′ 53.2″	122° 37′ 41.5″	Heywood Road	5	5	Very Good - Salinity, firebreak maintenance, weed

						invasion, inappropriate fire, poor recruitment
3B	33° 28′ 48.0″	122° 37′ 45.5″	Heywood Road	1	1	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
4A	33° 29′ 26.2″	122° 38′ 53.6″	Karl Berg Road.	7	5 (46)	Good - Road maintenance, salinity, weeds, inappropriate fire
4B	33° 30′ 08.2″	122° 39′ 20.6″	Private property	0	0	Good - Weed invasion, herbicide drift, inappropriate fire, poor recruitment
4C	33° 29′ 56.5″	122° 39′ 28.2″	Karl Berg Road	0		Good - Road maintenance, salinity, weed invasion, inappropriate fire, poor recruitment
4D	33° 29′ 37.9″	122° 39′ 50.2″	Karl Berg Road	1	1 (1)	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
4E	33° 29′ 58.1″	122° 39′ 12.2″	Private property	0	0	4E and 4F are likely to be same subpopulation
4F	33° 30′ 00″	122° 39′ 02″	Heywood Road	3	1 (261)	Degraded - Firebreak maintenance, herbicide drift, salinity, weed invasion, inappropriate fire, poor recruitment

4G	33° 29′ 26.2″	122° 38′ 53.6″	Heywood Road	1		Good - Road maintenance, weed invasion, salinity, inappropriate fire, wind
4H	33° 30′ 7.9″	122° 39′ 15.1″	Heywood Rd	0	(35)	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
4I	33° 29′ 38.2″	122° 39′ 5.6″	Private property	44	7 (338)	Good - Salinity, weed invasion, inappropriate fire, herbicide drift.
New (Pop 4K)	33^{0}29′23.5″	122^{0}39′12.6″	Private Property	7		
New (Pop 4L)	33^{0}29′22.6″	122^{0}39′1.4″	Private Property	1		
New (Pop 4J)	33^{0}29′19.44″	122^{0}38′49.02″	Private Property	4		
New pop 4M	33^{0}29′50.5″	122^{0}39′11″	Private Property	179		
New pop 4N	33^0 29′	122^0 39′ 13″	Private Property			
New pop 4O	33^0 29′ 38.2″	122^0 39′ 28″	Private Property	11		
New pop 4P	33^0 29′43.7″	122^0 39″25″	Private Property	20		
New pop 4Q			Private Property			
New pop 4R			Road reserve, Karl Berg Road	1		
5A	33° 31′ 35.6″	122° 40′ 14.9″	Heywood Road	39	23 (1357)	Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
5B	33° 31′ 38.7″	122° 40′ 13.5″	Heywood Road	2	1 (24)	Degraded - Salinity, herbicide drift, inappropriate fire, poor recruitment

5C	33° 31′ 34.4″	122° 40′ 17.9″	Heywood Road	13	9 (36)	Degraded - Road maintenance, weed invasion, inappropriate fire, poor recruitment
6	33° 28′ 49.8″	122° 40′ 41.2″	Karl Berg Road	0		Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
7A	33° 27′ 2.9″	122° 36′ 20.8″	Beaumont Nature Reserve (32783).	13		Good - Road maintenance, weed invasion, inappropriate fire, poor recruitment
7B	33° 27′ 2.9″	122° 36′ 20.2″	Private property.	48		Good - Salinity, herbicide drift, inappropriate fire, poor recruitment
8	33.4894444	122.6146667	Beaumont NR 32130	18		
New (Pop 11)	33°30′8.7″	122°38′56.7″	Private Property	3	2 (97)	
New (Pop 11)	33°30′21.5″	122°38′43.0″	Private Property	1	2	
New (Pop 11)	33°30′9.0″	122°38′39.9″	Private Property	67	62 (205)	
New (Pop 11)	33°30′16.9″	122°38′57.4″	Private Property	5	5 (703)	
New (Pop 11)	33°29′44.1″	122°38′22.8″	Private Property	5	5 (28)	
New (Pop 11)	33°30′29.0″	122°38′26.7″	Private Property	26	29 (85)	
New (Pop 11)	33°29′51.5″	122°38′46.1″	Private Property	0	(20)	
New (Pop 11)	33°29′47.5″	122°38′38.3″	Private Property	1	1 (7)	
New (Pop 11)	33°29′37.4″	122°38′30.9″	Private Property	40	48 (292)	
New (Pop 11)	33°30′24.78″	122°39′9.28″	Private Property	0	(31)	
New (Pop 12)	33°30′15″	122°39′44.4″	Private Property	5	6	

New 13a	33°27′31.3″	122°13′56″	Private Property	1598		
New 13b	33°27′35.9″	122°14′10.5″	Private Property	188		
New 13d	33°27′30″	122°14′8″	Private Property	1008		
New 13c	33°27′35.9″	122°14′20.7″	Private Property	260		
New 13e	33°27′21.5″	122°14′04.5″	Private Property	94		
New 13f	33°27′14.1″	122°14′07.3″	Private Property	189		
New 13g	33°27′15.5″	122°13′44.4″	Private Property	103		
New 13i	33°27′14.5″	122°14′12″	Private Property Neridup location 400.	1218		
New 13h	33°27′05.5″	122°14′15.1″	Private Property	1150		
New 13j	33°27′14.1″	122°14′07.3″	Private Property	189		
New 13k	33°27′23.2″	122°14′28.7″	Private Property	413		
New 13l	33°27′36.9″	122°14′20.7″	Private Property	260		
New 14a	33°27′30.5″	122°15′35.7″	Private Property		63	
New 14b	33°27′30.19″	122°14′44.2″	Private Property		70	
New 14c	33°27′32.4″	122°16′04.5″	Kau Rock Nature reserve A32776		20	
New 15a	33°26′44.3″	122°15′27.2″	Private Property		31	
New 15b	33°26′44.8″	122°15′36.5″	Private Property		4	
New 13m	33°27′00.2″	122°14′40.7″	Lake on boundary of Private Property		89	
New 18	33°29′16.2″	122°16′50″	Private Property / Kau Rock NR A32776 consists of 7 separate lakes		2500	
New 17ab	33°28′45.1″	122°16′17.4″	Private Property / Kau Rock NR A32776.		100	
New 17c	33°28′37.9″	122°16′14.9″	Private Property		50	
New 13n	33°26′51.9″	122°14′14.5″	Private Property		183	
New 13o	33°26′44.18″	122°14′20.7″	Private Property		189	
New 13p	33°26′31″	122°14′26.3″	Private Property		22	
New 13q	33°26′27.7″	122°14′51.9″	Private Property		99	

Myoporum turbinatum

Legend

- Myoporum turbinatum
- Nature Reserve

Virtual Mosaic (LGATE-V001)

N

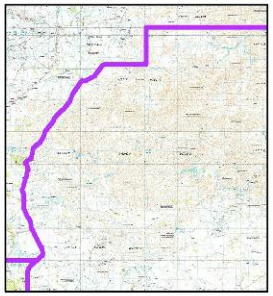
(A4)

1:180,000

0 1.75 3.5 7 10.5 14

Kilometres

Projection: Universal Transverse Mercator
MGA Zone 51. Datum: GDA94



Produced by AJ, Department of Parks and Wildlife

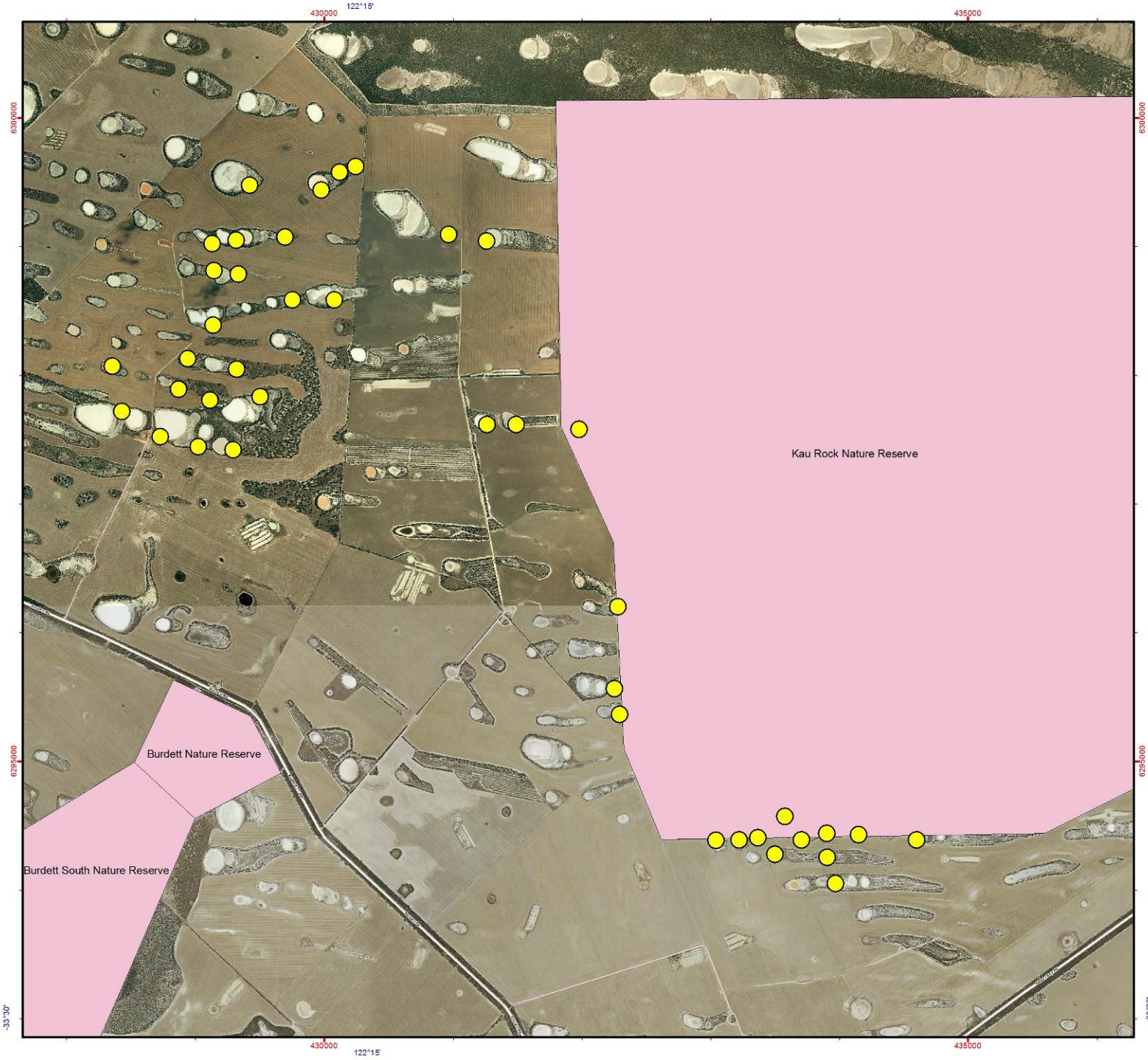
Department of Parks and Wildlife

Graticule shown at 5 minutes intervals

Grid shown at 5000 metre intervals

Produced at 3:16pm, on Mar 5, 2015

Myoporum turbinatum



Legend

- Myoporum turbinatum
- Nature Reserve

Virtual Mosaic (LGATE-V001)

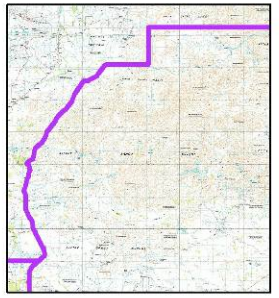
(A4)

1:30,000

0 0.3 0.6 1.2 1.8 2.4

Kilometres

Projection: Universal Transverse Mercator
MGA Zone 51. Datum: GDA94



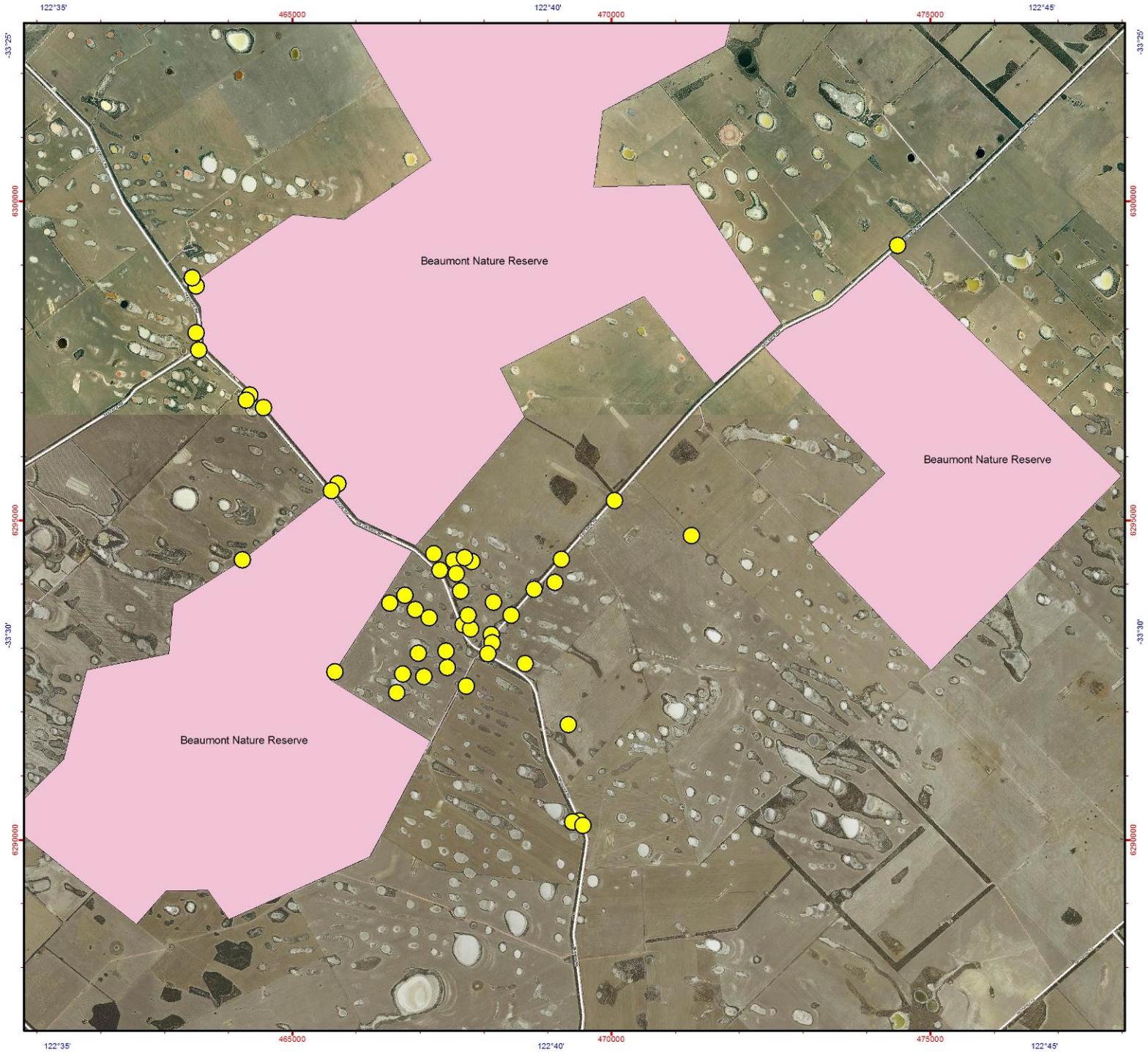
Produced by AJ, Department of Parks and Wildlife

Department of Parks and Wildlife

Graticule shown at 5 minutes intervals

Grid shown at 5000 metre intervals

Produced at 3:16pm, on Mar 5, 2015



Myoporum turbinatum

Legend

- Myoporum turbinatum
- Nature Reserve

Virtual Mosaic (LGATE-V001)

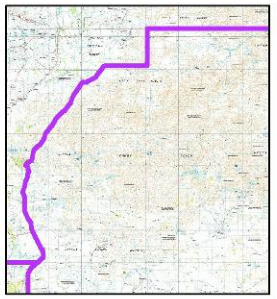
(A4)

1:60,000

0 0.5 1 2 3 4

Kilometres

Projection: Universal Transverse Mercator
MGA Zone 51. Datum: GDA94



Produced by AJ, Department of Parks and Wildlife

Department of Parks and Wildlife

Graticule shown at 5 minutes intervals

Grid shown at 5000 metre intervals

Produced at 3:16pm, on Mar 5, 2015