Department of **Biodiversity,
Conservation and Attractions**

GOVERNMENT OF
WESTERN AUSTRALIA

Nomination *(to be completed by nominator)*

Current conservation status	
Name of ecological community:	Herblands and bunch grasslands on gypsum lunette dunes alongside saline playa lakes
Other names:	
Description:	The community has been recorded from the Lake Magenta area, on grey sandy clay on the top of a lake edge dune on gypsum lunette dunes alongside saline playa lakes. Floristic composition includes the herbaceous taxa *Austrostipa juncifolia*, *Rytidosperma caespitosum*, *Podolepis rugata*, *Asteridea chaetopoda*, and shrubs *Atriplex paludosa*, *Maireana marginata*, *Tecticornia syncarpa*, *Scaevola spinescens* and *Lawrencia squamata*.
Nomination for:	Listing ☒　　　　Change of status ☐　　　　Delisting ☐

1. Is the ecological community 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	List or Act name	Date listed or assessed (or N/A)	Listing category eg. critically endangered (or none)	Listing criteria eg. B1ab(iii)+2ab(iii) (or none)
National	EPBC Act			
Western Australia	Threatened list	6/11/2001	Vulnerable	B)
	Priority list		1 ☐　2 ☐	3 ☐　4 ☐
Other State/Territory				

Nominated conservation status: category and criteria (include recommended status for deleted ecological communities)
Critically endangered (CR) ☐　　Endangered (EN) ☐　　Vulnerable (VU) ☒　　Collapsed (CO) ☐
Priority 1 ☐　　Priority 2 ☐　　Priority 3 ☐　　Priority 4 ☐　　None ☐

What criteria support the conservation status category for listing as a threatened ecological community or collapsed ecological community? *Refer to Section 32 of the Biodiversity Act 2016 for definition of 'Collapsed', and Appendix 3 table 'IUCN Red List Criteria for ecosystems version 2.2'.*	B3

Eligibility against the criteria	

Provide justification for the nominated conservation status; is the ecological community eligible or ineligible for listing against the five criteria. For __delisting__, provide details for why the ecological community no longer meets the requirements of the current conservation status.

A.	Reduction in geographic distribution *(evidence of decline)*	☐ A1 ☐ A2a ☐ A2b ☐ A3
	Justification of assessment under Criterion A.	For criteria A and B, the ecosystem was assumed to collapse when the mapped distribution declines to zero. • A: There is no information to support an inference that a ≥30% reduction at least in geographic distribution has or will occur over any 50-year period, or a ≥50% reduction since ~1750 (ie. the minimum requirements to meet the category VU under criterion A). • **Does not meet criterion A**
B.	Restricted geographic distribution *(EOO and AOO, number of locations and evidence of decline)*	☐ **B1** (specify at least one of the following): VU ☐ a)(i) ☐ a)(ii) ☐ a)(iii) ☐ b) ☐ c); ☐ **B2** (specify at least one of the following): ☐ a)(i) ☐ a)(ii) ☐ a)(iii) ☐ b) ☐ c); ☒ **B3 (Vulnerable Listing)**
	Justification of assessment under Criterion B.	• B1: EOO is $0.1km^2$ (≤$2,000km^2$, which is the threshold for CR). • B2: AOO is one 10x10 km grid cells (threshold for EN is 20 and for CR is 2 grid cells). • a): Few data are available to measure decline in spatial extent, environmental quality or disruption to biotic interactions. • b): Decline observed from the impacts of recreational activities and grazing; and inferred from future changes to the hydrological regime (salinization) and gypsum extraction (see Appendix 1 for further information on threats). • c) Ecosystem exists at one threat-defined location (threshold for CR is one and for EN is 5 threat-defined locations). • B3: Known from one threat-defined location and prone to relatively low-level impacts of recreational activities, grazing, changes in hydrology and drying climate. Current level of threat is considered trivial and community is considered prone to effects of human activities or stochastic events within a very short time period in an uncertain future and

thus capable of collapse or becoming CR within a very short time period (meets VU as <5 threat defied locations).

- **Although plausibly meets criteria for Critically Endangered, recommend rank of Vulnerable B3 due to the a relatively low level of threat from recreational activities and other issues to a level that is currently considered to be 'trivial'. VU is plausible under B3.**

C.	Environmental degradation of abiotic variable *(Evidence of decline over 50-year period)*	☐ **C1** ☐ **C2** ☐ **C3**
	Justification of assessment under Criterion C.	• C1, C2: Substrate removal is considered a potential future threat, particularly since the community occurs on unallocated crown land that is not secure conservation land, and there are limited opportunities to manage conflicting land uses. The community does not meet the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50-year period. • C1, C2: A significant abiotic variable affecting the community is removal of substrate for gypsum mining. Collapse of the community is defined under criteria C as 100% loss of substrate that sustains the community. There are currently no active proposals for gypsum extraction and the impact is currently considered 'trivial' in magnitude. As the land tenure on which the community occurs is not secure, the threat has the potential to become 'non-trivial' in future. • C3: Does not meet the minimum proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since ~1750. • **Does not meet criterion C**
D.	Disruption of biotic processes or interactions *(Evidence of decline over 50-year period)*	☐ **D1** ☐ **D2** ☐ **D3**
	Justification of assessment under Criterion D.	• D1, D2: Weed invasion is considered a threat to the biotic processes of the community and can be associated with impacts of introduced grazers, or other disturbances. The severity of weed invasion associated with collapse is uncertain, but it is assumed conservatively that the community reaches a collapsed state when only 10% (plausible range 0–20%) of its plant species are native. 100% of the community was considered in 'good' condition when last surveyed in 2016 however. Therefore, there is no appropriate evidence available to indicate the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of disruption of biotic processes (≥30%) over any 50-year period.

		• D3: Does not meet the minimum proportion of the extent (≥50%) or proportional severity of disruption of biotic processes (≥50%) since ~1750. • **Does not meet criterion D**
E.	Quantitative analysis *(statistical probability of ecosystem collapse)*	• No quantitative estimates of the risk of ecosystem collapse. • **Unable to assess**

Reasons for change of status

Genuine change ☐   New knowledge ☐   Previous mistake ☐   Review/Other ☒

Provide details: The community was initially ranked as Vulnerable using ranking criteria developed in WA that differ to those in the IUCN Red List Criteria for Ecosystems (version 2.2).

Summary of assessment information *(provide detailed information in the relevant sections of the nomination form)*

EOO	0.1 km^2	AOO	One 10x10 km grid cell
No. occurrences	1	Severely fragmented	Yes ☐ No ☒ Unknown ☐
Justification of whether fragmented	Single occurrence known		
Current known area			4.7ha
Pre-industrialisation extent or its former known extent (if known)			Thought to occupy most of its former extent
Estimated percentage decline			

Summary assessment against IUCN RLE Criteria

Criterion	Rank indicated	Overall conclusion
A1	-	• Available data do not indicate community meets criterion
A2a	-	• Available data do not indicate community meets criterion
A2b	-	• Available data do not indicate community meets criterion
A3	-	• Available data do not indicate community meets criterion
B1a	-	• EOO is ≤2,000km^2 • No available data indicate decline in spatial extent, environmental quality or disruption to biotic interactions that would meet minimum thresholds of the criterion (VU) • Does not meet criterion
B1b	-	• EOO is ≤2,000km^2 • Impacts from recreational activities and grazing; and inferred from future changes to the hydrological regime (salinization) and gypsum extraction. • Does not meet criterion as level of threat 'trivial'
B1c	-	• EOO is ≤2,000km^2 • Ecosystem exists at one threat-defined location • Does not meet criterion as level of threat 'trivial'
B2a	-	• AOO is one grid cell • No data available that indicate decline in spatial extent, environmental quality and disruption to biotic interactions • Does not meet criterion as level of threat 'trivial'
B2b	-	• AOO is one grid cell • Impacts from recreational activities and grazing; and inferred from future changes to the hydrological regime (salinization) and gypsum extraction • Does not meet criterion as level of threat 'trivial'
B2c	-	• AOO is one grid cell • Ecosystem exists at one threat-defined location • Does not meet criterion as level of threat 'trivial'
B3	VU	• Known from one threat-defined location • Prone to the effects resulting from recreational activities and grazing • Meets criterion for VU as community capable of becoming CR within very short period of time
C1	-	• Inadequate evidence to indicate the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over past 50 years to meet VU.
C2	-	• Inadequate evidence to indicate the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of degradation (≥30%) over any 50-year period to meet VU.
C3	-	• Does not meet the minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of abiotic processes (≥50%) since ~1750 to meet VU.
D1	-	• Inadequate evidence to indicate the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of disruption of biotic processes (≥30%) over past 50 years to meet VU.
D2	-	• Inadequate evidence to indicate the community meets the minimum thresholds for proportion of the extent (≥30%) or proportional severity of disruption of biotic processes (≥30%) over any 50-year period to meet VU.
D3	-	• Does not meet the minimum thresholds for proportion of the extent (≥50%) or proportional severity of disruption of biotic processes (≥50%) since ~1750 to meet VU.
E	NA	• No quantitative estimates of the risk of ecosystem collapse.
		Meets VU under B3

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Summary of location (occurrence) information *(provide detailed information in the relevant sections of the nomination form)*						
Occurrence	Land tenure	Survey information: date of survey	Condition*	Area of occurrence (ha)	Threats *(note if past, present or future)*	Specific management actions
G226	Unallocated Crown land	2019	90% excellent 10% very good	4.7 ha	Recreational activities, grazing (*past, present, future*) Hydrological change, resource extraction, drying climate (*future*)	Maintain signage Restrict access Control introduced fauna Seek increased security of tenure Monitor weed invasion, impacts of salinisation

*For the purposes of relating condition to IUCN Criteria, condition categories from (Keighery (1994) Vegetation Condition Scale (Government of WA 2000)) are defined below:

Good ('Pristine', 'Excellent', 'Very Good' using Bush Forever (2000) scale): This includes vegetation ranging from 'Pristine' - with no obvious signs of disturbance, to 'Excellent' - Vegetation structure intact, with disturbance only affecting individual species, weeds are non-aggressive species and 'Very Good' - Vegetation structure altered, obvious signs of disturbance eg: from repeated fires, dieback, logging, grazing.

Medium ('Good' using Bush Forever (2000) scale): This includes vegetation categorised as 'Good' - Vegetation structure altered but retains basic vegetation structure or ability to regenerate it, obvious signs of disturbance are present, from activities including partial clearing, dieback and grazing.

Poor ('Degraded' using Bush Forever (2000) scale): Basic vegetation structure severely impacted by disturbance such as partial clearing, dieback, logging and grazing. Scope for regeneration but not to a state approaching good condition without intensive management.

Beyond recovery ('Completely degraded' using Bush Forever (2000) scale): Vegetation structure is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native shrubs and trees.

Table 1. Known vegetation condition of the occurrence of 'Herblands and bunch grasslands on gypsum lunette dunes alongside saline playa lakes'

Condition Ranking (Keighery 1994) from Government of Western Australia 2000)	Hectares	IUCN Criteria condition ranking	Hectares
Pristine	0	Good	4.7
Excellent	4.2		
Very Good	0.5		
Good	0	Medium	
Degraded	0	Poor	
Completely degraded	0	Beyond recovery	
Total	4.7	Total	4.7

APPENDIX 1 THREATS

Recreational activities

A major track used by vehicles accessing the adjacent reserve bisects the community, potentially introducing weed seeds, plant diseases and erosion. The access track was rerouted in 2008 and signage installed to direct visitors to keep to the track. Despite this, evidence of vehicle usage is still apparent.

Introduced fauna

There is some evidence of impacts from rabbits and kangaroos at the site. Herbivores can alter species composition by the selective grazing of edible species, the introduction of weeds and nutrients, trampling and general disturbance.

Hydrological change

There are no DoW bores located within the vicinity to provide long-term data on groundwater levels. However, the community occurs within the south-eastern area of the Avon River Basin which is at 'moderate' risk of hydrological change from rising saline groundwater (Wheatbelt Natural Resource Management website: http://www.nrmstrategy.com.au/land-and-water-salinisation; accessed 2019). In the southern zone, where the community is located, salinization is likely to continue to develop in the future, with potential for major impact on the area.

Resource extraction

Gypsum mining is considered a potential future threat, particularly as the community occurs on unallocated crown land that has no specific protection.

Drying climate

The herblands and bunch grasslands on gypsum lunette dunes alongside saline playa lakes community is at risk from a drying climate resulting from a decline in rainfall in the south west of the state. The tolerance of particular species to changes that may occur in association with drying climate, including changes in rainfall and temperatures, is generally unknown. Climate change predictions for the south west of WA are as follows (from **NCCARF** website: https://www.nccarf.edu.au/sites/default/files/attached_files_publications/PDF%20Report%20Card%20Low%20Res.pdf); accessed 2019):

- Reduction in rainfall by 2030 by 2-14% (median 8%). Southwest predicted to experience some of the largest reductions in rainfall in all of Australia;
- Reduction in runoff by 10-42% (median 25%) by 2030;
- Decline in groundwater levels by 2030 (extractive yields may decrease by a third to a half in some areas).

References

Government of Western Australia (2000) Bush Forever. Department of Environmental Protection, Perth.

Keighery, B.J. (1994) Bushland Plant Survey. A Guide to Plant Community Survey for the Community. Wildflower Society of Western Australia (Inc.), Nedlands, Western Australia.

Graticule shown at 10 minute intervals.
Grid shown at 1000.0 metre intervals.

Legend

Herblands and grasslands

N

1:8,715
(A4)

0 0.0325065   0.13   0.195   0.26
Kilometres

GDA94 MGA Zone 50

Produced by the
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APPENDIX 3 IUCN Red List Criteria for ecosystems (version 2.2) (IUCN 2017)

A. Reduction in geographic distribution over ANY of the following time periods:

		CR	EN	VU
A1	Present (over the past 50 years).	≥ 80%	≥ 50%	≥ 30%
A2a	Future (over the next 50 years).	≥ 80%	≥ 50%	≥ 30%
A2b	Future (over any 50 year period including the present and future).	≥ 80%	≥ 50%	≥ 30%
A3	Historic (since 1750).	≥ 90%	≥ 70%	≥ 50%

B. Restricted geographic distribution indicated by EITHER B1, B2 or B3:

		CR	EN	VU
B1	Extent of a minimum convex polygon enclosing all occurrences (Extent of Occurrence)	≤ 2,000 km²	≤ 20,000 km²	≤ 50,000 km²

AND at least one of the following (a-c):

(a) An observed or inferred continuing decline in **EITHER**:

   i. a measure of spatial extent appropriate to the ecosystem; **OR**

   ii. a measure of environmental quality appropriate to characteristic biota of the ecosystem; **OR**

   iii. a measure of disruption to biotic interactions appropriate to the characteristic biota of the ecosystem.

(b) Observed or inferred threatening processes that are likely to cause continuing declines in geographic distribution, environmental quality or biotic interactions within the next 20 years.

	(c) Ecosystem exists at …	1 location	≤ 5 locations	≤ 10 locations
B2	The number of 10 × 10 km grid cells occupied (Area of Occupancy)	≤ 2	≤ 20	≤ 50

AND at least one of a-c above (same sub-criteria as for B1).

B3	A very small number of locations (generally fewer than 5) **AND** prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and thus capable of collapse or becoming Critically Endangered within a very short time period (B3 can only lead to a listing as VU).	VU

C. Environmental degradation over ANY of the following time periods:

		Relative severity (%)		
	Extent (%)	≥ 80	≥ 50	≥ 30
C1 The past 50 years based on change in an <u>abiotic</u> variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
	≥ 50	EN	VU	
	≥ 30	VU		

		≥ 80	≥ 50	≥ 30
C2 The next 50 years, or any 50-year period including the present and future, based on change in an <u>abiotic</u> variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
	≥ 50	EN	VU	
	≥ 30	VU		

		≥ 90	≥ 70	≥ 50
C3 Since 1750 based on change in an <u>abiotic</u> variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 90	CR	EN	VU
	≥ 70	EN	VU	
	≥ 50	VU		

D. Disruption of biotic processes or interactions over ANY of the following time periods:

		Relative severity (%)		
	Extent (%)	≥ 80	≥ 50	≥ 30
D1 The past 50 years based on change in a <u>biotic</u> variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:	≥ 80	CR	EN	VU
	≥ 50	EN	VU	
	≥ 30	VU		

D2	(D2a) The next 50 years, or (D2b) any 50-year period including the present and future, based on change in a <u>biotic</u> variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table: OR		≥ 80	≥ 50	≥ 30
		≥ 80	CR	EN	VU
		≥ 50	EN	VU	
		≥ 30	VU		

D3	Since 1750, based on a change in a biotic variable affecting a fraction of the extent of the ecosystem and with relative severity, as indicated by the following table:		≥ 90	≥ 70	≥ 50
		≥ 90	CR	EN	VU
		≥ 70	EN	VU	
		≥ 50	VU		

E. Quantitative analysis

	CR	EN	VU
… that estimates the probability of ecosystem collapse to be:	≥ 50% within 50 years	≥ 20% within 50 years	≥ 10% within 100 years