

Nullarbor 1 (*NUL1 – Nullarbor Northern Band subregion*)

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Subregional description and biodiversity values

Description and area

The Nullarbor bioregion extends over most of the onshore part of the Eucla Basin – an epeirogenic basin of cretaceous and tertiary sediments on an irregular basement predominantly of Precambrian granite and metamorphic rocks.

NUL1 is along the northern edge of the Bunda Plateau comprised primarily of the Carlisle Plain which has deeper soil profiles with a high proportion of red quartz rich sand mixed with loams and calcareous clays which is partly calcreted over calcareous sandstone. It is part of an old, now inactive paleodrainage system, which flows into the Nullarbor Karst. Landforms consist of salt lakes and major valley floors with lake derived dunes. Sand plains

with extensive seif dunes in the northern areas of the subregion, occasional outcropping (breakaways) and quartzite hills provide minor relief. Some Karst formations are found in the southern areas of NUL1.

Vegetation in the Northern sections of the subregion are primarily a Tree steppe of *Eucalyptus gongylocarpa*, Mulga and *E. youngiana* over hummock grassland dominated by *Triodia basedowii* on the aeolian sands, *Acacia*, dominates the colluvial soils with *Eremophila* and *Santalum* spp halophytes are confined to edges of salt lakes and saline drainage systems. Low woodlands of *Acacia papyrocarpa* (Western Myall) over *Maireana sedifolia* (bluebush) are present in the central and southern areas of NUL1. Includes *Myoporum platycarpum* and *E. oleosa* in the east and west and woodlands dominated by *Acacia aneura* (Mulga). Climate is arid non-seasonal, with average rainfall of 150 – 200 mm. The subregional area for NUL1 is 5,442,741 ha.

Dominant land use

Category	Description	Percentage of Subregion
x	Aboriginal Reserve	0.22%
xiii	Conservation Reserves	35.93%
ix	Grazing - Leasehold	5.56%
xi	Unallocated Crown Land and Crown Reserves	58.29%

Continental Stress Class

The Continental Stress Class for NUL1 is 6.

Known special values in relation to landscape, ecosystem, species and genetic values

Special Features:

- The Nullarbor is the worlds largest Karst system, though very few caves occur in NUL1.
- Stygofauna and troglodites associated with the cave systems is also of significance.

- Wetlands of the Nullarbor region

Rare Vertebrates Include:

Princess Parrot (*Polytelis alexandrae*), Southern Marsupial Mole (*Notoryctes typhlops*) and the Sandhill Dunnart (*Sminthopsis psammophila*).

Centres of Endemism:

Stygofauna are generally endemic to individual systems as they have no means of dispersal and have evolved independently.

Ecosystems That Have More Than 95% of Their Total Extent Within Nullarbor 1:

Code	Description
442	Low open woodland; mulga & <i>Allocasuarina cristata</i>
120	Succulent steppe with open low woodland; mulga & sheoak

Refugia:

Several caves in NUL1 may provide refugia evolutionarily relictual invertebrates such as Crustaceans, centipedes, cockroaches, ground (carabid) beetles, Orthopterans, Pseudoscorpions and spiders. Two vertebrate species that are also known to use the caves are the bat, *Chalinolobus morio*, and the Nullarbor population of the masked owl, *Tyto novaehollandiae* during good seasons (such as mouse

plagues) when it is thought that individuals move in from the South Australian or Western Australian populations.

High Species or Ecosystem Diversity:

Cave systems support very rich communities of troglobites and troglolithes.

Existing subregional or bioregional plans and/or systematic reviews of biodiversity and threats

In 1974 the Conservation Through Reserves Committee (CTRC) made recommendations for reserves within the Deserts and Nullarbor Plain (System 12) in the CTRC Green Book. Recommendations for reservation by the CTRC in NUL1 (Great Victoria Desert Nature Reserve, Plumridge Lakes Nature Reserve) were implemented. The subregion is covered by the Department of CALM's Regional Management Plan (1994), that provides an overview of the regions biota, addresses land and conservation issues, but was written to cover a third of WA and therefore was generalised in its attention to detail. The reviews and strategies therein (for reserve development or management of weeds, feral animals, fire, mining, ecosystem rehabilitation & disease quarantine)

do not address the specific needs of the subregions, or even bioregions, individually (Department of Conservation and Land Management 1994).

In 1992, the Commonwealth Government commissioned a report on the suitability of the Nullarbor Region for World Heritage Listing. The report was submitted but not supported by the Western Australian Government and the recommendation did not progress.

The Spinifex Agreement – signed between the State of Western Australia and the Pila Nguru (Aboriginal Corporation) in 2001 will influence future biodiversity planning and management in NUL1.

Wetlands

Wetlands of National significance (DIWA listings)

No Wetlands of National Significance have been identified in NUL1.

Wetlands of subregional significance (in addition to the DIWA listed wetlands)

Name and Code	Location	Description ¹	Special Values ²	Condition ³	Trend ⁴	Reliability ⁵	Threatening Processes ⁶
Plumridge Lakes	Eastings 720 000 Northings 6740 000, Zone 52	B8	ii	iii	iv	i	v (rabbits, camels, foxes and cats)

¹Appendix B, key d; ²Appendix B, key c; ³Appendix C, rank 2; ⁴Appendix C, rank 3; ⁵Appendix C, rank 1; ⁶Appendix B, key e

Riparian zone vegetation

Name	Condition ¹	Trend ²	Reliability ³	Threatening Processes ⁴
Creek Bed Vegetation	iii	iv	ii	iv, vi, vii, v (foxes, cats, rabbits, goats)

¹Appendix C, rank 2; ²Appendix C, rank 3; ³Appendix C, rank 1; ⁴Appendix B, key e

Ecosystems at risk

Threatened ecological communities (TECs)

There are no Threatened Ecological Communities (TECs) in NUL1.

Other ecosystems at risk

Ecosystem	Status	NVIS ¹	Condition ²	Trend ³	Reliability ⁴	Threatening Processes ⁵
Wetlands of the Nullarbor region	V	41	ii	iii-iv	i	iv, v (rabbits camels), vii

¹Appendix B, key f; ²Appendix C, rank 2; ³Appendix C, rank 3; ⁴Appendix C, rank 1; ⁵Appendix B, key e

Species at risk

Fauna

Species	Status	Condition ¹	Trend ²	Reliability ³	Threatening Processes ⁴
SCHEDULE 1: RARE/LIKELY TO BECOME EXTINCT, DIV 1 (MAMMALS)					
<i>Sminthopsis psammophila</i>	V	ii	ii-iii	iii	v (cats, foxes), vii
<i>Notoryctes typhlops</i>	V	ii	vi	ii	v (cats, foxes), vii
SCHEDULE 1: RARE/LIKELY TO BECOME EXTINCT, DIV 2 (BIRDS)					
<i>Polytelis alexandrae</i>	V	ii-iii	vi	ii	v (cats, foxes), vii

¹Appendix C, rank 2; ²Appendix C, rank 3; ³Appendix C, rank 1; ⁴Appendix B, key e

Declared rare and priority flora

Species Name	Status	Condition ¹	Trend ²	Reliability ³	Threatening Processes ⁴
Priority 1					
<i>Eremophila attenuata</i>	1	Unknown	vi	ii	iv, v (rabbits), vii, vi

¹Appendix C, rank 2; ²Appendix C, rank 3; ³Appendix C, rank 1; ⁴Appendix B, key e

Analysis of appropriate management scenarios

Reservation priorities of ecosystems

Beard Veg Assoc	Ecosystem Description	IUCN I-IV	Non IUCN Reserve	CALM Purchased Lease	Priority
18	Low woodland; mulga (<i>Acacia aneura</i>)				L
20	Low woodland; mulga mixed with <i>Allocasuarina cristata</i> & <i>Eucalyptus</i> sp (e6?)	X			L
24	Low woodland; <i>Allocasuarina cristata</i>				L
84	Hummock grasslands, open low tree & mallee steppe; marble gum & mallee (<i>Eucalyptus youngiana</i>) over hard spinifex <i>Triodia basedowii</i> between sandhills				L
85	Hummock grasslands, open low tree & mallee steppe; marble gum & mallee (<i>Eucalyptus youngiana</i>) over hard spinifex on sandplain	X			L
110	Hummock grasslands, shrub steppe; red mallee over spinifex <i>Triodia scariosa</i>	X			L
120	Succulent steppe with open low woodland; mulga & sheoak	X			L
122	Succulent steppe with open low woodland; <i>Acacia papyrocarpa</i> over saltbush & bluebush,	X			L
125	Bare areas; salt lakes				L
239	Hummock grasslands, open medium tree & mallee steppe; marble gum (<i>E. gonglocarpa</i>) & mallee (<i>Eucalyptus youngiana</i>) over hard spinifex <i>Triodia basedowii</i> between sandhills				L
251	Low woodland; mulga & <i>Allocasuarina cristata</i>	X			L
289	Succulent steppe; saltbush & bluebush				L
441	Succulent steppe with open low woodland; mulga & sheoak over bluebush	X			L
442	Low open woodland; mulga & <i>Allocasuarina cristata</i>	X			L
540	Succulent steppe with open low woodland; sheoak over saltbush	X			L
676	Succulent steppe; samphire	X			L
1241	Succulent steppe; bluebush				L
1271	Bare areas; claypans	X			L
4623	Succulent steppe with low woodland; <i>Acacia papyrocarpa</i> over bluebush	X			M

Subregional constraints in order of priority (see Appendix B, key g)

Other Subregional Constraints: These are primarily resource related in terms of management and research.

Competing Landuses: In particular prospective exploration and mining leases. Aboriginal Land Agreement (Spinifex) will in all likelihood work in favor of biodiversity conservation. There is a small area of pastoral leases in southwestern corner of subregion.

Bioregional and subregional priority for reserve consolidation

Overall 16% of Nullarbor bioregion is reserved in IUCN I-IV reserves and the bioregion is reservation Class 5 (see

Appendix D, and Appendix C, rank 4). At the subregional scale NUL1 has 36% of its area in IUCN I-IV reserves while NUL2 has 4.7%. An IBRA reservation class of 5 is appropriate for NUL1.

Reserve management standard

The reserve management standard for NUL1 is (ii) Fair (see Appendix C, rank 5). This indicates that biodiversity values and or management issues poorly identified and some resource degradation is occurring though retrievable. Wildfire management is non-existent, mining exploration activities are supervised and the impact of feral herbivores is unknown. Some grazing is done by domestic stock.

Class	Purpose	Name	Category	Reserve Management Rank ¹
A	Conservation of Flora and Fauna	Plumridge Lakes Nature Reserve	Nature Reserve	ii-iii
A	Conservation of Flora and Fauna	Great Victoria Desert Nature reserve	Nature Reserve	ii-iii

¹Appendix C, rank 5

Off reserve conservation

Priority species or groups

Species	Specific Recovery Plan	General Recovery Plan
<i>Polytelis alexandrae</i>	No	Action Plan for Australian Birds
<i>Notoryctes typhlops</i>	No	Action Plan for Australian Marsupials and Monotremes
<i>Sminthopsis psammophila</i>	Yes – RP in South Australia (Churchill, 2001)	Action Plan for Australian Marsupials and Monotremes

Appropriate species recovery actions

Fire management (ix) is needed in NUL1 to reduce the impact of large intense, summer wildfires on habitat and

fauna populations. Further research (xii) required to determine species status, distribution and gain-increased knowledge of subregion. Feral animal control (vii) would assist with extant CWR species recovery.

Species	Recovery Actions ¹	Recovery Descriptions
<i>Polytelis alexandrae</i>	vii, ix, xii	Feral predator control important, further research into species ecology and habitat requirements is needed. Fire management may be necessary.
<i>Notoryctes typhlops</i>	iii, vii, ix, xii	Habitat protection on other state lands, further research into the species ecology. Feral predator control and fire management are important.
<i>Sminthopsis psammophila</i>	iii, vii, ix, xii	Habitat protection on other state lands, further research into the species ecology. Feral predator control and fire management are important.

¹Appendix A, key h.

Ecosystems and existing recovery plans

Ecosystem	Specific Recovery Plan	General Recovery Plan
Wetlands of the Nullarbor region	No	No
Troglobites	No	No

Appropriate ecosystem recovery actions

Ecosystem	Recovery Actions ¹	Recovery Descriptions
Wetlands of the Nullarbor region	i, iii, vii, xii	Habitat retention through reservation and protection on other state lands, further research and feral animal control.
Troglobites	xii, i, ii	Further research into species ecology, and habitat retention and protection on other lands.

¹Appendix A, key h.

Subregion priority for off reserve conservation

The subregional priority for off park conservation is (iv) (see Appendix C, rank 6), which indicates that limited off park measures required, as a high percentage of NUL1 is in IUCN I-IV reserves. Mineral exploration and possible mine establishment and pastoral leases are considered the main conflicting land uses.

Conservation actions as an integral part of NRM

Existing NRM actions

Industry Codes of Practice: Mining industry and pastoral industry.

Integration With Property Management Planning, Catchment Planning and Landcare.

Feasible opportunities for NRM

Legislation: Including duty of care for leasehold and other lands

Institutional Reform: Expansion of existing institutional reform.

Threat Abatement Planning as Part of NRM: e.g. Vegetation and threatened species management plans, pest management, and fire management plans.

Capacity Building Required With Community, Landholders, Industry and Institutions.

Impediments or constraints to opportunities

A number of impediments exist including the Land Administration Act, Pastoral Land Boards activities and the negotiations with the Spinifex Land Agreement people. Conservation Through Reserves (CTR) is limited through mining leases and tenements. There is a need to increase awareness of conservation values through education of various industries (mining, pastoral) and the public in general. Limited financial resources are also a major constraint.

Subregions where specific NRM actions are a priority to pursue

The subregional NRM priority for NUL1 is (iv) (see Appendix C, rank 7), indicating NRM instruments are in place with some achieved biodiversity outcomes.

Data gaps

Gaps in data needed for the identification of biodiversity values and management responses

Prior to the Bioregional survey in 1984 no comprehensive biological study of the Eucla Basin had ever been undertaken. Other Nullarbor work had been largely opportunistic or focused on individual species or taxonomic groups.

Vegetation and Regional Ecosystem Mapping: Vegetation mapping is at the 1:1 000 000 scale (Beard 1975a). Regolith mapping is available (Hamilton, Victoria) for Nullarbor bioregion. Regional survey of flora and vertebrate fauna for bioregion has been published, but is based on very sparse sampling. Extra vegetation site data has been collected during 2002 by the South Australian Department of Environment and Heritage for the preparation of 1:100 000 scale maps (not yet available).

Systematic Fauna Survey: Data is confined to vertebrates and is sparse. Bioregion survey had 80 quadrats across bioregion (WA and SA), including 10 in NUL1 in WA only. Quadrats only positioned on discrete vegetation units and surface types with more widespread land units replicated. All quadrats were sampled twice, Spring and Autumn 1984 (4 days and nights each sampling).

Floristic Data: Data is general and knowledge is incomplete. Bioregion survey had 80 quadrats across bioregion (WA and SA), including 10 in NUL1 in WA only. Quadrats only positioned on discrete vegetation units and surface types with more widespread land units replicated

Ecological and Life History Data: There is little data on habitat requirements of virtually all invertebrate species, most ephemeral plants, persisting CWR mammals and uncommon vertebrate and plant species. There is no

data to provide regional context on life history (including population trend) of any species apart from rabbits. Gilfillan (1999) provides some insight into rabbit population trend, albeit from two survey sites.

Other Priority Data Gaps Include:

- No quantitative data on the affect of exotic predators, weed colonisation, fire.
- No quantitative data for feral herbivores other than rabbits.

Sources

References cited

No.	Author	Date	Title	Publication Details	Pub. Type
298	Garnett, S.T. and Crowley, G.M.	(2000).	The Action Plan for Australian Birds.	Environment Australia, Canberra.	R
483	Maxwell, S., Burbidge, A.A. and Morris, K. (eds).	(1996).	The 1996 Action Plan for Australian Marsupials and Monotremes. Wildlife Australia Endangered Species Program Project Number 50.	Environment Australia, Canberra.	R
172	Churchill, S.	(2001b).	Survey and Ecological study of the Sandhill Dunnart, <i>Sminthopsis psammophila</i> at Eyre Peninsula and the Great Victoria Desert.	National Parks and Wildlife SA.	R
231	Department of Conservation and Land Management	(1994b).	Goldfields Region Management Plan 1994-2004. Management Plan No. 27.	Department of Conservation and Land Management.	R
064	Beard, J.S.	(1975a).	Vegetation Survey of Western Australia - Nullarbor 1:1000000 Vegetation Series Explanatory Notes to Sheet 4.	University of Western Australia Press. Perth.	O
306	Gilfillan, S.	(1999).	Monitoring the impacts of changed rabbit numbers due to Rabbit Calicivirus Disease on native fauna and vegetation in the Stirling Range, Western Australia.	Department of Conservation and Land Management. National Rabbit Calicivirus Monitoring and Surveillance Program.	R

R = Report; J = Journal article; O = Other.

Other relevant publications

See reference numbers 040, 075, 081, 090, 098, 101, 166, 171, 181, 208, 241, 268, 271, 278, 370, 417, 507, 508, 519 and 673 in Appendix A.