



South Australian Arid Lands Biodiversity Strategy



Volume 2 Channel Country Conservation Priorities

SOUTH AUSTRALIAN ARID LANDS NATURAL RESOURCES MANAGEMENT REGION

A partnership between

**The Department for Environment and Heritage and
South Australian Arid Lands Natural Resources Management Board**



Australian Government



Government
of South Australia

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Introduction

The **South Australian Arid Lands Biodiversity Strategy** has been developed by the South Australian Arid Lands Natural Resources Management Board (SAAL NRM Board) and the South Australian Department for Environment and Heritage (DEH).

The South Australian Arid Lands Natural Resources Management Region covers over 520,000 km², almost 53% of the State. The landscapes and biodiversity of this huge area are diverse and complex. Planning for biodiversity conservation at such large scales requires a landscape-based system of classifying the land. The classification system used for this strategy is the Interim Biogeographic Regionalisation for Australia (IBRA) regions. The IBRA bioregions of the SAAL NRM region are the Stony Plains, Flinders Lofty Block, Broken Hill Complex, Channel Country, Simpson–Strzelecki Dunefields, Finke and Gawler.

The Strategy consists of six documents. Volume one is the South Australian Arid Lands Natural Resources Management Region Biodiversity Strategy: Region-wide Priority Actions. It identifies the region-wide goal for biodiversity conservation and sets resource condition targets that will enable us to measure our success in achieving this goal, and details a comprehensive suite of management action targets and strategies that must be implemented regionally to achieve this goal.

The five bioregional documents are separate volumes, and identify conservation priorities for each of the bioregions in the South Australian Arid Lands. These are:

- *Volume 2 Channel Country Conservation Priorities*
- *Volume 3 Flinders and Olary Ranges Conservation Priorities*
- *Volume 4 Gawler Conservation Priorities*
- *Volume 5 Sandy Deserts Conservation Priorities*
- *Volume 6 Stony Plains Conservation Priorities*

This document, **South Australian Arid Lands Biodiversity Strategy - Volume 2 Channel Country Conservation Priorities** has two sections. Section one describes the bioregion's natural attributes, land uses and the major threats to biodiversity. Section two sets out the priority actions for biodiversity conservation for the bioregion over the next five years. This document is one of five bioregional biodiversity strategies that, together, contribute to the South Australian Arid Lands Biodiversity Strategy.

The conservation priorities described here have been identified in the SAAL portion of the Channel Country bioregion. The Channel Country bioregion is in the north-eastern corner of the State, extending into Queensland, New South Wales and the Northern Territory.

Bioregional framework

The Interim Biogeographic Regionalisation of Australia (IBRA) establishes a hierarchy of ecosystem classification for which the physical, climatic and biological characteristics are described.

Bioregions:

are continental scale (1:1,000,000) ecosystems that range in size from one to 20 million hectares. They are distinguished from adjacent regions by their broad physical and biological characteristics. They may include more than 30 landforms and 50 vegetation associations. Seven bioregions, or parts thereof, occur in the SAAL NRM Region.

Subregions:

are sub-continental scale (1:500,000) ecosystems that range in size from 100,000 to seven million hectares. They occur within IBRA bioregions and may include up to 15 landforms and 30 vegetation associations.

Landsystems:

are regional scale (1:250,000) ecosystems that range in size from 2,000 to five million hectares. They occur within IBRA subregions and may include up to five landforms and 10 vegetation associations.

Vegetation communities:

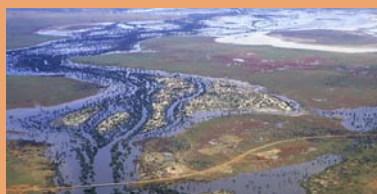
are local scale (1:100,000) ecosystems that range in size from five to 5,000 hectares and are based on a single landform and vegetation community.



Continental ecosystem:

Channel Country IBRA – Extensive drainage system of low topographic relief with extensive floodplains that criss cross stony plains and dunefields, draining into Lake Eyre.

IBRA Bioregion
Continental Ecosystem
1:1,000,000



Sub-continental ecosystem:

Coongie IBRA subregion – Parallel dune system with periodically flooded interdune flats and Cooper and Strzelecki Creeks, which flow through dunefields with periodically flooded interdune flats.

IBRA Subregion
Sub-continental Ecosystem
1:500,000



Regional ecosystem:

Cooper landsystem – Watercourses, floodplains, and ephemeral lakes which flow through sand dunes of varying mobility.

Landsystem
Regional Ecosystem
1:250,000



Local ecosystem:

Local ecosystem: River Red Gum woodland over chenopods and ephemeral herbs on the Cooper Creek

Vegetation Community
Local Ecosystem
1:100,000

Who is this strategy for?

This strategy is designed to address the needs of three main stakeholder groups:

- The SAAL NRM Board, Government and other investors
- Scientists, technicians, and NRM support staff
- Land managers

SAAL NRM Board, Government and other investors

The focus audience for this strategy is the SAAL NRM Board, State and Federal Government Departments with responsibility for biodiversity conservation, and other organisations currently investing, or wishing to invest, in conserving the biodiversity of the South Australian Arid Lands. The 20-year targets represent clear statements of intent about biodiversity conservation priorities in the Channel Country and how they will be managed. Monitoring and evaluating progress against the identified performance criteria will contribute to regional reporting on biodiversity conservation efforts.

The 5-year actions provide specific direction for targeting investment. In most instances, the actions can be implemented as new projects, or as part of existing projects currently undertaken by the SAAL NRM Board, Government Departments and other stakeholders.

Responsibility for delivering each action has not been detailed. Ultimately, the SAAL NRM Board and Government are responsible for the ongoing process of working with other stakeholders to deliver each action.

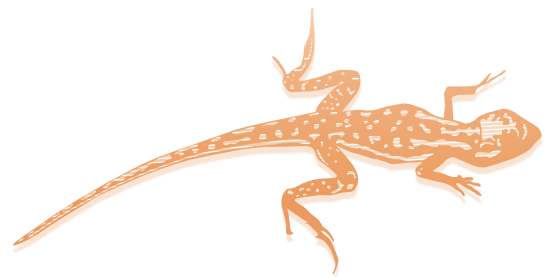
Scientists, technicians and NRM support staff

The strategy also has two main uses for biologists, ecologists, NRM support staff and others involved in biodiversity conservation and NRM projects and programs.

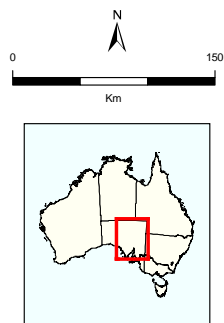
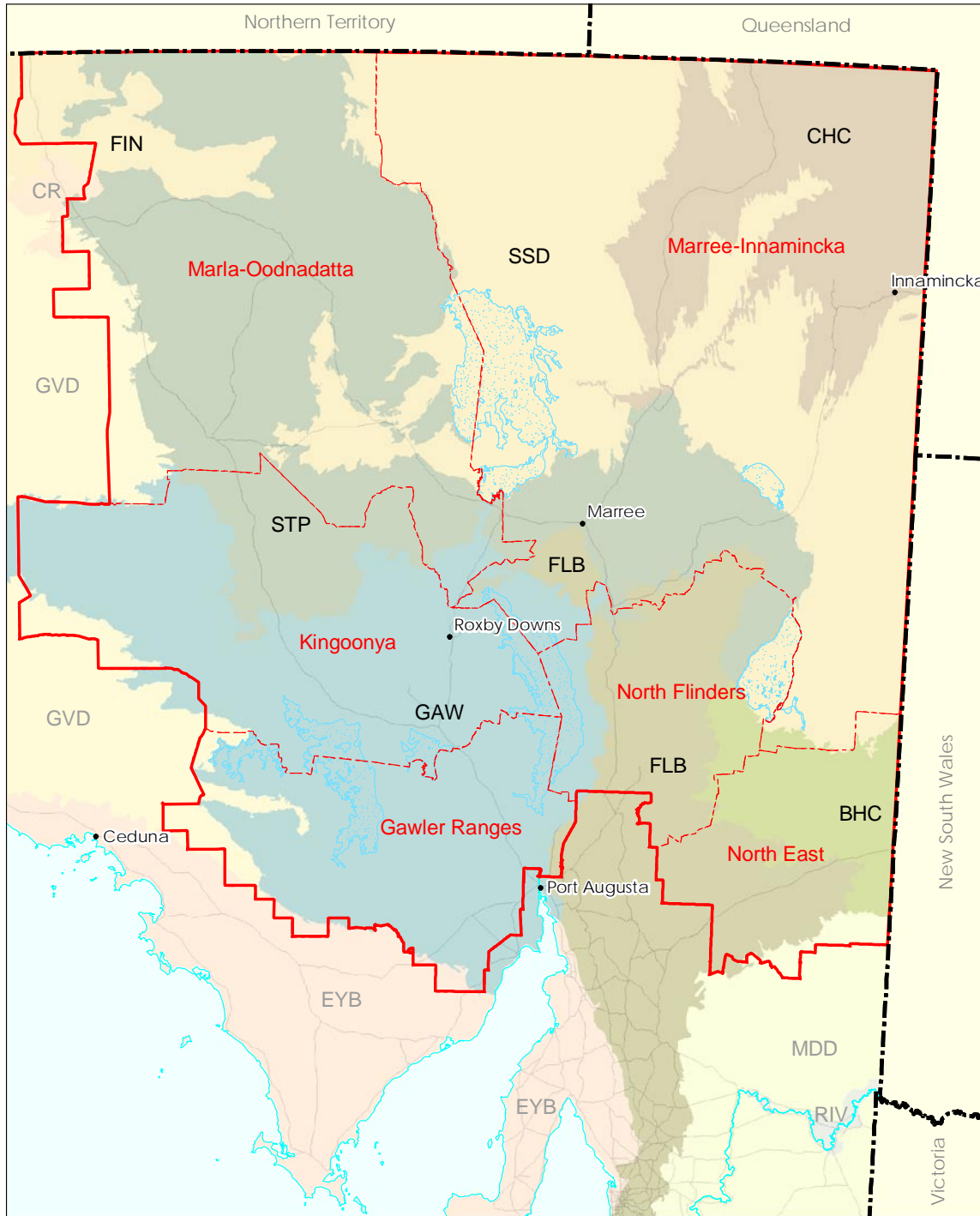
1. It provides a set of priorities for biodiversity conservation in the Channel Country. Technical staff can confidently structure existing or new projects to deliver the actions identified for each conservation priority.
2. It identifies practical strategies for direct involvement by land managers. Technical staff can use these strategies to structure and develop engagement and extension programs to build capacity of land managers to achieve effective biodiversity conservation goals.

Land managers

For the land managers of the Channel Country, this document clearly sets out the biodiversity conservation priorities for the bioregion, and describes the activities that need to be undertaken to address these priorities. The document also suggests practical strategies and actions that land managers can undertake as part of their day-to-day operations to maintain and improve biodiversity.



South Australian Arid Lands NRM region – IBRA bioregions



Bioregion

- | | | |
|----------------------------|-------------------------------------|--|
| Broken Hill Complex (BHC) | Gawler (GAW) | South Australian Arid Lands NRM Region |
| Channel Country (CHC) | Great Victoria Desert (GVD) | South Australian Arid Lands NRM Group Boundary |
| Central Ranges (CR) | Murray Darling Depression (MDD) | Salt Lake |
| Eyre Yorke Block (EYB) | Riverina (RIV) | Major Road |
| Finke (FIN) | Simpson-Strzelecki Dunefields (SSD) | State Border |
| Flinders Lofty Block (FLB) | Stony Plains (STP) | Locality |



SECTION 1

CHANNEL COUNTRY DESCRIPTION

IBRA subregions

Major landforms

Major land uses

Threats to biodiversity



Photo: Dingo *Canis lupus dingo*



Channel Country description

Covering an area of 51,745 km² of South Australia, the Channel Country bioregion represents 5.3% of the State.*

The Channel Country bioregion forms part of the catchment area for the Lake Eyre Basin (LEB), the world's largest internal drainage system. The LEB covers about 1,200,000 km², almost one-sixth of Australia. Lake Eyre itself, in the adjoining Simpson–Strzelecki Dunefields bioregion, is the fifth largest terminal lake in the world. Whilst the Channel Country is dominated by extensive drainage systems, it is to all intents and purposes, a desert except in good seasons.

The dominant landscape features that give the region its name are the two huge drainage systems that enter South Australia from the north and north-east; the Georgina–Diamantina and the Cooper systems. Their catchments extend hundreds of kilometres into Queensland and the Northern Territory and their flows are largely dependent on rainfall in these faraway parts of the country. The Georgina–Diamantina's multiple intertwining small stream channels and flood courses spread to form the ephemeral Goyder Lagoon before recombining into the narrow flood courses and channels of the Warburton and Kallakoopah Creeks that eventually feed into Lake Eyre. Cooper Creek enters South Australia as another 'braided stream' and spreads through the shallow Coongie Lakes system and large flood-outs between the dunes north of the Strzelecki Desert. It forms a single, defined channel below Lake Hope, and stays this way for most of the remaining distance to Lake Eyre. When floods are large enough, waters spread and follow broad and shallow floodplains through the gibber country toward Lake Eyre. The Coongie Lakes wetland system is the only major unpolluted, unregulated freshwater system in arid Australia. The wetlands change depending on the amount of rainwater flowing down from the north. In extreme flood conditions this north-east corner of the State is transformed into a huge expanse of interconnected lakes and wetlands, unimaginable after it dries out.

The Channel Country is, however, much more than just extensive floodplains and braided watercourses, or channels as the name suggests. The two major drainage features that give the Channel Country its name are separated by the equally extensive gibber plains, low hills and mesas of the Lamamour Plateau in the north and Sturts Stony Desert further south. The vast dunefields and sand plains of the Strzelecki, Tirari and Simpson Deserts, supporting low shrubs, grasses and herbs to the south and west of the bioregion, also provide a sand source for the dunefields dotted throughout.

*Bioregions and subregions are the reporting unit for assessing the status of native ecosystems, their protection in the national reserve system and for use in the monitoring and evaluation framework in the Australian Government's current Natural Resource Management initiatives. The IBRA boundaries presented in this report are provisional and unpublished and will not be officially recognised until IBRA version 7 is released in 2009. Monitoring and evaluation of the Channel Country bioregion will be consistent with national guidelines and fit the national monitoring and evaluation framework.

Water is central to the survival of all living things in this harsh environment, and survival is determined by the amount, quality and availability of water for breeding. Species may need permanent fresh water for all or part of their lifecycle, or they may rely on the vegetation that grows only in places where water is more available. The variation in productivity in the bioregion is huge, and largely influenced by the ability of the soils to retain or disperse water. Particularly after rain, the gilgais and cracking clay areas in the stony plains provide unique habitats and support an unusually large number of endemic species. Adjoining areas of deep sand, on the other hand, do not retain moisture for so long and ephemeral growth dies off very quickly, but they do enable easy burrowing, providing yet another unique range of habitats.

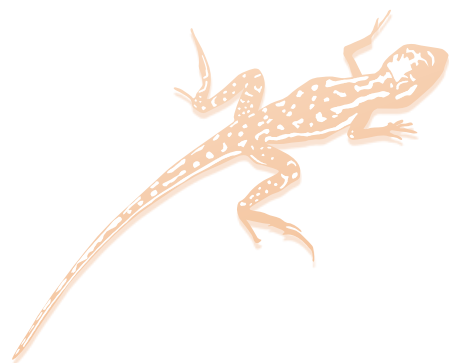


Photo: Forrester's Mouse *Leggadina forresti*



IBRA subregions

Four IBRA subregions occur within the SAAL component of the Channel Country bioregion. Detailed descriptions of the landsystems of the Channel Country bioregion can be found in the District Plan published by the Marree Soil Conservation Board.

Channel Country bioregion

Sturt Stony Desert (CHC2)

Gently undulating gibber plains supporting Mitchell Grass and Bladder Saltbush. There are occasional Lignum and Cane-grass swamps and scattered long red sand dunes covered by Sandhill Wattle or Sandhill Cane-grass.

Total Area: 22,778 km².

Landsystems: Bloodwood; Eulpa; Kachumba; Ketietoonga; Koonchera; Lamamour; Merninie and Sturts.

Diamantina–Eyre (CHC4)

The floodplains and braided streams of the Mulligan, Diamantina and Warburton, including Goyder Lagoon. There are extensive chenopod clay plains and Lignum flood-out flats and the major stream channels are lined with Coolibah.

Total Area: 9,446 km².

Landsystems: Diamantina; Ketietoonga; Koonchera; Mulligan and Warburton.

Coongie (CH6)

The Coolibah-lined watercourses, waterholes, channels, floodplains, ephemeral lakes of the Cooper and Strzelecki Creeks, and the dunefields with periodically flooded interdune flats.

Total Area: 17,331 km².

Landsystems: Cooper; Kachumba and Ketietoonga.

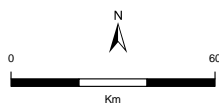
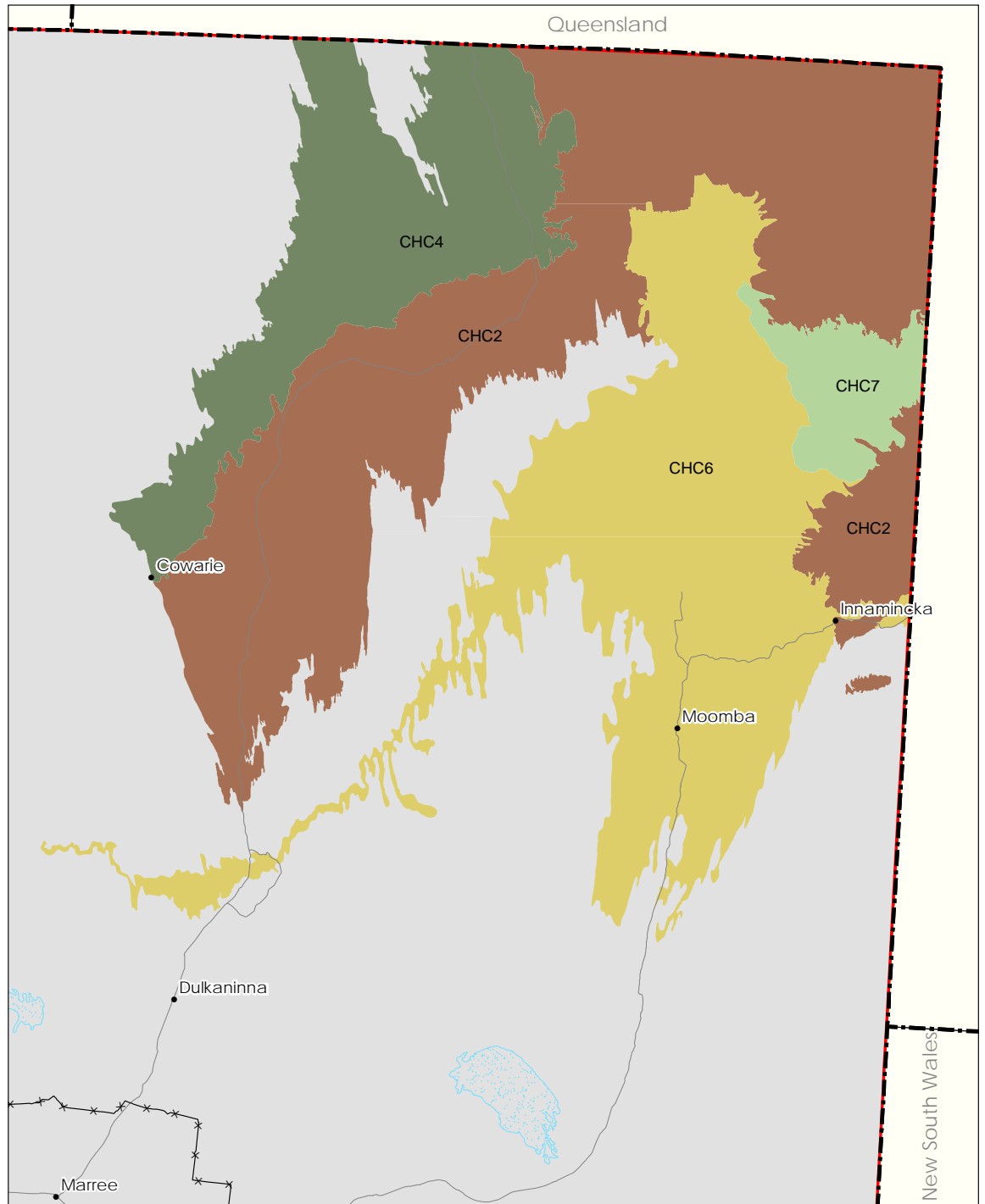
Lake Pure (CHC7)

Small, flat area north of Innamincka, dominated by Lignum and Cane-grass swamps and clay plains with numerous small clay pans, low dunes and lunettes with Sandhill Wattle, and some low sandy rises with Mulga and Dead Finish.

Total Area: 2,196 km².

Landsystems: Marcqualpie.

Channel Country – IBRA subregions



Subregion

- Sturt Stony Desert (CHC2)
- Diamantina-Eyre (CHC4)
- Coongie (CHC6)
- Lake Pure (CHC7)

- South Australian Arid Lands NRM Region
- Salt Lake
- Dog Fence
- Major Road
- State Border
- Locality



Major landforms

There are three major landforms in the Channel Country.

Wetlands, drainage lines and floodplains

Ephemeral watercourses draining towards Lake Eyre that, in places, form major drainage systems featuring broad floodplains. Characterised by the Cooper Creek, Diamantina River, Georgina River and Hay River catchments.

Subregions: CHC2; CHC4; CHC6 and CHC7.

Stony plains

Gently sloping gibber plains with a cobble sized stone cover to gibber pavements and silcrete-capped rises characterised by a dense cover of small pebbles.

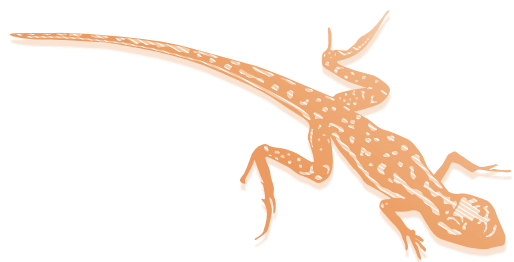
Subregion: CHC2.

Sand dunes and sand plains

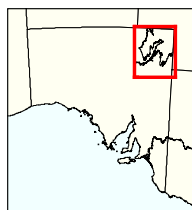
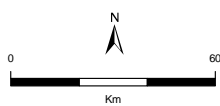
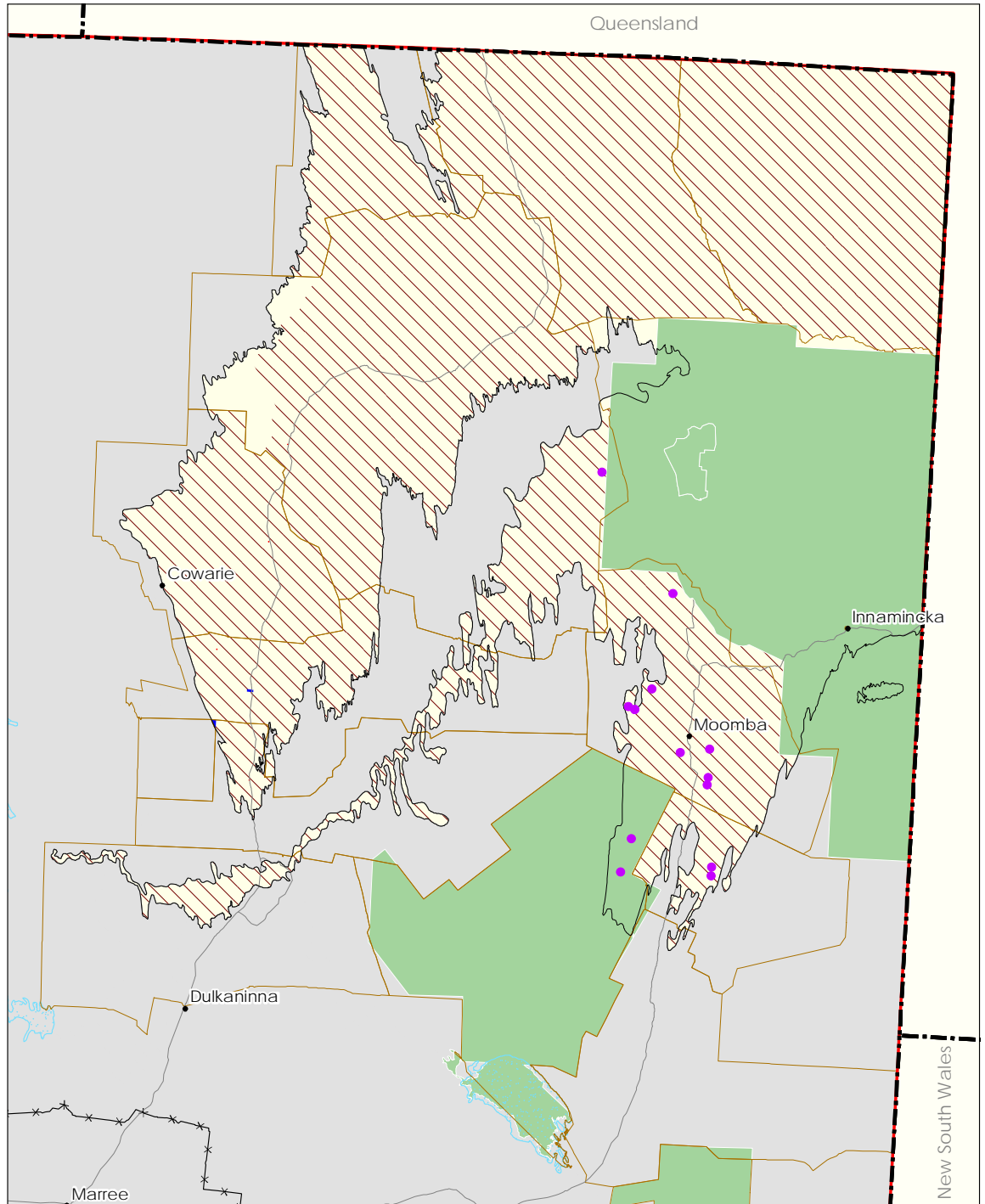
Dunefields or sand plains of varying depths may completely cover underlying stony plains or floodplain landforms. Where dune spacing is further apart, underlying soil may be exposed in the interdune areas.

Subregions: CHC2; CHC4; CHC6 and CHC7.

Conservation priorities have been grouped under each landform.



Channel Country – land use



Land use

- Pastoral Station
- Mainly Cattle
- DEH Managed Area
- Gas or Oil Field

- Channel Country Bioregion
- South Australian Arid Lands NRM Region
- Salt Lake
- Dog Fence
- Major Road
- State Border
- Locality



Major land uses

There are four major land uses in the Channel Country.

Pastoralism

The main land use within the Channel Country bioregion is cattle grazing, with the extensive flood plain areas supporting the highest densities of stock within the region. While pastoralism administered under the *Pastoral Land Management and Conservation Act 1989* covers over 75% of the region, pastoralism also occurs in both Innamincka and Strzelecki Regional Reserves.

Conservation

In the Channel Country bioregion, land dedicated solely to conservation is restricted to Coongie Lakes National Park and the Exclusion Zone at Cullyamurra Waterhole in Innamincka Regional Reserve. Both Innamincka and Strzelecki Regional Reserves are administered under a multiple use framework that enables both pastoralism and mining to be undertaken.

Tourism

The Birdsville and Strzelecki Tracks are the major tourism routes through the region. Popular destinations include Innamincka, Cooper Creek and Coongie Lakes.

Mining and petroleum

Petroleum activities are focused on the oil and gas fields of the Cooper Basin, but there is some exploration outside the basin. Exploration for minerals and geothermal also occurs in the region. Petroleum tenements including exploration and production licences cover a significant portion of the region.

Threats to biodiversity

There are many threats to biodiversity in the Channel Country. Some are specific to particular areas, or act primarily within the Channel Country, whilst others extend across multiple bioregions or jurisdictions.

The impacts of these threats also vary with time. The main threats to biodiversity in the Channel Country include:

Excessive total grazing pressure

The combined effects of excessive grazing pressure from domestic stock, feral and native herbivores.

Impact: Reduction in recruitment of some native plant species (decreasers); increase in recruitment of some unpalatable native plant species (increasers); loss of native animals due to competition for resources; reduction in habitat quality; increased soil erosion and increased spread of weeds and disease.

Alteration to natural water flows

Restrictions to natural flow and/or flooding regimes of a watercourse due to diversions or the construction of artificial flow barriers and storage areas, including seismic lines, tracks, roads, borrow pits, dams and other infrastructure.

Impact: Change in ecosystem structure; disruption of dispersal mechanisms of aquatic species; loss of refuges and increased soil erosion and salinity.

Competition for resources by pest plants and animals

Introduced fauna and flora species compete with native species for resources.

Impact: Reduction in recruitment and density of native plants and animals; change in species composition of ecosystems and potential loss of native plants and animal species.

Excessive predation

Hunting and consumption of native animals by introduced carnivores.

Impact: Change in species composition of ecosystems and potential loss of native animals.



Photo: Dune erosion

Altered fire regimes

Changes to intensity, season and frequency of fire from the previous regime under which the ecosystem evolved.

Impact: Change in ecosystem structure and habitat value and loss of local populations of plants and animals.

Fishing

Removal of native fish from wetlands.

Impact: Change in species composition of ecosystems and potential loss of native fish species.

Mechanical disturbance

Changes to the vegetation cover as a consequence of human activity that leaves the soil exposed.

Impact: Loss of habitat and reduction in habitat value for native species; increased potential spread of weeds and increased native species and increased soil erosion.

Pollution

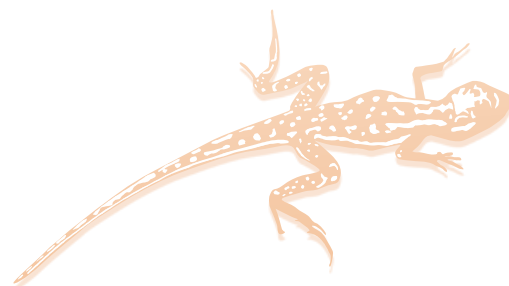
Reduction in quality of ground and/or surface water as a consequence of human activity.

Impact: Loss of native species and decline in habitat value in and surrounding waterholes.

Climate change

Changes in rainfall patterns and increase in temperature.

Impact: Reduction in the geographic range of species; changes in the location, structure and composition of habitats and ecosystems; increased risk of extinction of already vulnerable species and expansion of invasive species.





Section 2

CONSERVATION PRIORITIES

Identifying conservation priorities

Biodiversity exists at three levels - genes, species and ecosystems - and occurs at a variety of scales, from square metres to thousands of square kilometres. At each of these levels, it is necessary to identify thresholds where species, ecosystems or landscapes are recognised as priorities for targeted investment. Conservation priorities addressed by this strategy include:

Threatened species; Identified as Critically Endangered, Endangered or Vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Endemic species; Identified as occurring only within a single bioregion.

Threatened ecological communities; Identified as Critically Endangered, Endangered or Vulnerable under the Australian Government's Environment Protection and Biodiversity Conservation Act 1999, or identified in Neagle (2003) An Inventory of the Biological Resources of the Rangelands of South Australia.

Significant ecological processes; Significant ecological processes are those identified as being significant in maintaining the viability of species, communities, ecosystems or landscapes.

Other species or communities considered to be at risk but not currently listed under the Commonwealth Government's Environment Protection and Biodiversity Conservation Act 1999.

Conservation priorities have been presented within this strategy as either significant ecological processes or groupings of species and ecological communities that share a common set of conservation requirements at similar spatial scales. Individual conservation priorities have been grouped under the major landforms in the region.

Mapping conservation priorities at multiple scales

This strategy follows the method of Brandle (1998), and uses broad landform patterns to group vegetation communities and categorise the landscape. Vegetation communities, landsystems, subregions and IBRA bioregions are all categorised by the dominant landform at their respective scales. Whilst the distribution of biodiversity correlates strongly with landforms within bioregions, ecological processes, disturbance regimes and land use influence the distribution of biodiversity within the landscape.

Photo: Small Monkey-flower *Mimulus prostratus*

Landform	Conservation priority	
Drainage lines and floodplains	Significant response of water birds to water flow in the Diamantina and Cooper Creek drainage systems	Significant ecological process <ul style="list-style-type: none"> • Ecological responses to water flows in the landscape
	Important permanent and semi-permanent waterholes of the Diamantina and Cooper Creek drainage systems	Significant ecological process <ul style="list-style-type: none"> • Ecological responses to water flows in the landscape
	Threatened ecological communities on drainage lines, floodplains and swamps	Threatened ecological communities <ul style="list-style-type: none"> • Coolibah and River Red Gum woodland on regularly inundated floodplains • Old-man Saltbush on floodplains • Queensland Bluebush shrubland on cracking clay depressions subject to periodic waterlogging • Broughton Willow and Coolibah woodland along drainage lines and on floodplains
	Grey Grasswren on floodplains and swamps	Endemic fauna <ul style="list-style-type: none"> • Grey Grasswren (<i>Amytornis barbatus diamantina</i>)
Stony plains	Significant and endemic flora and fauna species on stony plains	Endemic fauna <ul style="list-style-type: none"> • Ashy Downs Skink (<i>Ctenotus astarte</i>) Nationally threatened fauna <ul style="list-style-type: none"> • Kowari (<i>Dasyercus byrnei</i>) • Fawn Hopping-mouse (<i>Notomys cervinus</i>)(pending) Nationally threatened flora <ul style="list-style-type: none"> • Pickard's Wattle (<i>Acacia pickardii</i>)
Dunefields and sand plains	Mulga low woodland on low dunes and sand plains	Threatened ecological community <ul style="list-style-type: none"> • Mulga low woodland on sand plains

Drainage lines and floodplains

The drainage systems of the Channel Country consist of complexes of waterholes, braided streams, channels, floodplains and ephemeral lakes. There are two major systems that extend from Queensland and the Northern Territory all the way to Lake Eyre, the Cooper and the Georgina–Diamantina. Water, the lifeblood of this arid region, is carried huge distances from where it falls by these extensive drainage systems. Whilst the region is dry most of the time, when in flood, enormous areas are covered by sheets of shallow water. This immense volume of water makes its way slowly down the catchment, transforming the landscape as it goes.

Goyder Lagoon, which separates the Diamantina from Warburton Creek, is an enormous area of shallow channels, alluvial flats and flood-outs. The intermittent lakes of the lower Cooper Creek flood-out and Coongie Lakes are nearly pristine wetlands and play a crucial role in the ecological and hydrological functioning of the Lake Eyre Basin. In average years, some of these lakes receive a regular flow of water from the north-west branch of the Cooper, but they can dry out almost entirely during extended drought. The presence of River Red Gums is an indication of relatively frequent flows. These wetlands are a huge mosaic of lakes, channels and interdune flood-outs, and after flood waters recede, extensive grass and herblands dominate. Lined with Coolibah trees, the lakes present an expanse of water in a desert environment. Complexes of highly diverse drainage lines and floodplains surround the wetlands. When water is present for extended periods, the lakes and open water areas are covered with mats of Duckweed and Water Primrose.

The variability of flows, rainfall and the complex floodplain landscape give rise to a huge variety of floodplain and riparian habitats that are diverse in both space and time. Coongie Lake is seldom dry, whilst other lakes in the system fill only during major floods and can remain dry for many years. During major floods, Coongie and other smaller lakes to the north gradually fill and overflow, eventually reaching Lake Hope. After Lake Hope fills, which can take up to three months, water travels rapidly to the Birdsville Track, then via a string of interconnected lakes and streams to Lake Eyre. Although the Cooper is the largest of the Lake Eyre Basin watercourses, it has flowed as far as Lake Eyre only eleven times since 1890.

Significance of drainage lines and floodplains

In 1987, part of the Cooper Creek system was proclaimed as the Coongie Lakes Wetland of International Importance under the 1971 Ramsar Convention, to which Australia is signatory and recognised by the Lake Eyre Basin Intergovernmental Agreement. While the Coongie Lakes name was the only one given, the listed area includes extensive dunefields as well as the more frequently flooded lakes and floodplains of the Cooper Creek system.

The Strzelecki Creek and Diamantina wetland systems are also listed as nationally important, the Strzelecki providing extremely important habitat for 18 raptor species of which 16 breed locally. Water bird diversity in the lower Cooper system is particularly high with 73 water bird species and another 13 wetland dependent species recorded. The wetlands also provide an important drought refuge for water bird populations. Cooper Creek and Coongie Lakes support at least 12 indigenous fish species from eight families. Only two exotic fishes have been recorded: the Goldfish (*Carassius auratus*) and the Plague Minnow (*Gambusia holbrooki*).

The Coongie Lakes area is a feeding ground, spawning ground, nursery and migration path for most of the indigenous Cooper Creek fishes. The wetland also contains a morphologically distinct form of freshwater turtle (*Emydura* sp.). The Red-naped Snake (*Furina diadema*), Woma Python (*Aspidites ramsayi*) and Black-headed Goanna (*Varanus tristis*) all have an uncertain abundance and small or sparse range. Not only are the wetlands and drainage areas important and unique habitat in an arid area, but they also provide protection and breeding areas for species that feed and forage in the less hospitable surrounding areas.



Major vegetation communities

Woodland

River Red Gum (*Eucalyptus camaldulensis*) woodland over +/- Elegant Wattle (*Acacia victoriae*) +/- Broughton Willow (*Acacia salicina*) and chenopods and ephemeral herbs on the Cooper Creek.

Coolibah (*Eucalyptus coolabah*), River Cooba (*Acacia stenophylla*) +/- Broughton Willow (*Acacia salicina*) low woodland over Lignum (*Muehlenbeckia florulenta*) and chenopods and ephemeral herbs on major drainage lines.

Coolibah (*Eucalyptus coolabah*) low woodland over Lignum (*Muehlenbeckia florulenta*), Tangled Poverty Bush (*Sclerolaena intricata*) and Rat's Tail Couch (*Sporobolus mitchellii*) and Spiny Flat-sedge (*Cyperus gymnocaulos*) on intermittent drainage lines and their floodplains.

Shrubland

Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*) and Lignum (*Muehlenbeckia florulenta*) low open shrubland over Cotton Bush (*Maireana aphylla*) and Queensland Bluebush (*Chenopodium auricomum*) with emergent Coolibah (*Eucalyptus coolabah*) and River Cooba (*Acacia stenophylla*) in minor drainage lines and non-saline swamps.

Lignum (*Muehlenbeckia florulenta*) tall shrubland with Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*) or Queensland Bluebush (*Chenopodium auricomum*) and chenopod shrubs and ephemeral herbs with emergent Coolibah (*Eucalyptus coolabah*) in minor drainage lines and non-saline swamps.

Cottonbush (*Maireana aphylla*) +/- Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*) +/- bladder Saltbush (*Atriplex vesicaria*) low open shrubland over Neverfail (*Eragrostis setifolia*) and Mitchell Grass (*Astrelba pectinata*) and Bindyi (*Sclerolaena* spp.) on flood-outs and run-on areas.

Queensland Bluebush (*Chenopodium auricomum*) and Lignum (*Muehlenbeckia florulenta*) open shrubland over Bindyi (*Sclerolaena* spp.) and ephemeral herbs with emergent Coolibah (*Eucalyptus coolabah*) in run-on areas and shallow swamps.

Samphire (*Tecticornia indica* ssp. *leiostachya*) Rat's Tail Couch (*Sporobolus mitchellii*) and Spiny Flat-sedge (*Cyperus gymnocaulos*) very low shrubland in saline depressions.

Tangled Poverty Bush (*Sclerolaena intricata*) very low open shrubland on floodplains.

Grassland

Swamp Cane-grass (*Eragrostis australasica*) +/- Lignum (*Muehlenbeckia florulenta*) tall grassland over chenopod shrubs, grasses and Bindyi (*Sclerolaena* spp.) in non-saline swamps.

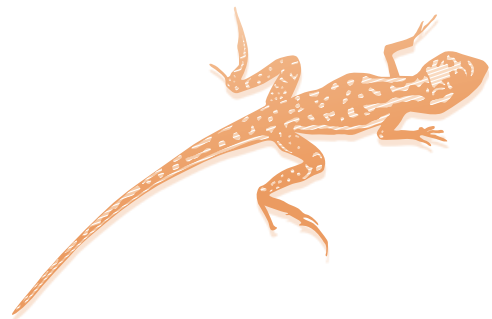
Rat's Tail Couch (*Sporobolus mitchellii*) low grassland in shallow, slightly saline swamps.

Ramsar Wetlands

Ramsar Wetlands are internationally recognised wetlands that have been specifically designated on the List of Wetlands of International Importance under the Ramsar Convention. Wetlands achieve this status by undergoing a comprehensive evaluation process, endorsement by both the State and Federal Australian governments, and acceptance by the Ramsar Secretariat, Switzerland. Coongie Lakes Ramsar Wetland meets eight of the 13 Ramsar selection criteria.

The purpose of designating a wetland under the Ramsar Convention is often misunderstood. The goal of Ramsar is to ensure the ecological character of a wetland does not change as a function of its use. They are not 'no-go' zones, but allow for development that can be shown to be ecologically sustainable in the long term. They are an important opportunity to demonstrate that resource use and biodiversity conservation are complementary activities.

Coongie Lakes Ramsar Wetland provides fundamental ecosystem services, such as the regulation of water regimes and source of biodiversity at all levels – species, communities and ecosystems. It is also important for its economic, cultural and recreational values. By ensuring the ecological character of Coongie Lakes Wetland is maintained, we are preserving these values for generations to come.



Managing the biodiversity of drainage lines and floodplains – practical ways that land managers can help

The main driver of biological activity in the arid areas is water. When the amount or intensity of rainfall over the Channel Country results in water runoff, surface water converges into drainage lines and, eventually, if the flows are large enough, onto floodplains. Flood events must be managed according to the origins of the rainfall. Local rain and subsequent flooding will provide grazing potential different from that of flood events triggered by rainfall away from the drainage lines in the upper reaches of the catchment.

Drainage lines and floodplains are often the focus for pest plant species, camping and grazing pressure from native and introduced herbivores. These pressures contribute to the suppressed recruitment of perennial shrub and tree species, and negative impacts on waterhole wildlife through increased quantities of pollutants and accelerated water use.

Practical strategies that land managers can use on drainage lines and floodplains to help retain biodiversity include:

- Grazing intensity should be dependent on the type of flooding event. Local floods resulting from local rainfall will trigger a different vegetation response to flood events from rainfall in the upper catchment.
- After heavy rains or flooding, manage total grazing pressure to promote recruitment, seed set and enable vegetation to establish.
- Manage total grazing pressure.
- Fencing to separate productive floodplain areas from adjacent sandier country.
- Maximise vegetation cover to help slow water runoff and promote water infiltration after rains. This has other flow-on benefits including:
 - Increased vegetation cover assists water infiltration and nutrient cycling,
 - Greater infiltration of water into the soil increases plant growth and biodiversity,
 - Increased vegetation cover protects the soil from erosion and reduces sediment in runoff waters,
 - Lower flows along drainage lines are less likely to scour and erode banks of watercourses.
- Control feral herbivores and pest plants, in collaboration with neighbours and the SAAL NRM Board.



Conservation priority

Significant response of water birds to water flow in the Diamantina and Cooper Creek drainage systems

The ecology of the Channel Country is principally driven by the size, duration and frequency of water flows in the Lake Eyre Basin (LEB) drainage system. Surface water flows are essential for many aquatic and terrestrial species to complete their life cycles and disperse throughout the landscape. The size and duration of the water pulse through these extensive drainage systems determines the initiation, number and size of recruitment events and levels of dispersal. Adequate water flows are essential in maintaining the productivity of drainage lines and floodplains for both pastoral production and for the many species that rely on this habitat.

The wetlands of the Channel Country bioregion provide habitat for over 175 bird species. More than 80 of these are water birds and over half of these are known to breed in the region. Water birds may travel great distances to opportunistically exploit the availability of resources and depart when these resources decline, whilst other individuals and species may become permanent residents on refuge water bodies.

The river systems of the Channel Country are characterised by extreme flow variability. The timing of water flows, structure of the landscape and salinity, all interact to shape the ecological processes and responses of the system. Water flows, irrespective of size and duration, act to reconnect species that become disconnected during the dry times. This creates a diverse mosaic of habitats, which is important for the aquatic, terrestrial and migratory species.

Extraction and diversion of water from this system reduces the frequency and quantity of water these areas receive and store. In addition, the maintenance of important breeding and roosting sites, such as Lignum (*Muehlenbeckia florulenta*) and large trees is important for the maintenance of habitat diversity.

The pattern of wetlands at different stages of the wetting and drying cycle largely determines the number and abundance of water birds in the Channel Country at any given time. Determining the relative ecological importance of different wetlands under various flow regimes is an essential first stage in assessing any future development in the catchment.

20-year target

The maintenance of the significant response of water birds to water flow in the Diamantina and Cooper Creek drainage systems.

5-year performance information

- Wetland habitat utilisation by water birds.

5-year actions

- Map area, location and persistence of wetlands in the Channel Country bioregion.
- Develop and test a predictive model of wetland utilisation by water birds under various flow regimes.
- Undertake audit of infrastructure that limits environmental flows in the Channel Country bioregion and reduce its impact.
- Support land managers to improve the ecological response of wetlands to water flows in controlling feral animals and promoting appropriate pastoral management.

Photo: Yellow-billed Spoonbill *Platalea flavipes* (J. Reid)

Conservation priority

Important permanent and semi-permanent waterholes of the Diamantina and Cooper Creek drainage systems

There are four major clusters of semi-permanent water bodies in the region; the Cullyamurra area on Cooper Creek, Coongie Lakes, Goyder Lagoon and several water bodies associated with the Kallakoopah Creek. Waterholes that retain water for shorter periods may also function as seasonal refuges. Refuge water bodies are those that persist for at least 19–24 months without receiving flood water. Generally, with the extreme evaporation rates, these water bodies need to be over three metres deep. Their refuge function is largely determined by salinity, physical structure and time since the last regional flow.

Waterholes in the Channel Country are generally very turbid, and much of their organic productivity occurs in a band of algae that forms on their shallow margins. Disturbance of this algal ring by uncontrolled stock or rapid changes in water level can lower productivity for many days before it recovers. Further work is required to quantify disturbance impacts on the ecological function of waterholes.

Waterholes, with their complex riparian areas, also provide essential habitat for water dependent terrestrial species such as Water Rats (*Hydromys chrysogaster*) and Carpet Pythons (*Morelia spilota*) that rely on the food sources provided by riparian habitats and permanent water.

In the drier times, the permanent and semi-permanent waterholes become increasingly important, not only as a pastoral resource but also as refuge areas. Introduced plants and animals, and more recently tourism have resulted in a range of threatening processes, including water pollution, predation, excessive total grazing pressure, competition for resources and mechanical disturbance. These processes affect the native species that rely on these habitats. They enable many species to survive through extreme drought and provide sources for recolonisation of potential habitats when conditions improve. All major drainage lines contain significant waterholes, but while our knowledge of in-stream processes is improving, little is known about their individual biodiversity values. Further work is required to identify these values, and to develop management strategies, in conjunction with land managers, to maintain or improve these values.

20-year target

The maintenance and improvement of biodiversity values of permanent and semi-permanent streams and waterholes.

5-year performance information

- Number of permanent and semi-permanent waterholes managed for biodiversity values.

5-year actions

- Establish criteria for scoring condition of permanent and semi-permanent waterholes.
- Undertake biological surveys and identify biodiversity values, and prioritise permanent and semi-permanent waterholes along drainage lines.
- Identify the extent and intensity of threatening processes reducing biodiversity values of permanent and semi-permanent waterholes.
- Identify and implement support mechanisms to assist land managers to maintain and improve biodiversity values of priority permanent and semi-permanent water holes.
- Undertake targeted restoration of permanent and semi-permanent waterholes based on condition, biodiversity value and linkage requirements.

Conservation priority

Threatened ecological communities on drainage lines, floodplains and swamps

Four threatened ecological communities occur on the floodplains of the Channel Country bioregion:

- Coolibah (*Eucalyptus coolabah* ssp. *arida*) and River Red Gum (*E. camaldulensis*) woodland on regularly inundated floodplains.
- Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*) on floodplains.
- Queensland Bluebush (*Chenopodium auricomum*) shrubland on cracking clay depressions subject to periodic waterlogging.
- Broughton Willow (*Acacia salicina*) and Coolibah (*Eucalyptus coolabah* ssp. *arida*) ± Bauhinia (*Lysiphyllum gilvum*) woodland along drainage lines and on floodplains.

Broughton Willow and Coolibah woodland is restricted primarily to the Channel Country bioregion within South Australia, while all other communities are present in riverine environments across far north South Australia. These communities often co-occur, or intergrade, along an inundation frequency and soil moisture gradient. Coolibah and River Red Gum woodland often occurs in lineaments along watercourses or in areas that retain water for a long time. Broughton Willow and Coolibah woodland tends to fringe minor river channels and extend out onto adjacent floodplains. Both Old-man Saltbush and Queensland Bluebush shrublands occur as understorey or may form dense stands on floodplains and swamps.

Floodplains are critical to the viability of all pastoral enterprises. Total grazing pressure, particularly historically, has been heavier in these more productive areas and has resulted in greater alteration of the natural environment than in the surrounding higher ground. Alterations to natural water flows have, in some areas, contributed to a reduction in habitat quality, a reduction in recruitment of native species and an altered plant community. The primary threat to these ecological communities is habitat modification associated with total grazing pressure. The implementation of conservative stocking strategies and feral animal control programs will significantly improve the resilience of these systems, enabling vegetation and fauna to respond better to even minor localised flows.

20-year target

The maintenance or improvement of the viability of threatened ecological communities on drainage lines, floodplains and swamps in the Channel Country.

5-year performance information

- Percentage of potential area occupied by threatened ecological communities on drainage lines, floodplains and swamps within IBRA subregions.
- Condition of individual occurrences of threatened ecological communities on drainage lines, floodplains and swamps within IBRA subregions.

5-year actions

- Determine the current extent and condition of threatened ecological communities on drainage lines, floodplains and swamps within the Channel Country, by IBRA subregion.
- Identify the potential area of occupancy of threatened ecological communities on drainage lines, floodplains and swamps within the Channel Country, by IBRA subregion.
- Identify and where possible, quantify the disruption and sources of disruption of key ecological processes supporting individual occurrences of threatened ecological communities on drainage lines, floodplains and swamps.
- Rank individual occurrences of threatened ecological communities on drainage lines, floodplains and swamps within IBRA subregions for viability, based on size, condition and landscape context.
- Develop and implement support mechanisms to assist land managers to improve threatened ecological communities on drainage lines, floodplains and swamps.



Conservation priority

Grey Grasswren on floodplains and swamps

The Grey Grasswren (*Amytornis barbatus*) is endemic to the Lake Eyre Basin. Two subspecies are recognised, of which only *Amytornis barbatus* ssp. *diamantina* occurs in South Australia. The majority of sightings have been in Coolibah woodlands with Lignum understorey. It has been found in a range of other vegetation communities adjacent to dense patches of Lignum. The reliance of the Grey Grasswren on Lignum means that alterations to the fire regime represent a significant risk. The poor dispersal ability of this species also means that the clearance of low and dense vegetation types for tracks may also significantly affect its ability to move through the landscape, increasing the risk of predation. This species requires further investigation to determine its status in the region and the relationship between habitat and disturbance.

20-year target

The maintenance or improvement of the viability of the Grey Grasswren on floodplains and swamps.

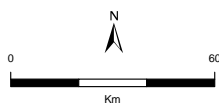
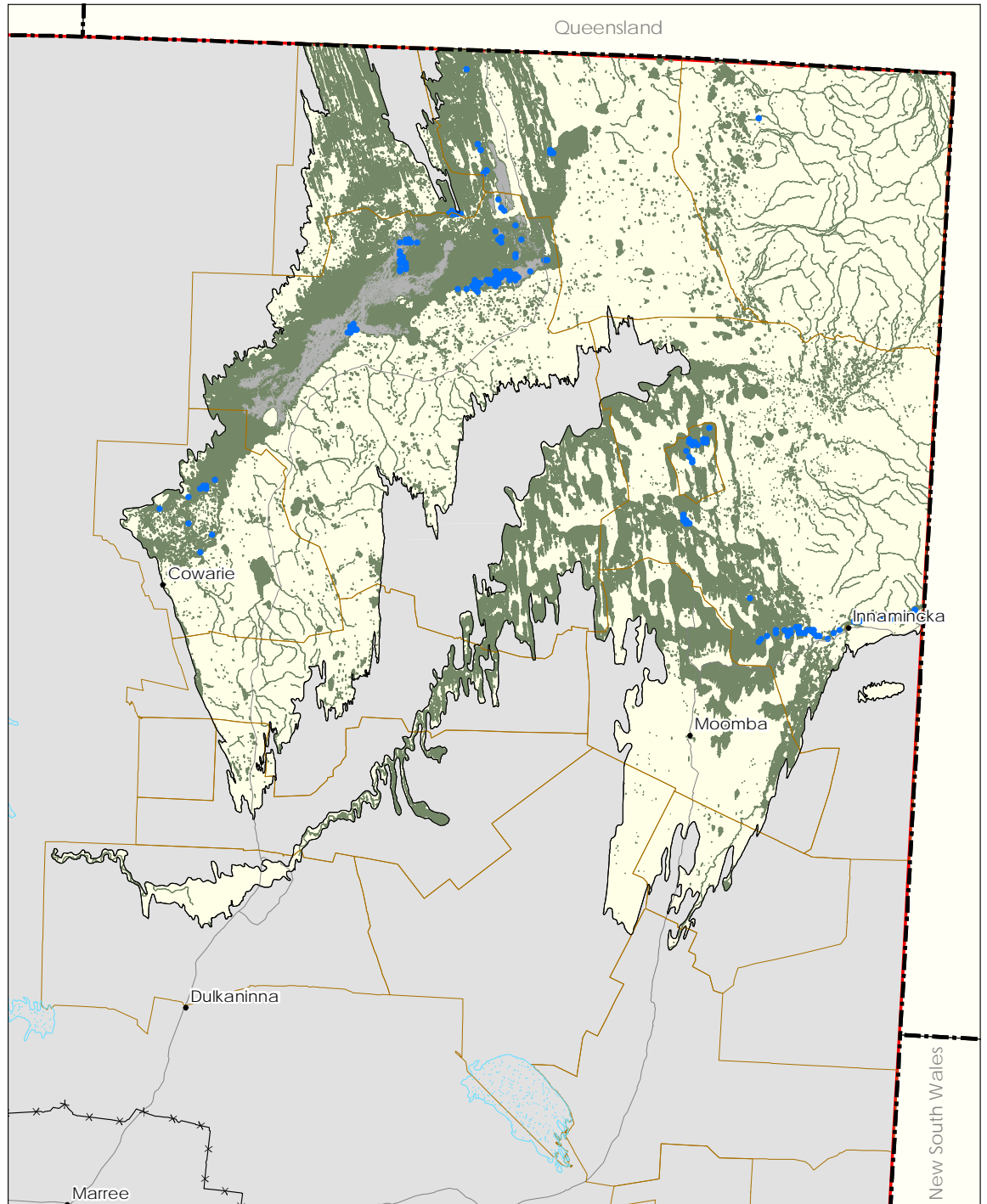
5-year performance information

- Percentage of potential habitat occupied by the Grey Grasswren on floodplains and swamps in the Channel Country bioregion.
- Number and viability of populations of the Grey Grasswren on floodplains and swamps in the Channel Country bioregion.

5-year actions

- Determine area of occupancy and relationship between habitat and distribution and abundance of the Grey Grasswren on floodplains and swamps in the Channel Country bioregion.
- Identify and where possible, quantify the disruption and sources of disruption of key ecological processes supporting individual populations of the Grey Grasswren on floodplains and swamps in the Channel Country bioregion.
- Identify potential habitats on floodplains and swamps within the Channel Country bioregion for the Grey Grasswren.
- Rank populations of Grey Grasswren on floodplains and swamps within IBRA subregions for viability, based on size, threats and landscape context.
- Support land managers to improve the viability of the Grey Grasswren on floodplains and swamps by controlling feral animals and overabundant native herbivores and promoting appropriate grazing practices.

Conservation priorities for drainage lines and floodplains



Conservation priorities

- Important permanent and semi-permanent waterholes of the Diamantina and Cooper Creek drainage systems
- Grey Grasswren on floodplains and swamps
- Threatened ecological communities on drainage lines, floodplains and swamps
- Significant response of water birds to water flow in the Diamantina and Cooper Creek drainage systems

- Channel Country Bioregion
- South Australian Arid Lands NRM Region
- Pastoral Station
- Salt Lake
- ××× Dog Fence
- Major Road
- State Border
- Locality

Mapped conservation priorities provide an indication of the potential distribution



Stony plains

The stony plains, with undulating gibber downs, tablelands and mesas, separate the two major drainage areas of the Channel Country bioregion. They also include smaller areas of dunes and salt lakes, and are dissected by a network of minor drainage areas lined with Coolibah (*Eucalyptus coolabah*), River Red Gum (*E. camaldulensis*) and River Cooba (*Acacia stenophylla*). The landscape is dominated by gibber-covered low hills and expansive undulating chenopod plains and tablelands.

In the far north, the Lamamour Plateau on Cordillo Downs supports Mitchell Grass (*Astrelba pectinata*), Neverfail (*Eragrostis setifolia*) and Common Bottlewashers (*Enneapogon avenaceus*). The stony country extends south-west to Sturt Stony Desert with its rolling gibber downs and occasional scattered dunes. To the north of Innamincka, extending into southern Queensland, is the smaller gibber area of the Merninie Tableland, low hills with Mitchell Grass, and Neverfail, and mesas with Emu-bushes (*Eremophila* spp.), Gidgee (*Acacia cambagei*) and Mulga (*Acacia aneura*) over Bladder Saltbush (*Atriplex vesicaria*).

Significance of stony plains

These stony plains, whilst being geographically separated from the Stony Plains bioregion, provide many similar habitats. Some species such as the Thick-billed Grasswren (*Amytornis textilis modestus*) are now found only in the Stony Plains proper and are extinct in the Channel Country. The vulnerable Kowari (*Dasycercus byrnei*) has its South Australian stronghold in the gibber plains on the eastern flanks of Goyder Lagoon, and one of the inland burrowing frogs listed rare in South Australia, the Knife-footed Frog (*Cyclorana cultripes*), lives in the gibber and gilgai areas and relies on the periodic wetting and drying of the cracking clays for survival.

The stony gibber plains are characterised by a high proportion of ephemeral species. These species have short lifecycles, enabling them to exploit the irregular and infrequent rains. Most of the perennial vegetation is in the highly productive gilgais and minor drainage depressions, and even modest rainfall events trigger extensive ephemeral growth. It is this localised and short-lived ephemeral vegetation that provides the unique habitats that are able to be exploited only by certain animals with specific adaptations. This means that more species are restricted or endemic to this landscape type than any other in the bioregion.

Major vegetation communities

Woodland

Mulga (*Acacia aneura*) low open woodland over Sandhill Wattle (*Acacia ligulata*), Narrow-leaved Hop Bush (*Dodonaea viscosa* ssp. *angustissima*), Spiny Saltbush (*Rhagodia spinescens*), Ruby Saltbush (*Enchylaena tomentosa*), Black Bluebush (*Maireana pyramidata*) and Lobed Spinifex (*Triodia basedowii*) and grasses on plains.

Shrubland

Sandhill Wattle (*Acacia ligulata*), Elegant Wattle (*Acacia victoriae*), Gidgee (*Acacia cambagei*) +/- Mulga (*Acacia aneura*) tall open shrubland over Cottonbush (*Maireana aphylla*), Bladder Saltbush (*Atriplex vesicaria*) and Bindyi (*Sclerolaena* spp.) and grasses on sand spreads on stony plains.

Cottonbush (*Maireana aphylla*) +/- Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*) +/- Bladder Saltbush (*Atriplex vesicaria*) low open shrubland over Neverfail (*Eragrostis setifolia*); and Mitchell Grass (*Astrelba pectinata*) and Bindyi (*Sclerolaena* spp.) on run-on areas and slight depressions.

Bladder Saltbush (*Atriplex vesicaria*), Oodnadatta Saltbush (*Atriplex nummularia* ssp. *omissa*), Low Bluebush (*Maireana astrotricha*) and Black Bluebush (*Maireana pyramidata*) low open shrubland over Bindyi (*Sclerolaena* spp.) and Neverfail (*Eragrostis setifolia*) on slightly saline plains and gilgais.

Grassland

Mitchell Grass (*Astrelba pectinata*) and Katoora (*Sporobolus actinocladius*) low open grassland with Bindyi (*Sclerolaena* spp.) and Bonefruit (*Osteocarpum acropterum*) on plains and gilgais.



Photo: Low Bluebush *Maireana astrotricha*

Managing the biodiversity of stony plains – practical ways that land managers can help

Stony plains represent a significant proportion of the Channel Country bioregion. These areas are highly utilised by the pastoral industry for their grazing value, and for the productivity of their watercourse and floodplain country.

The gibbers that cover much of the soil surface of the stony plains are extremely important for soil protection. If the gibber cover is removed, even if it is just slightly, the exposed soils are easily eroded and can often result in dramatic gully erosion, sometimes metres deep. Once this erosion starts, it is very difficult to stop. Erosion gullies redirect water flows from existing drainage lines where there is often a comparatively high level of biological activity and diversity. The various types of vegetation found on the stony plains provide valuable habitat for a wide range of native animals. Gilgais, drainage lines and sand spreads are particularly important habitat areas for biodiversity. Excessive total grazing pressure and weed infestations are a significant risk to these habitats.

Practical strategies that land managers can use on stony plains to help retain biodiversity include:

- Ensure, wherever possible, that the gibber cover is retained by rolling or compacting rather than mechanical disturbance (e.g. grading) when installing tracks, fence lines and other infrastructure.
- Locate stock water points well away from slopes to minimise erosion.
- Align access tracks and fence lines across slopes, rather than up and down, and onto less erosion prone soil types.
- Avoid creating drains – redirect water off tracks rather than along them. Avoid grading tracks lower than the surrounding soil surface, or creating windrows along tracks. Install water diversion bars across tracks at strategic locations.
- When providing water for stock, particularly dams, use only natural water flow rather than grading drains to increase water catchment.
- Ensure rehabilitation of borrow pits is carried out to prevent their use as alternative water sources.
- Implement total grazing management strategies to avoid over-utilisation of gilgais to the point where they lose perennial vegetation and become silted over. High stock numbers and intense trampling on gibber can also increase erosion.
- Avoid installing stock watering points in areas where there are low sand mounds over gibber, as these are important mammal and ground-nesting bird breeding sites, and always ensure conservative stocking rates are applied to maintain the integrity of these areas.
- Avoid re-stocking country immediately after good rains to allow recruitment of perennial vegetation.
- Control feral herbivores and pest plants, in collaboration with neighbours and the SAAL NRM Board.

Conservation priority

Significant and endemic flora and fauna species on stony plains

Four threatened and endemic species have been recorded in the South Australian portion of the Channel Country on stony plains. These include:

- Ashy Downs Skink (*Ctenotus astarte*)
- Fawn Hopping-mouse (*Notomys cervinus*)
- Kowari (*Dasyercus byrnei*)
- Pickard's Wattle (*Acacia pickardii*)

The Kowari, a small carnivorous marsupial, has experienced a reduction in its range of over 90% of its potential pre-European distribution and is now restricted to stony plains habitats in the Channel Country and southern margins of the Mitchell Grass Downs bioregions. The Fawn Hopping-mouse is thought to have experienced a similar range reduction and appears to be confined to the same stony plains habitat as the Kowari. The Ashy Downs Skink is a ground dweller that lives in crevices or shallow burrows on the margins of the major floodplains.

Both the Kowari and Fawn Hopping-mouse occur on stony plains where sand mounds cover less than 20% of the gibber pavement. Sand mounds support a variable mixture of perennial and annual plants and allow easy burrowing. Threats are unclear for either species, although trampling and overgrazing of sand mounds is thought to be significant for the Kowari. In South Australia the Kowari occupies nearly 60% of identified potential favoured habitat, with only one population being recorded as becoming extinct in the past 30 years.

Pickard's Wattle occurs on residual stony plains in the Channel Country bioregion and the north-western side of the Simpson Desert in the Simpson–Strzelecki Dunefields bioregion in the Northern Territory. In South Australia there are two populations on Goyder Lagoon (approximately 250 plants) and Cowarie Station (approximately 100 plants) near Mount Gason Bore. There are other small populations on Koonanie, Pandie Pandie and Kanowna.

20-year target

The maintenance or improvement of the viability of significant and endemic flora and fauna species on stony plains.

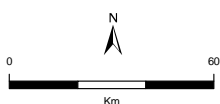
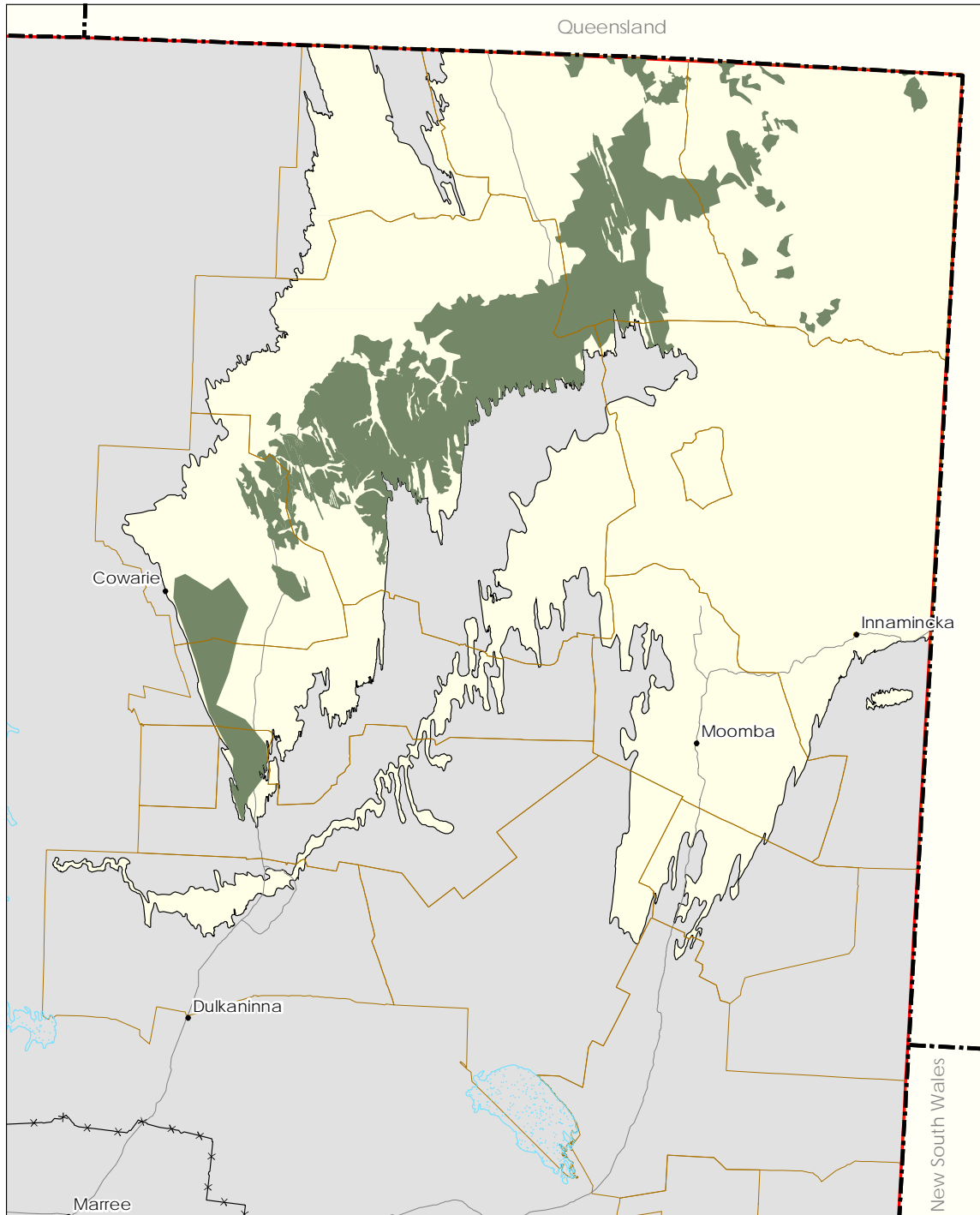
5-year performance information

- Percentage of potential habitat occupied by significant and endemic flora and fauna species on stony plains within the Channel Country.
- Number and viability of populations of significant and endemic flora and fauna species on stony plains within the Channel Country.

5-year actions

- Determine area of occupancy and relationship between habitat and distribution and abundance of significant and endemic flora and fauna species on stony plains.
- Identify and where possible, quantify the disruption and sources of disruption of key ecological processes supporting individual populations of significant and endemic flora and fauna species on stony plains.
- Identify potential habitats in the Channel Country for significant and endemic flora and fauna species on stony plains.
- Rank populations of significant and endemic flora and fauna species on stony plains within IBRA subregions for viability, based on size, threats and landscape context.
- Support land managers to improve the viability of significant and endemic flora and fauna species on stony plains by controlling feral animals and promoting appropriate pastoral management.

Conservation priority for stony plains



Conservation priority

Significant and endemic flora and fauna species on stony plains

Channel Country bioregion

South Australian Arid Lands NRM Region

Pastoral Station

Salt Lake

Dog Fence

Major Road

State Border

Locality



Mapped conservation priorities provide an indication of the potential distribution

Dunefields and sand plains

The Channel Country dunefields and sand plains take a variety of forms. Associated with the floodplains of the Cooper drainage system is an extensive field of parallel sand ridges with periodically flooded interdunes. Dunes vary from red to whitish siliceous sands, and vegetation varies. The larger dunes are similar to those of the Strzelecki Desert, supporting a tall shrubland of Sandhill Wattle (*Acacia ligulata*) over Kerosene Grass (*Aristida holathera*). The red, semi-mobile, linear dunes run north-north-west to south-south-east, with some individual dunes being up to 250 km long. Another form, associated with the intermittent streams of Montecleary and Nilpie Creeks north of Innamincka, include irregular, crescent-shaped, low, jumbled dunes with numerous small claypans and lakes in the swales and sand plains. These dunes have a cover of Sandhill Wattle and Rattlepod (*Crotalaria* spp.) over dense Lobed Spinifex (*Triodia basedowii*) and grasses. There are also the smaller dunefields in the northern part of Sturts Stony Desert on Pandie Pandie, western Cordillo Downs, and northern Innamincka, and the tall widely-spaced semi-mobile red dunes on the eastern extremity of the Simpson Desert.

Significance of dunefields and sand plains

dunefields and sand plains in the Channel Country bioregion have a similar species composition from those in the Simpson–Strzelecki Dunefields bioregion. They support a small number of mammal species, and many generalist birds use this habitat, although none are entirely dependent on it. Due to the proximity to major drainage areas, this landscape provides important foraging habitat for birds of prey, but few nesting places. Swales, where ponding occurs after significant rainfall, can also be highly productive areas.

Major vegetation communities

Woodland

Mulga (*Acacia aneura*) low open woodland over Sandhill Wattle (*Acacia ligulata*), Narrow-leaved Hop Bush (*Dodonaea viscosa* ssp. *angustissima*), Spiny Saltbush (*Rhagodia spinescens*), Ruby Saltbush (*Enchylaena tomentosa*), Black Bluebush (*Maireana pyramidata*) and Lobed Spinifex (*Triodia basedowii*) and grasses on sand plains.

Shrubland

Sandhill Wattle (*Acacia ligulata*) tall open shrubland over Sandhill Cane-grass (*Zygochloa paradoxa*), Lobed Spinifex (*Triodia basedowii*), Rattlepod (*Crotalaria* spp.) and Kerosene Grass (*Aristida holathera*) and ephemeral herbs on dunes.

Sandhill Wattle (*Acacia ligulata*), Elegant Wattle (*Acacia victoriae*) and Gidgee (*Acacia cambagei*) +/- Mulga (*Acacia aneura*) tall open shrubland over Cottonbush (*Maireana aphylla*) and Bladder Saltbush (*Atriplex vesicaria*) and Bindyi (*Sclerolaena* spp.) and grasses on sand plains.

Low Bluebush (*Maireana astrotricha*) +/- Black Bluebush (*Maireana pyramidata*) +/- Bladder Saltbush (*Atriplex vesicaria*) low open shrubland over Bindyi (*Sclerolaena* spp.) and Bottlewashers (*Enneapogon avenaceus*) in swales and on sand plains.

Bladder Saltbush (*Atriplex vesicaria*) and Low Bluebush (*Maireana astrotricha*) +/- Black Bluebush (*Maireana pyramidata*) +/- Spiny Saltbush (*Rhagodia spinescens*) low open shrubland over Bindyi (*Sclerolaena* spp.) and Bottlewashers (*Enneapogon avenaceus*) in swales and on sand plains.

Grassland

Sandhill Cane-grass (*Zygochloa paradoxa*) +/- Spiny Saltbush (*Rhagodia spinescens*) +/- Lobed Spinifex (*Triodia basedowii*) open hummock grassland over Poached Egg Daisy (*Polycalymma stuartii*) and sparse grasses with emergent Sandhill Wattle (*Acacia ligulata*) on dunes.



Managing the biodiversity of dunefields and sand plains – practical ways that land managers can help

Management strategies for the dunefields and sand plains in the Channel Country bioregion focus largely on total grazing pressure management. Sandy areas are prone to wind erosion and once an area begins to drift, the re-stabilisation process can take considerable time. Recruitment of palatable perennial plants requires a series of rainfall events at just the right time to allow for flowering and seed set, germination and seedling establishment. These recruitment events occur very infrequently – for many species only once in 30 to 50 years. It is critical to carefully manage grazing pressure on dunefields and sand plains following these events to maximise the likelihood of successful recruitment of perennial plants.

The various types of vegetation found in the dunefields and sand plains also provide valuable habitat for a wide range of native animals. Grazing pressure and potential weed infestations are a significant risk to these habitats.

Practical strategies that land managers can use on dunefields and sand plains to help retain biodiversity include:

- Spell dune systems in dry times and do not restock immediately following a rainfall event. This is important for promoting the recovery of Sandhill Cane-grass and other perennial grasses that stabilise the dune crests.
- Many dune swales with Queensland Bluebush and Cottonbush swamps also require spelling following prolonged dry spells. Rainfall that fills these swamps promotes recovery and recruitment events for these habitats.
- Avoid locating watering points on or near areas that might be prone to drifting such as dune crests. Wide, open swales are preferable for water points to minimise livestock traffic across dunes and encourage the stock movement along the swales.
- Ensure rehabilitation of borrow pits is carried out to prevent their use as alternative water sources.
- Use conservative stocking strategies as part of general management of these areas.
- Control feral herbivores and pest plants in collaboration with neighbours and the SAAL NRM Board.

Conservation priority

Mulga low woodland on low dunes and sand plains

Mulga (*Acacia aneura*) low woodland occurs infrequently on sand plains in the Sturt Stony Desert subregion. Mulga low woodland also occurs at the northern and southern extremes of the Simpson–Strzelecki Desert bioregion and on the few sand plains in the Flinders Lofty Block, Broken Hill Complex, Stony Plains and Finke bioregions. In the Finke bioregion, this community is not considered to be threatened.

Mulga low woodland is primarily threatened by inhibited regeneration from excessive total grazing pressure. Rabbits are the most significant component of total grazing pressure as they favour this sandy habitat. Rabbit burrowing exacerbates erosion, as does stock traffic near watering points. The reduction in rabbit numbers from Rabbit Haemorrhagic Disease (RHD) has resulted in an apparent improvement in the condition of this ecological community. However, the extent and significance of this improvement is unknown. The importance of fire for Mulga low woodland is also unknown, but fire may be a problem in good seasons, particularly if vegetation condition improves.

20-year target

The maintenance or improvement of the viability of Mulga low woodlands on low dunes and sand plains in the Channel Country.

5-year performance information

- Percentage of potential area occupied by Mulga low woodland on low dunes and sand plains within IBRA subregions.
- Condition of individual occurrences of Mulga low woodland on low dunes and sand plains within IBRA subregions.

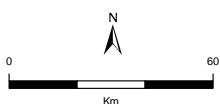
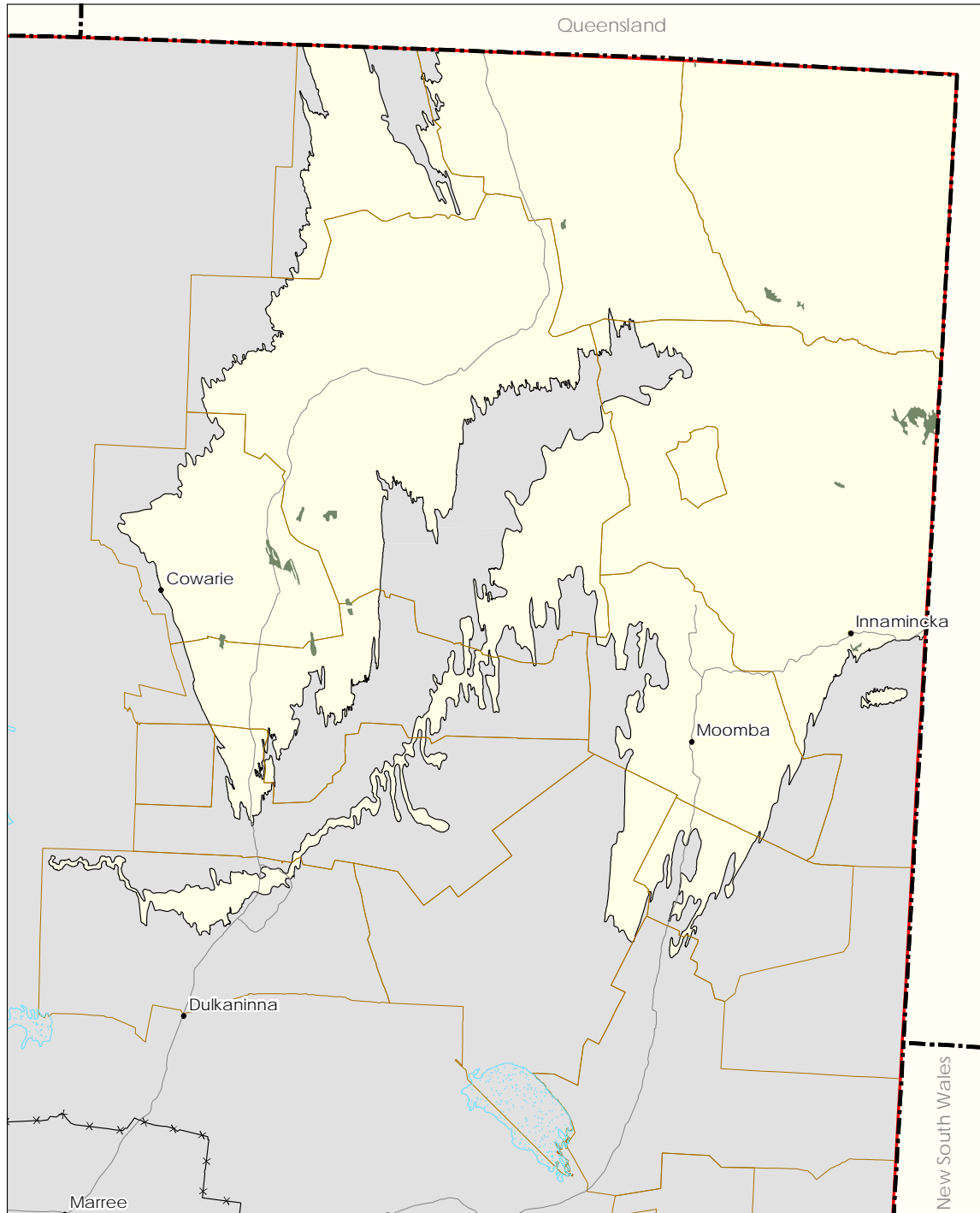
5-year actions

- Determine the extent and condition of Mulga low woodlands on low dunes and sand plains in the Channel Country.
- Identify the potential area of occupancy of Mulga low woodlands on low dunes and sand plains in the Channel Country.
- Identify and, where possible, quantify the disruption, and sources of disruption, of key ecological processes supporting individual occurrences of Mulga low woodland on low dunes and sand plains.
- Rank individual occurrences of Mulga low woodland on low dunes and sand plains within IBRA subregions for viability, based on size, condition and landscape context.
- Support land managers to improve Mulga low woodland on low dunes and sand plains.



Photo: Narrow-banded Sandswimmer *Eremiascincus fasciolatus*

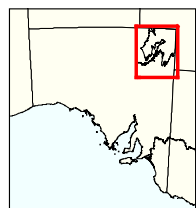
Conservation priority for dunefields and sand plains



Conservation priority

Mulga low woodland on low dunes and sand plains

- Channel Country Bioregion
- South Australian Arid Lands NRM Region
- Pastoral Station
- Salt Lake
- Dog Fence
- Major Road
- State Border
- Locality



Mapped conservation priorities provide an indication of the potential distribution

Monitoring and evaluation

The Channel Country Conservation Priorities aim is to facilitate conservation actions across the bioregion. The SAAL NRM Board and support partners will coordinate and support the delivery of these actions, guided by statutory mechanisms. The SAAL NRM Board will monitor and report on the implementation of the Channel Country Conservation Priorities.

Both the SAAL NRM Board and the Department for Environment and Heritage are jointly responsible for evaluating the effectiveness of this plan which contributes to the SAAL NRM Plan and *No Species Loss – A Nature Conservation Strategy for South Australia*.

DEH will produce a public report on overall progress towards the conservation priorities as part of the five year review and evaluation of the South Australian Arid Lands Biodiversity Strategy in 2014.

Monitoring and reporting information

Landform	Priority	Targets	Performance information
Drainage lines and floodplains	Significant response of water birds to water flow along the Diamantina and Cooper Creek drainage systems	The maintenance of the significant response of water birds to water flow in the Diamantina and Cooper Creek drainage systems	<ul style="list-style-type: none"> Wetland habitat utilisation by water birds.
	Important permanent and semi-permanent waterholes of the Diamantina and Cooper Creek drainage systems	The maintenance and improvement of biodiversity values of permanent and semi-permanent streams and waterholes	<ul style="list-style-type: none"> Number of permanent and semi-permanent waterholes managed for biodiversity values.
	Threatened ecological communities on drainage lines, floodplains and swamps	The maintenance or improvement of the viability of threatened ecological communities on drainage lines, floodplains and swamps within the Channel Country	<ul style="list-style-type: none"> Percentage of potential area occupied by threatened ecological communities on drainage lines, floodplains and swamps within IBRA subregions. Condition of individual occurrences of threatened ecological communities on drainage lines, floodplains and swamps within IBRA subregions.
	Grey Grasswren on floodplains and swamps	The maintenance or improvement of the viability of the Grey Grasswren on floodplains and swamps	<ul style="list-style-type: none"> Percentage of potential habitat occupied by the Grey Grasswren on floodplains and swamps in the Channel Country bioregion. Number and viability of populations of the Grey Grasswren on floodplains and swamps in the Channel Country bioregion.
Stony plains	Significant and endemic flora and fauna species on stony plains	The maintenance or improvement of the viability of significant and endemic flora and fauna species on stony plains	<ul style="list-style-type: none"> Percentage of potential habitat occupied by significant and endemic flora and fauna species on stony plains within the Channel Country. Number and viability of populations of significant and endemic flora and fauna species on stony plains within the Channel Country.
Dunefields and sand plains	Mulga low woodland on low dunes and sand plains	The maintenance or improvement of the viability of Mulga low woodlands on low dunes and sand plains within the Channel Country	<ul style="list-style-type: none"> Percentage of potential area occupied by Mulga low woodland on low dunes and sand plains within IBRA subregions. Condition of individual occurrences of Mulga low woodland on low dunes and sand plains within IBRA subregions.

Glossary

Alluvial Plain: An extensive stream-laid deposit that may include gravel, sand, silt and clay; typically forming floodplains that develop alluvial soils. The alluvial deposit of a stream generated from a gorge upon a plain or of a tributary stream at its junction with the main stream.

Arid: Refers to climates or regions that lack sufficient crop production or extensive sown pastures. Usually defined as a climate with annual average rainfall less than 250 mm (10 inches).

Biodiversity: The variety of life forms: the different plants, animals and micro-organisms; the genes they contain; and the ecosystems they form.

Bioregion: Extensive (continental scale) regions distinguished from adjacent regions by their broad physical and biological characteristics.

Conservation: The protection, maintenance, management, sustainable use, restoration and enhancement of the natural environment.

Decreaser Species: A species that decreases in abundance in areas of high grazing pressure, generally in proximity to water.

Degradation: Degradation of land is the decline in the quality of the natural resources of the land resulting from human activities.

Dispersal: The movement of organisms between locations, especially relating to the movement from birth site or breeding sites.

Ecological Community: A characteristic suite of interacting species adapted to particular conditions of soil, topography, water availability and climate.

Ecological Processes: Dynamic interactions that occur among and between biotic (living) and abiotic (non-living) components of the environment.

Ecosystem: A dynamic complex of plant, animal, fungal and micro-organism communities and the associated non-living environment interacting as an ecological unit.

Endemic: Exclusively native to a specified region or site.

Feral: A domesticated species that has escaped the ownership, management and control of people and is living and reproducing in the wild.

Fire Regime: The intensity, frequency and extent of fire.

Gene: The functional unit of heredity; the part of the DNA molecule that encodes a single enzyme or structural protein unit.

Genetic Diversity: The variability in the genetic makeup among individuals and populations within a single species.

Gilgai: A natural soil formation occurring extensively in inland Australia, characterised by an undulating surface sometimes with mounds or depressions caused by the swelling and cracking of clays during alternating wet and dry seasons.

Habitat Diversity: The number of different types of habitats within a given area.

Habitat: The physical place or type of site where an organism, species or population naturally occurs together with the characteristics and conditions, which render it suitable to meet the lifecycle, needs of that organism, species or population.

IBRA Region: Interim Biogeographic Regionalisation for Australia regions.

IBRA Subregion: A subdivision of a bioregion based on broad physical and biological characteristics; a system of related and interconnected landsystems within an IBRA region.

Increaser Species: A species that increases in abundance in areas of high grazing pressure, generally in proximity to water.

Indicator: A measure against which some aspects of performance can be assessed.

Invasive Species: Any animal pest, plant or disease that can adversely affect native species and ecosystems.

Landform: Any of the numerous features that make up the surface of the earth, such as plain, plateau and canyon.

Landscape: A heterogeneous area of land or sea that is of sufficient size to achieve positive results in the recovery of species or ecological communities, or in the protection and enhancement of ecological and evolutionary processes.

Landsystem: A group of local ecological communities derived from a landscape pattern of related and interconnected local ecosystems within a subregion.

Native Species: A plant or animal species that occurs naturally in South Australia.

Protected Area: An area of land and/or sea specifically dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

Refuge: A region, or habitat, where organisms are able to persist during a period in which most of the original geographic range becomes uninhabitable.

Remnant: Areas (generally small) of native plant communities that are found in otherwise cleared landscapes.

Restoration: Assisting the recovery of ecological systems to a state in which the viability of species and ecological communities, and ecosystem function, are improved.

Riparian: on, or relating to the banks of a natural course of water.

Runoff: The portion of precipitation not absorbed into or detained upon the soil and which becomes surface flow.

Semi-arid: Refers to climates or regions which lack sufficient rainfall for regular crop production. Usually defined as a climate with annual rainfall between 250 mm and 375 mm.

Species Diversity: Variability (richness and abundance) of biota in an area. An index of community diversity that takes into account both species richness and the relative abundance of species.

Species: A group of organisms capable of interbreeding with each other but not with members of other species.

Subspecies: Distinct geographical ranges of interbreeding natural populations of species that are reproductively isolated and possess distinguishing characteristics from other populations of the same species.

Sustainable Use: The use of components of biological diversity in a way and at a rate that does not lead to the long term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

Sustainable: The use of resources or components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

Tableland: An elevated and generally level region of considerable extent.

Terrestrial: Land-based biodiversity including inland aquatic ecosystems such as rivers, streams, lakes, wetlands, springs, groundwater and groundwater dependent ecosystems, and the native inland aquatic species in these areas.

Threat Abatement: Eliminating or reducing a threat.

Threatened Species or Ecological Communities: A species or ecological community that is vulnerable or endangered.

Threatening Processes: The dominant limiting factors and constraints to the ongoing conservation of biodiversity.

Vegetation Association: A stable plant community of definite composition presenting a uniform appearance and growing in more or less uniform habitat conditions.

Viability: The likelihood of long-term survival of the example/population of a particular ecosystem or species.

Abbreviations

DEH	South Australian Department for Environment and Heritage
DWLBC	South Australian Department for Water Land and Biodiversity Conservation
EPBC	Environment Protection and Biodiversity Conservation Act 1999
ESD	Ecologically Sustainable Development
GAB	Great Artesian Basin
IBRA	Interim Biogeographic Regionalisation of Australia
NPW	National Parks and Wildlife
NRM	Natural Resources Management
PIRSA	Primary Industries and Resources South Australia
SAAL	South Australian Arid Lands

Further reading

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