

South Australian Arid Lands Natural Resources Management Board  
EDUCATION KIT

The Arid Lands region is a healthy functioning ecosystem with sustainable industries and vibrant communities



Dusky Hopping Mouse



Looking at cochineal at Tarcoola





Looking at specimens of arid lands wildlife



# Education Kit

## COMPILED BY THE SOUTH AUSTRALIAN ARID LANDS NATURAL RESOURCES MANAGEMENT BOARD

The South Australian Arid Lands Natural Resources Management (NRM) Board is working with the community to manage our natural resources in the arid areas of South Australia. Today's school students are tomorrow's natural resources users and managers. Now is the time for them to gain real and relevant knowledge about sustainable management of those precious resources.

The SA Arid Lands Natural Resources Management (NRM) Region covers over 50% of South Australia and includes some of its driest parts. The region has the largest area of intact ecosystems and natural biodiversity of any NRM region in the state. However, managing sustainable use of these natural resources is complex.

Local landholders, industry, government agencies, and environmental and community groups, are collaborating with the NRM Board on regional projects to manage water resources, native vegetation, threatened species, weeds and feral pests. These activities are developing sustainable management practices that support communities, drive business activities and address processes that threaten valuable natural resources in the region.

Information contained in this kit will help young people learn more about these projects and develop their own. The kit has many ideas for teachers on local educational experiences, fact sheets on threatened birds and animals for year 3–6 students, and an extensive resource list of books, kits, web addresses and people to contact.

The kit has been compiled by primary school teachers now working in the field of natural resources management. We hope the ideas and resources are useful, practical and easy to use.

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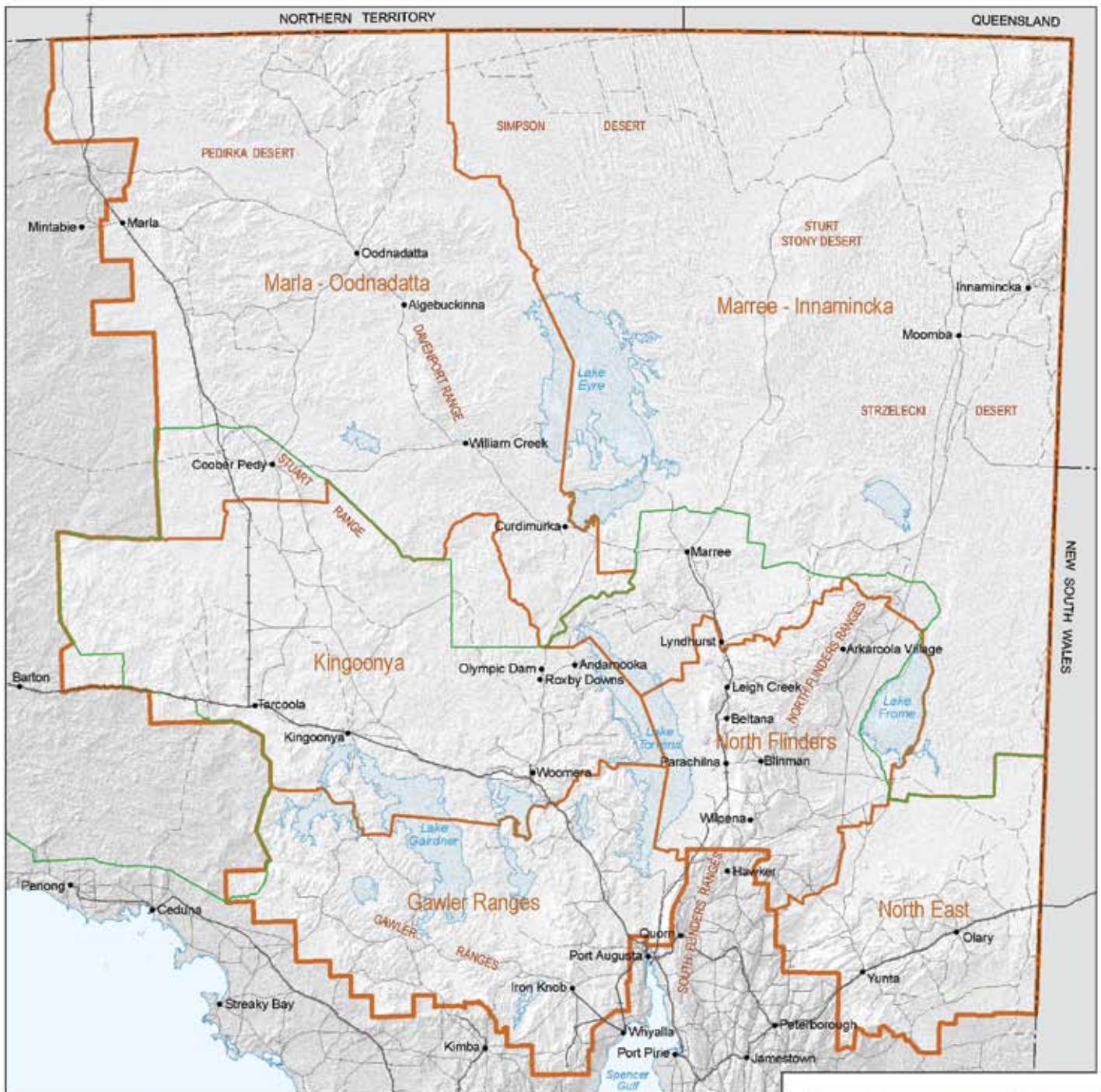
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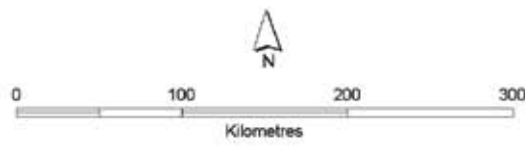
The Arid Lands region is a healthy functioning ecosystem with sustainable industries and vibrant communities



# SOUTH AUSTRALIAN ARID LANDS NATURAL RESOURCES MANAGEMENT REGION



- SA Arid Lands NRM Region Boundary
- NRM Group Boundary
- Dog Fence
- Railway Line
- Main Road
- Vehicular Track



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**Government of South Australia**  
 South Australian Arid Lands Natural Resources Management Board





Soil testing, Woomera



Wedge tailed Eagle, Stuart Hwy

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## WHERE THIS KIT FITS INTO THE CURRICULUM

Each of the relevant student outcomes from the South Australian Curriculum Standards and Accountability (SACSA) Framework below is accompanied by examples that would demonstrate achievement of the outcomes.

SA Arid Lands NRM Board is able and willing to help students achieve these outcomes. You may also find other Government bodies and NRM Boards from neighbouring regions are willing to assist with student learning.

Codes in square brackets relate to Essential Learnings – Future [F], Identities [I], Interdependence [In], Thinking [T], Communication [C] and Key Competencies [KC] as outlined in the SACSA Framework. Further information is available from [www.sacsa.sa.edu.au](http://www.sacsa.sa.edu.au).



Sparse vegetation on the sand hills

# Science and Technology

## EARTH AND SPACE

**KEY IDEA:** Students analyse how the earth sustains life and understand and report that the earth is continually changing. [F] [In] [T] [C] [KC1] [KC2]

1.1 Identifies and shares information about features of their natural and built local environment that affect living things, including themselves [Id] [T] [KC1] [KC2]	2.1 Expresses ideas about changes that occur in their local environment, and considers implications for sustainable environments [F] [In] [KC1] [KC2]	3.1 Describes the characteristics that sustain life on the earth and changes to these characteristics and their impact over time [F] [In] [T] [KC2]
Determines whether features are natural or built, and examines the similarities and differences between them	Classifies and compares properties of local soil samples	Appraises and communicates the effects of different management techniques on environments
Poses questions about, and takes action on, an issue at home or school that has environmental implications	Communicates the steps people take to reduce the risk of degradation of natural environments (e.g. bushfires, soil erosion)	Critically examines the ethics of mining in national parks, and presents their views about alternative possibilities for the future
	Describes situations where people have altered landscapes for activities such as farming and city living, and explores long-term implications	Uses videos, websites and recordings to study natural changes to the earth's surface

## LIFE SYSTEMS

**KEY IDEA:** Students construct and explain their ideas about the diversity of living things and how they reproduce and grow. They identify and communicate the importance of maintaining diversity of living things in order to sustain life on earth. [F] [C] [KC2]

1.5 Investigates the features and needs of living things, and demonstrates an understanding of their interdependence with each other and the physical world [In] [T] [C] [KC1]	2.5 Explores relationships between living things by posing investigable questions about features and functions [In] [T] [KC6]	3.5 Explains the inter-relationships between systems within living things, and between living things in ecological systems. They relate these ideas to the health of individuals and to threats to the sustainability of ecological systems. [F] [Id] [In] [KC1] [KC2]
Explains the nature of plants and animals, and considers growth, reproduction, food sources, specific physical features, body coverings, teeth, limbs and body parts	Poses investigable questions (e.g. Which flowers attract bees? What evidence of animals is found in spiders' webs?) to plan and carry out an investigation to establish a relationship between features and functions	Uses strategies promoting conservation to collect and compare features of plants found in local environments (e.g. root systems of weeds, flowers of flowering plants)
Explains how plants and animals are dependent on their environments	Describes the functions of a feature of an animal through the use of a multimodal presentation (e.g. the shell of a snail provides protection and shelter)	Gathers information, using digital and electronic technologies, to identify and describe the factors that led to disturbance of a local ecological system, and explores alternatives for the future
	Presents features of plants in a diagram (e.g. leaves, stems, roots, tendrils, flowers, fruit)	



# Society and Environment

## PLACE, SPACE AND ENVIRONMENT

**KEY IDEA:** Students examine natural and social environments in local and global communities, analysing patterns, systems and relationships. [In] [T] [KC1]

1.4 Explains and communicates how people interact and identify with environments [Id] [In] [KC2]	2.4 Shows and reports on understanding of the interrelationships between natural and built environments, resources and systems [In] [T] [KC2]	3.4 Identifies and describes significant resources, explains the threats which endanger them, and suggests strategies to combat threats [F] [In] [T] [KC1] [KC2] [KC6]
Distinguishes between natural and built features of environments in other places around the world	Identifies particular features (e.g. mountains, vegetation and climate patterns, urban/rural areas, desert landscapes, tropical forests, cities) in written texts and maps, and describes relationships observed	Determines a relevant resource issue to study (e.g. a water catchment, soil erosion, mining of a resource, forestry) through local fieldwork or other research, individually or in groups or teams
Describes how diverse elements of natural and built environments influence daily lives	Explains the relationships between some identified features (e.g. river systems and irrigation areas; mineral deposits and transport systems) in an Australian or other region	Identifies the dimensions of the issue, including problems, how they impinge on people and other living and non-living things, and how they are managed
Explains how people depend on particular resources, systems or features within environments	Analyses the ways people use and depend upon environments, resources and other people	Considers various strategies, including the use of information and communication technologies, put forward by different people or groups, and articulates their own suggestions and plans
Identifies aspects of interdependence among people, environments and communities		Determines benefits and costs, and the interests that various groups have in combating or perpetuating a problem



Landcare garden, Coober Pedy



**KEY IDEA: Students use a range of resources and technologies to gather and present information. They develop mapping and graphing skills to represent observable features in the environment. [T] [C] [KC1] [KC2] [KC5] [KC7]**

<p>1.5 Represents and categorises features of places and resources, using maps, contextual language and models [C] [KC2] [KC5]</p>	<p>2.5 Uses symbols, maps, models and flow-charts to describe the location of places and demonstrate relationships [T] [C] [KC2]</p>	<p>3.5 Interprets and represents data about natural and built environments, resources, systems and interactions, both global and local, using maps, graphs and texts [In] [T] [C] [KC1] [KC2] [KC5]</p>
<p>Draws maps, makes models or produces visual display to describe elements of a particular place or feature</p>	<p>Uses electronically generated maps, models or photographs to describe the relationship of places to particular relevant features (e.g. cities located on coasts and rivers, transport patterns following topography, mining areas linked to ports) and flow-charts to describe resource relationships</p>	<p>Selects and uses suitable media and modes of presentation (e.g. diagrams, maps, photographs, online resources) to illustrate and present researched information (e.g. to describe the ways in which people are a part of the water cycle and dependent upon water as a resource)</p>
		<p>Examines the implications of interrupting or changing interactions and relationships in natural and local environments, using relevant Australian or global examples</p>
		<p>Identifies and reports some ways in which people interact with environments</p>

F: Future, I: Identities, In: Interdependence, T: Thinking, C: Communication, KC: Key Competencies (www.sacsa.sa.edu.au)

Echidna, Arkaroola







**KEY IDEA: Students consider sustainability and care of resources and places as they explore how people’s attitudes and values affect their interactions with natural features and cycles.**  
**[F] [In] [KC6]**

1.6 Participates actively in projects to show understanding of the importance of caring for local places and natural environments [F] [In] [T] [KC3] [KC4]	2.6 Understands that people cause changes in natural, built and social environments, and they act together in solving problems to ensure ecological sustainability [F] [In] [KC6]	3.6 Identifies factors affecting an environmental issue, and reports on ways to act for sustainable futures [F] [In] [T] [KC1] [KC2]
Describes the purpose and work of relevant projects that involve caring for places and natural environments	Compares landscapes, land uses, resources and changes over time in Australian regions, or regions in another country	Examines hazards, both natural and those caused by people, and develops questions that can be researched to analyse their impact on environmental systems
Explains how and why various people, including Indigenous peoples, care for particular places	Explores the views and actions of diverse individuals and groups on environmental quality and preservation of places in a particular region or landscape now and in the future	Explores ways they and the community can act for sustainable development, while taking into account hazards
Identifies why it is important to care for places and ways they can care for a particular place	Discusses the concept of ecological sustainability, identifies personal responsibility, and collaborates in environmental projects	Recognises and describes strategies practised by governments, and various people or groups, including indigenous peoples, around the world to sustain local/global environments
Contributes to planning, implementing and evaluating a cooperative class, group or team project to care for a place		

F: Future, I: Identities, In: Interdependence, T: Thinking, C: Communication, KC: Key Competencies (www.sacsa.sa.edu.au)



Reece with an Ampurta at Marree Aboriginal School



# Learning Activities Reception-Year 2

## NATURAL RESOURCES

Our natural resources are water, land, plants, animals, sun and wind.

### WATER

#### Community use

- » Water usage activities – Look at household and school water usage; complete a water audit to see where most water is being used and where water can be saved. What steps can you take to use water more efficiently? (SOSE 1.4)
- » Water restrictions – What are they and why might they be necessary in some areas? Look at home water use. Make comparative statements about water use before and during water restrictions. Look at what happens to plants, our gardens and river levels. (SOSE 1.4)
- » Water recycling/reusing – Look at where used water ends up and grey-water reuse. (Sci 1.1, SOSE 1.6)
- » Community areas – How do common areas use water? How could they use it better? How many people use that area? In your opinion, is it good to use the water there? Who uses the parks? What for? (SOSE 1.4)

#### Coastal environment

- » Coastal environments – What are the different marine habitats for plants and animals? How might pollution affect them? (SOSE 1.6)
- » Visit the beach or mangrove habitat with a Coastcare officer; collect shells and name the animals that are or were inside. (SOSE 1.6)

#### Testing/analysis

- » Water bug surveys – Work with the Waterwatch coordinator to set up a half-day excursion to your nearest waterbody to look at water health (see Attachment 2 for NRM Board contacts). (SOSE 1.6)
- » Water testing kits (available from PIRSA) – Test the quality of your tap water, rainwater, bore water, river water etc. Compare how they look and compare what is in them. (SOSE 1.6)
- » An easy pH analysis of water using red cabbage as litmus can be done following the step by step instructions at [www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus](http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus) The site explains why changes occur. (SOSE 1.6)

#### General and impacts

- » Watercourses and catchments – Examine local creeks, rivers, waterholes, springs, lakes and dams. Where does their water come from and where does it go? Use a water cycle diagram labelled with real examples of local features if possible. (SOSE 1.4)
- » Floods and other significant water events – Look at the impact of localised flooding on local plants, animals, soil and people. What are the transport and health implications of these natural events for people? Have there been changes to the landscape that have increased or decreased the impacts of flooding? Levy banks, increased concrete, vegetation clearing are examples of things that can change the flow of water in a catchment. Create a mini-catchment using plasticine, clay, plaster of Paris or other things to direct the flow of water in your town. (SOSE 1.4)
- » Current media analysis on rivers and lake systems – Collect articles on a current water issue for classroom discussion. (SOSE 1.4, 1.6)
- » Water use plan – Come up with your own water use plan as a class. Think about all of the things you need water for in your classroom. (SOSE 1.4, 1.6)



## LAND

### Characteristics

- » Soil erosion by wind and water – Look at the causes of erosion e.g. lack of groundcover. What can happen if there are too many animals in an area? Are native and feral animals contributing to erosion? Think about animals that dig their homes. Photopoint data might be available for some areas (monitoring over long periods sometimes takes photos of the same scene as it changes over time; ask DEH officers). Are there areas of erosion in or near the school that a class or whole of Junior Primary (for example) could work on to improve? Talk to your local NRM officer. (SOSE 1.6)
- » Land quality and improvement – What are the different types (e.g. gibber grasslands, woodlands) and zones of land? How is land quality tested? (SOSE 1.6)
- » Health of the land and soil – How is healthy land and soil created? Link with units of work on mini-beasts. Dig up a patch of soil from your garden. Look for animals like worms, slaters and earwigs; they are natural soil aerators. (SOSE 1.6)
- » Have someone from SAAL NRM Board come and talk to the class about the animals that live in mound springs and show what has been discovered so far. (SOSE 1.6)
- » Land use – How is land used (farming, grazing, tourism, mining, conservation) and what are the effects of those activities? (Sci 1.1, SOSE 1.4, 1.5, 1.6)

## NATIVE SPECIES

### FLORA

#### Characteristics

- » Press and identify local natives, make up a data sheet (information about the plant) to go with it (contact NRM Boards (see Attachment 2) or Greening Australia). (Sci 1.1)
- » Examine local natives for adaptations (including camouflage). What are the characteristics of the plant that help it survive? Look at leaf shape, colour, texture, plant size and shape. (Sci 1.1)
- » Identify icon species and floral emblems from each state and look at the characteristics of each, including their response to heavy rain and drought. (Sci 1.1)
- » Discuss categories of plants – ephemeral (live only for a short period of time), perennial (live for more than two years), annual (live for one growing season). (Sci 1.1)

#### Threatened species

- » Information on current threatened and vulnerable plants can be accessed through DEH or SAAL NRM Board. [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (Sci 1.1)
- » Try to grow a plant species that was once found in your area but is now not widely found there. Australian native nurseries (including the Australian Arid Lands Botanic Garden and State Flora Nursery [www.stateflora.com.au](http://www.stateflora.com.au)) may be a good source of such plants. (Sci 1.1)

#### Impacts

- » Discuss food webs/chains, cause and effect, and implications. (SOSE 1.6)
- » Discuss and investigate the effects of pollution, boating and industry on mangrove habitats. (SOSE 1.6)
- » Discuss some of the threats to a chosen threatened plant and what can be done to help the species survive. (SOSE 1.6)

### FAUNA

#### Threatened species

- » Species of lizards, snakes, marsupials (e.g. yellow-footed rock-wallaby) and birds are threatened in various parts of the Arid Lands Region. Many are directly impacted by human activity, feral animals, and changes in land use. Learn about animals specific to your local area. Use the information on the fact sheets in this kit or on the websites [www.saalnrm.sa.gov.au](http://www.saalnrm.sa.gov.au) or [www.nynrm.sa.gov.au](http://www.nynrm.sa.gov.au) or [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (SOSE 1.4, 1.6)
- » Look at adaptations (including camouflage), threats, and how to assist the survival of specific threatened species. Government departments may have a way students can assist in scientific research or monitoring of a species in a particular area (contact the NRM Boards or DEH). (SOSE 1.6)



## INTRODUCED SPECIES

### FLORA

#### Weeds

- » Definition – A weed is any plant growing where it is not wanted (e.g. wild oats are weeds in a crop of wheat). In your home garden most things with prickles are weeds. (SOSE 1.6)
- » Weeds – The Where? Why? What? of their eradication and control.
- » Identify some weeds around the school. (Sci 1.5)

#### Impacts

- » Which plants have potential to become weeds (e.g. household and local)? (SOSE 1.6)
- » Threats to other plants and animals – Will the weed out-compete another plant? Look at how this might affect animals that rely on certain plant species for food. Create a food web that includes the pest plant and then remove it to discover differences. (SOSE 1.6)

### FAUNA

#### Feral animals

- » Definition – A feral animal can be defined as an animal that has reverted to a wild state from domestication. Australia's feral animals have been brought into the country from somewhere else in the world (e.g. rabbits, foxes, goats, cats, horses, donkeys, camels). Where are they? How did they get there? (contact the NRM Boards listed in Attachment 2) (SOSE 1.6)

#### Impacts

- » Threats to other plants and animals – What effect will the animal have on the ecosystem? Look at how this might affect other animals that rely on a similar food source. Create a food web that includes the pest animal and then remove it to discover differences. (Sci 1.1, SOSE 1.6)

#### Impacts

- » Examine types of land use e.g. grasslands, woodlands, gibber, and the animals present. What do the different types of animals need to survive? (Sci 1.1)
- » Research a threatened or common lizard or a marsupial in your local region. Use the fact sheets for information on which species are likely to be found in your area (contact any organisation listed in Attachment 2 for help finding a species and looking for signs of it). Monitor an area adjacent to the school, an area within the school, or both to determine differences between the environments. Discuss why they are different. Is there anything that should or could be done to assist that species? Are there any changes in behaviour the class or students can adopt? (Sci 1.1, SOSE 1.4, 1.6)



Burrowing Bettong, Arid Recovery, Roxby Downs





# Learning Activities Year 3-5

## NATURAL RESOURCES

Our natural resources are water, land (including soil and minerals), vegetation, animals, sun and wind.

### WATER

#### Community use

- » Water usage activities – Look at household and school water usage. Complete a water audit to see where most water is being used and where it can be saved. What steps can you take to use water most efficiently? (SOSE 2.4)
- » Water recycling/reusing – Look at where used water ends up and greywater reuse. What are current council and government laws and regulations for greywater reuse? (SOSE 2.4)
- » Community areas – How do common areas use water? How could they use it better? How many people use that area? In your opinion, is it worth the water used? Why? (SOSE 2.4)

#### Testing/analysis

- » Water bug surveys – Work with the Waterwatch coordinator to set up a half-day excursion to your nearest waterbody to look at water health (see Attachment 2 for NRM Board contacts). (Sci 2.1, SOSE 2.4)
- » Water testing kits (available from SAAL NRM Board and PIRSA) – Test the quality of your tap water, rainwater, bore water, river water etc. (Sci 2.1)
- » Monitor changes in water quantity – This is a major factor governing social wellbeing in the arid zone. Set up stream flow gauges and monitor over 2 terms or a year if possible (the longer the monitoring, the more valuable the results). Perhaps the school could adopt a catchment or stream and monitor its health. Look at relationships between flow and quality, and use NRM Board expertise to conduct experiments to look at bore flows, the amount water needed to maintain healthy ecosystems in bore-fed wetlands etc (see Attachment 2 for NRM Board contacts). (Sci 2.1, SOSE 2.4, 2.5, 2.6)
- » An easy pH analysis of water using red cabbage as litmus can be done following the step by step instructions at [www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus](http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus) The site explains why it changes. (Sci 2.6)

#### General and impacts

- » Watercourses and catchments – Examine local mangrove creeks, rivers, waterholes, springs, lakes and dams. Where does their water come from and where does it go? (Sci 2.1, SOSE 2.6)
- » Floods and other significant water events – Look at the impact of localised flooding or worldwide significant water events (e.g. tsunamis, cyclones, tidal waves) on the local plants, animals, soil and people. What are the transport and health implications of these natural events for people? Have there been changes to the landscape (e.g. levy banks, increased concrete, vegetation clearing) that have increased or decreased the impacts of flooding? (SOSE 2.4)
- » Current media analysis on rivers and lake systems – Collect media releases and articles on a current water issue. Prepare an argument for or against the popular media view. Set up a debate topic on a current issue. Analyse bias in media towards a particular group or community. As a class, come up with your own water-use plan for the region in question after taking different viewpoints into account. (Sci 2.1, SOSE 2.4, 2.6)
- » Impacts of salinisation – Look at the effects of dryland salinity. What happens when you replace deep rooted plants with pasture? Look at the relationship between grazing and water quality. (SOSE 2.4, 2.5, 2.6)

# LAND

## Characteristics

- » Soil erosion by wind and water – Look at the causes of erosion e.g. lack of groundcover, over grazing, impacts of stock. Are native and feral animals contributing to land degradation? Soil erosion is a natural process but can be accelerated by human activity. The soil crust absorbs the impact of water (e.g. raindrops) or wind; as it becomes more disturbed, erosion will increase. Photopoint data might be available for some areas (monitoring over long periods sometimes takes photos of the same scene as it changes over time; ask DEH). (Sci 2.1, SOSE 2.6)
- » Land quality (e.g. types, zones/ testing) and improvement – What can a farmer do to improve land in rocky hills? In sandy deserts? Grazing shrubland? Look at feral animals, erosion, and groundcover. (Sci 2.1, SOSE 2.6)
- » Health of the land and soil and factors to create healthy land and soil – Link with units of work on mini-beasts. (Sci 2.1, SOSE 2.6)
- » Land use – How is land used (farming, grazing, tourism, mining, conservation) and what are the effects of those activities on different land types (e.g. gibber grasslands, woodlands)? Link with ecological sustainability outcome SOSE 2.6 exploration activities and rehabilitation. (Sci 2.1, SOSE 2.4, 2.5, 2.6)
- » Calculate “dry sheep equivalent” for a piece of land. Look at stocking rates for sheep and cattle on [www.mla.com.au/flash/stockingratecalculator/index\\_src.html](http://www.mla.com.au/flash/stockingratecalculator/index_src.html) or [www.agronomy.com.au/download/DSEratings.pdf](http://www.agronomy.com.au/download/DSEratings.pdf). Design and create plans for a sustainable farming future. (Sci 2.1)
- » Consider total grazing pressure – Every animal that uses land, impacts on that land and needs to be considered in terms of water usage and vegetation cover for food. ‘Total grazing pressure’ counts every animal (stock, feral or domestic) that walks, lives and eats on that patch of land (see [www.environment.gov.au/land/publications/pubs/grazing-management-summary.pdf](http://www.environment.gov.au/land/publications/pubs/grazing-management-summary.pdf) for more on total grazing pressure. (Sci 2.1)

## Testing/analysis

- » Test soil pH – Some plants grow better in acidic or alkaline soils; many plant books tell you which. pH kits are available from local hardware stores for \$20–25, are easy to use and come with instructions. The SAAL NRM Board Community Engagement Officer has a kit and can work with classes on testing soil pH. (Sci 2.1)
- » Ribbon test for soil type – Do this very easy test which requires no chemicals (contact an NRM Board listed in Attachment 2 for test instructions). (Sci 2.1)
- » Soil components – To see soil layers, add a handful of soil to a jar and  $\frac{3}{4}$  fill it with water. Shake the contents and then wait a full day for it to settle. The soil settles out into several layers of different particles e.g. large sand particles, fine silt/clay and floating organic matter. (Sci 2.1)



Chambers Gorge



# NATIVE SPECIES

## FLORA

### Characteristics

- » Photograph a local native plant at different stages of its life (possibly at school, near home or on a regular track where it will be easy to see changes in the plant over a season or the year). Relate this information to other aspects of the plant (e.g. what is its survival strategy?) Set up a basic photopoint to collect data. Take photos at different times of year or specifically when changes are observed e.g. after rain, flowering, seeding. (Sci 2.5)
- » Examine local natives for adaptations (including camouflage). Which characteristics of the plant help its survival? Look at leaf shape, colour, texture, plant size and shape. (Sci 2.5)
- » Categories of plants – Discuss ephemeral (live only for a short period of time), perennial (last more than two years), annual (live for one growing season) plants. Study the differences between the three types and what that means in the arid lands (survival strategies). Find examples of local species in each of these groups. (SOSE 2.4, 2.6)
- » Study the Field guide to the plants of outback South Australia by Frank Kutsche and Brendan Lay, or a similar book. Find and identify some local plants in your area, in each category/chapter of the book (e.g. trees, shrubs, grasses). Report on the plants you identify or do extra research. Focus on a special feature of the arid lands e.g. mound springs, stony plains, sandy deserts, rocky outcrops (see the state biodiversity strategy [www.environment.sa.gov.au/biodiversity/rangelands.html](http://www.environment.sa.gov.au/biodiversity/rangelands.html)). (SOSE 2.4, 2.6)
- » Find some local plants that may be special for some reason (to you or others) and do your own profile and research e.g. Sturt desert pea (SA Floral Emblem), native peach/quandong (food), bluebush or saltbush (fodder/grazing), western myall or mulga (iconic feature of your area). (SOSE 2.4, 2.6)
- » Identify icon species and floral emblems from each state and look at the characteristics of each, including their response to heavy rain and drought. (SOSE 2.4, 2.6)
- » What is a plant community or an ecological community? Find a local example and describe it e.g. mulga low open woodland, old man saltbush shrubland. (SOSE 2.4, 2.6)

### Threatened species

- » DEH and SAAL NRM Board have information on current threatened and vulnerable plants. See [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (Sci 2.1)
- » Plant and monitor a plant species that was once found in your area but is now not widely found there. Australian native nurseries (including the Australian Arid Lands Botanic Garden) may be a good source of species. (SOSE 2.4, 2.6)
- » Investigate traditional uses of plants, including cultural significance, bush tucker and timber uses. Look specifically at plants in your area to gain a better appreciation of their value. (SOSE 2.4)

### Impacts

- » Food web/chain – What are the causes and effects of changes to your monitored plant in the food web? (SOSE 2.4, 2.5, 2.6)
- » Discuss some threats to the plant species and what can be done to ensure its survival. (SOSE 2.4, 2.5, 2.6)
- » Are introduced animals grazing on the plant? Will that increase its rate of growth or prevent it from seeding and therefore spreading? (SOSE 2.4, 2.5, 2.6)



Spidery or Balcanoona Wattle

## FAUNA

### Threatened species

- » Species of lizards, snakes, marsupials (e.g. yellow-footed rock-wallaby) and birds are threatened in various parts of the Arid Lands Region. Many are directly impacted by human activity, feral animals, and changes in land use. Learn about animals specific to your local area. Use the information on the fact sheets in this kit or on the websites [www.saalnrm.sa.gov.au](http://www.saalnrm.sa.gov.au) or [www.nynrm.sa.gov.au](http://www.nynrm.sa.gov.au) or [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (Sci 2.1, SOSE 2.4, 2.6)
- » Look at adaptations (including camouflage), threats, and how to assist the survival of specific threatened species. Government departments may have a way students can assist in scientific research or monitoring of a species in a particular area (contact NRM Boards or DEH). (SOSE 2.6)

### Impacts

- » Research a threatened or common lizard or a marsupial in your local region. Use the fact sheets for information on which species are likely to be found in your area (contact an organisations listed in Attachment 2 for help finding a species and looking for signs of it). Monitor an area adjacent to the school, an area within the school, or both to determine differences between the environments. Discuss why they are different. Is there anything that should or could be done to assist that species? Are there any changes in behaviour that the class or students can adopt? (Sci 2.5)

## INTRODUCED SPECIES

## FLORA

### Weeds

- » Definition –A weed is a plant growing where it is not wanted (e.g. wild oats are weeds in a crop of wheat). In your home garden most things with prickles are weeds. (SOSE 2.6)
- » Weed warriors is a program run through the Weeds CRC and a class or school can adopt an area nearby, or partner another school, and help remove or biologically control a weed in an area. You can grow/look after a biological control mechanism (e.g. moths) at your school for use in your region or another region, when the timing is right. (Sci 2.1, SOSE 2.6)
- » Weed busters educational materials are available in many South Australian schools or can be obtained from many government departments. Note the damage weeds cause and their effects on pastoralists, graziers, councils and community members, and the landscape ecosystem as a whole. Discuss the issues with some of these people. Look at the costs if weeds are left to spread and the costs of controlling the weeds. (Sci 2.1, SOSE 2.6)

### Impacts

- » Weed potential – Which plants have the potential to become weeds (e.g. household and local)? (SOSE 2.6)
- » Threats to other plants and animals – Will the weed out-compete another plant? How might this affect animals that rely on certain plant species for food? Create a food web including the pest plant and then remove it to discover differences. (SOSE 2.6)

## FAUNA

### Feral animals

- » Definition – A feral animal can be defined as an animal that has reverted to a wild state from domestication. Australia's feral animals (e.g. rabbits, foxes, goats, cats, horses, donkeys, camels) have been brought into the country from somewhere else in the world. The term 'declared pest' describes an animal that is a recognised pest in an area, region or country. (SOSE 2.4, 2.6)
- » Feral animals – Where are they? How did they get there? What are various landholders and government departments doing to eradicate or control this pest animal? (Contact the NRM Boards listed in Attachment 2) (SOSE 2.4, 2.6)

### Impacts

- » What damage do feral animals cause? What are their effects on pastoralists, graziers, councils and community members, and the landscape ecosystem as a whole? Discuss the issues with some of these people. Look at the costs if feral animals are left unmanaged and the costs of controlling their populations (contact SAAL NRM Board, see Attachment 2). (SOSE 2.6)
- » Threats to other plants and animals – What effect will the animal have on the ecosystem? How might this affect other animals that rely on a similar food source? Create a food web including the pest animal and then remove it to discover differences. (Sci 2.1 SOSE 2.5, 2.6)





# Learning Activities Year 6-7

## NATURAL RESOURCES

Our natural resources are water, land (including soil and minerals), vegetation, animals, sun and wind.

### WATER

#### Community use

- » Water usage activities – Look at household and school water usage. Complete a water audit to see where most water is being used and where it can be saved. What steps can you take to use water most efficiently? (SOSE 3.4, 3.5, 3.6)
- » Water recycling/reusing – Look at where used water ends up and greywater reuse. What are current council and government laws and regulations for greywater reuse? (SOSE 3.4, 3.5, 3.6)
- » Community areas – How do common areas use water? How could they use it better? How many people use that area? In your opinion, is it worth the water used? Why? (SOSE 3.4, 3.5, 3.6)

#### Testing/analysis

- » Water bug surveys – Work with the Waterwatch coordinator to set up a half-day excursion to your nearest waterbody to look at water health (Attachment 2 has NRM Board contacts) (SOSE 3.4, 3.5, 3.6)
- » Water testing kits (available from SAAL NRM Board and PIRSA) – Test the quality of your tap water, rainwater, bore water, river water etc. (SOSE 3.4, 3.5, 3.6)
- » Monitor changes in water quantity – This is a major factor governing social wellbeing in the arid zone. Set up stream flow gauges and monitor over 2 terms or a year if possible (the longer the monitoring, the more valuable the results). Perhaps the school could adopt a catchment or stream and monitor its health. Look at relationships between flow and quality, and use NRM Board expertise to conduct experiments to look at bore flows, the amount water needed to maintain healthy ecosystems in bore-fed wetlands etc. (see Attachment 2 for NRM Board contacts) (SOSE 3.4, 3.5, 3.6)
- » An easy pH analysis of water using red cabbage as litmus can be done following the step by step instructions at [www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus](http://www.thenakedscientists.com/HTML/content/kitchenscience/exp/red-cabbage-litmus) The site explains why it changes. (SOSE 3.6)

#### General and impacts

- » Watercourses and catchments – Examine local creeks, rivers, waterholes, springs, lakes and dams. Where does their water come from and where does it go? (Sci 3.1, SOSE 3.6)
- » Floods and other significant water events – Look at the impact of localised flooding or worldwide significant water events (e.g. tsunamis, cyclones, tidal waves) on the local plants, animals, soil and people. What are the transport and health implications of these natural events for people? Have there been changes to the landscape (e.g. levy banks, increased concrete, vegetation clearing) that have increased or decreased the impacts of flooding? (SOSE 3.4)
- » Current media analysis on rivers and lake systems – Collect media releases and articles on a current water issue. Prepare an argument for or against the popular media view. Set up a debate topic on a current issue. Analyse bias in media towards a particular group or community. As a class, come up with your own water-use plan for the region in question after taking different viewpoints into account. (Sci 3.1, SOSE 3.4, 3.6)
- » Impacts of salinisation – Look at the effects of dryland salinity. What happens when deep rooted plants are replaced with pasture? Look at the relationship between grazing and water quality. (SOSE 3.4, 3.6)

# LAND

## Characteristics

- » Soil erosion by wind and water – Look at the causes of erosion e.g. lack of groundcover, over-grazing, impacts of stock. Are native and feral animals contributing to land degradation? Soil erosion is a natural process but can be accelerated by human activity. The soil crust absorbs the impact of water (e.g. raindrops) or wind; as it becomes more disturbed, erosion will increase. Photopoint data might be available for some areas (monitoring over long periods sometimes takes photos of the same scene as it changes over time; contact DEH).  
(Sci 3.1, SOSE 3.4, 3.5, 3.6)
- » Land quality (e.g. types, zones/testing) and improvement.  
(Sci 3.1, SOSE 3.4, 3.5, 3.6)
- » Health of the land and soil, and factors to create healthy land and soil – Link with units of work on mini-beasts. (Sci 3.1, SOSE 3.4, 3.6)
- » Land use – How is land used (farming, grazing, tourism, mining, conservation) and what are the effects of those activities on different land types (e.g. gibber grasslands, woodlands)? Link with ecological sustainability outcome SOSE 2.6 exploration activities and rehabilitation. (Sci 3.1, SOSE 3.4, 3.5, 3.6)
- » Calculate “dry sheep equivalent” for a piece of land. Look at stocking rates for sheep and cattle on [www.mla.com.au/flash/stockingratecalculator/index\\_src.html](http://www.mla.com.au/flash/stockingratecalculator/index_src.html) or [www.agronomy.com.au/download/DSEratings.pdf](http://www.agronomy.com.au/download/DSEratings.pdf). Design and create plans for a sustainable farming future.  
(Sci 3.1, SOSE 3.5, 3.6)
- » Consider total grazing pressure – Every animal that uses land, impacts on that land and needs to be considered in terms of water usage and vegetation cover for food. [www.environment.gov.au/land/publications/pubs/grazing-management-summary.pdf](http://www.environment.gov.au/land/publications/pubs/grazing-management-summary.pdf). There is a summary report that gets information about total grazing pressure. (Sci 3.1, SOSE 3.5, 3.6)





# NATIVE SPECIES

## FLORA

### Characteristics

- » Photograph a local native plant at different stages of its life (possibly at school, near home or on a regular track where it will be easy to see changes in the plant over a season or the year). Relate this information to other aspects of the plant (e.g. what is its survival strategy?) Set up a basic photopoint to collect data. Take photos at different times of year or specifically when changes are observed e.g. after rain, flowering, seeding.
- » Study the Field guide to the plants of outback South Australia by Frank Kutsche and Brendan Lay. Find and identify some local plants in your area, in each category/chapter of the book (e.g. trees, shrubs, grasses). Report on the plants you identify or do extra research. Find reports that include recommendations for sustainable land management and outline future actions for an area of interest (try the government departments listed in Attachment 2). Focus on a special feature of the arid lands e.g. mound springs, stony plains, sandy deserts, rocky outcrops (see the state biodiversity strategy [www.environment.sa.gov.au/biodiversity/rangelands.html](http://www.environment.sa.gov.au/biodiversity/rangelands.html)). (SOSE 3.4, 3.6)
- » Study what a plant community or ecological community is. Find a local example and describe it (e.g. mulga low open woodland, old man saltbush shrubland). Look at the main threats to it remaining in its present condition or improving its condition. (SOSE 3.4, 3.6)
- » Examine local natives for adaptations (including camouflage). Which characteristics of the plant help its survival? Look at leaf shape, colour, texture, plant size and shape.
- » Categories of plants – Discuss ephemeral (live only for a short period of time), perennial (last more than two years), annual (live for one growing season) plants.
- » Identify icon species and floral emblems from each state and look at the characteristics of each, including their response to heavy rain and drought.

### Threatened species

- » DEH and SAAL NRM Board have information on current threatened and vulnerable plants. See [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (Sci 3.1)
- » Plant and monitor a plant species that was once found in your area but is now not widely found there. Australian native nurseries (including the Australian Arid Lands Botanic Garden) may be a good source of species. (SOSE 3.4, 3.6)
- » Investigate traditional uses of plants including cultural significance, bush tucker and timber uses. (SOSE3.4)

### Impacts

- » Food web/chain – What are the causes and effects of changes to your monitored plant in the food web? (Sci 3.1, SOSE 3.4, 3.6)
- » Discuss some threats to the plant species and what can be done to ensure its survival. (Sci 3.1, SOSE 3.4, 3.6)
- » Are introduced animals grazing on the plant? Will that increase its rate of growth or prevent it from seeding and therefore spreading? (Sci 3.1, SOSE 3.4, 3.6)



Eremophila

## FAUNA

### Threatened species

- » Species of lizards, snakes, marsupials (e.g. yellow-footed rock-wallaby) and birds are threatened in various parts of the Arid Lands Region. Many are directly impacted by human activity, feral animals, and changes in land use. Learn about animals specific to your local area. Use the information on the fact sheets in this kit or on the websites [www.saalnrm.sa.gov.au](http://www.saalnrm.sa.gov.au) or [www.nynrm.sa.gov.au](http://www.nynrm.sa.gov.au) or [www.environment.gov.au/biodiversity/threatened/index.html](http://www.environment.gov.au/biodiversity/threatened/index.html) (Sci 3.1, SOSE 3.4, 3.6)
- » Look at adaptations (including camouflage), threats, and how to assist the survival of specific threatened species. Government departments may have a way students can assist in scientific research or monitoring of a species in a particular area (contact the NRM Boards or DEH). (SOSE 3.4, 3.6)

### Impacts

- » Examine types of land use e.g. grasslands/woodlands/gibber and the animals present. What do the different types of animals need to survive? (Sci 3.1)
- » Research a threatened or common lizard or marsupial in your local region. Use the fact sheets for information on which species are likely to be found in your area (contact any organisations listed in Attachment 2 for help finding a species and looking for signs of it). Monitor an area adjacent to the school, an area within the school, or both to determine differences between the environments. Discuss why they are different. Is there anything that should or could be done to assist that species? Are there any changes in behaviour the class or students can adopt?

## INTRODUCED SPECIES

## FLORA

### Weeds

- » Definition – A weed is a plant growing where it is not wanted. For example wild oats are a weed in a crop of wheat. In your home garden most things with prickles are weeds. (SOSE 3.6)
- » Weeds – Investigate: Where? Why? What? for their eradication and control. (SOSE 3.4, 3.6)
- » Weed warriors is a program run through the Weeds CRC. A class or school can adopt an area nearby, or partner another school, and help remove or biologically control a weed in an area. You can grow/look after a biological control mechanism (e.g. moth) at your school and use it in your region or another region when the timing is right. (Sci 3.1, SOSE 3.4, 3.6)
- » Weed busters educational materials are available in many schools in South Australia or can be obtained from many government departments. Note the damage that weeds cause and their effects on pastoralists, graziers, councils and community members, and the landscape ecosystem as a whole. Discuss the issues with some of these people. Look at costs if weeds are left to spread and the costs of control of the weeds. (Sci 3.1, SOSE 3.4, 3.6)

### Impacts

- » Awareness – Which plants have potential to become weeds (e.g. household and local)? (SOSE 3.6)
- » Threats to other plants and animals – Will the weed out compete another plant? Look at how this might affect animals that rely on certain plant species for food. Create a food web including the pest plant and then remove it to discover differences. (SOSE 3.6)

## FAUNA

### Feral animals

- » Definition – A feral animal can be defined as an animal that has reverted to a wild state from domestication. Australia's feral animals (e.g. rabbits, foxes, cats, goats, horses, donkeys, camels) have been brought into the country from somewhere else in the world. The term 'declared pest' describes an animal that is a recognised pest in an area, region or country. (SOSE 3.4, 3.6)
- » Feral animals – Where are they? How did they get there? What are various landholders and government departments doing to eradicate or control various pest animals? (Contact the NRM Boards listed in Attachment 2) (SOSE 3.4, 3.6)

### Impacts

- » What damage do feral animals cause? What are their effects on pastoralists, graziers, councils and community members, and the landscape ecosystem as a whole? Discuss the issues with some of these people. Look at the costs if feral animals are left unmanaged, and the costs of controlling their populations. (Contact NRM Boards listed in Attachment 2) (SOSE 3.6)
- » Threats to other plants and animals – What effect will the animal have on the ecosystem? Look at how this might affect other animals that rely on a similar food source. Create a food web with the pest animal included and then remove it to discover differences. (Sci 3.1, SOSE 3.5, 3.6)



# Enquiry Questions

## WATER

**Where does our council get water for parks/ovals?**

**What constitutes good drinking water?**

Hint: Test a range of water from tanks, pools, rivers, dams, town supply.

**When it rains where does the water go?**

**Where do we get water from when there's no rain?**

Hint: Look at personal water use, and water use by farmers and local businesses. Consider water use from tanks, bores and the Great Artesian Basin.

**What is a mound spring? What sorts of things live in mound springs?**

Hint: Some animals live in mound springs and nowhere else.

**What is so important about natural springs, such as Appila Springs, in our region?**

**What is groundwater and what are some of its functions? How do we use groundwater? What else does it do?**

Hint: Learn about the Great Artesian Basin

**Who owns underground water?**

**Are floods a positive or negative event? Why do you think this?**

**Who uses our water?**

Hint: Consider changes and developments that could be recommended or that are currently being reviewed. You may be able to make recommendations from class studies.

**Who owns river or runoff water?**

## CONTACTS

Contact the Department for Environment and Heritage or your Natural Resources Management Board to arrange a visit from a field officer or for information about water regulations, rights and allocation restrictions and licensing.

Contact councils, community groups and landholders in related catchments for measurements and historical comparisons and photos.

Involve organisations such as council, Environmental Protection Authority, Primary Industries and Resources SA, local water experts and/or community members and groups.



Frome Creek



# LAND

**What types of erosion are there? How is erosion caused?**

Hint: Consider wind, water, lack of groundcover.

**How do we stop or minimise erosion? What are some of the land management practices that could be used to do this?**

Hint: Look for demonstrated land use comparisons, noting differences if any between National Parks, Conservation Reserves, or areas managed for conservation.

**What are the different land uses for our region? What impact do you think they have on the land and communities?**

Hint: Examples are mining, tourism, housing, cropping and grazing.

**What are the benefits and drawbacks of grazing animals such as sheep and cattle?**

Hint: Think about managing vegetation for fire risk for example.

**Why do you think native vegetation has been cleared in the past? What (if anything) do you think needs to be done about this? How?**

Hint: Consider what has to be done to make money from the land. It may not need to be cleared for all industries.

# CONTACTS

Contact your Natural Resources Management Board, Greening Australia, Primary Industries and Resources SA, Rural Solutions SA, Trees for Life, nurseries etc.

Contact local farmers/landholders for insights into causes and solutions tried at local levels.



Flinders Ranges





## NATIVE SPECIES

**How do various native species survive in a range of conditions?**

**Where do certain animals live? Why?**

**Where do you find different types of plants? Why?**

**What are the characteristics of different vegetation groups?**

**How can we improve/maintain these vegetation communities?**

**How do native animals survive?**

**What are some of the threats to native plant and animal species in our region? How can we try and address these issues?**

**What is the difference between a threatened and endangered species?  
What are some of the threatened or endangered species in our region?**

**Why do you think these species are threatened or endangered?**

**(How) can we help these species to exist and not become extinct?**



Stimpson's Python

## CONTACTS

Contact the SA Arid Lands Natural Resources Management Board to arrange an officer to bring in an animal to discuss threatened species.

Visit or invite a guest speaker from Arid Recovery in Roxby Downs, South Australian Museum or the Nature Education Centre (39 Osmond Tce Norwood SA, 8362 0112). The Nature Education Centre also has live and preserved animal specimens as well as kits and fact sheets on a variety of animals and environments for loan.

Department for Environment and Heritage, 'Friends of' groups, Port Germein and Telowie Conservation Park, Australian Arid Lands Botanic Garden, Port Augusta, Powell Park, Quorn, Catchment Action Planning groups, Mid North Grasslands Group, and individuals involved in monitoring flora and fauna.





# INTRODUCED SPECIES

**Which plants in your garden are introduced? Which plants may have the potential to become pests? How can we control weeds/plants that are considered pests? Do you know of abandoned townships that have garden escapees like cactus?**

Hint: Make up a plant list for home and school gardens and look at weedy potential. Visit an old railway town or similar to see garden escapees like cactus.

**What is wrong with introduced plants or animals? Why? What do they do wrong? How do/can we control them?**

Hint: Look at and discuss public perception of these issues. Look at animal rights issues, discussing media portrayal of certain topics e.g. mulesing.

**What do you think the landscape near your place would look like if there were thousands of rabbits digging holes everywhere? What effect do you think this would have on other animal and plant species in the area?**

**What would happen to lots of small marsupials like the southern marsupial mole if there were too many cats and foxes around and no one controlled their populations?**

**What do you think happens to yellow-footed rock-wallabies when there are too many goats around eating the same grasses and shrubs?**

**Which native Australian animals are at threat because of introduced species in our region? How do native and introduced animals compete in these environments?**

**Are there any introduced species that can have a positive influence? Which (if any) species, and how?**

Hint: Select a native and an introduced animal and investigate.

# CONTACTS

Visit the Weed CRC website [www.weedsrc.org.au](http://www.weedsrc.org.au) for fact sheets on many weed species in SA and around Australia.

Contact the SA Arid Lands Natural Resources Management Board's Threatened Species Officer or the Department for Environment and Heritage to discuss their Bounceback program or for photos of damage caused by introduced animals.



Prickly Pear



# Attachment 1. Resources

## REFERENCES FOR BIODIVERSITY STUDIES FACT SHEETS

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- Higgins, PJ and Peters, JM (eds). 2002. *Handbook of Australian, New Zealand and Antarctic birds. Volume 6: Pardalotes to shrike-thrushes*. Oxford University Press, Melbourne.
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- Pedler, L. 1992. Review of the status and distribution of the chestnut-breasted whiteface *Aphelocephala pectoralis*. *South Australian Ornithologist* 31: 79–93.
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## TEACHER RESOURCES

[home.howstuffworks.com/science-projects-for-kids-soil-experiments.htm](http://home.howstuffworks.com/science-projects-for-kids-soil-experiments.htm)

Small projects and experiments for small groups of students or individuals: soils, plants, energy, space and much more (check advertising appropriateness for younger students).

[www.abc.net.au/science/topics/?topic=enviro](http://www.abc.net.au/science/topics/?topic=enviro)

Science news, quizzes and games including Catchment Detox game for upper primary about managing ecosystems and water usage.

[www.amonline.net.au/explore/index.cfm](http://www.amonline.net.au/explore/index.cfm)

Australian museum online; various topics and factsheets.

<http://e-nrims.dwlbc.sa.gov.au/alis/>

The Arid Lands Information System is a database website where local maps can be designed by turning layers on or off. Some areas covered are geology, ground water, pest occurrences, mineral and pastoral leases.

[www.environment.gov.au/biodiversity/invasive/ferals/index.html](http://www.environment.gov.au/biodiversity/invasive/ferals/index.html)

Government website with information on a range of environmental topics.

[www.environment.gov.au/education/students-teachers/index.html](http://www.environment.gov.au/education/students-teachers/index.html)

Teacher and school information on various topics; many links to other useful websites.

[www.environment.gov.au/biodiversity/threatened/ts-day/index.html](http://www.environment.gov.au/biodiversity/threatened/ts-day/index.html)

National Threatened Species Day (7 September each year) encourages the community to help conserve Australia's unique native fauna and flora by taking action to prevent further extinctions; contains good resources to educate children on threatened species in Australia and what they can do to help the cause.

[www.environment.nsw.gov.au/pestsweeds/pestanimals.htm](http://www.environment.nsw.gov.au/pestsweeds/pestanimals.htm)

Information on feral animals of Australia, including fact sheets (has a NSW focus).

[www.juniorlandcare.com](http://www.juniorlandcare.com)

Information about funding 4 times a year for recycling, composting gardens and more; resources section has links to useful information and overviews of biodiversity, water and climate change.

[www.nrw.qld.gov.au/services\\_resources/item\\_list.php?category\\_id=72](http://www.nrw.qld.gov.au/services_resources/item_list.php?category_id=72)

Resources for practical classroom activities such as guidelines to acting out a water cycle or creating a model of a watercourse.

[www.saalnrm.sa.gov.au](http://www.saalnrm.sa.gov.au)

This site gives background to the Arid Lands Natural Resources Management Board and what it does in the region. Click on Publications and Resources to find biodiversity fact sheets on Threatened Species

[www.sustainabilitywiz.com](http://www.sustainabilitywiz.com)

Various schools take part in this program Australia-wide (costs involved).

[weedsrsc.org.au/static/for\\_schools](http://weedsrsc.org.au/static/for_schools)

Programs with planned learning experiences.





## R-2 RESOURCES

Interactive sustainability site on various topics including information to 'reduce, reuse, recycle', biodiversity, water and many more (with activities to engage students); has quiz questions, information, actions, and student/teacher sections.

[games.envirotalk.com.au](http://games.envirotalk.com.au)

Water Busters water saving game; not much reading after initial setup.

[www.kidcyber.com.au](http://www.kidcyber.com.au)

Contains lists and information on Australian animals, including feral animals and endangered animals.

[www.nrw.qld.gov.au/education/kids\\_corner/index.html](http://www.nrw.qld.gov.au/education/kids_corner/index.html)

Many great little easy activities for young children to get them thinking about environmental issues; Queensland focused but most activities are relevant.

[www.olliesworld.com/planet/index.htm](http://www.olliesworld.com/planet/index.htm)

Interactive sustainability site on various topics including information to 'reduce, reuse, recycle' concepts, biodiversity, water and many more (with activities to engage students); has quiz questions, information, actions, and student/teacher sections.



Pernatty Knob-Tailed Lizard



## YEAR 3-5 RESOURCES

[www.anra.gov.au/mapmaker](http://www.anra.gov.au/mapmaker)

Create maps of any region in Australia, adding on layers of rivers, roads and land use.

[www.frogatlas.com.au](http://www.frogatlas.com.au)

Database of frog distribution.

[games.envirotalk.com.au](http://games.envirotalk.com.au)

Yard Sale – environmental decisions, includes pricing items; I Don't Want To Clean My Room – categorising and recycling; Water Busters – water saving game; Energy Hog – energy saving measures; Errand Run – alternative transport game.

[www.kidcyber.com.au](http://www.kidcyber.com.au)

Contains lists and information on Australian animals, including feral animals and endangered animals.

[www.nrw.qld.gov.au/education/kids\\_corner/index.html](http://www.nrw.qld.gov.au/education/kids_corner/index.html)

Many great easy activities for young children to get them thinking about environmental issues; Queensland focused but most activities are relevant.

[www.nynrm.sa.gov.au/GettingInvolved/EducationPrograms/tabid/393/language/en-AU/Default.aspx](http://www.nynrm.sa.gov.au/GettingInvolved/EducationPrograms/tabid/393/language/en-AU/Default.aspx)

Snakes and ladders game based on environmentally friendly initiatives.

[www.olliesworld.com/planet/index.htm](http://www.olliesworld.com/planet/index.htm)

Interactive sustainability site on various topics including information to 'reduce, reuse, recycle' concepts, biodiversity, water and many more (with activities to engage students); has quiz questions, information, actions, and student/teacher sections.

[www.rbgsyd.nsw.gov.au/education/Resources/kids\\_zone](http://www.rbgsyd.nsw.gov.au/education/Resources/kids_zone)

Activities for learning about gardening, plants, composting etc; also activities to print and complete.

[www.weedwarriors.net.au](http://www.weedwarriors.net.au)

an innovative national program that helps participants learn, hands-on, about invasive pest plants, a major environmental menace to Australia, and become part of the solution.

[www.weedscrc.org.au/for\\_schools/weedwipeout\\_flash.html](http://www.weedscrc.org.au/for_schools/weedwipeout_flash.html)

A game in which children can pick different control methods to remove various weeds from a pastoral property.



## YEAR 6-7 RESOURCES

[www.abc.net.au/science/planetslayer](http://www.abc.net.au/science/planetslayer)

Interactive games and cartoons to teach children about carbon pollution, the effects of everyday activities on the planet and how you can reduce your carbon footprint.

[www.abc.net.au/science/topics/?topic=enviro](http://www.abc.net.au/science/topics/?topic=enviro) or [www.catchmentdetox.net.au](http://www.catchmentdetox.net.au)

Catchment Detox game for upper primary about managing ecosystems and water usage.

[www.anra.gov.au/mapmaker](http://www.anra.gov.au/mapmaker)

Create maps of any region in Australia, adding on layers of rivers, roads and land use.

[games.envirotalk.com.au](http://games.envirotalk.com.au)

PotBiz: the innovation game – making environmental and economical choices for a pot business, 1 year of business is about 20 minutes per game with the option to continue to a second year; Water Busters – water saving game; Energy Hog – energy saving measures; Errand Run – alternative transport game.

[www.kidcyber.com.au](http://www.kidcyber.com.au)

Contains lists and information on Australian animals, including feral animals and endangered animals.

[www.nrw.qld.gov.au/education/kids\\_corner/index.html](http://www.nrw.qld.gov.au/education/kids_corner/index.html)

Contains many great little easy activities for children to get them thinking about environmental issues; Queensland focused but most activities are relevant.

[www.nynrm.sa.gov.au/GettingInvolved/EducationPrograms/tabid/393/language/en-AU/Default.aspx](http://www.nynrm.sa.gov.au/GettingInvolved/EducationPrograms/tabid/393/language/en-AU/Default.aspx)

Snakes and ladders game based on environmentally friendly initiatives.

[www.olliesworld.com/planet/index.htm](http://www.olliesworld.com/planet/index.htm)

Interactive sustainability site on various topics including information to 'reduce, reuse, recycle' concepts, biodiversity, water and many more (with activities to engage students); has quiz questions, information, actions, and student/teacher sections.

[www.rbg Syd.nsw.gov.au/education/Resources/kids\\_zone](http://www.rbg Syd.nsw.gov.au/education/Resources/kids_zone)

Activities for learning about gardening, plants, composting etc; also activities to print and complete.

[www.thenakedscientists.com](http://www.thenakedscientists.com)

Written and podcast interviews for adults and upper primary students on a range of science topics.

[www.weedwarriors.net.au](http://www.weedwarriors.net.au)

An innovative national program that helps participants learn, hands-on, about invasive pest plants, a major environmental menace to Australia, and become part of the solution.





# PLANT IDENTIFICATION WEBSITES

[florabase.calm.wa.gov.au](http://florabase.calm.wa.gov.au)

Western Australian flora.

[plantnet.rbgsyd.nsw.gov.au/search/simple.htm](http://plantnet.rbgsyd.nsw.gov.au/search/simple.htm)

New South Wales flora online, PlantNET – NSW.

[www.anbg.gov.au/abrs/online-resources/flora/main-query-styles.html](http://www.anbg.gov.au/abrs/online-resources/flora/main-query-styles.html)

Flora of Australia online, Australian National Botanic Gardens and Australian National Herbarium.

[www.anbg.gov.au/anbg/photo-collection/index.html](http://www.anbg.gov.au/anbg/photo-collection/index.html)

Australian Plant Image Index – Photo ID facility (if you have the species name).

[www.anbg.gov.au/avh](http://www.anbg.gov.au/avh)

Australia's virtual herbarium with mapping facility (for checking the known range of species).

[www.flora.sa.gov.au/eFloraSA](http://www.flora.sa.gov.au/eFloraSA)

(Electronic Flora of SA): not a good 'ID' site but has many species fact-sheets if you know the species name.



Eucalypt



## PLANT IDENTIFICATION BOOKS

Barker, WR, Barker, R, Jessop, J and Vonow, H. 2005. *Census of SA vascular plants, Edition 5.0*. State Herbarium of SA, Adelaide.

Berkinshaw, T. 2006. *Native vegetation of the Northern and Yorke Region*. Greening Australia, Adelaide.

Chinnock, R. 2007. *Eremophila and allied genera*. Rosenberg Publishing, Dural NSW.

Cunningham, GM. 2006. *Plants of Western NSW*. Inkata Press, North Clayton Vic. (Reprint of 1981 edition; some names out of date)

Eddy, D, Mallinson, D, Rehwinkel, R and Sharp, S. 1998. *Grassland flora: A field guide for the Southern Tablelands (NSW and ACT)*. WWF Australia, Australian National Botanic Gardens, NSW National Parks and Wildlife Service, and Environment ACT, Canberra.

Jessop, J, Dashorst, G and James, F. 2006. *Grasses of South Australia: An illustrated guide to the native and naturalised species*. Wakefield Press, Kent Town SA.

Jessop, JP and Toelken, HR (eds). 1986. *Flora of South Australia*. South Australian Printing Division, Adelaide.

Kutsche, F and Lay, B. 2003. *Field guide to the plants of outback South Australia*. Department of Water, Land and Biodiversity Conservation, Adelaide.

Mid North Grasslands Working Group. 2006. *Grasses, gums & groundcovers: A field guide to the common native plants of the northern agricultural districts of South Australia*. Custom Press, Brompton SA.

Mitchell, AA and Wilcox, DG. 1994. *Arid shrubland plants of Western Australia*. University of Western Australia Press, Crawley WA.

Mitchell, M. 2002. *Native grasses: An identification handbook for temperate Australia*. Landlink Ress, Collingwood Vic.

Moore, P. 2005. *A guide to plants of inland Australia*. Reed New Holland, Sydney.

Prescott, A. 1995. *It's blue with five petals*. Ann Prescott, Prospect, SA.

Wade, S, Corbin, T and McDowell, L-M. 2004. *Critter catalogue: A guide to the aquatic invertebrates of South Australian inland waters*. Environment Protection Authority, Adelaide.

### CD-ROM

Maslin, BR (coordinator). 2001. *Wattle: Acacias of Australia*. ABRS Identification Series. Department of Conservation and Land Management, Australian Biological Resources Study and CSIRO Publishing.



# Attachment 2. People and Organisations

## SA Arid Lands NRM Board, 8648 5977, [www.saalnrm.sa.gov.au](http://www.saalnrm.sa.gov.au)

Staff located in Port Augusta, Coober Pedy, Roxby Downs, Dulkannina Station and Adelaide are willing to travel.

- » Threatened Fauna Officer. Will bring animals to your classroom, has extensive knowledge of characteristics and habits of animals on the fact sheets included in this kit.
- » Natural Resources Management Officers. Have experience with assisting land managers to revegetate sites and paddocks, removing pest plants and animals, and sharing best land management practices.
- » Pest Management Officer. Relays information about the potential threats and management of weeds and feral animals, the impacts people have on their environment and garden plants that have become weeds.
- » Community Engagement Officers. Work with schools and community groups to build understanding of natural resources management issues and can help gain funding for small environmental projects with schools and communities.
- » Aboriginal Engagement Officer. Works with Aboriginal land managers and communities and can talk to students about what Aboriginal land managers are achieving in the region.
- » Water Project Officers. Officers have a microscope and can look at rare invertebrates, teach children about animals found only in springs, water issues in the region, the Great Artesian Basin, where water comes from, threats to waterholes and more.

## Northern & Yorke NRM Board (Upper North region), 8658 1086, [www.nynrm.sa.gov.au](http://www.nynrm.sa.gov.au)

Staff located in Port Augusta, Orroroo, Kadina, Riverton, Clare, Jamestown, Wirrabara and other locations; head office in Crystal Brook (8636 2361).

- » Natural Resources Management Officers. Work with landholders, councils and community groups on projects and activities relating to managing our natural resources such as revegetation, management of wind and water erosion, environmental weed control and community engagement.
- » Authorised Officers (Animal and Plant Control). Increase community and landholders understanding, and acceptance in adopting practices for controlling and eradicating pest plants and animals; can help with learning about which plants are 'Declared' as a threat to the environment and so must be removed from an area and not sold.
- » Biodiversity Support (through Greening Australia). Provides expertise, guidance and support for biodiversity, including plant ID, local native plant species, seed collection, projects.
- » Land Management Support (through Rural Solutions SA). Provides expertise, guidance and support for land management, including soils, land uses/management practices (e.g. cropping, grazing).
- » Monitoring and Evaluation Officer. Ensures understanding of best practice natural resources management projects, and helps monitor and evaluate project progress; could work with senior primary or secondary students to help them develop their own monitoring processes for class assignments.

**NEED HELP GETTING STARTED?**

Call the SAAL NRM Board on 8648 5977





**Department for Environment and Heritage,  
Port Augusta 8648 5300, Clare 8841 3400,  
[www.deh.sa.gov.au](http://www.deh.sa.gov.au) or [www.environment.sa.gov.au](http://www.environment.sa.gov.au)**

Staff located in Port Augusta, and National Parks including Wilpena, Balcanoona, Innaminka, Mt Remarkable and Clare.

- » Interpretive Ranger – Well resourced with (written and spoken) information on areas and significant sites in National Parks; will take classes and groups to sites and discuss the significance of wildlife, ecology or landforms in the area.
- » Conservation and Program Management Officer – Will describe the programs in the region that help to look after the environment, and current conservation actions that students might be able to participate in.
- » Ecologists – Trap and sample for research work on threatened animal and plant species.
- » Wildlife Officers – Manage numbers of native and feral animals living in an area to maintain a healthy balance with the land; may also be helpful for debating topics.
- » Crown Lands Officers – May be used for information when debating topics of boundaries, redevelopment and new subdivisions.
- » Threatened Flora and Fauna Officers – Work to monitor, maintain and enhance threatened species in region; can provide information on various flora and fauna species.

**Department of Water Land and Biodiversity Conservation,  
8648 5300, [www.dlwbc.sa.gov.au](http://www.dlwbc.sa.gov.au)**

- » Pastoral Inspectors – Help landholders monitor the condition of their land, assess pasture and tailor stock levels to the condition of the land; can talk to about the effects of the drought and the impacts of animals on the land; can supply contacts for gaining access to sites and regulations of travel onto pastoral lands.

**Greening Australia,  
South Australia,  
[www.greeningaustralia.org.au](http://www.greeningaustralia.org.au)  
(plants only)**

Natural Resource Centre,  
5 Fitzgerald Road,  
Pasadena SA 5042  
Phone: 8372 0100  
Email: [general@greeningsa.org.au](mailto:general@greeningsa.org.au)

Northern and Yorke District,  
42 High Street,  
Wirrabara SA 5481  
Phone/fax: 8668 4312

## ORGANISATION ABBREVIATIONS

<b>SAAL NRM Board</b>	South Australian Arid Lands Natural Resources Management Board
<b>NY NRM Board</b>	Northern and Yorke Natural Resources Management Board
<b>DEH</b>	Department for Environment and Heritage
<b>DWLBC</b>	Department of Water, Land and Biodiversity Conservation
<b>EPA</b>	Environment Protection Authority
<b>PIRSA</b>	Primary Industries and Resources South Australia



Major Mitchell, Tarcoola

