

# What's in Your Backyard?



Environmental education package exploring threatened species  
found on the South Coast of Western Australia





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## WHAT'S IN YOUR BACKYARD?

Our region is recognised worldwide for its unique, varied and rich living ecosystems. Our backyard forms a part of Australia's only biodiversity hotspot.

This education package provides teachers with the resources to include local information into the curriculum. The resources are suitable for years K to 12.

It introduces you to some of the special local animals who call the South Coast home. Just like humans, the animals of the South Coast need access to basic requirements including:

- Suitable amounts and types of food they can find and eat to move, grow and reproduce
- Sufficient water
- Appropriate habitat to suit their specific needs
- The ability to safely move across landscapes in response to local events like fires or seasonal flooding or to impacts like broad scale plant deaths because of soil dieback or to avoid introduced predators
- Enough variety within their populations to support a vigorous genetic mix of characteristics.

In order to look after our special species, we need to be aware of what resources they use and what living conditions they need to survive, grow and breed in an ancient landscape formed from an amazing jigsaw of different soils and landforms. With this, we need to have an understanding of the threats that are impacting on the survival of some of the species and their habitats.

This package will continue to be updated over time and we encourage feedback and suggestions for improvement. If there is anything you would like to see included in future editions, please contact [caitlinj@southcoastnrm.com.au](mailto:caitlinj@southcoastnrm.com.au).

# WHAT MAKES A PLACE A HOME?

## 1. OVERVIEW

Students will learn about which features make a place a home for the Noisy Scrub-bird, a threatened bird restricted to the South Coast of WA near Albany. This will be achieved by investigating the inquiry question: What makes a place a home?

The focus of the investigation will involve the story of Jeemuluk: The Young Noisy Scrub-bird as a shared story.

## 2. LINKS TO AUSTRALIAN CURRICULUM

STRAND	SUB-STRAND / KEY ORGANISING IDEAS
<b>SCIENCE</b>	
Science understanding	Biological sciences
Science as a human endeavour	Nature and development of science Use and influence of science
Science inquiry skills	Questioning and predicting
<b>ENGLISH</b>	
Language	Listening
Literature	Reading
Literacy	Viewing
<b>SUSTAINABILITY</b>	
	Systems
	Worldviews
	Futures

## 3. OBJECTIVES

Students will:

- Describe at least two special features of the home of a Noisy Scrub-bird.
- Recall two ways that places can be cared for so that local animals can live there.
- Define place.
- Give one example of a place which is used by local animals in the school yard or garden.

### TOPICS

Birds  
Noisy Scrub-bird  
Jeemuluk  
Habitat

### PHASES OF LEARNING

K-2

### SITE (LOCATION)

- Classroom
- Home
- School grounds

### ACTIVITIES

1. A place called home
2. Sharing the book
3. Becoming Jeemuluk
4. Caring for places
5. How Minang people care for places
6. Local Action Project (EXTENSION ACTIVITY)

### MATERIALS

- Copy of Jeemuluk: The Young Noisy Scrub-bird (in file attached)

## 4. TEACHER BACKGROUND INFORMATION

### Noisy Scrub-bird

Jeemuluk or Timiluk is the local Minang Aboriginal name for the Noisy Scrub-bird. The scientific name is *Atrichornis clamorus*. It is a little bird with a big voice. Listen to these calls:

<https://macaulaylibrary.org/audio/8008>

The Noisy Scrub-bird can fly short distances of a few metres and can be found living in long unburnt thickets or scrub, low forest with dense understorey, low heath or dense damp sedges in watercourses. They are most common in vegetation that hasn't been burnt for over 50 years!

They can be very difficult to spot in their natural habitat because of their excellent camouflage and secretive behaviours. The thick, close vegetation that is their preferred habitat gives them cover within which to move, forage and breed.

This bird eats small insects and other invertebrates, foraging for its food in leaf litter, decaying wood and debris and on the surfaces of leaves and stems close to the ground. The Noisy Scrub-bird builds nests on the ground from flexible, broad leaf sedges and lay a single egg.

### Part of a bigger living system

The Two Peoples Bay Nature Reserve on the South Coast near Albany provides the perfect habitat for the Noisy Scrub-bird. The area of this nature reserve, Bald Island, and Mount Manypeaks, are considered to be the only places where the Noisy Scrub-bird is found.

By protecting and managing the Two Peoples Bay - Mt Gardner area for the Noisy Scrub-bird, other animals, plants and fungi also benefit. These include the Gilbert's Potoroo, Western Ringtail Possum, Western Bristlebird, Western Whipbird, Quokka, Australasian Bittern, Quenda, Two Peoples Bay Moss, Cut-leaf Banksia and over 30 different kinds of Truffles (ground fungi).

## 4. TEACHER PREPARATION

Before starting this inquiry, check students have this prior knowledge:

- What is a home?
- What are some of the features of a home that make it safe?
- Some habits of local birds observed in and around their own 'homes' - that is, around nests and feeding sites - at home and at school.
- Read the story of Jeemuluk: The Young Noisy Scrub-bird by Corinn Wallace Hine (ISBN: 0 7309 6890 1), and the History of the Noisy Scrub-bird, found on the last 2 pages of the book.
- You may also like to include a visit to the Two People's Bay Visitor Centre as part of this unit. Students will be immersed in the habitat of the Noisy Scrub-bird whilst learning about the plants and animals of the area in a hands-on and interactive experience with Department of Parks and Wildlife rangers. Call 9842 4500.

## 6. PROCEDURE

### ACTIVITY 1: A place called home

Students will learn about what features make a place a home.

Steps

1. Lead a class discussion on the question 'What is a home?' Start with students' own homes.

- a. What features help students feel safe and cared for in their own homes?
2. Ask students to investigate what birds live in their own backyards and to share clues including feathers, nests, food etc. with the class.
  - a. Ask students to draw the 'clues' they found.
  - b. Start a shared class diary on the students' clues and observations about what birds live in their backyards.
3. Explore your school grounds with students to discover different birds and identify homes and other 'clues', just as they did in their own backyards at home. Add this information to your shared class diary.

### **ACTIVITY 2: Sharing the book**

Students will identify the special features of the home of a Noisy Scrub-bird.

#### Steps

1. Introduce the book, Jeemuluk: The Young Noisy Scrub-bird - discuss the title, look at the cover of the book etc.
2. Run through some questions and predictions with your class, e.g.
  - a. What do you think we can learn about Jeemuluk and his home?
3. As reading proceeds, discuss any words that are new to the students.
4. Complete the reading - then discuss
  - a. What are some of the things (features of) home which Jeemuluk needs? List those words which told of all the things he needed to be safe.
  - b. The dangers that Jeemuluk faced.
  - c. Tie answers to a. and b. to what students have identified as the things they need at home to feel comfortable and safe.

### **ACTIVITY 3: Becoming Jeemuluk**

Students will identify with a Noisy Scrub-bird through actions to mark out a territory.

#### Steps

1. Move like Jeemuluk. Ask students to move like a Noisy Scrub-bird: darting and dashing movements. You may wish to show them first or ask for their own ideas. Ask students: 'Can you move like Jeemuluk to another place in the room?'
2. Mark your own territory. Ask students to find a place in the room and make a territory around themselves: they might draw an area on the floor using chalk or use objects to create a 'fence' or barrier or define an area.
3. Name your territory. This place is now the students' territory. Ask students to think of a word to mark it out. Then ask students to call out their word to let others know that that is their living place. Ask students: How did Jeemuluk mark out his territory?

### **ACTIVITY 4: Caring for places**

Students will discover ways that places can be cared for so that local animals, like birds, can live there.

## Steps

1. Review the book Jeemuluk and lead a class discussion on: How did humans help Jeemuluk?
2. Ask students to brainstorm the question: What can we do to help care for our other local birds? You may like to start this discussion by asking students how they care for their own homes and families.

The Birdlife Australia website ([www.birdlife.org.au](http://www.birdlife.org.au)) has many great ideas for how to care for local birds including identification, bird watching, attracting birds to your garden, how to build nest boxes and examples of other projects that have been undertaken by communities to help their local birds.

### **ACTIVITY 5: How Minang people care for places**

Students will learn how Aboriginal people cared for their country.

1. Invite an Aboriginal Elder to talk to your class about how Aboriginal people cared for their local area and share traditional stories.

### **EXTENSION ACTIVITY**

#### **ACTIVITY 6: Local Action Project**

Students will work with a buddy class to develop and implement a local action project.

## Steps

1. Arrange for a Year 6 class to buddy with your Year K to 2 students to design and implement their own student-led caring for local bird species project.
2. Develop a real Civics & Citizenship theme challenging students to design their own Action Project to care for the special places of some of our local birds.

Examples of local action projects could be to fundraise for the Noisy Scrub bird or another locally threatened bird species, or work with the school gardener, South Coast NRM or ask Bird Life Australia what to plant and how to maintain a bird friendly garden bed in their school yard.

### **RELATED RESOURCES**

#### **South Coast NRM contact details:**

Albany: Office address: 39 Mercer Road, Albany, WA 6330

Tel: (08) 9845 8537

Fax: (08) 9845 8538

[info@southcoastnrm.com.au](mailto:info@southcoastnrm.com.au)

Esperance: Office address is Esperance NRM Centre, Unit 4, Suite B, 113 Dempster Street, ESPERANCE, WA 6450

Postal Address: PO Box 1801, ESPERANCE, WA 6450

Tel (08) 9076 2200

Fax (08) 9072 0499

Albany Bird Group, phone: (08) 9844 7540; website: <https://sites.google.com/site/albanybirds/Home>

Esperance Bird Observers Group, phone: (08) 9072 1350; email: [mikegibbs@wn.com.au](mailto:mikegibbs@wn.com.au)

Department of Parks and Wildlife Albany, Phone: (08) 9842 4500

Birdlife Western Australia, phone: (08) 9383 7749; website: [www.birdlife.org.au/wa](http://www.birdlife.org.au/wa)

Wirlomin Noongar Language and Stories Project website: [http://wirlomin.com.au/?page\\_id=70](http://wirlomin.com.au/?page_id=70)

Noongar Published Resources webpage: <http://www.noongarculture.org.au/noongar-dictionary/>

## VOCABULARY

**Camouflage** - hide or disguise.

**Habitat** - the natural home or environment of an animal, plant, or other organism.

**Home** - the place where an animal or plant lives.

**Noisy Scrub-bird** - a small, brown almost flightless bird which lives in a handful of scattered areas across the South West of WA. The Noisy Scrub-bird is a tiny bird with a loud call. It eats insects and other bugs and lives amongst the thick cover of bushes and sedges. It needs bushland homes which have not been burnt in a very long time e.g. 50 years.

**Understorey** - a layer of vegetation beneath the main canopy of a forest.

**Place** - a particular position, point, or area in space; a location.

**Protect** - to keep from harm or injury.

**Sedges** - are grass-like or rush-like plants which grow on wet ground and have special roots called rhizomes and triangular stems.

**Territory** - an area defended by an animal or group of animals against others of the same sex or species.

## REFERENCES

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- Danks A, Burbidge A A, Burbidge A H and Smith G T (1996) Noisy Scrub-bird Recovery Plan. Department of Conservation and Land Management. <https://www.environment.gov.au/system/files/resources/39edc435-cfc7-40f4-8349-6362f00cod8b/files/noisy-scrub-bird.pdf>
- Cochrane A, Barrett S, Friend T, Bougher N, Comer S & Danks A (2008) Discovering Two Peoples Bay Nature Reserve. Department of Conservation and Environment <https://shop.dpaw.wa.gov.au/books/discovering-series/product/277-discovering-two-people-bay-nature-reserve>
- Birds in Backyards <http://www.birdsinbackyards.net/>
- Birdlife Australia <http://birdlife.org.au/>

# SIMILAR OR DIFFERENT?

## Life cycles of South Coast Critters

### 1. OVERVIEW

Students will investigate the life cycles of three threatened species of the South Coast. They will compare and contrast (Bloom's Thinking level of Analysis) the life cycle of three vertebrates (animals with backbones).

### 2. LINKS TO THE AUSTRALIAN CURRICULUM

STRAND	SUB-STRAND / KEY ORGANISING IDEAS
<b>SCIENCE</b> Science understanding  Science as a human endeavour  Science inquiry skills	Biological science Living things  Nature and development of science  Questioning and predicting  Planning and conducting  Communicating
<b>ENGLISH</b> Language  Literacy	Text structure and organisation Expressing and developing ideas Interpreting, evaluating, analysing Creating texts
<b>SUSTAINABILITY</b>	Systems

### 3. OBJECTIVES

Students will:

- Describe the life cycle of at least one local animal.
- Explain at least two differences in the stages of life cycles of a bird, a frog and a marsupial mammal, using local animals as examples.
- Name three key design aspects of a well-designed poster.

#### TOPICS

Life cycles  
Threatened species

#### PHASES OF LEARNING

Early 3-6

#### SITE (Location)

- Classroom

#### ACTIVITIES

1. Introducing life cycles
2. Exploring life cycles
3. Make your own poster (Includes Assessment Option)

#### MATERIALS

- Cardboard
- Pens, pencils, glue, scissors
- Computer with internet access
- TV

#### STUDENT WORKSHEET

1. Assessment Rubric
2. Life Cycles

## 4. TEACHER BACKGROUND INFORMATION

### Life Cycles of the Sunset Frog, Quokka and the Malleefowl

	<b>SUNSET FROG</b> KOOYAR 	<b>MALLEEFOWL</b> GNOW 	<b>QUOKKA</b> QUOKKA 
Habitat	Permanently moist peat-based swamps, which are found East and North East of Walpole: mainly in the Shire of Denmark.	Mainly in semi-arid and arid woodlands and mallee scrub across a number of Australian states. In WA, in Dryandra State Forest, Fitzgerald River, Kalbarri and Cape Arid National Parks and on private property in the Wheatbelt, throughout the Gondwanalink and the Stirling Ranges NP.	Mainland quokkas live in densely vegetated swamps, tea-tree thickets (closed stands of Melaleuca trees) and / or low dense heath on slopes. Found at Rottnest and Bald Islands. In SW WA, populations in 25 sites - including Walpole-Nornalup National Parks, Two Peoples Bay, Stirling Range NP and Manypeaks
Lifecycle stages	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Eggs (laid by adult female)</li> <li>• Tadpole</li> <li>• Adult</li> </ul>	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Eggs (laid by adult female) in an incubator mound = nest)</li> <li>• Chick</li> <li>• Adult</li> </ul>	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Fertilised egg (inside female adult)</li> <li>• Under-developed newborn *</li> <li>• Joey*</li> <li>• Adult</li> </ul> *Grow in mothers' pouch
Time of year	Males call from October to December	Breeding season usually June to February	Seem to breed all year round.
Numbers Eggs or live young	Less than 200 soft eggs are laid in water	15 to 24 hard-shelled eggs are laid	Female Quokkas give birth to a one young about a month after mating.
Length of stages		Males and females are sexually mature at 4 years	27 day gestation
Environmental conditions needed	<ul style="list-style-type: none"> <li>• Eggs sit just below waters' surface</li> <li>• Tadpole stage probably free swimming</li> <li>• Fires pose a threat to this species</li> <li>• Needs wet environment to live and breed</li> </ul>	<ul style="list-style-type: none"> <li>• Males and females are sexually mature at 4 years</li> <li>• Average time for incubation of eggs is about 63 days</li> <li>• Usually breed once a year</li> <li>• Live to 25 years</li> <li>• Can live in arid or dry conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Young stays in pouch for 6 months.</li> <li>• After joey leaves the pouch it will still feed at its mother's teats for extra 2 months or so.</li> <li>• Most development of young occurs in pouch</li> </ul>

## 5. TEACHER PREPARATION

### For Activity 1

Watch the following video clips:

- Why do plants make fruit? 5 mins 19 secs

<http://splash.abc.net.au/media/-/m/86130/fruit-why-plants-make-them>

Fruits come in all shapes and colours. Have you ever wondered why plants make them? Learn the secret of these little plant packages.

- How seeds become plants 5 mins 20 secs

<http://splash.abc.net.au/media/-/m/how-seeds-become-plants>

Did you know that a coconut and a walnut are actually seeds? Tiny of huge, prickly or smooth, seeds contain everything a plant needs to start a new life.

### For Activity 2

Access a poster on the life cycle of flowering plants. A simple poster can be found here:

<https://www.makewav.es/story/271601/title/plantlifecyclestories> or, ask your science department if your school has a similar poster you can use.

### For Activity 3

Print, or make electronically available, the **STUDENT WORKSHEET 2: Life Cycles** which provides information on the Sunset Frog, Malleefowl and Quokka.

If doing Assessment Option: read the assessment rubric and adapt as required.

Locate one life cycle poster of a plant or flowering plant which you think demonstrates good poster design features. Print copies of the **STUDENT WORKSHEET 1: Assessment Rubric** to distribute to the class.

## 6. PROCEDURE

### ACTIVITY 1: Introducing life cycles

Students will learn about life cycles of plants.

#### Steps

1. Depending on your class and access to IT there are two options for engaging your students in this activity: Either

A. Show the two ABC film clips (Why do plants make fruit? and How seeds become plants) which explore the life cycle of flowering plants: each takes a little over 5 minutes. You may choose to just show Why do plants make fruits? Ask students to make short notes to number, name and describe the different stages in the life of a flowering plant. You may like to re-view the video clip/s to allow students enough time to process the information and take notes.

OR

- B. Ask students to Mind Map or Brainstorm or do a Think, Pair and Share on the term “Life Cycles of Plants”.

2. After either A or B share and review and summarise your classes’ ideas on LIFE CYCLES. You may wish to begin a shared word bank of the new terms or key concepts discussed.

## ACTIVITY 2: Exploring life cycles

Students will learn about the stages in life cycles.

### Steps

1. Use at least one life cycle poster on flowering plants to reinforce the ideas raised in Activity 1.
2. As a class discuss and name the main stages of the life cycle.
3. Lead a class discussion on life cycles using the following prompts:
  - a. Why is it called a 'life cycle'?
  - b. What does the term 'cycle' mean? What other words do you already know which have the word cycle in them?
  - c. New words: Talk about new words, do they remind the students of other words they already know?

## ACTIVITY 3: Make your own poster (Includes Assessment Option)

Students will research, design, assemble and produce their own poster on the life cycle of a South Coast threatened species.

### Steps

1. Share with your class selected well designed poster/s. Using direct instruction, point out the features which make it work well (work through the criteria listed in the **STUDENT WORKSHEET 1: Assessment Rubric** for this lesson).
2. Depending on the ability of your class and your time budget, you may wish to involve students more in this activity. For example
  - Working in groups of three, ask students to look at one poster in detail.
  - Each group then assesses and scores that poster, based on their own criteria/ideas.
  - Ask each group to identify the features which make the poster work well: students could write on post it notes, naming the feature, and then place post it notes on what features work well.
3. Provide students with the **STUDENT WORKSHEET 1: Assessment Rubric** which will be used for their poster assessment. Ask students to give the poster a mark out of 20 using this rubric.
4. Divide your class into 3 large groups - and assign each group the task of learning about, researching and making a poster on ONE of the animals (Sunset Frog, Quokka and the Malleefowl).
  - a. Research phase: You may wish the students to do their own research or you may wish to provide the texts they will use. **The STUDENT WORKSHEET 2: Life Cycles** could be used here.
  - b. Note taking and forming ideas: Effective note-taking is a skill: it involves reading texts for meaning, recognising and recording key information accurately. This information can then be communicated in the students own words.
  - c. Refining ideas: This is the stage when decisions are made about what to keep in and what to take out. Small amounts of text, clear accurate drawings and photos or images are important. Is there a logical and clear sequence to the cycle?
  - d. Design phase - colour, using space, text - size and colour -easy to read? Ask each student to make a draft of their poster in pencil or on computer before finalising the layout.
  - e. Clear and accurate spelling: Check spelling.
  - f. Production phase: Make the final edition of the poster.
5. Have students display their posters in three areas - one for each of the animals studied.

6. Ask students to compile their own comparison table of the life cycles of these animals from their shared journey.

7. Ask students to compare and contrast the life cycles of the three study animals.

The following Inquiry Questions will help guide students:

- Explain how the life cycle of the Quokka, Sunset Frog and Malleefowl are similar to one another?
- Explain how the life cycle of the Quokka, Sunset Frog and Malleefowl are different to one another?
- How do some of the features of each animals' life cycle help them to live in their habitat?

## RELATED RESOURCES

Why do plants make fruit? 5 mins 19 secs

<http://splash.abc.net.au/media/-/m/86130/fruit-why-plants-make-them>

How seeds become plants 5 mins 20 secs

<http://splash.abc.net.au/media/-/m/106388t/how-seeds-become-plants>

Life cycle poster

<https://www.makewav.es/story/271601/title/plantlifecyclestories>

Frog Watch Schools Kit

<http://museum.wa.gov.au/explore/frog-watch-schools/frog-watch-schools-kit>

Frog relocation

<http://splash.abc.net.au/media/-/m/522541/frog-relocation>

Malleefowl - You Tube clips

<https://www.youtube.com/watch?v=y1JEzyQJcoc>

<https://www.youtube.com/watch?v=xjddOpWkqHo>

Yongernow Australian Malleefowl Centre

<http://yongernow.com.au/>

<http://yongernow.com.au/about-us/malleefowl/>

Quokka segment - All About Animals TV Show.wmv

<https://www.youtube.com/watch?v=WGJzKBFb6jU>

A three minute video clip: Unloaded 28 Sep 2011. Olivia

<http://australianmuseum.net.au/quokka#sthash.karfh2uu.dpuf>

## VOCABULARY

**Amphibian** - A cold-blooded, smooth-skinned vertebrate of the class Amphibia, such as a frog or salamander, which characteristically hatches as an aquatic larva with gills from moist, soft skinned eggs.

**Bird** - A warm-blooded, air breathing vertebrate with feathers of the class Aves. Birds lay hard-shelled eggs which hatch into chicks.

**Chick** - A young bird, especially one newly hatched.

**Egg** - An oval or round object laid by a female bird, reptile, fish, amphibian or invertebrate, usually containing a developing embryo. The eggs of birds are enclosed in a chalky shell, while those of reptiles are in

a leathery membrane. Frogs eggs are usually soft and moist.

**Incubator mound** - The nest-like mound built by incubator birds, like the Mallefowl. These mounds of earth and leaves, allow the eggs to be incubated by the heat from the sun and from rotting vegetable material.

**Joey** - a baby marsupial, for example, a baby kangaroo or a baby quokka, is called a joey.

**Life cycle** - The sequence or series of stages which a living thing goes through from birth to a mature adult capable of reproducing more of its' kind (of the same species) and so on again.

**Mammal** - A warm-blooded, air breathing vertebrate of the class Mammalia. This group of animals is able to suckle their young from mammary glands on adult females. Humans, dolphins and dingos are three examples of mammals.

**Marsupial** - A mammal of an order whose members are born incompletely developed and are typically carried and suckled in a pouch on the mother's belly. 70% of the worlds' marsupials are found in Australia. The name of the group comes from marsupium, (Latin word) for the specialised pouch for protecting, carrying, and nourishing newborn marsupial young. Some marsupials have well-developed pouches, others have small flaps of skin.

**Metamorphosis** - (meta-MOR-fo-sis): a dramatic change in an organism's appearance and habits during its life cycle. For example, typically during a frogs' life cycle, the animal will change from a tadpole - a free-swimming tadpole with a gills and a tail to an adult frog with lungs, legs, and no tail which emerges from the water.

**Pouch** - A pocket-like container found on the abdomen of female marsupials which is used to carry their young during breast feeding or suckling.

**Tadpole** -The tailed aquatic larva of an amphibian (frog, toad, newt, or salamander), breathing through gills and lacking legs until the later stages of its development. Tada comes from the Old English word meaning 'toad'.

**Vertebrate** - an animal which has a backbone.

## REFERENCES

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- South West Aboriginal Land and Sea Council (SWALSC) Connection to Country brochure <http://www.noongar.org.au/images/pdf/forms/BookOne-ConnectiontoCountry12p.pdf>
- WWF Australia [http://www.wwf.org.au/our\\_work/saving\\_the\\_natural\\_world/wildlife\\_and\\_habitats/iucn\\_levels\\_of\\_threatened\\_species/](http://www.wwf.org.au/our_work/saving_the_natural_world/wildlife_and_habitats/iucn_levels_of_threatened_species/)
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- Hammond, Paula. The Atlas of Endangered Animals: Wildlife under threat around the world. (2006) Amber Books, London, United Kingdom.



**SIMILAR OR DIFFERENT  
STUDENT WORKSHEET 1:  
Assessment Rubric**



**Assessment Rubric Making A Poster :**

**Similar or different? Life Cycles of the Sunset Frog, Quokka and the Malleefowl**

CRITERIA	4 marks	3 marks	2 marks	1 mark
<b>The poster has</b>  <b>1. A clear title</b>  <b>2. The names of all the life cycle stages</b>  <b>3. At least 3 photos or drawings</b>  <b>4. It shows a cycle</b>  <b>5. A link between the life cycle and the animals habitat</b>	The poster has all essential features.	All but 1 of the essential features are included on the poster	The poster is missing 2 essential features.	Several essential features are missing.
<b>Content - Accuracy</b>	Includes all the key pieces of information from texts read and outside research.	Includes some key pieces of information from texts read and outside research.	Includes basic information from texts read.	Content not clearly presented. Includes information from texts read.
<b>Capitals and punctuation</b>	Capitals and punctuation were used correctly throughout the poster.	There is 1 error in capitalisation or punctuation.	There are 2 errors in capitalisation or punctuation.	There are more than 2 errors in capitalisation or punctuation.
<b>Visual appeal/impact</b>	The poster is very attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout and neatness.	The poster looks acceptable though it may be a bit messy.	The poster is distractingly messy or very poorly designed. It is not attractive.
<b>Use of class time</b>	Used time well during each class period. Focused on getting the project done. Never distracted others.	Used time well during each class period. Usually focused on getting the project done and never distracted others.	Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others.	Did not use class time to focus on the project OR often distracted others.
<b>Total marks out of 20</b>				



Life Cycles of the Sunset Frog, Quokka and the Malleefowl

	SUNSET FROG KOOYAR 	MALLEEFOWL GNOW 	QUOKKA QUOKKA 
Habitat	Permanently moist peat-based swamps, which are found East and North East of Walpole: mainly in the Shire of Denmark.	Mainly in semi-arid and arid woodlands and mallee scrub across a number of Australian states. In WA, in Dryandra State Forest, Fitzgerald River, Kalbarri and Cape Arid National Parks and on private property in the Wheatbelt, throughout the Gondwanalink and the Stirling Ranges NP.	Mainland quokkas live in densely vegetated swamps, tea-tree thickets (closed stands of Melaleuca trees) and / or low dense heath on slopes. Found at Rottnest and Bald Islands. In SW WA, populations in 25 sites - including Walpole-Nornalup National Parks, Two Peoples Bay, Stirling Range NP and Manypeaks
Lifecycle stages	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Eggs (laid by adult female)</li> <li>• Tadpole</li> <li>• Adult</li> </ul>	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Eggs (laid by adult female) in an incubator mound = nest)</li> <li>• Chick</li> <li>• Adult</li> </ul>	<ul style="list-style-type: none"> <li>• Adult: female/male</li> <li>• Fertilised egg (inside female adult)</li> <li>• Under-developed newborn *</li> <li>• Joey*</li> <li>• Adult</li> </ul> <p>*Grow in mothers' pouch</p>
Time of year	Males call from October to December	Breeding season usually June to February	Seem to breed all year round.
Numbers Eggs or live young	Less than 200 soft eggs are laid in water	15 to 24 hard-shelled eggs are laid	Female Quokkas give birth to a one young about a month after mating.
Length of stages		Males and females are sexually mature at 4 years	27 day gestation
Environmental conditions needed	<ul style="list-style-type: none"> <li>• Eggs sit just below waters' surface</li> <li>• Tadpole stage probably free swimming</li> <li>• Fires pose a threat to this species</li> <li>• Needs wet environment to live and breed</li> </ul>	<ul style="list-style-type: none"> <li>• Males and females are sexually mature at 4 years</li> <li>• Average time for incubation of eggs is about 63 days</li> <li>• Usually breed once a year</li> <li>• Live to 25 years</li> <li>• Can live in arid or dry conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Young stays in pouch for 6 months.</li> <li>• After joey leaves the pouch it will still feed at its mother's teats for extra 2 months or so.</li> <li>• Most development of young occurs in pouch</li> </ul>

# LOOKING AT ADAPTATIONS: 'Think like a Bird'

## 1. OVERVIEW

Students will embark on a student-centred, contract learning package about adaptations. Using Bloom's Taxonomy each student will be challenged to use the full range of Lower to Higher Order Thinking Skills.

This lesson asks each student to adopt a world-view of a Carnaby's Cockatoo. By taking to the air, in their imaginations, students can 'look across' the broad landscape full of a number of habitats or living places for a whole range of South Coast animals and plants - some threatened and some not. This reinforces the Sustainability organising strand through ideas of systems, worldview and futures.

## 2. LINKS TO THE AUSTRALIAN CURRICULUM

STRAND	SUB-STRAND / KEY ORGANISING IDEAS
<b>SCIENCE</b> Science understanding Science as a human endeavour Science inquiry skills	Biological science Living things Nature and development of science Questioning and predicting Planning and conducting Communicating
<b>ENGLISH</b> Language  Literature Literacy	Language variation and change Text structure and organisation Literature and context Interacting with others Creating texts
<b>SUSTAINABILITY</b>	Systems Worldviews Futures

## 3. OBJECTIVES

Students will:

- Give examples of structural and/or behavioural adaptations of South Coast threatened animals as examples.
- Explain how adaptations of living things suit them to a particular habitat.
- Understand why some local South Coast animals and plants have Aboriginal names.

### TOPICS

Birds  
 Adaptations  
 Threatened species  
 Habitat  
 Threats

### PHASES OF LEARNING

Late 3-6

### SITE (LOCATION)

Classroom  
 Internet

### ACTIVITIES

1. Think like a bird
2. Explore a Habitat Learning Contract

### MATERIALS

- [Resource Sheet: South Coast Animals By Habitat](#)
- [3 Noongar Animal Name Wordle posters](#)
- DVD 'On and a Wing and a Prayer'
- TV or laptop with data projector
- Computers with internet access
- Any other books, posters or other materials to stimulate student interest -e.g. collected feathers from Carnaby's or discarded, eaten honkey nut

### STUDENT WORKSHEET

1. Think Like a Bird
2. Explore a Habitat



## 4. TEACHER BACKGROUND INFORMATION

Carnaby's Black Cockatoo is a large conspicuous bird and is perhaps one of the more visible threatened animals of the South Coast Region. This raucous bird lives and breeds in different parts of the WA landscape using locations close to the coast for living places or habitat in which to nest and breed. During the non-nesting season this cockatoo lives and feeds in banksia woodlands, coastal and near-coastal scrub as well as forests and introduced pine trees of the coastal regions.

Adaptations are all the features of an animal or plant which help it to survive in its habitat or ecological niche.

Adaptations can be physical, behavioural or physiological:

1. **Physical** - e.g. Physical adaptations can be resulting from the = habitat type or by the food type. The Noisy Scrub-bird, for example, is rufous/brown in its colouring whilst the Western Whipbird has olive plumage which camouflages them in their habitat. An example of an animal whose adaptation is for feeding is the Carnaby's Black Cockatoo which has a strong beak to open woody fruits.
2. **Behavioural** - e.g. Malleefowl incubate their eggs in an incubator mound of warm rotting leaf litter which they build.
3. **Physiological** - e.g. the Quokkas' body is able to survive in very dry environments, with very little water. They also can carry a second embryo in 'suspended animation' whilst an older young develops by nursing in the mothers' pouch

The threatened species of the South Coast live in a wide range of different habitats.

Common Name  ABORIGINAL NAME	Habitat types across the South Coast								
	Karri/ Tingle forests	Jarrah/ Marri forests	Coastal heath/ thicket	Pro-teaceous heath	Wood-lands	Open Mallee	Rocky granite or quartzite regions	Riparian Zones */ Rivers / Inlets	Peat swamps
<b>Carnaby's Black Cockatoo</b> <i>Calyptorhynchus latirostris</i> <b>NGOOLARK</b>	✓	✓	✓	✓	✓				✓
<b>Western Ground Parrot</b> <i>Pezoporus flaviventris</i> <b>KYLORING</b>				✓					✓
<b>Malleefowl</b> <i>Leipoa ocellata</i> <b>GNOW</b>		✓		✓		✓			
<b>Noisy scrub bird</b> <i>Atrichornis clamosus</i> <b>JEE-MUL-UK / Tjimiluk</b>			✓					✓	✓
<b>Western whipbird</b> <i>Psophodes nigrogularis nigrogularis</i> : south-west WA, west of Cape Richie <i>Psophodes nigrogularis oberon</i> : south-west WA <b>TAR-DING</b>			✓	✓		✓			
<b>Gilbert's Potoroo</b> <i>Potorous gilbertii</i> <b>NGILGYTE</b>			✓						
<b>Quokka</b> <i>Setonix brachyurus</i> <b>QUOKKA</b>	✓	✓	✓					✓	✓
<b>Dibbler</b> <i>Parantechinus apicalis</i> <b>DIBBLER</b>			✓	✓		✓			
<b>Black-flanked rock wallaby</b> <i>Petrogale lateralis lateralis</i> <b>QUACKA</b>							✓		
<b>Australasian bittern</b> <i>Botaurus poiciloptilus</i> <b>BAR-DAN-ITCH</b>								✓	
<b>Sunset Frog</b> <i>Spicospina flammo-caerulea</i> <b>KOOYAR</b>									✓

Each of these 11 threatened species of the South Coast, has some features which equip it to live and breed in its' natural habitat. Threats to the continued survival of these animal species have been largely caused by human activities, especially within the last 50 years.

Broadly these threats can be grouped into:

- 1. Loss Of Habitat** (loss of habitat area) - Large scale clearing of the natural vegetation for agriculture has historically been a major threatening process to many animals. Land has also been cleared for housing, roadways and a range of other infrastructure.
- 2. Degradation of habitat** (loss of habitat quality) - over-grazing, salinisation, invasive weeds, poor soil management, off road vehicle use are just some of the activities and processes that can reduce the quality of the natural environment.
- 3. Disease** - Phytophthora Dieback is a widespread and debilitating threat to many of the ecosystems of the South Coast. Caused by an aggressive soil water mould, which is carried in water and moist soil, dieback has the ability to destroy susceptible ecosystems containing vulnerable plants such as Banksias, Hakeas, Grevilleas and Grass trees
- 4. Fire regimes** - The increased frequency of and changed intensity of fire in bushland and across human-modified landscapes is another threatening process for many South Coast animals and plants. For example, animals like the Noisy Scrub-bird and Gilbert's Potoroo need dense, long- unburnt vegetation to live in. Local Aboriginal people, the Minang, historically managed the landscape differently using patch burning by fire to support a variety of plant communities which would be suitable homes for the species they hunted and collected for food.
- 5. Introduction of feral animals** - introduced predators like the fox and feral cat have killed many local small ground-dwelling animals as prey. Other animals like the feral pig and rabbit can compete with other native animals for food and living spaces as well as disturb and disrupt good ecological functioning.
- 6. Climate change** - Australian Bureau of Meteorology data shows that the South Coast of WA is experiencing trends towards hotter and drier climatic conditions. It is predicted that some local animals will not be able to survive the higher average temperatures and reduced rainfall in the long term because it will exceed their tolerance limits. The changed climatic conditions may result in an increase in fires, drought, induced death of plants used for food and habitat for animals, changes in disease impact, and proliferation of invasive species.

An excerpt from the Carnaby's Cockatoo Recovery Plan explains:

'Climate change is one of the primary global threats to biodiversity and ecosystem function and the south-west of Western Australia has been assessed as being particularly vulnerable to the effects of climate change. There has been an observed rainfall decrease of 10-20% in the south-west since the 1970s and an approximate increase in temperature of 0.70C since the 1950s, with warming greater in winter.

'Such a decline in rainfall is likely to have a significant effect on the extent and survival, or capacity for regeneration of the vegetation within the breeding and non-breeding habitat of Carnaby's cockatoo across its range.'

## 5. TEACHER PREPARATION

**Activity 1** provides an introduction to Activity 2 which is based on student centred learning through a 'student contract' in which you will need to allow several weeks for students to complete.

The activities are designed to assist students to develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems as of the Australian Curriculum. This is based on Bloom's Taxonomy and takes the students

through the critical and creative thinking learning continuum:

- Inquiring – identifying, exploring and organising information and ideas
- Generating ideas, possibilities and actions
- Reflecting on thinking and processes
- Analysing, synthesising and evaluating reasoning and procedures

In **Activity 1** you will lead a discussion on the adaptations of the Carnaby's Black Cockatoo. To assist it is recommended that you:

- Read the Teacher Background Notes
- Locate the video 'On and a Wing and a Prayer' - prepare to view the first 15 minutes of the video with your students. There is also a book, which you may wish to bring to refer to.
- Print off one copy of the **STUDENT WORKSHEET 1: THINK LIKE A BIRD** for each student.

In **Activity 2** students will use the **RESOURCE SHEET: SOUTH COAST ANIMALS BY HABITAT** and the **STUDENT WORKSHEET 2: EXPLORE A HABITAT** to complete a number of activities as a student contract. Students will use the suggested fact sheets on as resources to gain information on the 10 threatened species of the South Coast.

To assist it is recommended that you:

- Read the Teacher Background Notes
- Print off one copy of the **RESOURCE SHEET: SOUTH COAST ANIMALS BY HABITAT** for each student
- Print off one copy of the **STUDENT WORKSHEET 2: EXPLORE A HABITAT** for each student
- Print off the suggested threatened species fact sheets for students or provide the web links for students to search for these fact sheets. (Web links listed in Related Resources)
- Print the **3 NOONGAR ANIMAL NAME WORDLE POSTERS**

## 6. PROCEDURE

For this activity sequence, students are asked to:

“Imagine you a mature adult Carnaby's Black Cockatoo: as you wheel high in the sky, imagine looking down upon the landscape of our South West: the streams, rivers, rocks, plants and animals below. As you fly overhead, your worldview is one of whole systems of living things - with streams, rivers, wetlands and roadside puddles - pearls of water and wildlife to link your journey from one of your living places to another.”

### ACTIVITY 1: Think like a bird...

Students will use their thinking skills to consider behavioural adaptations of the Carnaby's Black Cockatoo.

1. In groups or as a whole class read about Carnaby's Black Cockatoo using the **STUDENT WORKSHEET 1: THINK LIKE A BIRD...**
2. Share part (the first 10 - 15 minutes) of the **DVD: On a wing and a prayer** (108 minutes) [Australia]: Roadshow Entertainment [distributor], c2011 to inspire the students and to engage them in the lesson.
3. Talk about the worldview of a Carnaby's Black Cockatoo. How would your point of view differ if you were this kind of bird rather than a human? Think about what things would be important to you if you were a wild Cockatoo.

### ACTIVITY 2: Explore a Habitat - Learning Contract

Students will complete a series of activities on adaptations and physical conditions of plants and animals of the South Coast region including 10 11 threatened species. These activities are provided as a learning contract to be completed over several weeks using 6 critical and creative thinking levels (knowing, understanding, applying, analysing, creating and evaluating).

1. Give every student the **RESOURCE SHEET: SOUTH COAST ANIMALS BY HABITAT** and as a class talk the students through the idea of the different plants and animals that are suited to each of the habitat types in the South Coast region.

2. Give every student the **STUDENT WORKSHEET 2: EXPLORE A HABITAT** and set them the challenge of completing at least ONE activity for each of the SIX Thinking Levels (knowing, understanding, applying, analysing, creating, evaluating) from the table. There are CORE activities which everyone must complete.

3. As you understand your classes' ability and the time you wish to allow for this sequence of lessons - you may wish to manage the number of activities completed by students. Students are directed to use the factsheets either printed or found online using the web links listed in the Related Resources.

## RELATED RESOURCES

Critical and Creative Thinking

<http://www.australiancurriculum.edu.au/GeneralCapabilities/Pdf/Critical-and-creative-thinking>

'On and a Wing and a Prayer' – short clip: <https://www.youtube.com/watch?v=8uAcn26ssil>

Full length can be ordered via <http://www.seadogtvinternational.com/wildlife-films-perth.html>

Australasian Bittern

<http://www.birdlife.org/datazone/speciesfactsheet.php?id=3767>

• BirdLife International factsheet: Australasian Bittern *Botaurus poiciloptilus*

<http://www.birdlife.org/datazone/speciesfactsheet.php?id=3767>

• Species Profile and Threats Database: *Botaurus poiciloptilus* — Australasian Bittern

[http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=1001](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1001)

• BirdLife Australia's Australasian Bittern Information and Identification Guide for Rice Growers

[http://www.rga.org.au/f.ashx/\\$168684\\$Bittern-BIRDLIFE12-11.pdf](http://www.rga.org.au/f.ashx/$168684$Bittern-BIRDLIFE12-11.pdf)

Black-Flanked Rock Wallaby

• Department of Parks and Wildlife Fauna Profiles: Black-Flanked Rock Wallaby [https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal\\_profiles/black-flanked-rock-wallaby\\_2012.pdf](https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal_profiles/black-flanked-rock-wallaby_2012.pdf)

• Perth Zoo factsheet: Black-Flanked Rock Wallaby <http://perthzoo.wa.gov.au/wp-content/uploads/2013/03/Black-flanked-Rock-wallaby-Fact-Sheet.pdf>

• WWF webpage: Black-Flanked Rock Wallaby [http://www.wwf.org.au/our\\_work/saving\\_the\\_natural\\_world/wildlife\\_and\\_habitats/australian\\_priority\\_species/rock\\_wallabies/black\\_flanked\\_rock\\_wallaby/](http://www.wwf.org.au/our_work/saving_the_natural_world/wildlife_and_habitats/australian_priority_species/rock_wallabies/black_flanked_rock_wallaby/)

• Species Profile and Threats Database: *Petrogale lateralis lateralis* — Black-flanked Rock-wallaby

[http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=66647](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66647)

Carnaby's Cockatoo

• Carnaby's Cockatoo (*Calyptorhynchus latirostris*) Recovery Plan. Pg. 18 Western Australian Department of Parks and Wildlife, 2013. <https://www.environment.gov.au/system/files/resources/94138936-bd46-490e-821d-b71d3ee6dd04/files/carnabys-cockatoo-recovery-plan.pdf>

• Perth Zoo webpage: Carnaby's Cockatoo <http://perthzoo.wa.gov.au/animals-plants/australia/cockatoo-exhibit/carnaby%E2%80%99s-cockatoo/>

• Perth Zoo factsheet: Carnaby's Cockatoo <http://perthzoo.wa.gov.au/wp-content/uploads/2013/03/Carnabys-Cockatoo-Fact-Sheet.pdf>

• Department of Environment Australian Threatened Species Factsheet: Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) <http://www.environment.gov.au/biodiversity/threatened/publications/factsheet-carnabys-black-cockatoo-calyptorhynchus-latirostris>

• Species Profile and Threats Database: *Calyptorhynchus latirostris* — Carnaby's Black-Cockatoo, Short-billed [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=59523](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=59523)

Black-Cockatoo

• Carnaby's Black Cockatoo Recovery Plan <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/calyptorhynchus-latirostris-recovery-plan>

- Carnaby's Search Tool <https://www.dpaw.wa.gov.au/plants-and-animals/animals/40-plants-for-carnaby-s-search-tool>

#### Dibbler

- Perth Zoo webpage: Dibbler <http://perthzoo.wa.gov.au/animals-plants/australia/nocturnal-house/dibbler/>
- Perth Zoo factsheet: Dibbler <http://www.zooaquarium.org.au/index.php/dibbler/>
- Department of Environment Australian Threatened Species factsheet: Dibbler (*Parantechinus apicalis*) <https://www.environment.gov.au/biodiversity/threatened/publications/dibbler-parantechinus-apicalis>
- Species Profile and Threats Database: *Parantechinus apicalis* — Dibbler [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=313](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=313)

#### Gilbert's Potoroo

- Gilbert's Potoroo Action Group <http://www.potoroo.org/>
- Gilberts Potoroo Action Group Twitter <https://twitter.com/gilbertspotoroo>
- Gilberts Potoroo Action Group Facebook <https://www.facebook.com/GilbertsPotorooActionGroup/>
- Gilberts Potoroo Action Group YouTube channel <https://www.youtube.com/channel/UCo4zc1LADtVvKvV5Nt-m-oQ>
- Perth Zoo factsheet: Gilbert's Potoroo <http://perthzoo.wa.gov.au/wp-content/uploads/2013/03/Gilberts-Potoroo-Fact-Sheet.pdf>
- Department of Parks and Wildlife Fauna Profiles: Gilbert's Potoroo *Potorous gilbertii* (Gould, 1841) [https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal\\_profiles/gilberts-potoroo\\_2012.pdf](https://www.dpaw.wa.gov.au/images/documents/plants-animals/animals/animal_profiles/gilberts-potoroo_2012.pdf)
- Department of Environment webpage: *Potorous gilbertii* (Gilbert's Potoroo) <http://www.environment.gov.au/node/16404>
- Species Profile and Threats Database: *Potorous gilbertii* — Gilbert's Potoroo [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=66642](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66642)
- Gilbert's Potoroo Australia's Most Endangered Mammal: A Case Study ( in file attached)

#### Local species

Perth Zoo: Fact Sheet: Love Your Locals <http://perthzoo.wa.gov.au/learn/loveyourlocalwildlife>

#### Malleefowl

- Department of Environment Australian Threatened Species factsheet: Malleefowl *Leipoa ocellata* <https://www.environment.gov.au/system/files/resources/eed39fb9-0a63-4aac-bc84-785330d8b9fb/files/tsd-06malleefowl.pdf>
- Perth Zoo factsheet: Malleefowl <http://perthzoo.wa.gov.au/wp-content/uploads/2013/03/Malleefowl-Fact-Sheet.pdf>
- Species Profile and Threats Database: *Leipoa ocellata* — Malleefowl [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=934](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=934)
- Yongernow Australian Malleefowl Centre <http://yongernow.com.au/>
- Malleefowl - You Tube clips <https://www.youtube.com/watch?v=y1JEzyQJcoc>
- Malleefowl (*Leipoa ocellata*) nesting pair, mound activity November 29, 2012.wmv - YouTube <https://www.youtube.com/watch?v=xjddOpWkqHo>

#### Noisy Scrub Bird

- BirdLife International factsheet: Noisy Scrub-bird *Atrichornis clamosus* <http://www.birdlife.org/datazone/speciesfactsheet.php?id=5164>
- Species Profile and Threats Database: *Atrichornis clamosus* — Noisy Scrub-bird, Tjimiluk [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=654](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=654)

#### Quokka

- Species Profile and Threats Database: *Setonix brachyurus* — Quokka [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=229](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=229)

- Perth Zoo factsheet: Quokka

<http://perthzoo.wa.gov.au/wp-content/uploads/2013/03/Quokka-Fact-Sheet.pdf>

- Quokka segment: All About Animals TV Show.wmv A 3 minute video clip: Unloaded 28 Sep 2011. Olivia <https://www.youtube.com/watch?v=WGJzKBFb6jU>
- Australian Museum Quokka factsheet <http://australianmuseum.net.au/quokka>

#### Sunset Frog

- Species Profile and Threats Database: *Spicospina flammocaerulea* — Sunset Frog [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=64782](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64782)
- Western Australian Museum Frogwatch webpage: Sunset Frog <http://museum.wa.gov.au/explore/frog-watch/frogs/sunset-frog>
- Western Australian Museum Frog Facts factsheet: Sunset Frog (in file attached)
- Amphibian Ark website: Sunset Frog <http://www.amphibianark.org/sunset-frog/>

#### Western Ground Parrot

- Friends of the Western Ground Parrot <http://www.western-ground-parrot.org.au/>
- Friends of the Western Ground Parrot Twitter page <https://twitter.com/friendswgp>
- Friends of the Western Ground Parrot Facebook page <https://www.facebook.com/Friends-of-the-Western-Ground-Parrot-283796521652371>

#### Western Whipbird

- Species Profile and Threats Database: *Psophodes nigrogularis nigrogularis* — Western Whipbird (western heath) [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=64448](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=64448)
- BirdLife International factsheet: Western Whipbird *Psophodes nigrogularis* <http://www.birdlife.org/data-zone/species/factsheet/22705330>
- Worldview Noongar Words <http://www.noongarculture.org.au/glossary/noongar-word-list>
- Endangered Flora and Fauna Noongar Database [http://www.perthregionnrm.com/media/50986/indigenous\\_website\\_material.pdf](http://www.perthregionnrm.com/media/50986/indigenous_website_material.pdf)

## VOCABULARY

**Adaptations:** all the features of an animal or plant which help it to survive in their habitat (Place where an organism or a biological population normally lives or occurs) or ecological niche (The role or function of an organism or species has in an ecosystem).

**Threats:** any of a number of conditions which reduce a species or an individual animal's chance of survival.

**Habitat:** The place where an organism or a biological population normally lives or occurs.

## REFERENCES

AMPHIBIAN ARK, <http://www.amphibianark.org/>

BIRD LIFE INTERNATIONAL, <http://www.birdlife.org/>

PERTH ZOO: Love Your Local Wildlife, <http://perthzoo.wa.gov.au/learn/loveyourlocalwildlife>

THE IUCN RED LIST OF THREATENED SPECIES, <http://www.iucnredlist.org/>

WA MUSEUM: FrogWatch, <http://museum.wa.gov.au/>

BBC NATURE WILDLIFE, <http://www.bbc.co.uk/nature/adaptations>

WWF Species Fact Sheet: Carnaby's Black Cockatoo, [http://awsassets.wwf.org.au/downloads/sp033\\_fs\\_carn-abys\\_cockatoo\\_26febo8.pdf](http://awsassets.wwf.org.au/downloads/sp033_fs_carn-abys_cockatoo_26febo8.pdf)

BIOLOGY ONLINE, <http://www.biology-online.org/>

Leanne Tomlinson (ABP) and Donna Rumenos (WAPRES), Special Values Booklet - South West of Western Australia Plantation Estate. March 2013



### Adaptations and Physical Conditions

Carnaby's Black Cockatoo is a large conspicuous bird. It is perhaps one of the better known Threatened Animals of the South Coast Region. This raucous bird lives and breeds in different parts of the WA landscape.

It uses the Wheatbelt for living places or habitat in which to nest and breed. During the non-nesting season Carnaby's Black cockatoos live and feed in banksia woodlands, coastal and near-coastal scrub and forests and introduced pine trees of the coastal regions.

Imagine you are a Carnaby's Black Cockatoo: as you wield high in the sky, imagine looking down upon the landscape of our South West: ,the streams, rivers, rocks, plants and animals below. As you fly overhead, your worldview is one of whole systems of living things - with streams, rivers, wetlands and roadside puddles - pearls of water and wildlife to link your journey from one of your living places to another.

Watch a DVD: You may be able to watch part of the **DVD: On a wing and a prayer** (108 minutes) [Australia]: Roadshow Entertainment [distributor], c2011.

**Group Activity:** Talk about the worldview of a Carnaby's Black Cockatoo. How would your point of view differ if you were this kind of bird rather than a human? Think about what things would be important to you if you were a wild cockatoo.



### Explore a Habitat

#### Student Learning Contract

Your challenge is to use the Resource Sheet: **SOUTH COAST ANIMALS BY HABITAT** to complete:

- All 8 core activities
- AND at least ONE activity for each of the SIX Thinking Levels below

THINKING LEVEL	ACTIVITIES: <b>CORE</b> and <b>OPTIONAL</b>
<b>KNOWING</b>  <b>Remember</b>  <b>Name</b>  <b>List</b>  <b>Tell</b>  <b>Relate</b>  <b>Find</b>	<p>1. a. List all 11 names of the threatened birds, mammals and frogs of the South Coast.</p> <p>b. List the names of threatened species from the habitat you are studying.</p> <p>2. a. Find the two part scientific name given to three of the animals listed.</p> <p>e.g. The two part scientific name for Carnaby's Black Cockatoo is <i>Calyptorhynchus latirostris</i></p> <p>b. Now find out what this scientific name means. You will probably need a dictionary - online or book.</p> <p>e.g. <i>Calyptorhynchus</i> is from Greek <i>kalyptos</i> = 'covered' + New Latin <i>rhynchus</i> = 'bill' or 'beak'. <i>latirostris</i> is from <i>latirostris</i> means 'widenose', derived from <i>lati</i> (Latin for 'broad' or 'wide') + <i>rostris</i> (Latin for 'nose' or 'snout')</p> <p>3. Explain what an adaptation is, in your own words.</p> <p>4. Find three examples of how two of the threatened animals are adapted to living in their environment. Make sure your answer clearly shows how the adaptation helps the animal deal with living conditions.</p>



<p><b>UNDERSTANDING</b></p> <p><b>Describe</b></p> <p><b>Convert</b></p> <p><b>Draw</b></p> <p><b>Explain</b></p> <p><b>Match</b></p> <p><b>Restate</b></p>	<p>5. Explain why a large proportion of the South Coast threatened species are ground-dwelling birds and small mammals? Describe what makes these animals more at risk than some others: what threats do they face?</p> <p>6. Select a threatened species which is a carnivore.</p> <p>a. Explain why it is a carnivore.</p> <p>b. Draw a picture to show how the body of this carnivore is</p> <p>7. Write a brief outline on why some of the common names for animals and plants (like Karri) come from local Aboriginal words. Give some examples from the animal list. Find some local plant names which have come from the Aboriginal language.</p> <p>8. Take an objective Fact sheet on one threatened species and convert it into an opinion piece by using the information to imagine a different or subjective point of view. Include how well suited you are to living in your habitat by talking about at least one of your behavioural adaptations. equipped to its' lifestyle.</p>
<p><b>APPLYING</b></p> <p><b>Apply</b></p> <p><b>Calculate</b></p> <p><b>Make</b></p> <p><b>Use</b></p> <p><b>Report</b></p> <p><b>Record</b></p> <p><b>Solve</b></p> <p><b>Illustrate</b></p>	<p>9. Invent a possible solution to the survival problems faced by the Black-flanked Rock Wallaby from our Wheatbelt region.</p> <p>10. Classify the following animals into their correct scientific Family: Quokka, Dibbler and Black-flanked Rock Wallaby.</p> <p>11. Calculate how many metres of fox-proof fencing would be needed to totally fence Two Peoples' Bay Nature Reserve.</p> <p>12. Make a model of the mouthparts of one of the threatened species. A good model will demonstrate how this animal eats its particular type of food.</p>



<p><b>CREATING</b></p> <p><b>Create</b></p> <p><b>Compose</b></p> <p><b>Plan</b></p> <p><b>Design</b></p> <p><b>Invent</b></p> <p><b>Construct</b></p>	<p>21. Create a new product which can raise awareness and help support the work being done by the local community - including staff from South Coast NRM, Department of Parks and Wildlife, Friends of Groups, Gondwana Link Bush Heritage and Bird Life Australia. Plan a marketing campaign for it.</p> <p>22. Compose a rhyme or a song about a threatened species in the South Coast. You could use a well-known tune E.g. Kookaburra sits in the Old Gum Tree and write new words about it using Carnaby's Black Cockatoo or use a rap tune or a popular song - like Happy or Don't Worry Be Happy and write new words to it.</p> <p>23. Construct a model of a nest of a Mallee fowl or Noisy Scrub-bird or Western Whipbird or Australasian Bittern. Use labels to show how it helps that animal survive in its environment.</p> <p>24. As a class, design a calendar or 12 screen savers for the computer of ... Love your Locals... incorporate some of the animals which are threatened from the South Coast area. Each page to include an illustration and description of why it is special to your area.</p> <p>25. Plan a real estate marketing campaign which promotes an area of land for sale which has features which would appeal to people looking for land to help conserve the:</p> <ul style="list-style-type: none"> <li>a. Quokka</li> <li>b. Sunset Frog</li> <li>c. Black-flanked Rock Wallaby</li> <li>d. Carnaby's Black Cockatoo</li> <li>e. Dibbler</li> </ul>
<p><b>EVALUATING</b></p> <p><b>Evaluate</b></p> <p><b>Debate</b></p> <p><b>Justify</b></p> <p><b>Advise</b></p> <p><b>Recommend</b></p>	<p>26. Decide on your own criteria to evaluate the effectiveness of a Recovery Plan.</p> <p>27. Recommend and justify at least 2 actions or projects which your family, school or your sports team could adopt to encourage local wildlife (plants and animals) to visit your backyard, school or local area.</p> <p>28. Discuss actions to be considered to protect your local habitat when camping with your family in local bushland areas.</p>





# Noongar plant names from

Yundilistlattoppedgate  
 BullonockisSilvertoppedgrasstree  
 MindalongisWattle  
 DjukisBroomBallart  
 BunoisPinkbottlebrush  
 BaigaisGrasstree  
 KoordenisMarri  
 YongmaarisRedkangaroo  
 QueitjatisOnesidedbottlebrush  
 DjidiokisChittick  
 YowarlisPaperbarkTree  
 MandartisJamTree  
 MangatisBanksia  
 MoortisRoundleavedMoort  
 KodjetisPincushionHakea

# country near Wellstead PS

Tar-dingisWesternWhipbird  
 GnowisMalleefowl  
 KooyarisFrog  
 BooteritchisWesternBristlebird  
 NgoolarkisCarnabyBlack-Cockatoo  
 Dib-berisDibbler  
 Jee-mul-ukisNoisyScrub-bird  
 Bar-dan-itichisAustralasianBittern  
 NgilkatisGilbertsPotoroo  
 QuackaisBlack-flankedRock-Wallaby  
 QuokkaisQuokka

Jee-mul-ukisNoisyScrub-bird  
 Booteritchordjardal-yaisWesternBristlebird  
 NgilkatisGilbertsPotoroo  
 Bar-dan-itichisAustralasianBittern  
 QuokkaisQuokka  
 NgoolarkisCarnabyBlack-Cockatoo  
 Tar-dingisWesternWhipbird  
 GnowisMalleefowl  
 Dib-berisDibbler  
 QuackaisBlack-flankedRock-Wallaby  
 KooyarisFrog

# GILBERT'S POTOROO CASE STUDY: Science as a human endeavour

## 1. OVERVIEW

Students will learn about one local South Coast ecosystem - the coastal heath / thickets of Two People's Bay, by investigating the 'ecological, scientific and human connections story' of the Critically Endangered Gilbert's Potoroo, found in and around Two People's Bay Nature Reserve, near Albany.

By using Gilbert's Potoroo as a Case Study, students will use Science Inquiry Skills to understand:

1. How Gilbert's Potoroo contributes to healthy functioning of the ecosystems to which it belongs e.g. learn about some of the interdependent organisms and abiotic components of its environment and how some matter and energy flows through this living system.
2. How the values and needs of contemporary society can influence the focus of scientific research e.g. learn about the collaborative research and recovery work of the Gilbert's Potoroo Recovery Team (led by the WA State government Department of Parks and Wildlife) and the Albany- based community group - The Gilbert's Potoroo Action Group. (GPAG). GPAG is an example of Science as a Human Endeavour - with scientists, land managers and volunteers - working together to produce effective results.

## 2. LINKS TO THE AUSTRALIAN CURRICULUM

STRAND	SUB-STRAND / KEY ORGANISING IDEAS
<b>SCIENCE</b> Science understanding Science as a human endeavour  Science inquiry skills	Biological science Nature and development of science Use and influence of science  Processing and analysing data and information Evaluating Communicating
<b>ENGLISH</b> Language Literacy	Text structure and organisation Interpreting, evaluating, analysing
<b>SUSTAINABILITY</b>	Systems Worldviews Futures
<b>ABORIGINAL AND TI HISTORIES AND CULTURES</b>	Culture

### TOPICS

Ecosystems  
 Organisms  
 Habitats  
 Threats  
 Conservation

### PHASES OF LEARNING

7-10

### SITE (LOCATION)

Classroom

### ACTIVITIES

1. Setting the Scene: Introduction to the Local Ecosystem
2. Case Study of Gilbert's Potoroo

### MATERIALS

- Activity 1
- TV or computer with data projector
  - remote
- Activity 2
- 4 to computers or digital devices with software to enable viewing of a Power Point presentation
  - Butcher's paper, markers, whiteboard / Smart board
  - RESOURCE SHEET
- [task cards 1-4](#)

### STUDENT WORKSHEET

1. Remote and Rugged Review



### 3. OBJECTIVES

Students will:

- Describe at least 2 of the ecological roles played by Gilbert's Potoroo in contributing to the health of coastal heath ecosystems found in the Two People's Bay Nature Reserve e.g. interrelationships, energy and matter cycling.
- Explain how the collaborative research and recovery work undertaken by scientists and community members to conserve the critically endangered Gilbert's Potoroo, reflects the values of contemporary society.
- Understand that scientists and community members use a range of communication text forms and styles to communicate their scientific research findings, each of which is suited to a different purpose. Eg. Conference Poster, Information Sheet or Power Point Presentation.
- Use one type of scientific communication method to effectively share key scientific understandings with other students.

### 4. TEACHER BACKGROUND INFORMATION:

#### South Coast ecosystems

There are a number of ecosystems found across the South Coast Region of WA. If you were to travel from west to east, you would start your journey in the tall Karri/Tingle forests near Walpole, travel into Karri forests, with the Peat swamps of the Denmark Shire to your north. These ecosystems would give way to Jarrah/Marri forests and woodlands and coastal wetlands of the plain from Denmark to Albany, the remnants of which stretch northwards along Albany Highway to Mount Barker and further north into Wheatbelt woodlands and then eastwards into Mallee country.

Coastal heath covers the hilly landscape around Two Peoples' Bay Nature Reserve, and it is punctuated with gullies and riparian zones. Further east again, the world renowned bio-diverse heath of Fitzgerald River National Park and surrounds provides habitat to a rich web of plant, animals, fungi and microorganisms. Scattered throughout the broader landscape are rocky granite outcrops: like islands containing a rich variety of habitats - from bare rock to deep soil or dark cave.

Habitat Types of the Threatened Species of the South Coast (table on following page)

Common Name  ABORIGINAL NAME	Habitat types across the South Coast								
	Karri/ Tingle forests	Jarrah/ Marri forests	Coastal heath/ thicket	Pro-teaceous heath	Wood-lands	Open Mallee	Rocky granite or quartzite regions	Riparian Zones */ Rivers / Inlets	Peat swamps
<b>Carnaby's Black Cockatoo</b> <i>Calyptorhynchus latirostris</i> NGOOLARK	✓	✓	✓	✓	✓				✓
<b>Western Ground Parrot</b> <i>Pezoporus flaviventris</i> KYLORING				✓					✓
<b>Malleefowl</b> <i>Leipoa ocellata</i> GNOW		✓		✓		✓			
<b>Noisy scrub bird</b> <i>Atrichornis clamosus</i> JEE-MUL-UK / Tjimiluk			✓					✓	✓
<b>Western whipbird</b> <i>Psophodes nigrogularis nigrogularis</i> : south-west WA, west of Cape Richie <i>Psophodes nigrogularis oberon</i> : south-west WA TAR-DING			✓	✓		✓			
<b>Gilbert's Potoroo</b> <i>Potorous gilbertii</i> NGILGYTE			✓						
<b>Quokka</b> <i>Setonix brachyurus</i> QUOKKA	✓	✓	✓					✓	✓
<b>Dibbler</b> <i>Parantechinus apicalis</i> DIBBLER			✓	✓		✓			
<b>Black-flanked rock wallaby</b> <i>Petrogale lateralis lateralis</i> QUACKA							✓		
<b>Australasian bittern</b> <i>Botaurus poiciloptilus</i> BAR-DAN-ITCH								✓	
<b>Sunset Frog</b> <i>Spicospina flammo-caerulea</i> KOOYAR									✓

## Focus on the coastal heath ecosystem within the Two People's Bay Nature Reserve

Scientists have studied some of the South Coast Region's ecosystems extensively. The coastal heath ecosystem of Two Peoples' Bay Nature Reserve is a protected natural area with 'A' Class protection, located approximately 35 kilometres east of Albany, WA. It is an area especially rich in local plant and animal life. In its vesting as a Nature Reserve in 1967, it was recognised for its value as a habitat for the Noisy Scrub-bird. Since that time, scientific research has shown that it is in fact habitat for a suite of animals and plants which are threatened or are listed as of priority in their conservation management status. One of these species is the Gilbert's Potoroo.

### Science as a Human Endeavour: One species - Gilbert's Potoroo

The following Case Study looks at the how local scientists have partnered with a local community group, the Gilbert's Potoroo Action Group, to learn more Gilbert's Potoroo including its reproductive behaviour in order to find a way to recover this species back to a sound conservation status, and ultimately sustaining populations in a number of locations.

By involving the community in active conservation partnerships, examining the research data for the Gilberts' Potoroo and communicating the key research findings to the wider community, the whole South Coast community can learn about and support these conservation efforts for the benefit of present and future generations. The desired outcome of the project is environmental sustainability.

FAST FACTS ON NGILGYTE (GILBERT'S POTOROO)	
<b>HABITAT</b>	<ul style="list-style-type: none"> <li>The original population was rediscovered in 1994 in Two People's Bay Nature Reserve, which is 35 kilometres East of Albany, WA.</li> <li>The wild population lives in dense low heath on the slopes of Mount Gardner, Two People's Bay.</li> <li>Translocated population at Bald Island live in shrubby and heath vegetation and exposed granite rock.</li> <li>Translocated population in an enclosure in Waychinicup National Park live in eucalypt (gum tree) woodland.</li> <li>Common plants found in this habitat include Melaleucas, myrtles and sedges</li> </ul>
<b>DESCRIPTION</b>	<ul style="list-style-type: none"> <li>Small rat-kangaroo (which weighs less than a kilogram)</li> <li>About the size of a rabbit</li> <li>Dark-grey - brown fur</li> <li>Prominent eyes</li> <li>Snout slender and slightly curved downwards</li> <li>Strong fore limbs and paws for digging</li> <li>Nocturnal</li> </ul>
<b>DIET</b>	<ul style="list-style-type: none"> <li>Underground fungi called <b>truffles</b> make up almost all of its diet</li> <li>These fungi are one part of a mycorrhizal partnership*(see vocabulary) between the fungi and the roots of many local plants.</li> <li>This secretive animal forages and digs for food at night.</li> <li>It makes small localised diggings (like a Quendas /Bandicoots) up to about 10 centimetres deep to find the fruiting bodies</li> <li>Supplements its fungi diet with insects, grass, roots and fleshy fruit</li> </ul>
<b>THREATS</b>	<p><b>PAST THREATS LEADING IT TO BECOME CRITICALLY ENDANGERED</b></p> <ul style="list-style-type: none"> <li>Changed fire regimes</li> <li>Clearing</li> <li>Predation by foxes and cats</li> </ul> <p><b>CURRENT THREATS</b></p> <ul style="list-style-type: none"> <li>Extensive fire</li> <li>Feral cats and foxes</li> <li>Dieback disease (<i>Phytophthora cinnamomi</i>) degrades their habitat</li> </ul>
<b>ECOLOGICAL ROLE</b>	<ul style="list-style-type: none"> <li>As a <b>digging mammal</b>, Gilbert's Potoroo plays a key role in helping to maintain soil health in the ecosystem of which it is part</li> <li>It helps to <b>cycle matter</b>: - eats truffles - deposits <b>scats</b> which contain nutrients for soil truffle spores and seeds.</li> <li><b>It distributes the spores of the up to 44 fungi</b> (which it has eaten) to new locations in the ecosystem in its scats</li> <li>It <b>turns and aerates soil</b></li> <li>It makes openings (diggings) for <b>water to penetrate</b> into the soil</li> <li>Predators like the <b>carpet python</b> prey on Gilbert's Potoroo</li> </ul>

## Threats to the Gilbert's Potoroo

'Threatening processes' – excerpt from The Gilbert's Potoroo (*Potorous gilbertii*) Recovery Plan

### Fire

The only known wild population of Gilbert's Potoroo exists in dense, long unburnt vegetation that is potentially highly vulnerable to wildfire. Fire exclusion is thus an extremely high priority in the protection of the wild population, and the captive colony was established at least partly to provide insurance against the loss of the single known population through a catastrophic fire event.

### Feral predators

Gilbert's Potoroo is within the Critical Weight Range (35 g-5 kg) of mammals thought to be most susceptible to decline (Burbidge & McKenzie, 1989). It is in the prey size range of both Foxes and Cats, both of which are known to occur in the Two Peoples Bay area. Foxes can be controlled using dried meat or egg baits impregnated with 1080. No suitable baits are yet available to control feral Cats that do not also put potoroos at risk. Dietary analysis of the gut contents and faeces of a feral Cat trapped in the West 6 area of Mt Gardner in 2001 revealed that it had consumed both Quenda (*Isodon obesulus*) and Noisy Scrub-bird (*Atrichornis clamosus*). Control of feral Cats would thus also be beneficial to other threatened mammals and birds in the area.

### Dieback disease (*Phytophthora cinnamomi*)

Potoroos are believed to be present only in areas of the Reserve that are free of *Phytophthora* infection. Dieback disease can cause considerable changes to the floristic structure of the habitat. Gilbert's Potoroo feeds primarily on hypogean fungi, many of which are mycorrhizal. Plant dieback disease is considered to be a major threat to the continued survival of the potoroo by altering vegetation structure or eliminating species that are hosts to the mycorrhizal fungi on which they feed.

### Clearing of vegetation adjacent to Two Peoples Bay

The population of Gilbert's Potoroo on the Mount Gardner headland has the potential to expand through the dispersal of young through adjacent bushland corridors into suitable habitat nearby (especially near Mount Manypeaks). Some of this linking bushland occurs on private land. Unless these corridors are protected from clearing, the chance of successful dispersal to new areas will be very small. Ideally, the strip of bushland linking Two Peoples Bay Nature Reserve with the Boulder Hill area should be protected from fire and expanded by rehabilitation of a small amount of grazing land to shrubland.'

The whole of Two Peoples Bay Nature Reserve is affected, or potentially affected, by fire, dieback and feral predators. In addition, all possible mainland translocation sites in the south west of Western Australia are affected by feral predators and at least potentially affected by fire and/or dieback. Before any translocations can be contemplated, any potential site will need to be prepared to minimise the impact of these processes and ongoing management of threatening processes will be required."

## 5. TEACHER PREPARATION

In Activity 1 you will review the scientific definition of ‘ecosystem’ and investigate the different types of ecosystems within the South Coast region. To assist you, it is recommended that you:

- Read the Teacher Background Notes
- Download **South Coast Region Clearing Map 1** from Resources section of this lesson plan. This map shows cleared and relatively intact vegetation of the South Coast.
- If possible, locate the video: **Remote and Rugged: Western Australia’s South Coast**. Produced by Blue Office for South Coast NRM 2013 (about 60 mins). The video provides an overview of the South Coast Natural Resource Management Region in terms of the geology, biodiversity, cultural heritage, human interactions post European settlement, land use, conservation values, threats to nature conservation management, threatened species recovery plans and research into local threatened fauna. Includes short interviews of key stakeholders in local NRM: hear their different Worldviews.
- Prepare to view the first 34 minutes 53 seconds of it with your students.

For activity 2

- Arrange to show Slides 1 to 11 of the Power point presentation of the **Gilbert’s Potoroo Australia’s Most Endangered Mammal: A Case Study** Dorn R and Rastick T. 2013
- Arrange for all your students to have access to the whole Power point - using a Shared Drive or Moodle or thumb drive or load to desktop of class computers / laptops
- Download and print off enough copies of **RESOURCE SHEET: Task Cards 1 to 4** for the number of students in your class and according to level of capability of individual students. If you have 3 or 4 students per group, you may end up with about 8 groups: e.g. two groups reviewing and sharing the same section of the Power Point.

A suggestion about Task assignment:

TASK CARD 1- Is the simplest task. Suitable for less able students.

TASK CARDS 2 & 3- Will suit moderately capable students.

TASK CARD 4- Is the most challenging task: suitable for the most able students.

## 6. PROCEDURE

### **ACTIVITY 1: Setting the Scene: Introduction to the Local Ecosystem (40 - 50 minutes total)**

Students will learn about what an ecosystem is and what conservation measures being undertaken to protect their local ecosystems.

Steps

1. Review the scientific definition of ecosystem:  
Ecosystem: A system which includes all living things or organisms or biotic factors as well as its physical environment or abiotic factors working together as a unit.  
ECO + SYSTEMS - Origin of ECO- Late Latin *oeco*- household, from Greek *oik-*, *oiko-*, from *oikos* house
2. Share and discuss the **South Coast Region Clearing Map 1**.  
Ask the question: What implications does widespread land clearing have for the survival of local wildlife?
3. View the first 34 mins 44 secs of **DVD: Remote & Rugged: Western Australia’s South Coast**. This finishes with a clear statement by DPAW Research Scientist Tony Friend about Gilbert’s Potoroo and the action we need to take as a community. It is a logical place to stop the DVD.

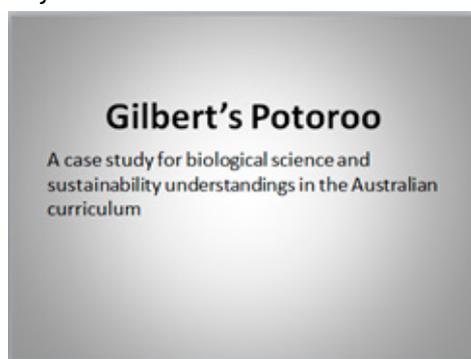
4. Ask the students to watch the DVD and to make short notes which will assist with answering the questions on the **Student Worksheet 1**

## ACTIVITY 2: Case Study of Gilbert's Potoroo

Students will learn about the Gilbert's Potoroo and the Gilbert's Potoroo Action Group's efforts to conserve the species. Students will be asked the question: Why conserve biodiversity? The lesson uses one of the communication tools designed and produced by the active Albany-based community action group - Gilbert's Potoroo Action Group. This tool is a Power Point presentation called: Gilbert's Potoroo - Australia's Most Endangered Mammal: A Case Study. by Dorn R and Rastick T. 2013

### Steps

1. Recall the information about Gilbert's Potoroo from Activity 1.
2. WHOLE CLASS FOR 10 MINUTES: Introduce and show the first 11 slides of the PowerPoint presentation produced by the Gilbert's Potoroo Action Group. (49 sides total)



SLIDE 1



SLIDE 11

3. Stop on Slide 11 and briefly pose the question: Why conserve biodiversity?
4. Divide the class into groups and assign to each group a Task Card relating to a series of slides from the Powerpoint presentation.
5. Ask the groups to review and discuss in their groups the information in their assigned slides.
6. Ask each group to report back to the class.
7. Another way your students could report back is to use a poster format which scientists use in conferences. There are 2 examples of recent Posters in the Conference Posters folder which you may wish to print off - A3 size for your students. Or you could give them electronic copies. This work could be assessed.

## RELATED RESOURCES

Gilbert's Potoroo Action Group website <http://www.potoroo.org/>

Mount Barker Community College Year 7s support the Gilbert's Potoroo Recovery Program in 2011  
<http://www.potoroo.org/newsletters/PP%20Issue%206%202012.pdf>

The Gilbert's Potoroo (Potorous Gilbertii) Recovery Plan. <https://www.environment.gov.au/system/files/resources/65f19909-be05-4409-834e-f37443fe5213/files/p-gilbertii.pdf>

Gilbert's potoroo translocated to new areas find their fungi Information Sheet 4/2009  
<https://www.dpaw.wa.gov.au/images/documents/about/science/pubs/infosheets/sdis004.pdf>

Florabase website for details about three plants are common to the habitat of Gilbert's Potoroo  
<http://florabase.dpaw.wa.gov.au/>

Cycling of Matter: Spores from fungi eaten and distributed in the scats of Gilbert's Potoroo  
<http://www.publish.csiro.au/>

Gilbert's Potoroo Australia's Most Endangered Mammal: A Case Study Dorn R and Rastick T. 2013 ( power-point in file attached)

DVD: Remote and Rugged: Western Australia's South Coast. Produced by Blue Office for South Coast NRM 2013

Poster: Sun Moth Fact Sheet <https://www.dpaw.wa.gov.au/images/documents/about/science/pubs/posters/sun-moth-fact-sheet.pdf>

Poster: Tackling threats to plant diversity on the south coast of Western Australia <https://www.dpaw.wa.gov.au/images/documents/about/science/pubs/posters/tackling-threats.pdf>

Margaret Roc and Kathleen Hawke Australia's Critically Endangered Animals, Port Melbourne, Victoria: Heinemann Library, 2006. (A simple, clear text suitable for students with reading difficulties. See pages 20 and 21)

Atlas Of Living Australia <http://bie.ala.org.au/species/Potorous+gilbertii>

Kids Corner - The Food Chain Game: <http://www.sheppardsoftware.com/content/animals/kid-scorner/games/foodchaingame.htm>

Climate Watch: <http://www.climatewatch.org.au/get-involved/land>

Bird Life Australia - Great Cocky Count: <http://birdlife.org.au/projects/carnabys-black-cocka-too-recovery/great-cocky-count>

## VOCABULARY

**Ecosystem:** A system which includes all living things or organisms or biotic factors as well as its physical environment or abiotic factors working together as a unit.

**Habitat:** The place where an organism or a biological population normally lives or occurs.

**Mycorrhiza:** \* The origin of this word is the Classical Greek words for 'mushroom' and 'root'. In a mycorrhizal partnership or association, the fungal hyphae of an underground mycelium connect with plant roots. The fungus does not parasitize the plant. In fact, the association is often (but not always) mutually beneficial. Through photosynthesis a chlorophyll-containing plant makes simple carbohydrates (using carbon dioxide, water and sunlight). It is estimated that between about 80 to 90% of plants form mycorrhizas.

**Threats:** any of a number of conditions which reduce a species or an individual plant or animals' chance of survival. E.g. Threats to the survival of Gilbert's Potoroo include bushfire, Phytophthora dieback, predation by foxes and cats or clearing for grazing.

## REFERENCES

- Australian National Herbarium website: Fungi Home Page. Australian National Botanic Gardens and Australian National Herbarium, Canberra. 2012 <http://www.anbg.gov.au/fungi/mycorrhiza.html>
- N. L. Bougher A and J. A. Friend, Fungi consumed by translocated Gilbert's potoroos (*Potorous gilbertii*) at two sites with contrasting vegetation, south coastal Western Australia in *Australian Mammalogy*, 2009, 31, 97–105
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- Courtenay, J and Friend, T for the Gilbert's Potoroo Recovery Team in *The Gilbert's Potoroo (*Potorous gilbertii*) Recovery Plan, July 2003-June 2008 Wildlife Management Plan No. 32.* Department of Conservation and Land Management. Wanneroo, WA. 2004.
- Dorn R and Rastick T, *Gilbert's Potoroo Education Package, Australia's Most Endangered Mammal: A Case Study*, 2013, [www.potoroo.org](http://www.potoroo.org)
- Fleming P.A. , Anderson H, Prendergast A, Bretz. M.A., Valentine L.E .and Hardy G. Is the loss of Australian digging mammals contributing to a deterioration in ecosystem function? *Mammal Review*, Volume 44, Issue 2, pages 94–108, April 2014
- Hammond P *The Atlas of Endangered Animals: wildlife under threat around the world.* Leicester, England. Amber Books, (2006)
- IUCN Red List of Threatened Species: June 2014  
<http://www.iucnredlist.org/>



Watch a DVD of Remote and Rugged: Western Australia's South Coast. The DVD provides an overview of the South Coast Natural Resource Management Region in terms of the geology, biodiversity, cultural heritage, human interactions post European settlement, land use, conservation values, threats to nature conservation management, threatened species recovery plans and research into local threatened fauna. The DVD includes short interviews from local NRM stakeholders.

Your challenge is to:

a) Note at least five key points made by any of the 7 different speakers to describe the South Coast region

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

b) Note what each of the speakers (area of expertise) say about threats to local animals and possible actions to save species from extinction.

Nathan Mc Quoid (geology)

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Doc Reynolds (cultural heritage)

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Keith Bradby (functioning landscape)

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Deon Utber (conservation and land management of natural South Coast landscapes)

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Sarah Comer (ecology and fauna surveys of the South Coast)

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Saul Cowen (monitoring the Western Ground Parrot)

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Tony Friend (research actions for the conservation of Gilbert's Potoroo)

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### **TASK CARD 1: CASE STUDY OF GILBERT'S POTOROO - REVIEW AND SHARE**

TASK - Watch, review and prepare a short report to share with the whole class about the key findings covered in Slides 1 to Slide 11 of the Powerpoint presentation compiled by the Gilbert's Potoroo Action Group.

Review and discuss the key information in these slides with your group members. Think how you will report back to class. Use headings and organise your thoughts clearly, accurately and briefly.

One idea: a Poster Presentation: Scientists at conferences often present 'Poster Presentations'. Basically, scientists make a poster or a chart which has summary ideas only, it may have graphs or photos or drawings to sum up key findings of their research work with others.

### **TASK CARD 2: CASE STUDY OF GILBERT'S POTOROO - REVIEW AND SHARE**

TASK - Watch, review and prepare a short report to share with the whole class about the key findings covered in Slides 12 to Slide 24 of the Powerpoint presentation compiled by the Gilbert's Potoroo Action Group.

Review and discuss the key information in these slides with your group members. Think how you will report back to class. Use headings and organise your thoughts clearly, accurately and briefly.

One idea: a Poster Presentation: Scientists at conferences often present 'Poster Presentations'. Basically, scientists make a poster or a chart which has summary ideas only, it may have graphs or photos or drawings to sum up key findings of their research work with others.



### **TASK CARD 3: CASE STUDY OF GILBERT'S POTOROO - REVIEW AND SHARE**

TASK - Watch, review and prepare a short report to share with the whole class about the key findings covered in Slides 24 to Slide 32 of the Powerpoint presentation compiled by the Gilbert's Potoroo Action Group.

Review and discuss the key information in these slides with your group members. Think how you will report back to class. Use headings and organise your thoughts clearly, accurately and briefly.

One idea: a Poster Presentation: Scientists at conferences often present 'Poster Presentations'. Basically, scientists make a poster or a chart which has summary ideas only, it may have graphs or photos or drawings to sum up key findings of their research work with others.

### **TASK CARD 4: CASE STUDY OF GILBERT'S POTOROO - REVIEW AND SHARE**

TASK - Watch, review and prepare a short report to share with the whole class about the key findings covered in Slides 33 to Slide 46 of the Powerpoint presentation compiled by the Gilbert's Potoroo Action Group.

Review and discuss the key information in these slides with your group members. Think how you will report back to class. Use headings and organise your thoughts clearly, accurately and briefly.

One idea: a Poster Presentation: Scientists at conferences often present 'Poster Presentations'. Basically, scientists make a poster or a chart which has summary ideas only, it may have graphs or photos or drawings to sum up key findings of their research work with others.

# SOUTH WEST CASE STUDY: BLUE GUM PLANTATIONS

## Striving for Sustainability on Changed Landscapes

### 1. OVERVIEW

Students will investigate how Australian Blue Gum Plantations (ABP), operating in the South-West of WA, plans, manages and operates its blue gum plantation whilst aiming to balance economic, social and environmentally sustainable outcomes. For the purpose of time effectiveness, a case study approach to ABP is outlined rather than a wider industry sector case study.

Through this case study, students are invited to evaluate this land use as one approach to contributing to the restoration and rehabilitation of the area being studied. They will do this using the concept of sustainability to address land cover and biodiversity loss into the future.

### 2. LINKS TO THE AUSTRALIAN CURRICULUM

STRAND	SUB-STRAND / KEY ORGANISING IDEAS
<b>GEOGRAPHY</b>  Geographical inquiry and skills  Geographical knowledge and understanding	Interpreting, analysing and concluding  Communicating  Depth Study: investigate the links between changes in land cover and biodiversity
<b>SUSTAINABILITY</b>	Systems  Worldviews  Futures

### 3. OBJECTIVES

Students will:

- Describe how extensive land clearing for agriculture in South Western Australia (Post WWII to 1984) has disrupted ecosystem function and has led to intensive biodiversity loss.
- Describe how one agricultural sector - Blue Gum plantations - seeks to protect local biodiversity in the 21st century, whilst commercially growing timber on previously cleared agricultural land.

#### TOPICS

Blue gum plantations  
 Biodiversity  
 Water cycle  
 Dryland salinity

#### PHASES OF LEARNING

Year 11-12

#### SITE (LOCATION)

Classroom  
 Internet

#### ACTIVITIES

1. A Million Acres A Year
2. Restoring Nature's Balance
3. South West Case Study

#### MATERIALS

- Activity 1
- TV/DVD player
  - A Million Acres a Year
- Activity 2
- LANDSCOPE article: Restoring Nature's Balance
- Activity 3
- Access to computers
  - Whiteboard / smartboard / blackboard or Butchers' paper and markers or chalk.

#### STUDENT WORKSHEETS

1. A million Acres a Year
2. Bluegum Plantation

#### SOURCE DOCUMENTS

1. Special Values
2. Plantation Management Plan



## 4. TEACHER BACKGROUND INFORMATION

Before studying Blue Gum plantations in the South West of WA, it's important to put the operations of this group in a regional context.

Significance of the Region's Biodiversity:

Extract from the South Coast NRM website, July 2014

*Scientists have identified 25 biodiversity hotspots around the world - areas considered to be of international significance, which supports a combination of endemic species, diversity and threats to biodiversity.*

*The unique biogeographic region of south west Australia, stretching from Shark Bay in the north to Israelite Bay in the south, covers more than 300,000sqm and is recognised as the only international biodiversity hotspot in Australia. The South Coast NRM (Natural Resource Management) region occupies the south-eastern part of this province and contributes significantly to its biodiversity values.*

*Separated from the rest of the continent by desert - the plants and animals in the hotspot have evolved in isolation for millions of years.*

*As a result the area is teeming with life - it is home to more than 1500 plant species, most of which are endemic. These include the majestic marri and karri eucalyptus trees that can grow to 30 and 70 metres respectively.*

*Several endemic mammals in the hotspot, including the numbat, which is a rabbit-sized marsupial anteater now endemic to the hotspot having disappeared from the rest of its range in Australia and the dibbler which had been thought extinct for 83 years.*

*Humans pose a threat to the biodiversity values, directly, through accessing remote parts (on foot and in vehicles) and through urbanisation, and indirectly by spreading diseases (e.g. the water mould, *Phytophthora cinnamomi*), introducing invasive species, and clearing land, which can have an impact on waterways (e.g. sedimentation and eutrophication).*

*There are 5472 known species and sub-species of flora in the region, which is more than 60 per cent of the province's flora. Of these 694 are endemic to the region.*

*Biodiversity contributes to the region's economy and provides ecological processes such as water and air purification and the pollination of food crops. It is valuable for our health and well being and contributes to tourism and the beauty of the region. In many cases, the components of biodiversity building blocks are better known than the complex interactions and inter-relations between and within ecosystems.*

## LESSON SEQUENCE: CONCEPT SEQUENCE

INQUIRY: What are some of the interrelationships between land cover change and biodiversity change in South Coast region of Western Australia?

This concept sequence shows how the lessons are sequenced.

### 1. Two Views of Country: Minang Way/ Settlers Way: Land Cover & Biodiversity

Examine the historical record  
1. Oral record - Minang people.  
2. Written record: journals, reports, articles and maps of South West region for descriptions of land cover and biodiversity pre- European settlement and after settlement.



### 2. A Million Acres a Year

A story of Post WWII agricultural land clearing of the South West which explores the effects on local flora, fauna landscapes & the farmers themselves.

Source: A Million Acres a Year DVD. 2002. 52 minutes. Film Australia.

### 3. Changing Values to Land and Biodiversity

Emergence of a Landcare movement in SW WA.  
Sources: 1. Annual reports - Department of Agriculture WA (Late 1980's - 1990's) and  
2. Community based catchment and NRM groups  
3. Newspaper articles



### 4. Remote and Rugged: Western Australia's South Coast

Look at the South Coast of WA through a Natural Resource Management lens.

Source: Remote & Rugged DVD.2013. 60 minutes. South Coast NRM.



### 5. Restoring Nature's Balance

Learn why planting and growing Blue Gum plantations in South West WA was suggested in late 1980's as a sustainable approach to overcoming environmental problems of salinity, water logging and phosphorus pollution.

SOURCE: LANDSCOPE Magazine article:  
RESTORING NATURE'S BALANCE:  
The potential for major reforestation for South Western Australia. Pages 3- 14. Vol. 3. No.3 1988. Shea S and Bartle J. CALM

### 6. Case-study: Land Use

Examine how one agricultural industrial sector - plantation timber- growing - approaches land use and biodiversity protection.

Source: Special Values Booklet: South West of Western Australian Plantation Estate. V1. 2013. High Conservation Value (HCV) Working Group: APFL, Bunbury Fibre, PF Olsen, WAPRES, Forest Products Commission, Bunbury Exports.



### Partnerships: Towards healthy, functioning landscapes

Meet some of the local players ...  
Minang people, NRM groups, NGO's, Community groups, Government, Philanthropic groups, Scientists, international groups, Land owners, Industry

Sources: 1. Phytophthora Dieback - The Fitzgerald Biosphere DVD. 2008. South Coast NRM.

## 5. TEACHER PREPARATION

Before starting the 3 Activities, check students have an understanding of the following:

- The role that Commonwealth and State government policy had in driving intensive land clearing for agriculture in the South West of Australia.
- The key environmental impacts of this land cover change from natural ecosystems to farmland on soil salinity (Dryland Salinity), water balance, soil erosion and loss of biodiversity.
- The key social and financial impacts of this land cover change on farming families in affected areas in the South West.
- The economic benefits of blue gum plantations which have become a viable industry contributing valuable jobs and income to the region

### For Activity 1:

- Source and view the **DVD: A Million Acres a Year**. 2002. (52 minutes) Film Australia
- Print **STUDENT WORKSHEET 1: A Million Acres a Year**

### For Activity 2:

- Print or provide electronically the LANDSCOPE Magazine article: **Restoring Nature's Balance**: The potential for major reforestation for South Western Australia. Pages 3- 14. Vol. 3. No.3 1988. Shea S and Bartle J. CALM. This resource - with graphs, tables and illustrations - tells the story of disruptions to the water cycle and salt storage in the soil of highly cleared agricultural land and the possible part Blue Gum plantations could play in restoring this land.

### For Activity 3:

- Familiarise yourself with:
  - **SOURCE DOCUMENT 1**: Special Values Booklet: South West of Western Australian Plantation Estate.
  - **SOURCE DOCUMENT 2**: Plantation Management Plan for Australian Blue Gum Plantations. Albany and The Green Triangle Region.
  - **STUDENT WORKSHEET 2**: Student Inquiry Activity Sheets: SOUTH WEST CASE STUDY: Blue Gum Plantations: Striving for Sustainability on Changed Landscapes
- Print or provide electronically **STUDENT WORKSHEET 2** and **SOURCE DOCUMENTS 1 and 2** to your class.

## 6. PROCEDURE

### ACTIVITY 1: A Million Acres A Year

Through this activity, students will learn that a key response to widespread land degradation in SW WA was the emergence of a Landcare ethic.

#### Steps

1. Students read the Viewing Guide in the **STUDENT WORKSHEET 1: A Million Acres a Year** to prepare them for note taking and comprehension during the viewing of the **DVD: A Million Acres a Year**.
2. View the **DVD: A Million Acres a Year** and complete the 8 focus questions from the Viewing Guide.
3. Discuss responses to the 8 focus questions.

## ACTIVITY 2: Restoring Nature's Balance

Through this homework reading assignment activity, students will understand that:

- Collaborative efforts were made to address Dryland Salinity through actions like State Salinity Action Plans, which includes reforestation plans.
- Blue Gum plantations are one response to rehabilitating salt-affected land in SW WA.

### Steps

1. Direct students to read this LANDSCOPE article, **Restoring Nature's Balance**: The potential for major reforestation for South Western Australia, prior to the Activity 3 in which you introduce the Blue Gum Plantations Case Study.
2. In class, review the LANDSCOPE article with your students and discuss the impacts of extensive agricultural clearing in the South West of WA, including water cycle disruption and dryland salinity. Explore the idea of restoring balance to the water and storage of salt in soil by planting parts of the landscape to blue gum trees for wood fibre.

## ACTIVITY 3: South West Case Study: Blue Gum Plantations: Striving for Sustainability on Changed Landscapes

Students will conduct a geographical inquiry into plantation land cover and biodiversity values near Albany on the South Coast of Western Australia.

### Steps

1. Introduction (10 minutes)
  - Conduct a class brainstorm for the term BLUE GUM PLANTATIONS.
2. Outline The Task (5 minutes)
  - Talk students through the **STUDENT WORKSHEET 2**
  - Examine SOURCE DOCUMENTS 1 and 2.
3. Student Inquiry (45 minutes in class)
  - Complete **STUDENT WORKSHEET 2** in class or as homework.

## RELATED RESOURCES

A Million Acres a Year Study Guide for this a Million Acres a Year. 2002. (52 minutes) Film Australia DVD is available from Enhance TV [www.enhancetv.com.au/shop/home.php?cat=248](http://www.enhancetv.com.au/shop/home.php?cat=248)

Restoring Nature's Balance: The potential for major reforestation for South Western Australia. Landscape. Pages 3- 14. Vol. 3. No.3 1988. Shea S and Bartle J. CALM. ( in file attached)

Special Values: South West of Western Australian Plantation Estate. V1. 2013. High Conservation Value (HCV) Working Group: members from APFL, Bunbury Fibre, PF Olsen, WAPRES, Forest Products Commission, Bunbury Tree Farms Project, Gunns Ltd. [ftp://ripplemultimedia.com/ANU/Upload/Special%20Values%20of%20the%20South%20West%20Plantation%20Estate\\_V1.pdf](http://ripplemultimedia.com/ANU/Upload/Special%20Values%20of%20the%20South%20West%20Plantation%20Estate_V1.pdf)

Plantation Management Plan for Australian Blue Gum Plantations. Albany and the Green Triangle Region. May 2014. <http://www.austgum.com.au/australian-plantations-woodchips/documents/Plantation%20Management%20Plan%202014.pdf>

## VOCABULARY

These definitions are from the WACE Geography Course Year 12 Syllabus (2014) School Curriculum and Standards Authority.

**Anthropocene** - An informal term commonly used to define the most recent period of geologic time. It is used to highlight the extent to which human activities have impacted on the Earth's ecosystem.

Evidence of human impact, such as the proliferation and spread of managed and constructed elements of environments, together with climate change, habitat loss and species extinctions, are cited by scientists as evidence that human impact has significantly changed the nature of the Earth's biodiversity. There is not, however, a consensus on when the Anthropocene commenced. Some scientists identify the Industrial Revolution as the start date. Others trace its beginnings to the rise of agriculture and the Neolithic Revolution some 12,000 years ago.

**Anthropogenic biomes** - Biomes that are the result of sustained direct human interactions with ecosystems.

**Biodiversity** - The type, number and variety of living organisms within a given environment.

**Ecosystem** - A community of plants and animals in a non-living environment.

**Environment** - The term 'environment', where unqualified, means the living and non-living elements of the Earth's surface and atmosphere. It includes human changes to the Earth's surface, for example, croplands, planted forests, buildings and roads.

**Interconnection** - The concept of interconnection emphasises that no object of geographical study can be viewed in isolation. It is about the ways in which geographical phenomena are connected to each other through environmental processes, the movement of people, flows of trade and investment, the purchase of goods and services, cultural influences, the exchange of ideas and information, political power and international agreements. Interconnections can be complex, reciprocal or interdependent, and have a strong influence on the characteristics of places. An understanding of the significance of interconnection leads to holistic thinking and helps students to see the various aspects of geography as connected rather than separate bodies of knowledge.

**Land cover transformation** - Refers to the changes that have taken place in natural environments due to a variety of natural and/or human-induced causes.

**Sustainability**: Meeting the needs of current and future generations through simultaneous environmental, social and economic adaptation and improvement.

## REFERENCES

- South Coast NRM <http://www.southcoastnrm.com.au/>
- Special Values Booklet: South West of Western Australian Plantation Estate. V1. 2013. High Conservation Value (HCV) Working Group e.g. the following plantation companies - APFL, Bunbury Fibre, PF Olsen, WAPRES, Forest Products Commission, Bunbury Tree Farms Project, Gunns Ltd.  
[ftp://ripplemultimedia.com/ANU/Upload/Special%20Values%20of%20the%20South%20West%20Plantation%20Estate\\_V1.pdf](ftp://ripplemultimedia.com/ANU/Upload/Special%20Values%20of%20the%20South%20West%20Plantation%20Estate_V1.pdf)
- Plantation Management Plan for Australian Bluegum Plantations . Albany and The Green Triangle Region. May 2014, students will conduct a geographical inquiry into plantation land cover and biodiversity values on the South Coast, near Albany.  
<http://www.austgum.com.au/australian-plantations-woodchips/documents/Plantation%20Manage>
- A Million Acres a Year DVD. 2002. 52 minutes. Film Australia.
- Remote & Rugged DVD.2013. 60 minutes. South Coast NRM.
- LANDSCOPE Magazine article: RESTORING NATURE'S BALANCE: The potential for major reforestation for South Western Australia. Pages 3- 14. Vol. 3. No.3 1988. Shea S and Bartle J. CALM (in file attached)
- State of the Environment Report WA 2007. Environmental Protection Authority. Government of Western Australia. Land Theme and Biodiversity Theme <http://www.epa.wa.gov.au/abouttheepa/soe/2007/Pages/default.aspx>
- Australian Blue Gum Plantations (ABP)  
<http://www.austgum.com.au/australian-plantations-woodchips/home.html>



BLUEGUM PLANTATION  
STUDENT WORKSHEET 1:  
A MILLION ACRES A YEAR



A MILLION ACRES A YEAR: Viewing Guide

Film Australia produced this DVD which tells the story of the push for broad-scale land clearing for agriculture in South West Australia driven by State and Australian governments, between 1946 and 1983. Follow the story of some local farmers, their families, the impacts of this extensive land clearing on the local ecosystems using this viewing guide.

1. Comment on this quote from the DVD.

“After WW II - more land was released in 3 decades than in the former 150 years.”

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2. “We can land a man on the moon and bring him back ... but we can’t create that bush...” Explain who expressed this thought: what perspective was this person coming from?

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3. Stephen Hopper: “This is one of two or three places in the world that really is superbly ancient.” What is Professor Hopper implying from this comment? Explain.

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4. “South West Western Australia is ranked in the Top 25 biodiversity hotspots worldwide.” What does that mean?

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5. Comment on this quote: “2 bulldozers working ball and chain can flatten up to 1 000 acres a day”.

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6. In 1981, 1982 and 1983, what environmental conditions showed that at least 10% of the area was unsustainable of maintaining viable agriculture? As one person expressed: “We are mining our resource.”

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7. When scientist, Dennis Saunders first came to Western Australia in 1968 to study Carnaby’s Black Cockatoo, they were regarded as vermin. Describe what has happened to these birds in the 30 years he has studied them. What is their status now? Why?

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8. How did some farmers respond to this described by Keith Bradby:  
“I guess the ‘80’s were a very intense personal time for a lot of people. Those who had been here for a long time had witnessed destruction on a scale that you rarely see on the planet.”

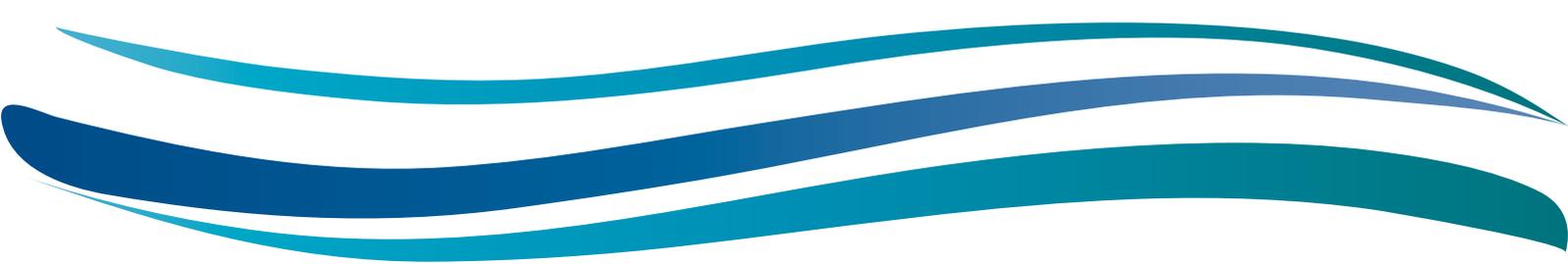
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BLUEGUM PLANTATION  
STUDENT WORKSHEET 2:  
Student Inquiry Activity Sheets

SOUTH WEST CASE STUDY: Bluegum Plantations: Striving for Sustainability on Changed Landscapes

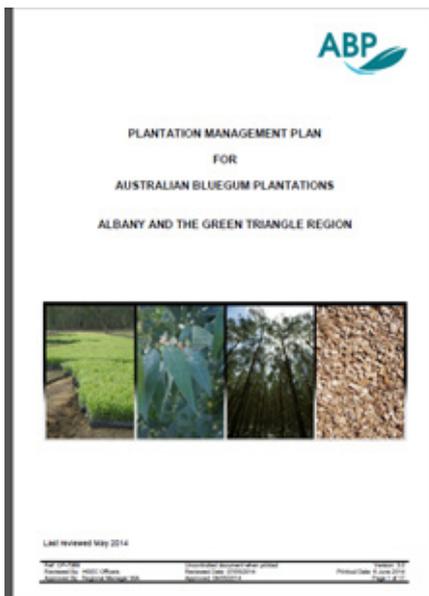
Source Documents

Use the following 2 SOURCE DOCUMENTS to complete your inquiry:



Source document 1:

This booklet was published in 2013 by a Working Group of staff from a number of Bluegum plantation companies working in South West Australia. Read why and how this booklet came into being on page 2 of this Inquiry: background Statement.



Source document 2:

This Management Plan was released in May 2014. It describes the operations for one company Australian Bluegum Plantations (ABP) - in the Albany Region and also in the Green Triangle, Victoria.

**Background to the Special Values Booklet: South West of Western Australian Plantation Estate. 2013.**

By the High Conservation Value (HCV) Working Group: Members from APFL, Bunbury Fibre, PF Olsen, WAPRES, Forest Products Commission, Bunbury Tree Farms Project, Gunns Ltd.

“This booklet was one outcome from a joint group of plantation companies working in the southwest of WA called the High Conservation Value (HCV) Working Group.

Because all our companies work in the same industry sector: we share similar operating conditions:

1. Our companies are certified by the international Forest Stewardship Council (IFSC) and/ or Australian Forestry Standard (AFS). These groups set strict requirements for responsible forestry management which we need to comply with. For example, the FSC standard has 10 principles and 52 criteria.

2. We strive to manage our plantations sustainably

Under these standards not only do we need to responsibly manage our plantations but any remnants we have on our land. To look after these areas and protect the local plants, animals and landscapes in them, we were looking for ways to assist our staff and contractors operate with greater environmental awareness and care.

At first, and before the formation of the HCV Working Group, each plantation company had their own booklet. However once a group, we saw the value in combining our efforts and developing one booklet.

The booklet took 18 months to compile and involved extensive consultation with various stakeholders. For example Gondwana Link, Green Skills, and Department of Environment and Conservation (now Dept. of Parks and Wildlife),

The booklet was released in March 2013 during a workshop which was attended by plantation company employees and contractors. Guest Speakers representing each component of the book ie. animals, plants, ecosystems, cultural heritage and threats were invited to present.

Our initial goal was to use the booklet as a training tool to inform contractors / staff about some of the plants, animals, ecosystems and threats such as weeds and dieback - they may encounter during their work.”

Leanne Tomlinson

HSEC Officer

Australian Bluegum Plantations Pty Ltd



# GETTING STARTED

## Source Document 1

### 1. COVER



Take a moment to look at the Cover of this 81 page booklet. Together with what you now know about the background of the booklet from the previous page, answer these questions:

What key information is communicated to you?

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Who produced this booklet?

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### 2. PURPOSE OF THE BOOKLET - page 2

Describe the main purpose of the booklet.

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And who is the “you” to whom the booklet is addressed?

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### 3. MAP INTERPRETATION - page 3

Write a description of the area which the Tasmanian Bluegum Plantation Estate covers, using geographical terms. Can you infer what kind of climatic and soil conditions are needed to grow these trees commercially in SW WA? Justify your answer.

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### 4. TABLE OF CONTENTS - page 4

Scan these pages to gain an understanding of the contents of the booklet.



### 5. INTRODUCTION - page 7

a. Why is the South Coast - an exceptional region?

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b. What 4 reasons has the plantation industry given as to why it concerns itself with biodiversity protection?

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6. LAYOUT OF THE BOOKLET - page 8

- Read this page to familiarise yourself with the 9 sections of the booklet and review ‘What we would like you to do to care for our special natural values ‘ (there are 4 sections here)
- Imagine you are a contractor for ABP working in a plantation lot in the Oyster Harbour- Kalgan-King catchment. You are working alongside a wetland densely surrounded by sedge. You hear a booming call of a waterbird, which sounds in distress. Upon investigation you locate an injured stocky- brown and white heron-like bird. Use the booklet to identify which endangered water bird it could be. What action/s would you now take if you used the booklet?

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7. CARNABY’S BLACK COCKATOO - page 11

Use this booklet to research why this large, gregarious bird is so threatened. Explain the key threats to this bird.

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8. Do you think that Bluegums would provide anything of value to support the survival of this bird? Explain your answer.

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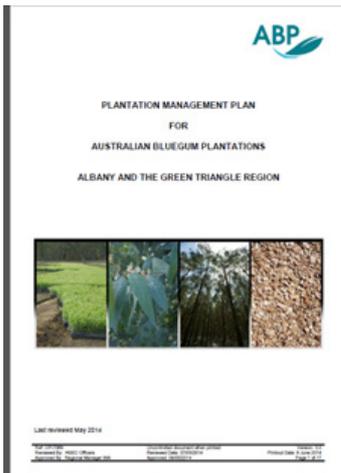
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## Source Document 2

Read this 16 page booklet and answer these questions. (You may wish to skip over the pages covering the Plantation Estate in The Green Triangle in Victoria.)



### 9. PROFILE OF A COMPANY

Name			
Industry Sector			
Role of business			
Where does it operate?			
Crop rotation in years			
End use of wood-chips			
Plantation estate	Plantation areas	(in hectares)	%
	Native vegetation areas		
	Total		

10. What are the 6 key values which ABP seeks to protect in its operations?

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11a. Using the table on page 4, describe some of the operating conditions which the West Australian based: Albany Forest Management Unit operates within.

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b. Generate a graph showing the components of the Forestry Estate using the Table on page 5.

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12. Now use you the information you have gained and interpreted in the earlier part of this Inquiry to answer this question: (you may wish to use Appendix 2 and Appendix 4 - Maps of the Albany Forest Management Unit also).

Support or refute this statement, quoting data from the 2 Source documents and any others you wish to draw on:

Bluegum Plantations are managed in ways which have a number of sustainability outcomes: for the local economy, the local environment and for our local community, in the Albany Region.

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