

# WOODLANDS Field Studies

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This is a fieldwork based unit of work which focuses on Stage 2 students. It provides opportunities for students to explore natural aspects of a woodlands area, the changes which have occurred over time, the reasons for and impact of these changes. The unit emphasises the skills of first hand observation and data gathering and of locating relevant information from other sources. It focuses on investigating and evaluating a woodland site and provides opportunity for students to consider their personal responsibility in contributing to ecological sustainability.

## INTRODUCTION

There is ample evidence of the loss of biodiversity throughout the Australian continent. Unfortunately, there has been a disproportionate loss of those vegetation communities which occurred on better soils. Woodlands on fertile soils were the first to be cleared for crops and pastures and now scarcely remain. For example, it is estimated that just 0.01% of the once dominant White Box Woodlands exists today. In contrast, woodlands growing on rocky hills, steep slopes or infertile soils comprise the bulk of remaining habitat. The impact of this on woodland birds and other creatures has been severe.<sup>1</sup> The impact on water quality and our soil asset has also been great.

The following work, based largely on fieldwork activities, tries to help children understand the processes at work within the landscape around them and to point a way to the future.

This work was originally prepared for Stage 2 children from Manilla Central School in Northern NSW. These children live in a district now surrounded by beautiful farming country, but once, a part of an extensive and diverse ecosystem, the Grassy White Box Woodland. Their visit was to Borah Reserve, a nearby creek site popular with bird watchers and part of a Travelling Stock Route.

This fieldwork forms part of a wider unit published by Manilla Central School and is available, with resources, on their website.

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<sup>1</sup> Robinson, D. & Traill, B. 1996. 'Conserving Woodland Birds in the Wheat and Sheep Belts of Southern Australia'. *Wingspan*, Vol. 6, No. 2, June 1996. RAOU (Birds Australia)

## Background for Teachers

### Activity One

#### *“Free” services provided by magpies*

Farmers benefit from the appetites of magpies who eat large quantities of invertebrates including pest species. Christmas beetle larvae (scarabs), for example, live in the soil eating the roots of pasture plants. Magpies have been known to eat 42 scarab grubs each day being a total weight of 35g. Magpies can hear the large grubs in the soil, picking them out by pecking at the exact spot. Magpies, however, are territorial creatures. They will breed successfully only where there is a territory with suitable trees. Territory can vary in size from 1 to 15 hectares and has fixed boundaries, defended vigorously from other magpies (but not from other species of birds).

As trees have been progressively cleared, many thousands of hectares have been left with insufficient remaining trees for breeding groups of magpies. The breeding potential of this helpful bird is therefore not realised and populations of pasture retarding larvae and tree defoliating adult Christmas beetles are less effectively controlled.

To encourage magpies, farmers should be aware of many aspects of their biology. Isolated trees do not allow successful breeding because the nestlings are exposed to predators while the parents are foraging.<sup>2</sup>



**“Just look at that one...”**

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<sup>2</sup> Davidson, R. & S., 1992. *Bushland on Farms*. AGPS.

*All elements within the woodland are interdependent...all life is connected.*

### **Birds of the Woodland**

Prior to the field trip, children should have been given the opportunity to research some woodland birds so that they have some familiarity with birds likely to be found and so that they have prepared notes (a database), on what each bird eats, where it feeds (e.g. on tree trunks, amongst tree leaves, amongst shrubs, on the ground, in the air) and where it nests. A summary of these notes should be brought along on the field trip for reference. This information is readily found but the Reader's Digest *Complete Book of Australian Birds* is a good place to start. If possible, invite a local bird enthusiast along to help spot and identify birds.

Good examples of birds to research include the regent honeyeater, fairy wren (whichever one is most likely to be found), red capped robin, mistletoe birds, kookaburra, currawong, grey fantail, yellow thornbill, silvereye, the striated pardalote, the double barred finch, grey crowned babbler, restless flycatcher, varied sittella, rufous whistler, scarlet robin, turquoise parrot, sacred kingfisher and the brown treecreeper.

During the fieldtrip, organise several bird watching sessions at appropriate times of day and encourage children to make incidental observations at any time. Following is the type of recording which children could attempt.

#### **Science & Technology LTS2.3:**

Identifies and describes the structure of living things and ways in which living things interact with other living things and their environment.

- *Designs, makes and uses a database to record information on selected fauna.*

#### **Science & Technology INV S2.7:**

Conducts investigations by observing, questioning, predicting, recording and analysing data and drawing conclusions.

- *Observes and reports on a local environment describing how plants and animals rely on each other.*

#### **HSIE CCS2.2:**

Explains changes in the community and family life and evaluates the effects of these on different individuals, groups and environments.

- *Identifies the effects of change on the environment e.g. changes in land use.*

#### **ACTIVITY ONE: Birds**

Sit quietly in one place for a while. When the birds are happy with your being around they will appear and will go about their business. Choose any bird to watch even if you do not know its name and even if it is very small. Make notes on the following:

##### **What does your bird look like?**

small                                  medium                                  large

colours \_\_\_\_\_

Is the beak    short                  curved                  straight                  long

What else can you say about how the bird looks?

What sort of bird do you think it is? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

##### **What does your bird do?**

Feeding                  watching                  resting                  nesting                  calling

Anything else?

## Background for Teachers

### Activity Two

*Plants are producers. Animals are consumers. Decomposers are the vital link.*

In the leaf litter, children will find the decomposers who live on the dead tissue of plants and animals (detritus). They include macro-consumers (worms, snails and some insects such as termites and cockroaches). They also include the organisms of decomposition. These micro-consumers are the bacteria, fungi and protozoa.

The decomposers are the most important members of all ecosystems because they break down the complex organic molecules of plant and animal tissue into basic components that can be used again by plants.

In the freshwater ecosystem, the detritus is more easily broken down. Therefore, in water the most important decomposers are detritus feeders such as mayfly larvae. On land, the most important decomposers are the micro-organisms that can digest cellulose and lignin of wood.



**Where did that beetle go?"**

**Where does your bird go?**    Leaves of trees    bushes  
Ground    tree trunk    grass    fallen logs    tree hollows

**Draw your bird**, labelling colours, beak shape, eye colour and anything else you notice.

### **HSIE EN S2.6**

Describes people's interactions with environments and identifies responsible ways of interacting with environments.

- *Identifies issues about the care of places in the community or places of importance to them.*

The information which children have gathered from their research can now be put to use to give answers to the following questions.

What do birds get from the woodland?

What does the woodland get from birds? (pollination, seed dispersal, cleaning services i.e. removal of herbivorous insects feeding on the trees and on grass roots).

Another useful activity is to take children to a cleared paddock and together make a bird species count. This count can be compared to a species count from the woodland visit. The woodland of course supports a greater biodiversity because it offers a wider array of habitats.

### **ACTIVITY TWO:            Minibeast Search**

Sometimes it is possible to find a variety of invertebrate animals in the litter under trees. Hoops can be useful to define the areas into which children should look. The point of searching for these animals is:

1. To find out exactly what it is that birds such as the babbler are actually eating;
2. to initiate discussion about the role of the invertebrates in breaking down the fallen materials into humus;
3. to initiate discussion about the cycling of nutrients through the woodland.
4. to initiate discussion about the consequences of removing the litter source (trees and shrubs).

Invertebrates are also common under and on the bark of trees. These are food for treecreepers and other birds. Children will find spider web which is also collected by some birds to bind nesting materials together. Please ask children to not pull bark from trees because in doing so, they destroy the habitat of these small animals.

Searches of foliage will reveal many chewed leaves and maybe some small creatures. These are the food of insectivorous birds such as whistlers and honeyeaters and robins.

(How does fencing off and looking after remnant woodland help the farmer manage his or her land sustainably?)

### **HSIE EN S2.5**

Describes places in the local area and other parts of Australia and explains their significance.

- *Names and locates natural features in their local area and evaluates their significance.*

### **HSIE EN S2.5**

Describes people's interactions with environments and identifies responsible ways of interacting with environments.

- *Evaluates the necessity of caring for and conserving a feature, site or place.*

*The whole is greater than the sum of the parts: seeing the woodland as well as the trees.*

**Science & Technology INV S2.7:**

Conducts investigations by observing, questioning, predicting, testing, recording and analysing data and drawing conclusions.

• *Observes and records temperature changes over a day in different locations and makes comparisons.*

**ACTIVITY THREE: Weather**

In an open area and at the edges of remnants, there is greater exposure to sun and wind. Different kinds of creatures will live here than in protected places.

At different times of day, take weather recordings:

1. in the woodland (not on the edge)
2. in an open paddock.

At both locations, and at each time of observation, record:

Temperature  
Wind direction  
Wind speed (use a Beaufort scale)  
Relative humidity if possible

In many woodlands under particular weather conditions and at particular times of day, there will be clear differences in the measurements taken indicating that the woodland provides a sheltered environment which a single tree or open area cannot provide.

Examine the temperature data for your town (or other suitable location): Bureau of Meteorology <http://www.bom.gov.au/>).

1. During which months of the year might temperatures be most stressful for animals?
2. How might woodlands help animals survive during these stressful times?

Examine the rainfall data for your town.

1. During which months of the year might water shortage be most stressful for animals?
2. How might woodlands help animals survive during this stressful time?

Use the following maps to examine changes in population of the scarlet robin between 1977 and 2000.

The scarlet robin is one of several woodland birds whose numbers are in decline. These are some of the creatures for whom it is increasingly difficult to find the things needed for survival.

These maps show the results of bird searches by members of Birds Australia. Throughout its range, 10-minute grid squares were classified according to whether Scarlet Robins were present or absent in both Atlases. Try to visualize the grid squares as lights that are 'on' if the robin has 'appeared' since the first Atlas, or 'off' if the robin has 'disappeared'. A comparison of the number of 'on' and 'off' grids indicates that the Scarlet Robin is 49% less likely to be recorded today as it was 20 years ago.<sup>3</sup>

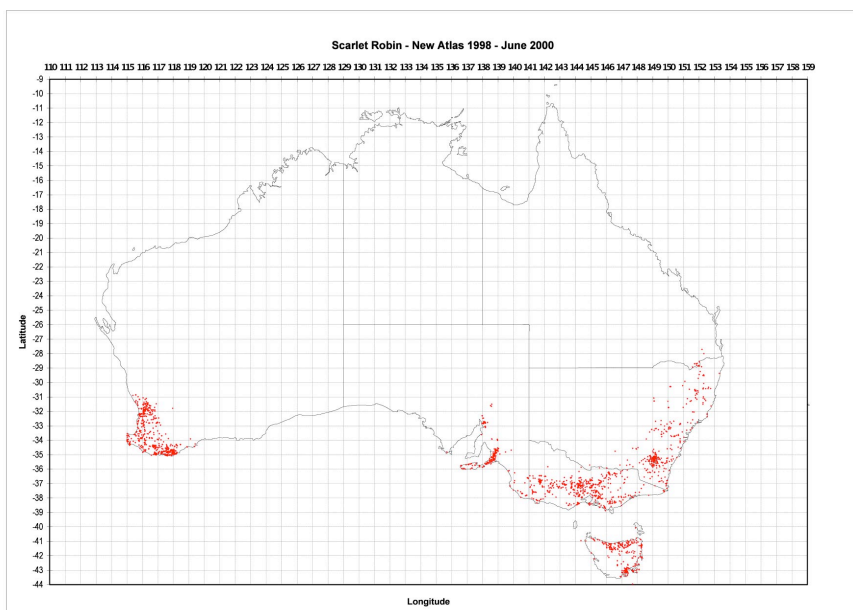
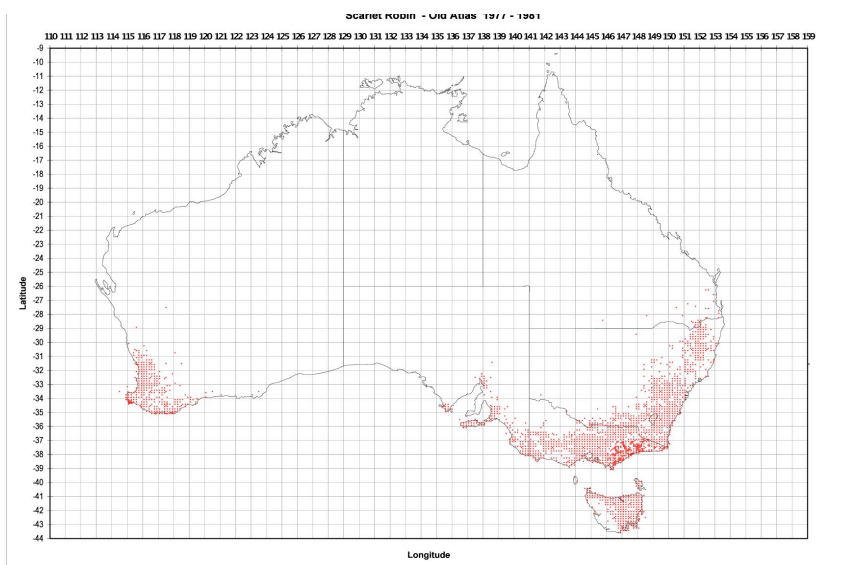
The findings for the June 2000 map are preliminary, with another year of surveys to be completed. The trend however is apparent

***If you remove part of the woodland you break up some of the connections of life. This is a threat to sustainability.***

### Science & Technology LT S2.3

Identifies and describes the structure and function of living things and ways in which living things interact with other living things and their environment.

- *Observes and describes a local environment, describing how plants and animals rely on each other.*



<sup>3</sup> Wingspan, May. 2000. Birds Australia. (used with permission)

## ACTIVITY FOUR: Habitat Connections

The woodland trees give people welcome shelter from the sun and the wind. Other creatures find everything they could possibly need within the woodland.

Prior to the field trip, organise children to find out brief details on the food and shelter needs of animals likely to be found in the area, for example, the koala, glossy black cockatoo, kangaroo, echidna, brushtail possum, striped legless lizard (or other reptile).

<u>Animal</u>	<u>Food needs</u>
<u>Shelter</u>	
Brushtail possum	
Squirrel glider	
Sugar glider	
Echidna	
Kangaroo etc	

Can you see in this woodland, the things which each creature needs? Tick those things which you can see are available.

What happens to these creatures if we remove the woodland?

What prevents many of these creatures from simply finding another patch of bush?

Refer back to the earlier work on birds. What might happen to the woodland if the small leaf gleaning birds such as pardalotes and thornbills no longer lived here because the woodland patch had become too small and isolated?



## Background for Teachers

### Activity Five

The protection given by a healthy remnant relates to far more than just climate modification. The following extract written by two of Australia's researchers details the problem of habitat loss:

“Nearly every surviving woodland remnant is being degraded because of overgrazing by rabbits and domestic stock, tree dieback, weed invasion, the use of inappropriate fire regimes, rising groundwater, salinity, nutrient inputs from fertilizer and stock, increased temperatures and increased wind speeds.

Collectively these processes modify and simplify the structure and composition of the vegetation, restrict tree regeneration and accelerate the rate of tree deaths. As a consequence the remaining habitat becomes unsuitable for many species of animal and plant and they disappear from degraded remnants. This has been true particularly for ground-dwelling animals, including ground feeding and ground nesting birds because of the loss of litter, logs, tussock grasses and other specialised habitat elements from woodland remnants.

The loss of individual plants, animals and habitats in turn threatens the viability of the woodland ecosystem by causing the breakdown of fundamental biological activities such as pollination, seed dispersal, pest control or decomposition. Thus even though woodlands remain they often consist of the living dead because these essential biological activities are no longer occurring and populations of plants and animals are dying out”.

The authors also point out that

“The decline of biodiversity has been exacerbated by the disproportionate loss of vegetation communities found on more fertile soils. Woodlands growing on more fertile soils were the first to be cleared for crops and pastures and now scarcely remain. For example, an estimated 0.01% survives intact of the once dominant White Box woodlands”.<sup>4</sup>

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<sup>4</sup> Robinson, D. & Traill, B.J., “Conserving Woodland Birds in the Wheat and Sheep Belts of Southern Australia”. *Wingspan* Vol. 6 No. 2, June 1996 (supplement). RAOU (Birds Aust), Conservation Statement No. 10.

***If you remove a part of the woodland you break up some of the connections of life. This is a threat to sustainability.***

### **HSIE SS S2.7**

Describes how and why people and technologies interact to meet needs and explains the effects of these interactions on people and the environment.

- *Describes how changes in technology have affected lifestyles and the environment.*
- *Examines possible consequences of a system change in some way.*

### **HSIE EN S2.6**

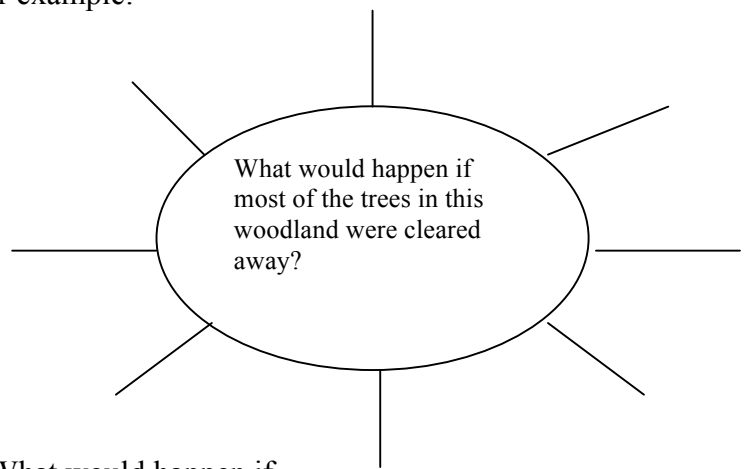
Describes people's interactions with environments and identifies responsible ways of interacting with environments.

- *Identifies issues about the care of places.*
- *Evaluates the necessity of caring for and conserving a site.*
- *Presents alternatives to, and consequences of, using sites in particular ways.*
- *Examines the advantages and disadvantages of various land uses.*

## **ACTIVITY FIVE: Consequences wheel**

The remnant woodland which you visit will provide habitat for creatures which are unable to survive in the long term outside a woodland habitat. Work at school prior to the field trip should establish that vast areas were at one time covered with woodlands which have subsequently and recently been removed. The remnants are now isolated and many creatures are unable to move from one remnant to another to find new food sources and breeding partners. One way of encouraging children to think about this issue is to provide them with a consequences wheel.

For example:



- Cattle were put into the woodland for a long period of time?
- Old dead trees were cut out and the dead logs 'cleaned up'?
- Young seedlings were trampled by stock and chewed by rabbits?
- Weeds were introduced into the woodland?
- Riverbanks were cleared for recreation?
- Towns were built on the best land between the hills and alongside the rivers?

This activity could be completed in the field or back at school after the field trip.

## **Background for Teachers**

### **Activity Six**

Pollutants released into streams can cause the death of aquatic organisms. Using Water Bug Survey procedures and materials, children can discover which animals are present in water and how tolerant or sensitive each species is to pollution.

Pollutants in water can affect the health of people who drink or even swim in the water or who eat contaminated organisms in the food chain. Pollutants can include fertilisers in farm and garden runoff and nutrients from other sources such as phosphorous in detergents and nutrients in storm water runoff. Where these lead to excessive algal growth, water quality problems can arise. An extreme, but not uncommon example is the blue-green algae bloom which periodically contaminates the Darling River system and many town water supplies.



**This is definitely great fun”**

***Humans are part of the connectedness of life and depend on natural systems for their continued existence.***

**HSIE ENS2.5**

Describes places in the local area and other parts of Australia and explains their significance.

**HSIE ENS2.6**

Describes people's interactions with environments and identifies responsible ways of interacting with environments.

- *Identifies issues about the care of places.*
- *Evaluates the necessity of caring for and conserving water resources.*
- *Plans and implements a strategy for caring for a particular site.*
- *Presents alternatives to and consequences of using a site in a particular way.*
- *Identifies the viewpoints of others regarding how water can be cared for and used and demonstrates an appreciation of the rights of others to have these viewpoints.*
- *Examines the advantages and disadvantages of various landuses.*

**Science & Technology INV S2.7**

Conducts investigations by observing, questioning, predicting, collecting and recording data and suggesting possible explanations.

- *Observes and reports on a local environment describing how plants and animals rely on each other.*

**Science & Technology LTS2.3**

Identifies and describes structure and function of living things and ways in which living things interact with other living things and their environment.

**ACTIVITY SIX: Water Testing**

Woodlands have uses for people other than the obvious welcome provision of shelter from sun and wind. These other values of woodland include the protection of fresh water supplies in dam catchment areas, the regulation of water flows in rivers and the protection of agricultural and urban land from dryland salinity. These values of woodlands are a little more remote from children's immediate lives and therefore not so easy to translate into field experiences. Children however can engage in freshwater monitoring which will help establish the link between the quality of water and the activities of people in the surrounding catchment. Biodiversity studies give an indication of stream quality. Turbidity and salt measurements can also be made by primary school children. High turbidity levels often follow clearing, overgrazing and other agricultural practices which expose the surface of the soil. Children can see the good sense in management practices which retain woodland habitat in the vicinity of streams and gullies and in steep areas.

Excellent materials for use in freshwater monitoring are available from :

Streamwatch  
Dept Land and Water Conservation  
P O Box 3720  
Parramatta NSW 2124  
Email: [kfowler@dlwc.nsw.gov.au](mailto:kfowler@dlwc.nsw.gov.au)

These materials include instructions on how to go about water sampling , charts to identify animals found in freshwater environments and instructions on how to calculate a stream quality rating. Details on the Water Bug Survey can be found on <http://www.streamwatch.org.au>.

Another very useful site for examining pond life and which children will enjoy is:

<http://www.yvw.com.au/students/juniorindex.html>

## **Background for Teachers**

### **Activity Seven**

Human wellbeing relies upon essential biological processes that occur only when combinations of species interact with one another and with the non-living environment in what are called ecosystems.

Ecosystem services include the purification of water and air, the detoxification and decomposition of wastes, regulation of climate, regeneration of soil fertility, natural pollination and pest control and the production and maintenance of biodiversity from which our food, pharmaceuticals and clothing originate.<sup>5</sup>

#### **Ecosystem Services: Water Purification**

Small amounts of organic material (plant and animal matter) released into a stream may not be harmful. This is because the waste is biodegradable and is broken down by decomposers. Streams are able to cope with a certain amount. However, if large amounts of organic waste are released into a stream, the decomposers which break it down use a lot of oxygen. The level of oxygen in the stream falls and fish and invertebrate fauna often die. For this reason, sewage is treated before being released into rivers.

#### **Ecosystem Services: Keeping the Salt Down**

Plants use water from the soil, then lose it through transpiration. Any salt in the water is left behind and therefore salt becomes more concentrated over time. This is usually not a problem because it remains in the groundwater well below the level of root penetration. When native vegetation is cleared, less water is removed by deep rooted plants and groundwater rises. As it does so, it brings salt closer to the surface and plants, intolerant to high salt concentrations, die.

#### **Ecosystem Services: Natural Pollination and Pest Control, Production and Maintenance of Biodiversity**

A study by Recher & Majer (2000) found that even isolated trees and those along corridors have greater value than just being windbreaks and stock shelter. Birds for example, are able to rest and feed in these trees on their route from one place to another. Although the matrix of vegetation has been lost from many landscapes, the corridors and isolated trees provide a vital link.

The researchers found that even isolated trees were a 'living zoo' providing a home for an array of small animals. These creatures perform tasks such as pollination and pest control of native plants and crops alike. They were not trapped here, but could be blown from place to place on the wind. A network of trees on farms maintains a legacy of the original fauna. This network complements the conservation of larger remnants and helps them to maintain our unique biodiversity.

Where trees have been lost from the agricultural landscape, it would help to plant and protect more, not just trees, but shrubs as well. This would encourage the small insect eaters.

Plantings have occurred in many areas to control erosion and salinisation. Unfortunately, many of the trees used are not native. It is local native trees that can support the maximum numbers of small creatures who, in turn, will support our native birds. Planting of trees not native to the region is a wasted opportunity.<sup>6</sup>

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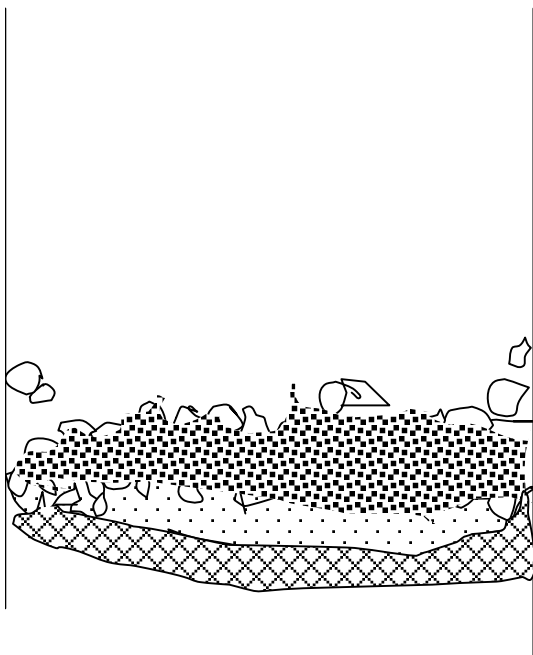
<sup>5</sup> Cork, S. 2000. "Ecosystem Services", *Nature Australia*, Spring, 2000.

<sup>6</sup> Recher, H., and Majer, J. 2000. *Nature Australia*, Winter, 2000.p. 58.





## HSIE ENS2.6

Describes people's interactions with environments and identifies responsible ways of interacting with environments.

- *Identifies issues about the care of places in the community or places of importance to them.*
- *Evaluates the necessity of caring for and conserving a feature, site or place.*
- *Gives reasons why a specified feature, place or site should be cared for.*
- *Examines the advantages and disadvantages of various land uses.*



### Key to Diagram:

- |  |             |
|--|-------------|
|  | gravel      |
|  | coarse sand |
|  | fine sand   |
|  | cloth       |

## ACTIVITY SEVEN:

### Making a Water Filter

Rain water and runoff filtering through the woodland and riverside vegetation is naturally cleaned along the way. Sediment in runoff is trapped by plants before entering streams. Making a water filter using natural materials will help children to understand the process of water cleansing that occurs in catchments protected by remnant bush.

### Instructions for Water Filter

#### You will need:

- Muddy water, 2 litre milk bottle, top removed and holes punched in bottom, gravel, coarse sand, fine sand, cloth, bowl.

#### What you do:

- Build the filter as shown in the diagram, i.e. cloth on the bottom, covered by finest material with gravel on top.

#### Next:

- Pour in muddy water. Collect water exiting the filter.
- What is the difference between the water poured in and the water that comes out?

Natural vegetation growing around rivers filters water before it enters the stream.

Find out if the water that comes to your home is filtered.

In the field, children could observe riverside areas with and without vegetation. These observations could be recorded as labelled drawings.

Aerial photographs and topographic maps could also be useful.

***Each child as an individual has an impact on the woodland environment and in some way can help to preserve it.***

**HSIE SSS2.8**

Investigates rights, responsibilities and decision-making processes in the school and community and demonstrates how participation can contribute to the quality of their school and community life.

**ACTIVITY EIGHT: Who's Been Here Before Me?**

Keep a list at the woodland site you visit of all signs of human activity. For example:

People have been here before me!

Object seen	What's been happening here?
Litter	people having picnics
Fences	people keeping stock out of the woodland
Cow Droppings	people letting stock into the woodland.
Charcoal	people having barbecues

What can I do to make sure that I do not damage the woodland in any way? OR

Put a tick beside the things I can do to make sure that I protect the woodland.

- Take away any litter.
- Carry in my own barbecue wood.
- Put out the barbecue fire when I've finished with it.
- Leave my dog at home.
- Keep my cat in the house at night or don't have a cat.
- Control any rabbits or foxes around my place.
- Get rid of garden weeds at home and make sure I take none near the woodland.

Write letters to relevant authorities to encourage them to conserve remnants on public land, control feral plants and animals, help farmers to conserve remnants. Write to the local paper to tell other people about the problems of woodland loss and decline.

**Tiger pear, a most unwelcome weed**

Make posters to tell other people about how they can help look after woodlands and about how important they are.

Adopt a woodland remnant. Pull out the weeds and clear away any litter left by careless people.

Plant woodland plants at school and at home. This helps add to the pathways that animals use to move from one woodland to another.

*People make their living from the land which once carried vast woodlands. The farms are where most of the things that I need come from and without these farms I would have trouble finding something to eat, something to wear and somewhere comfortable to sleep at night.*

**HSIE SSS2.7**

Describes how and why people and technologies interact to meet needs and explains the effects of these interactions on people and the environment.

**ACTIVITY NINE: What Do These Farms Give Me?**

Use the trip to the woodland field site as an opportunity to observe and note how land formerly under woodland is presently being used to produce the things that each one of us uses. Tick any of the following land uses which you see. Add any others that you can find along the way.

Landuse

Cleared paddocks	cattle grazing	meat for the BBQ
Cleared paddocks	sheep	Leather shoes Wool for my jumper Car seat covers
Crops	wheat Canola	bread rolls and pizza base margarine for sandwiches and cakes cooking oil for stir fries
	cotton pig sheds	T-shirts and jeans pork chops and roast

Because the things I use every day come from where the woodlands once were, it's up to me too, to help look after the woodland we still have.





**“Where to Now”**

## THE BEAUFORT SCALE

The Beaufort Scale is used to gauge wind speed using observations of the winds effects on trees and other objects. It is often used in monitoring projects because it doesn't require fancy equipment.

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Beaufort Number	Km Per hour	Description
0	0	<b>Calm:</b> Still: Smoke will rise vertically.
1	2-5	<b>Light Air:</b> Rising smoke drifts, weather vane is inactive.
2	6-12	<b>Light Breeze:</b> Leaves rustle, can feel wind on your face, weather vane is inactive.
3	13-20	<b>Gentle Breeze:</b> Leaves and twigs move around. Light weight flags extend.
4	21-30	<b>Moderate Breeze:</b> Moves thin branches, raises dust and paper.
5	31-40	<b>Fresh Breeze:</b> Moves trees sway.
6	41-50	<b>Strong Breeze:</b> Large tree branches move, open wires (such as telegraph wires) begin to "whistle", umbrellas are difficult to keep under control.
7	51-60	<b>Moderate Gale:</b> Large trees begin to sway, noticeably difficult to walk.
8	62-74	<b>Fresh Gale:</b> Twigs and small branches are broken from trees, walking into the wind is very difficult.
9	75-86	<b>Strong Gale:</b> Slight damage occurs to buildings, shingles are blown off of roofs.
10	90-103	<b>Whole Gale:</b> Large trees are uprooted, building damage is considerable.
11	104-119	<b>Storm:</b> Extensive widespread damage. These typically occur only at sea, and rarely inland.
12	120+	<b>Hurricane:</b> Extreme destruction.