ACT Government

CONSERVATION COUNCIL ACT REGION

Canberra's Amazing Nature

School Kit

-Teachers Handbook

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ABOUT THE EDUCATION KIT

Exploring the question: 'What is our natural heritage and what does it mean to us?'

Key concepts: identification with place, connections between all living things, impacts of humans on natural systems

Introduction:

The Canberra's Amazing Nature Education Kit is an update of the 2008 Nature's Treasures Travelling School Kit. This resource aims to help schools educate on the amazing natural environments found in the ACT and to encourage students to be more active in our local environment. The development of this Resource Kit has been assisted through funding made available by the ACT Government under the ACT Heritage Grants Program.

It is designed to assist teachers to conduct classroom sessions that introduce years 4-6 students to the ACT's amazing natural environment and ecosystems. These are our 'natural heritage'.

The content and central activities have curriculum links and assessments provided from the 'Every Chance to Learn' framework. The sessions incorporate the 'Inquiry Learning' style.

There are a number of digital and physical parts to the 'Canberra's Amazing Nature Education Kit' including:

- This teachers booklet;
- The 'Nature's Treasures Student Booklet;
- Canberra's Amazing Nature Workbook - hard copies also available for purchase

Essential Learning Achievements – ELA's	
Skills	**Understandings**
The student uses problem-solving strategies	The student understands the effects of humans on the Earth
The student reads and writes effectively	The student applies scientific understandings

The student listens, views and reads critically The student speaks coherently and confidently The student sorts and classifies The student recognises patterns and draws out generalisations The student communicates ideas and feelings through the arts The student contributes to group effectiveness	The student understands change

SESSION 1 - SPECIAL PLACES

Tuning in…

Creating a concept of a sense of place, special places and connections to these.

ELA - The student understands change

Assessment – The student can describe a place that is special to them, recognise threats to this place and understands that these may cause their place to change.

Activity 1: Read the story 'My Patch' by Nel Smit or a selection of stories from 'My Australia' (Australian Geographic)

Discuss with the class:

- What sorts of things would you find if you went to the special place?
- How does this place make the person feel?
- What does the person do when they go there?

Ask the students to consider the following questions:

- Why do people go to special places?
- How would it affect the person if their special place was ruined?
- What sorts of things could threaten someone's special place?

Ask the students to think about a special place they like to go:

- Why is it special?
- What do you do when you go there?
- How does it make you feel?
- Do you have any impacts on the place when you go there? Are these good or bad?
- Do you look after the place? In what ways do you do this?
- How would you feel if your special place was ruined or it disappeared?

The 'think- pair- share' process could be used here.

ELA – The student understands the effects of humans on the earth

Assessment – The student understands the effects that humans have on Canberra's Woodland birds and can suggest what some of the solutions might be to reduce these impacts

Preparing to find out…

Our 'natural heritage'

Have you heard of World Heritage?

The Great Barrier Reef and Tropical Rainforests of North Queensland are listed on the World Heritage List for their natural values.

Did you know that there are also places in the ACT that have important natural values?

Some of these are listed to the ACT Heritage Register or are within our Canberra Nature Park Reserves. E.g Kama Nature Reserve is currently heritage listed because it is home to a large patch of critically endangered Yellow Box – Blakley's Red Gum Grassy Woodlands. This is our own local heritage list.

What is 'natural heritage'?

Access what this means by breaking the concepts into two:

1. What is something that is 'natural'?
    a. E.g. produced by nature, not man-made
2. What is 'heritage'?
    a. What is or may be inherited

Natural features which demonstrate *natural significance*

A natural heritage place is one that has value, or is important due to its ***natural significance.*** These are places that are in a mainly natural state - there has been minimal changes to the place from human impacts. Natural heritage places have intact functioning ecosystems with a variety of native plants and animals interacting with each other and evolving over time (changing due to natural adaptations).

It is important to recognise that Indigenous people have played an important role in using and shaping the Australian landscape for at least 50,000 years and that a place with natural values is also likely have important indigenous values.

Natural heritage places may also have cultural significance. A cultural heritage place is often a building, but it could be any place, setting or object that has meaning due to peoples association with how it has come about. For example, a paddock showing grooves in the land from old plough lines has cultural heritage value.

Natural significance means the <u>importance</u> of *ecosystems*, *biodiversity* and *geodiversity* for their:

- value to present or future generations
- scientific value
- social value
- aesthetic value – the place has natural beauty and has value for the way it looks
- life-support value –humans depend on the earth's natural systems

Background Information

<u>What is an ecosystem?</u>

An ecosystem is a community of plants, animals and micro-organisms (living organisms that are too small to be seen with the naked eye) that are linked by energy and nutrient flows (see Session 3.) and that interact with each other and with the physical environment.

<u>What is the difference between a truly natural place and a seemingly natural place that has been made by people (ie. a park, a farm etc)?</u>

A truly natural place is one that has intact natural ecosystems. Parks and farms have elements of natural systems, they have plants and animals but they are places that have been changed substantially by people. Lawn or pasture grass has probably been planted and this will have replaced the native plants that once existed there. This means there are fewer different types of native plants and animals present – there is **less diversity**.

Of course 'natural places' have also been changed by people to varying degrees. But they have more complex ecosystems and higher levels of biodiversity.

<u>What is biodiversity?</u>

Biodiversity is the **variety** or **diversity** of life that exists in an area or ecosystem, including the animals, plants and micro-organisms. The way that all these components interact with each other is important to the health of an ecosystem. Loss of biodiversity results in the ecosystem becoming vulnerable to extreme events (like floods and drought) and unstable. A healthy ecosystem supports life - animals and plants, and in turn, provides the raw materials needed for human survival.

<u>What is Geodiversity:</u>

Geodiversity means the natural range (diversity) of geological (bedrock), geomorphological (landform) and soil features, systems and processes.

<u>Activity 2:</u> Show Woodland Birds Video

This video/DVD introduces some of Canberra's woodland birds. These birds and the woodland that they live in, are part of ACT's 'natural heritage'. *You can use the following questions/information to conduct a class discussion on the video/DVD.*

- What are the different parts of woodlands that birds use? (for nesting, feeding?) These are the things they need to survive in their woodland ecosystem.

- Can you remember which birds shown in the video are uncommon? The Hooded Robin, Brown Treecreeper, Varied Sittella and White-winged Triller are all listed as threatened species in the ACT. The Diamond Firetail and Jacky Winter are on a 'watching brief' which means that it is thought that they might be declining.

<u>Activity 3:</u> The 'Nature's Treasures' Student Booklet can be used as an introduction to the information that students will learn by doing the activities in this 'Resource Kit'. Students can fill in their booklet by using the information to answer the questions on each page. The sections of the booklet, for example, 'Woodland' or 'Grassland' can be done in separate sessions.

<u>Preparation for Session 2:</u>
Ask the students to bring to class a small natural object - material that can be used in a collage to make a poster. This could be grass, leaves, seeds, bark, small twigs etc. But remind the students to be careful not to take something that an animal is living in or something from a nature reserve.

<u>Extra activities:</u>

- **Quiet Time and Observation-** Each student to choose a special place within the school grounds (preferably an area with some plants!). Allocate time once/week for students to spend quiet time in their special place. This time should be spent observing the changes there and keeping a diary of these.

- **Creative Writing-** Students to write a story about their special place (from Activity 1.). Use the questions from Activity 1. as well asking for descriptions of smells, sounds, what it looks like and how they feel when they go there.

SESSION 2 - Special places are homes for others

Discovering ACT's special natural places and the plants and animals that live there.

Our 'natural heritage'

Why conserve our natural heritage places?

A natural heritage place is one that we believe we should keep for the future.

It may be a place which connects us to our country and helps us to define our identity.

It may be somewhere that we know is important because of what lives there and what it can tell us scientifically. It could be a river, a wetland, a forest, woodland or grassland; a place that provides habitat that is rich with life.

We want to keep it because by doing so we will be protecting the land, and the plants and animals that live there. This will help us and future generations to better understand the nature of our physical world and how we might live within its means.

Our natural heritage places are those we would want to inherit if we were to be born one hundred or one thousand years from now.

By keeping our natural environment healthy we are investing in our own well-being and leaving an irreplaceable gift for generations to come.

(Adapted from 'Protecting Natural Heritage (2nd ed)' Australian Heritage Commission, Department of Environment and Heritage, 2003)

A place can be formally recognised as having heritage significance by being added to a Heritage list. There are state, territory and national lists. In the ACT the heritage list is called the 'ACT Heritage Register'.

The Aranda Snow Gums site is on this list. You can visit this site in the Aranda Bushland Forest Reserve. It is particularly special because there are not many places in the ACT where Lowland Snow Gum Woodland still exists. There are lots of other special things to find out about this place!

The ACT Heritage Council are working on adding more places with *natural significance* to the ACT Heritage Register (many places with cultural significance are already listed), by designating them Nature Reserves, or listing them on the *Environmental Protection Biodiversity Protection* Act (1999). This could include some of our natural places such as grassland, woodland and river environments.

Site Visit: Visit the Aranda Bushland Forest Reserve. See 'Frost Hollow to Forest Walk' brochure. The Friends of Aranda Bushland have developed a great education program that can be done on site. Please see: http://www.friendsofarandabushland.org.au/schools/ for a vast range of environmental education activities, or http://www.home.netspeed.com.au/vaswhite/Activity/Activity_home.htm for most older, but still relevant, resources.

Friends of Aranda Bushland welcomes requests to provide a representative to meet school groups at the site. This is a fantastic opportunity.

Possibilities can be discussed with the group's contact person by emailing FriendsofArandaBushland@gmail.com.

Finding out…

What are different types of environments can we find in the ACT? What plants and animals live there? What is their habitat?

Background Information

What is habitat?

When we talk about habitat we mean the 'home' of a plant, animal or micro-organism. This is where it lives in its natural environment. This place, or 'habitat' is where the species finds the nutrients (food), water, sunlight, shelter, living space, and other essentials it needs to survive.

Habitat loss, which includes the destruction, degradation (decline in quality), and fragmentation (breaking up into small, isolated chunks) of habitats, is the main cause of species loss. See Session 4.

What is an ecological community?

An ecological community is an assemblage of species that occur together within an ecosystem.

Photosynthesis

Photosynthesis is a process that plants use to convert solar energy, carbon dioxide and water into oxygen and sugar. The sugar is what plants need for food.

Soil fertility

Soil fertility depends on the physical elements of the soil. It may range from being fertile to infertile depending on how much moisture, oxygen and nutrients are available as food to the plant.

Nutrients

All living things require nutrients for survival. These include elements such as carbon, oxygen, hydrogen, nitrogen, phosphorus and sulfur. Plants absorb nutrients from the soil and these nutrients are involved in a constant cycle. See 'Nutrient Cycle' in Session 3

ELA- The students applies scientific understandings

Assessment – The student understands the scientific concept of 'habitat' and can apply this concept by creating habitat requirements in a visual form.

Activity 1:

Ask the students to think about their habitat (where they live), and list the things they need to survive.

What would happen if one of these elements was removed or unavailable?

Activity 2:

What are some of the ecological communities and ecosystem types in the ACT?

Forest, woodland, grassland, wetlands and rivers. Our urban environment also provides habitat for some species.

- Place the cards representing these different types of environments in different sections of the room.
- Ask the students to choose a card of a plant or animal species from the selection and find the type of environment in which they live. This is assisted by the colour coding of the borders of the cards. The different environment types match the species that may live there. For example, the forest and its species are dark green, the woodland and species are light green, the grassland and species – yellow, wetland and species – aqua, rivers and species – dark blue and urban and species – red.
- Ask the students use their student booklet to think about and discuss in the group the following questions about the type of environment in which their species lives.

What does it look like?

What are the dominant plants there?

Where do you find it?

Activity 3: Each student is to make a poster that shows the type of environment that their species lives in, using drawings/paintings, cut-outs of coloured paper, etc. and the objects that they have brought in.

Ask the students to:

- Create the habitat requirements for their species in the poster. They will need to find out what these are by reading the information on the back of their species card and then make sure they include them in their poster.

For animals - shelter, physical requirements (food, water), what does it need for breeding? A hollow, nest or burrow etc?
For plants – does it require or provide shelter? Physical requirements – does it require sun or shade, a high or low altitude, a wet or dry environment, fertile or infertile soil? What's required for pollination (for the plant to reproduce)? And how do the seeds get dispersed?

- As a group, present their type of environment to the rest of the class.

Each student should present information on a different aspect of habitat.

Ie. What are all the different types of shelter found in the ecosystem and what provides shelter?
Physical requirements, types of food, water sources, breeding/pollination requirements and status of the different species living there.

Pollination
Pollination is the process by which pollen is transferred from the male to the female part of a flower on the same or another plant. This is an important step in the reproduction of a seed plant, allowing fertilisation to take place. This allows the plant to produce fruit and seeds so that the plant can reproduce. Insects, birds, and mammals, as well as wind or water, can all pollinate plants.

ACT for Bees has developed a curriculum that teaches on the links between pollination and food. Their sustainability focused resources can be found here https://actforbees.org/resources/curriculum/.

ELA- The student sorts and classifies

Assessment – The student can sort the information and group it into the categories.

Presenting combined group information will encourage the students to ask questions of each other and hold discussions within the group.

- Imagine how all these habitats and ecosystems are connected to one another (either before or after giving them information on **Connections between ecosystems**)

- Make one big picture with all the posters to show how everything is connected.

ELA- The student contributes to group effectiveness

Assessment – The student collects and shares information within the group.

ELA - The student speaks coherently and confidently

Assessment – The student presents the information to the class coherently and confidently.

Connections between ecosystems

Although each of these ecosystems are different they are also connected to one another.

Brittle Gum Dry Forest occupies the higher hill slopes and mountain foothills or more rocky sites above Yellow Box-Red Gum Woodland. Yellow Box- Red Gum Woodland is generally found on the middle and lower slopes of hills in an altitude range of 600-900 metres. The Woodland intergrades (merges) with Natural Temperate Grassland and Riverine ecosystems in the valley floors.

Extra activities:

- **Play 'Who am I?'** - Use the cards attached to the students' forehead or back. The students must ask each other 'yes or no answer' questions to see if they can guess their species. Those who guess correctly can peg their card on their front!

- **Concept Map – Habitat Requirements-** Use the information on the cards to investigate why certain plants and animals need to live in particular places. Ask each student to list 3 things that the species needs in its habitat and ask for suggestions from other members of the class as to what category (ie food, shelter, breeding requirements) this fits into. Note these on the blackboard to create a concept map of all the different habitat requirements.

- **Site Visits –** can be arranged to most of the different ecosystem types. These include Jerrabomberra Wetlands, Murrumbidgee River Corridor, Mulligans Flat Woodland and Aranda Bushland (for grassland, woodland and forest ecological communities).

See **Organise a site visit** on p. 40 for further information on these and extra suggested site visits.

- **Conduct an Interview-** Students to find an adult who knows something about plants or animals and conduct and record an interview with them. Try to focus the questions around habitat.

- **True or False Chasey – outdoor game-**

Use the information learnt about either a particular ecosystem or the group of plants and animals to conduct the game.

Instructions

1. Divide the class into 2 equal teams which line up and face each other 2 metres apart. Draw another line about 10 metres behind each team. These are their home bases.

2. The teacher names an ecosystem type (or instructs the students to use the information learnt about the plants and animals studied).

3. Each player in turn makes up a true or false statement about a plant, animal or ecosystem. If the player thinks the statement of their opponent (opposite them) is false, they run to their home base before their opponent catches them.

   If the player thinks the statement is true, they try to catch their opponent. Sometimes the players will try to catch each other and the teacher will announce the right answer. The team with the most correct catches wins.

   (Taken from Outdoor Environmental Games, Reid and Breidahl – see Reference List)

SESSION 3 - EVERYTHING IS CONNECTED. EVEN US!

Food chains and food webs

Our 'natural heritage'

Special natural places that are on the ACT Heritage Register are places people have recognised as important. Any member of the community can nominate a place that they believe has 'natural heritage significance'.

It will then be assessed by the Heritage Unit - the government department in the ACT responsible for our heritage places, and the Heritage Council – a group of experts who advise the Government whether the place has heritage significance and should be added to the Heritage Register.

Many of our special natural places in the ACT are in nature reserves. This is so that the plants and animals in these areas are protected – this prevents clearing of trees or building of houses or other buildings there.

Heritage Listing can be for places in or outside of reserves. If the place is also in a reserve, heritage listing can let people know that it is extra important or it might offer it better protection from threats.

So what makes a natural place important? Assessing natural heritage value.

The place might have a particularly diverse range of species, or have rare or threatened species living in the area. When there are lots of different plants and animals (high biodiversity) or when there are rare or threatened species living in an area this indicates that it is a healthy ecosystem.

So what are the connections and interactions within an ecosystem?

ELA- The students applies scientific understandings

Assessment – The student understands the scientific concepts of food webs, living component of an ecosystem (producers etc.), and nutrient and energy flows.

ELA – The student recognises patterns and draws out generalisations

Assessment – The student can recognise the different living components of an ecosystem (producers etc.) and can generalise this information by working out which group their species belongs to.

The students will actively find out the connections between all things in an ecosystem and the concept of the threats to the balance

Background Information

Ecosystem health

A healthy ecosystem is one in which there is a diversity of plant and animal species. Each plant and organism no matter how small or large has an important and unique role to play within the system. When the system is intact, it is in balance. Each component is connected and this is the basis of the web of life.

Food chains and food webs are the basis of all functioning ecosystems.

Food Chains

A food chain is when energy in the form of food is transferred from one organism to another in a single pathway. For example, plants harvest energy from the sun by photosynthesis, the plants then get eaten by herbivores and those herbivores then get eaten by omnivores or carnivores.

Food Webs

Food chains are not closed systems and do not operate individually. A food web shows the connections between various food chains and organisms in the ecosystem.

Components of a food web

Producers - Most producers are plants. Producers create their own energy from the sun, the air and/or the earth into organic energy (process of photosynthesis – see Session 2) that can be consumed. Producers create their own food and provide food for many other organisms.

Consumers – Consumers are animals. They cannot create their own food, they must eat other organisms.

There are a number of different types of **Consumers:**

1. Herbivores

A herbivore is a first-order **consumer**. Herbivores are plant eating organisms.

2. Carnivores

A carnivore is a second-order **consumer.** Carnivores eat other animals.

3. Top Level Carnivores

A top level carnivore is also a second-order **consumer**. Top level carnivores eat other animals and exist at the top of the food chain.

4. Omnivores

An omnivore is an animal that consumes both producer and consumer organisms.

Decomposers - Decomposers cause the decay or chemical breakdown (rotting) of dead organisms or organic material. This allows nutrients in the organic matter become part of the soil and then used by plants for their growth.

The Nutrient Cycle

Through food webs, the same nutrients (or chemicals) get consumed, broken down, converted back into food by producers and consumed. There is a limited supply of the nutrients we need to live and these nutrients are continuously recycled through the **nutrient cycle**. Some of the essential nutrients for life are carbon, nitrogen and phosphorous.

The Energy Cycle

Energy is the ability to do work. Energy has many different forms and it changes as it moves though ecosystems. To enter the system heat energy from the sun is used by plants to convert water and carbon dioxide to food energy (process of photosynthesis – see Session 2). This food energy is passed on through food chains and webs. Animals use energy from the breakdown of food within their bodies, to move and survive. At each level within a food chain some energy is lost as heat.

Invertebrates

An invertebrate is an animal that has no internal spinal column. More than 98% of all animal species are invertebrates! There are macro invertebrates – the ones you can see and micro invertebrates – the ones you can't.

Invertebrates are an important aspect of **soil function**. The larger invertebrates, like worms, ants and beetles, burrow into the ground, allowing water to flow through the soil. Tiny insects and spiders produce pellets which are a combination of soil and organic matter, which helps to nourish the soil. This assists with the recycling of nutrients, which plants need to grow.

Activity 1.

Food Web Mural -

- The mural provided should be laid out on the ground. This may be done outside to create plenty of space.
- The students will then need to select a species card for this activity. There is also a set of 6 'extra species cards' that need to be used for this activity.
- After introducing the students to the background information, ask them to work out where their species fits into the food web shown on the mural and place their species in the space (shown as white squares) in the food web.

The mural shows six different environment or habitat types (urban, forest, woodland, grassland, rivers, and wetland). The mural is also divided into trophic levels – decomposers, producers and consumers. There are different levels of consumers – herbivores (those animals that eat only plants), omnivores (those animals that eat plants and

animals) and carnivores (animals that eat other animals). There are arrows between the species which show who might consume who. However, **the mural does not strictly represent a food web** as some of the connections relate to where the species lives or what may use for shelter or where it may find its food. For example, the connection in the mural is that Brush-tailed Possums can be found in the roofs of our houses. These connections are generalised, with the importance being to show the connections rather than what is technically correct.

The purpose is to show that all species are connected to, and dependant on each other.

The students will need to work out which habitat type their species occurs in, then which trophic level it belongs to. The trophic levels (decomposers, producers, consumers) should be pointed out on the mural by the teachers prior to beginning the activity to assist students in working out where their species may go. There is a Food Web Map for the mural provided in the kit to show teachers where the species' belong. It should not matter too much if the cards are not placed in exactly the correct position, as long as the students can logically explain their choices.

- Brainstorm what would happen when a component of the web is modified or removed.

Extra Activities:

- **Miming-** Students to take turns in miming an animal with the rest of the class guessing.

- **Identifying with an animal -** Students to think of and imagine being an animal and think of a threat to it. In a circle each student should say what their animal and its threat is and what they would like others to do to help it.

- Conduct the **Webbing Game**

The following exercise emphasises the importance of the interactions between all members of an ecosystem. 'Webbing' portrays how air, rocks, plants and animals all interact together to form a balanced web of life.

Example:

1. Ask the children to form a circle. Stand inside the circle with a ball of string. Ask the children: 'Who can name a plant that grows in this area?'
   'The Brittle Gum.'

2. Give the end of the string to the child that answered the question. Ask the children: 'Who can think of an animal which might eat the Brittle Gum?'
   'The Yellow Faced Honey Eater.'

3. Unravel the ball of string from the first child to the second child, so both children are holding the string. Explain that they are connected because of the Yellow Faced Honey Eaters'

dependence on the Brittle Gum for food. Ask the children: 'who might need the Yellow Faced Honey Eater for their lunch?'

4. Continue connecting the children with string as they are intertwined through the emerging ecosystem. Bring in new elements, such as soil and water, until all the children are connected.

5. Take away one member of the web; by introducing an obstruction. For example, a fire kills a tree. When the tree dies it pulls on the string. Any child who feels the string pull should also tug the string. The process continues until each individual has been affected by an obstruction. Explain that this demonstrates how each individual is important to the whole ecosystem and that they each affect the others.

Game taken from 'Sharing nature with Children' by Joseph Cornell.

- **Music-** Students to make up a song or a poem about how everything is connected and what would happen if a component of an ecosystem was removed.

- **Create a Food Web-** Students to create their own food web with drawings and pictures. A particular ecosystem should be chosen and internet and library resources used to research the different components.

SESSION 4 - HOW DO WE INTERACT WITH OTHER SPECIES AND WHAT IS OUR IMPACT?

Threats and threatened species

Our 'natural heritage'

What is the value of listing a place to the ACT Heritage Register?

Heritage listing of a particular place lets people know that it is important and special. It has been recognised as having *natural significance* (see Session 1).

When a place is listed on the Heritage Register an official document is developed to guide the conservation of the place. *Conservation* means all the processes and actions of looking after a place to retain its *natural significance.*

This document sets down the actions that are necessary to look after the place. These are called *Heritage Guidelines* and are made by the Heritage Council.

By law, under the *Heritage Act 2004* the land owner must do and not do certain things that will protect these natural areas. They must follow the guidelines that have been created to protect the values of the place. If there is a threat to the place, a *Heritage Direction* can be given by the responsible Government Minister. The action that is necessary to protect the place must then be carried out by the land owner.

If the *Heritage Guidelines* or a *Heritage Direction* are not followed, a *Heritage Order* can be given to the land owner. The Heritage Council applies for this order to be given by the Supreme Court. This order is legally binding and requires the landowner to take or not take the necessary action to protect the place.

The above process is designed to protect the *natural significance* of a place from any threats. The same process applies to any heritage place – so places with cultural or indigenous values are also protected in this way.

'ACT Heritage Legislation Information Sheets'

A place with *natural significance* may have threatened species living there. Where there are threatened species, it is important to give the place special attention to make sure the threats are reduced and the species are not lost forever.

Going Further…

Background Information

The threats to our natural heritage and the species that live in these natural places generally come about from human activity – the things that we do.

What does threatened species mean?

A species or ecological community is threatened if it is likely to become extinct in the foreseeable future.

In the ACT, threatened species are declared as **vulnerable** or **endangered.** This indicates the level of threat. A species that has been declared endangered is more likely to become extinct than one that has been declared as vulnerable.

Threatened species in the ACT all have an Action Plan which sets down the actions that are necessary to protect them. Legally, these Action Plans must be followed and the species protected. But it is best to not let it get to this point! It would be much better to stop species from becoming threatened, so that we don't have to try to reverse the process.

Adding a natural place to the ACT Heritage Register may give it an extra level of protection against threats.

Threatened Species in Australia – facts and figures

In Australia about 1550 species are currently threatened with extinction. A species is **extinct** when every plant or animal of that species has died. Once this happens it is gone forever.

More than 1230 of these species are plants, and approximately 320 are animals.

27 mammal species have become extinct since the arrival of Europeans in Australia.

There are 86 mammals on the national threatened species list.

There are more than 100 birds, around 50 reptiles and 37 species of fish species on the national threatened species list.

There are so many different species of plants and animals in Australia (and the world), that we are still discovering new species all the time. So it's possible that species could become extinct before we discover them! This is why it's important to look after the ones that we know are threatened.

So what are some of the threats to our plants and animals in the ACT?

Habitat loss

The most common reason for a species becoming threatened is the loss of its habitat. Habitat loss includes the destruction, fragmentation (breaking up into small, isolated chunks) and degradation (decline in quality) of habitats.

Clearing and grazing

In the ACT, natural grassland and woodland areas were ideal for early settlers to convert to grazing and cropping. There was grass available for stock and less trees to clear than densely forested areas.

Large areas of woodland have been cleared in the ACT. There is less than 1/3 of the original amount of Yellow Box-Red Gum Grassy Woodland (now an endangered ecological community) remaining in the ACT.

Only 5% of the original area of Natural Temperate Grassland remains in moderate to good condition in the ACT (also now endangered ecological community). Farmers replaced native grasses with exotic pasture grasses (pasture improvement) to provide a richer food source for sheep and cattle.

Over-grazing reduces the variety of native plants and the understorey of woodlands. Disturbance includes:

- trampling hooves
- soil erosion
- reduction of more palatable plant species/increase in hardier species
- increase in weed species

The different layers of woodlands, the canopy (tree tops), the understorey (the middle layer of shrubs and small trees) and the ground layer (grasses and native herbs - small flowering plants) are all important to the health of the ecosystem.

See chapters 3, 4 and 5 of 'Woodlands a Disappearing Landscape' for further information.

Urbanisation

Large areas of land have been converted to make way for our houses and the city of Canberra itself! This is called urbanisation. Central Canberra was largely made up of natural grassland, a 'treeless plain' that merged with the woodland on the adjoining hill slopes.

Clearing woodland and grassland areas to make way for housing and infrastructure is still continuing today. Fortunately there are many areas of grassland and woodland in the ACT that are in nature reserve but some remaining natural patches are still cleared for urban development.

Threats to our natural areas from the activities that occur on adjacent land include:

- cats and dogs preying on native animals
- removal of bush rock and fallen timber by local residents and for fire hazard fuel reduction
- dumping of garden waste (which allows the spread of weeds)
- the spread of weeds into natural areas from garden plants escaping
- disturbance to plants and animals from people

Pest plants (or weeds!) and pest animals

Weeds and pest animals are one of the major threats to our native plants and animals.

Many weeds and non-native animals have been introduced from other countries (or places) on purpose for different reasons. The introduction of the fox and rabbit into Australia by English settlers in the 19th century for hunting, and blackberries for its fruit seemed like a good idea at the time. They are now some of our worst pest species! They degrade our natural areas by replacing the native species there.

Weeds

A weed is any plant out of its place. When a non-native plant is introduced to an area it doesn't have its natural conditions that would keep it in balance in its natural environment. This creates competition for native plants and allows the weed species to become dominant.

Many of our worst weeds in the ACT are garden escapees.

What can you do?

- Don't plant any weed species in your garden! It's best to plant locally occurring native plants as they generally won't take over our natural areas and provide good food sources for our native birds.

See 'Are your garden plants going bush?' leaflet.

Can you recognise any of these from your garden?

Pest animals

Rabbits cause soil erosion by digging their burrows and disturbing the soil and they eat native vegetation that would otherwise provide food and shelter for native animals. **Foxes and feral cats** eat native animals such as small marsupials and birds. This also reduces the food available for native animals that would naturally eat these species. Remember the food web!

Domestic cats cause a big problem for wildlife in the ACT. They roam at night and eat native birds. Many native birds are killed by domestic cats.

What can you do?

- Always keep your cat inside at night and make sure it has a bell on its collar to warn birds that it is nearby.
- See the Conservation Council Neighbourhood Cat Pack to spread awareness of cat containment in your local neighbourhood.

The introduced Common Mynah (or Indian Mynah) and Starling are aggressive birds, and compete with native birds for woodland nesting

sites such as hollows. They sometimes take over the nests of native birds.

Fragmentation of habitat

Much of the remaining habitat areas are 'patches' or 'fragments' of what originally existed.

When natural areas become fragmented, they suffer from the impacts of adjacent land uses.

For example, our nature reserves in the ACT are affected by the impacts of houses next to them (the urban edge). See 'Threats to our natural areas' under 'Urbanisation' heading.

Why is connected habitat important for species?

Some animals need large areas of connected vegetation. They need to be able to move between different areas:

- to find the right food and places to breed; and
- for young to find new territory.

Different species are more, or less sensitive to this depending on their habitat requirements. The Brown Treecreeper and the Hooded Robin are threatened bird species in the ACT. One of the reasons why they are threatened is because they need large connected areas of habitat and there aren't many of these large 'connected' areas left.

Degradation of Habitat

The diversity of plants within a habitat is very important for the survival of animal species. Ecosystems with a complex vegetation structure allow more variety of species to live there.

Standing and fallen dead trees and branches provide vital homes for animals and stabilise the soil.

In woodlands, shelter, food, or nesting sites for animals are provided by:

- trees of different ages;
- tree hollows;
- standing dead trees;
- a patchy shrub layer;
- a variety of plants in the understorey; and
- fallen timber

Some animals need a mix of all these things in their habitat to survive.

Degradation of habitat occurs from:

- removal of mature trees, fallen timber and rocks;
- over grazing;
- fires that are too hot or too frequent;
- weed invasion; and

- soil erosion

Tree hollows are especially important for the habitat of many birds, bats and arboreal (tree dwelling) mammals. More than 300 Australian vertebrate species, including over 100 species of birds, use tree hollows for nesting or shelter. If lost this is a major threat to these animals.

Tree hollows are formed through natural events that damage the trunk of a tree, for example fires and windstorms. The decay of wood is then continued by termites, fungi and bacteria. The process is very slow - if the tree is lost it may take 100 – 200 years to be fully replaced!

This is why it's so important to keep our old trees.

What can you do?

- Don't collect any fallen timber from our reserves

See 'Logs have life inside' information and activity sheet.

Threatened species in the ACT

As well as 53 threatened (vulnerable, endangered, and critically endangered) species in the ACT we also have 2 ecological communities that are listed as critically endangered and 1 as endangered. These are Natural Temperate Grassland and Yellow Box-Red Gum Grassy Woodland, and the High Country Bogs and Associated Fens. Many of our threatened species are found within these ecosystem types. This is because when there is not much of a particular ecosystem type left, the species that depend on these places have fewer places to call home. Keep up to date via the ACT Threatened Species and Ecological Communities register: https://www.environment.act.gov.au/cpr/conservation_and_ecological_communities/threatenedspecieslist

ELA- The student understands the effects of humans on the Earth

Assessment – The student understands that different species are more or less susceptible to becoming threatened, but that these threats are due to human impacts on natural systems.

Making Conclusions…

Status Classifications

Threatened – A threatened species is one that is in danger of extinction. Threats to this species are currently present and have resulted in a considerable reduction in the number of individuals.

Endangered – In the ACT a *threatened* species can be classified as either endangered or vulnerable. An *endangered* species is considered to be more threatened than a *vulnerable* species.

Declining – A declining species is one that has had a reduction in the number of individuals but has not become threatened.

There are many species which were once very common and widespread that are considered to be declining as they are present in lower numbers. Although it is still widespread it is thought that the Eastern Rosella may be declining in the ACT. Causes for decline in these species are often more subtle than those for threatened species and are difficult to define.

Rare – A rare species is not threatened but one that has only ever been present in small numbers.

Rare species are often limited to a specific habitat or geographic area. Because there are less of them rare species can more easily become threatened as the loss of a small number of individuals can mean the loss of a large proportion of the population.

Common – Common species are those which are usually widespread and have fairly large and stable populations.

Some species may be common only in some habitats.

Abundant – Abundant species are those which have increased since European settlement.

In some situations abundant species have become a pest to some humans, such as kangaroos eating crops.

Activity 1:
Use the cards to demonstrate why some species become threatened and others don't.

Ask the students to look at the status of their species. Discuss the meanings of the **status classifications** with the class. It will also be important to provide the other background information in this section and helpful to discuss the threats to environment types found in the student booklet.

Ask the students to choose a species and use the information on the cards (and/or in their student booklet) to work out

- why they think their species is common/threatened etc
- whether they think their species could become threatened

- what could be done to prevent their species becoming threatened

The answers to these questions should be discussed in class and a response could then be written up by each student.

What to look for:

- Is the environment type the species lives in threatened? (Use the student booklet to find this information)
- For animals - is the species a specialist or a generalist? (ie. does it have specific or general feeding habits and habitat requirements)
- Has its habitat range decreased due to human impact? To what extent? (Information on the different environment types found in the student booklet can be used here)
- Is it naturally rare? (Thereby making it more vulnerable to any threats)

When a particular environment type is threatened, the species that rely on this habitat type are also likely to be threatened ie Grassland Earless Dragon and Natural Temperate Grassland.

Whether a species is a **specialist** or a **generalist** refers to its particular feeding habits and the extent of its habitat. **Specialists** have specific requirements such the Grassland Earless Dragon which needs a particular type of native grassland for its habitat. Specialists are more likely to be threatened than generalist species. This is because they are more affected by changes in their environment - they cannot survive in a different type of or altered environment. In contrast, **generalists** make use of a wide range of resources. For example, Brush-tailed Possums' feed on a wide variety of food, and its habitat is much more widespread including forest, woodland, farmland and the urban environment. Generalists are therefore less affected by changes in their environment and less likely to become threatened.

Most species have decreased in number due to loss or degradation of habitat. However, some that prefer open land such as kangaroos and wombats are not under as much threat as the changes that have occurred to the landscape have created more suitable areas for these species.

ELA- The student uses problem-solving strategies

The students listens, views and reads critically

Assessment – The student reads information in the 'Green Kids Guide to Threatened Species' critically and uses problem-solving strategies to identify which conservation actions they can take and which need to be done by others.

Some of ACT's threatened species can be found in the book 'Neighbours in Trouble'. However, some of the information is out of date because a lot of new reserves have been created in the ACT since the publication of this book. See also 'Canberra Nature Park – bush on your doorstep' for a map of all the current reserves. Also note, the Highland Earless Dragon is the same species as the Eastern Lined Earless Dragon and the Grassland Earless Dragon.

Process of a place being listed on the ACT Heritage Register

- Any member of the public can nominate a place which they believe to have 'heritage' significance – for natural heritage this is *natural significance* (see Session 1)
- The Heritage Unit researches the place and makes recommendations to the Heritage Council
- The Heritage Council makes a preliminary assessment of the 'heritage' significance. The place will either be dismissed or provisionally registered within a period of 8 months
- A 4 week period of public consultation follows
- The Minister for Arts, Heritage and Indigenous Affairs provides a report to the Heritage Council
- Final Registration is made by the Heritage Council

SESSION 5 - FUTURE LANDSCAPES – IMAGINING THE FUTURE

Can we grow our natural heritage?

There is a difference between:

- **places that are listed on the Heritage Register for their *natural significance;***
- **and natural areas that are important for native species or that we value but that don't have *natural significance*.**

Whilst we can't technically *create* 'natural heritage' we can regenerate natural areas by planting native plants or recreate habitat to help species to feed, shelter and survive.

ELA- The student understands the effects of humans on the Earth

Assessment – The student understands the human impacts that have altered the Earths natural systems and acts locally with concern and understanding to sustain it.

ELA - The student reads and writes effectively

Assessment – The student effectively reads the 'Ideas' information and writes the plan for their design.

Taking Action...

Ideas for regenerating natural areas or recreating habitat at your school

CREATE A FROG POND!

'The well being of frogs is a good indicator of environmental health. Tragically, frogs are disappearing from habitats across Australia due to the drainage of wetlands, water pollution and climate change. By building a frog pond or small wetland you could help local frogs and beautify an ugly, boggy area.'

Excerpt from Peter Canty, '*How to stop frogs from croaking it*', Habitat (Oct 1997).

Before building the pond:

1. Look and listen! Frogs like to come out at night, especially after rain.

2. Research frogs and their need for shelter, water and food. Find out:
   - which frogs live in your area and what they look and sound like;
   - what might attract them;
   - what time of year you will see and hear them;

- if there are rules and regulations about building a frog pond;
- the types of plants that could go around the pond (visit the local nursery)

For help you could:

- Use the 'Frog Species of the ACT and Region' Fact Sheet
- Learn to identify local frog calls by using the 'Frog Calls of the ACT and South East NSW' C.D (included in this kit or can be downloaded from the Friends of Aranda Bushland Website www.home.netspeed.com.au/vaswhite/Activity/Frogs/Frogs.htm
- Contact Environment ACT to find out if 'Frogwatch' is running (Spring)
- Research the Internet and in books. Some good books are:
  - *Australian Frogs: A Natural History:* Tyler, M.J. 1994 Reed Books

  - *Reptiles and Frogs of the Australian Capital Territory,* Bennett, Ross. 1997 National Parks Association of the ACT, and

  - *Wet and Wild, A field guide to the freshwater animals of the southern tablelands and high country of the Act and NSW,* Lintermans, M. and Osbourne, W.

<u>Building the Pond:</u>

1. Find a partly shaded, damp area. Design the pond after researching what it might look like and the materials you will need. Dig out the shape of the pond.
2. Line the pond with cement. When it dries, cover it with leafy mulch and then water.
3. Place plants, rocks and small logs around and in the pond, ensuring they provide some shade.
4. Once all this is done, you need to wait a month before the frogs begin to appear. But don't just sit back and wait for them, look for the aquatic life and birds that visit it too!

<u>WARNINGS!</u>

1. Do not put fish in the pond. They will eat the tadpoles.
2. Do not spray pesticides near the pond.
3. Do not put the pond under trees with toxic leaves.

CREATE A NATIVE BEE AND BUG HOTEL!

Bees are busy creatures, constantly on the move collecting nectar and pollen, and building nests. Our native bees, like the Blue-banded Bee, build nests in hollows, logs and soft soil. We can create new places for them to nest by making a bee hotel.

CREATE A LIZARD LOUNGE!

Lizards are found in a variety of bush habitats, and can often be seen basking among rocks and logs. Hollow logs provide shelter for lizards and hide many insects that lizards like to feed on. Sadly, many plants and animals are disappearing when wood is collected for firewood, or habitat is lost due to urbanisation. You could build a lizard lounge, to create another place for lizards to live!

<u>Building a Lizard Lounge</u>

1. Before you build a lizard lounge, you need to find out what it is like to be a lizard. They hide under logs and rocks, and need sunshine. Research in books, and on the Internet to find out what kind of habitat lizards need.

A good reference book is *Reptiles and Frogs of the Australian Capital Territory*, Bennett, Ross. 1997 National Parks Association of the ACT

You can also do a web search on “lizard Lounge”

2. Design and build a 3D model of your Lizard Lounge. Make sure you create features that a lizard would appreciate. You could use paper mache, cardboard and natural materials like grass and sticks.

3. Build a real-life version of your design. You will need gardening tools, rocks, logs, Australian plants and mulch.

CREATE A NATIVE GARDEN ATTRACT LOCAL ANIMALS!

Building a habitat in an area of your school will provide a range of homes for animals while also restoring biodiversity, encouraging birds, insects, lizards and frogs to enter the garden. It will also create an area for you to play and study in.

Instructions:

1. Draw a plan of your school or community area, using a compass. Mark where the proposed garden will go, to scale, using measuring tape.

2. Research native plants in your local area, and which are beneficial to pollinators. See the suggested list below. Order the plants from a nursery, or collect seedlings and grow your own.

3. Prepare the site for planting: control weeds, break up the soil and add fertiliser and mulch before planting.

4. Plant the seedlings, ensuring the soil is dampened. Protect the area from frost, hot winds, large animals (and other students!). Record all your observations in a diary and take pictures as the garden begins to grow and change.

Helpful Information:

Here are a number of books, internet sites and organisations that you can use for help:

- *'Exploring Diversity: a resource book of ideas for National Science Week'* 2001, published by the Australian Science Teachers Association.
  The "Biodiversity project" on pages 33-35 provides details on planning, researching, preparing and maintaining a school woodland.

- https://www.gould.org.au/wildscapes-funded-biodiversity-gardens/
  is a Gould League web site which provides general information about preparing the ground and planting native plants at schools.

- www.treesforlife.org.au
  has useful information on planting natives and growing your own seedlings.

- https://actforbees.org/resources/gardening-for-bees/
  Has developed resources on how to plant gardens to support local pollinators. They have also developed a planting list for the Canberra region which includes great local plants.

LOCAL ENVIRONMENT GROUPS

The ACT has many local environment groups that work to protect our natural places and the species that live there. You could join ones of these groups or encourage your parents or friends to join up with you. You could even start your own group!

- The Australian Association of Environmental Educators: aaee.org.au
- ACT for Bees: actforbees.org
- Australian Native Plant Society Canberra: nativeplantscbr.com.au
- Canberra Ornithologists Group: canberrabirds.org.au
- Friends of Grasslands: fog.org.au
- Ginninderra Catchment Group: ginninderralandcare.org.au
- Greening Australia: greeningaustralia.org.au
- Landcare ACT: landcareact.org.au
- Molonglo Conservation Group: molonglo.org.au
- National Parks Association: npaact.org.au
- Southern ACT Catchment Group: sactcg.org.au
- Southern Tablelands Ecosystem Park: step.asn.au
- Woodlands and Wetlands Trust: woodlandsandwetlands.org.au

Activity:
Students are to design a project for your school that will help to restore our natural areas or recreate habitat.

The class should then vote on which project they would like to carry out. You could invite other classes to vote too and get the whole school involved!

Students could design a new project or if you already have an environmental project at your school, their design could be to build on the existing project.

Ask the students to include the following information in their design:

- What materials will you need?

Can some of these be found from home or from around your school or from revolve (the recycling station at the tip)?

- How much will your project cost?

Does your SRC have any funds available? You may need to think about how you could raise the money you will need (you could have a cake stall, a trash and treasure market, A READ-, DANCE-, OR WALK-A-THON and collect pledges from family, friends, and neighbours for each hour or kilometre you walk or dance, or for each book read, hold a talent show or sports event and sell tickets)

- Where in the school grounds will you create your future landscape?
- Describe the design, what it is, what it aims to achieve
- Write a plan of all the steps involved in carrying out the design and describe each step

See '**Ideas for regenerating natural areas or recreating habitat at your school**'

Resources are available from various community groups

- Canberra Ornithologists Group – visit their website http://canberrabirds.org.au/

You could invite a visitor to your school to give a presentation on their area of expertise

Invite a member of a local community group

GLOSSARY

- Abundant: Abundant species are those which have increased since European settlement.
- Biodiversity: The diversity of plant and animal life within an area.
- Bushland: An area covered mainly by bush and natural vegetation.
- Canopy: Tree tops.
- Carnivore: A carnivore is an animal which eats other animals.
- Catchment: The area from which a river, stream, lake or other water body receives its water.
- Climate Change: Increased temperatures and disrupted climate patterns due to the release of greenhouse gases into the atmosphere.
- Colony: A group of animals of the same type that live together.
- Common: Common species are those which are usually widespread and have fairly large and stable populations.
- Consumer: Consumers are animals. They cannot create their own food (like plants) and must eat other organisms to survive.
- Declining: A declining species is one that has had a reduction in the number of individuals but has not become threatened.
- Decomposers: Decomposers are organisms such as bacteria and fungi. They cause the decay or chemical breakdown of dead organisms or organic material.
- Degradation: A process which reduces the capacity of the land to function effectively within an ecosystem.
- Diversity: A wide range or variation of (plants and animals).
- Drought: When water availability falls below the requirements to sustain an area for an extended period of time.
- Ecosystem: A community of plants, animals and micro-organisms, linked by energy and nutrient flows.
- Ecological community: An ecological community is an assemblage of species that occur together within an ecosystem.

- Endangered: A species (or ecological community) which is likely to become extinct in the foreseeable future. In the ACT threatened species are classified as either endangered or vulnerable. Endangered are considered to be more threatened than a vulnerable species.

- Environment ACT: A government department dedicated to looking after the natural environment.

- Eutrophication: Increase in the mineral and organic content of a body of water resulting in a depletion of the oxygen content of the water which can cause the death of animal life. Usually triggered by hot weather combined with an excess of nutrient levels in the water.

- Food Chain: Energy in the form of food is transferred from one organism to another in a single pathway. For example, plants harvest energy from the sun, and are then eaten by herbivores, which in turn may be eaten by omnivores or carnivores.

- Food Web: Food chains do not operate individually. A food web shows the links between various food chains and organisms an ecosystem.

- Fragmentation: The fragmentation of habitat occurs when larger habitats are broken down into 'patches' or 'fragments'.

- Generalist: Generalists are animals that eat a wide range of food and can make use of a variety of habitats.

- Grassland: Areas found in valley floors where it is too cold for trees to grow naturally.

- Grazing: The consumption of one organism without killing it by another organism. For example, cows feeding on grass.

- Greenhouse Gases: Gases which cause climate change, caused mainly by cars and energy use.

- Habitat: The 'home' of a plant, animal or micro-organism. This is where the species find nutrients, water, sunlight, shelter and living space.

- Herbivore: A consumer (animal) which eats producers (plants).

- Heritage: What is, or may be inherited.

- Heritage Unit: Part of 'Environment ACT'. Assess places which community members believe have natural heritage significance.

- Hibernation: Allows animals to essentially 'sleep' through the winter, and conserve their energy. They will use up their body fat reserves

throughout the season.

- Invertebrate: Any animal without a spinal column.
- Insectivorous: An animal that eats insects.
- Mammal: Animals that are warm blooded, have a coating of hair on their body, suckle their young and mostly give birth to live young. Humans are mammals!
- Marsupial: Marsupials are mammals that usually have a pouch. Includes kangaroos, possums, bandicoots, and wombats.
- Micro-organism: A living organism that is too small to be seen with the naked eye including bacteria, potozoans, viruses, microscopic algae and some types of fungi.
- Migration: Occurs when living things move from one place to another. Animals often migrate during winter to warmer climates, and may also move for food or breeding purposes.
- Monotreme: A mammal that lays eggs. This is very unusual and there are only two – the echidna and the platypus.
- Natural Heritage: A place which has been assessed as having *natural significance* and has been listed to the Heritage Register.
- Natural Significance: ***Natural significance*** means the <u>importance</u> of ***ecosystems***, ***biodiversity*** and ***geodiversity*** (see Session 1). ***Natural significance*** is assessed to determine whether a place can be listed for its natural heritage values.
- Nature Reserve: An important area with plants and animals that is managed for conservation.
- Nocturnal: Animals which usually sleep during the day and become active at night.
- Non-native plants/animals: Plants or animals introduced to an area from another country or place which are often a threat to the plants and animals naturally existing within that environment.
- Nutrient Cycle: The essential nutrients of life are consumed, broken down and converted back into food by producers, for consumption in a continuing cycle.
- Omnivore: An animal which eats both producers (plants) and consumers (animals).
- Organism: Absolutely any living thing.
- Over grazing: Grazing of stock with high number and for a length of time that reduced the diversity of the ground layer and prevents tree and shrub regeneration. This occurs by compaction of the soil so that

seeds don't germinate or from stock eating the young seedling or trampling them.

- Pesticide: Chemicals which are used to destroy pests, such as insects.
- Photosynthesis: A process used by plants to convert solar energy, carbon dioxide and water into oxygen and sugar, which plants need for food.
- Pollination: The process by which pollen is transferred from the male to the female part of a flower on the same or another plant. An important step in the reproduction of a seed plant, allowing fertilisation to take place.
- Producer: Producers are mostly plants. They creates their own food by photosynthesis and provide food for consumers (animals).
- Rare: A rare species is not threatened but one that has only ever been present in small numbers.
- Regeneration: The re-establishment of a plant, animal or ecosystem, from a state of decline.
- Soil Salinity: In some areas of Australia, the top layer of soil has become irreversibly salty, due to the rising of the water table from clearing vegetation or using large amounts of water to irrigate. Native vegetation or agricultural crops cannot grow in these conditions.
- Specialists: Specialists are animals that have specific food and habitat requirements. They cannot utilise a wide range of these natural resources.
- Soil Erosion: Soil becomes exposed from removal of vegetation or from being compacted and the soil gets washed away.
- Threatened Species: A species (or ecological community) which is likely to become extinct in the foreseeable future. In the ACT these species are classified as either endangered or vulnerable.
- Top level carnivore: An animal that eats other animals and exists at the top of the food chain.
- Understorey: The middle layer of shrubs and small trees in woodlands.
- Urbanisation: Large areas of residential and commercial development where native vegetation once existed.
- Vegetation: The plant life of an area.
- Vertebrate: An animal with a spinal column.

- Water Pollution: Water with increased bacteria and damaged eco-systems due to the various types of waste put into natural water systems by humans. For example, sewage.
- Wetlands: Areas covered with water either permanently or temporarily. Wetlands may also be called a marsh, swamp, bog, fen or billabong.
- Woodlands: Found on the lower slopes in the ACT, with trees of a medium height between 10 – 30 metres and with trees more widely spaced than forest environments.

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ATTACHMENT A - Birthday Island: Using Boal's Environmental Tool – Drama Activity

Developed by Bren Weatherstone

Conceptual Understandings – as a result of this Unit of Work students will know that a consequence of exercising our power over the natural world or 'conquering nature' may lead to the loss of an important part of our world community. The concept of understanding that something can have value for its own essential nature as opposed to arguing it's use as a resource for humans is a challenging one that applies to the argument for the preservation of cultural as well as natural entities in our environment.

Students will understand that the oppression of less powerful beings without taking responsibility for the outcomes of our actions leads to irreplaceable loss and that we are handing on an impoverished heritage to future generations. Students will understand the consequences of their actions as humans.

Essential Learning Achievements that are addressed.
The student creates artistic works.
The student understands and acts for a sustainable future.
The student acts with empathy and integrity.

Specific learning outcomes –what will the students know, understand, do and value?
In considering the story of Birthday Island, students will consider the ethics of taking responsibility for our actions and how these actions affect others. In examining ethics, students learn to identify and become aware of values underpinning our attitude to the plants and animals in the environment.

Assessment
How the teacher will know what the students have learnt –evidence of learning /basis for summative assessment.
Empathy for dependent beings is demonstrated through role-play as other creatures (plants and animals). Evidence of learning will be in the use of argument articulating the ethics that underpin the reasons for making decisions expressed through dramatic action. This may emerge in dramatic action or discussion.

Birthday Island

This series of activities is grounded in the ideas expressed in Augusto Boal's *Theatre of the Oppressed*. The technique of involving the audience in the dramatic action in order to bring about an desired alternative to a situation is applied here to a consideration of alternatives to the destruction of the natural environment. In Birthday Island, the natural world is given a voice through some characters who can argue for an alternative version of the Birthday Island story.

Birthday Island is a greatly oversimplified version of what happened on Easter Island when people completely 'conquered nature' - notably the *Jubaea* palm which became extinct. Students might like to research the real story of Easter Island through search engines or books like *Easter Island Earth Island* by Paul Bahn and John Flenley (1992 Thames & Hudson).

Oppressed is a word associated with the idea of being 'pushed down' by something more powerful. [Exercise 1] When people & other beings are oppressed often they are not allowed to speak [Exercise 2], that is, they have no voice. They have no voice because they have no say about what happens in their lives. They have no power.

Birthday Island is an activity that ideally requires about an hour to carry out effectively. It can be repeated often as students enjoy re-enactment with their own variations or fresh input of ideas going into different scenarios.

Exercise 1

Work in pairs. One person crouches next to the other and may not speak. The standing person gently places a hand on the shoulder of the other and applying pressure while saying, 'You can feel my power. You have no voice.' At a signal, the position is reversed. Each pair exchanges their feelings of being powerful/having speech and of being powerless/gagged.

Exercise 2

Work in groups of 2 or 3. One person can stand and talk to the other(s) who sit on the floor and may not speak. Call the speaker Mr or Ms Bossyboots. Students take turns to be the one with the voice. Ask the whole group to share how it felt to be Bossyboots and how it felt to be voiceless.

Exercise 3

Visualisation. The leader/teacher takes the group through an exploration of a fantasy island that helps set the scene for Birthday Island before people arrived - eg yummy palmtrees were the only things that dragons ate, etc. Participants assume a relaxed position with eyes closed.

Roles

The people that arrive on the raft
The Yummy palmtrees
The unicorns
The boobybirds
The dragons
The forest
Lee
Tyler
The mother of Lee & Tyler
The father of Lee & Tyler.

The Story of Birthday Island

Scene 1

Imagine an island in the middle of the Great Ocean. This island is called Birthday Island. Once it was covered in yummy palm trees and forest right up to the top of the pointy little hills in the middle of the island. The palm trees were yummy and that's how they got that name. The trunks were food for the dragons that flew around in the valleys and for the unicorns that ran fast through the forest. There were large flocks of boobybirds who layed large eggs on the Birthday Island beach dunes.

Scene 2

One day a raft full of people landed on the beach and lit a fire with the forest wood and cooked the eggs of the booby birds. They stayed for many years cutting down the trees to make their houses and fences. They liked the yummy palm trees too and ate them everyday.

Scene 3

That was many years ago. Today all the forest and animals have gone. Lee and Tyler's parents are telling them about the dragons, the unicorns, the boobybirds, the yummy palmtrees and forest that once covered Birthday Island. These plants and animals were alive even when their own grandparents had cleared the forest. Everything has gone now.

Scene 4

The children are sad that they will never meet any of the Birthday Island plants and animals or eat any of the yummy palmtrees or boobybird eggs or play in the big forest.

Scene 5

The future?

After this story is read to the class, students are cast into characters.

Run 1 - mime the actions as the narrator tells the story.

Run 2 - this time, the actors fill in conversation and add this to the action. The narrator prompts the action by announcing the scene and encouraging the actors to improvise dialogue.

Run 3 - this time the class can either:

Outline an idea for a different story in which the ending is better for the plants and animals on Birthday Island;

OR the spectators can ask the actors to freeze and then to suggest a new direction for them to act out. They might like to REWIND and RE-RUN the previous action.

Student as Director: The person with the suggestion can direct the scene. Alternatively s/he may step into one of the roles in the play.

Run through again a day or week later. Ideas for variations often occur after the first time this activity is tried out. When the group returns to this story, they are usually more relaxed with the technique and see the potential for changing the story with new solutions to previous insurmountable problems of co-existence.

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