

Western Sydney Schools Tree Day



Teachers Notes

Activities

Resources



Cumberland Plain Woodland

Photo: J. Plaza

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Photographs of some Cumberland Plain Endangered Ecological Communities

Blue Gum High Forest *Photo: M.Cufer*



Sydney Coastal Riverflat Forest
Photo: J. Howell

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LESSON PLAN: Teachers notes



A lesson plan on the original vegetation of Western Sydney, the woodlands and forests of the Cumberland Plain

Sydney is very different to the way it looked over 200 years ago. The landscape west of the original settlement is also very different. Near the coastline, rugged escarpments move into hilly areas, which follow into gentle slopes and plains. It is the Cumberland Plain that is the focus for these lesson plans, the land where Sydney's western suburbs have now emerged. From Kurrajong in the north to Picton in the south, Parramatta in the east to Penrith in the west, this is the Cumberland Plain.

The Cumberland Plain

The Cumberland Plain sits on clay soils, which distinguish it from other areas of Sydney which are indicative of a sandstone geology. Residents of the Cumberland Plain would also relate to the warmer temperatures and colder nights in Sydney's west. This is also the driest part of Sydney. Less than 800mm of rainfall falls on the Cumberland Plain. It is hot, cold and dry!

The original vegetation of the Cumberland Plain, or that which the early Europeans described, was made up of predominantly trees and grasses. This created an open appearance, in comparison to Sydney sandstone environments that have a shrubby appearance. You can recognise shrubby woodlands and forests because sometimes they can be hard to walk through.

Clearing on the Cumberland Plain

Today, western Sydney could be considered as an open landscape too. This is because most of the original vegetation has been cleared. Clearing has been for reasons including housing and agriculture. As Sydney has exploded in population, so too has the demand for housing and food. It is because of this clearing though, that today less than 8% of the original vegetation that was once found on the Cumberland Plain remains.

This is a great concern to a number of people, particularly those that are trying to protect and restore natural environments in western Sydney. With only 8% of vegetation remaining, and much of this scattered throughout such a large area, tiny remnants battle to keep their health and strength with encroaching urban effects. This means that our houses and gardens; our pets and pollution are all affecting what little Cumberland Plain vegetation is left.

Protection for the Cumberland Plain vegetation

To help the survival of the remaining 8% of vegetation, the State Government has classified various vegetation types of the Cumberland Plain as *Endangered Ecological Communities (EEC)*. Put simply, being listed as an *EEC*, under the Threatened Species Conservation Act (1995) gives more recognition to the associated vegetation – and, hopefully more power against further clearing. Listing should also help the restoration process of particular remnants, as this is recommended as a best management practice for landholders with *EECs*.

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LESSON PLAN: Teachers notes



Types of Vegetation on the Cumberland Plain

In 1788 Governor Phillip described the vegetation of the Cumberland Plain to contain trees 'at a distance of 20-40 feet'. In today's measurements, 20-40 feet is about 6-12 metres. With trees at this distance apart, and a dominance of grass species, again an 'open' appearance can be imagined. This open appearance also describes what ecologists call, a 'Woodland'. Hence the 'Cumberland Plain Woodland' is one of the most well known vegetation types in the west of Sydney today.

What people are unaware of, is the fact that the Cumberland Plain Woodland is only one of 12 other vegetation communities found in western Sydney, that are also classified as *EECs*. River Flat Eucalypt Forest and Western Sydney Dry Rainforest are examples of these. They are vegetation communities that are struggling to remain today, but once existed over a wider range as the original vegetation cover of the Cumberland Plain.

For those *EECs* considered at most risk to extinction, the Federal government has joined the State of New South Wales in classifying four of the 12 Cumberland Plain vegetation types, as *Endangered Ecological Communities* (under the Environmental Protection and Biodiversity Conservation Act 1999). These include:

1. Cumberland Plain Woodland
2. Shale Sandstone Transition Forest
3. Sydney Turpentine Ironbark Forest
4. Blue Gum High Forest

The last of these, the Blue Gum High Forest, is found amongst Sydney's northern suburbs (and not the focus of this lesson plan). However, this vegetation community has just been elevated to '*Critically Endangered*' by the Federal Government, as there is evidence that less than 4% of it remains today. If 0% means that the community is extinct, there is little question as to why this listing has been changed.

These statistics are stark but true. We are losing the original vegetation of the Cumberland Plain. It is more obvious in the west of Sydney because the gently undulating plains were extensively cleared for agriculture. It was much easier to do this in areas that were flat to gently undulating, openly wooded and, dominated by grasslands already. Entire tracts of western Sydney woodland and forest were cleared as a result. Where it grew back it was different to before, as the soil composition (amongst a number of other factors) had been disturbed. Where it didn't grow back it was probably built upon (or is now under a plan to be built upon).

These statistics are also the reason behind the importance of planting local species from the Cumberland Plain, for initiatives like Planet Ark's National Tree Day. We need to put back into the ground what we have taken out. This is especially so, when we know of areas that need more habitat to make existing remnants larger, and possibly even connect one remnant to another so that animals can safely travel between each.

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Plants endemic to the Cumberland Plain Woodland

Endemic plants are those that belong to one particular vegetation community or geographic area. It is important to only plant endemics when trying to restore bushland in your local area. This will ensure the maximum chance of survival for your plants, as they are already known to grow in the local area, and hence are already adapted to the local conditions eg climate, soil type etc. Planting endemics will also ensure the opposite – that we don't introduce a species that will thrive in an area – and end up as a weed! It will also ensure that animals of the local area are provided with the exact food and shelter they need.

Forest Red Gum (*Eucalyptus tereticornis*) and Grey Box (*E. moluccana*) are the most common trees on the Cumberland Plain today. The Forest Red Gum is a tall tree, which grows to a height of 30-40m. It has a smooth white trunk, and shredded amounts of grey bark at its base. It is not 'red' to look at as a standing tree, this is only evident when harvested for its strong hardwood timber. Historically, the Forest Red Gum was logged for heavy construction and for use as railway sleepers, poles and posts. Grey Box is a medium sized tree with a spreading crown. It has rougher looking grey, fibrous bark that covers the main trunk. The bark then sheds in ribbons from the upper trunk and branches.

Other tree species that can be found in the Cumberland Plain Woodland include Narrow leaved Ironbark (*E. crebra*) and Cabbage Gum (*E. amplifolia*). The Ironbarks may be found on hillier country, whilst Cabbage gums (a very tall tree) prefer wetter areas such as creeklines.

The most common – and one of the only - shrub species of the Cumberland Plain Woodland is *Bursaria Spinosa*, or Blackthorn. Blackthorn grows to 3m tall, not much taller than us, and is known for its thorny assemblage on the end of its side branches. Blackthorn flowers in late summer, displaying magnificent stands of white flowers. The papery capsules that contain seeds are also typical of this unique survivor.

Themeda, *Lomandra* and *Dianella* species dominate the ground cover of Cumberland Plain Woodland, where the soil is still in reasonable condition and has not been disturbed. *Themeda australis*, or Kangaroo grass is one of the most widespread grasses native to Australia. It is – as the name suggests - the native fodder grass for Kangaroos. *Lomandra filiformis* is characterised as a tufted plant with narrow in-curved tough leaves up to 30cm long. Interestingly, there is a female and male version of *Lomandra filiformis*. *Dianella* species colour the ground layer of the Woodland, and many other vegetation types throughout the country, with purple flowers and blue berries.

Other EECs of the Cumberland Plain

Please refer to the Department of Environment and Climate Change's website for threatened species to find out more about other EECs on the Cumberland Plain (and the various endemic plants that make up their community).

www.threatenedspecies.environment.nsw.gov.au

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Activity 1: Disappearing Habitats

All years

Warm up activity designed to improve student understanding of clearing, the necessity of habitat, the impact of feral animals and the problem with irresponsible pet ownership

The word 'habitat' has not been talked about yet in this lesson plan. Habitat, however, is one of the most important words to describe the natural environment, it is 'home' to all plants and animals. Habitat enables shelter, food availability, water and the carrying on of plant and animal life cycles by allowing pollination or breeding, nesting and, the development of young. These factors maintain healthy and viable living populations of plants and animals in natural communities. Without 'habitat', plants and animals cannot pollinate or breed, and therefore do not survive in the long term. 'Habitat' is evidently vital to the survival of species.

Materials required: 12-20 patches of material varying in size from 100 to 1000 square centimetres. You can also play this game with no material at all, and improvise with a newspaper (as long as it isn't a windy day). Play some music, or alternatively, utilise a musical instrument or the clapping of hands. Two teacher assistants would be good; one to play the music; one to be the bulldozer.

Place the pieces of material randomly on the ground in an open area. Ask the students to imagine that the patches on the ground are 'habitat' for native animals (the trees, shrubs, grasses, rocks, logs and creeks that make up most natural environments). Let the students know that they are the animals. The object of the game is for the animals to move around with the music (as they would at different times of the day in search of food or water). Like musical chairs, when the music stops each student needs to find suitable habitat to be safe (by standing upon a material patch). In the interim, whilst the music is playing, someone needs to have taken away a piece of habitat (like a bulldozer clears trees). The 'clearing' will be more effective, with bulldozer sounds and movements. More than one person is allowed to stand on any piece of habitat as refuge when the music stops, but the students will find that if the remnant patch is too small it cannot house many animals... the result will be a student/s left standing without the safety of habitat, because a remnant piece of bushland (or 'woodland') has been cleared.

Without refuge of this type, the animal is now vulnerable to foxes (a 'feral' animal ie. one not native to Australia); to dogs wandering around the neighbourhood; and, to a cat out after the hours of dusk – or before dawn. Any animal (student) without habitat is officially 'out' of the game. The first 3 students out can play the role of fox, dog and cat to 'out' further students. This needs to carry on until only one or two remnant habitats remain, and hence only one or two scared animals... The message to the students should be one that illustrates what happens to the number of animals when their habitat is cleared...a drastic reduction in animal numbers because clearing of habitat also removes any safe refuge for an animal vulnerable to feral animals such as the fox, or badly behaving pets like the dog or cat.

Please refer to 'Survivor', Cumberland Plain (Activity 3) to see how we can all help keep foxes, dogs and cats under control.

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Activity 2: Planting Imitations

Early years

Drama for children to act out different Cumberland Plain plant types and the way their plantings will look, after a few years of growth

This lesson is designed for children to gain an understanding of different types of Cumberland Plain plants, which vary in height, size and shape. Reference should be made to the notes describing 'endemic' plants of the Cumberland Plain Woodland, which includes the heights, sizes and shapes of different trees, shrubs and grasses...

1. Ensure that at the planting, each student is told what plant type they have been given to plant. Alternatively, divide students into trees, shrubs and plants by assigning these descriptions to each (that way this activity can be followed in the absence of planting).
2. Ask students to remember the type of plant they received to plant for the Schools Tree Day event. Was it a tree, shrub or grass? Sitting in an open area, ask the children as a group. Encourage them to answer. Ascertain that everyone has a plant type in mind.
3. Physically divide the class into the three types ie. trees (left), shrubs (middle) and grasses (right).
4. Facilitate a group discussion with the children about the height, thickness and overall shape of these plant types. Ensure that they all understand what a tree shrub or grass will grow up to look like. Discuss with well known examples eg. the gum tree, a wattle shrub - or grass, like the stuff we walk on.
5. Choose individual/s within the three groups to show (making shapes with their body) the rest of the class what they will grow up to look like... Will they be a tall tree (stretchhhhh)? Or, will they be not so tall (but round and bushy...)? Finally, what will they look like as a grass (curled or bunched up low – or on – to the ground). Encourage exaggeration of the different heights, sizes and shapes and, ensure the class understands the general differences.
6. Ask the children all to stand up, and in a 'Simon says' manner, but with native animal statements, ask the children to respond in the appropriate way whenever they hear tree, shrub or grass. For example: Kangaroos like to eat 'grass'. A Kookaburra perches in a 'tree'. A blue tongue lizard may shelter in 'grass'. Native bees find lots of nectar to eat from 'shrubs'...carry on sounding out these statements until the game plays itself out.
7. The winner can then be asked to find the plant they planted... to stand behind it (carefully, so as not to disturb it)... and imitate the shape it may look like when it grows up. One by one, maybe starting with the runner up of the 'Planting imitations' game, ask the students to do the same. All together, this will give a good indication of what the whole planting will grow up to look like...it will contain trees, shrubs and grasses... which represent most natural environments. This is the reason why we need to plant trees, shrubs and grasses for Schools Tree Day... to imitate what a forest (or Woodland) might naturally look like.

Remember: before we altered the Cumberland Plain Woodland... it contained very few shrub species, and was 'open' with mostly trees and grasses.

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Activity 3: “Survivor”, Cumberland Plain

Middle years

Adventure story or artwork of a Cumberland Plain animal *trying* to survive in a woodland remnant today

...remembering back to the game of ‘Disappearing habitats (Activity 1)’, and what happened when more and more habitat was cleared...

Encourage students to choose an animal from the list of animals attached. Ask the students to put themselves in the ‘paws’ or ‘claws’ or ‘pads’ of these animals and to write a story or draw a picture (to explain later) about the animal... How does an animal survive in a ‘woodland’ which is really small, and doesn’t have enough food and shelter that might be needed for all the animals. What would an animal do in the search of food and shelter? How far could it travel? Ask the students to include in the story a description of how they felt (as the animal) if a fox came hunting in the area they normally wander freely in; or a dog or cat was roaming in the little habitat that remained where they were hiding. What did they do after feeling this way?

Sounds all too sad doesn’t it... so, then ask the students to describe how to make the remnant woodland which they reside in bigger, and how to keep foxes, dogs and cats out of the natural environment that they normally feel free and safe in...

Discussions for learning:

- *Planting for Schools Tree Day is one way that a habitat can be made bigger and, with more trees, shrubs and grasses, it can also provide more food and shelter available for animals... hence the planting they carried out can have really beneficial and lasting results.*
- *Foxes are a fierce – and introduced – predator within the Australian environment. Don’t encourage foxes by feeding them, even accidentally. Take simple measures such as putting food scraps (and other rubbish) from recess and lunch into a school bin (and making sure that if the bin has a lid that it is put on tightly). At home we can all help by not leaving pet food outside and, by covering up compost heaps.*
- *Dogs and cats are great companions, and sometimes can even be our best friends. Unfortunately, they can also cause a great amount of damage in our natural environments if left to roam freely...*
 - *Dogs need to be kept securely in a yard, and when walked need to remain on a lead. This is to prevent their natural instincts as a hunter to kick in, which often turns into a long chase of the dog after a native animal that can have really bad results...*
 - *Ever heard of a ‘cat and mouse’ chase? Like dogs, cats like to hunt, and chase anything they think could be a good catch. This doesn’t need to happen anymore, because normally we feed our pets, which means they don’t have to hunt to fend for themselves. Because of this tendency however, it is important to keep cats indoors as much as possible – especially before dusk, through the night and just after dawn.*

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Activity 4: Animals found on the Cumberland Plain

Older years

Materials required: Gloves to sift through grass, lift up sticks, leaves and/ or rocks on the ground for an insect search. Library books that identify birds, reptiles and insects. Notebook and pencil.

With only 8% of the original woodland in western Sydney remaining, there is literally not enough room left to house the larger animals that were once widespread in the area. Animals like the Eastern Grey Kangaroo, Wallaroo, Swamp Wallaby and Emu have now disappeared from most remnants. The habitat these animals require just doesn't exist anymore, and so today you are more likely to see these animals in larger natural areas, or those connected to larger tracts of vegetation like a National Park or Wildlife Reserve. Reptiles, frogs, birds and insects – all being considerably smaller than the large mammals mentioned above – do still exist in woodland remnants in varying numbers and levels of biodiversity. 'Bio-diversity' is simply, the diversity of life, or living things. If a reserve has a low biodiversity therefore, then it has a lower diversity of differing species. Likewise, a high biodiversity (which is how we can recognise if a natural environment is in a healthy state), has a high number of varying species.

- *Take students out of the classroom and into a natural environment. Most school grounds will have some sort of garden which will suffice for this activity. If, however, your school is lucky enough to have a native garden or natural bushland area nearby this would be preferred. Ask the students to sit down (quietly) and simply listen and watch the grass, shrubs and trees for any form of animal activity. The animals most likely to be seen are the birds. Insects can also be seen if the students focus on a small area on the ground; on a shrub (especially near flowers); or, on a tree (bark is great habitat for insects). If focusing on the ground, the teacher can sift between the grass blades, lift up sticks, leaves and/ or rocks to see if there are any insects present. Be sure to put back anything lifted up or disturbed, especially if anything alive was found underneath it, but also as a message to students to 'tread lightly' and keep the bush looking as if no one had ever been in it. Reptiles (or lizards) may be seen, but only if students are very quiet. Common garden skinks should be present in most garden environments, to see other lizards you may need to be in an actual remnant where a larger amount of good bush remains.*
- *Students should take note of any observations ie. the type of animal (or insect), where it was seen (tree, shrub or grass), what sort of animal it was (if this is known) - if it isn't known, then students will need to describe the animal in size, shape and colour/s. Compile everyone's list back in the classroom to make one long one. Have a tree, shrub and grass template on the board so that the list of animals can then be slotted into the related plant type (in which they were observed). This can be done in words, or with drawings, and should ultimately paint a picture of what animals exist in the bushland/ garden nearby.*

Thinking about the planting the class did for Schools Tree Day, and how many trees, shrubs and grasses were planted, encourage a discussion about what type of animals might be observed in the planting in the years to come when it has grown up (and offers better shelter, nectar etc). This discussion can be broadened to include what further plantings (including size and plant types) may be required to invite certain animals into the school grounds...

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Further Lesson Ideas for Seniors

1. More on the animals of the Cumberland Plain

Ask students to choose an animal from the attached list (or assign animals to them). They then have the task of researching their animal in the library, on the internet and for homework (refer to the resources listed at the end of this booklet).

Questions they need to answer include:

1. Is the animal considered special on the Cumberland Plain? Why?
2. What sort of habitat does this animal require? Is this habitat a special plant? If it is a plant, what shape, size and height does it have to be? Why? Does the animal require more than just plants ie does it need a creek, or rocks, or fallen logs to live out a healthy life...
3. Does the animal require other animals (or insects) for its survival?
4. What food does the animal eat? From which plant types can this food be obtained eg. flowers from trees, or flowers from shrubs?
5. How large an area does the animal need in order to live a long life?
6. Who are the animal's natural predators (if any)?
7. What could happen to the animal if a fox was to find it?
8. Is this animal vulnerable to dogs and cats?
9. What would happen to the animal if its habitat was all cleared? Could it make its way to another piece of habitat if it was over 10km away?
10. How could the animal benefit from planting out new habitat (that would also have more food sources for it)?

As senior students, the information discovered by the students on the animals of the Cumberland Plain can then be presented in a variety of ways:

- As a presentation to the rest of the class.
- (Even better) As a presentation or role-play of their chosen animals to the younger years of the school.
- (Better again) Senior students could develop a play or drama, acting out the behaviours of the animals that once lived in the Cumberland Plain – and the ways that they interacted with each other, and what plants in particular they needed for food and shelter. This could also be performed for the younger years.

Further Lesson Ideas for Seniors

2. Town Planning (suited to High Schools)

Consider western Sydney, and the Cumberland Plain, and brainstorm with the class a list of components that can be found in any town or suburb.

List the components discovered on the board (things like shopping centre, park, houses, roads etc).

When a good list has been developed, ask students to work in groups to plan a town that includes those components. This town also has a large remnant of Cumberland Plain Woodland, and various smaller amounts.

The objective of the exercise is for the town to be planned around the existing vegetation. Can this be done? Does more planting need to be carried out to expand the habitat that exists there, and connect all the isolated parcels?

Not all components listed from the brainstorm have to be included, but if they're not included, then a justification as to why not needs to be written down (for presentation later).

Within each group there should be 3-4 personalities, including for example:

- a Council worker wanting to develop land to house more people,
- a Ranger concerned about the remaining vegetation (and the last remaining Buff-banded Rail in the creekline of the woodland reserve),
- a family man (or woman) just wanting the best facilities and a nice town to live in and,
- a high school student learning about the Cumberland Plain landscape at school.

This activity can be expanded for Senior high school students, if considered at a regional scale.

LESSON PLAN: Resources

List of animals that require the Cumberland Plain Woodland as ‘habitat’:

Please note this is not an entire list of animals found in the Cumberland Plain, it is only a list derived for the activities attached. Please refer to the websites listed for further examples of Cumberland Plain plants and animals.

Mammals	Birds
Eastern Grey Kangaroo Wallaroo Swamp wallaby Other wallabies Brush tailed Possum Ring tailed Possum Gliders Grey Headed Flying Fox Gould’s Long-eared bat Eastern Bentwing bat	Brown Falcon Australian Raven Grey butcherbird Currawong Magpie White-winged chough (pronounced ‘chuff’) Australian owl-nightjar Tawny frogmouth Kookaburra
Reptiles Red bellied black snake Brown snake Blue Tongue Lizard Garden skink	Gang gang cockatoo King parrot Rainbow lorikeet Eastern rosella
Frogs Peron’s Tree frog Striped marsh frog Common eastern froglet	Masked lapwing White-faced heron Dusky moorhen Purple swamphen Buff-banded Rail
Insects and other small creatures Cumberland Land Snail Butterfly Fly Ant Spider Grasshopper Beetle Dragonfly Mite Worm	White-browded scrubwren White-throated treecreeper Welcome swallow Superb fairy-wren Eastern spinebill Red wattlebird New Holland honeyeater Eastern yellow robin Willy wagtail Eastern whipbird

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LESSON PLAN: Resources

Other resources to gain more information about the Cumberland Plain

a) Department of Environment & Climate Change (information on Cumberland Plain EECs and all other threatened species within NSW):

www.threatenedspecies.environment.nsw.gov.au

Cumberland Plain Woodland profile

www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10191

Cumberland Land Snail

www.threatenedspecies.environment.nsw.gov.au/tsprofile/profile.aspx?id=10526

b) NSW National Parks & Wildlife Service's Wildlife Atlas (search to see what plants and animals have been observed in your area):

wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp

c) Department of Environment & Heritage's Community Information Unit (huge variety of free threatened species resources including posters, stickers and fact sheets)

www.deh.gov.au/biodiversity/threatened

Phone: 1800 803 772

Threatened species publications:

www.environment.gov.au/biodiversity/threatened/publications/index.html - factsheet-06

Green kids guide to threatened species (9 ways you can help)

www.environment.gov.au/biodiversity/threatened/publications/kids.html

Green consumer guide to threatened species (45 ways you can help)

www.environment.gov.au/biodiversity/threatened/publications/greencon.html

Cumberland Plain ecological communities fact sheet

www.environment.gov.au/biodiversity/threatened/publications/tsd05cumberland-plain.html

d) Threatened Species Network (national partnership group dedicated to working with the community to stop the disappearance of Australian plants and animals)

wwf.org.au/ourwork/species/tsn

e) Australian Museum (a wealth of information about Australian plants and animals)

www.amonline.net.au/explore

f) Botanic Gardens Trust (a great resource to find out more about plants of the Cumberland Plain, including a photo gallery)

www.rbg Syd.nsw.gov.au

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Photographs of some Cumberland Plain
Endangered Ecological Communities



**Sydney
Turpentine
Ironbark Forest**

Photo: M.Cufer



**Castlereagh
Swamp
Woodland**

Photo: M.Cufer

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