
Eastern rosella


Kunzea ambigua'


Angophora costata

Chapter 8.

Biodiversity at the Coal Loader

Terms and concepts

Sustainable, vegetation, biodiversity, layers, exotic, indigenous, native, endemic, non-native, vegetation community, groundcover, canopy, middle layer, urbanised, shelter, habitat, water availability, weeds, producer, consumer, predator, herbivore, carnivore, omnivore, wildlife, fire regime, food chain, pollinator, possum drey.

Background Information

The Coal Loader site is in the North Sydney Council area, which is a small, highly urbanised area. Less than 5% of the original vegetation that occurred in the area before European settlement remains, so the vegetation at the Coal Loader site and at Balls Head (right next door) are very precious examples of the area's original vegetation. It is also vital as habitat for the wildlife that call the Waverton Peninsula home.

Did you know?

Biodiversity refers to the variety of plant, algae and animal species that interrelate to form the web of life on earth. It also refers to the ecosystems in which they live. Biodiversity supports all life on earth and ensures clean water, air and fertile soils.

The area has changed dramatically over the years, whether through wood gathering, fire or wharf construction. In the 1920's, the area was almost totally denuded of its natural vegetation cover. In the 1930's Balls Head reserve was replanted with trees as part of an early environmental campaign, led by the founder of the National Trust Annie Wyatt. Some of these trees and bushes can also be found at the Coal Loader site.

The canopy of the bushland on the edges of the Coal Loader is classified as 'Open Forest/Woodland' and is dominated by two species of trees Angophora costata (Sydney Red Gum) and Corymbia gummifera (Red Bloodwood). The middle layer is classified as a scrub community which is dominated by shrubs such as Kunzea ambigua (Tick bush). This shrub attracts numerous birds and colourful soldier beetles when in flower.

Like most urban bushland, the Coal Loader site contains a mix of native and non-native plants. You will notice along the edges of Balls Head Drive that exotic plants (plants from overseas) and non-indigenous plants (native to other parts of Australia) have been planted. These plants are surrounded by mature and regenerating native vegetation, some of which come from the precious soil seed-bank.

Throughout the North Sydney Council area many bushland reserves are under threat because of the invasion of weeds escaping from backyards and gardens. Common garden plants can be spread by birds eating the seeds or by people tossing garden clippings into the bush. Some exotic species are vigorous invaders because they grow faster than native species and they produce much more seed. Some native species, like Pittosporum undulatum (Sweet Pittosporum) respond well to the nutrients in urban runoff. Often species such as these, take over an area and shade the other species, which reduces biodiversity. Once weeds take over an area, the character of the bushland changes and this reduces both the habitat for native wildlife and the natural fire regime.

Table X below shows some of the common weeds found occasionally around the Coal Loader site.

Source: Wikipedia

Most common annual weed species		Other common weed species	
	*Ehrharta* sp. (Velt Grass)		*Tradescantia fluminensis* (Wandering Trad)
	*Bidens pilosa* (Cobblers Pegs)		*Protasparagus aethiopicus* (Asparagus Fern)
	*Conyza* sp. (Fleabane)		*Anredera cordifolia* (Madeira Vine)

To manage the spread of weeds bushcare groups and community volunteers work with the North Sydney Council's Bushland Management Team to eradicate and control noxious weed infestations and regenerate bushland vegetation.

The Coal Loader site and the adjacent Balls Head Reserve support a variety of native mammal, amphibian, reptile, insect and bird species by providing shelter, food and protection from predators. Species such as Brushtail possums, Ringtail possums, Grey headed flying foxes, Eastern Bent-wing bats, Water dragons and Striped Marsh frogs have established small populations in the area.

North Sydney Council has developed Wildlife Protection Areas and Wildlife Corridors so that species can move between the areas and access a wider range of breeding partners, thus preventing inbreeding and a loss of genetic diversity in the local population.

Unfortunately, introduced pests such as the European Red Fox also inhabit and hunt native species in the North Sydney Council area, which also reduces the number of native species at the Coal Loader site. North Sydney Council controls fox numbers by undertaking a fox control program twice a year in coordination with other nearby Councils.

A snapshot of fauna found on and near the Coal Loader site:

	Common Name	Conservation Status
Mammals	Brown Antechinus	Locally significant
	Common Brushtail Possum	Locally common
	Common Ringtail Possum	Locally common
	Grey-headed Flying-Fox	Nationally threatened
	Eastern Bent-wing Bat	Threatened in NSW
Amphibians	Common Eastern Froglet	Locally common
	Striped Marsh Frog	Locally common
Reptiles	Lesueur's Velvet Gecko	Locally significant
	Southern Leaf-tailed Gecko	Locally common
	Fence Skink	Locally common
	Barsided skink	Locally significant
	Common Garden Skink	Locally common
Reptiles	Delicate Garden Skink	Locally common
	Eastern Blue-tongued Lizard	Locally significant
Birds*	Australian Brush-turkey	Regionally threatened
	Little Penguin	Regionally threatened
	Fairy Martin	Regionally threatened
	Rufous Fantail	Migratory species
	Spectacled Monarch	Migratory species
	White-bellied Sea-Eagle	Migratory species
	White-throated Needletail	Migratory species

* Note there are dozens more species of birds found at Balls Head Reserve. See the full species list at *www.northsydney.nsw.gov.au*

Syllabus Links

- Geography Stage 1, 2, 3, 4 and 5.
- Curriculum Priority Sustainability – Geography Stages 1, 2, 3, 4 and 5.
- Science and technology and Science Stages STl, ST2, ST3 and ST4.
- Curriculum Priority Sustainability – Science – STl, ST2 and ST3.

Further Reading:

Watch the Coal Loader Balls Head Biodiversity three minute video which will give your class an overview of what you will find at the Coal Loader.

Other reference material, available at *www.northsydney.nsw.gov.au* includes:

- North Sydney Council Bushland Rehabilitation Plan 2013
- North Sydney Council Balls Head Reserve Species List
- North Sydney Council Natural Area Survey 2010
- North Sydney Council Continuing Bird Survey 2008
- North Sydney Council Bushland Plan of Management 2007
- www.northsydney.nsw.gov.au/biodiversity
- Environment.nsw.gov./nativeanimals/facts

Activity 1 – Student Worksheet An investigation into the biodiversity at the Coal Loader.

ACTIVITY SUMMARY

Students will investigate how the Coal Loader Centre's remnant bushland, bushland gardens and wetland supports biodiversity. Teacher to discuss questions and answers from the Biodiversity reference poster and conduct a basic assessment of the biodiversity of a bushland site.

Inquiry questions:

1. What is biodiversity?
2. What are the components of the environment at the Coal Loader that support biodiversity?
3. How do high levels of biodiversity help animals, plants and humans?

Syllabus Outcomes:

- Describes the ways people,places and environments interact. GE2-2
- Describes the diverse features and characteristics of places and environments. GE3-1
- Locates and describes the diverse features and characteristics of a range of places and environments. GE4-1
- Discusses management of places and environments for their sustainability. GE4-5
- Explores characteristics and basic needs of living things. Ste-3LW-ST

Materials and preparation

1. Each student will need a clipboard and writing equipment.
2. Each student will need a copy of the student worksheet.
3. Each student should be given, on the day, a copy;
    - of the laminated reference poster 'Biodiversity in North Sydney',
    - of the table 'A snapshot of fauna found on and near the Coal Loader site' in the Background information.
- A4 laminated map of the Coal Loader site.

Further Reading:

Watch the Coal Loader Balls Head Biodiversity three minute video which will give your class an overview of what you will find at the Coal Loader.

Other reference material, available at *www.northsydney.nsw.gov.au* includes:

- North Sydney Council Bushland Rehabilitation Plan 2013
- North Sydney Council Natural Area Survey 2010
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- www.northsydney.nsw.gov.au/biodiversity
- Environment.nsw.gov./nativeanimals/facts

Activity 1 – Student Worksheet Biodiversity at the Coal Loader.

Name .....

Location – Outside the Caretaker's cottage, in the community garden.

Did you know?

The Coal Loader site and the edges surrounding the Coal Loader have beautiful and important patches of bushland and bushland gardens. Most of the trees and shrubs have been replanted over the last 20 years to replicate the vegetation which was found here in the 1930's.

The main type of vegetation community that North Sydney Council is trying to replicate is called Open Forest. The Open forest vegetation community is dominated by trees such as the Sydney Red Gum and Red Bloodwood. Other trees which help make up the canopy include the casuarinas (She Oaks) and the Port Jackson Figs.

The shorter understorey layer of the Open Forest community features Grevilleas, Wattles, Geebungs as well as shrubs and grasses. In the sheltered gully near the Community nursery you will see Sweet Pittosporum, Blueberry Ash and Lilly Pillies.

The patches of bushland and bushland gardens at the Coal Loader are a refuge for native fauna, including Geckoes, Blue-tongued lizards, Skinks, Common Eastern froglets, Brushtail and Ringtail possums and a colony of eastern Bent-wing bats. As well many birds live and visit the area such as parrots, lorikeets, kookaburras, wrens and Koels in summer.

Unfortunately our bushland is under threat from many urban pressures such as weeds, pollution, dumping, suburban expansion, feral animals and climate change.

Activity 1a: Read the reference poster and look at the pictures on the poster titled 'Biodiversity in North Sydney' and answer the following:

1. What is biodiversity?

_____

_____

2. What makes up biodiversity?

_____

_____

3. Suggest why "it is in our own best interests to preserve biodiversity"?

_____

_____

4. Suggest why only 5% of the original vegetation observed before European settlement remains in the North Sydney Council area? Give two examples from the poster

_____

_____

Activity 1 – Student Worksheet
Biodiversity at the Coal Loader. *continued*

5. In 2007 and 2010 Council surveyed natural areas for the number and types of plants, animals and especially, for birds (an avian survey). Why was this important?

6. Look around you and name 3 species of either plants or animals which are examples of the Coal Loader site's biodiversity:

7. Look at the table, 'A snapshot of fauna found on and near the Coal Loader site', on the photocopied sheet your teacher has handed out. Write the name of a herbivore and write the name of a carnivore:

Activity 1 – Student Worksheet
Biodiversity at the Coal Loader. *continued*

Name .....

Activity 1b: Walk to the paved area in front of the Mess Hall (marked D on the map) or the Powerhouse (marked C on the map).
Sit down so you are facing the bushland gardens and trees.

1. a. Draw a sketch of the bushland and native garden, making sure to draw the three layers of the Open Forest vegetation community ie:
   1. The canopy – made up of the top of the trees.
   2. The understorey or middle layer – made up of the shrubs and bushes.
   3. The groundcover – made up of the plants growing close/on the ground.

   b. Write/label the words canopy, understorey and groundcover next to your sketch at the matching number.

   c. Look closely for evidence of animals eg, spider webs, bird nests, possum dreys, termite nests. Add these to your sketch and label them.

My sketch of the Coal Loader site's bushland and biodiversity.

1.....

2.....

3.....

Did you know?

When there are a number of different layers of vegetation the diversity of fauna especially is improved. Biodiversity is usually improved when there are many species, many layers, many places to shelter and act as habitat, some water for animals and plants, and a layer of leaves/mulch over the soil to reduce soil loss and hold the soil in place.

d. Look back at the table from the **Background information, 'A snapshot of fauna found on and near the Coal Loader site'**, and on your sketch above **write the name or sketch** one animal that,
   - lives in the canopy (trees)
   - lives in the understorey (middle layer)
   - lives in the groundcover, mulch or soil.

Did you know?

A food chain shows how animals and plants are connected and how nutrients and energy are transferred from one species to the other.

e. Use the words in the box below to sequence these species in a food chain from left to right. Draw arrows to show the flow of food and energy from producer to consumers. Label producer, herbivore, carnivore and omnivore.

Food chain

Put in the correct order, from left to right:
Earth worm, gum leaves, Blue-tongue lizard, Common garden skink.

Activity 1c: Walk to the paved area in front of the Mess Hall (marked D on the map) or the Powerhouse (marked C on the map). Sit down so you are facing the bushland gardens and trees.

f. Look at the bushland in front of you. Teachers and students discuss the answers for the spaces in the column on the right. Write your answers in the blanks.

g. Look at the bushland in front of you and use this table to assess/score the level of biodiversity. Tick ✓ the column you think best describes how many you observe.

Activity 1 – Student Worksheet
Biodiversity at the Coal Loader. *continued*

My assessment of the Coal Loader site's bushland – a simple measure of biodiversity.

Coal Loader Bushland	Score: None	Score: Some	Score: Lots/Many	How does this help biodiversity?
1. Trees				*Provides food,shelter/habitat,shade.*
2. Shrubs				*Provides food, shelter/habitat, shade.*
3. Groundcover				*Provides….*
4. Leaf-litter/mulch				*Holds the soil, keeps moisture in soil, home for decomposers.*
5. Rocks				*Holds the soil, keeps moisture in soil, provides habitat.*
6. Logs or fallen branches				
7. Tree hollows/nest boxes				
8. Flowering plants				*Provides pollen, nectar, shelter, habitat.*
9. Water				*Provides moisture for all living things*

h. Count how many ticks in the Lots/Many column?

_____

i. To work out what your score means, use this: (then circle your answer)
- If your score was between 7 and 9 out of 9 this means **HIGH** biodiversity.
- If your score was between 5 and 7 out of 9 this means **GOOD** biodiversity.
- If your score was between 3 and 5 out of 9 this means **FAIR** biodiversity.
- If your score was between 0 and 2 out of 9 this means **LOW** biodiversity.

j. Write in the table above how groundcover, logs/fallen branches and tree hollows/nest boxes help biodiversity. (Hint: Think about habitat)

k. Describe the biodiversity of the Coal Loader. Use this 'sentence starter'.
The biodiversity at The Coal Loader is high because:

_____

_____

l. Compare these results with the results you found from assessing your biodiversity at school. (see pre and post activities at the end of the chapter). Or make a prediction.
Which area has the highest biodiversity? Can you explain why?

_____

_____

Activity 2 – Student Worksheet

What are some of the plants that support biodiversity at The Coal Loader ? Where are they located? How are they connected with each other?

ACTIVITY SUMMARY

Students will investigate how the Coal Loader Centre's bush remnants, bushland gardens and wetland supports biodiversity. Teacher will guide students around the Bush Foods garden, bush gardens, wetland, community garden and the Platform.

Inquiry questions:

1. What are some of the plants at the Coal Loader that support biodiversity?
2. How do high levels of biodiversity help animals, plants and humans?
3. How can people improve biodiversity?

Syllabus Outcomes:

- Describes the ways people,places and environments interact. GE2-2
- Identifies ways in which people interact and care for places. GE1-2
- Describes the diverse features and characteristics of places and environments. GE3-1
- Explains interactions and connections between people, places and environments. GE3-2
- Locates and describes the diverse features and characteristics of a range of places and environments. GE4-1
- Discusses management of places and environments for their sustainability. GE4-5
- Assess management strategies for places and environments for their sustainability.
- Examines how the environment affect the growth, survival and adaptation of living things. St3-4LW-S

Materials and preparation:

Each student will require:

- a clipboard and writing equipment.
- a copy of the student worksheets.
- a copy of the laminated A4 map of the Coal Loader site.
- copy of the table 'A snapshot of fauna found on and near the Coal Loader site' from Background Information.
- a copy of the laminated reference posters 'Managing Council's Bushland' and 'Wildlife Watch'.

Reference

Biocollect website and Atlas of Living Australia – *https://www.ala.org.au/biocollect/*

Activity 2 – Student Worksheet – Biodiversity

Name some of the biodiversity features of the Coal Loader site. Where are they located? How do pollinators help biodiversity ? How does North Sydney Council help biodiversity?

Location: Start outside Mess Hall garden

Activity 2a: Name some of the biodiversity features of the Coal Loader site. Where are they located?

Teacher to guide students around the Coal Loader's Bush Foods Garden, Community garden down to the Coal Loader wetland, tunnel and Platform.

Use the map on the next page, diagram X to mark the start of your **biodiversity** trail.

As students walk around the area add each feature to the map, by writing the number onto the correct location on the map.

Start outside the Mess Hall and discuss:

1. For each of the biodiversity features listed in the table, tick when you see it ✓ and write down something from the word bank re how it helps biodiversity.
2. As you walk to each feature, write the number on the map on the next page.

Watch out for these biodiversity features. Learn, what plant is that?	**Tick ✓**	**How does this feature help biodiversity? Choose from the word bank: shade, shelter, habitat, pollen, seeds, stabilises soil, nectar, prevents water loss, food for animals,**
a. From the near the Mess Hall		
1. Banksia tree (wikipedia) 		
2. Lomandra grass (wikipedia) 		
3. Grevillea shrub 		

4. Mulch/leaves around the ti-tree 		
5. Anything else?		
b. From the Bush Foods Garden		
6. Native lime 		
7. Sandpaper Fig Tree 		
8. Blue Flax Lily (Dianella) (wikipedia) 		
9. Narrow leaf Geebung (shrub) (wikipedia) 		

10. Logs and sticks on the ground 		
c. From the Community Garden and the Platform		
11. Flowering plant		*Provides...*
12. Garden soil		*Provides nutrients for plants.*
13. Fruit tree eg, lemon		*Provides...*
14. Mulch eg, straw		*Covers the soil to prevent water loss (evaporation).*
15. Frog pond		*Frogs are a part of the food chain. Help eat insects.*
16. Native bee hive 		*Provides a home to native bees, which help pollination.*
17. Rainwater tank 		
18. Tunnels below Platform 		*Provides habitat for Eastern Bent-wing Bats.*
19. Chickens eat food scraps		*Chicken droppings provide nutrients for the garden soil.*

Activity 2 – Student Worksheet Biodiversity. *continued*

Get to know the Eastern Bent -wing Bat (Miniopterus schreibersii oceanensis)

It roosts for part of the year in the far Coal-Loader tunnel. After reading all about microbats on the sign near the tunnel, suggest why it is considered special:

20. Community plots on Platform 		*Flowering fruit and veggies provide pollen for bees.*
d. From the Wetland		
21. Lomandra grass 		*Provides groundcover/habitat and holds soil.*
22. Water plants eg, sedges		*Provides...*
23. Shorter trees, eg, paperbark 		*Provides a middle layer habitat.*
24. Tall trees like casuarina (she-oak) 		*Provide shade, pollen, habitat.*
25. Anything else?		*Provides...*

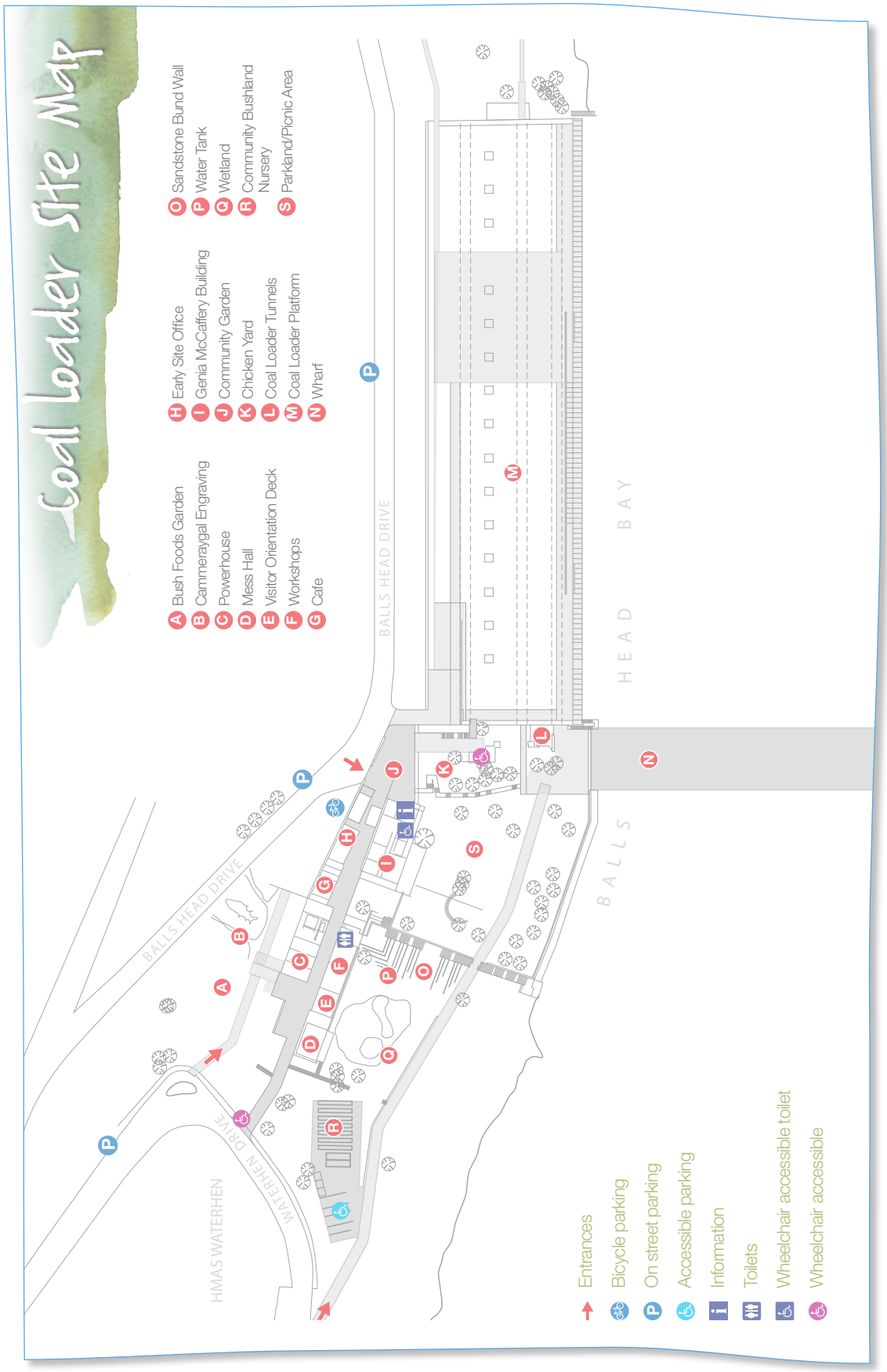


Diagram X – Biodiversity features map

Activity 2 – Student Worksheet Biodiversity. *continued*

Name .....

Activity 2b: These pollinators are found at The Coal Loader. How do pollinators help biodiversity?


Native bee


Lady beetles


Dragon - fly


Grey-headed Flying Fox

Did you know?

Pollen is a powdery, protein filled substance produced by plants so they can reproduce. Pollen is spread by wind, water and pollinators.

Pollinators refer to the animals that help move pollen from the male part of the plant to the female part of the plant so that seeds and fruit can form and that reproduction can take place.

Pollinators at The Coal Loader include insects such as flies, hover flies, beetles, lady bugs, native bees, grasshoppers, European bees, dragon-flies, ringtail possums, brushtail possums, Grey-headed flying foxes, Eastern Bent-wing bats and birds such as Kookaburras, Magpies, Myna birds and Rainbow Lorikeets.

Pollination often happens accidentally when pollinators visit flowers to sip **nectar from flowers**. **Nectar** is a sugary, carbohydrate filled liquid that is made by flowers.

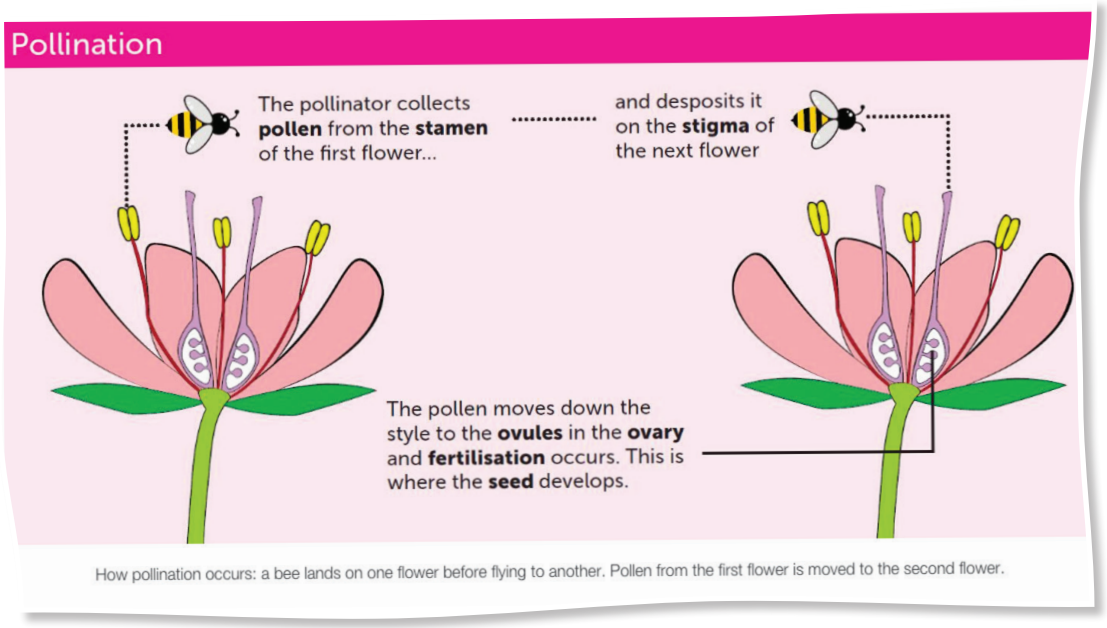
Pollination is an extremely important process as it allows plants to be able to reproduce, grow and provide food, fruit and seeds.

1. Sit for two minutes in the Community garden and write and/or draw what you see and hear. Encourage students to engage their senses when making observations.

2. Write down the names of any of the pollinators that you saw or heard, from the list above.

_____

_____



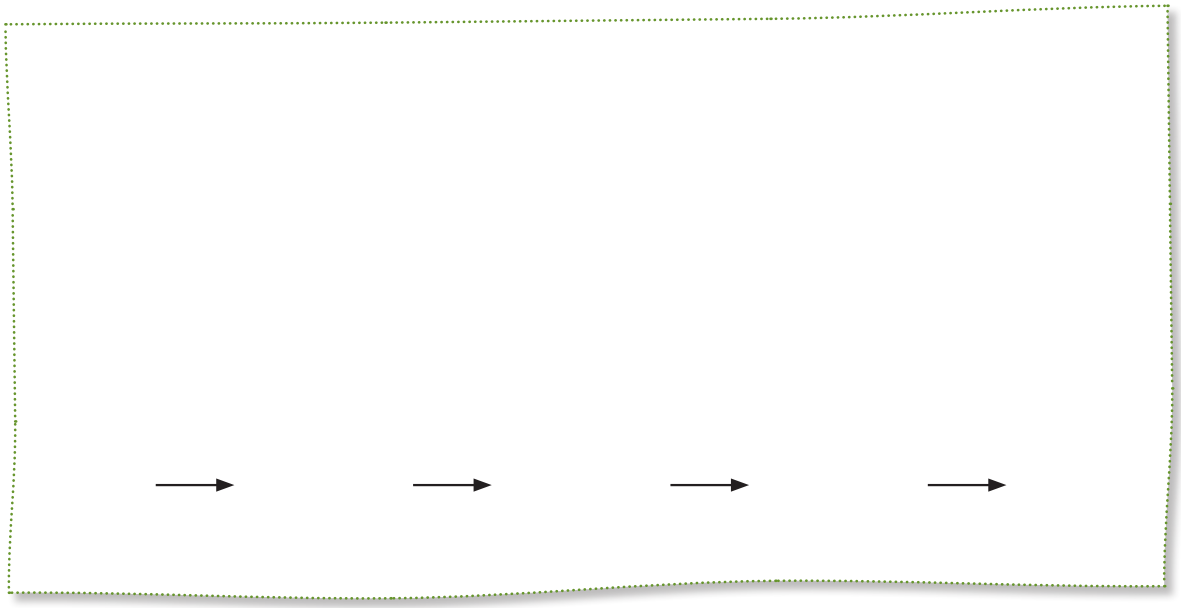
Source: Centennial Parklands/school programs/power of pollination
https://www.centennialparklands.com.au/learn/school-programs/classroom-resources/primary-classroom-resources/the-secret-life-of-pollinators/the-power-of-pollination

Activity 2 – Student Worksheet Biodiversity. *continued*

3. How does pollination help the community garden and bushland grow?

4. How does pollination help larger animals like brush turkeys?

5. Construct a **FOOD CHAIN** using the list of pollinators in the box above. The arrows show the flow of nutrients, food and energy.



Activity 2 – Student Worksheet Biodiversity. *continued*

Name .....

Activity 2c: How does North Sydney Council help the local bushland's biodiversity? How can you help biodiversity?

Location: Anywhere on The Coal Loader eg, the Community garden, Bush foods garden, The Platform and the wetland.

Teacher and students should read and discuss the information from the reference poster 'Managing Council's Bushland'.

1. From the information, students are to write below, a sentence describing what each program does to help bushland and biodiversity:

Council's Bush Regeneration team

Bushcare Program

Native Havens Program

Bushland Contractors

Adopt-a-Plot Program

Wildlife Watch Program

Coal Loader Community nursery

Activity 2 – Student Worksheet Biodiversity. *continued*

2. Teacher and students should read and discuss the information from the reference poster 'Wildlife Watch'. Note that, sightings and observations of species are now collated in the biocollect website and Atlas of Living Australia.

From the information, answer the questions below.

a Outline how 'Wildlife Watch' is a citizen science program.

b. Describe how 'Wildlife Watch' works.

c . Suggest why 'Wildlife Watch' helps North Sydney Council improve biodiversity.

Activity 3 – Your school compared with The Coal Loader – a biodiversity comparison.

Pre and post activities and resources

Activity Summary:

Students assess their school's biodiversity using simple fieldwork tools. Teachers may then take their own equipment to The Coal Loader site and assess the biodiversity of one of the natural bushland areas at The Coal Loader.

Inquiry Questions:

1. What are the general features of biodiversity that are present in our school's playground?
2. What are invertebrates and how do their numbers indicate biodiversity?

Materials needed:

- Students will each need writing materials, a clipboard and a copy of the Student Worksheet.
- Materials needed for the Invertebrate Survey tree shake are a white sheet, ice cube trays, tweezers, paint brush (note these can be supplied by North Sydney Council if needed).
- The Australian Museum's Bugwise Invertebrate Guide will help students idenitfy the bugs they catch *www.australianmuseum.net.au/Uploads/Documents/9362/invertebrate_guide.pdf*
- Background information on the Tree Shake activity can be found by reading Lesson 4 of Planet Ark's Earth Alive Manual *www.treeday.planetark.org/documents/doc-378-earth-alive-2012.pdf*
- Additonal downloadable bio data survey sheets can be found *http://australianmuseum.net.au/Bugwise*

Syllabus Outcomes:

- Describes the ways people,places and environments interact. GE2-2
- Explains interactions and connections between people, places and environments. GE3-2
- Locates and describes the diverse features and characteristics of a range of places and environments. GE4-1
- Discusses management of places and environments for their sustainability. GE4-5
- Examines how the environment affect the growth, survival and adaptation of living things. St3-4LW-S

Materials and preparation:

1. Students will need a copy of the worksheet and be able to research secondary sources.
2. Materials needed for the Invertebrate Survey tree shake include: a pale coloured sheet, ice cube trays or an egg carton, tweezers, paint brush.
3. The Australian Museum's Bugwise Invertebrate Guide will help students identify the bugs they catch.
4. Background information on the Tree Shake activity can be found in Planet Ark's Earth Alive Manual.

Activity 3 – Student Worksheet Your school compared with The Coal Loader – a biodiversity comparison.

Pre and post activities and resources

Name .....

Background Information:

Biodiversity refers to the astounding array of plant and animal species that interrelate to form the web of all life on earth. It also refers to the ecosystems in which they live. Biodiversity is the building block of life and supports all life on earth. It ensures clean air, water and fertile soils.

Observe the chosen study area at your school and complete the following tables. Complete the worksheet. The biodiversity of The Coal Loader will be completed on the fieldwork excursion.

1. Biodiversity Assessment at school – Choose an area of approximately 10 metres x 10 metres to count these features.

SCHOOL	None	Some	Lots
Trees			
Shrubs			
Ground cover			
Leaf litter/mulch			
Rocks			
Logs or fallen branches			
Tree hollows/nest boxes			
Flowering plants			
Water			

a. **Count** how many ticks in the Lots/Many column?

_____

b. To work out what your score means, use this: (then circle your answer)
- If your score was between 7 and 9 out of 9 this means **HIGH** biodiversity.
- If your score was between 5 and 7 out of 9 this means **GOOD** biodiversity.
- If your score was between 3 and 5 out of 9 this means **FAIR** biodiversity.
- If your score was between 0 and 2 out of 9 this means **LOW** biodiversity.

c. Describe how groundcover, logs/fallen branches and tree hollows/nest boxes help biodiversity. *(Hint: Think about habitat)*

_____

_____

Activity 3 – Student Worksheet
Your school compared with The Coal Loader – a biodiversity comparison. *continued*

d. Describe the biodiversity of your school's playground. Use this 'sentence starter'.
The biodiversity at school is ….because…

_____

_____

_____

2. Invertebrate survey – conduct the activity below at school and possibly at The Coal Loader. The activity can be set up as a teacher demonstration only.
Method: Students hold a white sheet under a branch while another person shakes the branch. The invertebrates will be dislodged and fall onto the sheet. They can then be sorted into a collection container and counted.

Number of Invertebrates found	School	The Coal Loader site
Butterfly		
Moth		
Dragonfly		
Centipede		
Millipede		
Pill Millipede		
Beetle Pupa		
Beetle		
Slater		
Bug		
Bush Cockroach		
Slug		
Ant		
Spider		
Grasshopper		
Other		

Activity 3 – Student Worksheet
Your school compared with The Coal Loader – a biodiversity comparison. *continued*

After you have completed the surveys, discuss:

- Is the biodiversity found at The Coal Loader similar to what was found at school?
- Did you find the same number of animals at both sites?
- Which site had the greatest amount of biodiversity?
- What might explain the difference?
- What impact would building houses on The Coal Loader have on the biodiversity of the area?

Activity 4 – Building Biodiversity at school

Activity summary

This activity brings the focus back to your school and what can be done to improve biodiversity on your school grounds. After visiting the Coal Loader, and discussions with the teacher, students will study the original ecological communities on their school grounds and consider how they can improve biodiversity at school, and how they can link with local Bushcare or Landcare groups for assistance.

Inquiry Questions:

1. What are the biodiversity lessons from the Coal Loader that we can incorporate at school?
2. How do we use the people at school and in our community to help improve the school's biodiversity ?

Syllabus Outcomes:

- Explains interactions and connections between people, places and environments. GE3-4
- Locates and describes the diverse features and characteristics of a range of places and environments. GE4-1
- Discusses management of places and environments for their sustainability. GE4-5
- Examines how the environment affect the growth, survival and adaptation of living things. St3-4LW-S

Materials and preparation:

- Map of the school with existing vegetation identified and information about local Bushcare or Landcare groups. Your own local Council will be able to assist with this information.
- Students are advised to first undertake the Coal Loader site Biodiversity activities at the Centre to gain an understanding of biodiversity at Coal Loader site.

Bringing Back the Bush

Many school grounds have had some, or sometimes all, of their original bushland removed, but all schools can increase the biodiversity of their grounds. Biodiversity can be increased by planting trees, removing weeds, growing plants in pots or growing up walls. Improving vegetation cover at school will provide homes for native wildlife, cool your school, and make it more beautiful too.

For those schools with remnant bush on their grounds, starting a Bushcare group at school is a great way to regenerate your bushland and improve the local environment. If your school is adjacent to a council reserve, your Council's Bushcare groups could help.

Most councils provide training and equipment for Bushcare volunteers. If you are doing regeneration work at your school, get in touch with your Council to find out how they can help you, including finding out what weeds you should be targeting, how to control them effectively (and without causing damage to the surrounding environment) and what native plants occur naturally in your area.

Activity:

1. Find out from your local council what ecological community once grew at your school. Your local Catchment Management Authority may have vegetation maps also.

> An ecological community is a unique group of plants, animals and micro-organisms that occupy, and interact within, the same geographical space. Each ecological community is adapted to occur in a particular habitat type, usually determined by factors such as soil type, position in the landscape, climate and water availability.

The ecological community that once grew on our school grounds was:

_____

The main species in this community are:

_____

2. Using the map of your school identify where biodiversity values could be improved.
   a. Map out the existing vegetation. Is it healthy?
   b Where are the remnant trees and other plants? Could they be better managed?
   c. Where can bushland be extended? e.g. along a school oval
   d. Where could you help provide homes for native animals at your school? Eg. Nest boxes, lizard lounges, protective shrubs for birds

3. Can you improve or create a vegetation corridor through your school. Why are vegetation corridors important?

4. Create an action plan to improve your school's biodiversity. Discuss ways that biodiversity could be improved at your school by students, staff and parents. Collate your ideas into a Biodiversity Action Plan. Consider:
   - WHAT – what are you going to do?
   - WHERE – where in the school will you do it?
   - WHEN – time frame
   - WHO – class, parent helpers, teachers, council?
   - WHY – what is the purpose?
   - HOW – steps involved?

Extension

5. Find out information about your closest Bushcare or Landcare group.

My local group is	
Where is the group located?	
When does it meet	
They are working on	

6. No matter where you live, you can encourage native wildlife into your backyard or balcony. What are two ways that you could encourage biodiversity at your home?

1. _____

2. _____

Biodiversity Bingo

Walk around the Coal Loader site and find these features:

- Frog pond
- Soil
- Fruit tree
- Seeds on a plant
- Any flower
- A moth or butterfly
- A bird hopping on the ground
- A leaf smaller than your hand
- A flying animal
- A stone or pebble
- A stick bigger than your hand.