A Simple Guide to Conducting a
SCHOOL
BIODIVERSITY
AUDIT

The biodiversity audit looks at how well the school grounds provide habitat for wildlife

This unit is designed for stages 2 to 6.

Table of Contents:

Why Do A Biodiversity Audit?

* To value wildlife habitat.

* To engage students in relevant and enjoyable science - observing, classifying, recording, analysing data, and making and testing predictions.

* To improve the school grounds - for both students and the wildlife that share our planet. With this knowledge students are empowered to act for their environment at home as well as at school.
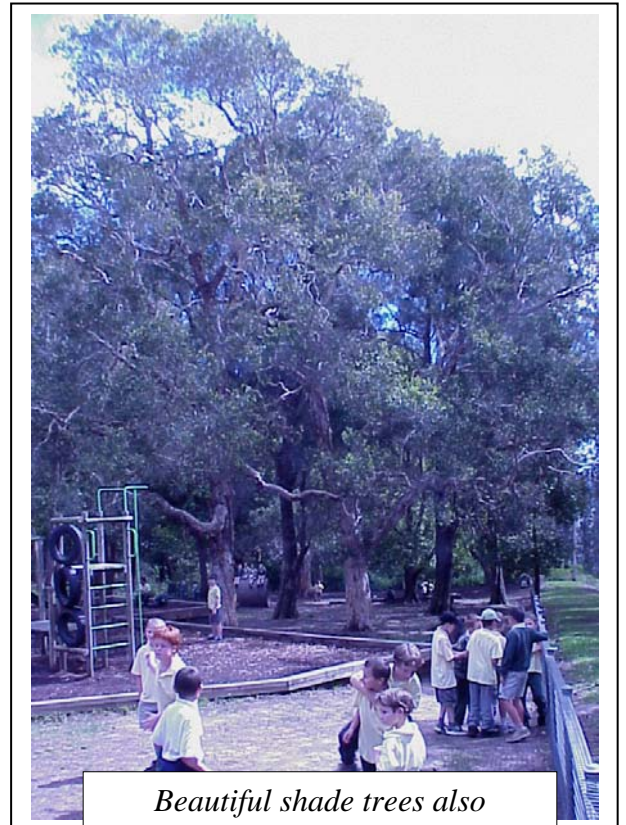
Beautiful shade trees also provide excellent wildlife habitat.

The Habitat Assessment

A Habitat Assessment is an attempt to quantify the value of gardens as places for wildlife and provides a simple guide for improving their value.

Equipment:
Clipboard, pencil, a Habitat Assessment sheet (appendix 2) and a plan map of the school and grounds (appendix 1).

Procedure:

a) Take the Habitat Assessment sheet to any garden or natural area.

b) Identify the garden to be assessed on a map of the school using an alphabetic code and then record the code on the Habitat Assessment sheet under Map ref.

c) In the row alongside that code record habitat values for each criteria (half points may be used e.g. for a poorly represented shrub layer or only one rock).

d) Tally the score and record in the column marked 'Total/14'

e) Repeat for each of the gardens in the school.

f) Suggest practical ways of improving each garden's value and submit to the School Environmental Management Committee.

Interpreting the Habitat Assessment

Area:

The bigger the better. Larger animals and those higher up the food chain need bigger territories. The effective area can be increased by creating wildlife corridors that connect with nature reserves or other areas of natural vegetation.

Layers:

Different animals utilise different layers of vegetation. Some feed on the ground others in the dense shrub layer and others in the canopy. Tall trees provide nesting sites and food for nectar and fruit eaters. Shrubs provide a safe place to hide for small insectivores like wrens and also small possums and gliders. Ground covers, grasses and leaf litter provide the food for finches, lyrebirds, lizards, frogs etc.

Native Plants:

Native plants are adapted to the Australian environment. They require less watering, no fertiliser and provide the right food at the right time for the native animals that evolved with them.

Weeds:

Weeds compete with native plants and therefore decrease the variety of plant life. Camphor Laurel, Privet, Lantana, Asparagus fern, Cassia and Ochna are problem weeds on the Central Coast whose seeds are carried far and wide by birds. Remove these weeds as soon as possible.

Shelter:

- Hollows - nesting sites for birds, possums, bats. Artificial nest boxes are an effective substitute.

- Ponds - homes for frogs, native fish, dragonfly nymphs and other invertebrates and drinking water for larger birds and animals.

- Leaf litter - protects smaller animals like lizards, frogs and invertebrates. Reduces evaporative water loss and reduces erosion.

- Logs & Rocks – shelter for small mammals, lizards, frogs, and invertebrates.
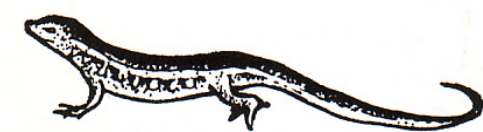
The Minibeast Survey

Invertebrates are the least mobile animals in the school grounds and so are relatively easy to sample. The variety of minibeasts in each area provides a relative measure of biodiversity.

Procedure

1. Obtain a School Plan/Map (appendix 1) showing the garden beds and outdoor areas.

2. Sampled areas will be given a map reference which will serve to identify them on the habitat assessment (appendix 2), Minibeasts ID & Tally sheet (appendix 3) and Minibeast Excel Recording Sheet (appendix 4).

3. A photograph of each sample area provides a visual record. If the Biodiversity audit is recorded in a Powerpoint presentation the photos can be inserted and linked to the Audit Record sheets. Photos are a useful tool back in the classroom for further discussion and development of Action Plans. Photos can record working bees and give children opportunities for reporting and monitoring progress.

4. Divide students into groups of 3 or 4 with one set of equipment for each group.

Leaf Litter
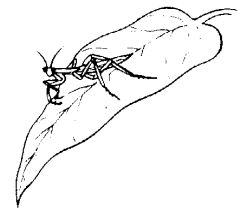
Equipment:
Gloves, garden trowels, collection cubes, colander (optional), tote trays and Minibeasts ID & Tally Sheet.

Method:

1. Each student, equipped with a glove on one hand and trowel in the other, sorts through the leaf litter looking for minibeasts. Use the colander to separate out the smallest minibeasts by scraping up some leaf litter with a trowel and placing it in the colander. Shake the colander over the tote tray. Small invertebrates will fall into the tray while larger animals will be trapped in the colander.

2. Caught minibeasts are transferred to a cube and taken to the recorder who identifies it (to the order level) by comparing it with pictures on the Minibeast ID & Tally sheet. Each minibeast species is recorded using a tally mark against the picture.

3. The identified minibeasts are retained so that they form a reference collection. If a minibeast brought to the recorder is already part of the reference collection it is released and not recorded. i.e. only one of each species is recorded.

4. The reference collection is released before moving on to the next sample site.
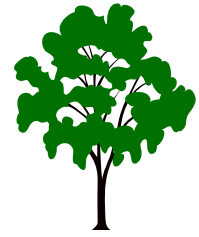
Tree Shake

Equipment:
gloves, tarpaulin / plastic sheet (min 2m x 2m) collection cubes,
Minibeasts ID & Tally Sheet.

Method:

1. Lay out the tarpaulin under the branches of the tree.

2. Shake the branches of the tree to dislodge Minibeasts in the branches.

3. Collect the animals from the sheet and place into collection cubes for identification.

4. Identify and record on Minibeasts ID & Tally Sheet as per "leaf litter" procedure.

Optional Activities

Grasses

Equipment:
Sweep nets, collection cubes, Minibeasts ID & Tally Sheet.

Method:

1. Sweep nets from side to side through low foliage and grasses.

2. After a minute of sweeping check nets carefully and transfer Minibeasts to temporary collection cubes.

3. Identify and record.

Lawn

Equipment:
Collection cubes, hand lens, Minibeasts ID & Tally Sheet.

Method:

1. Carefully search for minibeasts on an area of the lawn.

2. Transfer to a temporary collection cube.

3. Identify and record.

4. Repeat in different areas.

Opportunistic Sightings

These are chance sightings of animals made during the other surveys.
Record what you see, on the "Other Animals Sightings" sheet (appendix 5).

Monitoring should be conducted throughout the year. The sightings of animals may vary with the seasons and availability of food. Contact Rumbalara EEC or your local Council to obtain a copy of the "Central Coast Naturewatch Diary".

Signs of Animals

For example,
- Sounds (frogs, crickets, birds);
- scats (droppings) and owl pellets (regurgitated bones, feathers and fur);
- tracks, burrows;
- chewed leaves, seeds and flowers;
- feathers, fur, shed skin, shells;
- nests, webs, cocoons and bones

Use some detective skills to try and discover the animal responsible.
A good reference book for mammals is
Triggs, B. (2005) Tracks scats and other traces: a field guide to Australian Mammals. Oxford

Wombat Scat

Wombat Track

Discussion

What Does It Mean?

- Were different types of minibeasts found in different places?

- Compare places with the greatest and least variety (the most and least biodiversity).

- Find out what the area was like before the school was here. Do you think there are more or less minibeasts now?

Analysing the Results of your Biodiversity Survey

1. Transfer survey data from Minibeast ID & Tally Sheet (appendix 3) to Minibeast Excel Recording Sheet (appendix 4) or manually create a graph showing the "species richness" and "habitat assessment" for each area surveyed.

   Discuss trends e.g. do our "habitat assessments" predict "species richness"? Suggest actions that might result in increased biodiversity in different areas of the school. (The photographs might come in handy during these discussions).
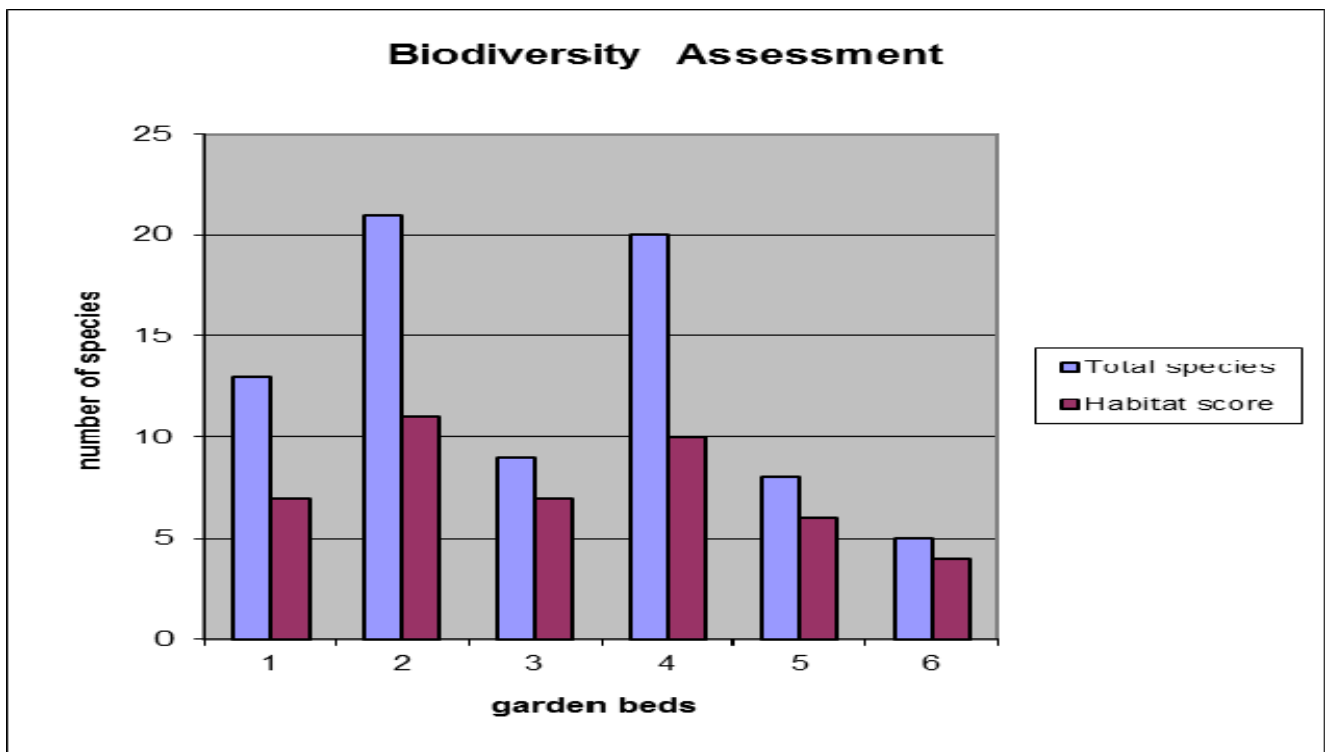
2. Describe ways of improving biodiversity in the school

3. Take your suggestions to the School's Environmental Management Committee

4. Act on suggestions/targets.

5. Evaluate the impact of your actions by conducting another audit at the same time next year.

Analysing the Results of Your Biodiversity Survey SCIENTIFICALLY

This activity is a very good example of the way scientists work.

The Biodiversity Habitat Assessment is a mathematical **model**. It considers some characteristics that we think influence biodiversity. Each characteristic has been reduced to a number and when added together they give a biodiversity 'score'.

If it is a good model the scores should be a good **predictor** of biodiversity.

To test the model students **measured** the biodiversity in each habitat by **counting** the different types of minibeasts (ensuring the same **sampling** effort in each habitat)

If the **results** show that places with high habitat assessment scores actually have more species than areas with low habitat assessment scores. (as in chart above) it is a good model .

If this is not the case, **analyse** the data for an explanation. For instance if there are more minibeasts whenever pools of water are present we could add more value to this characteristic to see if it **improves the model.**

Appendix 1: Map of School

"Your School"

MAP REFERENCE FOR HABITAT ASSESSMENT & MINIBEASTS SHEET
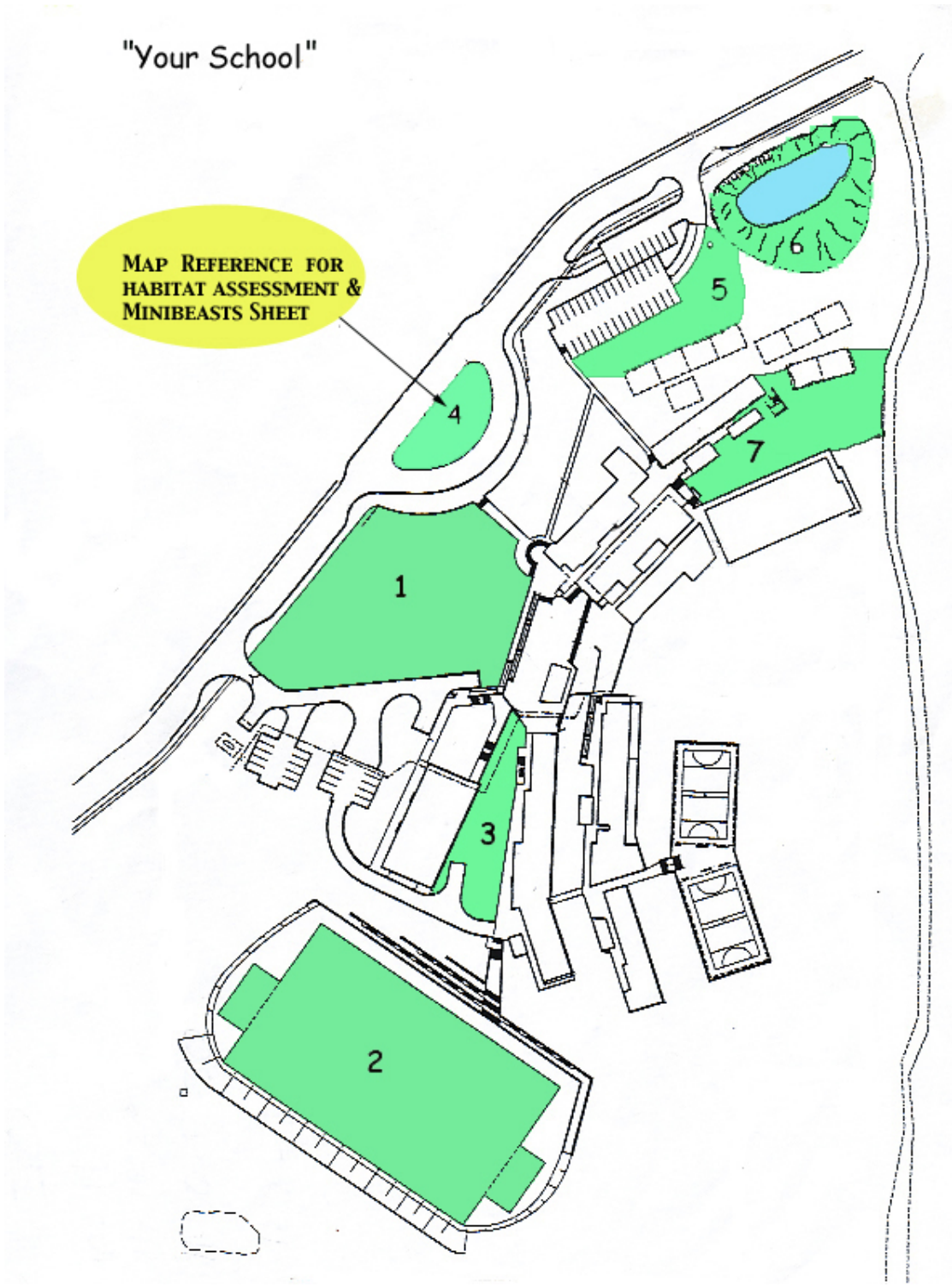
Appendix 2: Biodiversity – Habitat Assessment

School: Date:
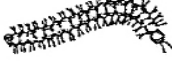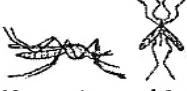
Audit Team:

Map Ref	Area			Layers			Native Plants			Weeds			Shelter				Total /14	Ranking
value	1	2	3	1	1	1	0	1	2	0	1	2	1	1	1	1		
	Small	Medium	Large	Herbs & ground covers	Shrubs	Trees	None	Some	Most	Most	Some	None	Nests or hollows	Pond	Leaf litter	Logs & Rocks		

Appendix 3: Minibeast ID & Tally Sheet

Area:

Tally number of species (not individuals)

Beetle Larvae		Millipedes
Beetles	Butterflies/Moths/Caterpillars	Centipedes
Ants	Flies	Mites
Bees/Wasps	Mosquitoes/Craneflies	Pseudo Scorpions
Bugs	Praying Mantis	Scorpions
Cockroaches	Stick Insects	Earth Worms
Earwigs	Thrips	Flat Worms/Leeches
Grasshoppers/Crickets	Termites	Slugs/Snails
Others		Spiders
		Amphipods
		Slaters

Appendix 4: Minibeast Excel Recording Sheet

Minibeasts	Number of species in each sample area									
Sample Area	A	B	C	D	E	F	G	H	I	J
Beetle larvae & beetles										
Ants										
Bees/Wasps										
Bugs										
Cockroaches										
Earwigs										
Grasshoppers & Crickets										
Butterflies, Moths & Caterpillars										
Flies										
Mosquitoes & Craneflies										
Praying Mantis										
Stick Insects										
Thrips										
Termites										
Millipedes										
Centipedes										
Mites										
Pseudo Scorpions										
Earthworms										
Flatworms & Leeches										
Slugs & Snails										
Spiders										
Amphipods										
Slaters										
Others										
Total										

Appendix 5: Other Animal Sightings

ANIMAL	WHERE	WHAT IS IT DOING?	DATE / TIME
e.g. Rainbow lorikeet	In a Redgum	Feeding on blossums	9am 8th March '06

Appendix 6: Biodiversity Plan - Curriculum Links

Add curriculum links relevant to the stage of the students that are conducting the audit

Student Activities Associated with the School Biodiversity Plan	CURRICULUM LINKS *
Discuss habitats, the needs of wildlife, threatened species in the local area, indicators of healthy habitat (e.g. area, presence of nesting sites, variety of vegetation layers,).	
Identify significant habitat in the school grounds. (eg area available, nest hollows in old trees, understorey vegetation, native plants).	
Record on a school map the different habitat areas of the school. (gardens, natural areas etc)	
Assess and record the habitat health of each habitat using set criteria.	
Discuss ways to improve habitat health of garden beds. (e.g nest boxes, weeding, foliage layers).	
Identify and record the variety of invertebrates sampled from each of the gardens in the school.	
Classify invertebrates according to their features.	
Identify and record the presence of vertebrate animals in the school grounds by observation (opportunistic sightings), and evidence (tracks, scats, scratchings).	
Analyse data to identify any correlations eg between animal and plant diversity.	
Suggest ways of increasing invertebrate biodiversity.	
Develop a plan.	
Implement plans for increasing biodiversity in the school grounds.	
Monitor abundance of animals over time by repeating biodiversity audits at regular intervals.	
Record abundance and seasonal behaviour/patterns of animals and plants.	
Make predictions of changes in biodiversity as habitat improves or degrades.	
Examine changes to the local environment surrounding the school. What habitat has been lost and what has been retained.	
Conduct a biodiversity audit of your own backyard.	

*.   *Rum*balara website : www.rumbalara-e.schools.nsw.edu.au

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Rumbalara Environmental Education Centre

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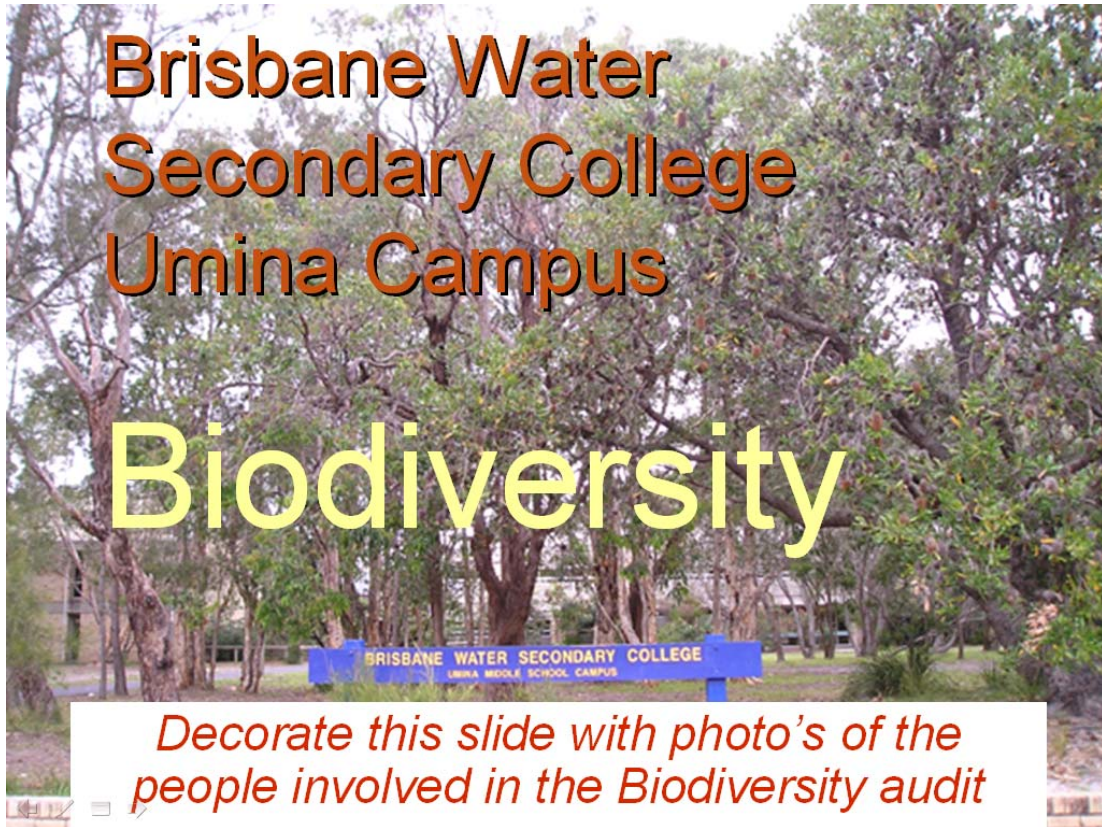## Appendix 7: Resources related to Biodiversity

- DEC biodiversity Links: http://www.curriculumsupport.education.nsw.gov.au/env_ed/teaching/focus/biodiversity.htm
- "Naturewatch Diary" - available from Rumbalara Environmental Education Centre (ph: 43247200) and Gosford Council (ph:43258355) www.rumbalara.eec.education.nsw.gov.au or www.gosford.nsw.gov.au
- "Biodiversity For Kids" www.nationalparks.nsw.gov.au
- Gould League …… http://www.gould.edu.au
- Australian Museum http://australianmuseum.net.au/animals
- A.B.C. Children's website http://www.abc.net.au/science/scribblygum
- Rumbalara EEC's library (phone 4324 7200 for inquiries)
- *Life in the Undergrowth* DVD, a BBC production available from ABC shops for $51
- *Atlas of Living Australia CSIRO Coordinated collaboration of Museums and Herbaria* http://www.ala.org.au/
- *NSW Bionet the website for the Atlas of NSW Wildlife* http://www.bionet.nsw.gov.au/
- *NSW Threatened Species* http://www.environment.nsw.gov.au/threatenedspecies/
- *Commonwealth Department of Sustainability, Environment, Water, Populations and Communities* http://www.environment.gov.au/biodiversity/conservation/index.html
- *Commonwealth Protected Matters Search Tool* http://www.environment.gov.au/epbc/pmst/index.html
- *PlantNET NSW Flora Online* http://plantnet.rbgsyd.nsw.gov.au/

Have you considered involving your school in these programs?

- "Land For Wildlife" - www.cen.org.au   for assistance to protect your piece of bush or grounds contact – landforwildlife@cen.org.au
- nominating any rare, mature or habitat trees in your area – Gosford "Register of Significant Trees" – Tree protection Committee, PO Box 21 Gosford NSW 2250
    - protecting or identifying any threatened plant / animal species or communities in your area – Office of Environment and Heritage - http://www.environment.nsw.gov.au/threatenedspecies/

Appendix 8: Example of a Biodiversity Plan

Brisbane Water Secondary College Umina Campus

Biodiversity

Decorate this slide with photo's of the people involved in the Biodiversity audit

Now and Then: Loss of biodiversity often results from urban development. **What changes have happened in your area?**
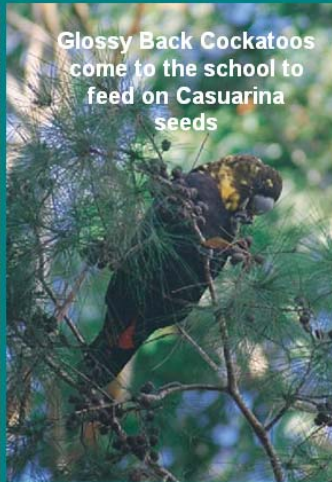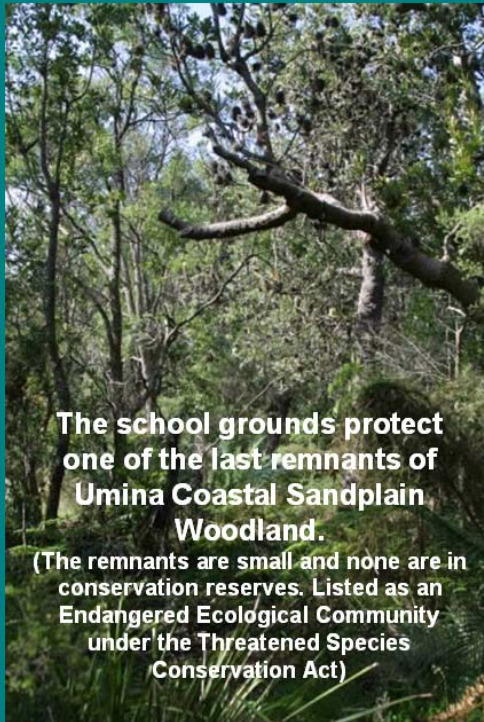
Site of Umina Campus

Recent Air Photo from Google Earth

!941 Air Photo

Some of Our Threatened Species

The school grounds protect one of the last remnants of **Umina Coastal Sandplain Woodland.**
(The remnants are small and none are in conservation reserves. Listed as an Endangered Ecological Community under the Threatened Species Conservation Act)

Glossy Back Cockatoos come to the school to feed on Casuarina seeds
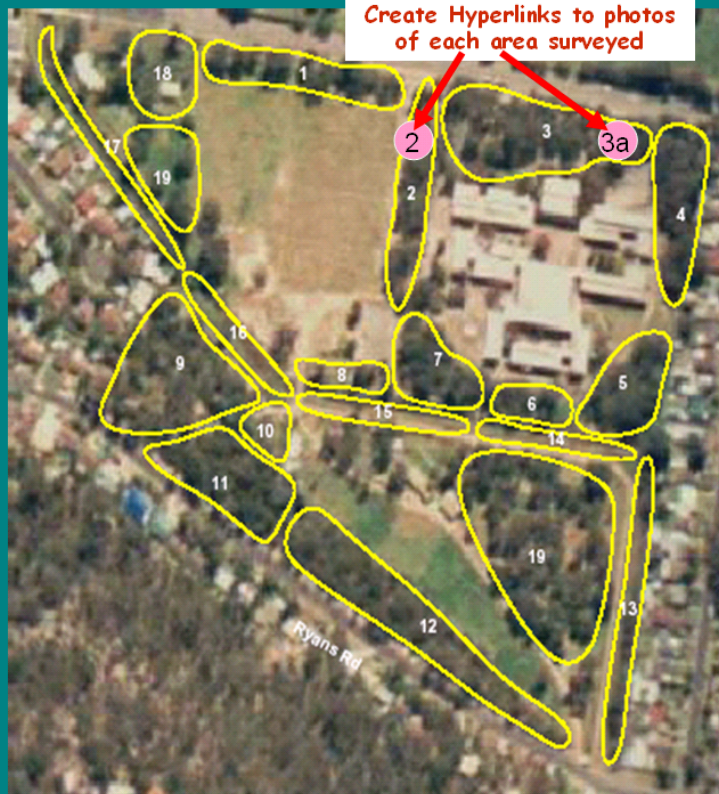
In NSW, there are more than 1000 native species, populations and ecological communities threatened with extinction.

Do you have any in your area? **Put their photos here** Go to www.threatenedspecies.environment.nsw.gov.au

Bush-stone Curlews nested and raised chicks in the school grounds in 2007

Create Hyperlinks to photos of each area surveyed

Umina Campus

Biodiversity

Survey 2008

Biodiversity Assessment
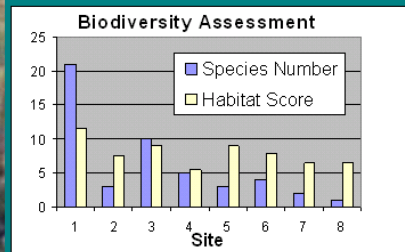
Biodiversity survey results

Habitat Assessments

Site 3

Assessment:

This remnant of the endangered Umina Sandplain Woodland Community is in good condition.

Habitat Score was 12 / 14

Bio-indicator score was 36

Threats:

- Weeds from neighbouring properties
- Informal tracks and trampling
- Slashing / underscrubbing
- Rubbish dumping
- Groundwater extraction

Solutions:

- signs to raise awareness
- weeding by local landcare group and accredited students
- Investigate groundwater use

Biodiversity Action Plan

▷ **Area 1**: Redirect Stormwater and control rabbits

▷ **Area 2**: Plan a walkway and landscape the garden area

▷ **Area 3**: Landscape plan for passive recreation, tree protection and habitat development.

▷ **Area 4**: Develop case for protection (Portables threat)

▷ **Area 5**: Conservation plan for Melaleuca biconvexa, weed removal.

▷ **Area 6**: Contingency plantings to replace Wattles

▷ **Areas 7 and 8**: Landscape plan habitat gardens, remove weeds

◁ Targets   ◁ Biodiversity planning map