biodiversity action in schools

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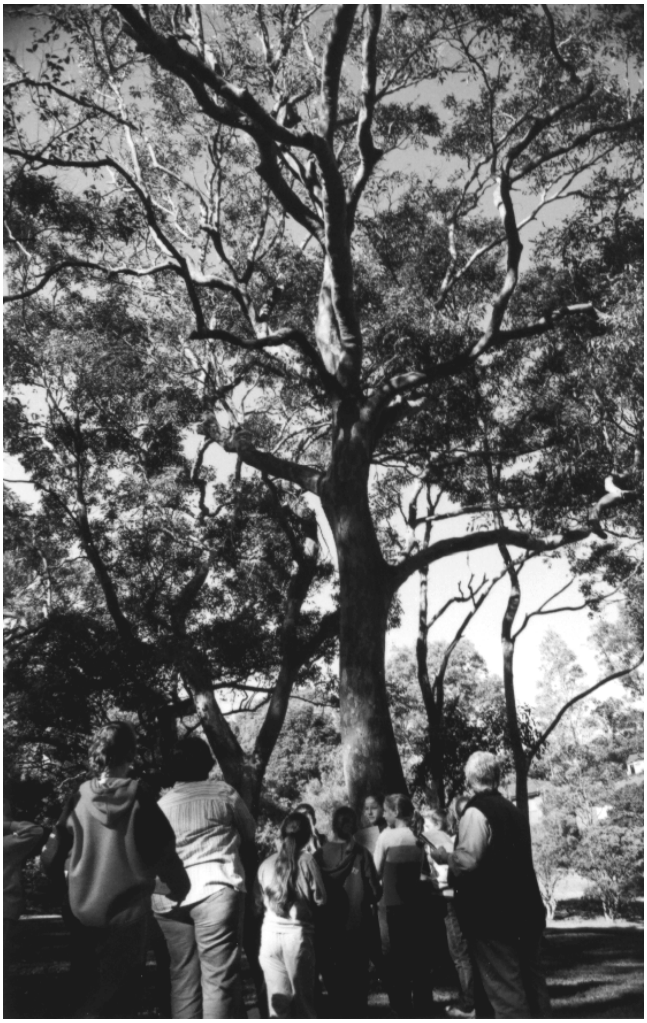

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Introduction

"We assume that the planet is ours for the taking, and we dole out small pieces of it for parks and reserves for wildlife. In the process, we chop what should be continuous habitat for animals and plants into minute fenced-off islands of wilderness. Extinction usually follows"
Source: 'Earth Time' David Suzuki

Caring for living things other than ourselves is fundamental to being alive. The trouble is that sometimes we are not always aware that our actions are impacting upon other species. Our lifestyles alone contribute to habitat destruction as we search for raw materials to sustain us. Conservation at home and at school is a start toward ensuring the world's biodiversity is retained.

Biodiversity is defined as *"the variety of all life forms- the different plants, animals and microorganisms, the genes they contain, and the ecosystems of which they form a part. It is not static, but constantly changing…"*
Source: ? EPA?

All levels of government and the community have a responsibility in conserving biodiversity. This manual is designed to assist teachers to present the concepts of biodiversity to students at both the primary and secondary level and to take action to enhance and conserve biodiversity in school grounds.

The need for this manual arose as the Greenhouse Action Program began to plant locally occurring species in school grounds. Greenhouse Action was an initiative of the Hawkesbury Nepean Catchment Management Trust in 1996 funded through the Natural Heritage Trust's Bushcare program and the State Government's Greenhouse Strategy. It aimed to assist schools to reduce impacts on the enhanced greenhouse effect. This included planting trees to act as local carbon sinks. Throughout the four year life of the program over 50,000 trees, shrubs and grasses were planted throughout the greater Sydney region and Wollongong.

The need for a self assessment process for schools to identify, conserve and enhance significant biodiverse areas was also highlighted when Greenhouse Action participated in the SCRAP (School Communities Recycling All Paper) Sustainable Schools Program (SSP) conducting energy audits and grounds surveys with students and staff.

The process was developed in surveys of 27 school grounds. One of the main outcomes was the focus on biodiversity as the single most important value of the school grounds. When the school grounds are valued on a biodiversity spectrum other factors such as student usage and safety become a part of a holistic integrated plan.

About this Manual

Developing a school grounds plan can be done in a variety of ways.
A good plan will have the following outcomes. It will

- be built on consensus from the whole school community
- be a dynamic plan that allows for the constant change and renewal of the school community
- conserve biodiversity both within the grounds and external to the school
- provide many safe and interesting opportunities for outdoor learning, passive and active play
- create a joyous place to spend the day

These outcomes can be achieved through professional facilitation and landscape design. However, this manual, based on several years of working with schools, takes a different approach. It aims to equip staff and students with basic skills and knowledge to produce a plan of action and implement it. While an overall grounds plan can be generated it is not essential. What is essential is that the key biodiverse areas in the school are recognised and conserved. Taking action, perhaps the most important part of the manual, can be done on an ad hoc basis providing a set of overall biodiverse principles are adhered to.

The survey process can be dynamic. It can be repeated on a yearly basis and may each time pick up different information. Grounds' surveys and accompanying actions can be built into curriculum, become the Student Representative Council or School Environment Committee's role or an active community group.

Relating biodiversity to school grounds
Over 20 schools were surveyed when developing the assessment process. Each, while having common elements, were also distinctly different. The assessment process needed to be adaptable to any school grounds and to any level of skills, support and knowledge. For this reason a broad approach to biodiversity assessment was taken and a number of assumptions were made, as follows:

- The importance of vegetation

Vegetation is considered the basis for a healthy, dynamic, biodiverse community. and local, original or remnant species of trees, shrubs, grasses and other ground covers are special and unique to each area. Local plant species generally support the local wildlife more effectively than introduced species. Communities of plants are arranged differently but generally there are many layers of plants a canopy of trees, layers of shrubs, ground covers, mulch and underground life as well as a variety of species in each layer- structural diversity. A healthy biodiverse school grounds will have areas with layers of local species.

This manual cannot hope to give a comprehensive list of every plant occurring within each local area. Instead the survey process starts in section one with students researching the original vegetation pattern and species on the school grounds.
The survey process concentrates on assessing structural diversity in the school grounds rather than recognising individual species.

Generally there seems to be a low level of knowledge of local species. Conserving biodiversity in school grounds is really about returning the original species and species structure. Existing remnant vegetation needs to be conserved and regenerated and replanted in highly disturbed areas.

- Surveying wildlife and habitat

There are more opportunities for habitat in a structurally diverse garden or school grounds. That means a large deep garden with local trees, shrubs, grasses, logs, ground covers, soil, mulch, roots etc will have many opportunities for living things to inhabit. Some of these living things will be seen and known but others will not be obvious.

A huge range of animals could be found in school grounds and every school will be different. The focus of this manual is for students to develop skills to recognise and so conserve and construct structurally diverse areas that will invite a range of creatures in. This is started in section one where students research an animal found in the school grounds. In section two, students look for signs of animal use and potential habitat. In section three, students can construct or conserve potential or current habitats.

- Taking the big picture into account

School grounds are part of a greater biodiverse community that extends beyond the school boundaries to the local community. The biodiversity survey places the school in this context by looking at local land use, the closest natural areas and sites for potential biodiversity conservation and enhancement within the local area. Activities that occur within school grounds may have a negative impact on biodiverse values elsewhere for example, within the water catchment or an adjoining patch of remnant bush. Schools may also have a positive impact for example, in urban areas the grounds may be the most biodiverse site in the local community. School grounds can often provide space for corridors linking remnant trees and bushland.

- Human impact

People, especially students, are integral to the biodiversity survey process as they can create impacts on biodiversity but also be positive agents for change. School ground usage for play, sport etc is important to recognise and acknowledge. However, the way school grounds are used is also dynamic, developed over time and sometimes by default. Grounds usage is therefore viewed as an impact on biodiversity and has potential for change.

Integration with teaching programs

Biodiversity is a very broad area of study and there are many resources already within schools that provide structured learning on living things and the environment. This manual's primary focus is to provide a tool for the school community to increase and conserve biodiversity within the school grounds. As such general curriculum links, fact sheets and work sheets have been developed to reflect the knowledge required to take action in the school grounds and to learn by actions. Other available educational resources are listed in the appendix.

How to use this Manual

This manual has been developed to assist teachers to assess, conserve and improve biodiversity in school grounds. The manual assumes no prior knowledge of biodiversity or habitat but recognises that most teachers will need some assistance in identifying, acquiring and planting local species. The aim is to provide a simple ongoing assessment process that can be used by a range of people with varying ability and knowledge.

Who can use the manual
The manual can be used by teachers, parents, older students. It is designed to be a self guided process. There is no requirement for prior knowledge such as species identification and in many cases highlights information that is already known to the survey team such as who plays where and what areas of the school has lizards and birds.

The manual has been developed for Stages 2-5 and the content and outcomes are relevant to NSW syllabuses for most Key Learning Areas.

This manual particularly addresses the requirements of the Environmental Education Policy for Schools. The Policy requires schools to develop a School Environmental Management Plan (SEMP). The SEMP consists of three integral components, each subject to an audit. This manual assists with the following areas.

Curriculum
- KLAs with outcomes specific to the environment,
- KLAs that do not have an environmental focus but could have environmental education topics to support achievement of their outcomes
- Specific environmental events, days and programs

Please refer to Appendix 1 for details of the curriculum links of each lesson.

Management of Resources
- Water (stormwater)
- Waste (green waste and litter)

Management of School Grounds
- Biodiversity
- Soil
- Noise
- Litter
- Shade
- Human Traffic
- Visual amenity
- Stormwater
- Who uses the school grounds

Source: ‘Implementing the Environmental Policy in your School’, supporting document to the ‘Environmental Education Policy for Schools’

The manual guides students and teachers in using the biodiversity audit results to develop a biodiversity management plan as promoted in the Environmental Education Policy. A process is outlined in the manual to develop, implement and evaluate the biodiversity management plan. The school could endorse the plan as part of its SEMP or all of the SEMP for a year.

As stated in the Environmental Education Policy, “teachers can incorporate the audit, design and implementation of the management plan into the formal curriculum”. With this in mind the manual links the biodiversity audit and plan processes with practical curriculum-based activities.

How is it put together
Learning about Biodiversity, the first section of the manual introduces the main concepts and provides practical lessons on the concepts of biodiversity, habitat and impacts on biodiversity. The emphasis is on learning about the local plant and animal communities and how these concepts relate to their own school grounds

Investigating Biodiversity, the second section is a series of practical activities designed so that students can investigate the biodiversity of the school grounds. The activities collect basic information on physical features, school usage, biodiversity hot spots and impacts. The outcome is a series of maps that show the school’s landscaping features, significant biodiverse sites and trees and usage of the school grounds. This information provides the basis for making decisions on the kinds of activities that need to be done within the school grounds.

Conserving Biodiversity, the third section, aims to assist schools to develop a plan to increase and conserve biodiversity based on the information that they have already found and then to take action. A series of fact sheets are provided to solve problems that commonly occur within schools. Ideally a whole grounds plan could be constructed at this point

Section 1
Learning about biodiversity

‘there are more things in heaven and earth, Horatio, than are dreamt of in your philosophy’,
William Shakespeare’s Hamlet

LESSON 1 - WHAT IS BIODIVERSITY?

Teaching/Learning Activities Students will:

1. Read Fact Sheet 1a.
2. Find out:

- The meaning of biodiversity
- What is meant by genetic diversity and species diversity
- How many different living things are there in Australia
- How to measure species diversity

3. With teacher assistance, students conduct a brief survey of animal and plant life in the school grounds. They could do this by walking around the school grounds or focussing on a few particular areas. Record results. Compare results with the range of life depicted on Activity 1a.

4. Discuss reasons why different kinds of living things were found in the school grounds eg

5. Complete Activity sheet 1b using the poster "Habitat Diversity and Threatened Species in Australia". Draw on the map of Australia a threatened species or community and explain why it is special.

Extension activity
Students write a short description of one of the ecosystems in Activity 1b and the biodiversity that could be found there.

'biodiversity
it depends on you and me
Animals and plants both need
Us to plan our every deed

If you want the whole world to stay
Reduce recycle every day
There's room for everything and one
So saving nature can be fun'

By Michelle and Shelly- Evatt PS

Fact Sheet 1a

What is biodiversity?

Biodiversity or biological diversity refers to the variety of life. It comes from two words –bio meaning life and diversity meaning variety. Biodiversity refers to living things we can see- plants animals, insects, fungi, and also living things that we can't see such as bacteria and micro organisms. Biodiversity also includes the differences between each living thing and how living things work together. Australia has over 1 million living things that have been developing for over 50 million years. Australia's biodiversity is still developing today.

Biodiversity can be described in 3 ways.

Genetic diversity

Genes contain all the information that makes us what we are. They are passed from both parents to their children. Every living thing has its own special genes. Look at the differences between each person in your class or at the different kinds of dogs, Some different kinds of animals have similar genes (ie humans and apes) whilst others are quite different (humans and gum trees).
There are around 109 different 'genes' in the world's living things.

photos of different children or of a class of children

Species diversity

A species is a group of living things that can breed with each other to produce healthy offspring. One species cannot breed with members of other species. For example humans cannot breed with gum trees. There are between 5 and 100 million species on the earth.
In the school grounds you can measure species by

- counting how many different types of living things you can see (eg small lizards and a kookaburra),
- counting how many of each type (6 small lizards and 1 kookaburra),
- what each one is doing. (the kookaburra is trying to catch the lizard)

Ecosystem diversity

An ecosystem describes living things and where they live. For example a rainforest is an ecosystem that has living things-plants and animals as well as non living things such as water, rocks, soil and air. These all work together to make a rainforest ecosystem. In Australia we have many different kinds of ecosystems. See activity sheet 1b to look at the range of ecosystems.