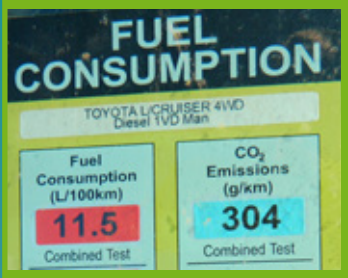
ALEP

16

Aboriginal Landcare Education Program

PARTICIPATE IN ENVIRONMENTALLY SUSTAINABLE WORK PRACTICES



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CONTENTS

PUBLICATION NOTES

BHP Billiton Iron Ore is proud to support Greening Australia to provide valuable conservation and land management training to communities throughout the Pilbara through the Indigenous Training Program.

This Learning Guide series has been developed as part of our partnership of the program.

Gavin Price, Head of Environment, BHP Billiton Iron Ore

Greening Australia is proud to produce and provide the comprehensive suite of new ALEP Learning Guides. The guides are compatible with the new horticulture and conservation industries training package and suited to developing skills in Indigenous communities within remote areas of the country where employment opportunities are limited. We would like to thank BHPBIO for their generous support in the development of the guides.

Brendan Foran, National CEO Greening Australia

The second series of ALEP Guides is aligned with a number of units of competence from the *Training Package AHC10 – Agriculture, Horticulture and Conservation and Land Management* (Release 8.0). The units selected are frequently used within Certificates I to III in Horticulture and Conservation and Land Management. As such they cover, where possible, the elements, performance criteria and required skills and knowledge of each unit.

The principal goal of these resources is to support the learning process; the learning activities may complement a trainer's assessment plan. The intent is that they will be used in an interactive manner with learners rather than as self-paced study guides. The structure and sequence have been designed to follow the logical steps of the practical tasks wherever possible. Concepts are introduced and then consolidated with discussion and/or practical activities.

The writers consider that these guides can provide a sound technical foundation but also strongly encourage trainers to complement the guides with additional, authentic resources from relevant industry texts and websites. The guides can be used in part or in their entirety but should always be linked to practical activities to strengthen the teaching and learning.

Genuine consideration was given to the level of language used in the guides. The goal has been to find a balance between simplifying the language to an accessible level and ensuring that the vocational concepts are addressed. The writers contend that with appropriate support these texts can provide an opportunity for students to strengthen their language, literacy and numeracy skills, which may be required for pathway progression.

A number of Aboriginal people have been involved in developing this ALEP Guide, which is considered suitable for use within a program based on Aboriginal pedagogies.

INTRODUCTION

Welcome to *Participate in environmentally sustainable work practices*. In this unit you will learn what sustainability means and how you can make your workplace a more efficient one.

This unit is not as practical as others in this series. You will be introduced to the basic science behind sustainability as well as the legislation. You will then look at your workplace procedures and plans to see what is already in place. The last part of the guide requires you and your work team to come up with ideas to make your workplace even more sustainable.

Sustainability is an important global issue. It requires people worldwide to become involved in implementing solutions.

ALEP
Aboriginal Landcare Education Program

EQUIPMENT REQUIRED

To complete this training you will need the following:

1. Access to federal and state legislation
2. Workplace policies, procedures and Environmental Management Plan
3. Workplace organisational chart
4. Access to internet (not essential but preferred)

LEARNING ACTIVITIES

There are four kinds of activities to complete. These activities may go toward your final assessment.

SECTION	ACTIVITY	SATISFACTORY (Y/N)	DATE
RESEARCH ACTIVITIES			
1	Personal ecological footprint		
1.2	The carbon cycle		
1.3	Waterwise landscaping and irrigation		
2.2	State-based legislation		
DISCUSSION ACTIVITIES			
1.1	Biodiversity		
2.1	National legislation		
3	Workplace policies, procedures and plans		
5.1	Environmental hazards		
5.2	Reporting breaches		
WORKBOOK ACTIVITIES			
4	Environmental hazards – resource usage		
5.2	Reporting breaches		
6	Ideas for your workplace		
6	Improve sustainable work practices		
PROJECT			
5.3	Record resource usage		
6	Improve sustainable work practices		

1 WHAT IS SUSTAINABILITY?

NOTE

Traditional Aboriginal culture is all about sustainability. All Aboriginal cultures recognise the connection between all parts of the environment. Cultural ways of caring for Country make sure the land is protected for future generations. Looking after biodiversity and water management is very important.

Sustainability is a broad concept. To understand it you need to remember that Earth and its atmosphere form a system, and everything in the system is interconnected.

When something is sustainable it means that it can keep going. So when we talk about living sustainably we are talking about living in a way that means people in the future will be able to meet their needs.

If our goal is sustainability then we must only take, use and produce what Earth can manage. If we don't, there will not be resources for the people of the future.

Resources are the things we use: land, timber, metal, water, food, fuel, etc. The way we get, use and dispose of these resources is making our lifestyle unsustainable in many different ways.

The term **ecological footprint** describes how much land and water it takes to support a lifestyle or workplace. In Australia, we are using more resources than Earth can produce and we are creating more rubbish than Earth can dispose of. Australia has one of the largest ecological footprints per capita in the world.

RESEARCH ACTIVITY

Calculate your personal ecological footprint using the website listed in the *Resources* section or another recommended by your trainer.

Discuss the results with your work team.
Were you surprised by the size of your footprint?

R1

See Ecological footprint calculator *Resource R1*, page 28

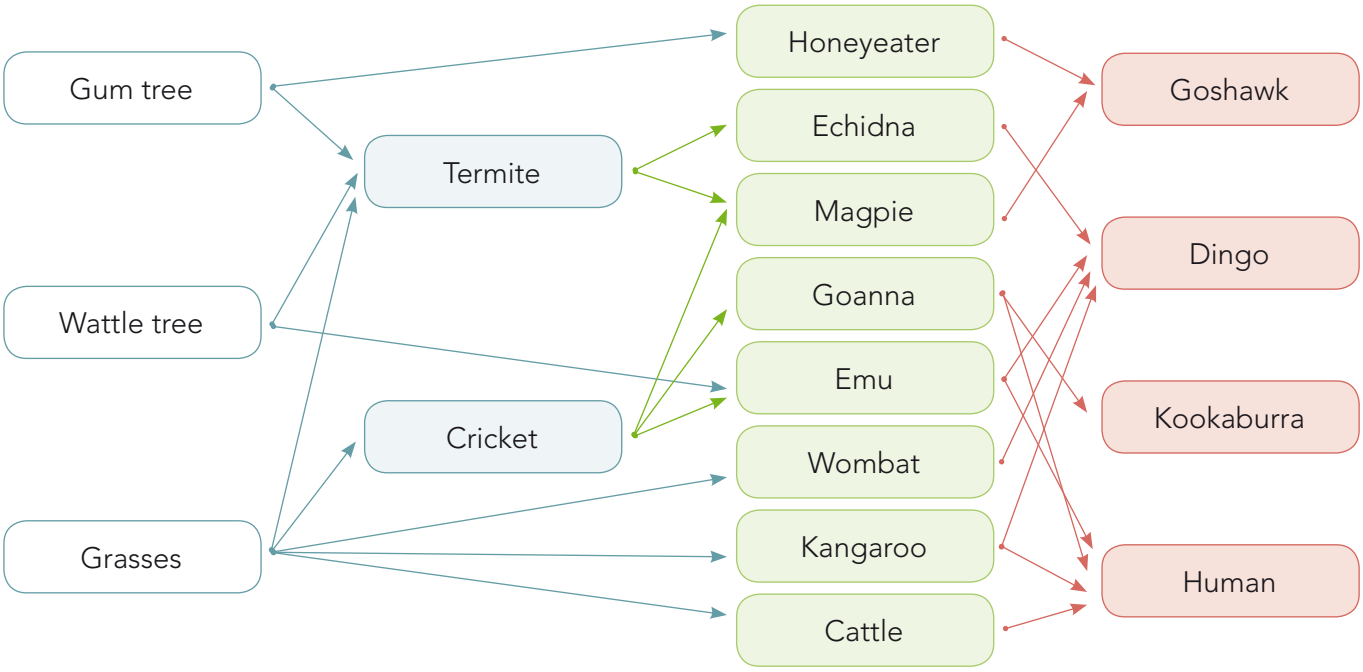
Sustainability is a global issue. Every country needs to think about its impact across the planet. The main areas to focus on are:

- Biodiversity
- Climate change
- Water shortage

1.1 BIODIVERSITY

The word biodiversity means many different kinds of life. Biodiversity is a good thing in an ecosystem because different plants, animals and micro-organisms do different jobs to keep the ecosystem going. This includes the roles they play in the carbon cycle (there will be more about this in the next section).

Biodiversity also supports a broad food web. This makes the ecosystem resilient, which means if one species has a poor year the remaining group of species will be able to survive.



Biodiversity is an important aspect of sustainability, and so we need to monitor activity that threatens it.

Conservation Land Managment (CLM) workers often participate in biodiversity survey work. This assists with monitoring impacts, such as development, on the biodiversity of a region. Survey data from a pristine area is very valuable as baseline data. This means we can compare it with survey data taken after development, and if there is any indication of a decline the data can be used to lobby for change.

Controlling invasive species such as weeds and animal pests also helps to maintain biodiversity.

There are other activities that we do in our roles in horticulture and CLM that could threaten biodiversity, so we need to be very careful of these. The use of pesticides is an example.

DISCUSSION ACTIVITY

Bees are a major pollinator of the plants that produce our food. If bees die out the plants will not be pollinated and will not produce our food. At the moment we use a lot of pesticide to keep other insects from destroying our crops. Many pesticides are very harmful to bees.

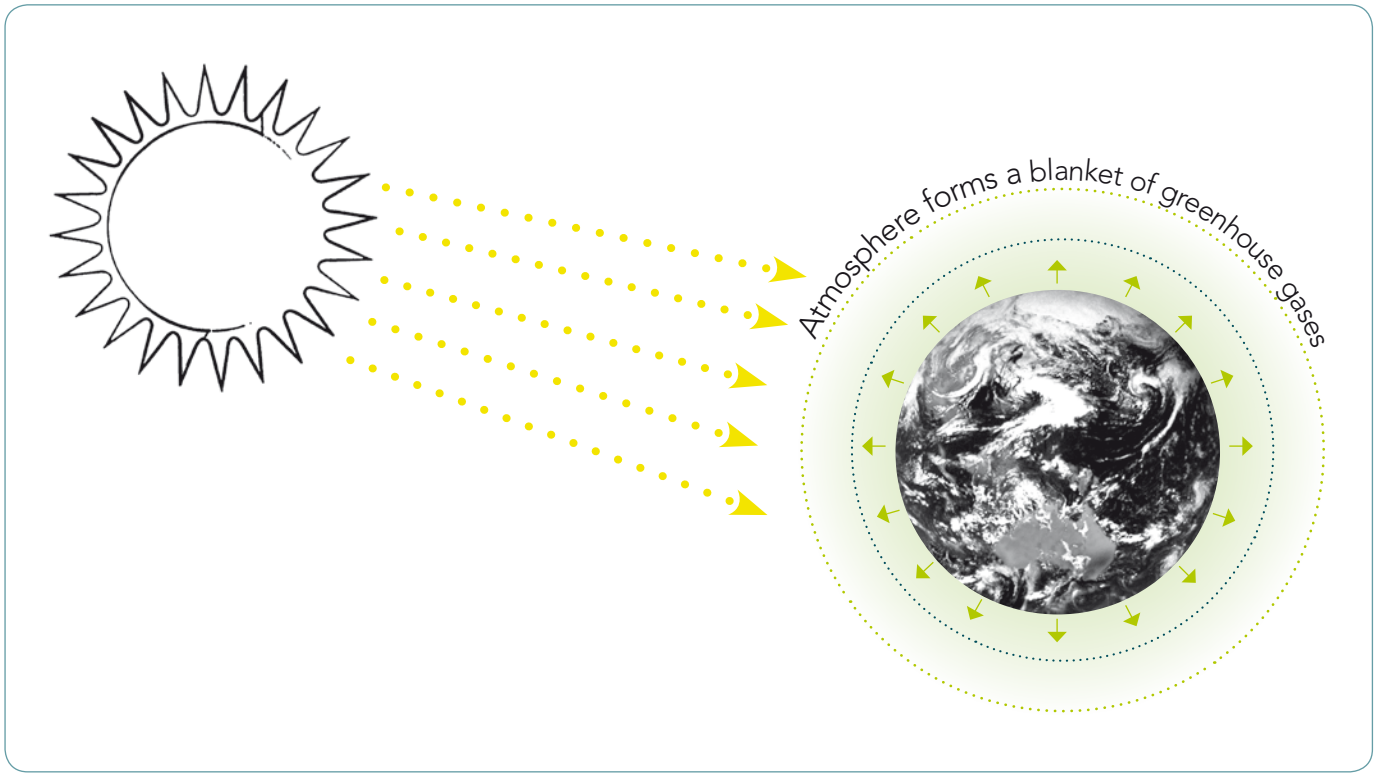
Discuss this problem with the group. How has it arisen, and what can we do about it?

1.2 CLIMATE CHANGE

Climate change is causing sea levels to rise and changing the weather we experience. This can mean a rise in average temperatures and an increase in the number of extreme weather events. The future predicted effects of climate change are:

- Crops and stock for food production are impacted
- Rainfall patterns are disturbed – more rain in some places and less in others
- Higher temperatures lead to a shortage of water due to evaporation
- Coastal areas become unliveable due to rising sea levels
- Some places become unliveable due to extreme weather events
- Reduction in biodiversity

Climate change is caused by an increase in greenhouse gases. These gases act like a blanket around our atmosphere. Since the 1970s they have increased too quickly, and now too much heat is kept in Earth's atmosphere.



NOTE

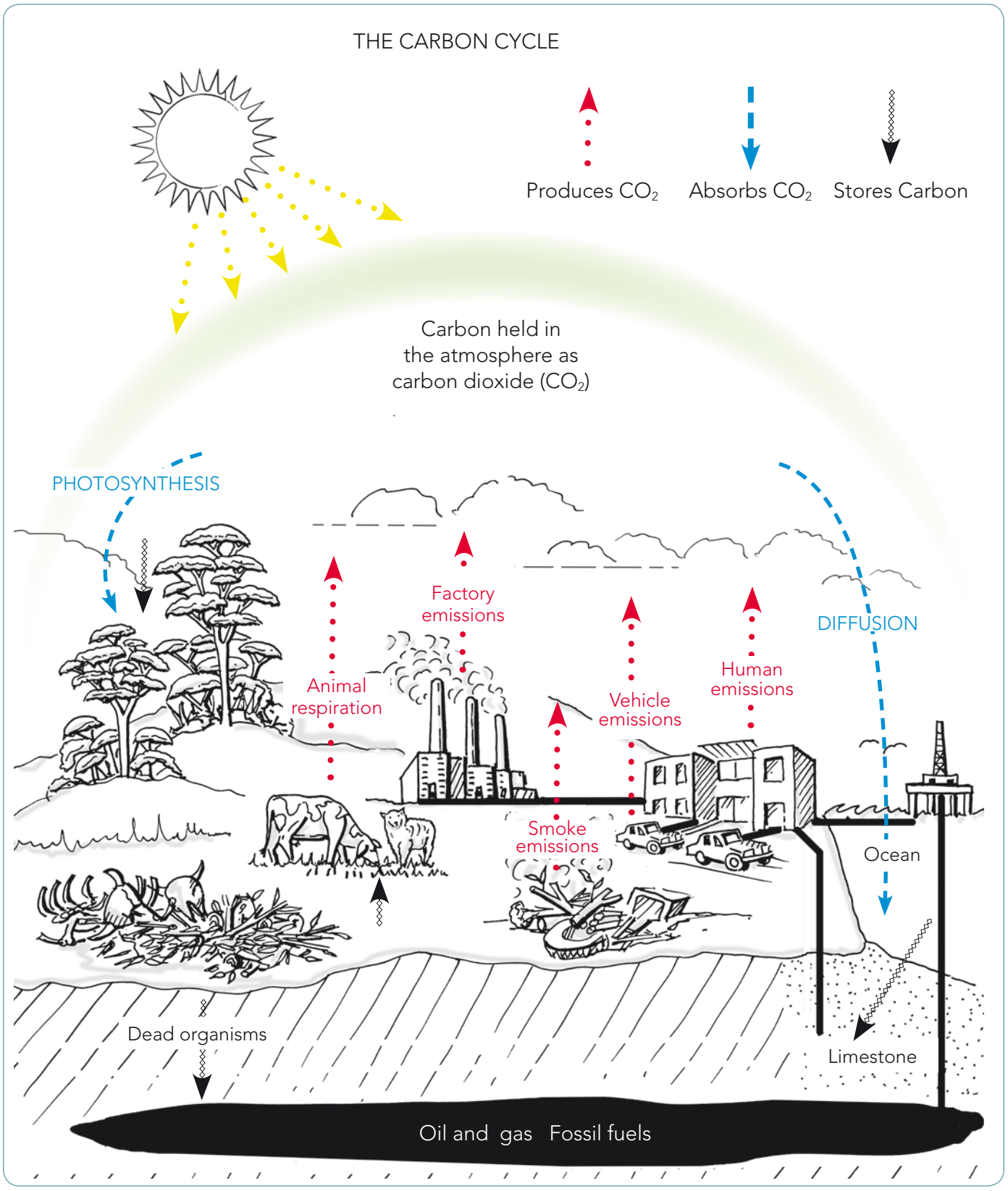
Burning in the right way can help maintain biodiversity so is okay. Too much burning or burning the wrong way leads to climate change.

The main reason for the increase in greenhouse gases is the increased release of carbon dioxide. This happens when anything that is living or was living:

- Burns
- Decomposes

Anything that was living contains carbon atoms. When it burns or decomposes it releases the stored carbon as carbon dioxide gas. This is called carbon emission.

The single largest source of carbon emissions is **burning fossil fuels.** We burn coal, petroleum/oil and natural gas for transport and electricity. These resources come from Earth. We call them fossil fuels because they are formed from prehistoric plants and animals. This process takes millions of years. When we burn fossil fuels to produce power in vehicles, generators or power stations they release carbon dioxide into the atmosphere.



The other main reason for climate change is **deforestation**. This is when forests, woodlands and wetlands are destroyed by:

- Clear-felling land to grow crops and graze stock for meat
- Felling trees for building timber and to make paper
- Wildfire
- Urban and industrial development

Deforestation produces carbon emissions in two ways:

1. Trees are often burnt in order to clear the land
2. The paper and wood products are burnt or decompose

More importantly, deforestation contributes to climate change because plants and soil can capture carbon dioxide from the atmosphere. This is called **carbon capture** or **carbon sequestration.** By destroying forests, woodlands and wetlands we have reduced the number of plants and areas of soil that can capture and hold carbon. Places that are good at capturing carbon are often referred to as **carbon sinks**.

Wetlands are very important carbon sinks, because much of the dead organic matter does not decompose. This means it doesn't produce carbon dioxide. Instead, the carbon is preserved in the organic matter that is covered by water.

So as we drive more cars and use more fossil-fuelled electricity there is more carbon in the atmosphere. As we burn and clear land for agricultural grazing and planting there are fewer plants to capture that carbon.

To slow down climate change we need to:

↓ Reduce the amount of fossil fuels we use

↓ Reduce other activities that produce carbon dioxide

AND

↑ Increase carbon capture

The CLM and horticulture industries have an important role to play in increasing the opportunity for carbon capture.

- Reforestation
- Wetland restoration and protection
- No-till farming techniques
- Production and use of biochar

RESEARCH ACTIVITY

R2

Watch one of the videos in the *Resources* section about the carbon cycle. Ask your trainer or supervisor any questions you have about how the modern world impacts sustainability.

Start thinking about ways you can reduce your use of fossil fuels.

See The carbon cycle – videos *Resource R2,* page 28

1.3 WATER SHORTAGE

A shortage of fresh water is a major concern. Fresh water is used for:

- Agriculture – meat, grains, fruit and vegetables
- Production of fuel and electricity
- Manufacturing
- Domestic purposes (in houses)

The shortage is because:

- The world's population is growing and needs more food
- There is an increased demand for electricity
- There is an increased demand for fuel for transport
- Climate change is altering rain patterns
- Water is polluted by industrial processes
- Ground water becomes saline through land clearing

You might not have a shortage where you live, but water shortages will affect the availability and cost of food, fuel, power and manufactured products into the future.

We all need to reduce our reliance on fossil fuels for electricity and transport. This will decrease water shortage and slow down climate change.

Changes to our agricultural practices must be made to reduce the amount of water used to produce crops and meat. Good land-management practices must be used to reduce salinity.

If you live in an area that has water shortage issues then you must find ways to be waterwise in the work that you do in horticulture or CLM.

RESEARCH ACTIVITY

R3

Look at the Water Corporation document listed in the *Resources* section. See if you can find some ways to improve water efficiency in the work that you do in landscaping and/or irrigation.

Use the internet to find out about no-till agricultural practices or biochar.

See Water-saving information *Resource R3,* page 28

2 SUSTAINABILITY LEGISLATION

NOTE

There are national and state laws to ensure we improve sustainability across Australia. It is considered very important by all of our governments.

2.1 NATIONAL LEGISLATION

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's main environmental legislation. It aims to protect and manage matters of national environmental significance (MNES). This means caring for flora, fauna, ecological communities and heritage places that are important in Australia and internationally.

This legislation is made up of:

- *Environment Protection and Biodiversity Conservation Act 1999*
- Environment Protection and Biodiversity Conservation Regulations 2000

The objectives of the EPBC Act are:

- Protect the environment
- Provide a national environmental assessment and approval process for proposed developments
- Enhance the protection and management of natural and cultural places
- Control international movement of plants and wildlife
- Promote ecologically sustainable development using natural resources
- Recognise the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity
- Promote the cooperative use of Indigenous peoples' knowledge of biodiversity

The nine MNES are:

- World heritage properties
- National heritage places
- Wetlands of international importance ('Ramsar' wetlands)
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development

DISCUSSION ACTIVITY

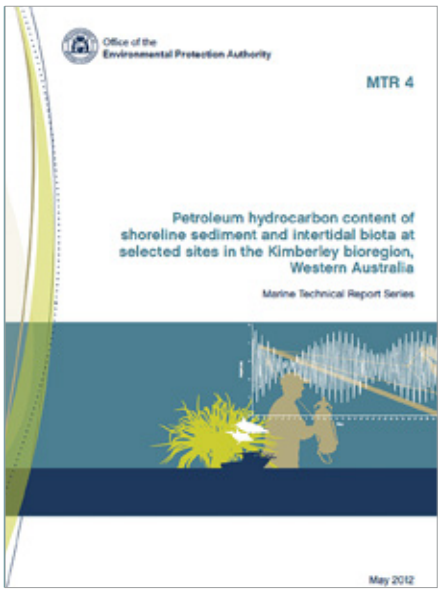
What are the links between the work you do and the objectives and MNES above?

2.2 STATE LEGISLATION

As well as being governed by the EPBC Act we are also governed by state legislation. This is enforced by the environment protection authority/agency in each state.

One of the key features of these Acts and Regulations is to provide a framework for assessing proposals for development projects. This is often called an environmental impact assessment. Some Acts and Regulations also have sections concerning:

- Water quality
- Air quality
- Waste management policy
- Sustainable economic development



STATE	LEGISLATION	WEBSITE
ACT	*Environment Protection Act 1997* Environment Protection Regulation 2005	www.environment.act.gov.au
NSW	*Environmental Planning and Assessment Act 1979*	www.epa.nsw.gov.au
NT	*Environment Protection Authority Act 2012*	www.ntepa.nt.gov.au
QLD	*Environmental Protection Act 1994* Environmental Protection Regulation 2008	www.ehp.qld.gov.au
SA	*Environment Protection Act 1993*	www.epa.sa.gov.au
TAS	*Environmental Management and Pollution Control Act 1994*	www.epa.tas.gov.au
VIC	*Environment Protection Act 1970*	www.epa.vic.gov.au
WA	*Environmental Protection Act 1986* Environmental Protection Regulations 1987	www.epa.wa.gov.au

There may be other legislation covering aspects of sustainability not covered in this text. Please seek advice from the appropriate government department in your state.

RESEARCH ACTIVITY

With the support of your trainer, go to the website for your state or territory and find out about the legislation that you work under.

What are the main topics that affect your job role?

3 WORKPLACE POLICIES & PROCEDURES

Your workplace will have policies and procedures to make sure you follow the law as you work.

Standard Operating Procedures (SOPs) and other forms and reports help your workplace show they are complying with the law. For example: procedures for applying chemicals will make sure that you do not damage waterways. You and/or your organisation can be fined if you do not comply with the legislation.

Your workplace might also have an Environmental Management Plan (EMP). This will show all the things your workplace is doing to work in a more sustainable way and will identify:

- Goals
- Responsibilities
- Actions and procedures that will help meet the goals
- Progress tracking procedure

Detailed EMPs must be submitted by organisations to the EPA when applying for approval to do development work.

Many workplaces are aiming for certification that recognises they have met specific environmental sustainability standards, for example, Green Tick™ and Good Environmental Choice Australia.

DISCUSSION ACTIVITY

Look through and discuss your workplace policies, procedures and EMP (if your workplace has one).

How do your workplace procedures and plans help you to follow the legislation in your state and improve environmental work practices?

4 RESOURCES YOU USE AT WORK

It is useful to think about the resources you use in your workplace that are hazardous to the environment. Then you can think about ways to minimise the risk of damage to the environment.

4.1 PESTICIDES

Pesticides can be hazardous to the environment because they can:

- Pollute waterways, killing plants and animals
- Kill plants and animals in sensitive areas
- Breed pests resistant to pesticides so they overpopulate an area
- Pollute landfill with empty containers

The above can:

- Reduce biodiversity
- Damage vegetation that acts as a carbon sink

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment as you use pesticides?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.2 WATER

Some environmental hazards associated with incorrect water use are:

- Using too much water for irrigation
- Leaking/dripping taps or toilets

The above can:

- Contribute to water shortages

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment as you use water?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.3 MACHINERY, EQUIPMENT & VEHICLES

The environmental hazards associated with using machinery, equipment and vehicles are:

- They can use excessive fossil fuel to manufacture and operate
- They can leak oil and fuel into waterways and soil and kill plants and animals
- They can spread pests by carrying weed seeds from place to place
- They can cause or add to erosion
- If items are not looked after and maintained they can break down really quickly. Manufacturing items uses raw resources such as metals and a lot of water and fossil fuels. The longer an item lasts, the better
- Buying cheap items that break down quickly wastes raw resources, fossil fuels and water, as new items need to be manufactured
- If broken items are just dumped, then this is wasting resources such as metal that could be recycled or reused

The above can:

- Contribute to climate change
- Contribute to water shortages
- Reduce biodiversity

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment as you use machinery, equipment and vehicles?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.4 ELECTRICITY

The environmental hazards associated with electricity are:

- Electricity is generally made by burning fossil fuels
- Excessive use of electricity wastes fossil fuels

The above can:

- Contribute to climate change
- Contribute to water shortages

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment when you use electricity?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.5 FIRE

Wildfire and poor fire management practices can:

- Produce excessive carbon dioxide
- Reduce the number of forests, wetlands and woodlands

The above can:

- Reduce biodiversity
- Contribute to climate change

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment when working with fire?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.6 PAPER

The environmental hazards associated with using paper are:

- Paper is made from trees
- Timber from clear-felled areas is used
- Land is cleared for plantations
- A large amount of water is used to manufacture it

The above can:

- Contribute to climate change
- Contribute to water shortages
- Reduce biodiversity

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment as you use paper?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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4.7 RAW MATERIALS

The environmental hazards associated with using raw materials for landscaping are:

- Areas are degraded by harvesting soil, rocks, river pebbles, timber, etc.
- Animal habitat can be destroyed or lost
- Erosion and sedimentation can occur

The above can:

- Contribute to climate change
- Reduce biodiversity

WORKBOOK ACTIVITY

What do your workplace procedures tell you to do to minimise the risk of damage to the environment as you choose nursery and landscaping materials?

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Do you have other ideas for increasing resource efficiency and minimising environmental risk?

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5 REPORTING

As part of your role in horticulture or CLM, there are some things that you need to report.

5.1 ENVIRONMENTAL HAZARDS

It is important for you to report any environmental hazards to your supervisor if they are not addressed in your workplace procedures.

For example, you might realise your workplace procedure for applying pesticide does not cover how to rinse and dispose of empty containers. This is very important, because the law requires this to be done appropriately.

Check with your supervisor or trainer as to the best way to report the problem. This could be by doing one or more of the following:

- Chat with your work colleagues to find a solution
- Talk with your supervisor to suggest solutions
- Send an email with your concerns to your supervisor
- Attend a safety and environment meeting to discuss the problem

DISCUSSION ACTIVITY

What is the best way to report environmental hazards in your workplace?

5.2 BREACHES

A breach is when someone does not follow a procedure or the law.

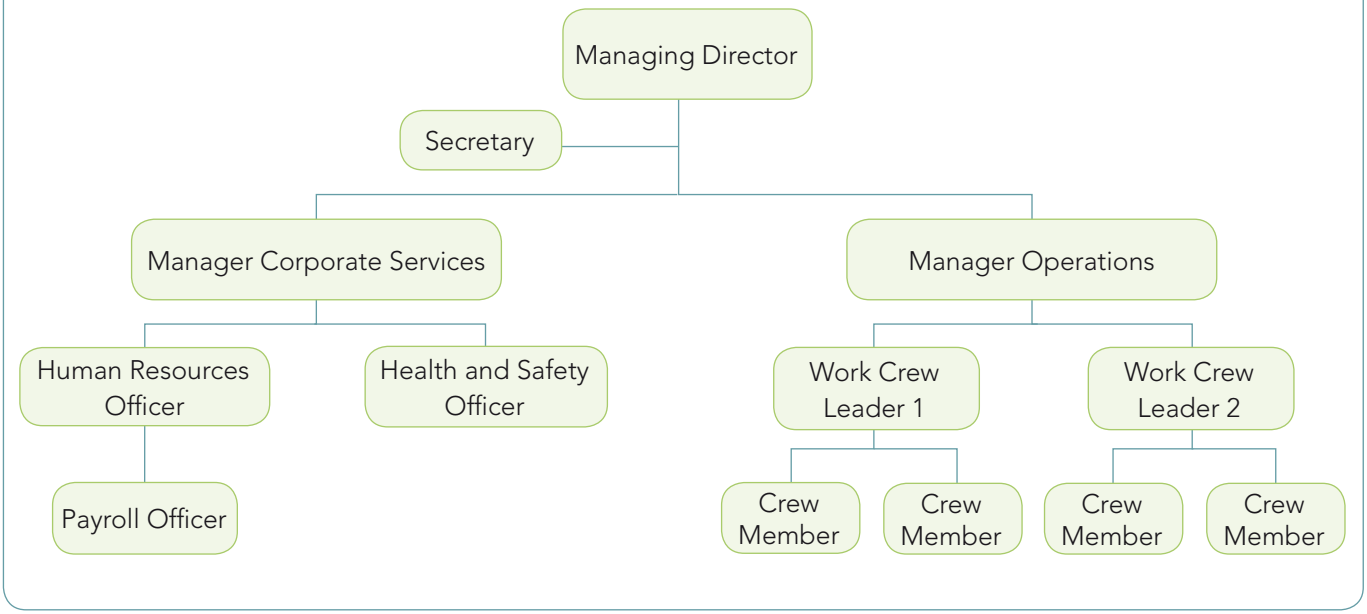
For example, someone washes out a pesticide container over a sink and the procedure says this should never be done.

Part of your role in ensuring an environmentally sustainable workplace is reporting breaches when you see or hear of them. This might mean reporting breaches to your supervisor. If your supervisor is the one breaching the procedures or law then you will need to report it to someone else.

This might be a really difficult thing to do. It is important to know who the appropriate person to talk to is. This will depend on your organisational structure.

ORGANISATIONAL STRUCTURE

Organisational structure describes the working relationship between the positions in the workplace. The easiest way to understand the structure of your organisation is by using an organisational chart. This is a made-up chart.



DISCUSSION ACTIVITY

Examine the organisational chart above.

If you are a Crew Member and you need to report a breach made by your Work Crew Leader, who can you talk to?

IMPORTANT

Remember the aim is not to get someone into trouble, it is to fix the problem and stop any other breaches.

You might feel very worried about reporting a breach if you think that it will make trouble for you or someone else. It is important to understand your roles and responsibilities in relation to this.

You are employed to do a particular job. According to Australian laws, part of that job is to look after the environment. If your workplace is in breach of these laws you have a responsibility to try to do something about it.

WORKBOOK ACTIVITY

Find a copy of your workplace's organisational chart or draw it below.

Who can you talk to, apart from your supervisor, if you know about a breach of environmental procedures or legislation at your workplace?

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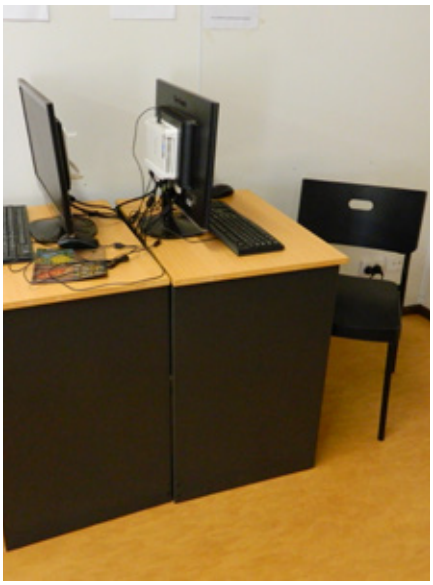
5.3 RECORDING RESOURCE USAGE



You can help your workplace monitor the use of resources by recording their usage.

The kinds of records you might keep are:

- Vehicle logs showing distance travelled and fuel usage
- A vehicle history for your workplace showing vehicles purchased, distance driven and years of use
- Machinery or equipment logs showing hours operated and/or supplies and parts used
- The amount of resources such as fuel and/or tyres you have purchased
- The amount of electricity your workplace uses over a period of time

PROJECT

Work with your trainer or supervisor to identify a set of records that you can keep or gather.

You need to maintain these records and store them in an appropriate place. Use the method of storing your records that suits your workplace. This might be on a computer or using a paper filing system.

After you have compiled the records look through them with your work team, trainer and supervisor. Try to think of ways to make improvements to your work practices. You can use these ideas in the next section.

6 IMPROVE WORKPLACE SUSTAINABILITY

In this section you and your work team will identify ways to make your work practices more sustainable.

It might help to remember the three main goals to achieve a more sustainable workplace:

- Support biodiversity
- Slow down climate change
  - Reduce use of fossil fuels
  - Increase carbon capture
- Reduce water usage

You might have already come up with some ideas in *Section 4*. Some more suggestions are given below.

Remember that the benefit from your actions might not be felt directly where you live or work. Improving sustainability aims to benefit the planet more broadly.

WORKBOOK ACTIVITY

Tick the ideas that you can discuss for your workplace.

The codes used in the goals column are:

- B – Support biodiversity
- FF – Reduce fossil fuels
- CC – Increase carbon capture
- W – Reduce water usage

IDEAS FOR MORE SUSTAINABLE WORK PRACTICES	GOALS SUPPORTED	☑
Waste management		
Start a rubbish management program in your workplace, including regular rubbish collections in the areas you work in	B	
Find out about recycling of regular rubbish such as paper, glass, metal, etc.	B, FF, CC, W	
Find out about recycling of technology such as old computers, phones, etc.	B, FF, CC, W	
Find out about recycling of industrial waste such as used oils, pesticide containers, etc.	B, FF, CC, W	
Find out about selling retired vehicles for scrap metal and parts	B, FF, CC, W	
Transport		
Use web conferencing to do training, rather than always having a trainer travel out	FF, W	
Camp out on site when working remotely rather than returning to base each day	FF	

IDEAS FOR MORE SUSTAINABLE WORK PRACTICES	GOALS SUPPORTED	☑
Pesticide use		
Implement an Integrated Pest Management program for your workplace	B	
Machinery and equipment		
Buy equipment and supplies from local businesses	FF	
Start a regular maintenance program for vehicles, machinery and equipment – this will ensure things last longer and run efficiently	FF, W	
Electricity		
Install a solar- or wind-powered energy system	B, FF, W	
Replace incandescent light globes with compact fluorescent or LED globes	FF, W	
Turn off lights, electrical equipment and air-conditioners when you're not using them	FF, W	
Close the doors and windows when air-conditioners are on	FF, W	
Set air-conditioners to a milder temperature and don't use them unless necessary	FF, W	
In the garden		
Install water efficient irrigation systems	W	
Start a regular maintenance program for irrigation systems and taps to ensure no water is wasted	W	
Plant more trees around your area – particularly endemic species	B, CC	
Grow and use edible plants	B, FF, CC, W	
Purchase materials from suppliers dealing in sustainably sourced resources	B, CC	
In the office		
Start a regular maintenance program for your base or office e.g. checking for leaking taps or toilets	W	
Buy only recycled paper	W, FF, CC, B	
Buy energy-efficient appliances	W, FF, B	

WORKBOOK ACTIVITY

Write other suggestions for ways to make your work practices more sustainable here.

Maintain your infrastructure and equipment so they will last longer and improve workplace sustainability.

PROJECT

When you have thought through the ideas you have, discuss these with your team.

As a group, narrow down the ideas to what you think you can really achieve.

Discuss with your trainer and supervisor ways that you can implement these ideas to make a more sustainable workplace.

RESOURCES

R1 ECOLOGICAL FOOTPRINT CALCULATOR

Footprint calculator – test your ecological footprint

http://www.wwf.org.au/our_work/people_and_the_environment/human_footprint/footprint_calculator/

Time to complete: 10–30 minutes

Summary: Using simple language and clear illustrations, the application prompts the user for basic information about their domestic resource usage. It calculates their ecological footprint in hectares and then compares this with the amount of land available globally, thereby demonstrating the unsustainable nature of an average urban Australian's current lifestyle.

R2 THE CARBON CYCLE – VIDEOS

What's the deal with carbon?

Produced by Bell Museum of Natural History

http://youtu.be/2Jp1D1dzxj8

Duration: About 3 minutes

Summary: Good clear presentation

The carbon cycle

Produced by USA EPA

http://youtu.be/vrDekmRbBVk

Duration: About 4:30 minutes

Summary: The narration and images are really good; however, there is a bathtub analogy that might be confusing for some students. You could skip this from 2:48 to 3:48.

Carbon cycle and global warming

Produced by Wydea LLC

http://www.wydea.com/topic/carbon

Duration: About 8 minutes

Summary: Very basic illustrations and a good clip if you want a little more detail. The script is available on the website.

R3 WATER-SAVING INFORMATION

A guide to water efficient landscape & irrigation for non residential facilities

http://joshbyrne.com.au/wp-content/uploads/2013/12/PM-8731100-v1-WC_Water_Efficient_Landscape_and_Irrigation_Guide_WEB.pdf

COMPOST vs. LANDFILL

We have included this here because it didn't logically fit into the structure of the learner guide but could be of interest, particularly in the horticulture industry.

In a well-managed compost system, the organic matter rots down aerobically – it uses oxygen. To make this happen, the compost needs to be a mix of green leafy (nitrogenous) and dead brown (carboniferous) material that is turned often to let in the oxygen. This process gives off carbon dioxide (CO_2).

In a landfill, the organic matter is buried and rots down anaerobically; that is, it does not use oxygen. This process gives off methane gas (CH_4).

Methane gas and carbon dioxide are both greenhouse gases, so both stop heat from leaving Earth's atmosphere. But methane gas is much better at trapping the sun's radiation than carbon dioxide, so it adds more to global warming.

If you can compost organic waste it is less damaging to Earth's atmosphere than if you send it to the tip.

Of course there are many other good reasons to make compost. It feeds the soil, helps it to hold water and improves its texture. If you use compost you won't need to use as much artificial fertiliser, so there won't be as many harmful chemicals running off into waterways and ground water. This means compost is also a good way to save water and to keep the environment healthy for a wide range of living creatures.

GLOSSARY

Diffusion	Diffusion is when two substances mix in together. Carbon dioxide diffuses into sea water.
Emission	Emissions are generally gases that are discharged or given off by something; for example, exhaust is an emission from a car engine.
Endemic	An endemic species is found naturally in a particular area; it has not been introduced.
Evaporation	Evaporation happens when a liquid is heated and becomes a gas. Water evaporates from a puddle on a hot day.
Infrastructure	Infrastructure refers to physical structures and facilities such as buildings, sheds, roads, airstrips, power supplies, water treatment facilities, etc.
Photosynthesis	Photosynthesis is a process used by green plants. They use light energy from the sun to absorb carbon dioxide and water and convert it into sugars and release oxygen.
Pristine	When something is pristine it is in its original, unspoilt condition.
Resilient	If something is resilient then it is able to avoid damage from hardship or distress or recover quickly.
Saline	When something is saline it contains salt. Salinity refers to how much salt is in the soil or water.
Add your own words and meanings here	

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Published and distributed by
Greening Australia
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Shenton Park
Western Australia 6008
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Publication copyright © 2015 Greening Australia
ISBN: 978-0-9942059-1-9

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Artwork photography: TASWA Training Consultants and Greening Australia, unless otherwise stated
Editing: Madelaine Dickie
Proof: Ruth Davies (centrEditing)
Graphic design: Square Peg Design

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ISBN 978-0-9942059-1-9 (2015)

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