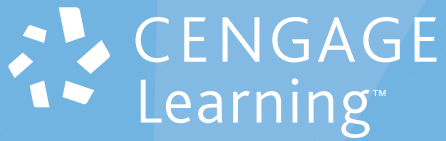




NELSON
OUTDOOR &
ENVIRONMENTAL
STUDIES
VCE UNITS 1-4

MARCIA CROSS / PHILIP HUGHES / ANDREW MANNION / LEIGH PARK

4TH EDITION



COPYRIGHT NOTICE

Copyright in this work is owned by Cengage Learning Australia (“the work”). A condition of purchase of this electronic version of the work is that you agree to respect the copyright in the work, abide by the Copyright Act 1968 and specifically agree not to transfer, sell, assign, misuse, copy or transmit an electronic or other version of the work to any third party.

Please note: This product is accompanied by a licence (single user, network or adoption) governing the terms and conditions of its use.

This is a legal agreement between the you, (the “Customer”) and Cengage Learning Australia Pty Limited (ABN 14 058 280 149) (the “Licensor”) which provides the terms and conditions of this non-exclusive licence and the limited warranty for the Product. Use of the Product indicates an acknowledgement that the Customer has read and agreed to be bound by the terms and conditions of this Agreement. If you do not agree to these terms and conditions, return the Product to the place of purchase within 15 days of the date of purchase (with proof of purchase) for a full refund

1. Licence Grant

You do not receive title to the Product. Copyright in the Product (which includes all images, photographs, video, animations, audio, music and text incorporated in the Product, including all of the accompanying printed material) is owned by the Licensor and/or its suppliers and is protected by Australian copyright laws. The Licensor grants you a non-exclusive licence to use the Product subject to the restrictions and terms set out in this Agreement.

2. A Licence allows you to:

Use the Product on your computer. The Customer represents that they shall in no way place the Product in the public domain or in any way compromise our copyright in the Material. You agree to take reasonable steps to protect our copyright.

3. You may not:

Alter, modify, translate, reverse engineer, decompile, or adapt the software or create derivative works based on the Product. Make further copies by any means technological, electronic, digital whatsoever without the written permission of the Licensor. Rent or transfer all or any part of your rights under this Agreement. Remove or alter any copyright or other proprietary notice or label attached to the software.

4. Termination

Any failure to comply with the terms and conditions of this agreement will result in the automatic termination of this licence. Upon termination of this licence for any reason, the Customer must destroy or return to the Licensor all copies of the software and accompanying documentation.

5. Warranties

To the extent permitted by law, the Licensor’s liability for any breach of the warranty or any term implied by law into this licence is limited to the lowest cost of replacing the goods, acquiring equivalent goods or having the goods repaired.



NELSON
OUTDOOR &
ENVIRONMENTAL
STUDIES
VCE UNITS 1-4

MARCIA CROSS / PHILIP HUGHES / ANDREW MANNION / LEIGH PARK

4TH EDITION

Nelson Outdoor and Environmental Studies

4th Edition

Marcia Cross

Philip Hughes

Andrew Mannion

Leigh Park

Publishing editor: Deborah Barnes

Project editor: Mandy Herbet

Production controller: Karen Young

Editors: Monica Schaak, Bree DeRoche

Proofreader: Karen Tait

Indexer: Russell Brooks

Permissions researcher: Janet McKeown

Project designer: Aisling Gallagher

Cover design: Chris Starr

Text design: Jennai Lee Fai

Typeset by: MPS Limited

Any URLs contained in this publication were checked for currency during the production process. Note, however, that the publisher cannot vouch for the ongoing currency of URLs.

© 2017 Cengage Learning Australia Pty Limited

Copyright Notice

This Work is copyright. No part of this Work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without prior written permission of the Publisher. Except as permitted under the *Copyright Act 1968*, for example any fair dealing for the purposes of private study, research, criticism or review, subject to certain limitations. These limitations include: Restricting the copying to a maximum of one chapter or 10% of this book, whichever is greater; providing an appropriate notice and warning with the copies of the Work disseminated; taking all reasonable steps to limit access to these copies to people authorised to receive these copies; ensuring you hold the appropriate Licences issued by the Copyright Agency Limited ("CAL"), supply a remuneration notice to CAL and pay any required fees. For details of CAL licences and remuneration notices please contact CAL at Level 15, 233 Castlereagh Street, Sydney NSW 2000, Tel: (02) 9394 7600, Fax: (02) 9394 7601
Email: info@copyright.com.au
Website: www.copyright.com.au

For product information and technology assistance,
in Australia call **1300 790 853**;
in New Zealand call **0800 449 725**

For permission to use material from this text or product, please email
aust.permissions@cengage.com

National Library of Australia Cataloguing-in-Publication Data

Cross, Marcia, author.

Nelson outdoor and environmental studies / Authors: Marcia Cross, Philip Hughes, Andrew Mannion and Leigh Park.

4th edition.
9780170401777 (paperback)
Includes index.
For secondary school age.

Outdoor life--Textbooks.
Conservation of natural resources--Textbooks.
Human ecology--Textbooks.

Hughes, Philip G. (Philip Graham), 1950- author.
Mannion, Andrew, author.
Park, Leigh, author.

Cengage Learning Australia
Level 7, 80 Dorcas Street
South Melbourne, Victoria Australia 3205

Cengage Learning New Zealand
Unit 4B Rosedale Office Park
331 Rosedale Road, Albany, North Shore 0632, NZ

For learning solutions, visit cengage.com.au

Printed in by China Translation & Printing Services.
1 2 3 4 5 6 7 21 20 19 18 17





CONTENTS

ABOUT THIS BOOK	V
ABOUT THE AUTHORS	VIII

UNIT

1

EXPLORING OUTDOOR EXPERIENCES

1 Motivations for outdoor experiences	2
Uses and meanings of common terms	3
Types of outdoor environments	16
Motivations for seeking outdoor experiences	19
Personal responses to outdoor environments	22
Knowing, experiencing and responding to outdoor environments	27
Knowing outdoor environments	31
Safe participation in outdoor experiences	34
2 Influences on outdoor experiences	39
The influence of media portrayals on personal responses to outdoor environments	40
Codes of conduct	42
Planning interactions with outdoor environments	47
Factors that affect our outdoor experiences	55
Technologies used in outdoor environments	61
Risk in outdoor experiences	64

UNIT

2

DISCOVERING OUTDOOR ENVIRONMENTS

3 Investigating outdoor environments	68
Characteristics of different outdoor environments	69
Recreational users' understandings of specific outdoor environments	82
Scientific understandings of outdoor environments	85
Land managers' understandings of specific outdoor environments	101
Artistic, Indigenous Australian and historical understandings of specific outdoor environments	109
4 Impacts on outdoor environments	113
Human activities and their impacts	114
Conservation activities	114
Commercial activities	117
Recreational activities	122

Community-based environmental action	125
Impacts of technology on outdoor environments	128
Impacts of urbanisation	134

UNIT 3

RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

5 Historical relationships with outdoor environments	140
Relationships with outdoor environments	141
Australia before humans	144
Indigenous relationships with the environment	151
Non-indigenous relationships with the environment	163
Environmental movements in Australia	176
Political movements from environmental awareness	184
6 Relationships with Australian environments since 1990	188
Societal relationships with outdoor environments	189
Factors influencing relationships with outdoor environments	199
Social and political debates about environmental issues	223
Environmental politics in Australia	241

UNIT 4

SUSTAINABLE OUTDOOR RELATIONSHIPS

7 Healthy outdoor environments	250
Sustainability and sustainable development	251
Observable characteristics of healthy outdoor environments	263
The state of outdoor environments in Australia today	272
The importance of healthy outdoor environments	276
Potential impacts of environmental threats	282
8 Sustainable outdoor environments	290
Conflicts of interest over the uses of outdoor environments	291
Methods used to influence decisions about outdoor environment use	302
Processes followed in conflicts over outdoor environments	305
Management strategies for healthy and sustainable outdoor environments	325
Acts or conventions related to the management and sustainability of outdoor environments	331
Actions to sustain healthy outdoor environments	337

GLOSSARY	347
INDEX	353



ABOUT THIS BOOK

This is a new edition of the textbook, with all new material and exactly matching the new VCE Study Design 2018–2022. We hope you will like it, and find it useful.

KEY KNOWLEDGE AND KEY SKILLS

These are reproduced exactly from the *2018–2022 VCE Outdoor and Environmental Studies Study Design* and can be found on the chapter opening page. We have included page numbers for the major headings of key knowledge.

It is important you read these as you start each chapter, so you are aware of what is essential to know. (The teacher website also has a document introducing each area of study.)

CASE STUDIES

Case studies and articles give real-life scenarios to tie down a theory. They include text from other sources.



CASE STUDY: LOVE BELLS BEACH

Declared the world's first 'Surfing Recreation Reserve' in 1973, Bells Beach is recognised worldwide as a sacred surfing sanctuary. The pilgrimage to Bells is as legendary as the corduroy lines and big sweeping walls that grace the famous Bells Bowl during big autumn and winter swells.

Unfortunately, Bells Beach is under serious threat from negative commercial impacts and development. Though Bells Reserve is public land, commercial coach/bus/mini bus tours are being allowed to freely use Bells Reserve and the Surf Coast Shire has now begun works to create parking spaces for 5 coach/long vehicles and around 10 parking spaces for 22-seater buses in Bells car park alone. Vegetation has been removed to allow commercial tour vehicle movement within the car park and there is great concern that the already identified pedestrian and vehicle traffic risks will increase.

Additional works outlined in Surf Coast Shire's Bells Beach Surfing Reserve Coastal Management Plan and Master plan (September 2010) include a designated parking area for 4–6 coaches in Winki car park, no parking areas to ensure coaches can enter/exit the car park, construction of a second toilet/change facility in Winki car park, concrete viewing platforms and photo/interpretation billboards. The loss of car parking space for recreational surfers and other non-commercial visitors to Bells will be significant.

The Surf Coast Shire are proceeding with works despite clear and Shire-acknowledged local community opposition. If the works are not stopped now the pristine natural environment and sacred surfing resonance of Bells will be destroyed forever.

EXTRACTS

We have included some recent extracts, with others referred to in our Learning Activities.

A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the Earth and its community of life are un-trammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which:

- 1 Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- 2 Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- 3 Has at least two thousand hectares (five thousand acres) of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and,
- 4 May also contain ecological, geological or other features of scientific, educational, scenic or historical value.

The US Wilderness Act of 1964, written by Howard Zahniser of The Wilderness Society [US]

Alamy Stock Photo/Radius Images



PHOTOS AND ILLUSTRATIONS

There are more than 300 colour photos and illustrations. Most of the photos are of local areas, which many of you will recognise. Many photos were supplied by our authors from their field trips and we are very grateful for their generosity in sharing them. Without these photos, the book would not be so ‘grounded’.

LEARNING ACTIVITIES

These activities develop the key skills required for each area of study. They are quite varied, and many of them require further reading or watching a video clip. A few scaffolds are included to help you organise the information for later study.



Scaffold

LEARNING ACTIVITY



ANALYSING AND SYNTHESISING GMO DEBATES

Find out about some of the debates concerning the development and use of GMOs. What people or groups are involved in the debates? What are some of the arguments used by people and groups who are for or against the ongoing development of GMOs?

By combining and synthesising some of the arguments, develop your own arguments:

- in support of using GMOs
- against the use of GMOs.

NOTES FOR THE EXAM

In chapters 5–8 (Units 3 and 4) these notes appear at the end of a section to reinforce your awareness of the key knowledge requirements or key skills that you will need to know for the end-of-year exam.

NOTES FOR THE EXAM



For the exam, you should:

- know some examples of adaptations of plant or animal species that suit Australian conditions
- be able to connect at least one of the three conditions (biological isolation, geological stability and climatic variation) to an environment you have visited.

WEB ICONS



Because URLs frequently change, we have not included them in the textbook itself. All links to websites and videos are available on a free-access webpage, accessible via <http://oes.nelsonnet.com.au>.

This means that as we discover broken links we can replace them, so you can be sure that each time you click there will be a relevant and useful link, if not the original one. It also means that we can include updated material more easily. However, please notify us immediately if any link does not work for you and we will work to quickly replace it.

MARGIN DEFINITIONS AND GLOSSARY

These definitions, plus some other general definitions, are repeated in the Glossary section on pages 347–352. If you use the digital NelsonNetBook, there is a button at the top of every page that brings up the whole Glossary, alphabetically.

ecosystem

A community of interdependent species and their environment



FAST FACT

It's estimated that around 46% of the world's land mass is wilderness, but only about 20% of this is actually protected as designated wilderness areas.

FAST FACTS

Fast facts are non-examinable text, which are included just for interest.

YOUR STUDENT WEBSITE

Everything on your student website can be reached via <http://www.nelsonnet.com.au>, using your login code.

Chapter 3 has a non-examinable but interesting worksheet on fires. The first three chapters each have a table (scaffold) for you to fill in online, if you prefer. These are marked beside the learning activity, with a scaffold icon.

Chapter summary revision cards for chapters 5–8 are downloadable PDFs. These can be emailed to your smartphone for easy revision before your exams.

FEEDBACK

We would love you to contact us if you have any comments, suggestions or find any errors. It is important to us that this book is as useful as possible. Just email us at aust.secondary@cengage.com.

We hope you enjoy using and learning with this book.





ABOUT THE AUTHORS

Marcia Cross has taught VCE Outdoor and Environmental Studies for the majority of her teaching career and has both designed and implemented Outdoor Education programs for Years 7–10. She has worked with Outdoor Education students at tertiary level and delivered professional development to teachers and other educators within the field of Outdoor Education. Marcia instigated and continues to coordinate the Outdoor and Environmental Studies Network, where resources are shared among members. She has been involved in various roles within VCAA, including Study Design review and development panels, multiple levels of exam assessment and exam development processes.

Philip Hughes is Campus Manager of Wonthaggi Secondary College, McBride Campus. He has taught VCE Outdoor and Environmental Studies (and Outdoor Education) for 20 years and has developed and implemented junior Outdoor Education programs at P–10 levels. Phil has delivered planning and implementation of professional development sessions to teachers of VCE Outdoor and Environmental Studies and has been a member of VCAA Study Design review and development panels. Although aquatic environments are his personal favourite, he believes anywhere in the outdoors is a superior learning environment than a classroom. Phil lives across the road from Inverloch Main Beach, is married to Penny and has three children – Ella, Holly and Oscar – who all enjoy the outdoors ... probably more than he does.

Andrew Mannion worked as a Maths and Science teacher for ... a long time. An early midlife crisis 15 years ago, and a passion for the outdoors, saw him learn to surf and snowboard and begin teaching Outdoor and Environmental Studies. He now juggles his professional time between outdoor trips, Maths, Science and figuring out how to write these books from a surfboard.

Leigh Park has taught Outdoor and Environmental Studies for the past 15 years and designed and implemented Outdoor Education programs across both junior and senior schools for the past 25 years. He has presented at numerous state, national and international conferences and has run examination preparation sessions for teachers and students. Leigh has been an Outdoor and Environmental Studies state reviewer and a VCAA assessor since 2004. He is particularly interested in making Outdoor and Environmental Studies an engaging and interactive subject for students and teachers. Leigh enjoys sea kayaking and bushwalking, especially trips down to Queenscliff with his family: Joanna, Jazmin and Brooke.



UNIT

1

EXPLORING OUTDOOR EXPERIENCES

- **Area of Study 1**
Motivations for outdoor experiences
Chapter 1 (page 02)
- **Area of Study 2**
Influences on outdoor experiences
Chapter 2 (page 39)



CHAPTER

1

MOTIVATIONS FOR OUTDOOR EXPERIENCES

KEY KNOWLEDGE

- the use and meanings of terms including nature, outdoor environments, wilderness, managed parks, urban environments and built environments (page 3)
- types of outdoor environments: wilderness, managed parks, urban environments and built environments (page 16)
- the range of motivations for seeking outdoor experiences (page 19)
- the range of differing personal responses to outdoor environments, such as fear, appreciation, awe and contemplation (page 22)
- a variety of ways in which people know, experience and respond to outdoor environments:
 - as a resource, for recreation and adventure, spiritual connection and as a study site (page 27)
 - through experiential knowledge, environmental history and ecological, social and economic perspectives (page 31)
- the requirements for safe participation in outdoor experiences, such as basic first aid or the conditions necessary for the safe conduct of specific activities (page 34)

KEY SKILLS

- plan for and reflect upon a range of practical outdoor experiences and analyse relevant information collected during these experiences
- define and describe a range of relevant terms
- analyse motivations for seeking outdoor experiences
- analyse ways in which outdoor environments can be known, experienced and responded to, by reflecting on both personal experiences and the experiences of other people
- use appropriate practical skills for safe participation in outdoor experiences

¹Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22 (2017)*
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

USES AND MEANINGS OF COMMON TERMS

To start with, we need to define some common concepts for an agreed context to describe and understand what will come throughout this textbook and the Outdoor and Environmental Studies course.

Alamy Stock Photo/Radius Images



Nature can be something, or some place, we observe.

Uses of the term nature

‘Nature’ is one of those words that seems pretty simple – until we have to actually come up with a definition for it. And what seemed to be common sense and simple starts to have a number of different aspects and becomes more complex.

The first thing to recognise with the word ‘nature’ is that we use it in a wide variety of contexts and situations – including some where the meaning seems to change, or at least be a little different from others.

The following list gives some of the different contexts and uses of the word.

- **Human nature** – a term used to talk about the innate qualities of humans; that is, the characteristics of our behaviour that we’re born with. Some people say that aggression is human nature, or that sadness is human nature. This relates to the notion of something being ‘natural’ (which we’ll discuss briefly below) – that is, human nature is the way humans naturally are.
- **Nature versus nurture** – the concept that refers to a common debate in the past few decades over a key aspect of human development: your genetic makeup (nature) versus the environment you are raised in (nurture). Nature here is taken to mean the genetic code that is found in your cells and governs how your cells and body develop and operate.
- **The laws of nature** – often discussed when talking about science and physics, and refers to descriptions (often mathematical) of the way the physical world works, and the way parts of the physical world interact with, and relate to, each other. You may have heard of Newton’s Law of

Universal Gravitation, which is a mathematical description of how gravity works between two objects. This is a law of nature.

- **The nature of ...** – we often use the expression ‘the nature of (something)’ when describing how something works, or some important feature or characteristic of something. If someone asked you about the nature of gravity, for example, they are really asking: ‘What’s this thing called gravity all about, how does it work, and what does it do?’
- **Mother Nature** – a term that refers to the Earth’s **biosphere**; that is, all of the living things on Earth and the processes and systems that are part of, or related to, these living things.

biosphere

The place on Earth’s surface where life dwells



Andrew Mannion

Nature can be a journey or an experience.



Alamy Stock Photo/Tim Hester

On a road, nature might be separated from us by the car window, or we might walk through it.

MOTHER NATURE

The concept of **Mother Nature** raises an interesting question: Why ‘mother’ nature, as opposed to ‘father’ nature?

We often give a gender or sex to particular objects or ideas, such as ‘She’ll be right, mate’ or ‘She’s a great car’, and often that gender is female. In particular, when humans refer to the Earth’s biosphere – when we talk about the living things and the **ecosystems** that they’re a part of – we almost always seem to use a female gender.

In fact, there are many languages where nouns (the words for things) are given a particular gender. French, German, Spanish and many other languages (although, interestingly, not English), all have nouns that are considered masculine and other nouns considered feminine. They also have a third ‘neutral’ gender for some nouns. In almost all of these gendered languages, nature is a feminine noun.

This is probably a throwback to, or remnant from, early human societies where the female qualities were the life-giving ones. Women were the bearers and nurturers of children, and so ecosystems and other living things were seen from this female-specific perspective.

Many early human societies had belief systems based on a large number of gods, and it was common for the gods and of living things to be female.

The ancient Greeks had a huge collection of gods, including Zeus, Apollo, Poseidon, Aphrodite and many others, as well as the Mother Goddess – Gaia. For the Romans, there was Terra. For the Andean peoples of South America, there was Pachamama. And some Indigenous Australian communities had the goddess Eingana.

For these cultures, the Earth goddesses usually created and nurtured the physical world and were used to explain and understand the world around them.

MEANINGS OF NATURE

Therefore, as we use the term ‘nature’ in a variety of different ways, this makes defining it tricky. But we all know what it is we’re talking about, don’t we?

Nature is probably best thought of as the living things, the ecosystems and the processes that form them, and the places in which we find all of these. In essence, what we call nature could also refer to natural environments, which shall be discussed shortly.

NATURAL, UNNATURAL AND ARTIFICIAL

Nature often comes in a kind of continuum – such as when we talk about something that is natural, or something that is unnatural, or even something that is artificial.

Something that is natural is said to occur ‘out there’ somewhere or comes from nature itself. Unnatural usually refers to an object or process that humans have influenced in some way. Artificial, at the end of the continuum, refers to things that are created by humans. In summary:

- **Natural** is easy enough to define – a eucalyptus tree, an echidna and a tropical rainforest are all examples of natural things.
- **Artificial** is probably just as easy to explain – a car, a computer or the aspartame chemical sweetener in a diet soft drink are all examples of artificial things.
- **Unnatural** gets a little trickier, and the normal use of the term raises an interesting issue that we’ll look at briefly a little later. The introduction of rabbits into Australia, the rose garden in someone’s front yard, or a downhill ski slope are all examples of unnatural things, since each of these occurs only because of human impact in (or on) a particular place.

An interesting debate that has occurred in recent years is around the development of food that is genetically modified – called genetically modified organisms (GMOs). One example of a GMO is golden rice (called this because of its yellow colour). Golden rice was engineered to include beta-carotene, a form of vitamin A, because of deficiencies in many developing world diets. It is estimated that around

Mother Nature

The Earth’s biosphere – all of the living things on Earth and the processes and systems that are part of, or related to, these living things

ecosystem

A community of interdependent species and their environment

nature

The living things, the ecosystems and the processes that form them, and the places in which we find all of these

670 000 children under the age of five die each year because of this deficiency. Other GMOs include genes for herbicide resistance, lowering cholesterol, virus protection, growth hormones and fruit decay.

Are GMOs natural? The genes that are spliced into GMO foods are from other organisms, so they could be called natural. But when you put genes from one organism into another, is that natural? Many people don't think so, and the debate has become very emotional. GMOs aren't recent though. Scientists from Peru have found a genetically modified sweet potato from approximately 8000 years ago. Would that be natural or not?

LEARNING ACTIVITY



ANALYSING AND SYNTHESISING GMO DEBATES

Find out about some of the debates concerning the development and use of GMOs. What people or groups are involved in the debates? What are some of the arguments used by people and groups who are for or against the ongoing development of GMOs?

By combining and synthesising some of the arguments, develop your own arguments:

- in support of using GMOs
- against the use of GMOs.

Show your arguments to a variety of different people – friends, family, classmates. Which argument do they find more convincing? Why?

BEAUTY IN NATURE

There's a common view that nature, natural things and the natural world are beautiful. Conversely, anything that is unnatural or artificial (created by or modified by humans) is therefore considered not beautiful. This view may well explain why so much human art attempts to represent, or is at least inspired by, nature.



Shutterstock.com/Troy Wegman

Beauty can be found in nature in unlikely objects, such as the decay of man-made objects.

Natural environments

Like the natural–unnatural–artificial continuum, there’s also a sort of progression or hierarchy of places to which we give the label ‘natural environments’.

Local parks, some of which might be nearby your school or your house, might have native Australian plants mixed with gardens of flowers and non-native shrubs and trees. They might also have some sportsgrounds or ovals, as well as nearby car parks, a bike path and maybe a children’s playground. Depending on where you live, local parks might even have a dam, a lake or some other similar water feature, or they might be built around or bordering a creek or river. For many Australians, particularly those who live in big cities, using these sorts of parks might be their most common experience of the outdoors.

Beyond these local parks are the larger and ‘wilder’ protected places: the state parks, national parks and **wilderness** areas. It is often these places that we think of when we talk about natural environments. These places are harder to get to; often they’re a long way from where we live. They usually have less signs of human interaction. They are also more likely to have mostly native plant and animal species living in them.



123RF/Roger Chappel

Nature is the scrub, trees and bush on the fringes of our cities and towns.

Urban and built environments

Just as the term ‘artificial’ acts as an opposite to the term ‘natural’, the terms ‘**urban environments**’ and ‘**built environments**’ can be considered as the opposite of natural environments. Built environments are those places that have been created by, or modified by, people and include buildings, parks and transport systems like roads and railways. Urban environments are built environments that have a high density of human population – in other words, cities.

Indoor rock-climbing centres, artificial surfing reefs and indoor snow-skiing centres are all examples of built environments that attempt to recreate conditions found in natural environments.

Is a backyard (or front yard) garden or a school garden heavily planted with natives an urban environment or a natural environment? This might be where trying to divide places into these two groups breaks down. A backyard or school is clearly an urban, developed place, although you could argue that it could be a natural environment too if it’s big enough and has a variety of plant species in it. Sometimes our definitions can get a bit twisted around and the distinction between them can become clear cut or helpful.

An interesting aspect of built environments when considered in relation to outdoor environments is the cost of maintaining these built environments. Asphalt, concrete and many of the other materials that we use in our built environments degrade over time and need to either be replaced or repaired.

Later in the course we’ll consider some of the relationships that different people have, and have had, with outdoor environments. One aspect of these relationships is the impact that people have on the environments they live in and interact with. What might be the impact of our built environments? Will our buildings and constructions last long after we have gone?

Journalist Alan Weisman considered the long-term nature of our built environments in his book *The World Without Us* (2007). He visited many places around the world where, for one reason or another, humans have constructed things and then left them. One typical feature of his journeys to these abandoned places was the speed with which nature returned to them. Plants and animals took almost no time at all to begin to utilise and change the places that humans built, remodelling them or removing them to suit their own purposes.

So, it seems that our built environments may not last forever.

wilderness

An environment that is big, remote, and untouched (or relatively untouched) by humans

urban environments

Areas of permanent infrastructure designed to support higher population densities such as cities and towns

built environments

Areas that have been created or modified by people and include buildings, parks and transport systems



Shutterstock.com/A-Probyn

Introduced species, such as brumbies (wild horses) in the Australian bush, are also a part of the nature around us.



Alamy Stock Photo/Chris Putnam

Nature is also the parks and the gardens within our built environments.

Are human impacts really unnatural?

A debate that has begun to occur in recent times relates to some of the descriptions here about natural and unnatural. Remember, unnatural is usually used to refer to objects or processes that humans have influenced in some way – so, the infestation of northern Australia by cane toads could be considered unnatural in this view.

According to some people, there's a problem with this perspective. If we take nature to mean the living things and ecosystems and environments (essentially, the Earth's biosphere), then we should consider humans to be a part of nature. We are, after all, living things, and we interact with ecosystems and environments just as other living things do. Therefore, if humans are part of nature, then how could what humans do be considered unnatural? The introduction of cane toads to northern Australia and their subsequent spread across the Top End might be unfortunate, but is it really unnatural? After all, it was caused by humans, who are a part of nature.

This may or may not be true. Certainly, it masks the deeper debate that lies behind it – how much impact have humans had, or are humans having, on natural environments? Are large-scale effects, such as global **climate change**, the result of humans and their impacts?

In the end, whether we call something natural or unnatural probably doesn't really matter that much. Rather, it's the effects that matter. Is the spread of cane toads natural or unnatural? It doesn't really matter what we call it if we accept (as everyone in Australia does) that this spread is a bad thing for the Australian environment.

climate change

A significant and lasting change in weather patterns over an extended period of time

LEARNING ACTIVITIES



FEATURES OF NATURAL ENVIRONMENTS

Make a table of things that are found (or might be found) in natural environments compared with things that are not found (or unlikely to be found) in natural environments. Choose a particular natural environment and name it. Include as much detail as you can – be as specific as you can. Try to group or sort your list in some way, and explain how and why you chose this sorting focus.

USE OF NATURE AND NATURAL ENVIRONMENTS IN MEDIA

Find and describe at least five examples of the way nature and natural environments are used in newspapers and magazines, on television and in other media. Include a note about the media source

with each description. Choose any two of the examples you found and write an analysis of each. Your analysis should include responses to the following questions.

- 1 What is the purpose of this media's use of nature/natural environments (i.e. why is nature/natural environments being used in this way)?
- 2 Do you think this purpose is or may be achieved? Why/why not?
- 3 What might be a result of this portrayal of nature/natural environments?
- 4 Do you think this media portrayal is good, bad or neither? Why/why not?

REPRESENTATION OF AN OUTDOOR ENVIRONMENT

Create a poster or multimedia representation of an outdoor environment you've visited. Include in your poster or multimedia representation at least THREE of the following:

- images and/or photos
- factual descriptions
- audio sounds (such as bird songs, frog croaks, water flows, etc.)
- hand-drawn sketches
- fictional descriptions (such as a poem, short story or song lyrics).

Include a statement about what the key or important aspects of this place are for you.

EXAMPLES OF NATURE

Choose one of the following places:

- zoo
- aquarium
- residential garden.

Argue whether or not this place should be considered an outdoor environment. Include at least ONE argument supporting this place as an outdoor environment. Include at least ONE argument that opposes the idea of this place as an outdoor environment. Give your own judgement based on the arguments you include.

ARTIFICIAL NATURE

Produce a report on an artificial or simulated environment such as an artificial reef, indoor climbing wall or indoor skiing centre. Include in your report answers to the following questions:

- 1 What are some reasons why people would construct this type of artificial environment? (Give at least TWO reasons.)
- 2 Briefly describe an example of this type of artificial environment.
- 3 What might be some of the difficulties involved in constructing this type of artificial environment?
- 4 What might be some of the impacts (good and/or bad) of constructing and using one of these artificial environments?
- 5 Would you use one? Why/why not?

Wilderness

In everyday usage, the term 'wilderness' often means natural, untouched places – wild places. Like many of the terms we use, there is a common definition of wilderness; although, unlike many terms we use, the definition for wilderness is a little less well defined. A wilderness environment is:

- big
- remote
- untouched, or relatively untouched, by humans.

But how big is big? How far away do you need to be to be considered remote? And what is untouched?



FAST FACT

It's estimated that around 46% of the world's landmass is wilderness, but only about 20% of this is protected as designated wilderness areas.



Shutterstock.com/ian woolcock

DEFINING WILDERNESS

Big

Wilderness areas can, like many protected places, begin as smaller environments that are then gradually expanded over time. Although, remote places that become wilderness areas often start out large, simply because of their remoteness. How big is big enough to be considered a wilderness can vary, but a lower limit is often set at about 2000 hectares. More generally, a

wilderness area needs to be big enough to be self-sufficient in terms of maintaining its ecosystem processes and biological diversity.

In Victoria, two of the biggest wilderness areas are the Avon Wilderness Park in the Victorian Alps (at just under 40 000 hectares) and the Big Desert Wilderness Park in the state's west (at over 100 000 hectares).

Remote

Remoteness refers to the ease with which we can access a place. We would typically expect a remote place to be some distance from large population centres such as Melbourne, Geelong, Ballarat, Bendigo and other large cities. We would also expect that a remote place doesn't necessarily have easy transportation access – limited public transport, probably with no air or rail connections. To get to wilderness you probably have to drive, likely on unmade roads, and you may also need to walk or cycle to get the last bit of the way.

Untouched

There are some places on Earth that humans have yet to travel to, live in or alter in some way – but there aren't many. In Australia, there aren't any of these places – either the many Indigenous communities or the European settlers, or more recent generations of modern Australians, have walked, ridden or driven pretty much everywhere across the continent. So, strictly speaking, there aren't likely to be any 'untouched' places.

But when it comes to defining a wilderness area, 'untouched' means undamaged or unmodified. In other words, a wilderness area is a place that looks pretty much as we would expect a place to look without any major damaging impacts by humans. There are quite a few places like this across Australia, including in Victoria. We could even consider a place wilderness if it had received some major human impacts, as long as it were possible to repair and rehabilitate that place.

The US Wilderness Act of 1964 gives a nice summary definition that we might find useful here:

A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the Earth and its community of life are un-trammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which:

- 1 Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- 2 Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
- 3 Has at least two thousand hectares (five thousand acres) of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and,
- 4 May also contain ecological, geological or other features of scientific, educational, scenic or historical value.

The US *Wilderness Act of 1964*, written by Howard Zahniser of The Wilderness Society (US)

The Wilderness Society defines wilderness as follows:

A wilderness area is defined as an area that is, or is capable of, being restored to be:

- of sufficient size to enable long-term preservation of its natural systems and biological diversity;
- substantially undisturbed by colonial and modern technological society; and
- remote at its core from points of mechanised access and other evidence of colonial and modern technological society.

A range of activities are incompatible with wilderness protection because they diminish its essential qualities of remoteness and naturalness. Such activities include:

- mechanised access and provision of mechanised access points and routes, e.g. roads;
- extraction of resources such as timber and minerals; and
- use of non-native animals for transport or primary production.

The Wilderness Society (Australia)

CRITIQUES OF WILDERNESS

All conservation of wildness is self-defeating, for to cherish we must see and fondle,
and when enough have seen and fondled, there is no wilderness left to cherish.

Aldo Leopold

Wilderness might initially be seen as an obviously good thing to have – how can you argue against protecting places by calling them wilderness areas?

Like many aspects of studying outdoor environments that we'll discover throughout this course, the reality is not as simple as it might initially seem.

Aldo Leopold's quote presents one problem with wilderness that will be examined in different ways throughout this course. If we go to the place and do things in the place, can we really call it wilderness since we'll have disturbed it in some way? And if we leave it alone and do not disturb it (that is, if we don't visit the place at all), then what's the point? Are we trying to protect wilderness so that we and our descendants can enjoy it, or are we protecting it just for the sake of having it there?

All definitions of wilderness that exclude people seem to me to be false. African 'wilderness' areas are racist because indigenous people are being cleared out of them so white people can go on holiday there.

Jay Griffiths

One of the debates that has raged about wilderness areas is in relation to Indigenous communities and their use of these places. Wilderness is a modern concept – a big and remote place, untouched by humans. Many Indigenous communities that have long-standing and traditional connections with outdoor places see these places as a part of their communities – as a part of their homes – and reject the notion that we can set these places aside from human interactions. They would argue that these places have been interacted with for as long as humans have been in them, and to set them apart from other places ignores the rich connections with them that people have built over thousands of years.

In some situations, designating an area as a wilderness environment means that people are restricted from certain activities in these places. Hunting, for example, would not be an appropriate activity in a wilderness environment, at least based on the definitions we looked at earlier, and yet many Indigenous communities have hunted in these places in the past, and some still wish to do so, in order to keep their culture alive.



'Islands' of protected areas in a 'sea' of human development

'Islands' of protected areas connected by wildlife corridors

Before agriculture ... humans were in the wilderness. We had no concept of 'wilderness' because everything was wilderness and we were a part of it. But with irrigation ditches, crop surpluses, and permanent villages, we became apart from the natural world ... Between the wilderness that created us and the civilization created by us grew an ever-widening rift.

Dave Foreman, quoted in Cronon, William, "The Trouble with Wilderness", in *The Great New Wilderness Debate*, (eds. Callicott, J.B. and Nelson, M.P), 1998, University of Georgia Press, Georgia.

Another concern about wilderness, and about protected areas more generally, can be broken into two separate problems:

- 1 poor representation of **habitats**
- 2 lack of connectivity between habitats.

Poor representation of habitats relates to the ways in which protected areas in the past have often been considered and declared. Many wilderness environments and other protected places started out as being public land without a clear and obvious use, and without obvious economic value. When protecting environments became a common and popular ideal, these places were protected. But these places don't necessarily represent all the places that we might want to protect. They are often considered marginal, poor land – after all, the good land had already been bought and sold for other more useful purposes. Only more recently have land managers and environmentalists begun to approach land protection with a view to making sure that we protect lands that are representative of the variety of different sorts of places that exist. But are these places available anymore?

Lack of connectivity between habitats is sometimes called the 'island problem'. The argument is that protecting places as wilderness (or national or state parks) protects only isolated sections of land – islands of protection in a sea of farms, towns, cities and other human-used and human-modified places. This is recognised to some extent by public land managers trying to include wildlife corridors that connect protected places, but some people are concerned that setting aside places for protection allows us to think that we have done what we need to do to protect the environment, and perhaps means that we might ignore the plight of natural environments all around us.

Additionally, the wildlife corridors themselves are problematic, given that there may be significant development in between two protected areas.

habitat

An area or environment where an organism or ecological community normally lives or occurs

LEARNING ACTIVITIES



ARGUMENTS ABOUT WILDERNESS

Each of the following cases about hypothetical animals has two clear sides that could argue for and against both proposals:

- **Case 1:** The western spiky-tailed possum was once a critically threatened species, but with numerous conservation programs, and a complete ban on the killing of the species, the population

has recovered somewhat to be now considered only rare. A local Australian Aboriginal tribe, looking to return to some of their old ways in an attempt to rebuild their culture, is seeking permission to hunt the possum for food.

- **Case 2:** The great eastern blue kangaroo, a protected species in Australia, has become a pest to many local farms and orchards. Its population has increased dramatically and is starting to also impact on the vegetation and habitat of the nearby Wimbledon State Park. A local hat maker has put forward a proposal to harvest the kangaroos and use their skin for their new bush hat, which they intend to market to international tourists and overseas hat stores.

In case 1, you could argue for the Australian Aboriginal tribe or against them (and for complete conservation of the possum species). In case 2, you could argue for the hat maker or against them (and for complete conservation of the kangaroo species).

Your task is to write a brief argument for each case. You should choose to argue one way for one case, and the other way for the other case. For example, if you argued for the Australian Aboriginal tribe in case 1, then you would argue against the hat maker in case 2. Each case may share similar arguments, or they may not. Each of your arguments should be a maximum of 100 words, and you must justify your argument with supporting evidence or ideas.

MAKING A DIFFERENCE

Humans have no place on the natural environment. All humans throughout history have shown that they cannot live compatibly with the environment. All have altered the environment in some way.

Unknown author

As the youth walked the beach at dawn, he noticed an old man ahead of him picking up starfish and flinging them into the sea.

Finally, catching up to the man, he asked him why he was doing this.

The answer was that the stranded starfish would die if left in the morning sun.

'But the beach goes on for miles and there are millions of starfish,' countered the other. 'How can your effort make any difference?'

The old man looked at the starfish in his hand and then threw him safely into the waves.

'It makes a difference to this one,' he said.

Adapted from *The Star Thrower* by Loren Eiseley, 1969

An elderly man was planting a small apple tree.

The younger man said, 'Why are you planting that? You'll be dead before it grows fruit.'

The elderly man answered, 'Son, everything is not just for ourselves.'

Unknown author

When we look round, the time is rapidly approaching when natural environment, natural unspoilt vistas are sadly beginning to look like leftovers from a vanishing world. The natural world contains an unbelievable diversity, and offers a variety of choices, provided of course that we retain some of this world and that we live in the manner that permits us to go out, seek it, find it, and make these choices. We must try to retain as much as possible of what still remains of the unique, rare and beautiful. It is terribly important that we take interest in the future of our remaining wilderness.

From a speech by Olegas Truchanas, 1972

Write a brief response (about 300 words) to one or more of the quotes on page 13. Some of the following questions may be useful to consider:

- 1 How can the outdoor user (recreationalist) complain about the destruction of a forest or extraction industries when the majority of their lives are spent using up natural resources (electricity, water, petrol and chemicals in various forms), and living and working in places that are constructed of timber, concrete, glass, plaster and iron, all of which are derived from the environment? The very equipment they use in their recreation and the means by which they get to their outdoor sites is itself a product responsible for some form of environmental impact.
- 2 What problems arise with trying to balance the needs of society with the needs of the environment?
- 3 Can the commercial, scientific, recreational and environmental needs of society ever be balanced?
- 4 Can individual efforts help to make a difference to bring about change?

Alamy Stock Photo/Miscer Stock



Land management practices include building boundary roads and fences to delineate one piece of managed land from another.

Protected areas

In the previous section we looked briefly at wilderness areas, but there are a number of other sorts of protected areas across Australia and other parts of the world. National parks, state parks, marine parks and heritage areas are just some of the different types of protected areas that are found in Victoria alone.

The International Union for Conservation of Nature (IUCN) has a list of protected area categories that many countries around the world, including Australia, use as the basis for how to begin the process of protecting, preserving and managing outdoor environments.

The IUCN's list includes:

- 1a **Strict nature reserve** – These are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphic features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. These areas can serve as reference areas for scientific research and monitoring.
- 1b **Wilderness area** – These areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition. We've discussed these in some detail above.
- 2 **National park** – These protected areas are large natural areas set aside to protect large-scale ecological processes, along with the variety of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational and recreational opportunities.
- 3 **Natural monument or feature** – These protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. Examples of this type of place in Australia might include Uluru and the Great Barrier Reef, although Australia doesn't use the natural monument label for these areas, preferring instead to use national park as a blanket term for many such places.
- 4 **Habitat/species management area** – These protected areas aim to protect particular species or habitats and management reflects this priority.
- 5 **Protected landscape/seascape** – A protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value;

and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values. The Mountain Cattlemen of the Victorian Alps would argue that their interactions – grazing cattle in the alpine areas of the state – are vital to the ongoing **sustainability** of the alpine region. This is highly contested, although there are other more valid examples of this sort of human interaction connecting significantly with an environment – Uluru is perhaps the most prominent example in Australia, combining protection with Indigenous management and ecotourism perspectives.

- 6 **Protected area with sustainable use of natural resources** – These protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area. In Victoria, most of our state parks would fall into this category.

Adapted from International Union for Conservation of Nature (IUCN)

sustainability

The ongoing capacity of Earth to maintain all life

PROTECTED AREAS IN VICTORIA

Around one-third of Victoria is public land – that is, land that is managed, maintained and held in trust for the people by the state government. About half of this land (17% of the state's total area) is protected in a series of parks and reserves that utilise the IUCN protection categories. The protection of outdoor environments in Victoria and the rest of Australia (and in many other parts of the world) has led to a type of hierarchy of levels of protection. The following identifies many of these (although it's not entirely comprehensive) and roughly runs from higher levels of protection down to lower levels of protection.

World Heritage protected areas

These are places deemed so significant for humans and for environmental protection that they are given a status beyond the borders of the state or country. Australia has 19 places on the World Heritage list, although there are no outdoor environments in Victoria currently included in that list.

National parks

There are currently 45 national parks in Victoria; combined they cover about 11% of the state's total area.

Wilderness parks

As of 2016 there are three wilderness parks in Victoria:

- Avon Wilderness Park (40 000 hectares) in the Victorian Alps near Licola, Dargo and Lake Tali Karnig
- Big Desert Wilderness Park (142 000 hectares) on the border with South Australia
- Wabba Wilderness Park (20 000 hectares) in the Victorian Alps near Corryong.

Marine parks

Victoria has protected just over 5% of its coastal areas in 13 marine national parks and 8 marine sanctuaries – a world first in coastal area protection.

State parks

There are 25 state parks in Victoria covering over 3 million hectares of the state, which are managed to supplement the national park system, as well as to provide access to a range of natural resources, such as timber, and a more extensive array of recreational activities than are permissible in the national park network.

Local and metropolitan parks

As well as the variety of protected areas described on page 15, Victoria currently has over 3000 managed parks and reserves that are part of the protection system. Many of these are local, metropolitan and regional parks.

TYPES OF OUTDOOR ENVIRONMENTS

There are many ways to classify different types of outdoor environments. The most common today uses the concept of **biomes** to distinguish different environments. Biomes (effectively the same as what we call ecosystems) are distinguished by their climate, geological features, plant and animal communities found in them, and the spacing of plants, among other things.

The World Wildlife Fund (WWF) defines over 31 different biomes around the world, including land and marine types. In this course, we'll only look at those that are particularly relevant for Victoria, and we'll use the categories that Parks Victoria includes in their description of Victorian ecosystems and biomes. This area will also be discussed in more detail in Unit 2.

biome

A large, naturally occurring community of flora and fauna occupying a major habitat

plateau

An elevated, comparatively level expanse of land

Alps

The Australian Alps are characterised by granite, sandstone, limestone, basalt and slate rocks, from a combination of sedimentary and volcanic processes. Unlike mountain ranges in many other parts of the world, in the Australian Alps it's difficult to determine the highest peak from the surrounding **plateaus**.

Mount Bogong, the highest peak in Victoria for example, has a flat top with steep valleys all around – it's essentially an uplifted plain.

Dr Vince Morand, Australian Alps National Parks newsletter no. 41, 2011

The highest parts of the Alps are treeless, being dominated instead by grasses, shrubs and other small flowering plants. As the altitude drops, we find an environment dominated by eucalyptus trees, the snow gums, and below them the ash trees.

The diversity of plant types provides habitat for many different animals, including over 40 species of mammals such as *Burramys parvus* (mountain pygmy possum), 200 bird species, 30 reptile species, 15 amphibian species, 14 native fish species, and countless invertebrates as well as many introduced and pest species.



Fire damage can be seen on ridges and spurs in the Victorian Alps.

The climate of the Alps is harsh, often being covered by snow for more than a third of the year, suffering hot and dry summers, and being subjected to high winds and regular major fire events.

In Victoria, the Alps are protected in many parks including the Alpine National Park (the largest national park in the state), Baw Baw National Park, Mount Buffalo National Park (one of the oldest protected areas in Australia) and the Avon Wilderness Park.

Grasslands

In Victoria, grasslands are found across the western part of the state (in the Western Victorian Volcanic Plains), as well as to the north of the state and in some parts of Gippsland. Grasslands are dominated by grasses and other small plants such as herbs and wildflowers. Trees are either not found at all or only in small numbers, often as a result of fertile but rocky soils and low rainfall.

The native grasslands in Victoria support some very rare animal species, including the eastern barred bandicoot and the striped legless lizard.

Grasslands were often kept free of trees through persistent burning from Indigenous communities, and when the Europeans arrived in the 1700s and 1800s they recognised that these places were very suitable for a variety of agricultural practices including cropping and grazing. This has meant that Victoria's grasslands are now particularly threatened.

A number of protected areas include significant grasslands across Victoria: Terrick Terrick National Park (near Echuca), and the Derrimut Grassland and Craigieburn Grassland nature conservation reserves (both in Melbourne).



FAST FACT

Covering 2.3 million hectares (more than 10% of Victoria), the Western Victorian Volcanic Plains are the third-largest volcanic plain in the world. Over 400 volcanoes have been found, with the last eruption occurring only 7200 years ago.

Heathlands

Heathlands grow where soil and wind conditions prevent the growth of trees and taller shrubs – heaths being dominated by low, woody shrubs. They are often found near windswept, salt-sprayed coastal areas on sandy and low fertile soils.

Birds are the common animal species found in heathlands. In Victoria, lorikeets, honeyeaters, eagles, ground parrots, bristlebirds and the orange-bellied parrot are some of the bird species found in this type of environment. The Western Australian heathlands are home to the world's only nectar-feeding mammal, the honey possum.

Fire is an important part of Victorian heathlands. Some species re-sprout after fire; others, such as hakeas and banksias, are usually killed, but their woody fruits open shortly afterwards to release their seeds. Some species, including grass trees and orchids, respond to fire with a flush of flowering, and some species of fauna, such as the ground parrot, rely on regular fires to maintain optimum habitat for foraging and breeding.

Examples of heathlands found in Victoria include the Anglesea Heath, as well as sites in the Grampians and Wilsons Promontory national parks, and the Jilpanger Nature Conservation Reserve near Mount Arapiles.

Mallee

Mallee is named for small mallee trees – the group of eucalyptus trees that dominate this type of environment. Mallee trees sprout multiple stems from an underground root. If the tree stems are destroyed by fire, the tree simply re-sprouts new stems from the underground root.

Mallee environments tend to have sandy soils with saltbush and small heathy shrubs combining with grasses to form an understory beneath the mallee trees. The environments are found in Victoria's north-west where the climate is hot and dry and rainfall is typically low. The soils are poor, but this results in rich biodiversity of plant variety and large numbers of reptiles and small mammals. The malleefowl is a distinctive bird species in these regions, building massive mounds of sand and plant litter to create nests for their eggs.



Trees covering uplifted layers of rock in Victoria's Central Highlands

Typical Mallee environments are the Hattah-Kulkyne, Murray-Sunset, Wyperfeld and Little Desert national parks, as well as the Big Desert Wilderness Park.

Dry forests and woodlands

The dry forests of Australia, and in particular Victoria, are not really one type of environment but encompass many different types. Stringybark forests are common near the coast to the east of Western Port; grassy woodlands are scattered through the grasslands of the western part of the state; and box-ironbark forests cut a broad swathe through the north-central part of the state.

These forests occur on well-drained but nutrient-poor soils. They are often found in areas with low rainfall and have to cope with periods of extended **drought** and high summer temperatures. Trees are tall, but not as tall as those found in wet forests. They have an understorey of kangaroo, tussock and other native grasses, as well as supporting rare orchids.

Mammals are rich in these forests and include kangaroos, wombats, wallabies, koalas, possums, bandicoots and bats. There are many species of birds, as well as reptiles and insects found throughout these forests.

Examples of these places in Victoria include Chiltern-Mt Pilot, Mount Eccles, Grampians and Brisbane Ranges national parks, although there are many other examples of these environments.

drought

A long period of abnormally low rainfall, especially one that adversely affects growing or living conditions



FAST FACT

Myrtle beech, found in Tasmania and the Central Highlands of Victoria, is part of a group of flowering plants that dates back to the era of the dinosaurs. It is thought to be a key to understanding how vegetation evolved and migrated throughout the Southern Hemisphere.

Wet forests and rainforests

Wet eucalypt forests are found in the central and north-eastern parts of Victoria, particularly surrounding the alpine environments. These forests include Victoria's tallest tree, *Eucalyptus regnans* (the mountain ash), which is also the world's largest flowering tree. These trees often dominate their environments, providing a vast canopy cover for tree ferns (which themselves can be very tall at over 12 metres), as well as other ferns, mosses and shrubs. Myrtle beech (*Nothofagus cunninghamii*) as well as messmate (*E. obliqua*) and other eucalypts can be found through these forests.

The mountain ash trees, and many other species in these environments, have evolved characteristics that utilise fire in germinating their seeds, and so bushfire has become an important part of these forests.

Possums, bats, owls and many other bird species are commonly found throughout the wet forests.

These environments are characterised by cooler temperatures and generally high rainfall. In Victoria, key examples of wet forests are found in Great Otway, Kinglake, Yarra Ranges, Snowy River, Dandenong Ranges and Errinundra national parks, among many others. Travelling eastward out of Melbourne passes over the Black Spur between Healesville and Marysville, which is another iconic wet forest area.

Inland waters and wetlands

Inland waters include flowing water sources such as creeks and rivers, as well as standing sources such as lakes and wetlands. Many of these are permanent features in environments, but the harsh nature of climate conditions in Australia can mean there are many temporary or intermittent features resulting from cycles of flooding and droughts.

Inland waters provide habitats for a wide variety of plant and animal species, including many fish and amphibians, as well as platypuses. Birds are often a major part of wetlands, using these places not only for their resources but also as travel corridors in **migratory paths**. The land surrounding inland waterways often have tall canopies of eucalypts and wattle trees, providing a habitat for many mammals such as possums and bats.

Inland waters are the key component in the natural water purification process.

In Victoria, there are over 17 000 wetlands larger than 1 hectare in size. The iconic Murray River (especially Barmah National Park) is an example of this type of environment.

Coast and marine environments

Subject to constant change, the coastal environment is a difficult place for life. Wind, large waves and constant salt spray create a wide variety of landforms and put dune systems, cliffs and shorelines under ongoing pressure.

Grasses and small shrubs and trees dominate the coastal flora, including saltbush, tea-trees and moonah trees. Birds are common in coastal areas, including oystercatchers, shearwaters, penguins and the highly endangered orange-bellied parrot.

The Victorian coast includes many iconic places such as Port Campbell, Wilsons Promontory and Croajingolong national parks, as well as French Island and Phillip Island, and Gippsland and the surf coasts.

The marine environment beyond Victoria's coasts include an enormous range of habitats, such as reefs, kelp forests, mudflats and seagrass beds. The many marine national parks and marine sanctuaries preserve these and other marine ecosystems.



Alamy Stock Photo/Kim Petersen

The intricate features of the Victorian coast shelter a wide variety of plants and animals.

migratory path

The geographic route along which birds seasonally migrate

MOTIVATIONS FOR SEEKING OUTDOOR EXPERIENCES

What is a motivation?

Motivations are simply the reasons why we do something. As we've already done, and will continue to do throughout this book, to make our developing understanding a bit easier, we'll break this concept into pieces. Motivations, to start with, can be broken into two main types: intrinsic and extrinsic.

INTRINSIC MOTIVATIONS

Motivations are almost always linked to some advantage that we gain from doing something, so in that sense, you could argue that all motivations are **intrinsic motivations**.

That wouldn't make this distinction all that useful, so we'll keep intrinsic motivations to refer to the motivations that literally come from within us. What motivates us in this way? Think of anything you do that you enjoy doing, and are motivated to do, and ask yourself:



Alamy Stock Photo/LOOK Die Bildagentur der Fotografen GmbH

What motivates a person to go rafting? Many adventure sports, including rafting, feature intrinsic motivations such as fun, adrenalin rushes and personal satisfaction.

intrinsic motivations

Motivations we get from within ourselves

‘What is it inside of me that helps me to keep going?’ Chances are it will be some sort of good feeling you get when you do this thing: an adrenalin rush from making a gnarly bottom turn when catching a wave perhaps, or from making an extremely difficult climbing move. Or, if not a feeling, then it might be a more general sense of personal satisfaction that you’ve done something worthwhile. ‘Peak baggers’ enjoy ticking (or bagging) mountains (peaks) off a list. There’s a sense of personal satisfaction at having completed a list and this sense helps to motivate them to continue to try to do it. Bird watchers sometimes have a similar sort of list that they use to generate a sense of satisfaction, and therefore motivation, to tick a bird sighting (sometimes called ‘twitching’) off their list.


extrinsic motivations

Motivations we get from outside ourselves, which are external to us

EXTRINSIC MOTIVATIONS

What about **extrinsic motivation**? What could come from outside of us to achieve the same affect? One example is obvious: money. Many of the things that people do in the outdoors – from professional snowboarders and surfers to farmers and parks rangers – they do because, at some point, they will get paid to do these things. That isn’t to say this is the only motivation. Often motivations start with the intrinsic. Snowboarders love to snowboard as it makes them feel good, and park rangers love the environment and the sense they get of caring for it. But extrinsic motivations can help keep people going – it helps pay the bills.

Is money the only extrinsic motivation? Probably not, although it may be the most obvious. Some people will do things because of authority – they are told to do these things. Some people might do things because of some external physical reward (other than money). Competition – when we are challenged by other people – can also be thought of as an extrinsic motivation.



LEARNING ACTIVITY

WHAT IS A MOTIVATION?

If you risk nothing, you gain nothing.

Bear Grylls

What do you think Bear’s motivation is for participating in an outdoor experience?

Motivations for outdoor experiences

What about motivations for the sorts of outdoor experiences we are likely to participate in? What motivates those people looking for adventure and recreation and fun and challenge in the outdoors? We can recognise four broad groups of motivations for these sorts of experiences.

1 COMPETENCE/MASTERY

Examples of this type of motivation include:

- being the first to achieve something (e.g. climbing Mount Everest)
- building strength through participating in the experience
- being competent in the activity
- setting a record or other achievement (e.g. ‘bagging’ a peak).

2 STIMULUS AVOIDANCE

This type of motivation is a type of negative reinforcement. This is where we do something because it helps us to avoid something else. Examples of this type of motivation include:

- participating in outdoor experiences as an escape from aspects of our everyday life (e.g. ‘getting away from it all’)
- the health and wellbeing we get from participation
- being on our own.

3 SOCIALISATION

This type of motivation is about the social benefits we get from participating in outdoor experiences.

Examples of this type of motivation include:

- personal and social development
- the feeling of community from doing things with other people
- the feeling of growth and independence.

4 COGNITIVE REWARD

This type of motivation is about the mental rewards we get from participating in an outdoor experience.

Examples of this type of motivation include:

- learning something new
- achieving something new, different or risky
- obtaining an adrenalin rush
- experiencing ‘flow’
- proving something to yourself or others
- seeking transcendence.

‘FLOW’ – AN EXAMPLE OF MOTIVATION

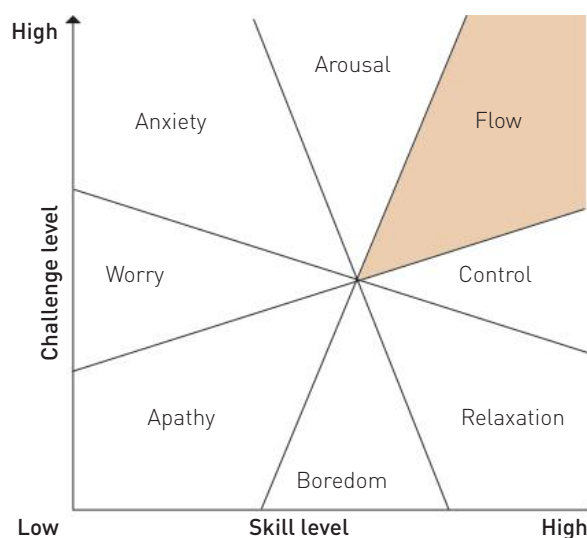
Developed in the mid-1970s by Hungarian psychologist Mihaly Csikszentmihalyi, the ‘flow model’ of concentration and engagement basically suggests that people are at their happiest when they are fully and completely engaged in an activity; that is, when they are in a state of flow.

[Flow is] being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you’re using your skills to the utmost.

Mihaly Csikszentmihalyi

When someone is doing something with such concentration that nothing else matters, time seems to move incredibly quickly. When you’re in a ‘flow’ experience:

- you feel at one with the world – your sense of being an individual disappears
- you let go of worries and problems



- you're completely focused
- you feel satisfied with what you're doing
- you're happy, although you probably don't notice it as you are completely engrossed in what you're doing.

This is flow, and is possibly one of the key motivations for participants who are experienced in outdoor activities.

The Buddhist practice known as 'mindfulness' creates a similar effect, and is something many adventurers and recreationists practice.

Mindfulness means paying attention in a particular way: on purpose, in the present moment, and non-judgmentally.

Jon Kabat-Zinn, *Wherever You Go, There You Are*, 1994

LEARNING ACTIVITIES



POETRY OF MOTIVATIONS

I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach, and not, when I came to die, discover that I had not lived.

Henry David Thoreau, *Walden*, 1854

Find some examples of poetic or literary quotes about outdoor environments and/or outdoor experiences, similar to the quote from Henry David Thoreau. Describe some of the motivations you can find in these quotes.

PERSONAL MOTIVATIONS

Visit the Billabong website 'I surf because' via the link at <http://www.nelsonnet.com.au/oes>, which features videos people have uploaded that help describe their motivations to surf. Sort or categorise some of the motivations on this website into the different groups described in this section. Alternatively, complete this activity with other websites or sources that your teacher suggests.



I surf because – Billabong

PERSONAL RESPONSES TO OUTDOOR ENVIRONMENTS

The previous section looked at why people visit and interact with outdoor environments. In this section, we will look at the results of these interactions – how we respond to our experiences in and with outdoor environments.

'Response' refers to the feeling or emotion that an outdoor environment or outdoor experience creates in your mind. Responses will typically lead to certain behaviours. The way you respond to or feel about an environment is likely to influence the way you act in and with that environment.

Types of responses

We'll divide personal responses into two main groups based on the sorts of behaviours or actions that they may influence: positive and negative responses.

POSITIVE RESPONSES

A positive response to an outdoor environment is one that will probably result in positive behaviours towards that place – behaviours that might protect, preserve or enhance that place in some way.

Positive responses include the following:

- **appreciation** – a recognition of value and significance in an outdoor environment
- **awe** – a feeling of wonder or admiration for an outdoor environment
- **contemplation** – a feeling that engenders long and thoughtful observation, or a deep reflection about an outdoor environment.
- **inspiration** – a feeling about the outdoor environment that leads a person to want to do something or create something
- **exhilaration** – a feeling of excitement or happiness, particularly resulting from an outdoor experience
- **connection** – a feeling that we are a part of a place or connected to that place; it can come with spiritual feelings or feelings of the wondrous nature of an environment
- **curiosity** – a feeling of wanting to know more and wanting to understand an outdoor environment in more detail or in other ways.

Shutterstock.com/michelangelo



It can be incredibly hard to get to, but the beauty of an outdoor place can inspire awe and appreciation.



Alamy Stock Photo/Bjorn Svensson

A sense of achievement, or wonder ... or exhaustion?



Leigh Park

Curiosity or adventure?

NEGATIVE RESPONSES

A negative response is one that will probably lead to damaging behaviours or dangerous actions with respect to an outdoor environment, such as the desire to clear it, change it or remove things from it. Negative responses include the following:

- **fear** – an unpleasant feeling resulting from a belief that something about an outdoor environment (or an activity in an environment) is dangerous
- **revulsion** – a sense of disgust and loathing; an environment could elicit a revulsion because of something negative that a person sees in an environment, such as one animal hunting and killing another
- **curiosity** – is the same as the curiosity in the positive responses; it appears in both sections because the behaviours resulting from curiosity may vary significantly from positive to negative ones.

VARYING RESPONSES

Like everything else about people, responses to environments vary significantly. Just as some people will relish eating a blood sausage or a scrambled egg, and others will not, one particular place may elicit a positive response in one person but a negative response in another. Additionally, the ways we respond to these places can change over time.

As we age

As a person ages, and as their character, personality, experiences and values change, the ways they respond to a particular outdoor environment may change. A place that a teenager may have responded to positively may elicit a completely different response in them many years later (or vice versa).

As society changes

Society as a whole changes over time, and this can lead to society-wide changes in the way we respond to particular places. As an example, in the early days of European settlement of Australia, the bush was seen as a scary place, and while not everyone was fearful of it, many people were. As European explorers and settlers opened up the country to settlement and development, this fear changed and, for many people, disappeared, so that today fear is less common as a response to many places.

The ways we exhibit or show our responses can vary also, and may relate to the sorts of practices we are familiar with from other parts of our lives. A writer may write about their responses, while a painter may paint them, or a musician may sing about them. For many Australians, photographs can be a powerful way of capturing a place or an experience to help them revisit and demonstrate their responses. The ease with which we can take, store and transmit images helps this particular way of exhibiting responses.

LEARNING ACTIVITY



RESPONSES TO NATURE

Wilderness can be regarded as 'raw' nature, as a place unspoiled by humans. Below are quotations reflecting changing perceptions of wilderness (from Dick Johnson, *The Alps at the Crossroads*, VNPA, Melbourne, 1975).

a Genesis 1:28:

And God blessed them and told them, 'Multiply and fill the earth and subdue it; you are masters of the fish and birds and all the animals.'

b St Matthew 4:1:

After Jesus was baptised by John, he was 'led out into the wilderness by the Holy Spirit, to be tempted there by Satan.'

c The legend of Beowulf:

Beowulf led his men in heroic battle against monsters that inhabited an unvisited land among wolf-haunted hills, windswept crags and perilous fen tracks.

d Lord Byron:

From my youth upwards my spirit walked not with the souls of men ... my griefs, my passions, and my powers, made me a stranger ... my joy was in the wilderness.

e Estwick Evans:

Evans journeyed in the winter months so that he might experience the pleasure of suffering, and the novelty of danger.

f Henry David Thoreau:

In Wilderness is the preservation of the World.



g John Muir:

Muir argued for the creation of an organisation that would be able to do something for wilderness and make the mountains glad.

h Theodore Roosevelt:

There are no words that can tell of the hidden spirit of the wilderness, that can reveal its mystery, its melancholy and its charm. There is delight in the hardy life of the open ... the silent places ... the wide wastes of the earth, unworn of man, and changed only by the slow change of the ages through time everlasting.

- 1 For each of the quotations you just read, write one or two words in a table to describe the way wilderness was perceived. Next, write one or two words to describe the feelings or emotions that wilderness provoked in the minds of the subjects for each quotation. (The first response is given as an example.) You can fill in a table online via your student website at <http://www.nelsonnet.com.au/oes>. Log in by using the code at the back of your book, and go to Resources, page 26.

	Wilderness as a ...	Wilderness provoking feelings of ...
a	storehouse (of everything humans need)	greed

- 2 How do these quotations reflect changes in perceptions of wilderness over time?
- 3 Which quotation best reflects your own understanding of, or feelings about, wilderness? (Alternatively, write your own memorable quotation about wilderness.)

Factors influencing personal responses to outdoor environments

Why do we respond the way we do to being in particular places or seeing particular sights or doing particular things?

For every person’s response there’s probably a different reason why they responded in that way, but certainly there are some common things that influence the ways we respond to the outdoors:

- age
- background
- education
- experience
- culture
- religion
- socioeconomic background
- media.

LEARNING ACTIVITY



FACTORS AFFECTING PERSONAL RESPONSES

Choose one or more of the factors from the list above and write about how this (or these) factors affect your response to outdoor environments. Ask other people how they think their responses might be affected by these factors. Come up with some other factors that you think might also affect personal responses to environments.

KNOWING, EXPERIENCING AND RESPONDING TO OUTDOOR ENVIRONMENTS

Outdoor environments, and the humans that interact with them, are complex and highly diverse. Consequently, there are many different ways people will interact with and respond to outdoor environments. The focus of the last section was on a range of emotive responses (fear, awe, appreciation, and so on). In this section we'll look at other possible responses and some of the different ways people experience and come to know an outdoor place.

The way people view or value an environment is dependent upon the interactions they are likely to undertake, what they believe they can gain from the environment, as well as the context of their experience. For example, if someone has grown up on a farm from a young age, they may be more likely to view the environment as a resource – somewhere they raise animals until such time they can sell them for a profit. On the other hand, an Indigenous Australian may be more likely to have a deep spiritual connection with the land – they may feel 'at one' with the environment based on shared stories of the Dreaming and their cultural understandings of the land.

Of course, it's highly likely that someone who grew up on a farm could develop a spiritual connection with their land, and an Indigenous Australian could also see their land as a resource. Experiences of places and the responses that they generate can be very complex.

As we've done already though, we'll start by keeping it simpler. Some of the ways in which people experience and respond to outdoor environments can be as:

- a resource
- recreation and adventure
- a spiritual connection
- a study site.

LEARNING ACTIVITY



DIANA BOYER'S EXPERIENCE AND RESPONSE TO THE ENVIRONMENT

Read about Diana Boyer's environmental art collection on the National Museum Australia website via the link at <http://www.nelsonnet.com.au/oes>. Diana's art has been influenced by Australian natural environments and delves into her history of botany and farming. You can also visit Diana Boyer's website and watch her 'Time Change' animation.



Diana Boyer's
environmental
art collection

Outdoor environment as a resource

In Outdoor and Environmental Studies, a resource can be described as something from the environment that supplies, supports or aids humans in some way, and is often a source of income. The environment has always played a part in providing resources in order for humans to survive; whether it is a source of food and water, or for materials such as rock and timber for shelter. The plentiful resources provided by the Australian environment have led humans to take advantage of them, and we have developed many ways of exploiting the environment's resources through practices such as timber and water harvesting, agriculture and horticulture, mining, grazing and other farming methods. Because of their experiences, landowners and land managers often respond to environments as a resource. More recently, tourism and education have also become aspects of the natural environment that people have been able to harness and use to make money.

Seeing the land as a resource could be a negative response if it leads to increased **exploitation** and destruction, and certainly this has been the case in the past. Over time though, humans have become increasingly aware of their role in the destruction of Australia's natural environment. The unrelenting

exploitation

Making use of and benefiting from resources, often in an unsustainable way and accompanied by environmental degradation

salinity

The concentration of dissolved salts in water or soil

removal, exploitation of and pressure on its natural resources has caused a lot of damage such as soil erosion, high **salinity** levels and deforestation, which endangers both native flora and fauna. The concepts of sustainability and sustainable development are ways of thinking and acting where we aim to conserve and mindfully distribute our resources in the hope of prolonging the availability of them for us and for future generations alike.



Shutterstock.com/frantic00

Collecting water from a natural spring



Shutterstock.com/Pavel Vakhrushnev

Using timber in underground mines

LEARNING ACTIVITIES



ENVIRONMENT AS A RESOURCE

While on an outdoor experience, keep a journal of all the specific ways the environment can be used as a resource. What are some of the ways in which you and your class are using the environment as a resource? Think about people other than yourself and include some details about the kinds of people who would use it as a resource now, and may have used it as resource in the past.

FICTIONAL FARM

Create a fictional farm and build up a case study about it. While this activity requires some creative thinking, you should also include realistic information where possible.

Your case study should include the following sections:

- 1 An introduction including general details such as the name of the farm, where it is located, how long it has been operating for, and what product(s) are farmed and sold.
- 2 A description about the destructive nature of the farming practices that may have been used in the past and how the farmer(s) may have viewed the environment at this time.
- 3 A description about the sustainable nature of farming practices that may be used nowadays and how the farmer(s) may view the environment at this time.



Andrew Mannion

Hiking in the Alpine National Park

Outdoor environment as recreation and adventure

Typically, recreation is an activity that is done for enjoyment, amusement or pleasure, and is considered to be fun by the participant. Conversely, adventure can be described as an exciting, risky or daring experience that is in some way hazardous or dangerous in nature. The concepts of recreation and adventure are characteristically intertwined, and often share

similar examples. For instance, rock climbing can be regarded as a recreational activity as well as an adventurous one. Sometimes the context of the environment can be used to differentiate recreation and adventure. For example, following the Great Ocean Walk could be considered a recreational activity when compared with the adventurous nature of hiking up Mount Bogong, Victoria's highest mountain peak.



Shutterstock.com/Ammit Jack

White-water rafting

Many experiences within outdoor environments are based on the premise of

recreation and adventure, and these experiences usually provide ample time to reflect, appreciate and respect the environment you are in. Recreation and adventure programs are usually non-competitive, although there are exceptions. For example, the Australian adventure sports company Rapid Ascent hosts 'extreme' events including the Great Otway Gravel Grind, Bike Buller Festival, XAdventure, Run Larapinta and the Augusta Adventure Fest.

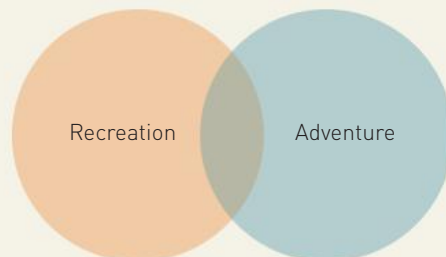
Recreation and adventure can be challenging and encourage people to push themselves to achieve a particular goal. They can include passive, active, exploratory, educational and high-risk activities. Due to their highly versatile outcomes, these experiences are often undertaken by school groups to achieve a heightened sense of environmental awareness. In Outdoor and Environmental Studies, recreation and adventure activities are predominantly non-motorised, although the use of recreational vehicles such as four-wheel drives and trail bikes are exceptions to this generalisation.

LEARNING ACTIVITY



RECREATION AND ADVENTURE

Create a Venn diagram to compare and contrast recreation and adventure experiences.



Environment as a spiritual connection

Describing or defining the term 'spiritual connection' is difficult. Some people say it's connecting to something on a deeper level, feeling close to or having faith in something; others say it's being in sync or aligned with something, like puzzle pieces fitting together. In terms of the environment, it could be a spiritual notion where you find a sense of place and can put your life into perspective, or a deeper connection that cannot be achieved through participation in a purely recreational activity.

To have a spiritual experience, you don't necessarily have to visit an environment to do something in particular. Instead, you may visit an environment and just 'be'. Taking time out from the city and the bustle of everyday life to be among nature and immersing yourself in the environment are examples of spiritual experiences and connections.



Alamy Stock Photo/Kurt Lackovic

Admiring one of the many views at the Grampians National Park

Often Indigenous Australians are described as having deep spiritual connections with the natural environment in which they live. In contrast, non-Indigenous Australians are often associated with simply using environments for their own personal gain, or for relaxation, recreation or study. However, this is a stereotype or a generalisation, and doesn't account for individual differences in a society that is becoming more aware of the importance of the environment. Having a spiritual connection with the environment could include sleeping on the ground, tasting

the air after rain, watching the wind rush through the trees, or closing your eyes and listening to the sound of birds.

In some historical cultures, including those of many Indigenous communities, particular places such as certain mountains, rivers, beaches, forests, or even just individual rocks or trees had very important meaning. We might call these meanings religious, or some people use the term 'numinous', which means something that has a mysterious, holy or spiritual quality. Today, many people who travel in the outdoors describe numinous experiences when standing on the top of a mountain, or watching the cloud lift up from a valley early in the morning, or even when listening to the sound of waves crashing on rocks.

LEARNING ACTIVITIES



CREATIVE RESPONSE

In small groups, brainstorm a list of ways that people can form spiritual connections with outdoor environments. Present your ideas in a creative way, such as creating a rap, rhyme or song, a poem, a cartoon strip, or a short radio/television segment or advertisement.

EXPERIENCES IN SONG

Xavier Rudd's music video for his song *Follow the Sun* was filmed at Stradbroke Island and along the coast of Queensland and New South Wales. It shows the local Minjerrabah people and some of their interactions with the environment, as well as the interactions of some non-Indigenous Australians. Watch his video via the link at <http://www.nelsonnet.com.au/oes> and think about what the images are suggesting about people's experiences with the environment. Discuss your thoughts with your fellow class members.



Follow the Sun by Xavier Rudd

Outdoor environment as a study site

A study site is a location or place where investigation, analysis and other activities occur in the pursuit of knowledge. There are many people who utilise the environment as a study site, such as scientists, students, land managers, volunteers and outdoor education companies. They may undertake observation, exploration, testing, monitoring, recording and reporting in order to better understand the environment, how and why it has changed over time, and human **interrelationships** with it.



Alamy Stock Photo/Doug Steley C

Water testing

interrelationship

The way in which two or more things affect each other because they are related in some way

LEARNING ACTIVITIES



BEING A SCIENTIST

Select a specific type of scientist, such as a geologist, ecologist, archaeologist, anthropologist or botanist (or another with the approval of your teacher).

- 1 Investigate the work they do with the environment.
- 2 Summarise their use of, experience with, and response to the environment in a short oral presentation.

COLLAGE OF IMAGES

Find at least 10 images that represent each of the following ways people may experience and respond to environments:

- resources
- recreation and/or adventure
- spiritual connection
- study sites.

Print, draw or place the images onto a collage and include a brief description or key words about what each of these experiences and/or responses means.

EXPERIENCES AND RESPONSES

- 1 Your teacher will show you a variety of images of a particular environment. As each image is shown to you, note down your immediate response, including any words that come to mind.
- 2 Share your notes with a partner or in a small group to gain a better understanding of the various ways of responding to an environment. Talk about your own experiences and how these may have shaped your particular response.

KNOWING OUTDOOR ENVIRONMENTS

There are different ways people can come to know and therefore understand outdoor environments. Environments are encountered from various viewpoints and positions, including through experiential knowledge (explained on page 32), environmental and natural history, and ecological, social and economic perspectives.

To know something is to be aware through observation or investigation; to have developed a relationship through meeting and spending time with it; to have learnt about and to possess information and an understanding of it. In getting to know outdoor environments, we need to observe and enquire about them, spend time in them, gather information and learn about them in order to understand them to some degree.

People can experience the environment in many ways – through recreational activities; media such as television, the Internet and social media; literature such as research studies, books and poems; education; and through their geographic location (the place they live in or near to, such as coastal towns or outback plains).

Let's explore these viewpoints and perspectives mentioned that lead to people knowing about outdoor environments. These are:

- experiential knowledge
- environmental and natural history
- ecological, social and economic perspectives.

LEARNING ACTIVITY



WAYS YOU KNOW THE ENVIRONMENT

Compile a list of all the ways you personally have come to know and understand the environment. Think about trips you might have been on, something you read about, a television show you watched, a conversation you had with a neighbour or what you like to do outdoors. Once your list is complete, compare it with a friend and discuss what you know about the environment.

Experiential knowledge

Experiential knowledge is essentially obtaining knowledge and understanding through actively engaging in an environment. It is a personal experience, such as visiting a location and/or getting involved in an activity. These hands-on experiences are extremely important in allowing us to form a relationship with the environment, and feature heavily throughout the Outdoor and Environmental Studies course. People who come to know the environment through their own individual experiences often have a deep and clear understanding of it.

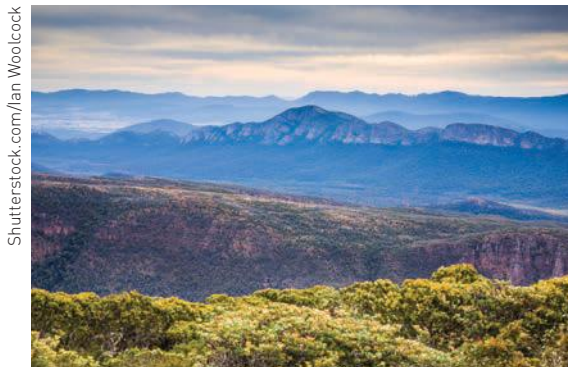
LEARNING ACTIVITY



JOURNAL ENTRIES

While on an outdoor experience, keep a journal of your encounters with the environment. Include details such as:

- activities you participated in
- how they made you feel
- what you learnt about yourself
- what you learnt about the environment
- impacts you had on the environment
- the relationship you developed as a result of the experiences.



Shutterstock.com/ian Woolcock

From land formations and vegetation and climate (among other features), we can come to know a place.

Environmental and natural history

Natural and environmental history is based on land formations, climate and weather events, changes to the landscape and the animals that inhabit it, and a basic knowledge of what has occurred in a specific environment throughout a period of time. Those who encounter environments through the discovery of history have the ability to reflect on what has changed and why it might have changed, and then try to make predictions about the future.

LEARNING ACTIVITY



TIMELINE

As a class, select an environment you have visited (or will visit) as part of an outdoor experience. Together, construct a timeline of events from the deep past to the present, either electronically or using a wall in your classroom. You may like to work on this over a few lessons, adding information about Gondwana, key historical events, images and obvious changes in landforms, climate, vegetation, animals and human interactions. Once complete, you should be able to see the natural and environmental history of your selected area. To whom would this information be most useful?

Ecological, social and economic perspectives

ECOLOGICAL

Ecological perspective is grounded in biology and is concerned with the interrelationships between living organisms and their physical surroundings. It plays an important role in ensuring the adequate functioning of ecosystems within an environment. Ecological perspectives can lead to a level of knowledge and understanding about the environment that is not always immediately obvious, and the development of an appreciation that goes beyond what we can simply observe with the naked eye.



Shutterstock.com/Morgan DDL

Commercial anglers may have an economic perspective of the environment.

SOCIAL

Human interactions with outdoor environments are the foundation of the social perspective. They refer to the actions of society as a collective or community, rather than just focusing on individuals. By encountering the environment through a social perspective, we can gather knowledge about which activities and behaviours have been successful and which ones have not, thereby leading to a greater understanding about specific environments.

ECONOMIC

Economic perspective is directly linked to profit, and is therefore associated with what the environment offers in terms of its resources and income opportunities, such as those in tourism, farming, timber and water harvesting, mining and commercial fishing. Some people who come to know the environment through this perspective may be narrow-minded with an insatiable desire to make money, but they may also come to understand the value of protecting the very asset they require – the environment itself.

LEARNING ACTIVITIES



PERSPECTIVE CHALLENGE

Your teacher will select an environment, divide the class into small groups and provide each group with a particular perspective to investigate (ecological, social or economic). When researching the environment, you should be doing so from your given perspective only. Your group should challenge itself with the following questions:

- 1 What does knowing an environment mean from this perspective?
- 2 What is valuable or important about this environment in relation to your given perspective?
- 3 How would people come to know and understand the environment from this perspective?

Present your group's perspective in a way that reflects its meaning. For example, the group researching an economic perspective may choose to present their information graphically; those researching a social perspective may undertake a role-play; and those researching an ecological perspective may put together a short animation. Once all groups have presented, discuss how different people may come to know and understand the same environment.

DIFFERENT PEOPLE, SAME ENVIRONMENT

Construct an essay using the following template:

- Introduction – overview of your selected environment.
- Paragraph 1 – the way you know and understand the selected environment; what the environment means to you.
- Paragraph 2 – the way someone else knows and understands your selected environment (e.g. a farmer, logger, miner, adventurer, Indigenous Australian or artist); what the environment means to them.
- Conclusion – how different people can know and understand the same environment; the different meanings an environment can have.

SAFE PARTICIPATION IN OUTDOOR EXPERIENCES

Living and travelling in remote, outdoor environments brings with it a whole set of demands and issues we don't normally face in our everyday lives. In the next chapter we'll look at some strategies aimed at reducing our physical impact on environments, including good planning, navigation and group awareness, preparing suitable equipment and food supplies, and developing minimal impact approaches.

The most important aspect of any group's or individual's participation in an outdoor experience is to do so safely, and to get home safely afterwards. In later parts of this course we'll examine the nature of some of the risks that are a part of outdoor experiences, but in this section we'll start our focus on safe participation by considering some of the simple strategies and practices that you can begin to develop on your own practical trips.

Types of risks in the outdoors

Risk management is a process that all teachers and outdoor leaders must include in their planning of outdoor experiences with students and other groups. There are a huge number of possible risks inherent in outdoor activities. We can break these risks into three main groups:

- 1 **Environmental risks** – Environmental risks are those that originate from the outdoor environments themselves and can have an impact on the activity. They include such factors as

weather, terrain, the availability of shelter and the remote aspect of many outdoor environments, as well as the inherent dangers associated with some Australian flora and fauna.

- 2 **Risks associated with people** – Risks can be connected to the people involved in outdoor activities, such as leaders and participants, as well as other people that groups may encounter. They include such factors as the skills, knowledge, experience, health and fitness, age, fears, and other emotions that participants bring to an outdoor experience.
- 3 **Risks associated with equipment** – Risks can be associated with the specialised equipment that we use while on outdoor trips, and the equipment used to get to the places that we visit. They include such things as clothing, buoyancy aids, kayaks, surfboards, bikes, tents, climbing ropes, helmets, motor vehicles and fuel stoves.

LEARNING ACTIVITY



RISK MANAGEMENT ANALYSIS OF AN OUTDOOR EXPERIENCE

- 1 In preparation for an outdoor experience, prepare a list of possible risks that you and your group may face as a part of that experience.
- 2 Divide these risks into the three categories: environmental, people and equipment.
- 3 Analyse and describe ways of preparing for and reducing these risks.

Starting points for students

I remember, in exasperation, once telling a class that falling in the snow, getting tired, wet and cold weren't risks of their forthcoming introductory nordic ski trip, they were certainties, part and parcel of the experience! The risks I wanted them to consider were things like hypothermia and skiing into a snowgum at speed, things that could really harm them, not just leave them slightly uncomfortable.

Rob Hogan, *Australian Journal of Outdoor Education*, vol. 6 no. 2, 2002

Managing risks well takes practice and experience. Teachers and outdoor leaders will have first-aid and other qualifications that form a part of their experience and knowledge, and you may develop (or have already developed) some similar skills as you work through this course. Even without recognised qualifications, there are some common-sense starting points that can help in your preparation for a safe outdoor experience.

Life-threatening dangers

There are many things in our everyday lives that have the potential to harm us. Two examples that come to mind quickly are cars and electricity, but we use cars and electricity all the time, despite the dangers. Why do we do this? Because we prepare for, and try to minimise, the dangers of potentially harmful actions. We wear seatbelts, drive using socially and legally binding rules, and cross roads carefully. We don't stick knives into toasters, and we hire qualified electricians to work on our household circuits and lights. These sorts of precautions and preparations often don't even cross our minds – they're just a part of life in 21st-century Australia.

When we live and travel in the outdoors, such as when bushwalking, mountain biking, camping in tents, canoeing or climbing, there are life-threatening dangers we need to be aware of. In the same way we prepare for and are cautious about dangers in our everyday lives at home, we can prepare for and be cautious of these outdoor dangers too.

While this is not intended to be a comprehensive list, any collection of dangers on outdoor experiences should probably include:

- drowning
- impacts with solid things (which either fall onto you or onto which you fall)
- exposure (including hypothermia)
- burns from bushfires and fuel stoves
- lightning strikes
- poisonous bites.

LEARNING ACTIVITY



COMMON-SENSE APPROACHES TO DANGERS IN THE OUTDOORS

As a class activity, divide into six groups. Each group will be allocated one of the dangers listed above. As a group, develop some simple common-sense guidelines that could be followed to minimise the potential threat from this danger. Present your group's guidelines to the class, and listen to the guidelines for other dangers.

Emergency procedures

Instructors on first-aid courses always describe numerous simple principles related to helping people in an emergency. We'll briefly describe three of these: preparation, getting lost and injury.

1 PREPARATION

The best way to avoid injury is to avoid whatever causes the injury. The best way to do this is to be fully prepared. There are some basic risk management preparations that any group should make before a trip.

- **Let someone know before you go.** Make sure people are aware of where you're going, what you're doing, who is going, and where you expect to be at key times and dates. This includes advising police and emergency services for schools and bigger groups.
- **Prepare and take a well-stocked first-aid kit.** Make sure you will have people on the trip who are trained and confident in its use, and know how to deal with the most likely emergency scenarios.
- **Carry emergency equipment.** This includes extra food, dry clothes, sleeping bag, space blanket, torch, fire-lighting kit, maps and navigation aids.
- **Learn to navigate,** or have people with experience in navigation as a part of the group. Online maps and mobile navigation apps are great for finding your way around, but in remote areas they can be problematic as there is often no internet signal. Also, it is good to have a navigational alternative in case your device batteries run out.
- **Practice skills** with more experienced leaders before you go on your own or lead your own group.
- **Watch the weather** before the trip. Having an idea of what sorts of conditions you are expecting gives you a better chance to select and bring appropriate clothing and other gear.
- **Avoid going on your own.** Many adventurers and more experienced outdoor people will undertake solo trips and often talk about the amazing experiences they have when outdoors on their own, but in terms of safety it's generally recognised that four people is a good minimum group size. If someone in a group is injured, having a group of four means that two people can go for help and another person can stay behind to help care for the injured person.

Trip preparation will be covered in more detail in the next chapter.

2 YOU ARE LOST ... WHAT NOW?

In remote environments, it's easy to become lost. It's important to have some procedures to follow if this situation occurs:

- **Stop**, so you don't become more lost (yes, that can happen).
- **Don't panic.** Panic and anxiety don't help anyone. It creates unwanted tension in a group, and wastes time.
- **Start trying to work out where you are.** Try to find features in the landscape around you that you can identify on your maps.
- **Stay together** as a group – do not split up. It is better to have one big lost group than to have multiple lost groups. If you must wait for a rescue, it will be easier with the group intact.
- Once you are settled and organised, consider finding a higher point where you might have mobile phone access and better vision of the surroundings, and/or try retracing your steps to return to a place you recognise.
- **Contact emergency services.** Give them details of the group, your equipment, your current environment, and your best recollection of place before becoming lost.
- If you are unable to contact emergency services, your task changes to surviving until rescue. Help your rescuers by staying together, finding shelter and conserving energy.

3 SOMEONE IS INJURED ... WHAT DO YOU DO?

When injuries and incidents occur in the outdoors, the leaders and first-aid-trained people will take charge. They will go through an emergency procedure similar to the one below.

If you find yourself in a situation where an injury or incident has occurred and you don't have immediate access to first aid, try to follow the same procedure as best as you can. In a remote environment, with professional help potentially a long way away, anything you can do to improve the situation is better than nothing.

- Stop. Take a moment to collect and calm yourself – take a deep breath.
- Ensure everyone else in the group is safe.
- Get to the injured person as quickly and safely as possible.
- Only move the injured person if absolutely necessary.
- Try and determine the condition of the injured person – what's wrong?
- Treat any life-threatening injuries.
- Make the injured person comfortable.
- Send for help.
- Keep reassuring and advising the injured person.

LEARNING ACTIVITY



EMERGENCY CASE STUDIES AND ROLE-PLAYS

As a class, look at some examples of wilderness and outdoor emergency case studies such as those from the National Outdoor Leadership School via the link at <http://www.nelsonnet.com.au/oes>.

Discuss some of the ways you might respond in these scenarios. Use some of these scenarios in role-plays about dealing with emergencies in the outdoors.



National
Outdoor
Leadership
School case
studies



Alamy Stock Photo/Bill Bachman

Gaining knowledge through experience

Safety for specific activities

All activities, including those we undertake in outdoor environments, have specific skills associated with them. The better we become at these skills, the better (and more safely) we can perform the activities.

The development of some skills can be utilised in many activities, or learnt and transferred from one activity to another. For example, the development and improvement of physical coordination and balance is a skill that can be used in activities such as skiing, surfing, climbing and kayaking. The ability to work with knots is another skill that can be transferred across many outdoor activities.

Many skills are specific for a particular activity. We won't teach them theoretically here, as activity-specific skills are only usefully learnt through participation in the activity. You learn to surf, ski, climb and kayak by doing these things outdoors rather than reading about them. Once you have learnt and practised some specific skills,

you can certainly improve on them by studying them more carefully (which can include reading about them) and by thoughtful reflection and feedback on your practice.

We encourage you to go outdoors and begin (or continue) to develop your skills. Enjoy!

LEARNING ACTIVITY



SPECIFIC SKILLS

Come up with a list of the specific skills needed to safely perform one of the following activities:

- walking
- canoeing/kayaking
- sailing
- rock climbing
- mountain biking
- skiing
- surfing
- horse riding
- snorkelling
- swimming.

INFLUENCES ON OUTDOOR EXPERIENCES



KEY KNOWLEDGE

- the influence of media portrayals on personal responses to outdoor environments (page 40)
- rationales for codes of conduct relating to recreational activities (page 42)
- strategies for planning safe and sustainable interactions with outdoor environments (page 47)
- the factors that affect access to and kinds of outdoor experiences, including socioeconomic status, cultural background, age, gender and physical ability (page 55)
- relevant technologies and their effects on outdoor experiences (page 61)
- the variety of personal responses to risk in outdoor experiences, including the interplay between competence, perceived risk and real risk (page 64)

KEY SKILLS

- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected during these experiences
- describe and analyse specific examples of recreational codes of conduct
- describe and analyse a range of personal responses to risk, to outdoor environments and outdoor experiences, and to sustainable interactions with outdoor environments
- explain the effects of relevant technologies on outdoor experiences
- plan for and use appropriate skills for safe and sustainable interactions with outdoor environments
- explain factors that affect access to outdoor experiences

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

THE INFLUENCE OF MEDIA PORTRAYALS ON PERSONAL RESPONSES TO OUTDOOR ENVIRONMENTS

media

The main means of mass communication, including television, newspapers and magazines, film, billboards and posters, books, artworks, the Internet and social media

In this section we'll look at how the world is becoming more and more dominated by our use of **media**, and we'll focus specifically on the ways that media influences our responses to environments.



NewsPix/Nathan Richter

Sometimes the only thing we see of an outdoor adventure is the rescue efforts when things go wrong. How do these images affect our response to outdoor environments?

Nowadays, when we talk about media, people often immediately think of social media such as Facebook, Twitter or Instagram, but media is a diverse range of different things. Some of these are more influential than others, and these influences change over time. So when we talk about media, we'll sometimes refer to something specific, but more often we'll be including:

- television
- newspapers and magazines
- film
- billboards and posters
- books
- artworks, including painting, photography and music
- Internet, including social media.

How the media portrays outdoor environments

In this section, we're interested in the influence that media portrayals of outdoor environments have on our personal responses to those environments. But how does the media portray outdoor environments?

Media portrayals are potentially so diverse that the answer to this question could become meaningless. Perhaps better questions to ask are, 'Why does the media portray nature?' and 'What is the point of portraying nature?' To answer these questions, we will look at a few different motives for portrayal.

MOTIVES FOR MEDIA PORTRAYAL OF OUTDOOR ENVIRONMENTS

- **To celebrate nature and the outdoors** – An amazing film or television documentary about a particular place or a particular animal will often do this, and of course many artworks also aim to do this. We might also find a celebration of the outdoors in a media work that is focusing on something else, such as a film about surfing or mountain climbing where the focus is on the activity or the adventurer.
- **To sell a place or an experience** – This is the role of advertising and marketing, and we find it throughout the media. People are perhaps literally trying to sell a place, or maybe they're focusing on tourists and tourism that visits a particular place or a particular experience in a place. We can even find the portrayal of outdoor places in the selling of other things such as cars, iPads or ice-cream.
- **To inform** – In newspapers and magazines, and across the Internet, portraying the environment is about informing us in some way.
- **To understand and develop our knowledge** – Related to informing, this is the portraying of environments to educate us. Wildlife documentaries are an example of this type of portrayal.
- **To challenge** – Film and television often challenge the ways we see things, and this is one of the main purposes of artworks. Music challenges us in a powerful way, such as some of the music by Midnight Oil, R.E.M. and Joni Mitchell.
- **To scare** – Creating fear is something that media can do very well. Portrayals of outdoor environments that scare us aren't hard to find, particularly in film and television. The film *Wolf Creek* (and its sequel) is an example of where the portrayal of the environment can scare us. Indeed, in many of these types of portrayals, the environment itself is said to almost become another character in the story that we are watching, reading or hearing.

HOW OUR RESPONSES ARE INFLUENCED

How does the media influence our own personal responses? Since our personal responses are emotional responses, media can influence our responses by tapping into our emotions or influencing them in some way.

There are many ways media can influence our responses, including:

- **motivating** – such as inspiring people to care for or about something, or motivating them to go to a particular place or participate in a particular activity
- **changing behaviour** – such as moderating the way someone acts in a particular place
- **informing** – such as educating people about an issue related to a particular place or activity
- **influencing** – such as influencing people to buy and use the latest equipment and technology.

LEARNING ACTIVITIES



MEDIA PORTRAYALS OF OUTDOOR EXPERIENCES

Nature and images of natural outdoor environments figure prominently in the media. There are two significant uses of images:

- to add emphasis, clarity or explanation to a discussion relating to the natural environment
 - to add impact to an unrelated issue (often the case in advertising).
- 1 Why can images of the natural environment have a powerful impact on those viewing them?
 - 2 Find images of the natural environment that you think aim to elicit the following responses: fear, awe, contemplation, excitement, happiness and peace.
 - 3 Share your findings with others and discuss whether each person agrees if the images you have chosen correlate with the emotional responses listed.

MEDIA, MOTIVATIONS AND RESPONSES

Collect at least six articles, headlines or photos from a variety of newspapers and magazines that depict adventure in various ways. Apply the following points and questions to the articles you have collected:

- 1 Explain the image that is being portrayed (e.g. is it a sensationalised report on misadventure? A glamorised description of adventure? Does it convey the value and rewards of the activity?).
- 2 Explain the impact this image is likely to have on participation (e.g. will it discourage people? Inspire them? Attract participants?).
- 3 Describe the possible motivations of people who choose to participate in this activity (e.g. is it the challenge? the fame and glory?).

CODES OF CONDUCT

We have looked at some of the ways the media can impact our experience with the environment. The application of codes of conduct relating to specific recreational activities is yet another way our experience with the environment can be influenced. Essentially, codes of conduct are associated with promoting safe and enjoyable participation for people engaging in various outdoor pursuits.

Codes of conduct in relation to the outdoor environment are therefore the set of rules for correct practice in the outdoors.

The need for a code of conduct often arises from the recognition that unregulated use is leading to significant negative impacts on an area. The creation of a code of conduct in this case aims to reduce the negative impacts and promote sustainability. Codes of conduct are developed by different **stakeholders** such as government, commercial and community-based groups working together. Some of these include:

- Department of Environment, Land and Water Planning (DELWP)
- Parks Victoria
- Department of Primary Industries (DPI)
- Environmental Protection Authority (EPA)
- Victorian Government and its associated bodies (some of which have already been mentioned)
- Four Wheel Drive Victoria and other recreational activity peak bodies or associations
- Bindaree Outdoor Adventures and other outdoor education companies.

Considerations in relation to codes of conduct include:

- ideal group sizes
- seasonal restrictions
- vehicle restrictions
- best practices for the conduct of the activity
- practices that should be avoided.

Codes of conduct are often associated with minimal impact strategies and are used for both prevention and education, which means there can be specific reasons for their development as they are used by individuals, commercial groups, outdoor educational organisations and schools. Abiding by a code of conduct is a question of ethics. It is everyone's responsibility to follow the guidelines that have been provided to them. Some codes of conduct include penalties. For example, it may be a condition of membership to a certain group that you adhere to a particular code of conduct. However, in most cases, codes of conduct related to recreational activities are recommendations that cannot be strictly enforced by law.

code of conduct

A set of rules outlining the responsibilities of, or proper practices for, an individual, group or organisation

stakeholder

A person, group or organisation that has interest or concern in an issue

Codes of conduct in various recreational activities

CAMPING

Camping is a recreational activity often associated with other pursuits and is highly relevant to school groups. Therefore, it is important for you to have an understanding of a typical camping code of conduct. For example:

- Use established campsites if they are available.
- Observe and listen to wildlife, but don't touch or disturb it.
- Leave no trace – leave the environment as you found it, or in a better condition (for example, pick up any rubbish you find).
- Use toilet facilities if they are available, otherwise dig a hole at least 15 centimetres deep and at least 100 metres away from natural water courses and bury all faecal waste and paper.
- Use bins if they are available, otherwise take all rubbish and leftover food home with you.
- Have campfires in designated fire places and use only dead timber; completely extinguish fires before leaving the area.
- Don't wash dishes in natural water courses, instead wash them at least 50 metres away.

Codes of conduct related to specific recreational activities vary depending on the type of activity, location and source. Some typical code of conduct extracts have been included as follows.



Leigh Park

Code of conduct signs can be displayed in prominent places.

Shutterstock.com/noomcm



Typical designated fireplace found at a campsite



Alamy Stock Photo/Bjorn Svensson

Following a boardwalk in an area of sensitive vegetation

BUSHWALKING

When bushwalking:

- stay on the tracks provided; if tracks do not exist then spread out rather than walking in a single file (as this can create a new track)
- be aware of sensitive areas
- avoid marking the track with tape or rock cairns (as this can confuse other walkers)
- observe and enjoy the wildlife, but do not disturb it
- follow appropriate toileting procedures
- use boot-cleaning stations if they are provided
- carry out what you carry in and pick up any rubbish you see along the way.

ALPINE TRAVELLING

When alpine travelling:

- use campsites provided or choose one away from regular ski trails
- dismantle snow walls and/or shelters you have built
- use a fuel stove rather than burning firewood (as this can leave fire scars on fragile alpine grasses)
- minimise the use of fires in huts during the winter season and restock any wood you have used
- only use huts in emergency situations (as others may need to use these)
- use the ski trails provided and avoid sensitive vegetation.



Code of conduct –
Australian Alps
National Parks

LEARNING ACTIVITY



CARE FOR THE ALPS – LEAVE NO TRACE

Visit the Australian Alps National Parks website via the link at <http://www.nelsonnet.com.au/oes>.

Read about their latest code of conduct, which encompasses many recreational activities, and watch the short video clip.

CANOEING, KAYAKING AND RAFTING

When canoeing, kayaking and rafting:

- wear helmets if participating on moving water
- carry spare paddles on all river trips
- carry and use appropriate safety equipment (towing system, throw bag, repair kit, etc.)
- keep left of the river when travelling on the water
- wear shoes to protect your feet
- take boats in and out of the water at designated entry points and carry rather than drag them (as this reduces riverbank erosion)
- use boardwalks and other tracks provided.



Shutterstock.com/Ammit Jack

You should carry boats to designated entry points (not drag them) to reduce riverbank erosion.

ROCK CLIMBING AND ABSEILING

When rock climbing and abseiling:

- proper belaying technique and backup belaying technique must be taught and used
- all equipment must be appropriate to the activity and in a safe condition
- staff must be correctly qualified depending on type and nature of the climb
- carry out what you carry in
- use appropriate toileting practices
- reduce the use of chalk (as this can lead to long-term deterioration of the rock surface)
- do not change the nature of an established climb or mark the start of a climb
- avoid destructive practices such as chipping and bolting
- respect access arrangements, climbing restrictions and all cultural, geological or scientific sites
- be aware of vegetation on tracks leading to and at the base of climbs.

SURFING AND BODYBOARDING

When surfing and bodyboarding:

- beginner surfers should use soft boards
- participants should have basic swimming and water safety skills
- leg ropes or wrist leashes should be worn
- a rescue tube or board should be readily available for rescue purposes
- use a whistle or other device for signalling
- keep off sand dunes and coastal cliffs
- avoid nesting areas
- do not touch any animals and be aware of those that can be harmful
- wear some form of foot protection if reef walking
- use appropriate toileting practices
- carry out everything you carry in and remove any rubbish you see
- do not collect shells or other marine life.

MOUNTAIN BIKING

When mountain biking:

- ride on open trails only and respect trail/road closures
- avoid skidding, cutting corners and riding off track
- avoid riding in muddy trails or creating new trails (instead, dismount and carry your bike around these areas)
- control your bike, ride at a reasonable pace and distance from others, slowing in heavily used areas
- carry and wear appropriate clothing and equipment, such as a helmet and adequate supplies
- respect the rights of others; stop and pull over to allow walkers to pass; make your approach well known and use a bell if one is available to you
- give way to horse riders and uphill cyclists
- avoid riding over plants and animals on the track
- ensure your bike is in safe working order.



Marcia Cross

When riding, control your bike and ride at a reasonable pace and distance from others.



Old codes
of conduct –
Australian Alps
National Park

LEARNING ACTIVITIES



OLD CODES OF CONDUCT

Visit the Australian Alps National Park website codes of conduct section via the link at <http://www.nelsonnet.com.au/oes>. Read some of the scanned versions of old code of conduct brochures for bushwalking, car-based camping, mountain biking, horse riding, river users, snow camping and huts. (These were previously published by the Australian Alps Liaison Committee, but are no longer in print.) Select one of these codes of conduct that relates to a recent practical experience you have been on then answer the following:

- 1 Were you aware of this code of conduct before your practical experience? If yes, then how did you find out about it?
- 2 While on the practical experience, did you abide by the code of conduct? Provide examples of how you may and/or may not have followed the code.
- 3 From your observations, did other people (from your class or members of the public) abide by the code of conduct?
- 4 Evaluate the effectiveness of this particular code of conduct, based on your experience and observations.

CREATE YOUR OWN CODE OF CONDUCT

Create your own code of conduct for a recreational activity of your choice. Your code of conduct can be inclusive of some of the information provided in this book, but should also include some updated or new information. Describe the stakeholders or groups of people you would involve in the creation process (if they were available). Provide illustrations, diagrams or a sample of how you would produce and market your code of conduct to ensure it was used effectively.

ALPINE RESPONSIBILITY CODE

Regardless of how you enjoy your snow sport, always show courtesy to others and be aware that there are risks in all snow recreational activities that common sense, protective equipment and personal awareness can reduce. These risks include rapid changes in weather, visibility and surface conditions, as well as natural and artificial hazards such as rocks, trees, stumps, vehicles, lift towers, snow fences and snowmaking equipment.

- 1 Stay in control and avoid other people and hazards.
- 2 Use appropriate protective equipment, especially helmets, to minimise the risk of injury.
- 3 You must have the ability to use each lift safely. If in doubt, ask the lift attendant.
- 4 Obey all signs and warnings, and keep off closed trails and areas.
- 5 It is your responsibility to avoid and give way to people below and beside you.
- 6 Do not stop where you are not visible from above or where you obstruct a trail.
- 7 Before starting downhill, or merging into a trail, look uphill and give way to others.
- 8 Use care to prevent runaway snowboards.
- 9 If you are involved in or see an accident, alert and identify yourself to Resort Staff.
- 10 Be aware that it is dangerous to ski, board or ride lifts if your ability is impaired by drugs or alcohol.

KNOW THE CODE. IT'S YOUR RESPONSIBILITY.

Australian Ski Patrol Association Inc.

LEARNING ACTIVITY



ALPINE RESPONSIBILITY CODE

Read the Alpine Responsibility Code on page 46 and answer the following questions:

- 1 Who might have been involved in the creation of this code of conduct?
- 2 Who would use this code of conduct and when?
- 3 Explain how this particular code of conduct differs from some of the others that have already been mentioned in this book.
- 4 Do all codes of conduct have the same intention(s) and outcome(s)?
- 5 Which type of code of conduct is more effective?

PLANNING INTERACTIONS WITH OUTDOOR ENVIRONMENTS

You could write whole books on planning for outdoor trips, or even just one small part of the planning process – and many people have done just that. Try to find some of these books to help with your own learning about the planning process.

For this book, we'll look at a few key areas and some of the main things to keep in mind as you start planning for your school trips or your own trips.

Why plan?

Some of the things we might want to get from an outdoor experience include fun, enjoyment and challenge. But we also want to make sure that we have the experience safely and we do it in a way that doesn't negatively impact on the environment – we want our experience to be sustainable.

We could simply step into the bush and hope we can do all of this (and for experienced outdoor users this might be achievable), but it's more likely that by planning our experience we can accomplish these ideals.

This section is an overview of some things to consider when planning outdoor experiences, but it's only a starting point. You should look for other sources of information and ask people with experience in the outdoors to help supplement your own planning.

ROUTE PLANNING

When planning an outdoor experience, whether it be a short activity over several hours or a multi-day journey, there are many factors that should form a part of your planning:

- **Nature of the possible activity (or activities)** – Each activity (such as walking, cycling, canoeing, skiing and climbing) has its own equipment requirements and may affect the likely venues.
- **Geographic location** – Where you are going will affect the clothing and equipment requirements, and you'll need to consider how you're going to get there.



Marcia Cross

Day trip or many days? Walking on tracks or off track? In summer or winter? Asking questions of you and your group is a key part of trip planning.



Grassy plains make visible many alpine topographic features.

- **Time of year** – This will determine the sort of clothing, equipment and food required for the experience, and may affect the availability of water.
- **Possible weather conditions** – Although you can't necessarily know beforehand exactly what the weather will be like on a trip, you can make some good deductions about likely conditions based on where and when you're going, and you can be prepared for likely extremes.
- **Capabilities of the group** – The size and the experience of the group will determine the sorts of equipment you'll need, the places you can go, the activities you can include and the time you'll need to allow.
- **Nature of the terrain** – Is it likely to be flat or mountainous? Open grasslands or thick forest? Sandy beach or muddy swamp? The sort of terrain you face will affect how easy (or otherwise) it is for a group to move through the environment.
- **Location of campsites (if needed)** – Suitable places for campsites are a requirement for a multi-day trip, not just for the comfort and convenience of the group, but for the likely sustainability of your journey. It is easy for a large group setting up tents to trample, disturb and otherwise impact sensitive environments – this should be factored in when planning the trip.
- **Location of water** – Water is an absolute requirement. Whether the group carries all their water requirements (very difficult for multi-day trips), relies on water drops (needing careful planning beforehand) or sources water from the environment as the group travels through it (needing a decision about whether or not to treat the water before drinking) is going to be a major consideration.
- **Availability of maps** – Although maps have become less essential with modern global positioning system (**GPS**) technology, a suitably prepared leader will have a good map in the case of emergencies or flat batteries in devices. Not all environments have good maps available. This doesn't necessarily mean you shouldn't go to those places, but you should treat that place with caution.
- **Possible escape routes when facing emergencies** – The most obvious emergency facing many groups will be bushfire. A group would be foolish to attempt a journey in an environment under bushfire threat, but many fires are sudden and unexpected. A planner should consider ways a group might escape from a fire depending on their location while on a trip. Other emergencies that may require a rapid change of travel plans are floods and injuries to one or more of the group.

GPS

(global positioning system) A satellite-based navigation system that can determine accurate and precise locations and give directions to other destinations

SPURS

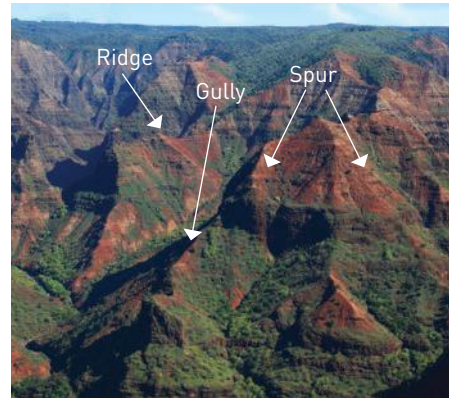
A spur is sometimes described as a tongue of land that descends from the high point of a ridge or mountain top. Spurs are usually easier to travel up than down, since it can be easy to lose the spur (especially near the bottom), and vegetation tends to be less dense on the crest of a spur.

RIDGES

A ridge is usually an extended high prominence that connects two (or more) high points or peaks together. Ridges are usually excellent features to walk along, since they're generally easy to stay on and their elevation will often make for great views of surrounding areas.



Mount Feathertop with steep spurs and exposed ridges



Some key landscape features

CREEKS AND RIVERS

Creeks and rivers are great for helping you to locate your position and for travelling, although it's usually easier to travel downstream with the flow rather than upstream where smaller creeks and tributaries can become confusing.

STEEP CLIMBS

If lots of climbing or steep ascents are involved in a route, it's probably better to include them at the start of the trip, or the start of the day, when everyone is still fresh.

Predicting walking time

In planning a multi-day walking journey, you'll need to figure out how long it will take to get from campsite to campsite. Most people tend to underestimate the amount of time it will take them to travel a particular route, figuring that they will be able to move faster than they actually do. This is especially true for larger groups. A good rule of thumb is: the larger the group, the slower they will move.

One way of predicting walking time is to use Naismith's rule, which was developed by Scottish mountaineer William Naismith in 1892. His basic rule breaks into three simple points:

- 1 Allow 1 hour of travel time for every 5 kilometres forward.
- 2 Allow 1 hour for every 600 metres of ascent.
- 3 When you're in a group, calculate all times based on the slowest person.

Other people have subsequently added to Naismith's original idea, adding time for descents (often figured at 1 hour for every 1000 metres of descent), as well as decreasing the forward distance achieved in 1 hour if carrying a heavy pack or walking through more challenging bush.

The specifics probably don't matter too much, as you'll need to be flexible in terms of how your group manages a particular route. Remember that as a day progresses, people get tired, so you will need to factor in rest breaks and time for food. Also, remember that an outdoor experience is intended to be fun – you won't want to be slogging it out all day, so you should probably factor in time to 'chill out' and do other things.

If the group is moving through an environment in a way other than walking (such as canoeing, cycling or skiing), then speeds will probably be faster and travel times will be less.

Maps and navigation

Maps come in all sorts of types, many of which are useful for groups planning an outdoor experience. The two most common maps used on trips are topographic maps and mud maps (sometimes called sketch maps).

topographic maps

Maps showing detailed graphical representations by contour and lines of features that appear on the Earth's surface

TOPOGRAPHIC MAPS

Topographic maps are designed to represent vertical relief (the third dimension) on a flat two-dimensional sheet. When combined with a compass, these are a powerful navigational tool. All of Victoria is represented by the Vicmap Topographic 1:25 000 map series, and also by the newer online 1:30 000 map series by Land Victoria.

The map scale shows the way the map has reduced the real world in making the representation. For example, 1:25 000 means that 1 centimetre on the map corresponds to 25 000 centimetres in the real world (or 1 centimetre = 250 metres).

mud maps

Rough sketches of a place or journey that show key features and likely routes, but are not drawn to scale

MUD MAPS OR SKETCH MAPS

Literally once drawn with sticks in mud, **mud maps** are rough sketches of a place or journey. They show key features and likely routes, but are not drawn to scale. Mud maps are very useful as a rough plan, but they should not be used for navigational purposes.

COMPASS OR GPS?

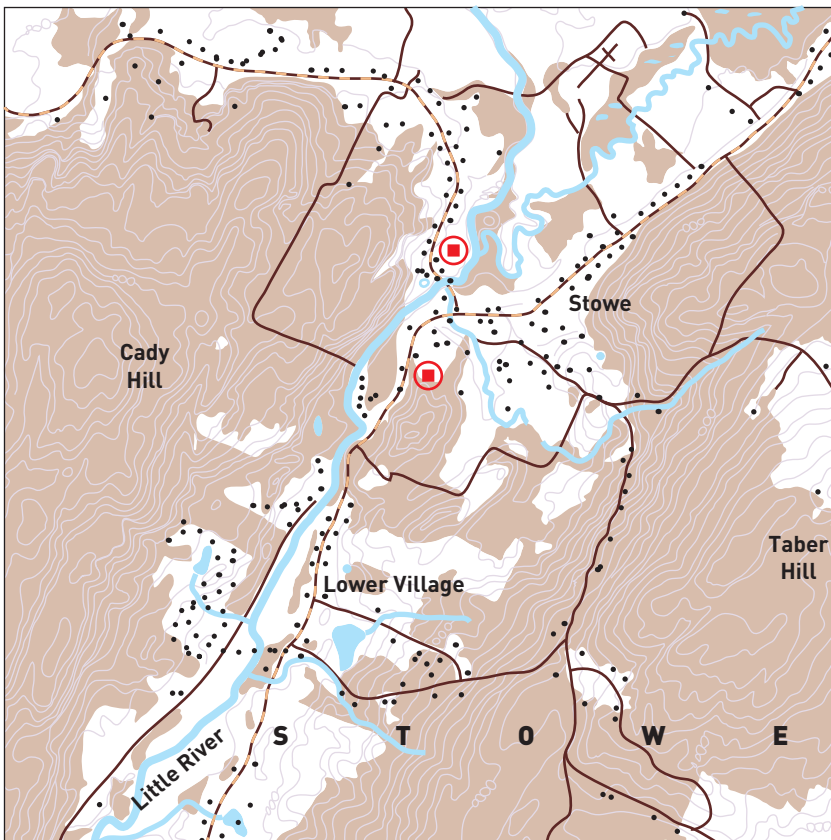
Which is better for navigation: a compass or a GPS? Many mobile phones (particularly smartphones) have GPS capability, which uses orbiting satellites to precisely determine your location on the Earth. Many groups will have access to purpose-designed GPS devices for navigation.

Comparing a GPS with a compass

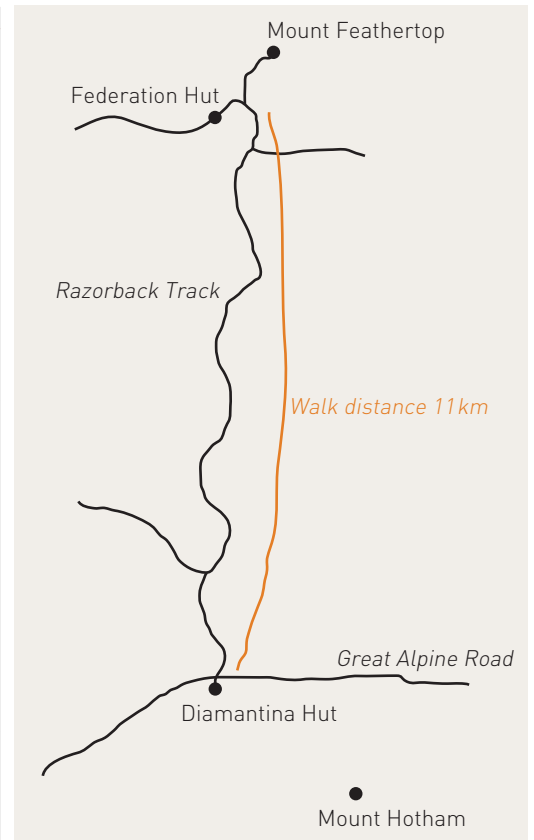
	GPS	Compass
Advantages	<ul style="list-style-type: none"> Will accurately locate your position and able to track your movements Can be used to enter a route before a trip, which can then be followed while on a trip Will determine altitude, which can be useful when on a trip in the Alps 	<ul style="list-style-type: none"> Very tough and durable Doesn't need power to operate
Disadvantages	<ul style="list-style-type: none"> Satellites can take some time to be found, and in thick vegetation may not be able to be located Usually needs batteries (although solar chargers can be found) Might be damaged by water, cold or shock 	<ul style="list-style-type: none"> Requires knowledge about how to use them – they're not as intuitive as a GPS

It is always worth taking a compass (assuming you have someone in your group who can use it), but a GPS is a good idea as well.

Do you even need a navigation device? While many trips will follow tracks and signs, it's always a good idea to be prepared for many possibilities. Remember, you're planning for safety and to minimise risk.



Note the pale contour lines on this simple topographic map.



An example of a mud map.

Minimal impact

Minimal impact is relatively straightforward and obvious – you and your group should aim to have as little environmental impact as possible, from when the trip begins to when you finally get home. Why? Hopefully you've chosen the subject Outdoor and Environmental Studies because you have an interest in and an affinity with the Australian environment, so this question should be redundant. We aim to have minimal impact as a result of our activities so that other people, coming later, can have the same experiences with the same environment. Eventually, we might like to visit the same environment again ourselves, and we hope that it will be as it was when we first visited it.

There are some classic phrases used to encourage and remind people about minimal impact:

- leave no trace
- tread softly
- tread lightly
- take nothing but photographs, leave nothing but footprints
- pack it in, pack it out.

You might use these as a simple mantra while out on your trip to help remind you about the idea of minimal impact.

CODE FOR MINIMAL IMPACT LIVING

You should be able to recall the specific camping and bushwalking codes of conduct from earlier in this chapter. There is also a code of conduct for minimal-impact living and travelling in outdoor environments, and a basic version will include variations on the following:

minimal impact
To have as little environmental impact as possible

- **Plan ahead and prepare** (the whole point of this section).
- Travel and camp on durable surfaces – avoid walking or pitching your tent on areas that are potentially sensitive.
- Dispose of waste properly – in most cases this will mean take your rubbish with you. Even when rubbish bins are around, remember the effort required to have someone empty and maintain them. You could help out simply by keeping your rubbish with you and disposing of it at home.
- Leave what you find.
- Minimise campfire impacts.
- Respect wildlife.
- Be considerate of other users in an environment.



Many protected places in Victoria are designated as 'Fuel Stove Only' environments – find out what you can and can't do, and take the right gear with you when you go.

CAMPFIRES

There's nothing quite like sitting around a campfire after a hard day of outdoor activities. But from the scars created by fires to the collecting of wood for fuel, campfires can have a major impact on fragile environments. Assuming fires are allowed in a particular place (they aren't allowed everywhere), and assuming it's not a Total Fire Ban day, building a safe fire is a great idea. If possible, dig a hole or trench for your fireplace to avoid fire scars, and bring firewood with you if it's easy to do so.

LEARNING ACTIVITY



CAMPFIRES

Make a list of things you could do to reduce the impact of a campfire on an outdoor trip.

TRANSPORT TO AND FROM A TRIP

When thinking about minimal impact, people often focus only on the actual activity part of a trip – the walking, canoeing or skiing. But a trip begins at home or school, and ends at home or school. In other words, there's the travel to and from the trip venue itself, which could be considered to have a greater impact on the overall environment than anything you might do while in the bush. If you're going on a trip to a particular place, you obviously have to get there somehow. Try to think about ways of reducing your travel impacts:

- use less vehicles if possible, or public transport if it's an option
- consider extending the trip to include further walking, cycling or canoeing to help you get to the venue
- avoid using eroded and damaged roads
- always use made roads and designated car parks where available
- think about ways to offset the impact of your travel, perhaps through tree-planting programs at school, home or in your local community.

TOILETS

Assuming you want to stay healthy and not cause damage to your internal organs, at some point on a trip you'll need to go to the toilet. Toilets, including drop toilets, are often provided at campsites (especially the more popular sites). While some of these can be very smelly, you should use these if provided. Many of the places people visit in the bush don't have toilets, so you'll need to consider a couple of options on your trip:

- **Bury your waste** – There's only one simple rule for digging a toilet: keep away from water sources, including creeks and rivers. Your toilet hole, which should be at least 15 centimetres deep, needs to be far enough away from a water source that it doesn't contaminate the water. How far is that? Some people suggest about 15–50 metres, or even 100 metres, from the water source. This will depend on the environment you're travelling and living in. In some places, it won't be possible to get 100 metres away from the water. A simple rule of thumb is: get as far away from water as is reasonable and possible for your group.
- **Take your waste with you** – Some environments are particularly sensitive to human waste, such as alpine areas, which are often the start of major water systems. In alpine areas, it's also often difficult to actually dig a hole to bury your waste. In areas of deep snow, just reaching the ground can be difficult, let alone digging down into it. Many groups are now using 'poo tubes' to carry their solid waste with them. While initially it can be an unsavoury thought, poo tubes (PVC pipes that can be opened and sealed up with screw-on lids) are simple to make and use.

Equipment

Part of your planning for any trip will include gearing up – getting together all of the equipment you will need to be comfortable (or as comfortable as you can get) and safe. Equipment usually falls under the following main groups:

- **Activity-specific equipment** – Climbing, surfing, skiing, canoeing, snorkelling, cycling and most other activities that might be a part of your experience will need some specific equipment to be able to safely and reasonably undertake the activity.
- **Sleeping** – Equipment for this part of an experience is probably obvious, and includes tents, sleeping mats and sleeping bags.
- **Eating** – You can probably break the eating part of a journey down into three parts: preparation, eating and clean-up. Each of these will require specific equipment, including a cooking stove (e.g. a Trangia), utensils, and so on.
- **Personal items** – Other things you might need on a trip include spare clothes, toiletries (including toilet paper and toothpaste), first-aid kit, camera, torch, and so on.



FAST FACT

Many outdoor enthusiasts and adventurers make their own gear, from portable stoves to tents and bivvy bags. For example, a lightweight methylated spirits fuel stove can be made from a recycled soft-drink can.

LEARNING ACTIVITY



GEAR CHECKLIST

- 1 Create a checklist of gear required for a specific trip.
- 2 Compare your checklist with those from other students, and compile a realistic final list.



FAST FACT

Two hours of walking with a backpack can use between 800 and 1000 extra calories, so be sure to include more food than you would normally eat when you plan your menu.

Food

Food on outdoor trips is one of those areas in which you'll need to balance several competing ideas. On the one hand, you'll probably be very active and so will likely need more food (to account for burning calories) than you may normally eat. On the other hand, the more you bring to eat, the

heavier your pack will be. There's also the issue of what you bring and how it needs to be prepared. Food that needs to be cooked will require you to bring something to cook it with, which in turn will probably need fuel.

There are no easy solutions to these problems, but here are a few points to keep in mind as you prepare the food list for a trip:

- You need food that is nutritious, light to carry, tasty, easy to prepare and easy to clean up afterwards. This can be a tall order, so it is often worth experimenting in the ease and comfort of home rather than trying out your ideas for the first time on a trip only to find it doesn't work or that you (or your group) don't like it.
- Food that requires water to cook it (such as noodles, pasta and rice) can be very light and is useful to take on trips, but make sure you will have access to enough water, and note that some of these (particularly rice) can be tricky to cook on a trip.
- If your trip is likely to run at a time when a Total Fire Ban could be in force, make sure you have alternative meals to cooked ones – you don't want to be eating your pasta or noodles uncooked.
- Pre-packaged dehydrated meals can be great in terms of weight and ease of preparation, but sometimes leave a bit to be desired when it comes to taste, and they can be very expensive.
- Hygiene is vital on an outdoor trip, so don't forget to allow time for the clean-up.
- The preparation, the eating and the clean-up are all part of the social aspect of being with other people in an outdoor environment. Make the main meal (probably dinner) a part of your day, not just some add-on that you've got to find time for. Sitting around with a group, having some laughs, telling some stories and singing some songs, all while making your meal, are very satisfying and enjoyable parts of an outdoor experience.

Emergencies

For any trip, you should be aware of possible emergency situations that might arise and have someone who can help you deal with them. A first-aid trained person is essential on an outdoor experience, especially when you are travelling in a remote area.

Depending on the actual environment and time of year, there are a number of specific emergencies that a group could face in Australia.

- **Bushfire** – Any environment threatened by bushfires should absolutely be avoided by a group planning an outdoor experience.
- **Blizzard** – Blizzards are usually only specific to alpine environments, and while they would be mostly expected to occur in winter, this is not always the case. Any group travelling into an alpine environment should at least consider the threat of blizzard and discuss possible approaches should they be caught out. Blizzards have been the cause of a number of deaths in the Australian Alps and groups should be prepared for any eventuality, even in summer.
- **Injuries** – Typical injuries include bee and wasp stings, snake bites, and soft tissue and bone injury to limbs. An experienced first-aid practitioner and a well-prepared first-aid kit is a must.
- **Broken equipment** – Usually broken equipment will not be life-threatening, but it can be annoying and frustrating for a group, potentially slowing a group down or otherwise significantly decreasing the enjoyment of an activity. It's impossible to be prepared for every possibility, but there are some common equipment failures that can be anticipated. For example, broken tent poles and broken buckles on packs are common issues, and it's usually easy to prepare for these ahead of time. Gear that is specific to an activity can also fail, from broken ski bindings to flat tyres when cycling, and every group should have a repair kit that suits the specific activity (or activities) of their trip.

LEARNING ACTIVITIES



TRIP PLANNING

You and three friends are planning a day trip to the snow in your car to go cross-country skiing. Outline the procedures you would follow, the specific preparations you would make, and what you would take with you to ensure a safe and enjoyable day in the snow.

Choose another activity you would be interested in undertaking for three days. Consider the questions above for this experience and describe how the experience changes due to the extended nature of the experience.

FIRST AID

Choose one aspect of first aid to research from the following list (or negotiate another topic with your teacher):

- asthma
- bites and stings
- bleeding
- burns
- care of an unconscious patient
- diabetes
- ear and eye injuries
- epilepsy
- head injuries
- heart attack and stroke
- hyperthermia
- hypothermia
- lower limb fractures
- management of an accident scene
- poisons
- shock
- sprains and strains
- upper limb fractures.

For your chosen aspect of first aid, investigate and report on:

- 1 the nature of the condition and possible causes, where appropriate
- 2 appropriate emergency treatment
- 3 any first-aid or other equipment that should be carried as a precaution, or which could be used in an emergency
- 4 any preventative measures (short- or long-term) that could be taken to try to prevent the condition occurring.

FACTORS THAT AFFECT OUR OUTDOOR EXPERIENCES

The kind of outdoor experiences we have are influenced by factors that affect the amount of access we have to particular activities and locations.

There are lots of things that can affect how easy or difficult it may be to participate in an outdoor experience. Here we will focus on five factors:

- 1 socioeconomic status
- 2 cultural background
- 3 age
- 4 gender
- 5 physical ability.



Some outdoor experiences are free.

Shutterstock.com/Monkey Business Images

It is important to be aware of these as there are many different people in Australia who will face diverse challenges in relation to their desire to access outdoor environments. An activity considered

relatively easy to access could be walking in a local park, compared with an expensive activity or one that requires a degree of specialised skill or equipment, such as downhill skiing.

Socioeconomic status

socioeconomic status

An individual's or family's economic and social position in relation to others based upon income, education and occupation

Socioeconomic status (SES) can be described as an individual's or family's economic and social position in relation to others based upon income, education and occupation. It can be loosely categorised as low, middle or high. Those of low SES are characterised by lower income, lower levels of education and fewer employment options. In contrast, people of high SES are associated with higher income, higher levels of education and more employment options. Most people in Australia fall into the middle SES category, and therefore most of you will have an understanding about how socioeconomic status can affect access to the outdoors as you may have experienced an instance when you wanted to do some type of adventure activity but were restricted by the costs associated with it.

Australia is ranked as one of the most expensive places to participate in adventure activities (such as rock climbing, surfing and paragliding), even though there are a lot of locations around the country where outdoor experiences can be enjoyed for free. SES can influence the type of activity a person may be able to access, and also the kind of experience they are likely to have. Take surfing as a simple example. A person of high SES may have a brand-new surfboard and full-length wetsuit, and could surf all year round. Compare this situation with a person of low SES, who may have to borrow an old surfboard from a friend and only has board shorts to wear, so can only enjoy surfing in warm weather and when their friend is able to lend them the board. However, this doesn't necessarily mean that one person's experience is better than another's. For instance, someone who swims in the ocean with their friends may have a more enjoyable time than someone who rides alone on a jet ski.

LEARNING ACTIVITY



ACCESSIBLE OR INACCESSIBLE?

- 1 Select an outdoor experience (other than the ones mentioned previously) and complete a table similar to the one shown, detailing how different levels of SES can influence the accessibility of your chosen activity.

Low SES	High SES

- 2 Analyse how accessible or inaccessible this particular activity is based on socioeconomic status.

Cultural background

cultural background

Patterns of thinking, feeling and acting that stem from the social context of your life experience, such as ethnicity, race, socioeconomic status, gender, language, religion, sexual orientation and geographical area

Cultural background is a broad and complex topic that is presented in a simplified manner here to suit the purposes of Outdoor and Environmental Studies. Culture affects who we are, how we think, how we behave, how we learn and how we respond to the environment. It includes patterns of thinking, feeling and acting that stem from the social context of your life experience, such as membership in various groups based on ethnicity, race, socioeconomic status, gender, language, religion, sexual orientation and geographical area. Each country in the world has a unique culture with its own set of rules, regulations and expectations. Often, if someone moves from one country to another, they will take their culture (or aspects of it) with them. Australia is described as being multicultural, as more than 25% of our population was born overseas and another 20% have at least one parent born overseas. Our culture is very diverse and can mean many different things to many different people.

Often the effect of culture on our access to outdoor environments will depend on the circumstances of a given scenario. Some people say that being outdoors is the Australian way, suggesting that Australians have greater access to a variety of environments and, therefore, a greater level of associated experiences.

Again, by using simple examples we can highlight how access might be influenced by culture. Many Middle Eastern cultures believe traditional outer garments that cover much of the body should be worn, which limits participation in outdoor activities where this type of clothing may be restrictive.

Outdoor education participants could experience a form of ‘culture shock’. With the new and unfamiliar surroundings of a unique outdoor environment, overseas students may experience feelings of disorientation and anxiety with the additional separation from their own cultural norms.

Being of a particular culture or carrying with you selected beliefs doesn’t automatically preclude you from being involved in outdoor activities.



NewsPix/Russell Brown

Students doing a ropes course

Age

Age is possibly one of the most influential factors that can affect access to and the types of outdoor experiences undertaken. It is accepted that we reach the peak of our physical fitness at approximately 27–30 years of age; beyond this, our fitness declines and we become weaker. It is common to hear people say, ‘I’m too old to do that’, as they may feel their body would not be able to cope with the demands placed on it. Of course, there are also the old sayings, ‘Age is only a number’ and ‘You’re only as old as you feel’, suggesting that just because someone may be 70 years of age doesn’t necessarily mean they are restricted by certain outdoor pursuits.

If age doesn’t affect the type of activity someone can do, it could affect the intensity at which they can participate. For example, the distance a 20-year-old could cover bushwalking in one day may be significantly more than the distance a 60-year-old could cover in the same time period. Conversely, being young can also limit access to the outdoors. An example is someone who is 17 years of age living in central Victoria who loves to surf – they would need to rely on family members or friends to drive them to the beach, or they might need to catch a bus. However, as soon as they turn 18 (provided they can obtain a vehicle and have a licence), they can drive themselves to the beach and their access to the coastal environment and surfing increases dramatically.



Shutterstock.com/PhotoSky

Sometimes a person’s age can affect their outdoor experience. This older climber is not wearing the required safety helmet. In his youth, safety helmets were not part of the safety precautions that casual climbers took.

gender

The state of being male or female, but also typically used with reference to social and cultural differences rather than biological differences

Gender

Gender is the state of being male or female, but the term is typically used with reference to social and cultural differences rather than biological differences. Our concept of gender often includes our perception of physical, mental and behavioural characteristics. In the past, outdoor activities were generally more accessible to males than females, as boys and men were often motivated and encouraged to participate, and male adventurers predominately appeared in the media and images of males were used throughout advertising campaigns. However, the profile of female adventurers has grown in recent years and the number of women participating in outdoor activities has increased.

The perception that the majority of outdoor activities are considered ‘manly’ has been dissolved, as there is nothing men can or have done that women cannot or have not done – such as climb Mount Everest, surf 15-metre waves or complete a nonstop circumnavigation of the world. Therefore, it can be suggested that gender does not impact on access to outdoor environments, or the types of experiences within them.

LEARNING ACTIVITY



FEMALE ADVENTURERS

Research one of the following Australian female adventurers (or select another with your teacher’s permission):

- Belinda Ritchie
- Allie Pepper
- Linda Beilharz
- Danielle Murdoch
- Nancy Bird-Walton
- Kay Cottee
- Brigitte Muir
- Jessica Watson
- Sorrel Wilby
- the ‘ice maidens’ Michelle Bloomcamp, Noelene Weightman and Sandra Floate.

Produce a multimedia presentation that tracks their particular adventure(s). Your presentation may be relatively short, but it should be entertaining and feature images, videos, media grabs and music.

physical ability

The quality of being able to perform some type of physical action

Physical ability

Physical ability can be described as the quality of being able to perform some type of physical action. In relation to outdoor environments and their associated activities, physical abilities are specific to particular locations and actions – for example, someone who excels at hiking in steep terrain may not excel at surfing. It is more likely that a low level of (or a limit to) someone’s physical ability may restrict their access to an outdoor environment or activity.

Limits to physical ability may include those associated with mobility, vision or hearing impairments. People with mobility impairments, such as those who require the use of a wheelchair, may find it difficult to move along bush tracks. People who are sight impaired may find it difficult to participate in rock climbing, and those with hearing impairments could find activities that rely on verbal communication such as rafting or canoeing difficult. People with a disability may have lower access to the outdoors than able-bodied people. However, there are many ways to overcome the limits to physical ability, such as modified equipment, extra support and instructors with specific qualifications.

MIKE LETCH

The story of Mike 'wheelie' Letch is amazing and inspirational. Disability gave him more ability than anyone thought possible: from pilot (he was one of the first in Australia to fly using modified hand controls) and wheelchair marathoner to rehabilitation counsellor, dive master and rescue diver (again, the first in Australia with a physical disability to qualify), disabled diver and instructor, and mentor to countless people of all abilities the world over.



Shutterstock.com/Andrea Izzotti

Born in Melbourne in 1948 and educated at Camberwell Grammar, Mike was a thrill-seeker from a young age and obtained his pilot's licence before he was 17. By the time he was 18, he had taken up speedway racing and set off for England. In August 1970 he crashed and his life changed forever when he broke his back and became a paraplegic. After four months in hospital he was flown home and entered rehabilitation. While in England, Mike had met Sir Douglas Bader, who was a World War II fighter pilot, despite losing his legs in a plane crash in 1931. Bader sent Mike specialised hand controls so he could fly solo in light planes again, which he continued to do for 10 years. In the late 1980s, Mike took up wheelchair marathon racing and was soon competing all over the world. He won the Melbourne wheelchair marathon in 1997 and competed in the Japan marathon for seven consecutive years.

Once he retired from wheelchair marathons, he returned to the sea. He had always loved the ocean, skin diving and surf lifesaving at Point Leo on the Mornington Peninsula in his youth. He found that in the weightlessness of water, there was no disability. Diving gave him the freedom his ailing body denied him. He lived for summer, when he could dive every day, usually in the Ricketts Point Marine Sanctuary, which he considered the best place to dive in the world. His diving colleagues carried him into the water, and off he went with hand flippers but no snorkel or tank; free diving was for him, always.

In 2002 Mike said, '... does it matter that your life on the surface requires wheels to get around? No! Scuba diving and snorkelling are open to you regardless of your physical ability ... Whilst water had always been my love, I presumed that being stuck in a wheelchair meant that I was confined to land. But in reality, instead of fins on my legs I use a turtle stroke with my arms to get around. Otherwise I'm the same as any other scuba diver, and equally if not more qualified ...'

After a Churchill Fellowship that took him to the United States and Japan in 2006, Mike cofounded the Disabled Divers Association in Australia and Aquability Group to provide experiences and training in basic snorkelling to scuba diving instructing. He campaigned for a disabled ramp and facilities at Ricketts Point, and secured a beach wheelchair known as a Mobi-Chair. He received an OAM in 2012 for services to disabled diving and was a crucial member of the volunteer group Marine Care Ricketts Point.

Aquability was the first disability-specific scuba diving service in Australia, specialising in equipment modification, higher instructor student ratios in aquability classes and lobbying local councils for disabled coastal facilities. More beaches have also become accessible thanks to Aquability's 'Aqua Tracks' system that lays a path across the sand. Traditionally, the biggest impediment to getting to the water with a wheelchair; there is now a superb access ramp at Smith's Beach on Phillip Island and Ricketts Point offers a ramp to the high water line and firm sand after that. Mike has said his main motivation for starting Aquability was to boost confidence and self-esteem in people who have mobility challenges. Unfortunately, limited access to aquatic activities in natural environments means that thousands of people with mobility challenges cannot readily participate in activities that are beneficial physically, emotionally and spiritually.

Seeing disabled people transformed by a dip in the sea, be it snorkelling or diving, was for Mike the source of purest joy. 'Surfacing from the water and seeing eight empty wheelchairs on the beach – that's what it's all about,' he said early in 2013. In the same year Mike helped Heather Lawson, from Frankston, to become the first deaf-blind person in Australia to go scuba diving, a logistically difficult achievement of which he was immensely proud. He said then he was looking forward to diving with her again this summer. Sadly, Mike passed away in November 2013, but his has been an extraordinary life of achievement, generosity of spirit, hard-earned wisdom and inspiration.

Adapted from *Outdoor and Environmental Studies* (2nd edition) pp. 51–2 and FreeLists.

Other factors

Accessibility can also be determined by:

- travel distance and remoteness of location
- time required to plan, prepare and participate
- costs associated with travel, equipment, preparation, permits, food, supplies, staff and taking time off work
- scale or size of the group
- fitness, training and experience or qualifications required
- motivation
- weather
- regulations
- physical environment such as terrain, water availability and emergency access
- risk and required safety precautions and plans
- history and popularity of certain experiences and activities.

By taking all of these factors into consideration, you can determine how easy or difficult it may be to participate in an activity in the outdoors.



Documentaries



Scaffold

LEARNING ACTIVITIES

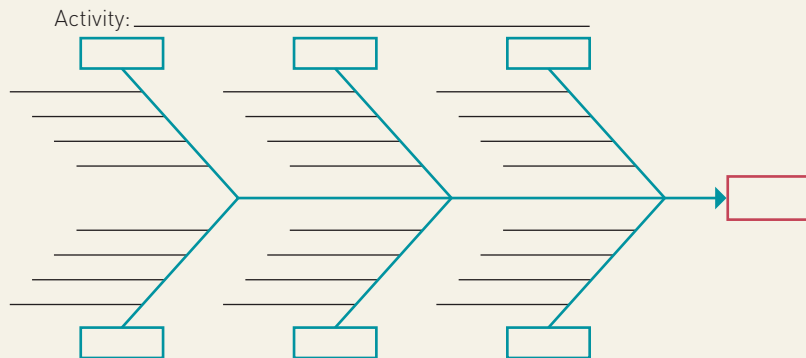


WATCH A DOCUMENTARY

Watch one of the following documentaries: *Touching the Void* (2003) or *Everest* (2015) via the link at <http://www.nelsonnet.com.au/oes>. During viewing, make note of all the factors that make these particular experiences low access. At the conclusion of the documentary, compile everyone’s notes on the board in a brainstorm session or mind map.

FACTORS AFFECTING SUCCESS

- 1 Select an outdoor activity and create a fishbone diagram similar to the one shown.



- 2 Place the name of the activity at the head of the fish (the red box on the sample diagram).
- 3 Write the factors that can affect access to this activity (SES, cultural background, age, gender and physical ability) along the top and bottom of the spine (the blue boxes on the sample diagram).
- 4 Detail how each factor could potentially affect someone’s access to the activity you have chosen (could include both restrictions to access or improved access).
- 5 Display your diagram in the classroom, and then spend time moving around the room and reading other people’s diagrams.

You can use the online fishbone diagram via <http://www.nelsonnet.com.au>. Use your login code, and then click on Resources, page 60.

TECHNOLOGIES USED IN OUTDOOR ENVIRONMENTS

Technological developments can be summarised as advancements and modifications made to clothing and equipment in order to enhance our participation in some way. Technologies may have made certain experiences easier or safer, or improved our access to them. But it is also suggested that technologies have caused a disconnection between people and their environment, making challenging activities too easy, de-skilling individuals and causing an over-reliance on devices that can fail in the outdoors. The term ‘technologies’ refers to a wealth of advancements that have been made across many industries, but in this section we will only be focusing on those related to outdoor recreational experiences.

LEARNING ACTIVITY



OLD vs NEW

Compare and contrast one of the following combinations of technology:

- closed-cell foam mat/Therm-a-Rest mat
- leather ski boots/Plastic ski boots
- handheld radio/Mobile phone or smartphone
- compass and paper map/Handheld GPS device.

You might like to use a table similar to the following to present your information.

	Old technology	New technology
General information		
Positive effects on outdoor experiences		
Negative effects on outdoor experiences		

Technologies used in outdoor experiences

These days, outdoor experiences and the use of various technologies go hand in hand. Examples include:

- communication devices, such as radios, smartphones and EPIRBs (emergency position-indicating radio beacons)
- navigational devices, such as GPS
- synthetic materials and clothing, such as fleece, Gore-Tex, polypropylene, Dri-FIT, nylon, plastics and Smartwool
- specialised equipment, such as fibreglass canoes, lightweight mountain-bike frames, kernmantle climbing ropes and autofocus cameras.

Technology has had an enormous impact on the way in which adventure activities have been undertaken by relatively unskilled participants over the last 60 years. The creation of synthetic fibres paved the way for development within adventure clothing and equipment, coupled with more efficient production of these items and a decrease in the overall cost. Participants in the outdoors are now confronted with a seemingly overwhelming range of equipment and clothing.

LEARNING ACTIVITY



TECHNOLOGY AND YOUR GEAR

When preparing for (or unpacking after) a practical experience, spread your clothing and equipment out and think about how advances in technology have contributed to the amount of gear you take into the outdoors, the weight of this gear and your experience overall.

contemporary

Events or actions that have occurred within the last 15 years

While the use of technologies is great for helping unskilled individuals to partake in outdoor experiences with more confidence and efficiency, technological advancement has also been associated with the de-skilling or loss of self-reliance among **contemporary** outdoor adventurers. In many cases, technological advances that have made outdoor activities easier have also removed the need for adventurers to develop their own skills through personal experience.



Shutterstock.com/Lucky Business

Technological advancements in communication devices and synthetic clothing and plastics have had an enormous impact on adventure activities.

Navigation is an example of where de-skilling has occurred. In the past, a bushwalker would need to ensure that their skills of map reading and compass use were adequately developed and proficient to a degree. In gaining information on the area they were planning to bushwalk in, they would most likely have spoken to locals and people who had previously visited the area. Today, this is simply not required. Instead, bushwalkers have a range of navigational devices at their disposal, such as high-quality topographical maps, guidebooks, EPIRBs, handheld GPS devices and smartphones. These technologies allow bushwalkers to undertake journeys that they may not have been capable of in the past. In this example, technologies have replaced the need for personal navigational skills, and perhaps caused an over-reliance on devices that can ultimately fail at any time in the outdoors. Many people argue that drastically reducing the difficulty of tasks weakens the environmental experience of those involved.

On the positive side, more people can experience the environment as a result of technological advances, and in many ways the need for expensive rescues and medical attention has been reduced. Technologies have enhanced adventures by creating safer experiences and by suggesting that more is now possible within outdoor environments, resulting in increased participation rates in many outdoor activities. For example, synthetic fibres are water-repellent, quick drying, durable, lightweight and breathable – this means people can spend longer in the outdoors with less clothing and equipment, and people can endure more extreme conditions all year round and feel more comfortable. Likewise, an EPIRB is a compact, buoyant, self-contained radio transmitter that can be activated in life-threatening situations – carrying this device enhances the feeling of security people have in the outdoors, making their experience less stressful and more enjoyable.



Getty Images / Gualter Fatia

Surfing has seen many advances in technology.

However, some people suggest that by providing participants with a more controlled environment, the use of technology increases a person's sense of disconnection from the natural elements.

LEARNING ACTIVITIES



RESEARCH TASK

- 1 Select either a piece of equipment or an adventure activity. (Suggestions for equipment include surfboards, skis, outer shell jackets, thermals, canoes, navigation devices, cameras or rock climbing equipment. Suggestions for an adventure include a comparison between Douglas Mawson's expedition to the South Pole and Linda Beilharz's journey from edge of the Antarctic continent to the South Pole.)
- 2 Investigate the changes, development and advancements that the equipment or the activity has undergone in relation to technologies. You may like to address the following questions in your research:
 - a What changes have occurred (such as shape, materials, price or durability)?
 - b Have the changes altered any aspect(s) of the activity?
 - c Have the changes in equipment affected participation (such as numbers, experience or people who can access the activity)?
 - d Have the changes in equipment brought participants closer to the environment or separated them from it?
- 3 Present your research in a basic report format (including images) to highlight the changes in technologies.

CLASS DEBATE

Your teacher will select one of the debate topics from the following list (or provide another for you to research). The class will be divided into two groups – one in favour of the selected topic and one against it).

- Technological advances have made outdoor experiences safer and alleviated many dangers.
- Technological advances can only enhance our experience with the outdoors.
- Technological advances have only increased the separation between people and nature.

Prepare for the debate according to your teacher's instructions.

RISK IN OUTDOOR EXPERIENCES

Only those who will risk going too far can possibly find out how far they can go.

T.S. Eliot, 1931



Shutterstock.com/Greg Epperson

Rock climbers usually manage the risk of the activity with a variety of safety equipment. How is this climber managing risk? Are there things he could do better?

Risk is sometimes seen as an inherently bad thing. We often try to avoid risk wherever we can and we certainly take steps, both individually and as a society, to reduce the risks associated with many parts of our daily lives. However, there are risks that can be good for us as humans.

Stepping outside of our comfort zone can be challenging, but it's also been shown to improve our confidence, sense of self-worth and other psychological benefits. We feel better about ourselves when we can face a risky, challenging situation, and succeed at it. And if we don't succeed? Learning about failure can also help us. If the risky situation is managed well, initial failure may encourage us to try again.

Before we explore risk in more detail, a note of caution: this section is not about unmanaged risk, such as drinking alcohol and driving a car, or having unprotected sex with multiple partners. Risk in outdoor experiences should be managed or controlled as much as we possibly can, without, of course, taking away the risk itself. We'll explore this further in the definitions below.

What is risk?

As discussed in chapter 1, risk is the potential to lose something that you value measured against the possibility of gaining something you value. The thing we might lose may be physical (such as an injury to your body), psychological (such as embarrassment at failure) or financial (such as damage to expensive equipment). The thing we might gain could also be physical (such as developing physical fitness, or some sort of biochemical change such as an adrenalin boost), psychological (such as a rise in self-esteem) or financial (such as some sort of monetary reward).

Risk involves uncertainty. When we take a risk we're not exactly sure what will happen. In outdoor activities, we often don't know exactly what will happen during the activity, and this is a risk. In some outdoor activities, the risk may be in potentially facing injury or even death measured against the physical, psychological and emotional benefits of succeeding.

TYPES OF RISK

There are a number of terms relating to risk that you should be familiar with.

- **Absolute risk** – the uppermost limit of risk in a particular situation or activity, assuming safety has not been considered. Think of it as the 'worst-case scenario' type of risk. For example, the risk associated in climbing a rock wall with no safety devices to aid you.
- **Perceived risk** – the subjective assessment that a person makes about the risk they are about to face in a particular situation. The perceived risk can vary dramatically, and could be much higher or lower than the actual/real risk.
- **Actual/real risk** – the risk that actually exists for a particular situation or activity, given that safety has been considered and controls are put in place. For example, the risk associated in climbing a rock wall and using ropes, harnesses, belay devices, helmets and other equipment.

Given that we would probably never undertake an activity without a consideration of safety issues, perceived risk and real risk are of more importance to us in outdoor experiences than absolute risk.

Competence vs difficulty

A useful way to help think about managing risks related to outdoor activities is sometimes called the competence–difficulty model.

Competence is the ability of someone to be able to deal with the situation they are in, and comes from the skills and experiences that they have. Someone with more skills and greater knowledge and experience is going to be more competent to deal with a particular situation.

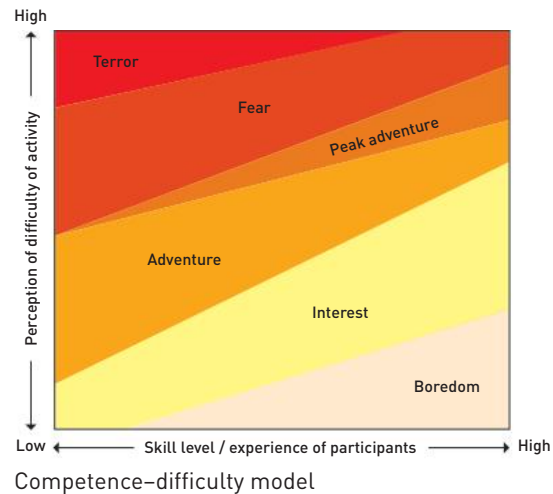
Think of the most wonderful experience of your life: the happiest moments, ecstatic moments, moments of rapture, perhaps from being in love, or from listening to music or suddenly ‘being hit’ by a book or painting, or from some creative moment.

Abraham Maslow, 1968

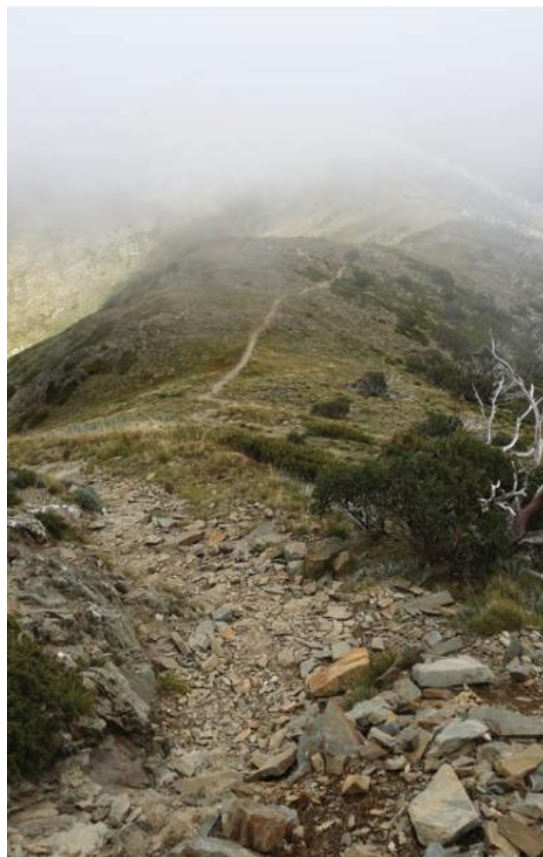
Psychologist Abraham Maslow first described the term ‘peak experience’ in the 1960s. For him, the peak experience was an event or moment that was incredibly joyous and exciting. It stood out from everyday events and involved sudden feelings of intense happiness and wellbeing, wonder and awe. The memory of such events was long-lasting, and Maslow likened them to intense spiritual or religious experiences. For people undertaking outdoor activities, achieving a peak experience is often the goal.

As can be seen in the competence–difficulty model, the peak experience is wedged between adventure and fear. According to this model, it requires just the right mix of skill/experience and perception of difficulty. Not enough skill or too high a perception of difficulty and we are terrified; too much skill and not enough difficulty and we are bored.

You might notice the similarity between the diagram that represents the competence–difficulty model for risk and the diagram for the idea of flow (which we looked at earlier when considering the motivations that people have for participating in outdoor activities). The notion of the peak experience synchronises very closely with the idea of flow – it seems that when someone is having a peak experience, they are probably in this psychological state called flow.



The Outdoor Leader Online, Bushwalking and Mountaineering Training Advisory Board (BMTAB)



Andrew Mannion

Shrouded by cloud, a steep walking track crosses an exposed ridge at Mount Feathertop, a few hundred metres off the summit.





UNIT

2

DISCOVERING OUTDOOR ENVIRONMENTS

- **Area of Study 1**
Investigating outdoor environments
Chapter 3 (page 68)
- **Area of Study 2**
Impacts on outdoor environments
Chapter 4 (page 113)



CHAPTER

3

INVESTIGATING OUTDOOR ENVIRONMENTS

KEY KNOWLEDGE

- characteristics of outdoor environments, including alpine, marine, coastal, wetlands, grassland, forest and arid (page 69)
- recreational users' understandings of specific outdoor environments (page 82)
- scientific understandings of specific outdoor environments, including:
 - interrelationships between biotic and abiotic components (page 91)
 - effects of natural changes to environments on people and places such as day to night, seasons, tides, flood, drought, migration, succession and climate change (page 92)
 - the effect fire (both wildfire and controlled burns) has on the environment (page 101)
- land managers' understandings of specific outdoor environments, including the features that can be used to delineate one particular area from another such as landform, vegetation type, public and private land, types of parks and reserves, management zones (page 101)
- artistic, Indigenous Australian and historical understandings of specific outdoor environments (page 109).

KEY SKILLS

- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected
- describe, compare and contrast the characteristics of different outdoor environments
- analyse a range of understandings of the use of, and relationship to, outdoor environments
- analyse how land managers delineate outdoor areas

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

CHARACTERISTICS OF DIFFERENT OUTDOOR ENVIRONMENTS

No matter how far I have traversed around this Earth, I have yet to find another location that rivals Australia. Nowhere else on Earth can you find such spectacular landscapes, such unique and fascinating animals, and such warm friendly people. This is why I will always call Australia home.

Adam Cropp – conservationist and filmmaker

Australia is the planet's sixth-largest country after Russia, Canada, China, the United States and Brazil. It comprises a land area of about 7.692 million square kilometres, which accounts for 5% of the world's land area. It is the flattest and (with the exception of Antarctica) the driest continent in the world. It has varying climatic zones, ranging from deserts and tropical rainforests to cool-temperature forests and snow-covered mountains. Long periods of erosion, inundation, deposition and glacial action have resulted in the range of landforms we now experience. It is one of the most biologically diverse countries on the planet.

Victoria's various outdoor environments support a high level of **biodiversity**, including at least 3140 native species of vascular plants, 900 lichens, 750 mosses and liverworts, 111 mammals, 447 birds, 46 freshwater and 600 marine fish, 133 reptiles, 33 amphibians, and an unknown number of invertebrates, fungi and algae.

This chapter investigates the characteristics of outdoor environments and analyses different ways of understanding them.

biodiversity

The number and variety of organisms found within a specified area

Leigh Park



Mount Stapylton in Gariwerd (the Grampians) at sunset

Factors affecting outdoor environments

The type of outdoor environment that exists within a specific location is the result of the interaction of three factors: geology, **climate**, and position and aspect.

climate

The prevailing weather conditions of a region

geology

The scientific study of the origin, history and structure of the Earth

evaporation

The change of a liquid into a vapour

drought

A long period of abnormally low rainfall, especially one that adversely affects growing or living conditions

perennially

Lasting or active through the year or through many years

community

A group of interdependent plants and animals inhabiting the same region and interacting with each other

GEOLOGY

The influence of **geology** in an area can be seen in the type of rock material found in a particular location, soil characteristics and drainage. Soil develops over time through interaction between the parent rock, the elements (such as wind, water and sun), living and decomposing plant and animal matter, and groundwater. As the Australian landscape is very flat, with an average elevation of only about 325 metres, many of Australia's major rivers are slow flowing. Geology is also relevant and important when we consider topography, or the shape of the land. This can be seen in places such as Gariwerd, where the upswept rocks provide clear evidence of previous geological history.

CLIMATE

Annual rainfall, extremes in temperature and average daylight hours are examples of climatic factors that can affect a landscape. Other aspects of climate may include wind patterns, **evaporation**, ground temperature, frost frequency and snow cover.

Two-thirds of Australia receives less than 500 millimetres of rain each year, and very few areas receive more than 1000 millimetres. The distribution of rainfall is usually seasonal and erratic, resulting in extended periods of **drought** – to the extent that drought is considered part of the normal climatic pattern in many areas. In addition to 'normal' conditions, Australian flora and fauna have adapted to survive during sustained dry or wet periods.

The Australian continent spans almost 30 degrees of latitude and includes deserts, mountain ranges, tropical rainforests and extensive coastal areas. Temperatures can vary widely, and extremes are intensified by dry and cloudless skies. The highest temperature ever recorded in Australia was 50.7°C at Oodnadatta Airport on 2 January 1960. The lowest temperature ever recorded in Australia was -23.0°C at Charlotte Pass on 29 June 1994. Many of the widest ranges in temperature occur in the dry regions. The frequency and intensity of frost is critical for many plants that cannot survive when exposed to freezing temperatures. Temperature variations also affect evaporation and the level of moisture in soil.

POSITION AND ASPECT

Geographical location is an important determinant in the development of environment types. In Victoria, the vegetation on a hillside facing south (a southerly aspect) will typically have more shade, greater levels of soil moisture and lower temperatures overall when compared with a slope on the same mountain that faces north. A northerly aspect will typically result in drier soils and warmer temperatures, and potentially quite different vegetation. For example, depressions in the high plains or on lowland plains can result in a localised effect on plant communities leading to a lack of vegetation in these **perennially** cooler areas.

These and other aspects of outdoor environments interact constantly with one another to determine the types and characteristics of the flora and fauna that are present in a location. Outdoor environment types are generally recognised by either the landform (such as coastal and alpine environments) or the characteristic vegetation they support (such as rainforest or grassland). Often it is difficult to describe a place as one 'type' of environment – it may be easier to think in terms of different ecosystems. An ecosystem is made up of a **community** of interdependent species and their environment. It includes the processes that occur due to the interactions between the biotic (living) and abiotic (non-living)

components. Victoria's land area supports a wider range of ecosystems than any area of a similar size in Australia: alpine, marine, coastal, wetlands, grassland, dry forest, wet forests and rainforest, arid and heathland environments.

LEARNING ACTIVITY



DIFFERENT ENVIRONMENTS

Visit Skwirk Online Education (Geography Resources section) and watch two short video clips: *Different Environments Part 1* (31 Jan 2013) and *Different Environments Part 2, Tundra, Polar Regions, Grasslands, Wetlands, Deserts* (25 July 2011). The videos provide a two-part introduction to the different outdoor environments found in Australia.



The alpine environment

The word 'alpine' is often used to describe any high mountain area. Theoretically, the term refers to areas above a certain altitude that are treeless because of prolonged low temperatures. In Australia, the environments that regularly experience snow for an extended period occur in the elevated regions of the Australian Alps on the mainland, and the Central Plateau and other areas of Tasmania. This snow-covered region occupies approximately 5200 square kilometres on the mainland and 6500 square kilometres in Tasmania. The combined area is 0.15% of Australia.

DISTRIBUTION

The Victorian Alps encompass approximately 500 000 hectares of the north-east and east of the state. The range extends along the Great Dividing Range, including some isolated plateaus such as Lake Mountain, Mount Baw Baw and Mount Buffalo.

ELEVATION AND CLIMATE

The alpine environment in Victoria is mostly above 1300 metres, with rainfall usually exceeding 1400 millimetres per year. The highest mountain in Australia is Mount Kosciuszko at 2228 metres and the highest peak in Victoria is Mount Bogong at 1986 metres. Climatic conditions in the alpine environment are harsh, with a covering of snow for more than a third of the year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Unlike other alpine regions around the world, Australia's alpine areas have been eroded over 500 million years to form rounded mountains and plateaus. They are typically vegetated by a range of heath, herb and grass species, along with unique **sphagnum bogs** that have adapted to specific soil types and climatic conditions. The predominant tree species at higher elevations is the snow gum *Eucalyptus pauciflora*, which is well known for its distinctively gnarled form, shaped by wind and snow.



Alamy Stock Photo/Chris Mellor

Eucalyptus pauciflora (snow gum) is the hardiest of all *Eucalyptus* species and is able to survive severe winter temperatures.



FAST FACT

The Australian Alps are part of the Great Dividing Range, the series of mountains and highlands that extend about 3000 km from northern Queensland into north-eastern Victoria.

sphagnum bogs

Species of mosses; alpine sphagnum bogs are found in permanently wet sites in high rainfall alpine, sub-alpine and montane areas of NSW, ACT, Victoria and Tasmania

microclimate

The prevailing weather conditions of a small, specific place within a larger area

topography

The landforms or surface features of a region

aestivate

Animal dormancy similar to hibernation

weed

Any plant that grows wild and profusely among cultivated plants, depriving them of space and food

subtidal

The area that is permanently covered with water

intertidal

The area that is above water at low tide and under water at high tide

The highest areas consist of communities of heathland, grassland and alpine bog that have adapted to the particular characteristics of their environment, including soils, water availability, **microclimate** and **topography**. The region can usually expect to be covered in snow for three to four months of the year, and most species take advantage of the short growing season during spring and summer. Plants and animals found in these areas have evolved over many years to survive in the unique alpine living conditions, and several species are only found in this environment, including the Baw Baw frog and the mountain pygmy possum. Migratory species such as the flame robin and spine-tailed swift make the most of the abundant food resources available during the short growing season, while millions of Bogong moths **aestivate** in rock crevices in the cooler summer climate.

HUMAN INFLUENCE AND THREATS

The Victorian Alps are largely intact and contained within the Alpine National Park, which was established in 1989 after many years of lobbying and campaigning, but they are still under threat from several directions. One of the biggest effects on this environment is from the continued development of ski resorts, particularly in areas such as Falls Creek, Mount Hotham and Mount Buller. These resorts are situated on leasehold land and operated by boards of management and, in some cases, are surrounded by national park or other reserved land. Other issues affecting the Victorian Alps today include the continued summer grazing of cattle, predation by feral cats and dogs, water catchment pollution and environmental **weeds**. An issue of increasing concern is the effect of global warming on the viability of this unique habitat, particularly for those species of flora and fauna that rely on annual snowfall and cooler temperatures.

The marine environment

The marine environment includes a wide variety of ecosystems such as **subtidal** and **intertidal** rocky reefs, sponge gardens, kelp forests, mangroves, mudflats, open water, sandy plains and seagrass beds. Victoria's marine environments are among the most biologically diverse in the world with over 90% of Victoria's marine organisms found nowhere else on Earth. This high biodiversity is a result of the relatively low level of nutrients in the water compared with other areas of the world. This limits the production by plants, algae and bacteria of food, leading to many species evolving over time to adapt to the specialised conditions with no one species able to dominate.

DISTRIBUTION

Victorian marine environments extend 3 nautical miles offshore. Victoria's marine waters cover approximately 10 000 square kilometres. This includes rocky reefs, sandy seafloors, spectacular underwater canyons, intertidal mudflats, sheltered bays, estuaries and waters adjacent to the open ocean.

ELEVATION AND CLIMATE

Most Victorian marine waters are shallow; however, some extend to depths of 90 metres or more. The rainfall is variable, from 700 to 1200 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Marine waters contain a diversity of habitats such as the seagrass meadows, mud flats, intertidal and subtidal rocky reefs, mangrove kelp forests and pelagic systems. Over 12 000 marine animals and plants live in these waters, contributing to their high levels of biodiversity as well as being

important representations of species **endemic** to the Southern Ocean. Towering kelp forests, seagrass meadows and a wide variety of fish, sponges and other animals from tiny organisms to large sea mammals are contained within these environments.

HUMAN INFLUENCE AND THREATS

Threats to marine environments include overfishing, increases in sediment from **dredging** and entering our seas from land clearing (which smothers marine plant growth), pollution from factories, stormwater drains and fertilisers, pesticides and herbicides used in farming practices (causing poisonous algal blooms and impeding the growth of marine plants) and introduced species such as the Northern Pacific seastar (Japanese starfish) from **ballast water**.

The coastal environment

Coastal environments relate to areas linking the land and the sea; however, the characteristics of these landscapes vary greatly – from beaches to dune systems to woodland, dry forests and rocky coastal cliffs. The coast is constantly changing in response to its interaction with the sculpting effects of wind, rain and waves. Much of the Victorian coast has been reserved as public land. The west coast is sometimes exposed to gale-force winds that have contributed to the spectacular scenery visible along the Great Ocean Road. Some regions, such as Wilsons Promontory, Croajingolong and the Twelve Apostles, have been national parks for some years. In 2002, the Victorian Government declared a system of marine national parks designed to further protect these areas, particularly the adjacent marine waters and the ecosystems within them. The waters and foreshores are also important for the economic opportunities they provide in supporting fishing, tourism, shipping, ports, and social and recreational pursuits.

DISTRIBUTION

Victoria has 2000 kilometres of coastline, ranging from sheltered bays and inlets to rugged eroded cliffs. There are about 123 bays, inlets and estuaries – varying in size from approximately 1 square kilometre to 2000 square kilometres.



Shutterstock.com/Willyam Bradberry

endemic

A feature that is unique to a defined geographic location

dredging

An excavation activity or operation usually carried out to gather up bottom sediments and dispose of them at a different location

ballast water

Water taken on board to provide stability for ships



Alamy Stock Photo/ImageBROKER

The spectacular and rugged Victorian surf coast

ELEVATION AND CLIMATE

Coastal environments are located in flat landscapes at low altitudes from 0 to 200 metres above sea level with a rainfall from 700 to 1200 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Some of the factors that influence coastal vegetation are related to wind, salt and natural land instability. Primary dunes are **colonised** by grasses and herbs such as the hairy spinifex, while salt marsh and mangroves inhabit the mudflats. These plants play a crucial role in holding together the subsoils in these environments. In less exposed areas, such as the lee side of dunes and in **swales**, coastal scrub (consisting of species such as melaleuca, casuarina heaths and banksia) has developed.

Birds are the foremost faunal species living in the immediate environs of the coast. For example, the endangered orange-bellied parrot migrates from south-western Tasmania to spend winter in the coastal salt marshes in Victoria. Fairy penguins (also known as little penguins) and short-tailed shearwaters nest in the dunes along with a large number of migratory birds from Siberia, Japan and the north Pacific Ocean, including the hooded plover and the little tern. Fur seals can also be seen in some areas, such as Phillip Island, raising their young.

HUMAN INFLUENCE AND THREATS

More than 85% of Australians live less than 50 kilometres from the coast; therefore, the largest threat to coastal areas comes from urban development and the associated issues of introduced weeds and animals, which readily adapt to this ecosystem. Ground-nesting birds and small mammals are threatened by these problems as well as significant recreational use of the coast. The escalating use of four-wheel drive vehicles has increased coastal degradation and the spread of weeds in more isolated areas. Additional impacts include rising sea levels and increases in the frequency of storms due to climate change.

The wetland environment



Leigh Park

The wetland environment is characterised by an area that is wet on a semi-regular basis. This includes areas of marsh or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt. South-eastern Australia is home to a variety of estuarine and inland aquatic environments, including rivers, creeks, lakes, swamps and groundwater reserves.

Major functions of wetland environments include water purification, flood prevention, bushfire prevention and carbon storage. Because wetlands and rivers are ideal venues for recreational pursuits such as fishing, swimming, boating, hunting and water-skiing, they can be placed under enormous pressure from human impacts. Naturally this affects the native flora and fauna that inhabit an area, and careful management is essential. Land use systems must encompass the entire **catchment area** of rivers and wetlands if they are to be successfully conserved.

colonised

Occurs when a species populates an area

swales

Shallow troughs between sand dunes

catchment area

The area of land where water from precipitation drains into a body of water

Barmah National Park is a part of the largest river red gum forest in the world and is internationally protected under the Ramsar Convention on wetlands.

DISTRIBUTION

There are more than 17 000 wetlands over 1 hectare in size in Victoria alone. They range from the substantial coastal system of the Gippsland Lakes, to inland wetlands linked to rivers such as those at Kerang and Barmah, to small freshwater meadows and lakes such as Cherry Lake in Altona. Several of Victoria's wetlands have been recognised as being of international significance because of the bird species that migrate to them from the Northern Hemisphere. These sites are covered by fresh or salt water and support diverse vegetation, birdlife and wildlife, and include Port Phillip Bay and the Bellarine Peninsula, Western District Lakes, Hattah Lakes, Barmah National Park and the Gippsland Lakes.

ELEVATION AND CLIMATE

Wetlands are located in flat landscapes at low altitudes below 200 metres with a variable climate depending on seasonal changes. Rainfall can be between 300 and 1200 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Many of the species inhabiting wetland environments (such as birds, frogs, fish and plants) cannot exist anywhere else and rely on these ecosystems as their breeding grounds. Often the **riparian vegetation** that occurs beside rivers and wetlands, such as tall eucalypts, large wattles and broad-leafed shrubs, provide vital breeding sites for native birds such as kingfishers and swallows, and other native animals that inhabit wetlands such as platypuses, water rats, skinks and snakes.

HUMAN INFLUENCE AND THREATS

Wetlands are among the most threatened ecosystems in Australia. Many wetland environments have been significantly degraded or destroyed by human activities such as **irrigation** and drainage for agriculture, **urbanisation** and introduced species. It is vital to maintain adequate ecological flow regimes for wetland ecosystems to be maintained. Many rivers in Victoria have been dammed, dredged or channelled and severely polluted. Water from many of the rivers is redirected via channels to be used for pasture and crop irrigation. In addition, approximately 35% of wetlands have been drained for **land reclamation**. These processes result in the removal of streamside vegetation and habitat, and the interruption of natural flows, all of which leave the ecosystems in poor health. Effects such as these, as well as land clearing and degradation, water extraction, salt disposal, the construction of dams, weirs and locks, increased nutrient levels from agricultural runoff, de-snagging, predation and competition from **exotic species** (such as European carp), will continue to degrade the quality of these ecosystems.

riparian vegetation
Plant habitats and communities along a river's margins and banks

irrigation
Artificial application of water to arable land for agricultural use

urbanisation
The physical growth of urban areas as a result of rural migration

land reclamation
The process of creating new land from the ocean, riverbeds or lakes

exotic species
A species living outside its native distributional range

LEARNING ACTIVITY



WETLAND ECOSYSTEMS

To learn more about the critical role wetland ecosystems play in Australia, visit the Australian Department of the Environment and Energy website via <http://oes.nelsonnet.com.au>.



Wetland ecosystems

The grassland environment

Grasslands are defined as ecological communities where grass species dominate the area and there is less than 10% natural tree or shrub cover.

DISTRIBUTION

Prior to European settlers arriving in Victoria, extensive grasslands covered the plains between the Murray Valley and the Great Dividing Range. Today, grasslands are found in patches in the northern and western parts of the state and in some parts of Gippsland. Some of the most valuable areas of native grassland are on the western and northern outskirts of metropolitan Melbourne.

ELEVATION AND CLIMATE

Grasslands are located in flat to gently undulating landscapes at low altitudes below 700 metres, with low to medium rainfall areas of 400–1000 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Grasslands are among the most species-rich plant communities in Australia. They contain many grass species and an even greater diversity of other herbs. The grasslands contain a variety of floral species, but are best known for their kangaroo grass, wallaby grasses and spear grasses, and in areas where the soils are deeper, grassy woodlands are populated by yellow gums, river red gums, casuarinas and acacias.

Grasslands play host to many faunal species that have adapted to life in this environment, such as kangaroos, bandicoots, possums, bats, skinks, lizards, snakes and a large number of birds including magpies, swallows, wagtails, ibis, rosellas, parrots and galahs. The bush stone-curlew and the plains-wanderer are examples of ground-dwelling birds whose numbers have declined as a result of habitat loss and predation by feral species.

HUMAN INFLUENCE AND THREATS

Indigenous Australian inhabitants had used fire in some areas to maintain the open nature of landscape, promote new growth and attract feeding animals. The open nature of grasslands made this type of environment particularly attractive to European explorers and settlers seeking suitable grazing, cropping and pasturelands. Because much of the grassland environment had little timber and was seen to be resource-poor (in terms of mining and water), it was readily available to free settlers. The introduction of sheep and cattle increased the degradation and, hence, decreased the biodiversity of grassland environments.

As a result of this extensive settlement, less than 1% of Victoria's native grasslands remain intact today – these mostly occur in small areas, which are at risk from weed invasion, urban development, salinity and agricultural practices.

The greatest natural threat to the health of grasslands is climate change. With an increase in temperatures and drought conditions, the shallow-rooted grasses are at most risk.

FAST FACT

Grassland environments are the most critically endangered ecosystem in Australia. Since European settlement, 95% of these grasslands have been destroyed.



Mulla Mulla Grasslands at Mount Cottrell, a threatened native grassy ecosystem of the Victorian Volcanic Plains.

The dry forest environment

Dry forests and landscapes are dominated by a range of eucalypt trees. These trees are separated, allowing light to reach the ground and enabling a rich variety of hard-leaved shrubs, ferns, herbs and

grasses to flourish. The Great Dividing Range, which was formed approximately 3 million years ago, forms a barrier across Victoria. It serves to protect many of the north-facing slopes from the cool, moisture-laden winds sweeping in from Bass Strait and the Southern Ocean. This results in the northern slopes and foothills being relatively dry, which supports a variety of dry forests and woodlands. The vast majority of forests in Australia are known as dry **sclerophyll**. Approximately 80% of the plants in these forests are eucalypts trees with hard, short and often spiky leaves, which is a condition closely associated with low soil fertility.



This box-ironbark forest in Greytown, central Victoria, is a dry forest environment.

Museums Victoria/Photographer: Rodney Start

DISTRIBUTION

There are many types of dry forests in Victoria. Stringybark forests dominate the landscape east of Western Port; grassy woodlands are scattered throughout the Western District; and box-ironbark forests cover the area west of Stawell to the east of Wangaratta.

ELEVATION AND CLIMATE

Dry forests are found mostly between 200 and 1000 metres above sea level, receiving limited amounts of rain, varying between 550 and 1000 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

Dry forests and woodlands are biologically diverse and support a variety of plants and animals, including some of Victoria's rarer flowers and birds.

Open woodlands are comprised of a variety of eucalypts, casuarinas and cypress pines, and they have grassy, heathy **sedge** and herb-rich understoreys. Red gum forests dominate major waterways, such as the Goulburn and Murray rivers, in the north of Victoria. Stringybark forests populate the landscape east of Western Port; remnant grassy woodlands are scattered throughout the Western District; and very little of the once extensive box-ironbark forests lie across the middle of Victoria. Fire is an important component in this type of forest as some native trees, such as the banksia, require the heat of a fire to crack open seedpods to free the seed inside.

Dry forests are home to a vast variety of fauna such as wallabies, kangaroos, koalas, wombats, possums, echidnas, parrots and gliders.

HUMAN INFLUENCE AND THREATS

Much of the dry forest and woodlands that would have been found in Victoria around 1800 have diminished, mainly due to extensive clearing during the gold rushes and settlement when the demand for timber for housing, mining and railways was large. Further decline has occurred as a result of agricultural practices and urban development.

Major threats to the health of the dry forest environment include habitat modification and **fragmentation**, vegetation clearance, overgrazing, weed invasion, **cinnamon fungus**, feral predators and the loss of hollow-bearing trees.

sclerophyll

Sclerophyll forests are a typically Australian vegetation type having plants (typically eucalypts, wattles and banksias) with hard, short and often spiky leaves

sedge

A grass-like plant with triangular stems and inconspicuous flowers, growing typically in wet ground

fragmentation

The reduction or breaking up of one area of habitat into several smaller separate areas

cinnamon fungus

A soil-borne water mould that produces an infection that causes root rot or dieback

The wet forest and rainforest environments

Wet forests and rainforests are landscapes with thick, dense vegetation in areas of high rainfall. The tall trees grow close together, which forms a canopy, minimising the light and vegetation at ground level.

FAST FACT

Only small patches of rainforest remain in Victoria, covering a total of 16 000 hectares.

Leigh Park



A Victorian rainforest

DISTRIBUTION

Victoria's wet forests and rainforests are found in the southern, central and north-east regions of the state. They occur in locations such as the Otway Ranges, East Gippsland, Wilsons Promontory, the Strzelecki Ranges and the Victorian Alps.

ELEVATION AND CLIMATE

Wet forest and rainforest environments are found in sheltered gullies at altitudes ranging from 200 to 1200 metres above sea level, and rainfalls are between 800 and 1500 millimetres per year.

BIODIVERSITY AND COMMON FLORA AND FAUNA

More species live in wet forests and rainforests than any other type of ecosystem. They are very high in biodiversity due to the large range of habitats created in the many layers of forest and the warm, humid climate.

Wet forest and rainforest environments are dominated by a dense canopy of non-eucalypt tree species over an understorey of shrubs, ferns and small soft-leafed herbs. The world's largest flowering plant, the mountain ash (*Eucalyptus regnans*), occurs in these ecosystems. It has been measured at 100 metres in height and 15 metres in circumference. Other plants and trees include the manna gum, messmate stringybark, mountain grey gum, white peppermint, sassafras, blackwood, myrtle beech, lilly pilly and various tree ferns.

Wet forest and rainforest environments are home to possums, gliders, bats, owls, wombats, wallabies, skinks and snakes, and bird species such as fantails, honeyeaters, rosellas, currawongs, robins, pardalotes, cuckoos and kookaburras. Several rare mammals, including Leadbeater's possum (the faunal emblem of Victoria), and many birds depend on older, hollow-bearing trees for nest sites and habitat.

HUMAN INFLUENCE AND THREATS

Many forest plants have adapted well to fire and can re-establish themselves afterward; however, rainforest plants are not fire-tolerant and their distribution can be significantly reduced following burning.

Although rainforests are nationally protected from harvesting, many areas of adjacent wet forests are the focus of intensive timber harvesting. This results in damage to both forest types, including habitat loss, weed invasion, declining water quality and damage from the burning of **coupes** after harvesting.

coupes

The removal of almost all vegetation from an area of forest

The arid environment (Mallee)

An arid environment is one that is characterised by a severe lack of available water, which hinders the growth and development of plant and animal life. Approximately 4 million years ago, a vast inland sea covered what we now call the Mallee and the north-western part of Victoria. After a succession of arid and wet phases, the area has been left with a legacy of sand and shallow soils that cover the area today.

DISTRIBUTION

In Australia, arid and semi-arid environments are located in the interior of the continent, with infertile soils, a highly erratic rainfall, extremes of long dry periods and occasional flooding.

In Victoria, the name 'Mallee' is used to describe the arid and semi-arid north-western parts of the state. The key environmental features of Mallee are high summer temperatures, relatively infertile soils and low, unreliable rainfall.

ELEVATION AND CLIMATE

The Victorian Mallee environments have an annual rainfall of about 250–400 millimetres per year and an altitude range of between 50 and 200 metres above sea level.

Shutterstock.com/Photodigital.nl



An arid environment

BIODIVERSITY AND COMMON FLORA AND FAUNA

The landscape tends to be dominated by low Mallee scrub of small mallee eucalypts that can withstand prolonged dry periods and harsh conditions. Deeper soils are home to heathland with desert banksia, scrub pine and casuarina. Saltbush grows in more saline areas, and spear grass and cypress pine intermingle with salt pans. The flora and fauna in this seemingly lifeless landscape are remarkably diverse. Numerous reptile and bird species inhabit the area, along with a range of native grasses and shrubs.

The Mallee environments are home to the malleefowl (which constructs huge mounds of sand and litter to incubate its eggs), parrots, kangaroos, geckos, skinks, snakes and a range of small ground-dwelling mammals.

HUMAN INFLUENCE AND THREATS

About one-third of all the Mallee environment has been cleared for agriculture, mining or urban development.

Agricultural practices and subsequent issues such as salinity have affected significant areas of arid and semi-arid environments, particularly in the northern parts of Victoria. At least 12 species of mammals have become **extinct** in recent times. **Remnant vegetation** exists in small, fragmented areas, threatened by environmental weeds, predation by feral animals (such as rabbits and goats) and intense fire events.

extinct
No longer existing or living

remnant vegetation
Small patches of native plants that remain after conversion of landscapes to agricultural or other use

The heathland environment

Heathland is one of the oldest recognised ecosystems in the world. The heathland environment is characteristically low and shrubby, with trees twisted and gnarled by the typically dry winds in nutrient-poor sandy soils.

DISTRIBUTION

Heathlands are found throughout Victoria from the coast and hinterland to the mountains; however, they are particularly prevalent near the coast and in the south-west of the state.

ELEVATION AND CLIMATE

The annual rainfall of heathland environments varies from 600 to 1100 millimetres per year and the altitude they can be found at ranges between 50 and 300 metres above sea level.



Alamy Stock Photo/Philip Game

A Victorian heathland environment

BIODIVERSITY AND COMMON FLORA AND FAUNA

Nutrient levels in the soils in the heathland environment are generally low and the soils are acidic. Many species in heathlands have a close interrelationship with fire. While some may re-sprout following burning, others will die, but their hard, woody fruit pods will open under intense heat and release seeds. The distinctive grass tree, *Xanthorrhoea australis*, will respond to fire with a display of new growth.

Heathlands tend to be dominated by hard-leaved plants such as banksias, hakeas, peas, bottlebrushes, melaleucas, tea trees and eucalypts. As their name suggests, they are also populated by a range of heaths, including the common heath, cranberry heath, daphne heath and flame heath. Over 80 species of birds inhabit this ecosystem, along with small marsupials such as dunnarts, potoroos and bandicoots, and placental mammals.

HUMAN INFLUENCE AND THREATS

Approximately half of all Victorian heathland environments have been permanently cleared for agriculture, urban development or mining. Several areas of heathland have been conserved in Victoria's park system, but coastal development, plant diseases and environmental weeds threaten others. Heathlands are also particularly prone to cinnamon fungus and invasion by woody native species. If fire occurs too infrequently or is too large in scale, it is a threat to a heathland environment.

LEARNING ACTIVITY



AUSTRALIAN ECOSYSTEMS

Visit the Gulliver Media website ('for schools' section) and watch some of *The Living Landscape – An Australian Ecosystem Series* (10 parts) via the link at <http://www.nelsonnet.com.au/oes>, investigating the different ecosystems of Australia's outdoor environment. (You will need Adobe Flash Player.)

- Using examples from a specific outdoor environment you have visited or investigated this year, identify and describe the different factors that have influenced the type of environment that has developed in this location.
- Working individually or in small groups, produce posters of each of the types of outdoor environments identified in the text. For your poster, include:
 - the type of outdoor environment
 - distribution of your outdoor environment on a map of Victoria
 - the elevation, annual rainfall, and examples of unique flora and fauna
 - the influence humans and other threats have had on the health of this environment
 - pictures displaying a range of unique features of your outdoor environment.
- Using information from all of the posters, complete the table below in your workbook (or use the online table on your student website via <http://www.nelsonnet.com.au/oes>). Summarise the characteristics of each type of outdoor environments.

Type of outdoor environment	Size within Victoria	Rainfall	Elevation	Unique flora and fauna	Human influence and threats
-----------------------------	----------------------	----------	-----------	------------------------	-----------------------------

- On a large map of Victoria, map the major outdoor environment types and their distribution.
- Many urban areas in Victoria have been built on land that was originally forested.
 - Which forest type was cleared to make way for the area in which you live?
 - What strategies have been implemented to preserve remnant forest in your area?
 - Apart from the dominant forest type, what other flora and fauna may have lived in your area before it was urbanised?
 - Find a place where some remnant forest exists in your area. Visit and describe its current condition, detailing the plants and animals it contains.



Gulliver
Media
ecosystem
videos



Scaffold

RECREATIONAL USERS' UNDERSTANDINGS OF SPECIFIC OUTDOOR ENVIRONMENTS

In the previous section, you investigated the characteristics of different types of outdoor environments. It is this diversity that compels people to explore and experience these diverse environments firsthand while participating in recreational activities. This section considers the understanding that recreational users gain of the complexities of the outdoor environment from participating in outdoor activities.

Specific outdoor environments



Shutterstock.com/My Good Images

Recreational users must understand their outdoor environments in order to properly plan and prepare for activities, taking varying conditions into account.

Some outdoor activities do not require any specific environments, such as photography, whereas others require specific landscapes, altitudes and climatic conditions, such as cross-country skiing. Cross-country skiers would require a detailed understanding of the alpine environment. Alpine environments are susceptible to extreme weather conditions, which can change rapidly and unexpectedly. For example, snow fall has been recorded in all months of the year in the Victorian alpine regions. Recreational participants must understand, plan and prepare for these varying conditions carefully.

Some recreational activities can be completed in a variety of environments, such as kayaking. Kayaking in a flat-water lake would require a different set of skills and knowledge of the activity and the environment than kayaking in a river with a strong current. It is important that recreationalists have a comprehensive knowledge and understanding of the unique features of the specific outdoor environment and how their recreational activity may be influenced by these features to safely and sustainably participate in the outdoor activity.

Once involved in the recreational activity, participants develop a closer relationship with outdoor environments. Often, it is only when they are within the environment that participants are able to fully appreciate and comprehend the features of the specific environment, such as the extremes in climatic conditions. An example is the experience of being in **whiteout** conditions in the snow. It is difficult to understand how visibility and contrast can be so severely reduced and how easy it is to become disorientated if you have not personally experienced it. It is important to prepare for these conditions and know how to safely negotiate them. Alpine skiers will develop an understanding of the differences in the snow conditions throughout the day – commonly, hard packed and icy in the morning and softened and slushy in the afternoon if the sun is shining. These snow conditions can greatly influence your skiing speed and level of control. Without this understanding, there would be a greater risk of injury.

whiteout

Lack of daylight visibility due to snow or fog



SnowSafe

LEARNING ACTIVITY



SNOW SAFETY

The SnowSafe website via the link at <http://www.nelsonnet.com.au/oes> can help schools develop an understanding of safe and sustainable interactions with alpine environments.

ESSENTIAL KNOWLEDGE OF SPECIFIC OUTDOOR ENVIRONMENTS

Essential knowledge for safe and sustainable outdoor recreation includes:

- good planning and preparation
- access and evacuation points, and emergency contingency plans
- facilities available at your location (e.g. toilets, shelter and campsites)
- sensitivities of the flora and fauna
- sites of cultural significance
- appropriate clothing, food and equipment requirements
- expected range of weather conditions
- access to drinking water
- camping and fire restrictions
- access to medical help
- mobile phone coverage
- completed risk assessment
- local knowledge updates
- codes of conduct for recreational activity
- minimal impact strategies.

Recreational users who take the time to develop a greater knowledge of the outdoor environment are more likely to have safer and more sustainable interactions, achieve more, have more fun and develop a greater appreciation of the outdoor environment and the recreational activity.

If recreational users have a poor understanding of the environment, this could lead to increased risk to themselves and others, and unsustainable interactions within the outdoor environment. For example, a swimmer who ventures out into a surf area without an understanding of rips may soon find themselves being swept out into deeper water, endangering the safety of themselves and any potential rescuer. Similarly, without an understanding of the damage that cinnamon fungus (*Phytophthora cinnamomi*) can do to native trees, a hiker may not understand the need to adequately wash down camping equipment and hiking boots, and so may inadvertently promote the spread of the disease and lead to further loss of native flora and fauna.

LEARNING ACTIVITY



BONDI RESCUE SURF SAFETY VIDEO

Watch the Surf Safety Tips video by the Bondi Beach lifeguards via the link at <http://www.nelsonnet.com.au/oes> discussing the knowledge required by recreational beach users for safe interactions with the outdoor environment, including what to do in a rip.



Bondi Beach
Lifeguards

CASE STUDY: THE IMPORTANCE OF PREPARATION

VICTORIAN MAN FINED FOR TREKKING UNDERPREPARED IN BLUE MOUNTAINS

A Victorian man, who went on a three-day trek in NSW's Blue Mountains with only potatoes and naan bread in his pack, has been fined \$500 for being poorly prepared.

The 29-year-old was winched to safety by a police helicopter following a search.

He set out from Newnes, almost 200 km north-west of Sydney, on Boxing Day and told friends he planned a 150 km, three-night hike to Colo Heights.



When the hiker did not reach his intended destination on Saturday, his friends called police.

Two police helicopters and SES volunteers were involved in the search, which ended in the man being winched to safety on Saturday.

He suffered a minor ankle injury and declined treatment.

NSW Police Force Rescue and Bomb Disposal Unit Commander Brenton Charlton said the man was fined \$500 under the 2009 National Parks and Wildlife Regulations for 'engage in activity that risks the safety of self/others'.

'When the man set out he had with him a kilo of potatoes and naan bread,' Insp Charlton said.

'We believed the 29-year-old placed himself and the search teams at risk through his lack of planning and preparation, and through carrying inadequate provisions.'

Police said the man's intended route through remote terrain would have been extremely difficult to complete safely and would have taken much longer than he estimated.

Insp Charlton said the man's drama was a timely reminder of the dangers of bushwalking.

By Amelia Harris, *The Herald Sun*, 30 December 2012

LEARNING ACTIVITY



RECREATIONAL UNDERSTANDINGS OF OUTDOOR ENVIRONMENTS

- 1 Identify two recreational activities that do not require a specific outdoor environment to participate in.
- 2 Identify two recreational activities that do require a specific outdoor environment to participate in.
- 3 Identify a recreational activity that can be completed in a variety of outdoor environments not presented in this text. Describe the characteristics of the different outdoor environments and how the skills and understandings for safe and sustainable interactions by participants would differ for each outdoor environment.
- 4 Describe an example of how your understanding of a specific outdoor environment changed once you participated in an activity in the environment.
- 5 Consider the list on page 83 of essential knowledge for safe and sustainable participation within the environment. List what you consider to be the top five. State the reason for each of your choices.
- 6 Discuss two advantages of people having a good understanding of the outdoor environments they are visiting.
- 7 Discuss two possible implications of people having little understanding of the outdoor environments they are visiting.
- 8 Considering the article in the case study, 'Victorian man fined for trekking underprepared in Blue Mountains', evaluate the hiker's level of understanding of the outdoor environment he was visiting. What were (or could have been) the implications of this level of understanding for him and for the environment?
- 9 Assess your level of understanding of an outdoor environment you have visited as a recreational user. Describe how your level of understanding may have influenced your experiences.

SCIENTIFIC UNDERSTANDINGS OF OUTDOOR ENVIRONMENTS

Scientific investigations into nature have provided some of the most important discoveries of our world, such as the theory of evolution by British naturalist Charles Darwin (1809–1882). This section examines how we can understand outdoor environments from a scientific perspective. This includes the interrelationships between components, the effects of natural changes and fire on the environment.

Structure of natural systems

THE BIOSPHERE

A shell approximately 20 kilometres wide surrounds the Earth and stretches from the deepest oceans to the highest mountains. This shell is called the biosphere, and includes all forms of life on Earth and all their interactions. Within the biosphere, there are three major regions of the Earth that interact:

- the **atmosphere** – a gaseous envelope of air surrounding the Earth
- the hydrosphere – all water on the Earth, including vapour in the atmosphere, oceans, lakes, rivers and ice caps
- the lithosphere – the soil and rocky crust of the Earth, its mantle, and core of molten rock.

atmosphere

The thin layer of gases that surrounds the Earth

COMPONENTS OF AN ECOSYSTEM

The interaction occurring between organisms and their environment is an ecosystem. The concept of an ecosystem was developed to make the study of different parts of the biosphere easier. The components of an ecosystem can be grouped in various ways (see diagram on page 86):

- An **organism** refers to individual living things.
- A **species** is a group of organisms of the same type, which are capable of interbreeding and producing fertile offspring.
- A **population** is a group of organisms of the same species living together in the one area.
- A **community** consists of a number of populations of different species living together in a particular environment.

In a community, organisms interact with one another and within their surroundings. It is these surroundings – chemical and physical, living and non-living – that make up an **outdoor environment**. Habitat refers to the specific place within an ecosystem that is occupied by an organism or population. Habitat size can vary from an ocean to a decomposing leaf. A broader concept is that of ‘ecological niche’, which describes the place and role of an organism in a community. This concept includes information about what an organism consumes, what consumes it, where it lives, and its interaction with the **biotic** and **abiotic** components of its environment.

No two species can occupy the same niche; however, similar species can coexist in a particular habitat if they do not pose a threat to each other. This ability to coexist reduces the effects of competition, which occurs when different organisms try to use the same resources, including air, water, space and nutrients.

The Earth’s environments have many varied cyclic processes, which enable nutrients to be reused. These include the **biogeochemical** cycles that allow elements to move throughout ecosystems, such as the carbon, oxygen, nitrogen and water cycles. Each cycle relies upon both biotic and abiotic components of the ecosystem to function effectively.

The cycling of these elements and water can be disrupted by human activity, such as overgrazing and land clearing. Nitrogen and phosphorus levels in the soil can quickly diminish, while burning fossil fuels contributes to increased levels of carbon dioxide in the atmosphere.

outdoor environment

Environments that have minimal influence from humans, but may also include those that have been subjected to human intervention

biotic

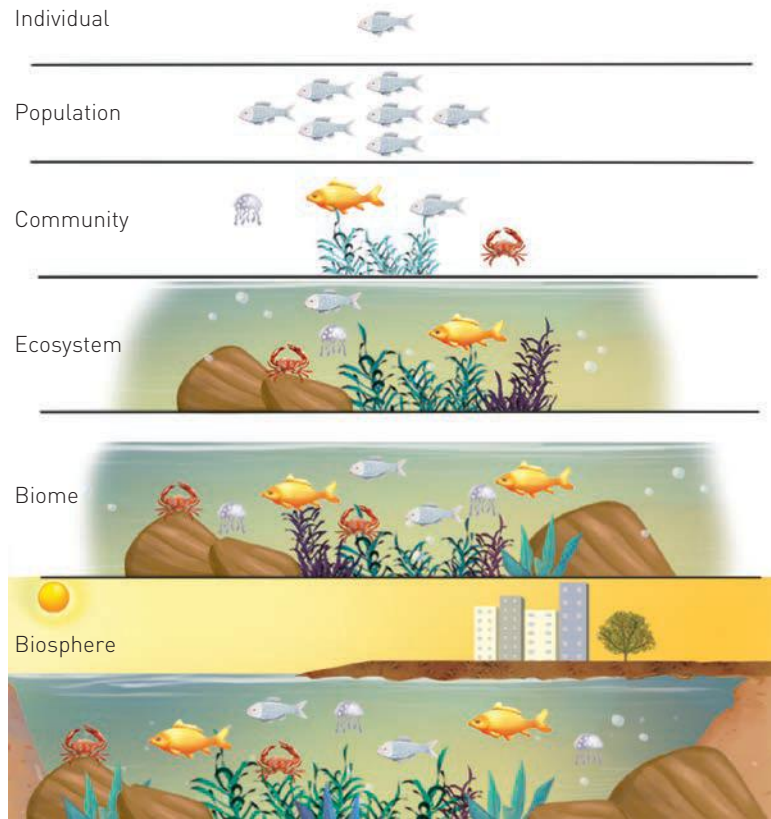
A living organism

abiotic

A non-living feature in an environment

biogeochemical

The cycle in which simple substances and chemical elements are transferred between living elements and the environment



The levels of organisation of material

photosynthesis

A process used by plants to convert light energy into chemical energy to grow

carbon dioxide (CO₂)

A colourless, odourless gas that is the fourth-most abundant in the atmosphere (approximately 0.04%); it is produced from the burning of fossil fuels and acts as a greenhouse gas



Ecosystem ecology video

respiration

The physiological process that enables animals to exchange carbon dioxide

fossil fuels

A deposit, such as petroleum, coal or natural gas, derived from the accumulated remains of ancient plants and animals and used as fuel

LEARNING ACTIVITY

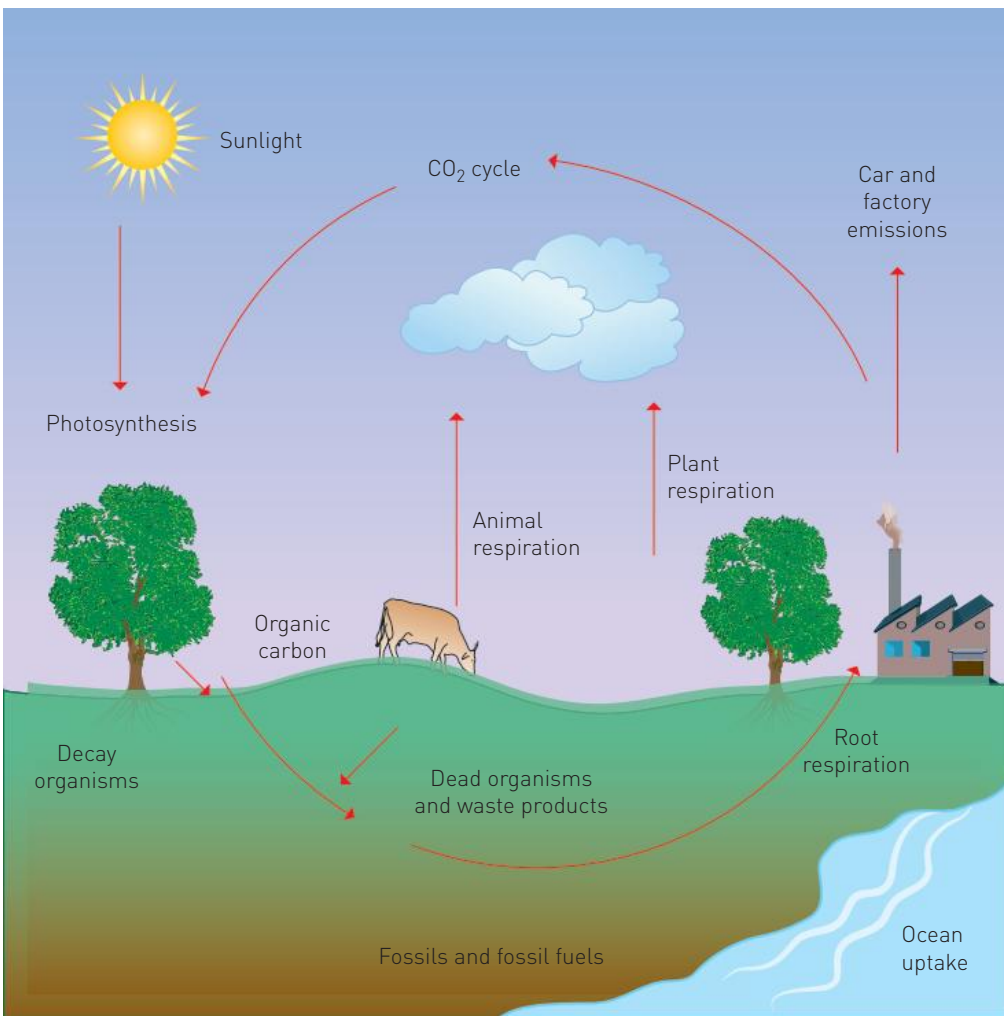


ECOSYSTEM ECOLOGY

Watch a short video on ecosystem ecology via <http://oes.nelsonnet.com.au>. This video simply describes the components and processes of ecosystems.

CARBON-OXYGEN CYCLE

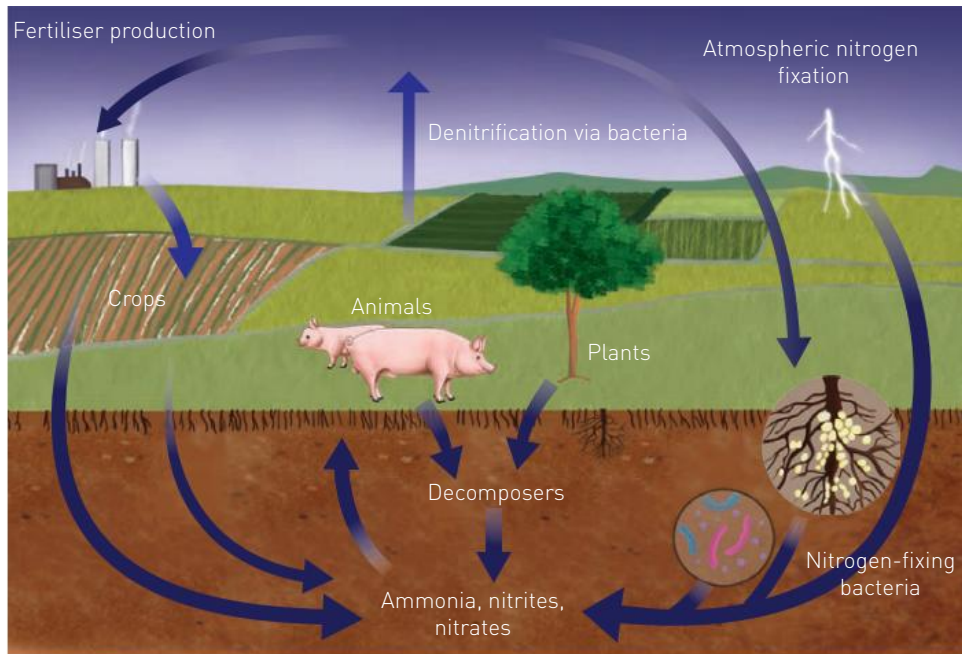
During **photosynthesis**, plants absorb **carbon dioxide (CO₂)** into their leaves from the atmosphere. The carbon from the carbon dioxide is then integrated into materials such as glucose and starch, which allow plants to function effectively and maintain their structure. Carbon then passes along the food chain as animals acquire nutrients from plants and each other. The processes of **respiration** and decomposition eventually release carbon back into the atmosphere. As carbon is also found in **fossil fuels** (such as oil, gas and coal) that have derived from decomposed plant matter, it is released into the atmosphere as carbon dioxide when these substances are burned in industrial processes, cars or domestic use. Some natural processes, such as volcanic eruptions and erosion, can also contribute to carbon levels in the atmosphere.



The carbon-oxygen cycle

NITROGEN CYCLE

The nitrogen cycle is the process by which nitrogen is converted between its various chemical forms. Approximately 80% of the atmosphere consists of nitrogen. It is an essential element required by organisms to manufacture protein and vitamins, and is a vital component of DNA. Plants cannot absorb nitrogen as a gas and so rely on soil bacteria that convert the nitrogen (gas) to nitrates (salt), allowing them to absorb it through their roots. Animals obtain nitrogen by eating plants and other animals. Nitrogen is returned to the system via faeces and urine, and the process of decomposition.



The nitrogen cycle

WATER CYCLE

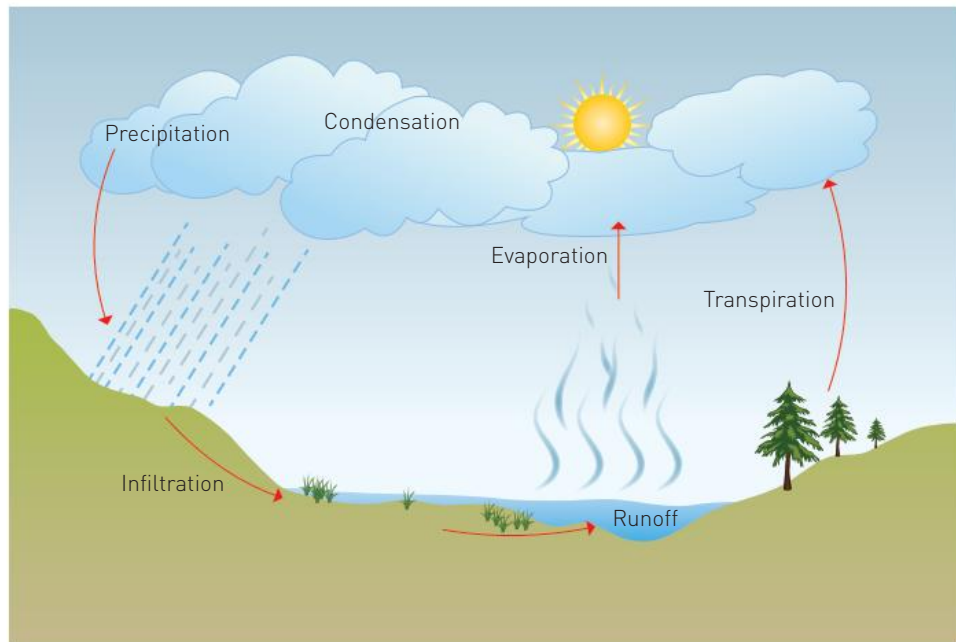
All life depends on water for survival. The sun's energy powers the water cycle through evaporation and **precipitation**. Plants absorb water from soils and use it during processes such as photosynthesis, and release excess water back into the atmosphere via **transpiration**. Animals (including humans) release water into the atmosphere through respiration, sweat and urine. In addition, the water contained in dead animals and plants is quickly evaporated into the system.

precipitation

When water is released from clouds in the form of rain, freezing rain, sleet, snow or hail

transpiration

The evaporation of water into the atmosphere from the leaves and stems of plants



The water cycle.

FAST FACT

There are approximately 1 397 918 500 trillion litres of water on Earth.

LEARNING ACTIVITY

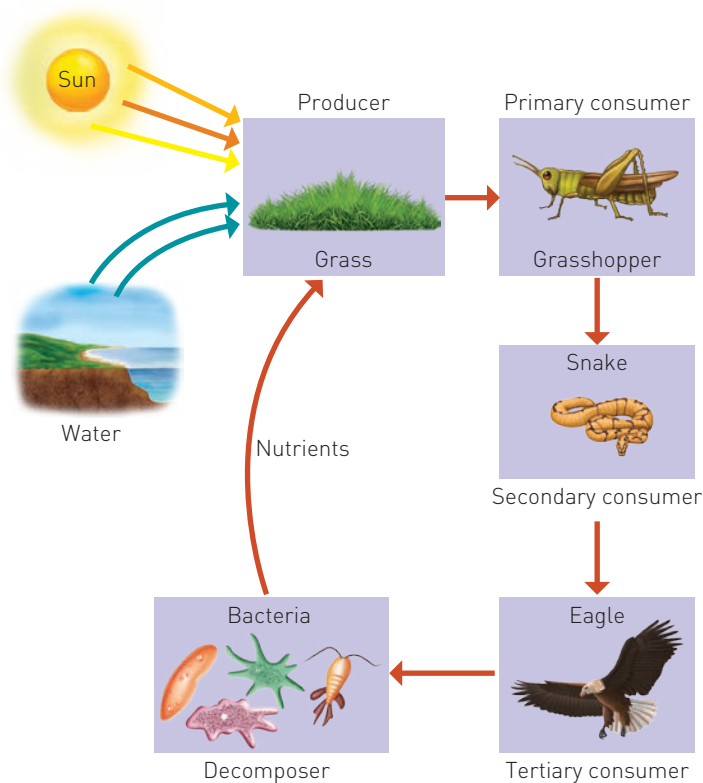


EARTH'S NATURAL SYSTEMS

- 1 Identify and describe each of the components of the biosphere.
- 2 Using a diagram, name and describe the components of an ecosystem.
- 3 Create a classroom display illustrating the natural processes involved in the carbon, nitrogen or water cycle.

FOOD CHAINS AND WEBS

The connection between the **geochemical cycles** is the exchange of the basic materials of life – the consumption and transfer of nutrients and energy through feeding. The living components of an ecosystem cannot maintain themselves without energy. The transfer of food energy begins with the consumption of the producers (green plants) by **herbivores** and passes through a series of changes or links as herbivores are eaten by **carnivores** that, in turn, are then consumed by the higher predator carnivores. This series of links is referred to as a food chain. Each component obtains energy from the previous link in the chain. The sun, or solar radiation, is the primary source of energy for nearly all components of the food chain, as illustrated in the diagram below.



A simple food chain in which energy is passed from the sun to the producer (here, the grass) and then to the consumers (in order of hierarchy: the grasshopper, the snake and the eagle).

geochemical cycles

The circulation of biological, geological and chemical substances

herbivore

Animals that feeds on grass and other plants

carnivore

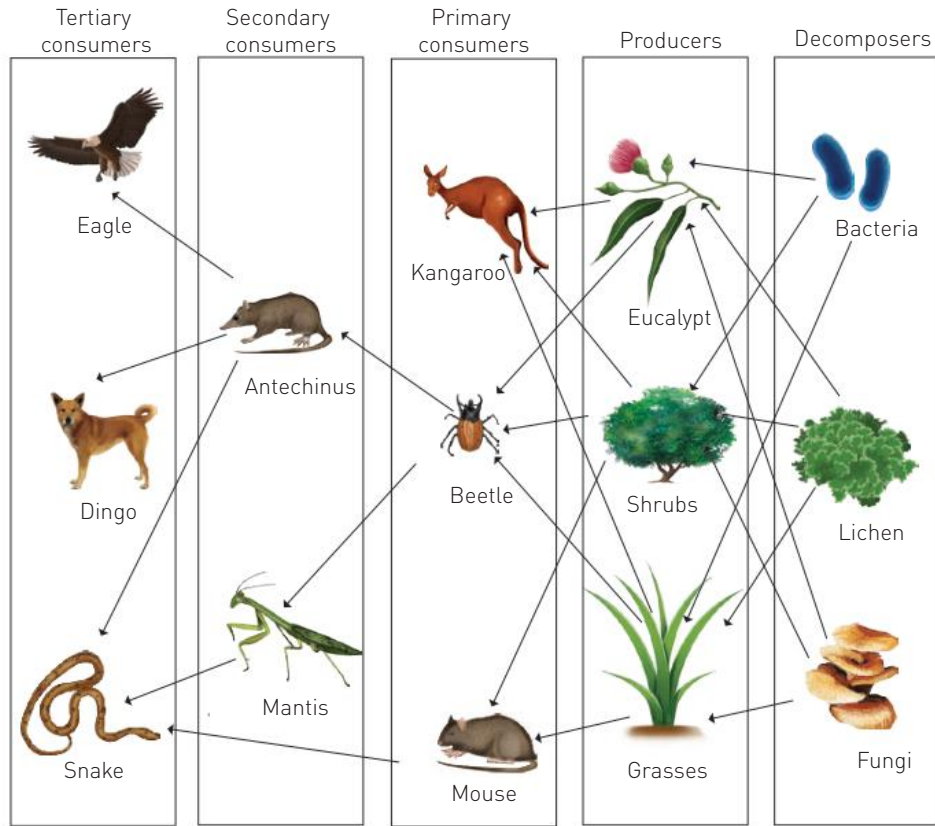
Animals or plants that feed on animals

trophic level

A feeding level; organisms that form one link in a food chain; either producers, consumers or decomposers

Each link in a food chain is referred to as a **trophic level**. Producers occur at the first level and capture sunlight to convert it into chemical energy through photosynthesis. This is the first trophic level. Some of this energy is then used by producers in their growth. It can be stored in organic matter and used as the organism grows. Herbivores, or primary consumers, are the second trophic level, while carnivores are known as secondary consumers or the third trophic level. Tertiary consumers form the fourth trophic level, and so on.

Most animals consume or are consumed by several types of organism. Each one is linked into several different food chains. These complex relationships can be described using a food web.



Food web for a forest ecosystem



Gould League

LEARNING ACTIVITY



FOOD CHAINS AND WEBS

Learn about food chains and food webs at the Gould League site via the link at <http://www.nelsonnet.com.au/oes> and then answer the following:

- 1 Describe the difference between a food chain and a food web.
- 2 How is energy passed from one organism to another within a food web?
- 3 Why is the role of decomposers important in a food web?
- 4 Construct your own food web for an environment you have visited or investigated this year.
- 5 Visit the Gould League website to construct your own Australian grasslands food web.

Interrelationships between biotic and abiotic components

In order to understand outdoor environments, it is crucial that we appreciate the complex interrelationships between the biotic components (living plants and animals) and abiotic components (non-living structures such as rocks, soils, sunshine and water). All outdoor environments contain a number of ecosystems, which consist of a number of components that must interact in order to function well. Any change in one component of an ecosystem will result in changes to other elements of the system. For example, changes to vegetation of a forest ecosystem that involve the removal of habitat, such as hollow-bearing trees, will impact on the breeding cycles of some bird and mammal species.

The interactions between components of an ecosystem are complex. Plants compete with one another for water, light and soil nutrients, while animals and birds compete for food and habitat. Non-living elements such as soil, rain and topography also affect the species within an ecosystem. Just as the components within a particular ecosystem interact together, ecosystems also interact with one another. For example, a wetland ecosystem consists of the fauna subsystem (including subsystems of birds, reptiles, amphibians and invertebrates), the flora subsystem, the water subsystem, the climate subsystem and the soil subsystem. None of these can exist in isolation.

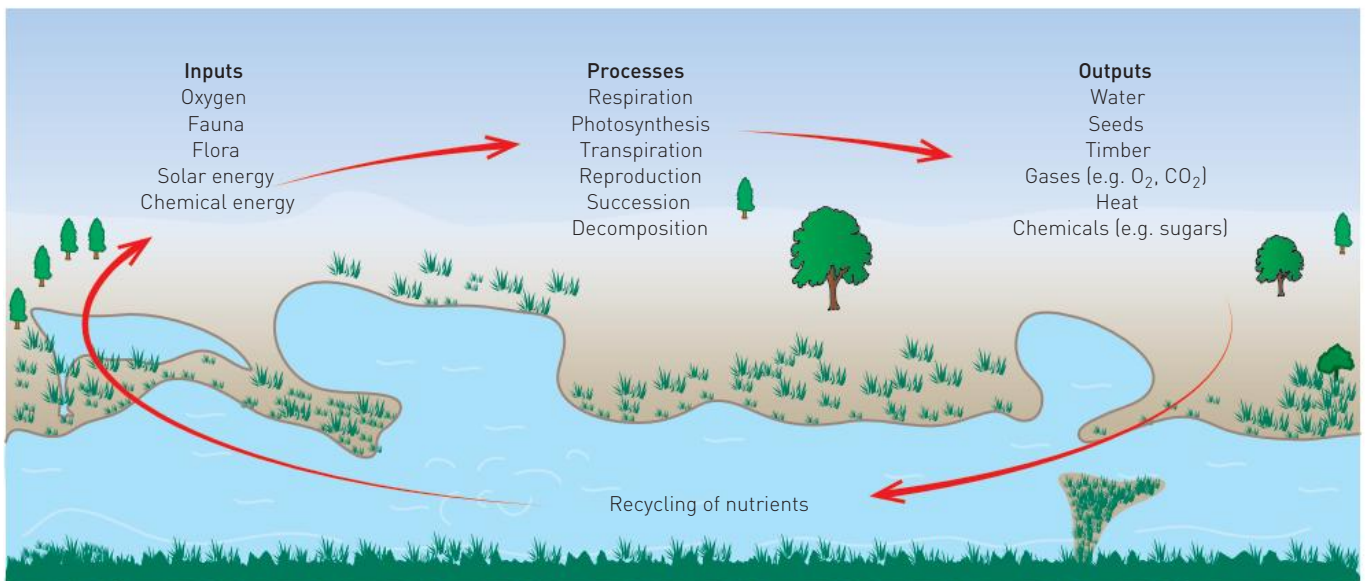
All ecosystems have inputs and outputs, together with processes that occur along the way to change the inputs in some way. Inputs and outputs can be categorised as **matter** or energy (in the form of thermal, solar, wind, **kinetic**, sound or potential energy). For example, a plant requires the input of carbon dioxide (CO₂), water and sunlight (solar energy) to produce sugar and oxygen through the process of photosynthesis. The materials leaving an ecosystem can be quite different from those that entered, as can be seen in the following diagram.

matter

In physics, that which has both a mass and volume, which occupies space and possesses a rest mass (as distinct from energy)

kinetic

Relating to or resulting from movement



Natural systems are complex and involve many interrelated processes.

LEARNING ACTIVITY



NATURAL SYSTEMS

- 1 Define the following terms:
 - a ecosystem
 - b component
 - c biotic
 - d abiotic.
- 2 Give three examples of natural systems.
- 3 What are the consequences of removing a component from each of the ecosystems you have described?
- 4 What is a subsystem?
- 5 Identify and describe the inputs, components, processes and outputs of a specific environment you have visited or investigated this year (other than a forest environment).
- 6 List the subsystems of one of your examples from question 2.
- 7 List the inputs, processes and outputs of a forest ecosystem.
- 8 Identify which of the following are biotic or abiotic components of the environment:

<ul style="list-style-type: none"> • wallaby • water • red-back spider • eucalypts • nitrogen 	<ul style="list-style-type: none"> • granite • sunshine • kangaroo grass • oxygen.
--------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------
- 9 Describe five biotic and five abiotic requirements for human survival.
- 10 Describe the process of photosynthesis. Draw a model to explain your answer.
- 11 What would happen without the sun's energy to a natural system such as the water cycle?
- 12 What would happen overall without the sun's energy?

Effects of natural changes to environments on people and places

Outdoor environments are dynamic. Changes in their structure and species composition over millions of years have made them what they are today. Change occurs on three levels: individual, community and large-scale.

- **Individual organisms** – Individual plants and animals constantly grow, develop, reproduce, die and decompose.
- **Community** – One type of community can succeed another type. Natural changes in plant communities are often referred to as 'plant succession' and result in **climax vegetation**. In most of Victoria, climax vegetation is dominated by fire-adapted eucalypts.
- **Large-scale** – Climatic change and movement in the Earth's crust can cause large-scale natural changes to occur. Some abiotic factors can result in sudden change (such as floods, cyclones, earthquakes, landslides and tsunamis) but more often changes happen slowly, such as the weathering of rocks and soils.

Change can also be short-term or long-term.

SHORT-TERM AND LONG-TERM CHANGES

Natural changes to outdoor environments may be considered to occur over a short-term or over a longer period of time. Short-term changes include:

- changes from day to night
- solar influences, such as seasons
- lunar influences, such as tidal flow
- flood and drought.

climax vegetation

Vegetation that establishes itself in an area over a long time in the absence of any major disturbances

Long-term natural changes to outdoor environments may include:

- migration
- primary and secondary succession
- climate change.

These natural changes affect both the outdoor environment and those who live in these environments. In Australia, we have seen the effects of people trying to manipulate their environment by altering the regularity and degree of natural changes, such as the regular burning regime like those practised by Indigenous Australians and more recent artificial flooding for irrigation.

DAY TO NIGHT

The regular change from day to night has some complex and profound effects on both humans and outdoor environments. Once the sun has set, temperatures decrease on both land and in bodies of water such as oceans, lakes and rivers. This can lead to changes in the speed and direction of wind. **Nocturnal** animals become active and **diurnal** species, unable to function as well in darker conditions, may seek out nesting sites. This includes humans who, without the aid of artificial light and heating, would traditionally seek shelter and rest. In our highly urbanised society, the effects of the change from day to night are not felt as keenly. Insulating houses and clothes, along with artificial light and heat sources, allows us to ignore the effects of darkness.

During the day, plants use sunlight for the process of photosynthesis whereby they take in carbon dioxide and produce oxygen. Plants are also continuously respiring to release energy for their functions. This means that, at night, plants can be net carbon dioxide producers. Vegetation that relies on animal species active during daylight hours may close their petals and their leaves may droop during the night. Other plant species attract night-time pollinators through their strong perfume or light-coloured flowers.

Native animals, including most mammals, are active from dusk to dawn to avoid predators, seek out food and avoid extremes in temperature. With the exception of species such as owls, tawny frogmouths and owl nightjars, most birds roost at night in hollows or nests, although some (such as plovers and magpies) will come out on nights when there is more light available.

The theory of **biorhythms** claims that the daily lives of humans are affected by rhythmic cycles such as day to night. One such cycle involves **circadian rhythms** – sensitivity to light and darkness and sleep/wakefulness patterns. In the absence of cues such as sunlight, aspects of metabolism, physiology and behaviour continue to be regulated by a 'biological clock'. This is one explanation for the effects of long-distance plane travel, known as jetlag.



FAST FACT

Check out the 'Fluker Post Project' to learn about changes to outdoor environments over time.

nocturnal

Animals and plants that are active at night

diurnal

Animals and plants that are active during the day

biorhythms

Cyclic pattern of changes in activity of living organisms

circadian rhythms

A 24-hour cycle in the physiological processes of living organisms

LEARNING ACTIVITY



EFFECTS OF NATURAL CHANGES TO ENVIRONMENTS

During a practical experience, take time out by yourself to note the changes in the environment from day to night and record how these changes affect you.

SEASONS

Indigenous Australians understand the seasons and the natural changes that occur throughout them and utilise them to their advantage. The movement of people across landscapes was often dictated by seasonal changes in particular regions. For example, prior to European settlers dominating the landscape, the Indigenous people of Victoria's north-east would move to the river plain areas to take advantage of flowing water caused by snowmelt. This was a time of breeding for birds and other animals, and a range of plant foods was readily available.



Shutterstock.com/deb talan

The quoll (genus *Dasyurus*), a native Australian marsupial, is nocturnal.

often a string of waterholes, filled with fish, animal and bird life attracted to the limited water supply. This made gathering food quite easy. After several heavy rains, the creeks and rivers in the foothills would be flowing again and people would move to these areas to seek shelter from the onset of the colder months.

At the end of the floods, people would return to the riverbanks and then travel to the high plains for both the cooler weather and the Bogong moths. This was a time of ceremonies, initiations, trading, dispute settlement, marriage and renewing of acquaintances. When the weather cooled in the mountains, people would once again descend to the rivers and plains areas. Prior to departing, the dry grasses would be set on fire to create regeneration for the following year.

Prior to European settlement and the introduction of dams and locks on the river, during the dry period the Murray River was



Gwangel moronn

Season of honey bees – autumn (late-March to June)

Sunrises, bees and flocking birds

Autumn (the season of native honey bees or gwangel moronn) is when the country starts to cool down after the summer heat.



Chinnup

Season of cockatoos – winter (June to late-July)

Cold, cockatoos and early wildflowers

Morning frosts, bleak mists and freezing winds make winter (season of cockatoos or chinnup) the coldest time of year.



Larneuk

Season of nesting birds – early spring (late-July to late-August)

Nesting birds and changeable weather

Early spring (season of nesting birds or larneuk) is usually the wettest time of the year with rivers running high. It is a time of dramatic weather changes, with up to six seasons in one day.



Petyan

Season of wildflowers – late spring (late-August to mid-November)

Wildlife and wildflowers

In spring (season of wildflowers or petyan), the bush bursts into life. Nature's rock gardens amaze. The days are warmer, although the weather can still be tempestuous.



Ballambar

Season of butterflies – early summer (mid-November to late-January)

Warmth, butterflies and wetland plants

With the onset of summer heat, the land dries and the weather stabilises. This is the season of butterflies or ballambar.



Kooyang

Season of eels – late summer (late-January to late-March)

A parched landscape

Late summer (season of eels or kooyang) is the hottest and driest time of the year. The risk of bushfire (Piikorda) is high. Streams dry up.

The traditional peoples of Gariwerd (the Grampians) the Jardwadjali and Djab Wurrung recognised six distinct weather periods that influenced their lives and the surrounding flora and fauna.

LEARNING ACTIVITY



NATURAL CHANGES REPORT

- 1 How do seasonal variations influence and affect your participation in outdoor activities?
- 2 Investigate the relationship between the sun, the Earth's position on its axis and the seasons. Produce a report that explains how these elements interact, utilising diagrams.
- 3 Describe the effects on people and the outdoor environment of the changing seasons.

TIDES

Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the moon and the sun and the rotation of the Earth. As the moon circles the Earth, its gravity gently pulls the waters of our seas and oceans toward it. In Australia, most coastal areas (with some exceptions) experience two high tides and two low tides every 24 hours and 50 minutes; therefore, high and low tide times vary every day.

The seashore can be divided into four separate zones based on the tides: the splash zone, which is rarely covered by water; the upper zone, which is covered by water during some high tides; the middle shore, which is covered at every high tide and exposed every low tide; and the lower shore, which is almost always covered by water. Different plants and animals live in different seashore zones. The area exposed to the air between the high and low tide marks is known as the **intertidal zone**. This area provides insight into the mysterious lives within marine environments.

With increases in the urbanisation of coastal areas in Australia, more people are visiting our beaches on a regular basis, placing greater pressure on the health of these areas. The intertidal zone has been a popular place to collect bait-like worms, clams, yabbies and crabs, leading to loss of biodiversity. Beachside developments such as piers, seawalls, groynes and marinas have influenced the natural tidal processes and marine life. People collecting shells from intertidal zones could reduce the availability of habitat for animals such as hermit crabs.

King tides can lead to the loss of sand dunes and coastal vegetation, and can also lead to flooding of developed areas. It is possible to harness the power of tides to produce clean **renewable energy**.



Getty Images/Jason Edwards

There are many treasures to be found on the shore at low tide along the Victorian coastline. However, even small children should be taught that we do not take our treasures home; we leave them on the beach as responsible global citizens.

intertidal zone

Area of foreshore and seabed exposed to air at low tide and submerged at high tide (i.e. the area between low-tide and high-tide marks)

renewable energy

Energy that can be obtained from natural resources that can be constantly replenished



FAST FACT

The highest tides occur with the coming of the full and new moons, and many believe these natural events coincide with a rise in madness, hence the term 'lunacy'.

LEARNING ACTIVITY



TIDES REPORT

- 1 Investigate the relationship between the moon and tidal flow.
- 2 Produce a report that explains how these two elements interact and why. Include diagrams.
- 3 List the effect of the tides on people and on a specific outdoor environment.

FLOOD

The effects of flood can sometimes be devastating to those who live and work in low-lying areas, with loss or damage to life and property. However, it is important to remember that flooding is part of the natural water cycle. Land that borders waterways such as rivers, creeks, lakes and swamps form a natural floodplain. The size of floodplains can vary from a few hundred metres to hundreds of kilometres, such as the lower Goulburn Valley around Shepparton and the Riverina area of the Murray River.

Prior to European settlement, the Yarra River had experienced floods up to 10 metres above the normal level of the river. Throughout the 19th century, there were several large floods that inundated the central business district of Melbourne and other low-lying areas such as South Melbourne and Collingwood. Because of natural valley storage areas installed at Eltham, Yering Flats and Fairfield, the incidence of major flooding along the river has been greatly reduced, but it can still occur.

The need to avoid future problems for both humans and the outdoor environment is crucial, but planning and development processes in the past have been known to overlook such needs. Effective floodplain management can be achieved through introducing measures that concentrate on preventing new problems caused by urbanisation and development, and alleviating existing problems. Management strategies that can have an impact on the frequency and volume of flooding include flood warning and emergency procedures, the construction of retarding basins, storage areas and levee banks, excavation of waterways, and concreting of channels (such as along the Moonee Ponds Creek). Many of these

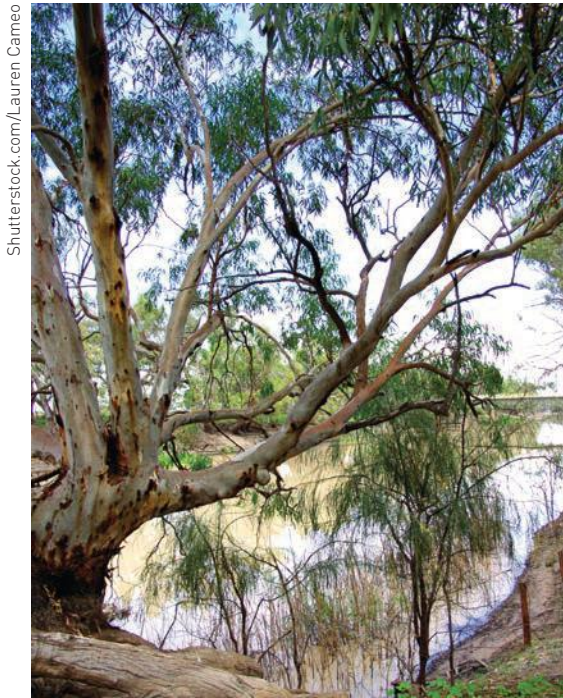
measures can have extremely negative effects on the natural environment through the removal of natural vegetation and associated habitats.

Stream erosion is a natural process, particularly around bends. However, changes in land adjacent to a stream can lead to instability and result in continuous erosion along its channel. Such changes include increased runoff from **impervious surfaces** (such as paved roads and car parks) and piped tributaries, uncontrolled access by stock, or direct interference such as straightening and channelling. When a stream has been straightened or channelled using concrete banks, the stream may be stable with little erosion, but it will have little vegetation cover and provide a minimal amount of habitat.

Flooding can also be essential in the reproductive cycle of some plants. For example, the river red gum, *Eucalyptus camaldulensis*, needs to be inundated by flood waters for its seeds to germinate. The lack of flooding of rivers in some areas, such as in the Barmah National Park, because of river damming for irrigation, has led to the absence of young river red gum trees in these and other areas.

impervious surfaces

Areas that have been covered by any material that impedes the infiltration of water into the soil



Shutterstock.com/Lauren Cameo

A river red gum (*Eucalyptus camaldulensis*) at Barmah National Park relies on regular flooding to thrive.

DROUGHT

According to the Australian Bureau of Meteorology, drought is 'a prolonged, abnormally dry period when the amount of available water is insufficient to meet our normal use'. Drought does not mean low rainfall – it is measured on the availability of water based on our ever-increasing needs. For this reason, human interactions with the environment can impact greatly on whether an area is considered

to be drought affected. Droughts are usually associated with extended dry periods of lower-than-expected rainfall.

Australia is the driest inhabited continent in the world. Our climate is highly variable – drier periods and wetter periods are natural cycles, and their extent varies from year to year. Therefore, we must learn to live and adapt to naturally occurring drought conditions. Based on climate records for the past 100 years, on average in Australia for every 10 years there will be 3 years of drought. The fluctuations in Australia's climate are influenced mostly by

what is known as the El Niño–Southern Oscillation phenomenon (El Niño). **El Niño** is an abnormal warming of surface ocean waters, causing increased probability of drier conditions.

Drought can have far-reaching effects on outdoor environments and the people who live and rely on the services provided by these areas. Some of the impacts of drought on the outdoor environment not only include the initial loss of crops and livestock, toxic algae outbreaks and increased threat of bushfires, but also erosion and the loss of the valuable topsoil, leaving land infertile for years to come.

Ultimately, drought impacts upon the lives of all Australians. Drought can have a significant impact on the economy due to the reduction in agriculture production and associated industries such as transport and manufacturing. Food shortages and rising food prices, and in some countries widespread famine, can lead to many deaths.

Droughts can lead to water restrictions – limiting the watering of gardens and lawns, and the washing of motor vehicles. It encourages people to adopt water-saving practices in their homes and businesses. The impacts of major droughts have social implications, such as an increased incidence of depression and suicide among farmers affected by a prolonged lack of rainfall.



Drought affects the lives of all Australians.

Alamy Stock Photo/Raymond Warren

El Niño

Extensive warming of the central and eastern tropical Pacific, associated with an increased probability of drier conditions

migration

A species that moves from one location to another in response to changes in habitat

immigration

The movement of people into another country or region to which they are not native in order to settle there

LEARNING ACTIVITY



DROUGHT VIDEOS

- 1 Follow the link to the National Geographic website via <http://oes.nelsonnet.com.au> and view *Droughts 101* video discussing the effects of drought on people and places.
- 2 View the BBC Science video *Extreme Drought in Australia* examining the impacts of drought in Australia.
- 3 As a class, discuss the differences in the information. Collate your responses to both videos.



National
Geographic
BBC Science

MIGRATION

Migration occurs when species move from one location to another in response to changes in habitat. When the variation in habitat is predictable, so is the pattern of migration. The significance of migration is that animals move from one habitat to another, sometimes similar, as each is only suitable for part of their lives. Migration can include dispersal to new areas, nomadism (or wandering), **immigration** and **emigration**. Some migration patterns are linked to climate and food availability, while others relate to breeding seasons and habitat change. The large range of migratory patterns within Australia is a reflection of the range of habitats available.

In spring millions of Bogong Moths migrate from the inland plains of eastern Australia to the Victorian Alps and Snowy Mountains to escape the summer heat. The moths provided a regular high

emigration

Leaving one's country or region with the intent to settle permanently in another

Auscapes/Terry Whittaker



The *Puffinus tenuirostris* is commonly known as the mutton-bird.

protein and fat food source for Indigenous people for thousands of years; these days the local mammals and birds rely on the annual migration for the same reasons.

The short-tailed shearwater (commonly known as the mutton-bird) breeds in burrows along the shores of Tasmania in summer. It undertakes one of the longest migrations in the world to the north Pacific (via Japan) and along the west coast of America before returning to Australia. Chicks emerge from their burrows at about 97 days old and follow their parents (who have departed up to two weeks earlier) along the migratory path. This route seems to take advantage of available food, while utilising prevailing winds.

Migrating birds and the outdoor environments they seasonally rely on for habitat and resources can be recognised and protected internationally (such as being identified as a Ramsar site). This can have a positive effect on the outdoor environment – more funds and stricter regulations in place may increase the health and sustainability of these areas. Stricter planning regulations to protect the habitat of migrating birds may place limits on how people can use outdoor environments, such as limiting development in protected areas.



Tasmania Parks & Wildlife Service

succession

The process of change in the species structure of an ecological community over time

primary succession

When a community is established where it has never been before

LEARNING ACTIVITIES



MIGRATION RESEARCH

- 1 Investigate the migratory patterns of a species in an area you have visited this year, or the area where you live.
- 2 Prepare a written response, including a map, along with a report to be presented to the class.

SHORT-TAILED SHEARWATER

Follow the link via <http://oes.nelsonnet.com.au> to the Tasmania Parks & Wildlife Service website page outlining the characteristics and migration patterns of the short-tailed shearwater (*Puffinus tenuirostris*).

SUCCESSION

Succession is the process of change in the species structure of an ecological community over time. Succession can happen over a very long period of time (such as after a volcanic eruption) or over a relatively short time (such as regrowth after a fire). There are two types of succession: primary and secondary succession.

Primary succession

Primary succession occurs after a major impact has been felt on an ecosystem, resulting in total destruction. A community will be established where it has never been before in a previously unvegetated, bare area. Coastal and rocky environments provide examples of primary succession.

- **Succession in coastal environments** – After sand has been deposited by wave action and formed into dunes, salt-tolerant plants such as spinifex will become established and their roots will bind the sand. As vegetation litter accumulates around the plants and decomposes, the sand will be gradually replaced with soil, which can support a wider variety of plants. As soil is less salty than sand, it will be colonised by bacteria, fungi and invertebrates that assist in the recycling of nutrients. As succession continues, woodland and open forest may be established. These are often found on secondary and tertiary dunes.
- **Succession in rocky environments** – After a lava flow from a volcanic eruption, the immediate result will be bare rock. Eventually lichen will appear and begin to break down the rock to form soil. The process of weathering involving water and wind will also play an important role

in fragmenting the rock. Mosses and ferns will follow, taking sheltered positions in cracks and crevices of the rock. Plants will reach the location when birds, insects, wind and water transport seeds and spores into the cracks and crevices. Gradually more species of plants will become established until a **climax community** is reached.

climax community
The development of vegetation in an area over time that has reached a steady state

Alamy Stock Photo/shoultis



Sand dunes act as an important role in protecting coastlines from saltwater intrusion and act as a buffer against wind and wave damage.

Secondary succession

When succession occurs in an area that has been previously occupied by a community, it is referred to as **secondary succession**. This can occur after grazing, timber harvesting or fire, or another mass disturbance has cleared an area. Over time, the community that develops will be similar to the original community. The factors that influence the rate and degree of succession can vary according to the event that occurred.

After a fire, the rate of recovery will depend on the length of time that has elapsed since the last event, the fire's intensity and the season in which the fire occurs. As the plants mature in the regrowing forest, they will require more light, nutrients and water. Some species will be displaced because of insufficient amounts of these components. This will lead to a decrease in plant density. As the dominant species, eucalypts will grow and reduce the light reaching the forest floor. Species richness will decline as a result and the understorey plants will change as shade-tolerant species become more abundant. These changes will suit some faunal species more than others, resulting in further change. Low-intensity fires can cause sterilisation of soils, while higher temperatures can alter



Getty Images/Ausccape

secondary succession
When a community that develops over time is similar to the original community

This mountain ash forest is approximately 25 years old. It is an example of a secondary succession as this area has previously been logged.

the amount and availability of nutrients such as nitrogen and phosphorus. This can result in more fertile soil, but also raises the risk of these water-soluble nutrients being washed away by rainfall.

LEARNING ACTIVITY



SUCCESSION VISUAL DISPLAY

Create an annotated visual display that illustrates examples of primary and secondary succession changes to a specific outdoor environment you have visited or investigated.

CLIMATE CHANGE

There are many different views about the effects of climate change. Scientists do not always agree about the level of change that has occurred, or whether any change is in fact natural or has been hastened by humans. It does seem clear that there has been an increase in global temperature in the past century, and there is evidence to link this change with increases in **greenhouse gases** in the atmosphere.

greenhouse gas

A gas in an atmosphere that absorbs and emits radiation; examples include carbon dioxide, methane, nitrous oxide and ozone

A small change in temperature can result in significant climatic change and noticeable local changes. For example, Australian annual average daily mean temperatures have increased by 0.9°C since 1910 (with the majority of this increase occurring after 1950), and sea surface temperatures have increased by about 0.8°C since 1910. The Bureau of Meteorology and CSIRO have predicted the effects of global warming on Australia's climate in the future (by 2030):

- Australian temperatures will continue to increase with more extremely hot days and fewer extremely cool days.
- The number of days with weather conducive to fire in southern and eastern Australia is projected to increase.
- Winter and spring rainfall is projected to decrease across southern continental Australia, with more time spent in drought.
- Past and ongoing greenhouse gas emissions mean further warming of ocean temperatures.
- Sea level rise and ocean acidification around Australia are projected to continue.

Bureau of Meteorology (2016)

It is also predicted that rainfall will increase in northern and eastern regions during summer periods and decrease in the south-east. Warm rain and higher temperatures could lead to a reduction in snowfalls and shorter snow seasons.

Some of the many people who rely on snowfall for their income over winter claim that this effect is already being felt. This reduces the time available for those relying on tourism during the winter season to generate income and places them under increased pressure for economic survival. This is one reason that it is important for these businesses to diversify and build a market for the summer months. For example, ski resorts can offer bushwalking and mountain-biking tours during summer so that their occupancy rates remain high, they continue to receive an income, and employment in the local community is maintained. Without initiatives such as these, tourism and recreation will continue to be affected and local economies will bear the brunt of the impact.

These climatic changes may also affect Victoria's flora and fauna. For example, the mountain pygmy possum's habitat is a limited area within the alpine environment. Habitat loss would be one result of a reduction in cold and snow periods. Changes in rainfall patterns and amounts will alter the way in which catchments are managed and affect flooding in urban areas. Agricultural practices may also be affected.



FAST FACT

Australian average temperatures are projected to rise by 1.0–5.0°C by 2070.

LEARNING ACTIVITY



CLIMATE CHANGES INVESTIGATION

- 1 Investigate an area you have visited or studied this year. Describe the long-term changes that have shaped this environment, including climatic, geological and vegetation changes. Use illustrations to explain your findings.
- 2 Create a concept map illustrating some of the long-term effects that have occurred as a result of human impact on the specific environment.
- 3 Prepare a response to the statement: 'Extinction is a naturally occurring long-term change, and as such humans should not interfere with this process.'



The effect of wildfire and controlled burns on the environment

LAND MANAGERS' UNDERSTANDINGS OF SPECIFIC OUTDOOR ENVIRONMENTS

Land managers are responsible for managing the use and development of land resources. In Victoria, the Department of Environment, Land, Water and Planning (DELWP) is responsible for the management of Victoria's public land. Covering over 4 million hectares, this includes parks and reserves, alpine resorts and catchments. More than 60% of Victoria is private land. Landowners, including farmers, have many obligations in terms of managing their land.

All land managers, private and public, are responsible for ensuring the long-term health and sustainability of outdoor environments, including the protection of water resources, control of pest animals, eradication of noxious weeds and conservation of soil. It is important that all land managers have an intimate knowledge and understanding of the land they are responsible for – their decisions can have a dramatic impact on the environment.

Different land-management regimes can create barriers and lead to fragmentation of habitat. This is particularly apparent in agricultural areas where open paddocks can act as barriers to birds and animals living in regions either side. The 'edge effect' is a term used to describe the consequences on vegetation and wildlife that occur as a result of one type of vegetation sharing a border with another. Some edges are natural, such as those that occur between a forest and open woodland, but many are human constructions such as those just described. The amount of edge has a variety of consequences on fauna and habitat. Some of the changes that occur at edges are:

- **micro climatic** – changes in solar radiation, temperature and humidity, soil conditions and wind strength
- **different inhabitants** – species that require a larger core area can be lost from areas when they develop more edge; aggressive species that prefer the edge habitat, such as noisy miners and bell miners, can displace others; parrots and cockatoos will utilise edges for nest sites
- **increase in pest species** – feral species such as cats, dogs and foxes will use roads and tracks to move between areas and prey on native animals and birds
- **weed invasion** – weeds take advantage of disturbance to establish; wind, water, animal, vehicle and livestock movement all spread weeds
- **impacts from adjacent land use** – chemical and fertiliser drift from adjacent farmland, trampling and grazing by stock, escaping fire, littering and disturbance from recreation uses are all threats to edges
- **noise and movement** – roads and tracks result in an increase of activity and traffic; some species rely on undisturbed habitat in order to breed.

Artificial barriers such as fences, roads and power lines can disconnect species within a habitat. A well-known example of this occurred at Mount Hotham when the road was constructed. Essentially,



Shutterstock.com/Dale Turner

Land managers' understandings of outdoor environments are important when developing infrastructure such as boardwalks to minimise the impact on native flora and fauna.

the habitat of the mountain pygmy possum (*Burramys parvus*) was cut in two, separating the males and females. This had a predictable effect on breeding rates and the need for action became apparent. The solution was found when a tunnel containing rock scree (the favoured habitat of the species) was built underneath the road, which allowed the possums to travel in safety from one side of the road to the other. However, foxes that also inhabit the area soon became aware of a ready source of food and started waiting at the entrances to the tunnel. A program of extensive trapping and baiting was undertaken to reduce the fox numbers.



Zoos Victoria

LEARNING ACTIVITIES



POSSUM DREAMING

Go to the Zoos Victoria website via the link at <http://www.nelsonnet.com.au/oes> and read the article titled 'Mountain Pygmy-possum' to learn more about the endangered mountain pygmy possum.

BUSH CORRIDORS

Locate a natural or constructed corridor in your area. This may be a creek, a railway or a power line. Spend some time observing the area quietly and then respond to the following:

- 1 Record the vegetation you find.
- 2 What impact do you notice from weeds, litter and other edge effects?
- 3 How many different species of birds did you observe?
- 4 What other factors affect the species that may have used this area as habitat?
- 5 Investigate the effects of fragmentation through human constructions in the area.
- 6 Describe ways in which the effects of fragmentation can be reduced.

Features that define particular areas

We have already seen that there are several ways in which an outdoor environment can be described. In this section, we will examine other methods of distinguishing or delineating areas using both natural and human-constructed features. Some of the ways areas are distinguished include:

- landform and catchment areas
- vegetation types
- public and private land
- types of parks and reserves
- the use of management zones.

LANDFORM AND CATCHMENT AREAS

Victoria has a diversity of landforms, which have been influenced by **tectonic** activity, erosion, river and marine action, and climatic conditions. Land-forming processes create **delineations** between areas – this may take the form of a mountain range, such as the Great Diving Range, which creates differing climatic conditions on either side of the range.

tectonic

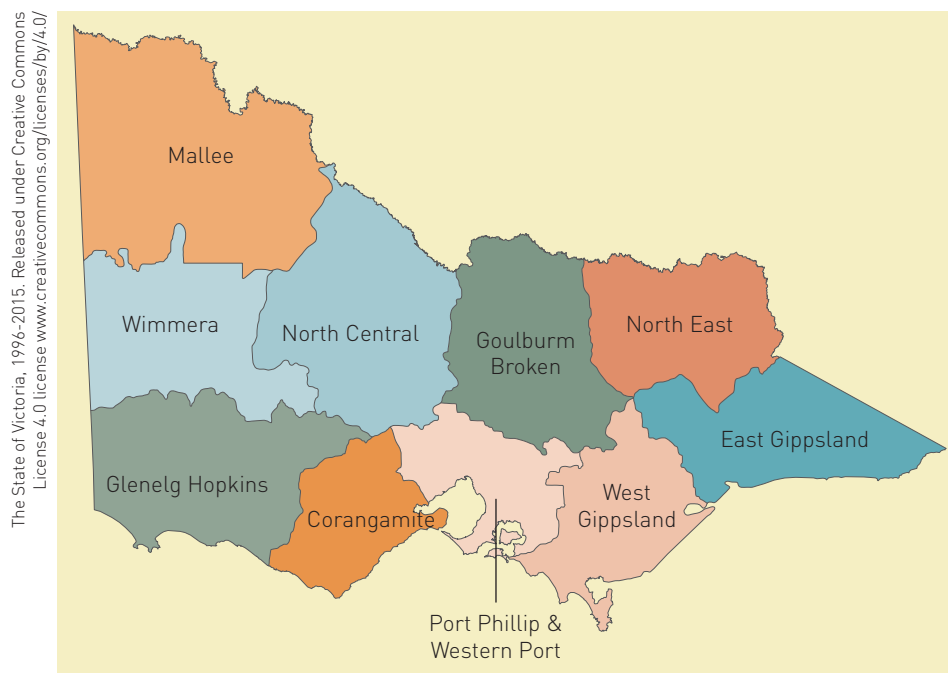
In geology, relates to the structure of the Earth's crust and the forces and movements that take place within it

delineations

Indicating the exact position of a border or boundary

Landforms determine the boundaries of different catchment areas. Catchments are areas defined by the watershed or the ridge between regions drained by two different river systems. For example, the Goulburn–Broken catchment stretches from near the outskirts of Melbourne to the Murray River, and encompasses approximately 2.4 million hectares and 200 000 people. It includes the municipalities of Moira, Delatite, Murrindindi, Strathbogie and the City of Greater Shepparton. This enormous area also covers several smaller catchments, including Honeysuckle Creek near Violet Town, Lake Nillahcootie, around Lake Eildon, Seven Creeks near Euroa, and watercourses near Kilmore.

Within this catchment area is a range of environments containing diverse ecosystems with different needs. The irrigated Goulburn and Murray valleys require regular water delivery via a series of channels to produce fruit, vegetables and milk, while the dryland grazing and cropping regions rely on rain for their water needs. Victoria's High Country is valued for its tourism and recreational uses, and relies on regular snowfall for economic sustainability.



Victoria's catchment management authorities

LEARNING ACTIVITY



MY CATCHMENT AREA

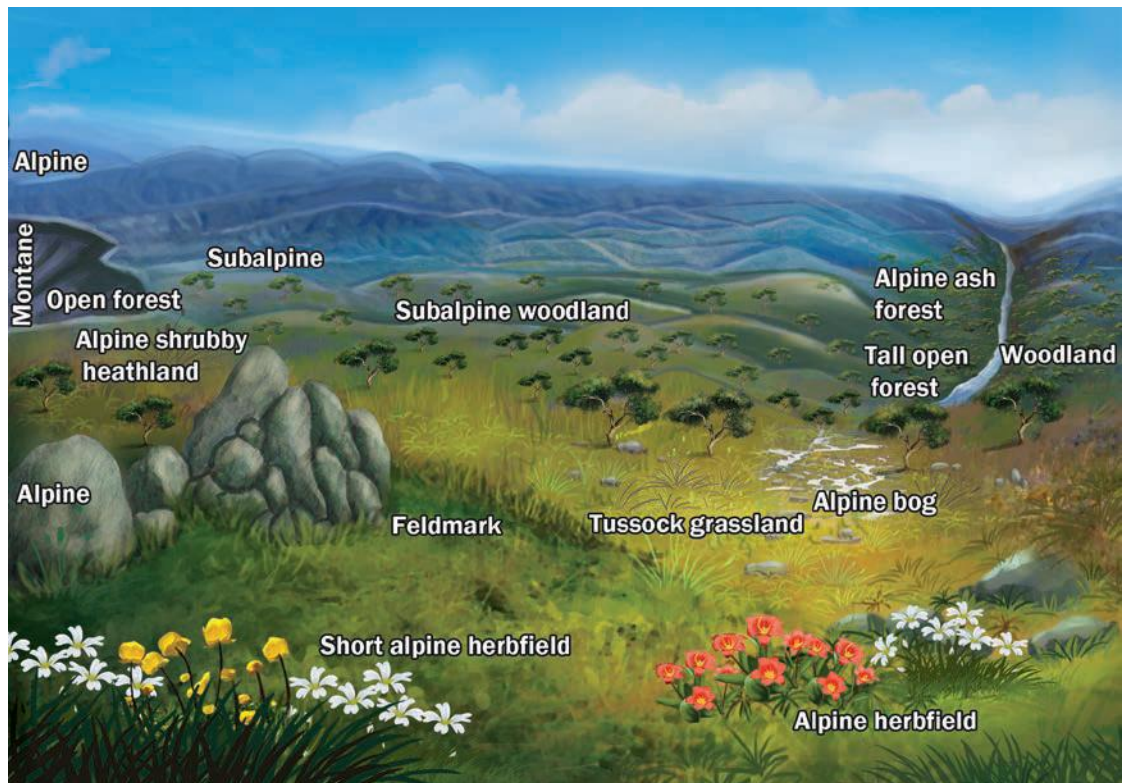
- 1 On a large map of Victoria, highlight the rivers and streams in your catchment area. What factors impact on the quality of this catchment?
- 2 What are some of the management strategies for your area?
- 3 What will affect the success or otherwise of these strategies?

position and aspect

Geographical location and the direction facing of a location

VEGETATION TYPE

As discussed earlier in the chapter, geology, climate, and **position and aspect** can influence the type of outdoor environment that exists within a specific location. In alpine regions, altitude can also play a major role in determining the vegetation present. There are four distinct zones in alpine regions: lower slopes or tableland, montane, subalpine and alpine. The most obvious change is the transition at the tree line or upper altitude where trees grow. Above the tree line is the true alpine zone where there are no trees, and vegetation is primarily dwarfed shrubs and ground-hugging herbs. The diagram is a visual representation of these areas.

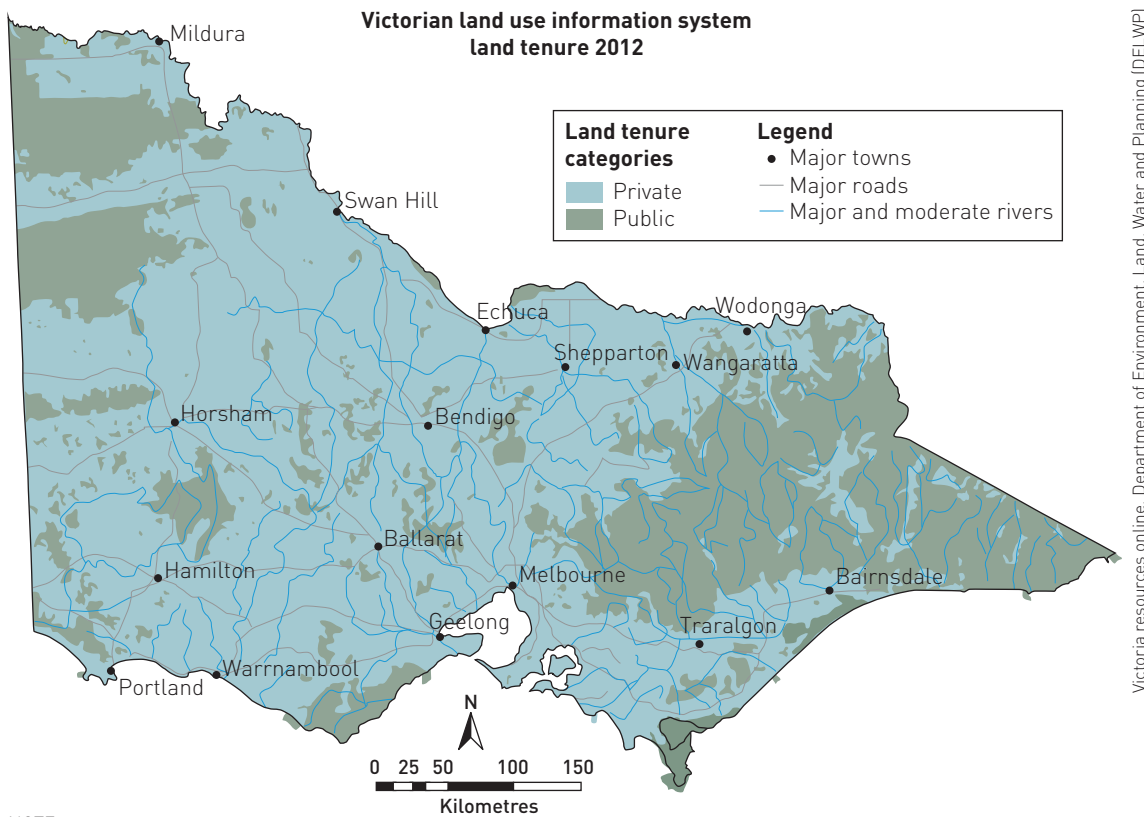


Adapted from Australian Alps Cooperative Management Program

Vegetation communities of the Australian Alps

PUBLIC AND PRIVATE LAND

The total area of Victoria is 22760000 hectares. The majority of this land is privately owned by individuals, families, companies and other entities. The remainder is referred to as public land, or Crown land, and is managed by various government authorities. When Australia was colonised on behalf of King George III in 1788, all land was claimed for him and managed for the British Government by its colonial representatives. Hence, the term ‘Crown land’ was used. Since then, as arable land has been granted to settlers or sold to private individuals, Crown land has decreased in size. Much that remains is found alongside roads and railways, in parks, hospitals, schools and other government institutions. In total, public land covers around 39% of Victoria. The following map shows public land within Victoria.



Victoria resources online, Department of Environment, Land, Water and Planning (DELWP)

NOTE:

The majority of road and rail areas are public land representing these on a statewide map obscures the division of land tenure and therefore they have been omitted for clarity.

Public land in Victoria

TYPES OF PARKS AND RESERVES

Parks Victoria manages over 4 million hectares of public land, or approximately 17% of Victoria. This includes overseeing the recreation and tourism aspects of Port Phillip and Western Port bays, the Lower Yarra, Lower Maribyrnong and Patterson rivers, as well as piers and jetties, historic sites and prestigious heritage properties.

According to DELWP, Victoria's reserve system consists of:

- 45 national parks
- 26 state parks
- 13 marine national parks
- 11 marine sanctuaries
- 3 wilderness parks
- 30 metropolitan parks
- 60 other parks (including regional and reservoir parks)
- over 2700 natural features and conservation reserves
- more than 11 000 formally registered Indigenous Australian cultural heritage places
- more than 2500 non-Indigenous historic places.

There are also other types of reserves, such as state forests, which are managed by the DELWP. Each type of reserve has been set aside for a particular purpose, some of which are outlined in the following table.

Public land reserves within Victoria

Description	Purpose
<p>National park</p> <p>Extensive area of land, nationally significant because of specific flora, fauna, archaeological, historic and/or geographic features.</p>	<ul style="list-style-type: none"> • Protect and conserve native species, landscape and cultural and historical significance • Protection of catchments • Recreation and education • Limited areas of development
<p>Wilderness park</p> <p>Large area relatively unaltered by the European settlement of Australia and free of extractive processes.</p>	<ul style="list-style-type: none"> • Maintain undisturbed nature • Maintain and protect natural processes • Opportunities for isolated, self-reliant recreation • Managed for conservation, with no facilities provided for visitors and no vehicles permitted
<p>State park</p> <p>Similar to national parks, but are generally smaller, scenic landscapes and land types complementing those found in national parks and representing the major land types of Victoria.</p>	<ul style="list-style-type: none"> • Protect and conserve native species, landscape and cultural values • Protection of catchments • Recreation and education • Limited areas of development
<p>State forest</p> <p>Native forests and other vegetation available for conservation, recreation and resource harvesting.</p>	<ul style="list-style-type: none"> • Provide timber on a sustainable basis • Protection of catchments • Opportunities for public recreation • Protect and conserve native species, landscape and cultural values
<p>Reference area</p> <p>Undisturbed areas containing representations of major ecosystems.</p>	<ul style="list-style-type: none"> • Protect natural ecosystems for scientific reference • Restricted use for non-manipulative scientific investigation
<p>Regional park</p> <p>Regional parks allow for more intensive recreational activity in fairly natural surroundings. They are commonly located near major regional centres.</p>	<ul style="list-style-type: none"> • Provide opportunities for informal recreation for large numbers of visitors • Protect and conserve native species
<p>Nature conservation reserve</p> <p>Public lands of considerable value are set aside to conserve species, communities and habitats of indigenous plants and animals of significance.</p>	<ul style="list-style-type: none"> • Primary land use objective is nature conservation • Education, scientific study and passive recreation are permitted provided they do not damage the values of the particular reserve
<p>Historic and cultural features reserve</p> <p>Established primarily to protect places with highly significant historical remnants and features, such as buildings, structures, relics or other artefacts.</p>	<ul style="list-style-type: none"> • Range of sites associated with Indigenous Australian history and European exploration, settlement, agriculture, timber production and gold exploration and mining
<p>Natural features reserve</p> <p>Areas to protect remnant vegetation, habitat, landscape character, natural and scenic features.</p>	<ul style="list-style-type: none"> • Education and passive recreation • Include bushland reserves, wildlife reserves, lake reserves, scenic reserves, geological and geomorphological features reserves, streamside reserves and water-frontage reserves
<p>Marine sanctuary</p> <p>Small, highly protected area with no fishing, extractive or damaging activities allowed.</p>	<ul style="list-style-type: none"> • Protect special values • Complement marine national parks
<p>Marine national park</p> <p>Highly protected area with no fishing, extractive or damaging activities allowed.</p>	<ul style="list-style-type: none"> • Represent a range of marine environments • Protect and conserve native species, landscape, sites of historical significance and cultural values
<p>Marine and coastal park/marine reserve</p> <p>Coastal, intertidal or subtidal land of conservation or scientific significance.</p>	<ul style="list-style-type: none"> • Represent a range of habitats and ecosystems • Restricted use for non-manipulative scientific investigation

Adapted from Parks Victoria and Department of Environment and Primary Industries, 2014

MANAGEMENT ZONES

Land managers use management zones to delineate areas of public land to assist in minimising existing and potential **conflicts** between uses and activities, or between activities and the protection of the park's values.

In general, an entire park will be zoned as conservation and recreation unless there is a specific reason to zone for another purpose. Significant areas that are particularly sensitive to dispersed recreational activity can be zoned for conservation to minimise these impacts. Zoning an area for conservation and recreation does not compromise the conservation priorities of an area. Specific zones are provided for reference areas, wilderness zones and areas specifically designated for use for educational purposes or high visitor use.

The zoning scheme used by Parks Victoria has six primary management zones, outlined as follows:

- **Recreation development zone** – To provide primarily for high-use visitor nodes (more than 50 000 visitors) with a concentration of recreation and/or interpretation facilities.
- **Conservation and recreation zone** – To protect natural environments and to provide for sustainable dispersed recreation activities and small-scale recreation facilities without significant impact on natural processes.
- **Conservation zone** – To protect sensitive natural environments and to provide for minimal impact recreation activities and simple visitor facilities subject to ensuring minimal interference to natural processes.
- **Wilderness zone** – To protect or enhance the essentially unmodified natural condition of the area and, subject to that protection and minimal interference to natural processes, to provide opportunities for solitude, inspiration and appropriate self-reliant recreation.
- **Reference area zone** – To protect viable samples of one or more land types that are relatively undisturbed for comparative study with similar land types elsewhere, by keeping all human interference to the essential minimum and ensuring as far as practicable that the only long-term change results from natural processes.
- **Education zone** – To provide primarily for environmental education in a relatively undisturbed area.

Parks Victoria

conflict

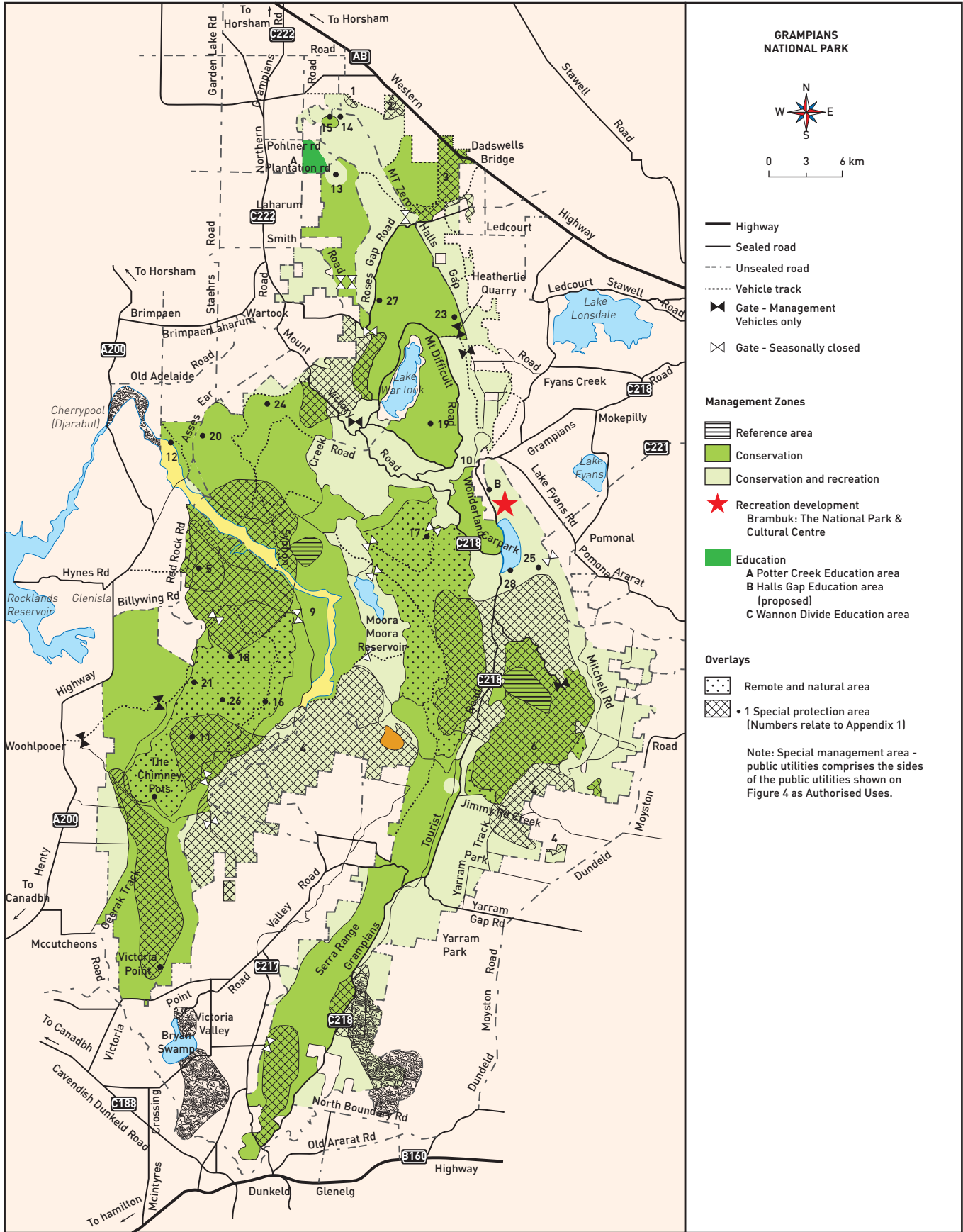
A serious disagreement or argument, typically a protracted one; a serious incompatibility between two or more opinions or interests

LEARNING ACTIVITY



THE EDGE EFFECT

- 1 What is the edge effect? Provide an example of the edge effect from an environment you have visited or investigated to demonstrate your understanding.
- 2 Describe some of the consequences on fauna and flora of the edge effect.
- 3 What type of landforms border a catchment area?
- 4 What aspects of an outdoor environment may influence the type of vegetation that is present at a particular location?
- 5 Distinguish between public and private land.
- 6 Create a table in your workbook that summarises the different types of public land reserves within Victoria. For each type of reserve, provide a description, identify its purpose and name a specific example within Victoria.
- 7 Identify and describe the different management zones used by land managers to delineate areas of public land.
- 8 Download a map of an outdoor environment you have visited or investigated this year. What management issues may or do arise at the borders of different land use areas?



Map of Grampians National Park indicating the different management zones

ARTISTIC, INDIGENOUS AUSTRALIAN AND HISTORICAL UNDERSTANDINGS OF SPECIFIC OUTDOOR ENVIRONMENTS

*I guess it boils down to how you see it, do you see Kimberley,
Or just another ... hole in the ground just another opportunity?*

Kimberley song lyrics, John Butler

In chapter 1, you examined the range of motivations for undertaking experiences in outdoor environments. Examples of these motivations included: for the adrenaline rush, to set a record, to carry out research, to escape the reality of everyday life and for the sense of achievement. A person's motivations will influence their interactions with outdoor environments. This, in turn, will affect how they understand the environments they are in. For example, a group motivated by conservational values are more likely to adopt sustainable interactions and develop a greater understanding of human impacts on specific outdoor environments. Whereas, a group motivated by a desire to seek an adrenaline rush are more likely to develop an understanding of the impact of the outdoor environment on themselves. There is a relationship between who we are and what we understand about the outdoor environments we visit. This section analyses artistic, Indigenous Australian and historical understandings of specific outdoor environments.

Artistic understandings of outdoor environments

Artistic representations of the Australian outdoor environment have provided a rich insight into the changing nature of the nation's identity over time. Relationships with the Australian outdoor environment have been portrayed in many artworks, including:

- rock paintings, thousands of years old, by Indigenous Australian communities
- the early European oil paintings of John Glover
- paintings by members of the Heidelberg School (Australia's first significant art movement), such as Tom Roberts, Fredrick McCubbin and Arthur Streeton
- more modern representations by Sidney Nolan and musicians such as Midnight Oil, Xavier Rudd and John Butler.

Australian Indigenous art is the oldest ongoing tradition of art in the world. There is evidence of Indigenous rock art dating back at least 40 000 years found in the Northern Territory, depicting extinct megafauna. Common subjects of the artwork include animals of the surrounding environment, and the Dreaming – when ancestral spirits came to the land and created rivers, plants, people, animals and tribal laws. This artwork demonstrates the close relationships and intimate understandings that Indigenous Australian people had with their environment.

John Glover arrived in Tasmania from England in 1831. He was known as the pioneer of landscape painting in Australia. Some of his paintings, such as *The bath of Diana, Van Diemen's Land* (1837), have been criticised as a European take on the Tasmanian landscape, demonstrating a lack of understanding of the uniqueness and 'local characteristics' of the Australian environment.

John Longstaff's painting *Gippsland, Sunday night, February 20th, 1898*, presents the perception of fire within the outdoor environment as destructive and frightening. This is in direct contrast to Indigenous communities' understanding of fire as a useful environmental management tool.

Frederick McCubbin's three-panel painting *The Pioneer* (1904) is considered one of the masterpieces of Australian art. The painting tells the story of a free selector establishing a home in the Australian bush over three time periods. This painting demonstrates the artist's understanding that the Australian outdoor environment is harsh and untamed; however, through hard work and persistence it is possible to progress and achieve.

Melbourne-born artist Sidney Nolan, famous for his iconic suite of Ned Kelly paintings, painted images of inland Australia from 1949 to 1953. These included desert and mountain ranges, and drought-stricken landscapes with dried carcasses. Sidney Nolan understood the Australian outdoor environment for its cast of colourful characters and for its beauty stemming from its diversity and uniqueness.

Alamy/Heritage Image Partnership Ltd

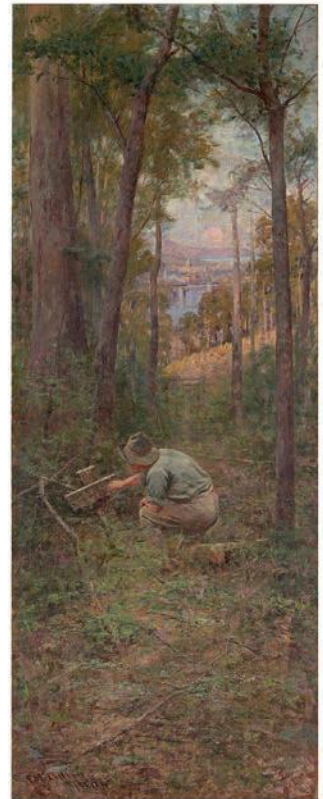


John Glover, *The bath of Diana, Van Diemen's Land* (1837)



John Longstaff, *Gippsland, Sunday Night, February 20th, 1898*

National Gallery of Victoria



Frederick McCubbin, *The Pioneer* (1904)

National Gallery of Victoria

Australian musicians such as John Williamson, Xavier Rudd and John Butler, and bands such as Midnight Oil and Yothu Yindi, have been singing about the plight of the environment for many years. These artists use their musical talents to draw our attention to environmental issues, demonstrating an understanding of the need for conservation and adoption of sustainable practices in the protection of our fragile outdoor environment.

LEARNING ACTIVITIES



THE OUTDOORS IN ART

Investigate an example of an artistic representation of the Australian outdoor environment not presented in the text. This could be a song or artwork. Identify the environment it relates to and analyse the understandings of the specific outdoor environment it presents.

WEBSITES

- 1 Visit the National Gallery of Victoria website to access videos documenting the work of great Australian artists, including the work of Frederick McCubbin, Henry Burn and Sidney Nolan.
- 2 Follow the link via <http://oes.nelsonnet.com.au> to a video of John Butler performing the conservation-focused song *Kimberley*, and read the lyrics.



National
Gallery of
Victoria

John Butler

Indigenous Australians' understandings of outdoor environments

Throughout their 60 000- to 70 000-year history on this landscape, Indigenous Australian communities have developed an intimate bond and exceptional understanding of the outdoor environment. They viewed the land as their mother – it was to be respected, as it was the giver of life. All the daily requirements came directly from the land, which required proficient knowledge, such as where to locate a nearby source of fresh water and which plants were edible and which were useful as medicines. A lack of understanding could have dire consequences.

Indigenous Australians understood the impact of natural changes with the outdoor environment – their identification of six separate seasons rather than four demonstrates this close knowledge. This understanding is also reflected in Indigenous use of management strategies to promote sustainable outdoor environments, such as fire-stick farming to encourage regeneration, sanctuary zones for conservation and adopting nomadic lifestyles for continued food supplies.

The profound understandings Indigenous Australians have of the outdoor environment enabled them to live in harmony with the land for thousands of years prior to European settlement, which is testament to their status as the oldest ongoing culture in the world.

Historical understandings of outdoor environments

Since the arrival of the First Fleet in 1788, there has been rapid change to the Australian landscape. The first non-Indigenous settlers did not understand the environment like the Indigenous communities had done for thousands of years. It was a steep learning curve for the first Europeans in Australia just to survive. They quickly realised their European farming practices were not suited to the dry and leached soils of the Australian landscape. They set about changing this harsh and hostile unfamiliar environment to better suit their needs. They introduced hard-hooved animals, rabbits, foxes and blackberries. Native vegetation was cleared to make way for introduced crops and flowering plants to tame the harsh environment and make it feel 'more like home' to them.

The early Europeans' lack of understanding of the fragile nature of the Australian environment, which had evolved over millions of years with little outside influences, led to dramatic ecological damage. The hard-hooved animals compacted and eroded the dry soil, polluted the waterways, and spread disease and weeds throughout the landscape. The native deep-rooted grasses, which held the precious soil in place, were eaten by herds of sheep, leading to further land degradation. The rapid spread of rabbits and foxes across the land drastically reduced countless native species.

Throughout significant periods in Australia's history since European settlement, such as the gold rushes, industrialisation, Federation and the periods after the two world wars, there have been dramatic increases in population. This has caused further pressure on the services that the environment provides. There was little regard and understanding of the **intrinsic value** of the outdoor environment. The rise of the environmental movement of the 1970s brought to the forefront the impacts of our interactions on the environment and a greater understanding of the need to adopt more sustainable practices.

Diverse relationships with outdoor environments will produce different understandings of the same environment. In this chapter, we have examined a range of different understandings, all of which play an important role in shaping current and future relationships with outdoor environments.

intrinsic value

Something that is prized for what it is, rather than for what it can provide

LEARNING ACTIVITY



ANALYSIS OF AN OUTDOOR ENVIRONMENT

Select a Victorian outdoor environment you have visited or investigated this year. Analyse the recreational, scientific, land managers', artistic, historical and Indigenous Australians' understandings of the use of and cultural relationship to your selected outdoor environment.

IMPACTS ON OUTDOOR ENVIRONMENTS

KEY KNOWLEDGE

- the impact of conservation, commercial and recreational activities on outdoor environments (page 114)
- community-based environmental action to promote positive impacts of humans on outdoor environments (page 125)
- impacts of technologies on outdoor environments, including:
 - direct impacts, such as recreational vehicles and snowmaking (page 128)
 - indirect or deferred impacts, such as equipment manufacture and transport (page 129)
- the impact on outdoor environments of urbanisation and changing human lifestyles (page 134)

KEY SKILLS

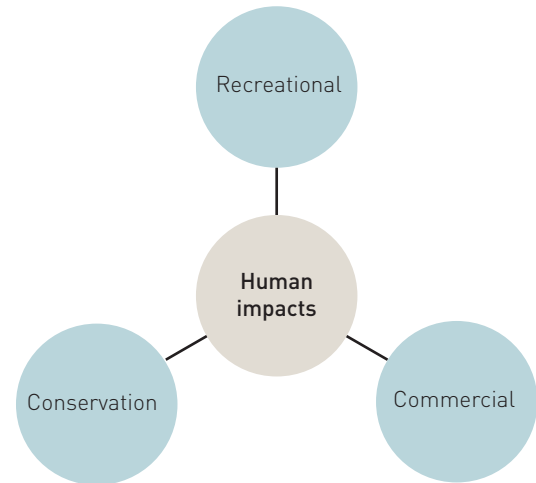
- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected
- identify and evaluate the impacts of different types of activities on outdoor environments
- identify and apply practices for promoting positive impacts on outdoor environments
- analyse direct and indirect impacts of technologies on outdoor environments
- analyse the impact of urbanisation and changing human lifestyles on outdoor environments

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

HUMAN ACTIVITIES AND THEIR IMPACTS

Human impacts have changed over time. Indigenous Australians utilised fire to control vegetation, clear out undergrowth to make travel easier, and as a hunting tool whereby new growth was promoted to attract feeding animals. It is also believed that Indigenous people introduced the dingo to Australia as an efficient hunting partner. European arrival to Australia signalled the advent of permanent settlements, fences, the introduction of feral animals and plants, as well as wide-scale timber harvesting, land clearing and farming. (These historical activities and impacts will be explored in detail in Unit 3.)

Today, humans undertake a variety of activities in outdoor environments, which can be broadly classified as conservation, commercial or recreational (as illustrated in the diagram). While many of these activities have had adverse effects on aspects of the environment, some are used for preservation and restoration. Therefore, it is important to recognise that impacts can be both positive and negative, depending on the activity and outdoor environment in question.



CONSERVATION ACTIVITIES

conservation

The preservation, protection, management or restoration of the natural environment, inclusive of ecosystems, vegetation, wildlife and natural resources, such as soil and water

Conservation is the preservation, protection, management or restoration of the natural environment, inclusive of ecosystems, vegetation, wildlife and natural resources, such as soil and water. Conservation activities incorporate revegetation and rehabilitation, the establishment of parks and reserves, scientific investigation, controlled burning, community education and the implementation of management strategies. Overall, conservation activities are considered to have positive impacts on outdoor environments, although some negative impacts can occur.



iStock.com/dolgachov

Tree-planting and revegetation are forms of conservation.

Impacts of conservation

Positive impacts as a result of conservation activities include:

- preservation of sensitive vegetation due to zoning
- protection of areas of significant value due to the creation of reserves such as state and national parks
- reduction in areas of erosion, soil compaction and soil loss due to the creation of walkways
- smaller and more centralised impacts from human faeces due to the introduction of composting toilets at campsites
- rehabilitation and revegetation due to seasonal track closures
- disease control due to the implementation of boot-cleaning stations and quarantine areas
- reduction of negative impacts overall due to group size restrictions and permit requirements
- reintroduction of species into areas they originally inhabited.

Negative impacts as a result of conservation activities include:

- vegetation modification due to controlled burning (that is, the prevention of larger fires through the deliberate burning of fire breaks)
- land clearing due to conservation infrastructure (e.g. walkways, composting toilets)
- environmental intrusion due to the creation of permanent structures in natural areas (e.g. fences, viewing platforms)
- incidental disruption of habitats.

LEARNING ACTIVITY



CONSERVATION IN SONG

There have are many people around the world who have expressed their views about conservation. Listen to the song *Big Yellow Taxi* by Joni Mitchell and the cover version of the same song by Counting Crows via the link at <http://oes.nelsonnet.com.au>. Think about what the lyrics are suggesting about conservation. Discuss your thoughts with your fellow class members.



Joni Mitchell –
Big Yellow Taxi

Counting Crows –
Big Yellow Taxi

AN EARLY ATTEMPT AT CONSERVATION IN AUSTRALIA: ROYAL NATIONAL PARK

Royal National Park, south of Sydney in New South Wales, was Australia's first national park and in 1879 it was an example of an early attempt at conservation. It was the second such park to be declared in the world, the first being Yellowstone National Park in the United States of America. In fact, in the early days of the park, it was used more as a place where residents of Sydney could come to relax and amuse themselves, land was cleared for large areas of lawns, a train line was set up between two towns within the park and a dance hall was even built there as late as the 1940s. During this time there would have been a combination of positive and negative impacts on this particular environment. Nowadays there is a greater focus on conservation activities at Royal National Park, including the protection of small pockets of native rainforest and threatened fauna species such as the Tiger Quoll.

Australian Government: National parks



CASE STUDY: TODAY AUSTRALIA HAS A CONSERVATION FRAMEWORK

ONE LAND – MANY STORIES: PROSPECTUS OF INVESTMENT

The national biodiversity conservation prospectus, *One Land – Many Stories: Prospectus of Investment* (the Prospectus), presents the Australian Government’s vision for conserving and managing Australia’s valuable and most vulnerable environments. Australia’s biodiversity is important globally and nationally because of its uniqueness and richness. It has developed largely in isolation over many millions of years, making this continent one of the most biologically diverse parts of the planet. Between 7% and 10% of all plant and animal species on Earth occur only in Australia. Australia’s land and seascapes also feature an extraordinary diversity of unique ecosystems and significant cultural heritage.

Conserving biodiversity is an essential part of safeguarding the biological life-support systems on Earth, including the oxygen we need to breathe, clean water to drink, fertile soil for food production and physical materials for shelter and fuel. The Australian Government recognises the need for more systemic and enduring approaches to conservation and improving natural resource management. This is reflected in a range of government policies and programs, including Australia’s Biodiversity Conservation Strategy (Natural Resource Management Ministerial Council, NRMCM, 2010), the National Wildlife Corridors Plan, Australia’s Native Vegetation Framework (COAG Standing Council on Environment and Water) and, more broadly, the Australian Government’s water reform and climate change initiatives.

This Prospectus provides an overarching framework of the Australian Government’s priorities for funding conservation and improving natural resource management in 2013–14. This Prospectus articulates the places (target areas), national priorities (investment themes) and the available grant funding to guide the development of project proposals in the 2013–14 round of biodiversity conservation and natural resource management investment across the Australian Government environment portfolio. The Australian Government recognises that a diverse range of responses are required to meet the challenges and opportunities posed by improving conservation and natural resource management outcomes. For these reasons, the government will be investing in our environmental future through a range of programs.

Australia Government: Department of the Environment, *One Land – Many Stories: Prospectus of Investment*



Australian
Department
of the
Environment
and Energy

LEARNING ACTIVITIES



ONE LAND – MANY STORIES

Using the full document *One Land – Many Stories: Prospectus of Investment*, which can be accessed online at the Australian Department of the Environment and Energy, answer the following questions:

- 1 Select and name three target areas from the prospectus.
- 2 For each of your selected target areas:
 - a Identify two major achievements that have been made so far.
 - b Evaluate what still needs to be done in order to improve conservation. Include how this is going to occur and give reason(s) why you think this will be successful or not.

3 Describe the following terms:

- conservation estate
- fragmentation
- habitat refuges
- invasive species
- National Reserve System
- remnant vegetation (native habitat)
- wildlife corridor.

MINIMISING IMPACTS AT YOUR SCHOOL

Design a litter policy for your school that encourages all students to be more conscientious of not littering. You will need to market the policy (via posters, smartphone apps, etc.) and implement the policy (at school assembly, information sessions, etc.). After a designated period of time, seek student feedback across several year levels (via survey, interview, etc.) to review the policy's effectiveness at inspiring the change of becoming more conscious of not littering.

NATIVE THREATENED SPECIES

Visit the Zoos Victoria webpage 'Fighting extinction: Priority native threatened species'. Read the information and watch the video clips on the mountain pygmy possum (as studied in chapter 3), Leadbeater's possum and helmeted honeyeater, then answer the following:

- 1 What are the human-induced impacts that have caused the decline in these species?
- 2 What are the ways we can reduce the impact we are having and improve the number of these animals in the wild?



Zoos Victoria

COMMERCIAL ACTIVITIES

Commercial activities are those that result in a profit or financial gain for an individual or group as a result of utilising the natural environment. They can also be inclusive of large-scale operations that are commonly referred to as industrial activities. Therefore, commercial activities include tourism, any activity guided by an adventure company or tour operator, such as four-wheel driving, surfing, rafting, horse riding, fishing and rock climbing, as well as forestry and timber harvesting, fishing, farming and agriculture, the production of energy, mining, game hunting, scientific exploration, development and urbanisation, irrigation, grazing and natural resource extraction of coal, gold, petroleum and other minerals.

Commercial activities have a predominately negative impact on outdoor environments, as often they are associated with the exploitation of what we have come to understand as natural resources for human use. For this reason, people often give priority to commercial activities over the needs of other species or ecosystems.

Adventure companies and tour operators in Victoria who utilise public land need to have relevant licences. As such, the Victorian Department of Environment, Land, Water and Planning (DELWP) suggests that 'indirect benefits provided by tour operators may include providing a platform to learn about ecosystems, biodiversity, flora, fauna, and cultural and historic heritage', which consequently lead to more positive impacts on outdoor environments. However, some commercial activities may include the overuse or redevelopment of a particular area, which can lead to increased waste, facilities being created to cater for large groups and forever changing the landscape – such as the car park development at Bells Beach.

CASE STUDY: LOVE BELLS BEACH

Declared the world's first 'Surfing Recreation Reserve' in 1973, Bells Beach is recognised worldwide as a sacred surfing sanctuary. The pilgrimage to Bells is as legendary as the corduroy lines and big sweeping walls that grace the famous Bells Bowl during big autumn and winter swells.

Unfortunately, Bells Beach is under serious threat from negative commercial impacts and development. Though Bells Reserve is public land, commercial coach/bus/mini bus tours are being allowed to freely use Bells Reserve and the Surf Coast Shire has now begun works to create parking spaces for 5 coach/long vehicles and around 10 parking spaces for 22-seater buses in Bells car park alone. Vegetation has been removed to allow commercial tour vehicle movement within the car park and there is great concern that the already identified pedestrian and vehicle traffic risks will increase.

Additional works outlined in Surf Coast Shire's Bells Beach Surfing Reserve Coastal Management Plan and Master plan (September 2010) include a designated parking area for 4–6 coaches in Winki car park, no parking areas to ensure coaches can enter/exit the car park, construction of a second toilet/change facility in Winki car park, concrete viewing platforms and photo/interpretation billboards. The loss of car parking space for recreational surfers and other non-commercial visitors to Bells will be significant.

The Surf Coast Shire are proceeding with works despite clear and Shire-acknowledged local community opposition. If the works are not stopped now the pristine natural environment and sacred surfing resonance of Bells will be destroyed forever.

Bells is a local and global surfing icon. The beautiful environment, ancient Indigenous presence, rich surf culture and raw Southern Ocean swells collectively resonate deeply within the heart, mind and spirit of surfers and non-surfers alike.

'Love Bells Beach' by Surfrider Foundation Surf Coast Branch, October 2012



Alamy/David Wall

Bells Beach

LEARNING ACTIVITY



BELLS BEACH DEVELOPMENT

Research the impacts (both positive and negative) that have occurred at Bells Beach as a result of the car park development. Useful websites include:

- Surf Coast Shire
- Surfrider Foundation
- *Surf Coast News*
- Bells Beach Preservation Society.



Surf Coast Shire
Surfrider Foundation
Surf Coast News
Bells Beach
Preservation Society

Impacts of large-scale commercial activities

Commercial activities of a large-scale industrial nature can also cause devastating effects on the local and potentially global environment. In Victoria, the Department of Primary Industries is focusing on ways to utilise ‘renewable resources’ (natural resources that replenish sustainably), which are better for the natural environment as they reduce greenhouse gas emissions. An example of a positive human impact via industrial activity is wind energy production, where wind turbines are constructed to utilise the natural wind to generate energy, which can then be converted into electricity (rather than the use of **non-renewable** fossil fuels such as coal burning).

On the contrary, commercial and/or industrial activities that create large amounts of jobs and income, thus boosting the Australian economy, can also have negative impacts on outdoor environments. The Waratah Coal mine in Queensland’s Galilee Basin is one example of a commercial activity that could have a significant negative impact in the future – part of the 8000-hectare Bimblebox Nature Refuge will be destroyed to make way for the construction of the thermal coal mine.

It is important to understand that people do need to utilise the natural resources that outdoor environments supply in order to sustain our species. However, if not regulated by laws and community action, then there are potentially significant consequences that can occur.

non-renewable

A resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes

LEARNING ACTIVITY



WARATAH COAL MINE

Research the Waratah Coal mine and construct a single-page fact sheet highlighting the impacts (both positive and negative) that the mine will have on its surrounding environment.



Waratah Coal
mine

Impacts of forestry and timber harvesting

Positive impacts of forestry include:

- renewable resource of timber due to sustainable timber harvesting schemes where trees are continually replanted
- reduction in pollution due to local timber harvesting and reduced transport needs.

Negative impacts of forestry include:

- large-scale land clearing due to clear felling
- **habitat fragmentation** due to removal of live trees, dead/fallen timber and truck routes being built
- species endangerment and reduction in biodiversity
- poisons entering food webs and waterways due to pesticide and herbicide use
- salinity issues due to rising water table
- topsoil disturbance and gully erosion

habitat fragmentation

Habitat that is divided or broken down into smaller habitats (e.g. when a road is constructed in a swamp and it is separated into two)

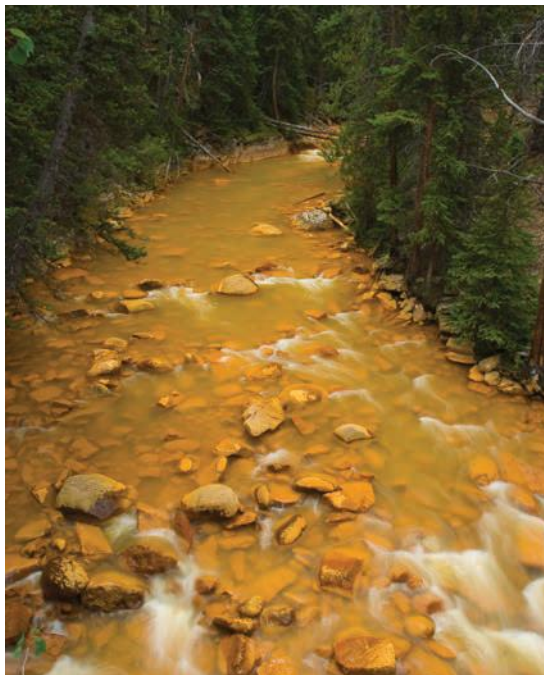
- soil compaction and loss of leaf litter
- introduction of weed species and diseases.



CSIRO/Nick Pitsas

Topsoil disturbance and gully erosion are some negative impacts of forestry.

iStockphoto/Adventure_Photo



Water pollution can be one of the negative impacts of mining.

emissions

A gas in an atmosphere that absorbs and emits radiation

Impacts of mining

Positive impacts of mining include:

- reclamation of natural environments due to mine rehabilitation programs.

Negative impacts of mining include:

- soil disturbance and timber clearing due to total removal of vegetation and soil
- loss of biodiversity and species endangerment due to loss of habitats
- introduction of weed species and diseases due to deforestation and machinery use
- atmospheric pollution and increased greenhouse gas **emissions**
- soil and water pollution due to chemicals leaching into soils
- disturbance of marine life due to underwater testing and drilling
- extraction of fossil fuels from inaccessible and possibly inappropriate locations, such as the Great Barrier Reef.

Impacts of farming and agriculture

Positive impacts of farming include:

- prevention of erosion and soil retention due to utilisation of recycled waste water on crops.

Negative impacts of farming include:

- loss of vegetation and topsoil due to land clearing
- salinity issues due to rising water table
- decline in biodiversity due to land clearing and loss of habitats
- erosion of creek beds and loss of nutrients in soil due to movement of hard-hooved animals
- degradation of soil nutrient values
- decline in water quality due to fertiliser use
- introduction of weed species and diseases.

CSIRO



Salinity has widespread effects on the environment, as can be seen here in the Western Australian wheat belt.

Impacts of development and urbanisation

Positive impacts of development and urbanisation include:

- preservation of important habitats due to the parks and reserves system.

Negative impacts of development and urbanisation include:

- fragmentation of habitats due to transport routes
- decline in biodiversity due to land clearing
- introduced weeds and feral animals
- soil compaction and erosion
- air pollution
- contamination of watercourses and oceans due to stormwater drainage, sewage outfall and industrial waste disposal
- unstable nutrient levels and soil contamination due to detergents, fertilisers, insecticides, pesticides and animal faeces.



iStock.com/knapjames

Urban areas continue to grow in size.



Australian Koala
Foundation

LEARNING ACTIVITIES

KOALA THREATS

Visit the Australian Koala Foundation website to learn about the threats to koalas that are directly related to humans. Create a double-sided postcard that summarises this information and would be both visually appealing and educational to someone who doesn't know much about koalas.

MIND MAPPING A COMMERCIAL ACTIVITY

Use a mind mapping software program (e.g. *Inspiration*) to draw out the impacts of a commercial activity of your choice that has not been discussed here. There are various ways to present mind maps, but perhaps segmenting it into positive and negative impacts is a good starting point.



From the Australian Koala
Foundation: <https://www.savethekoala.com/>

RECREATIONAL ACTIVITIES

Recreation is an activity for enjoyment, amusement or pleasure, and is considered to be fun by the participant(s). Activities are undertaken in leisure or free time. They can facilitate the refreshment of one's mind and body after a period of work and often fulfil a basic human need. Recreation in outdoor environments includes a multitude of pursuits such as bushwalking, camping, rock climbing, cross-country skiing, four-wheel driving, fishing, hunting, photography and canoeing.

Recreational activities may be undertaken via two ways:

- nature-based – focuses on the person being involved with the natural environment
- adventure-based – the user focuses on the activity as opposed to the setting itself.

For example, a nature-based rock climber may gain great fulfilment at Summerday Valley in the Grampians and associate the activity with other positive factors, such as being with friends, camping, camp fires or the night sky. An adventure-based rock climber, however, may primarily focus on the particular benefits of the activity, such as physical fitness, so the setting is less relevant (whether at Summerday Valley or at a local indoor rock climbing gym).

When undertaking recreational (and commercial) activities, it is important to be aware that just your presence may indirectly cause negative impacts on the particular environment you are visiting. However, if the activity facilitates a greater care and understanding of that environment, then a positive impact may follow whereby you contribute to, or advocate for, the future protection of that particular environment.

Recreational activities are usually associated with negative impacts on outdoor environments, although users often express a love of nature or of being outdoors. The increasing popularity of outdoor activity can lead to ‘loving a place to death’. However, general positive impacts of recreational activities can include the benefits gained from experiential education. Recreational users who venture into outdoor environments will gain a better understanding for the environment they use and what effect they can have on it. Consequently, they may develop a greater respect for it, leading to development of practices that conserve and protect the areas they visit.

Recreational activities are regularly linked to tourism (and therefore commercial activities). Often the most sought-after places are those areas with high natural values. Yet, visitors often disrupt the environment by making noise and requiring services such as accommodation, food, transport and waste disposal. Tourism infrastructure can decrease natural values if their facilities encroach on and destroy habitats, causing native animal feeding and breeding behaviours to be disturbed and pollution to occur.



iStock.com/omgimages

Hiking and climbing can be a group activity.



Shutterstock.com/Jacek Chabraszewski

Your presence can impact the environments you visit, yet also lead to a greater respect.

LEARNING ACTIVITY



COMPARING RECREATIONAL USERS

Compare and contrast the different human impacts that nature-based and adventure-based recreational users might have within an outdoor environment of your choice. Provide appropriate reasons to support your response.

Impacts of recreation

Negative impacts as a result of bushwalking, hiking and camping could include:

- introduction of weed species
- fire scars, depletion of firewood and damage to vegetation due to campfires
- soil compaction and erosion due to repeated treading and tent pitching
- pollution from inappropriate toileting and rubbish disposal methods
- wildlife dependency on humans due to feeding fauna
- disruption of wildlife due to domestic animals and increased noise levels
- decreased biodiversity levels due to habitat loss
- landscape degradation due to construction of visitor facilities.

Negative impacts as a result of recreational vehicles (trail bikes and four-wheel drives) could include:

- damage to trees due to vehicle extraction methods
- pollution of watercourses due to increased runoff from tracks and inappropriate toileting and rubbish disposal methods
- soil compaction, erosion and track rutting due to repeated tracking
- track braiding due to drivers seeking new routes around boggy or unnegotiable areas.

Negative impacts as a result of alpine skiing (downhill and cross-country) could include:

- landscape degradation due to construction of roads and ski-resort facilities
- loss of biodiversity and species endangerment due to loss of habitats
- land clearing due to construction of ski runs
- trampling of exposed vegetation
- pollution from inappropriate toileting and rubbish disposal methods (particularly during summer months when litter and faeces are exposed).

Negative impacts as a result of rock climbing could include:

- invasion of natural environment due to permanent fixtures such as bolts, belay points and ladders
- removal of vegetation, such as moss, along climbing routes
- pollution from inappropriate toileting and rubbish disposal methods
- soil compaction and erosion due to repeated trampling at the base of popular climbs
- defacing of rock surfaces due to chipping, smoothing, cementing and chalk residue.

LEARNING ACTIVITIES



INDOOR VERSUS OUTDOOR SETTINGS

- 1 Experience an activity of your choice at an indoor venue and then at an outdoor setting. For example, you could rock climb at an indoor climbing centre and then at an outdoor location such as Werribee Gorge or the Organ Pipes. Compare the impacts at each location – do the positive impacts outweigh the negative impacts at the indoor venue or within the natural setting? Why or why not?
- 2 Visit Sustainable Tourism Online to find more information about visitor impacts on national parks from recreational activities and the research that has gone into understanding exactly how to minimise these impacts.

HUMAN IMPACTS

- 1 Think of an environment you have visited or studied this year, and then complete the following table by identifying specific conservation, commercial and/or recreational activities that have occurred (or currently occur) there.



Sustainable
Tourism
Online

Activity	Impacts		Possible cause(s) of these impacts	Procedures and/or practices to reduce these impacts
	Positive	Negative		

- While on an outdoor experience, keep a journal of the activities that you took part in each day and the observable positive and/or negative impacts that occurred as a result. At the end of the practical experience, explain why minimal impact strategies should be employed while experiencing the outdoors.

COMMUNITY-BASED ENVIRONMENTAL ACTION

A community is a group of people living in the same place, having a particular characteristic in common or a feeling of fellowship with others, as a result of sharing similar attitudes, interests and goals. There are many different collections of people that could be considered to be communities, such as the residents of a particular suburb or town, church or religious members, primary-school students and their families, conservation volunteers, farmers, land owners or managers, local sporting teams and their coaches, and a friendship group.

In relation to Outdoor and Environmental Studies, a community could be thought of as a group of people who live, work and/or have businesses in a local area, share a common interest in their local environment, and perhaps even work together to develop plans and goals in order to protect the environment. Community-based environmental groups focus on the ecological health of the whole local environment, which often extends beyond the physical community borders, and it also involves social, economic and environmental conditions. Therefore, communities could also include those people who join together in the Adopt-A-Roadside program, members of Landcare, supporters of Land for Wildlife or Planet Ark and even those people who partake in Clean Up Australia Day once a year.

LEARNING ACTIVITY



YOUR COMMUNITIES

Make a short list of the communities you are a part of. Which of these groups are influenced by the condition of the outdoor environment in some way?

Every living thing has an impact on the environment; therefore, it is inevitable that humans play a role in impacting the environment. Human impacts can be widespread and large scale, such as deforestation and the production of greenhouse gases, or they can occur on a much smaller scale, such as litter found in a local park or walking off the track on your way to the beach. By recognising the positive and negative human impacts that certain activities can have, you should now understand more deeply the issue of conservation and the need to conserve and/or protect outdoor environments. Recently there has been greater concern for environmental issues in modern society and a drive to live more sustainably. This is evident in the amount of effort and changing attitudes about using renewable energy sources, utilising recycled materials, and the application of taxes or levies to make individual people and big businesses more accountable (such as a **carbon tax**). All of these are examples of community-based environmental action.

carbon tax
Tax charged to industries based on their level of greenhouse gas (primarily CO₂) production



Fairfax Syndication/MICHELE MOSSOP

Clean Up Australia Day is an example of community-based environmental action.

removal, counting native species, refusing to use plastic shopping bags, and walking on designated tracks and boardwalks while visiting parks and reserves.

Community-based environmental action can also be:

- zoning within the parks and reserves system
- catch and size limits for recreational fishers
- conservation covenants
- following minimal-impact guidelines and codes of conduct
- maintaining appropriate environmental licences
- revegetation, rehabilitation and restoration programs
- implementing a whole farm plan or **integrated farming**
- disposing of waste appropriately, such as using recycling and green waste bins
- National Tree Day (co-founded by Planet Ark and Olivia Newton-John)
- various projects undertaken by Greening Australia.

While it is important to differentiate between an individual or personal action and the action of a community, some overlap always exists. What one person might be able to do alone could also be conducted by numerous people living in the same place. For example, the act of an individual picking up a piece of litter would be considered a personal action, whereas the act of multiple families in the same neighbourhood meeting on a Saturday morning and picking up litter in their local park would be considered a community-based action. Likewise, some of the community-based actions previously listed could also be described as programs, organisations, projects or initiatives. Try not to get bogged down in the terminology too much – this section of the book is simply meant to focus on the positive human impacts that maintain, protect and enhance outdoor environments.

integrated farming

An approach to farming combining traditional methods with modern technology to achieve higher levels of productivity without increasing the environmental impact

LEARNING ACTIVITIES



HUMAN IMPACT CHECKLIST

Travel to a park or open area close to your school. Walk around and take note of any observable human impacts on your community environment (e.g. introduced species, erosion, buildings, drains and domestic animals). Assess how each negative human impact could be counteracted by a positive human impact.

FURTHER READING

Visit the following websites to learn more about community-based actions and their positive human impacts:

- Conservation Volunteers
- Enviro eHub (search 'community programs')
- Planet Ark



Conservation
Volunteers
Enviro eHub
Planet Ark

- Coastcare
- Waterwatch Victoria.

When investigating these websites, think about what ordinary Australians can do to help their local environment, and what benefits can be achieved with successful community involvement.

POSITIVE IMPACTS AUSTRALIA-WIDE

- 1 Visit the Landcare Australia and Greening Australia websites and watch the video clips (especially about the Gippsland Biolink on the Greening Australia website, under 'What we do').
- 2 Spend some time browsing these websites to understand more about these organisations.
- 3 Create a table similar to the one below and use it to summarise what community-based actions and subsequent positive impacts Landcare Australia and Greening Australia are having on the environment (allow for at least four points for each).

Organisation	Community-based actions	Positive impacts
Landcare Australia		
Greening Australia		

CLASS PRESENTATION

- 1 Select an environment of your choice, and identify and describe three impacts people have in this environment.
- 2 For each impact, research a community-based program that either currently exists, or could potentially be created to promote positive human impacts.
- 3 Present your findings to your class in a visual way (such as a multimedia presentation or a poster).

WHAT, WHY, WHO, WHEN AND HOW

Select a well-known community-based environmental action, then answer the following:

- 1 What is the name of the environmental action?
- 2 Why is this environmental action important?
- 3 Who is involved in this environmental action?
- 4 When does this environmental action occur?
- 5 How successful is this environmental action?

Present this information in a series of five palm-sized flash cards that can be laminated and kept for revision.

PLAN YOUR OWN COMMUNITY-BASED ENVIRONMENTAL ACTION

Research an environmental issue in your local community (perhaps one within or close to your school if possible), then complete the following:

- 1 Working as a group, give each member of the class a role (such as project manager, community liaison officer, media correspondent, equipment supervisor, funding/fundraising officer or advertising consultant).
- 2 Plan to implement a brand-new and unique community-based environmental action.

Your group may use Landcare Australia's 'New Group Starter Kit' (although not all of this document will be applicable to all classes who undertake this activity).

If possible, the plan could be promoted and implemented within your school or community with class members facilitating in their designated roles.



Coastcare
Waterwatch Victoria



Landcare Australia
Greening Australia



New Group
Starter
Kit – Landcare
Australia

GET INVOLVED

- 1 Become involved in a local environmental action – for example, tree-planting, cleaning up around a waterway, or a litter removal program such as Adopt-A-Roadside or Clean Up Australia Day. (If you cannot physically be involved, speak to someone from your community who promotes a local environmental action and/or is a participant.)
- 2 Reflect upon your experience and any personal benefits you gained as a participant.
- 3 Analyse why some people don't seem to care for outdoor environments and how this can be remedied.

IMPACTS OF TECHNOLOGY ON OUTDOOR ENVIRONMENTS

Developments in technology have impacted significantly on the ways in which humans relate to and experience outdoor environments. Earlier in this book we explored the effect of technologies on an individual's outdoor experiences. In this section, we will focus on the impacts of technologies on outdoor environments.

technology

The application of scientific knowledge for practical purposes to extend our human abilities and to manipulate nature to satisfy our wants and needs

The term 'technology' is a representation of the various ways people have modified the natural world to suit their own purposes. It is the application of scientific knowledge for practical purposes, to extend our human abilities, and to manipulate nature to satisfy our wants and needs. In relation to outdoor environments, technology refers to a multitude of advancements:

- machinery (associated with farming, agriculture, mining, forestry, water harvesting and other commercial enterprises)
- transportation (cars, buses, planes, boats, hovercraft, snow/sand transport vehicles)
- infrastructure (associated with recreation and industry)
- communication devices (radios, mobile and smartphones, EPIRBs)
- navigational devices (GPSs and PNDs – personal/portable navigation devices)
- specialised equipment (canoes, mountain-bike frames, climbing ropes, tents, PFDs – personal floatation devices)
- materials and clothing (Gore-Tex, Dri-FIT, Smartwool and other synthetic materials).



Shutterstock.com/irina02

Snow vehicles are able to get to areas that were difficult to access in the past.



AAP Image/NPWS

An emergency position indicating radio beacon (EPIRB) is registered to a vehicle/boat, and not to a specific person. The battery lasts up to 10 years without use, and 48 hours with constant use.



123RF/Spencer Berger

Personal locator beacons (PLBs) and satellite emergency notification devices are specific to the person who owns them, and need to be registered to that person. A battery lasts up to 24 hours with constant use.

Direct impacts from technology are those caused by the action itself. They occur at the same time and place and are usually observable. Examples include the use of recreational vehicles or snowmaking machinery.

Indirect or deferred impacts from technology are those that are caused by the action, but not immediately. They happen either before or after the event, but the impacts are still reasonably predictable. Examples include equipment manufacture and transport.

Although impacts can be positive or negative, our focus here is on the impact of technology on the actual outdoor environment (not its effect on our experience).

LEARNING ACTIVITY



TECHNOLOGY-FREE EXPERIENCE

For an upcoming overnight outdoor experience, organise one day where your class can use technologies and one day where you will go without technologies. It is very important to keep in mind that the health and safety of all participants should not be put at risk under any circumstance as a result of this activity. Therefore, you will need to work with your teacher and classmates to decide on what is classified as technology and what is suitable to go without.

An example of the technology day might be participating in recreational activities such as mountain-bike riding, rock climbing or canoeing, cooking and preparing meals using fuel stoves, and sleeping in tents. The technology-free day might include cooking using a campfire, partaking in weather interpretation, ochre face painting, storytelling and other games, and the construction of shelters to sleep under.

After each day, record in an outdoor education journal the activities that took place and the impacts (both direct and indirect) that each had on your environment.

Recreational vehicles

The term recreational vehicle covers a range of vehicles including, four-wheel drives, quad and trail bikes, specialised all-terrain vehicles, hovercraft and amphibious watercraft.

Since the early 2000s there has been a dramatic increase in sales of 4WD and SUV-style vehicles. The flexibility to handle different road types, the ability to access a greater range of environments coupled with characteristics such as higher driving position and greater seating capacity have attracted people to 4WD-type recreational vehicles.

4WD vehicles offer a means to escape the rigors of everyday life and access unique outdoor environments in comfort. Having vehicles that are capable of accessing areas that in the past have not been easily accessible means people are exploring previously untouched areas of the country.

There are positive impacts of increased access to unique environments including visitors developing a great appreciation and therefore being more involved in the future protection and conservation of these areas.

Negative impacts are more obvious and include:

- the erosion and widening of tracks causing a loss of native vegetation
- introduction of weeds and pests due to transmission via the vehicle
- compaction of soil reducing habitat potential
- disturbance from vehicles may cause birds to fly out of nests.

Vehicles impact on our water quality because different fluids and particles, such as oil, get deposited onto our roads. The runoff from roads is washed into stormwater drains, which feed into our creeks, rivers and larger waterways. Greenhouse gas emissions, such as carbon dioxide (CO₂), are also produced by vehicles, which contribute to global warming and climate change. While greenhouse gases occur naturally in the atmosphere, increases in these gases are occurring from the burning of carbon-based fuels – a result of vehicle use.



iStock.com/samvaltenberg

Four-wheel driving is a popular pursuit in Victoria.

Snowmaking

Artificial snow is produced by forcing water and pressurised air through snow cannons. These cannons require low temperatures, water pumps and air compressors to operate effectively. The machinery is large and expensive and the process requires large amounts of energy and water.

You might initially be unaware of the negative impact that snowmaking machinery has on our environment because the water being utilised makes its way back to nature as the snow melts. However, moving large amounts of water through these machines can have harmful effects on plant and animal life, and on water reserves.

The period of intense water use for snowmaking occurs at a time when water levels are generally at their lowest. Our nation is already battling with the fact that water is our most precious resource. However, we continue to transport and store water for our ski seasons to ensure that tourism and our economy continue to boom. Putting in place snowmaking machinery such as tanks, pipelines and snow cannons means changing our landscape, altering ecosystems, increasing pollution and potentially destroying habitats. Trucks and generators required for water transportation require huge amounts of energy, further polluting our waterways and atmosphere.



iStock.com/alexandrumagurean

A snowmaking cannon

Artificial snow is harder, denser and heavier than natural snow, resulting in a waterproofing effect on soil, subsequently making soil erosion easier. Artificial snow melts more slowly and therefore prolongs the snow season. The longer the artificial snow is maintained, the more impact there is on woody plants, snow-bed species and late-flowering species. This further impacts on bird diversity and populations due to the modification made to their natural habitat and food source.

Direct impacts of snowmaking include:

- large amounts of water are required to make artificial snow, which negatively impacts on water sources and the flora and fauna depending on them

- water loss associated with making snow in the Australian Alps is equivalent to the annual water consumption of a city with 500 000 people (Englebert, 2011)
- land clearing is required for trucks to access alpine areas
- extending the snow season and the amount of time people are spending in alpine areas means less time for the environment to regenerate and replenish
- artificial snow is waterproof (unlike natural snow), which results in increased soil erosion
- bird communities around ski resorts are being directly impacted as the artificial snow can modify their habitat and food sources.

Indirect impacts of snowmaking include:

- large amounts of energy are required to produce artificial snow and fossil fuels are burnt, which results in pollution of air, water and ecosystems
- the manufacturing process of snowmaking machinery and other equipment needed for the production of artificial snow requires a high amount of energy
- a prolonged snow season results in more people populating alpine ski-resort areas for a longer period of time, which results in increased power consumption, pollution and other associated impacts
- snowmaking is usually required when the environmental water levels are at their lowest, which means that water has to be transported and stored before it is used to make snow and large equipment such as trucks must be used to transport the water, which further pollutes the environment
- putting in place snowmaking machinery can lead to changing our landscape and altering ecosystems.

Fuel stoves

Fuel stoves are lightweight, compact and versatile. Using a fuel stove for cooking in outdoor environments, rather than a campfire, is often mentioned in camping codes of conduct.

Direct impacts of fuel stoves:

- contributes to atmospheric pollution
- reduces the need to burn timber.

Indirect impacts:

- requires fuel that needs to be sourced and refined
- manufacturing process requires a lot of energy, as well as creating a lot of waste.



Shutterstock.com/LoloStock

A fuel stove

LEARNING ACTIVITIES



FUEL STOVES VS CAMPFIRES

Using a fuel stove in fragile environments instead of a campfire is a standard minimal-impact practice. Fires are bad, stoves are good – right? What are the actual impacts of a campfire on a local environment? What are the impacts of a fuel stove?

Fuel stoves probably have a lower impact on the environment you visit, but what about deferred impacts? What about the mining, refining and processing to make the materials of the stove? What about the extraction of the fossil fuels? What about the transportation impacts of getting the stove to the shops for you to purchase? What about the impacts of the stove parts once it is old and thrown away?

- 1 Analyse the direct and indirect impacts of fuel stoves and campfires for cooking in outdoor environments. You have been provided with a few impacts from fuel stoves above, but you will need to undertake further research to put together a comprehensive analysis.
- 2 Once your analysis is complete, make a judgement about which cooking method actually has a lower impact on the environment overall.

EQUIPMENT INVESTIGATION

Select one of the following items of outdoor recreational equipment: canoe, Gore-Tex clothing material, mountain-bike frame, tent, GPS device or rock-climbing rope (or an alternative piece of equipment with teacher approval).

- 1 Investigate the following for your chosen piece of equipment:
 - what the piece of equipment is made from
 - where the parts/components come from (including how far they need to be transported)
 - effects (positive and/or negative) on the environment from the manufacturing process
 - what happens to the piece of equipment and/or its parts when it is no longer usable
 - how this piece of equipment has changed the way humans interact with the environment (including increased or decreased participation rates)
 - how this piece of equipment has changed the way humans impact on the environment (including positive, negative, direct and indirect impacts).
- 2 Link your chosen piece of equipment and its impacts to an environment you have visited recently by providing examples you observed while in the outdoors.
- 3 Create a presentation that can be viewed by your class, such as a PowerPoint, Prezi, poster or brochure, Glogster, video, song or simulation/role-play.

Equipment manufacture

All equipment manufacture has an impact on the environment in terms of air quality, greenhouse gases, ozone depletion, water quality, use of natural resources and noise. Manufacturing equipment requires the use of non-renewable resources such as metals, petroleum and fossil fuels. The extraction of these resources has a high energy demand, which subsequently results in atmospheric polluting. The recycling of any equipment is important, as it decreases the one-way flow of these resources and reduces the amount of landfill material and associated soil and water pollution.



Patagonia

Patagonia is committed to reducing its environmental impact

they ask that the customer vow to 'buy only what you need, repair it when it breaks, and recycle it when you're through'.

Outdoor equipment manufacturers, such as Patagonia and One Planet, are very wary of the need to reduce their impact on the environment through their business practices. Each of these companies is committed to reducing the environmental impact of their products at every level of production. Patagonia donates 1% of their annual sales to environmental charities and organisations. Patagonia's commitment to environmental sustainability was highlighted in their switch from pesticide-laden industrially grown cotton in their products to organic cotton, which cost the company years worth of profit. Patagonia make a promise that they will 'make great stuff, fix it when it breaks, and recycle it when you're done with it'. In return,

Transport

Transportation projects such as overpasses, ring roads and bridges can have lasting effects on the environment through the development phase as well as into the future with increased activity through the area. These projects are often attractive to people as they reduce travel time and improve

accessibility. However, we often forget about the environment and what is at stake in relation to its health when these projects go ahead.

Direct impacts of transportation include:

- habitat destruction and/or fragmentation
- increased stormwater runoff that pollutes waterways
- disruption to fauna
- increased noise pollution.

Indirect impacts of transportation include:

- increased motor vehicle exhaust emissions, which can lead to further pollution of the environment over a period of time
- more land development and urbanisation, as more people are potentially attracted to the area due to increased access.

LEARNING ACTIVITIES



VEHICLE IMPACTS

Investigate the process of building, operating and maintaining a vehicle of your choice. Compile a range of facts specific to your vehicle (such as the specific amount of CO₂ emissions produced, or fuel consumption).

Visit the following websites to begin your research:

- Green Vehicle Guide
- RACV.

Complete the following table with your findings. Compare your results and impacts with those of your classmates.

Direct impacts	Indirect impacts

THE FOOTPRINT CHRONICLES

The Footprint Chronicles is an initiative of Patagonia (an American outdoor clothing and gear company) that began in 2007. It allows you to explore the various impacts their manufacturing process has on the environment.

Visit the website of The Footprint Chronicles. In pairs, select a product and record its manufacturing process, considering the following:

- 1 What is it made from?
- 2 Where do its component parts come from?
- 3 What impact is there on the natural environment as a result of this process?
- 4 How far has it travelled between its place of manufacture and you?
- 5 What is its life cycle?

NEW ENVIRONMENTAL TECHNOLOGIES

It is easy to dwell on how technologies are harming our environment. The Live Science website looks at a range of different technologies and how they can positively affect our environment. Search the Live Science website for articles on the latest environmentally friendly emerging technologies. As a class, discuss how the latest eco-technologies may improve the health of our outdoor environments.



Green Vehicle Guide
RACV



The Footprint
Chronicles



Live Science

DEBATE

Your teacher will divide the class into two groups (one in favour and one against) to debate one of the following topics:

- 'Technologies are reducing the impacts we have on outdoor environments'.
- 'The use of multiple technologies is increasing the indirect impacts we have on environments'.
- 'Advances in technology allow us to better protect our precious environments'.
- 'Advances in technology are contributing to the degradation of many outdoor environments'.

During the debate you will have the opportunity to put forward and hear arguments for both positive and negative impacts, which will allow you to gain an insight and understanding into the ways in which technology is impacting on outdoor environments.

IMPACTS OF URBANISATION

Urbanisation refers to the development and physical growth of towns and cities, including residential areas, as people move to these locations. Australia is considered one of the most urbanised and coast-dwelling populations in the world, as more than 80% of Australians live within 100 kilometres of the coast. However, these urban areas are less than 2% of Australia's total land mass.

The process of urbanisation means that natural environments suffer as more space is required for the construction of houses and the development of industry. An example of this is the ever-growing urban sprawl of suburbs that surrounds the city of Melbourne, which stretches approximately 150 kilometres from east to west.

Typical characteristics of urbanisation

Typical characteristics of urbanisation include:

- construction of housing estates, roads, railways and other transport corridors
- provision of amenities such as running water, sewage treatment and disposal systems for household and industrial waste
- increase in hard surfaces such as sealed roads, concrete footpaths and roofing.



Shutterstock.com/ FiledIMAGE

Urbanisation requires infrastructure such as housing and roads, which impact on nature.

IMPACTS OF URBANISATION

Waterways

Typical impacts from urbanisation on waterways include:

- decline in riverine species
- disruption of ecosystems
- increased turbidity and siltation
- rising salt levels
- loss of streamside vegetation
- erosion of creeks and watercourses
- increased stormwater runoff
- alteration of flow patterns
- water pollution from litter, garden refuse, soap, petrol, oil products, animal faeces, sediment from rivers and streams, overflowing sewage and cigarette butts.



Litter traps are often needed in urban waterways.

Land

Typical impacts from urbanisation on land include:

- habitat loss through timber harvesting, mining excavation and clearing of vegetation
- loss of old hollow trees
- lack of dead wood and forest litter
- introduction of weeds
- loss of topsoil
- decreased water absorption into the soil
- predation by introduced domestic animals
- decrease in biodiversity levels
- land disturbances due to deforestation, mining and farming.

While the impacts listed here have a predominately negative effect on the environment, urbanisation can also bring about the development of parklands and areas where native **remnant vegetation** is protected and regenerated.

remnant vegetation

Small patches of native plants that remain after conversion of landscapes to agricultural or other use

LEARNING ACTIVITY



LOCAL INVESTIGATION

- 1 Investigate and describe the impact of urbanisation on the area you reside in (or the area where you go to school) and consider the following:
 - a How has the local environment changed over time?
 - b What were the key features of the environment prior to European settlement?
 - c What was the native vegetation previously like in this area?
 - d Are there any examples of remnant habitat that exist?
 - e Why did urbanisation occur?
 - f How quickly did it occur?
- 2 Present this information in a short cartoon strip that is either hand-drawn or created on a computer or tablet.

Impacts of changing human lifestyles

Changing human lifestyles have been influenced by:

- advancements in technology – such as motor vehicles, television, radio, air travel, telephones, internet and social media, and labour-saving devices including washing machines and refrigerators; there is also a heavy reliance on cars for transport and an increasing popularity of compact SUVs and four-wheel drive vehicles
- occupational conditions that can be inclusive of flexibility with working hours, job-sharing arrangements, increased leisure time and disposable income
- media and lifestyle programs that increase our awareness of, and interest in, outdoor environments and the opportunities they provide – this is increasing the number of people who visit outdoor areas for relaxation and recreation
- composition of families and their residences – families are generally smaller, occupying smaller parcels of land with larger houses filled with modern-day home accessories and smaller backyards; attempts at higher levels of energy efficiency have also increased (through government legislation and rebates).

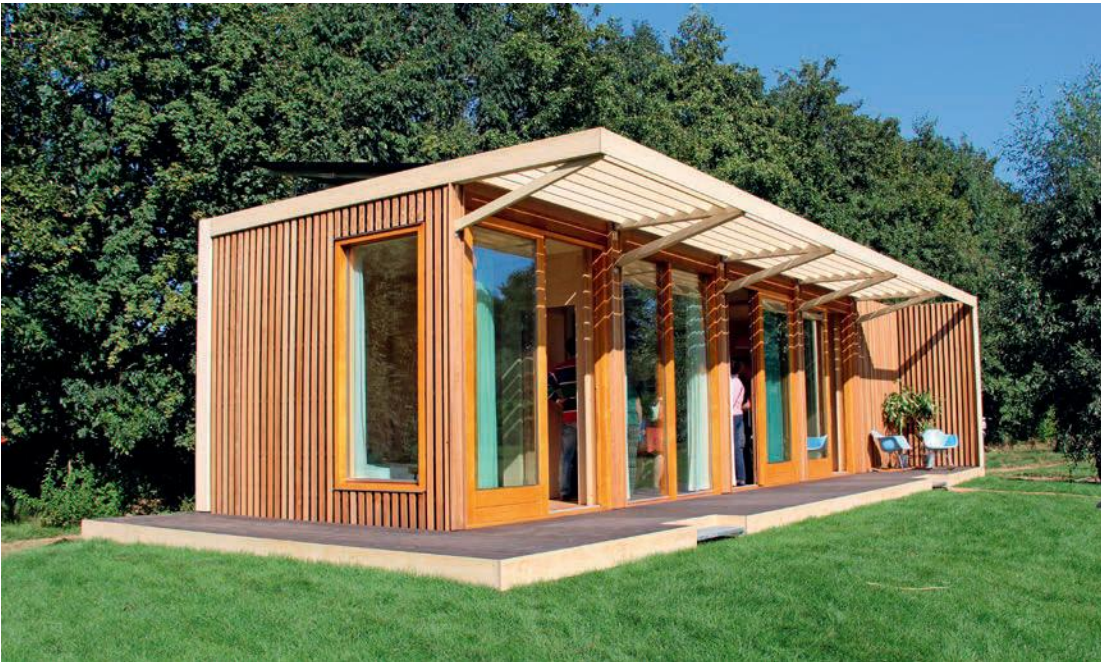
In general, people in the 21st century spend more time in urbanised areas and less time in natural environments. They also spend a lot more time engaged with technology. Some people even say that technology is the very cornerstone of our evolving world. People are now able to access footage and/or images that enhance their knowledge and enable them to experience the outdoors (to a degree) without even leaving their own home. Coupled with the fact there are fewer natural spaces such as parks, wetlands, forests and even sand dunes at the beach, this inevitably reduces access to outdoor environments and the unique hands-on experience that people have with it.

The urban population often seeks a more natural setting to visit, holiday in or explore, because they are missing it on a day-to-day basis. With increasing numbers of people exploring outdoor environments, there is the possibility of overuse and misuse of areas, resulting in damage and destruction. While outdoor environments are being exploited through commercialisation by tourism and government sectors, the money (or a percentage) that is charged to visitors could go towards the protection and restoration of the environment, somewhat balancing out the positive and negative impacts our outdoor spaces endure.

In order to assess the sustainability of a population, geographers sometimes use an **ecological footprint** model. This determines the impact that a defined human population (such as one person, city or country) has upon its surrounding environment. Likewise, an urban ecological footprint does this by providing an approximation of the total amount of land required by a city to provide it with

ecological footprint

A measure of how much productive land (global hectares) is required to produce the goods and services and dispose of the waste necessary to support a particular lifestyle



Our ecological footprint is a measure of our impact on resources and the environment.

the resources it needs to sustain its population. In addition to accounting for the food, water and other natural resources people consume, the footprint also includes the space required to dispose of all the waste they generate. The ecological footprints of individuals within a defined geographical area (such as a country) can also be calculated. The higher a country's human ecological footprint is, the less-sustainable population is. The Australian population has an extremely large ecological footprint compared with other countries around the globe, which is indicative of our unsustainable consumption patterns, and reflective of the impact we have upon our surrounding environments. (Ecological footprint will be covered in more detail in chapter 7.)

LEARNING ACTIVITY



ECOLOGICAL FOOTPRINT

Visit the World Wildlife Fund (WWF) website and access the ecological footprint calculator to find out what it takes to support your current lifestyle. This website also has some great tips about people and the environment, footprints, and how you can change the way you live.

EPA Victoria also has some information about ecological footprints including a school ecological footprint calculator.

Once you have calculated your personal footprint or your school's ecological footprint, write a short report that includes the following:

- 1 Explain what an ecological footprint is.
- 2 Describe your current lifestyle and the ecological footprint this causes.
- 3 Suggest ways you could realistically reduce your own footprint.
- 4 Analyse the impact of urbanisation and changing human lifestyles (in general) on outdoor environments.







UNIT

3

RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

- **Area of Study 1**
Historical relationships with outdoor environments
Chapter 5 (page 140)
- **Area of Study 2**
Relationships with Australian environments
since 1990
Chapter 6 (page 188)



CHAPTER

5

HISTORICAL RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

KEY KNOWLEDGE

- an overview of Australian outdoor environments before humans, including characteristics of biological isolation, geological stability and climatic variations (page 141)
- relationships with Australian outdoor environments expressed by specific Indigenous communities before and after European colonisation (page 151)
- relationships with Australian outdoor environments as influenced by:
 - the first non-Indigenous settlers' experiences (page 163)
 - increasing population (page 166)
 - industrialisation (page 168)
 - nation building (page 170)
- the foundation and role of environmental movements in changing relationships with outdoor environments, in relation to at least one of the following:
 - Lake Pedder (Tasmania) (page 177)
 - the Little Desert (Victoria) (page 179)
 - the Franklin River (Tasmania) (page 180)
- the impact of increasing environmental awareness in Australia on the policies of political parties (page 184)

KEY SKILLS

- explain the characteristics of the Australian environment before humans
- describe and analyse the changing relationships with Australian outdoor environments expressed by specific Indigenous communities
- describe and analyse the changing relationships with Australian outdoor environments influenced by historical events and associated key social and cultural issues
- evaluate the foundation and role of environmental and political movements in changing relationships with outdoor environments
- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected during these experiences

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

A relationship is the way that two or more people or things are connected. Applying this to the idea of a human relationship with the outdoors should be fairly clear – we’re interested in the ways humans connect with outdoor environments, right? But how do you describe this? How do you talk, or write, about the relationships that people have with the outdoors?

This is more than just a theoretical question, because it’s exactly what you need to do as the central task throughout Unit 3. You are going to be asked to develop an understanding of these relationships we humans have with outdoor environments, and to write about them.

Andrew Mannion



What do your relationships with outdoor environments look like?

Describing relationships

Think about some of the relationships you have with other people – your friends, parents, brothers and sisters, your classmates, teachers, and so on. How would you describe these?

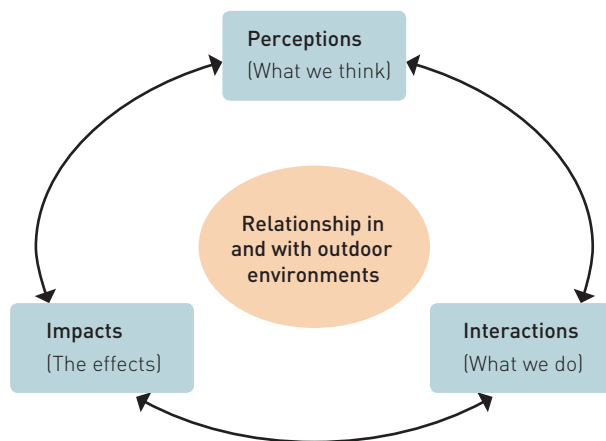
Relationships are hard to describe. They’re fluid – constantly changing as we change, others around us change and the circumstances that connect us in these relationships change. But if you were forced to describe any of your own relationships with another person, you might include some (or all) of the following:

- feelings about the person
- experiences and history with the person
- things you like and don’t like about the person
- things you do with the person.

DESCRIBING RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS – A FIRST GO

You might have found describing relationships with other people a bit tricky, but if that was hard, doing the same thing for non-human objects (such as outdoor environments) is probably going to be even harder.

One way to think about human relationships with outdoor environments (a way that we’ll use in this book) is shown in the diagram on the following page. The arrows connecting each of the three aspects in the diagram are an attempt to show how these aspects of relationships connect to and affect



each other. For example, our perceptions help to determine the interactions we have, and the interactions we have also help to influence our perceptions.

In this view of relationships, we have three key aspects of the relationship:

- 1 **Perceptions** – what we think about the outdoor environments
- 2 **Interactions** – what we do in, and with, the outdoor environments
- 3 **Impacts** – what happens as a result of our relationship.

We'll use this idea about relationships as we move through different parts of the course.

DESCRIBING RELATIONSHIPS USING METAPHORS

Having a model (like the diagram above) to understand relationships is one thing, but to write about them and describe them we need a little bit more – and this is where metaphors come in. You will have heard of these before and even used them, although you may not know them by name. Basically, a metaphor is when two unlike things are compared with each other because of something they have in common. They're used in lots of ways, but often when we're trying to understand something complex, we use a metaphor to compare it with something simpler. Here are some examples of metaphors:

- The foot of the mountain.
- Life is a journey.
- You are a pig.
- 'All the world's a stage, and all the men and women merely players, they have their exits and their entrances.' (Shakespeare from *As You Like It*).
- She ruffled his feathers.
- The world is my oyster.
- The Lord is my shepherd.

Let's look a little more closely at two of these metaphors.

- 1 'The foot of the mountain.' Mountains don't actually have feet – feet are something that humans have, and maybe we can attribute feet to some other animals too. But a mountain is not a human. So, what do we mean when we talk about the foot of a mountain? We recognise feet as being at the bottom of a human (assuming the human is standing up), which is the point of using this particular metaphor. The foot of a mountain is recognised as the part of the mountain at its base – it's the bottom of the mountain.
- 2 What about Shakespeare's well-known quote from the play *As You Like It*? The world isn't actually a stage, and the men and women that live in the world aren't players (or actors). So, what might Shakespeare have been trying to get at? In many productions, both in Shakespeare's time and now, one actor might play many roles. In our lives, we are often asked to do different things and 'be' different people – brother or sister, son or daughter, father or mother, friend, colleague, and so on. And these 'characters' do what they need and then disappear to be replaced by other characters. Could Shakespeare have meant something like this? The beauty of a metaphor is that it can have many meanings – the one intended by the author, but also potentially many others.

Here are some examples of metaphors used to describe human relationships with the outdoors:

- **Outdoors as an adversary** – An adversary is an opponent in a contest or fight. This might be a useful metaphor when looking at a human–nature relationship that sees the environment as something we are fighting against; something to beat, control and dominate.
- **Outdoors as a museum** – In a museum we collect and store valuable things. We protect them and maintain them, and we use them to learn about the world. When describing human–nature relationships that involve conservation, protection or preservation, this could be a useful metaphor. When the environment is seen as a place to study or learn, whether it's the environment we're studying or ourselves, or something else altogether, this metaphor could also be useful.
- **Outdoors as a cathedral** – Cathedrals, churches, temples, mosques, synagogues, and so on, are spaces where people worship and pray, and spend time to connect with their spirituality. The connection with spirituality and the outdoors is something we've discussed in earlier chapters and is what can make this a useful metaphor.
- **Outdoors as a gymnasium** – A gymnasium is a place where we challenge ourselves and look to physically develop our bodies. People go to gyms to work out and 'raise a sweat'. For many people, outdoor environments are places for them to do this (work out, sweat and physically develop), which makes this metaphor useful in this sense.
- **Outdoors as a storehouse** – A storehouse or a warehouse is a place where we find resources: things we need, and we need lots of them. This would be a useful metaphor for people who see the human–nature relationship as being made up of an environment that gives us access to many resources, such as food, air, water, plants, animals, minerals and more.
- **Outdoors as a mother** – A mother is the person who birthed us and who then goes on to protect and care for us. We expect a mother to love her children and to be cared for by her children when she ages. This metaphor, commonly cited by Indigenous communities (as we'll see shortly), is an important way to describe human–nature relationships that see the environment as the place from which we come, the place which provides for us and the place we must help to protect.
- **Outdoors as a web** – A web (as in the web of a spider) is a connection of many strands that interweave and combine in many ways. This metaphor could be appropriate for someone who sees the environment as a place with many interconnecting aspects. When we describe food webs in science and biology, for example, we are connecting with this metaphor as a useful way of seeing aspects of the natural world.

LEARNING ACTIVITIES



METAPHORS

- 1 Are metaphors useful in helping to explain a relationship someone might have with an outdoor environment? Choose one or two metaphors discussed in this book and analyse how useful you think it would be in helping to describe and explain the relationship that an individual or group might have with outdoor environments.
- 2 Find examples of people whose relationships might be typical of those described in these metaphors.
- 3 Find examples of other metaphors (or come up with your own) that could be useful in helping to describe and understand the relationships that people can have with outdoor environments.

QUOTES

Man, if we look to final causes, may be regarded as the centre of the world.

Francis Bacon, *Of the Wisdom of the Ancients*, 1857

I dream of looking abroad summer and winter, with free gaze, from some mountainside ... I to be nature looking into nature with such easy sympathy as the blue-eyed grass in the meadow looks in the face of the sky.

Henry David Thoreau, *Familiar Letters of Henry David Thoreau*, 1841

- 1 What do you think these quotes mean?
- 2 What sort of relationships with the outdoors are these people describing?
- 3 Find some examples of metaphors in the two quotes.
- 4 Find some more examples of quotes about environments. Look for metaphors being used in these. What are the metaphors and why do you think the authors of the quotes used them?

AUSTRALIA BEFORE HUMANS

The point of this section is to set the scene for what we're going to study. To understand the relationships people have had (and are having) with the Australian environment, and to understand the impacts, effects and issues associated with these relationships, we need to have something to compare against – a reference point from which to assess the result of our efforts.

Have we had a negative effect? Have we had a positive effect? The only real way to know is to understand what Australia was like before there were any humans here at all.

This isn't without some controversy. Many Indigenous cultures base their practices, philosophies and histories on the belief that they, or their ancestors, have always been here. While our intention is to be mindful and respectful of these beliefs, the accepted scientific understanding places human arrival in Australia at between 40 000 to 60 000 years ago – a long time, but not forever.

What was this place like before that? What sort of land did the first Australians find?

AUSTRALIA – A VERY BRIEF OVERVIEW

Australia, with an area of just over 7 600 000 square kilometres, is the sixth-largest country in the world. Australia is the flattest continent, with the oldest and least fertile soils, and is also the driest inhabited continent.

The climate of Australia is significantly influenced by ocean currents, including the El Niño–Southern Oscillation (ENSO) – commonly referred to as **El Niño** – and the seasonal tropical low pressure systems that produce cyclones in the north. These factors mean rainfall patterns vary dramatically from year to year.

Although most of Australia is semi-arid or desert, it includes a wide range of habitats – from alpine heaths to tropical rainforests. Because of the age, variable climate and long-term geographical isolation, much of Australia's plants and animals are unique.

PREHISTORY OF AUSTRALIA

The world hasn't always looked like it does now. The super-hot blob of rock and minerals at its core produces tectonic effects that, over hundreds of millions of years, move the continents across the surface, and raise and lower different regions. Around 200 million years ago, Australia was part of the supercontinent Gondwana – formed from the linking of what is today Antarctica, Africa, South America, India and Australia.

El Niño

Extensive warming of the central and eastern tropical Pacific, associated with an increased probability of drier conditions in Australia

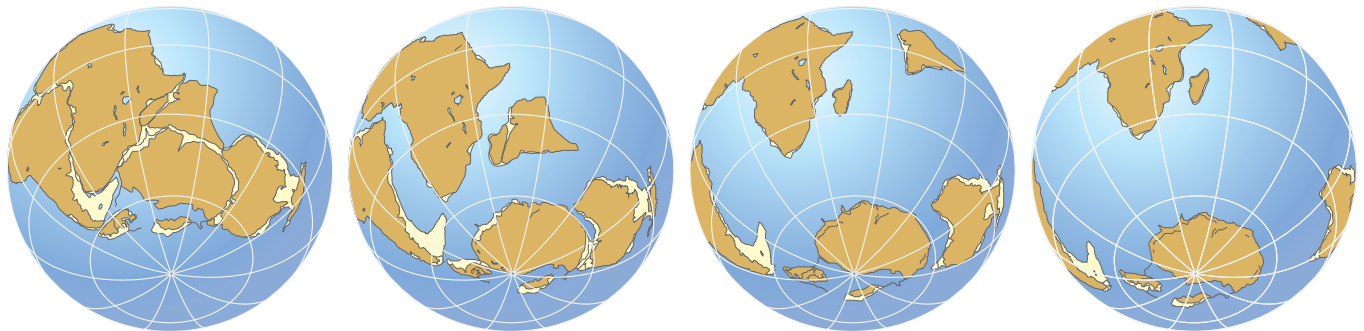
Some of the plants and animals that thrived across the supercontinent are still found in regions of the separated continents today (or, at least, relatives and descendants of them are). Beech trees, such as the myrtle beech in Victoria, are found across the southern continents, as are conifers, such as the Huon Pine from Tasmania and *Podocarpus* found in the Alps. Marsupials, commonly found across Australia, are also found in parts of the other southern continents, especially South America.

The dynamic nature of the Earth meant that Gondwana was never going to be complete for too long. Africa began to break free, followed by South America and later India. Australia and Antarctica, the final two remaining parts, began to separate from each other around 80 million years ago, but the separation really kicked into action around 50 million years ago when the Southern Ocean began to form.

The formation of the Southern Ocean allowed water to completely flow around Antarctica, keeping it colder and causing a major cooling of the Earth's climate – sea temperatures dropped by almost 10°C.

About 15 million years ago, New Guinea (the northern part of the Australian continental plate) collided with South-East Asia, creating the New Guinea highlands. This caused a rain shadow effect, which changed weather patterns across Australia and dried the whole continent out, which helped to encourage the dominance of acacia and eucalypt trees across much of the continent.

Maps created by Greg Houseman using the program 'Terra Mobilitis' written by Scotese C.R. and Denham, C.R.



200 million years ago: The southern continents were locked up as a part of the supercontinent, Gondwana. The outlines of what became Africa, South America, India, Australia, Antarctica and Madagascar are shown here.

100 million years ago: Forces from below the crust started breaking Gondwana apart. Africa and South America drifted apart to form the Atlantic Ocean. India moved north towards a collision with Asia, resulting in the formation of the Himalayas. Australia and Antarctica remained locked together, although India's movement put pressure on the faults between them.

50 million years ago: Australia and Antarctica started to separate. The circumpolar ocean currents formed to cool the whole world, turning Antarctica into a continent of ice and causing the 'big dry' in Australia.

Present day: The continents have reached their current positions, but have not stopped moving. India continues pushing into Asia, causing the Himalayas to keep growing. Africa and South America keep moving apart, which enlarges the Atlantic Ocean. Australia continues northward into Asia, perhaps forming a new great mountain range.

PREHISTORY OF VICTORIA

The rocks and soils that make up Victoria's landscape have undergone the same sort of processes that occur all around the world – volcanism, uplift, sedimentation, folding and faulting, and erosion and weathering. The result of these processes are features you'll come across throughout your experiences – the coast and wetlands, the Victorian Alps, the rivers and valleys, the grasslands and deserts, and the forests.



Getty Images/Paul Sinclair Photography

Exposed rocks often tell a story of the geology of a place. The rocks we see in outdoor environments (on the coast, in the mountains and elsewhere) tell a story of layering, folding, faulting and many other geological processes.

of its greatest effects in south-eastern Australia. Rift valleys formed between the two continents, including two in southern Victoria. Steep mountain ranges formed at the edges of these valleys. The Grampians and Mount Arapiles are the remnants of one. The Victorian Alps are the remnants of the other.

- The low-lying areas around Gippsland and Western Port Bay, formed from the separation of Australia and Antarctica, became swamps and marshes. These would later form the coal beds of the Latrobe Valley, and also include some of the best examples of dinosaur fossils found in Australia.

There are some key features, events and issues in the prehistory of Victoria that are important to consider.

- For much of the history of Australia, Victoria and the whole eastern part of Australia didn't exist – they only formed about 500 million years ago. Western Australia has been around almost 10 times longer. In Victoria, some of the oldest rocks can be seen on the exposed coast at Waratah Bay, near Phillip Island.
- For much of its history, Victoria was a seabed. The evidence of this can be found in surprising places – fossilised sea life has been found high in the Victorian Alps.
- As Australia and Antarctica broke apart, the stretching and tearing of rock had some

CHARACTERISTICS OF PRE-HUMAN AUSTRALIA

There are three key characteristics that were a feature of the Australian environment before humans arrived:

- 1 biological isolation
- 2 geological stability
- 3 climatic variations.

All three of these characteristics have helped shape the land and its various forms, the variety and features of Australian ecosystems, and the specific behaviours and features of the plant and animal species found across the continent.

When humans arrived in Australia, these characteristics continued to shape the interactions people had with the environments they found. Indeed, these three characteristics still shape the interactions that we have today with the Australian environment.

LEARNING ACTIVITY



GEOLOGY

Find out about the geology of a place you've visited, or are about to visit, or a local place. How did it come to be like it is? Take some photos or makes some sketches of the layout of the place, and find out about the time periods and processes that were involved in its formation. How do we know what we know about this place?

Biological isolation

The separation of Australia and Antarctica about 50 million years ago marked the time when Australian plant and animal species lost their ability to interact with other species. From that time, Australia has been an island. Apart from bird migrations, and perhaps the occasional swimming castaway from South-East Asia, the species of Australia haven't been able to naturally mix, compete and relate with any other species than those already here (or those introduced by humans).

One main and obvious implication of this characteristic has been the dominance of the marsupial mammals in the Australian landscape. Marsupials are found in other parts of the world, but with no significant competition from placental mammals, the marsupials – kangaroos, koalas, wombats, devils and others – had the whole place to themselves.

Other consequences of biological isolation include:

- a high percentage of **endemic** species found in Australia (that is, species that are not found anywhere else). Species endemic to Australia include:
 - 95 per cent of fungi
 - 85 per cent of land mammals
 - 89 per cent of reptiles
 - 94 per cent of frogs
 - 91 per cent of flowering plants
 - 57 per cent of mangrove species
- a large diversity of different plant and animal groups
- wildlife of major evolutionary importance; for example, Australia has 12 of the 19 known families of primitive flowering plants, two of which occur nowhere else.

endemic

A feature that is unique to a defined geographic location

Geological stability

There are no major faults across the Australian mainland – earthquakes are rare and usually low in intensity. The boundaries of the Indo-Australian Plate on which the continent sits are nowhere near the mainland, and so Australia has been mostly geologically stable (at least since the separation of Gondwana).

One of the main consequences of this geological stability is that Australian soils are very nutrient-poor. Because of the relative lack of volcanic and other tectonic activities, which normally help to recycle rocks and soils, Australian soils have weathered and aged and become progressively poorer in the nutrients that are important for plants. Of course, Australia still has a lot of plants, but the relatively poor soils have led to the dominance of particularly tough species, especially eucalypts.

Geological stability has also meant that the dominant geological process in Australia has long been erosion – large-scale examples of mountain building or other catastrophic processes are quite rare (although there are a number of volcanic sites across Victoria and some other parts of the continent). This erosion-dominated landscape has produced a flat place, which has had implications for the way both water and fire move across the continent.

Climatic variations

Australia is generally regarded as the driest inhabited continent (Antarctica being the driest, but without the permanent settlements we find on other continents). The large area of deserts and arid lands has been significant in the development of Australia's flora and fauna, but perhaps more important to the ways plants and animals have evolved and adapted has been the variation in Australia's climate over time.

Australia (like the rest of the world) has endured many large-scale climate changes, including ice ages and periodic warming events, over many millions of years. However, for at least the last 10 000 years, a periodic change in ocean temperatures off the western coast of South America has led to dramatic changes across the Pacific, including the Australian continent.

EL NIÑO–SOUTHERN OSCILLATION (ENSO)

Named after the Spanish term for ‘Christ child’, since in South America the effects of this pattern were initially more noticeable around Christmas, the El Niño–Southern Oscillation results in drier-than-normal conditions across northern and eastern Australia, increasing droughts and the risk of bushfires, which cause haze and a decrease in air quality.

LA NIÑA

La Niña is the reverse process to El Niño. When it happens, Australia has more significant periods of rainfall, which can lead to extensive flooding.

La Niña

Extensive cooling of the central and eastern tropical Pacific Ocean, associated with increased probability of wetter conditions in Australia

OUR CONTINENT

Australia’s variable climate and weather has led to a continent where:

- drought is common, leading to plants and animals developing strategies to conserve or reduce the requirement for water
- bushfires are common, and plants both fuel these and have adapted to them
- floods occur intermittently, leading to large-scale bird migration patterns to take advantage of occasional wetlands.

LEARNING ACTIVITY



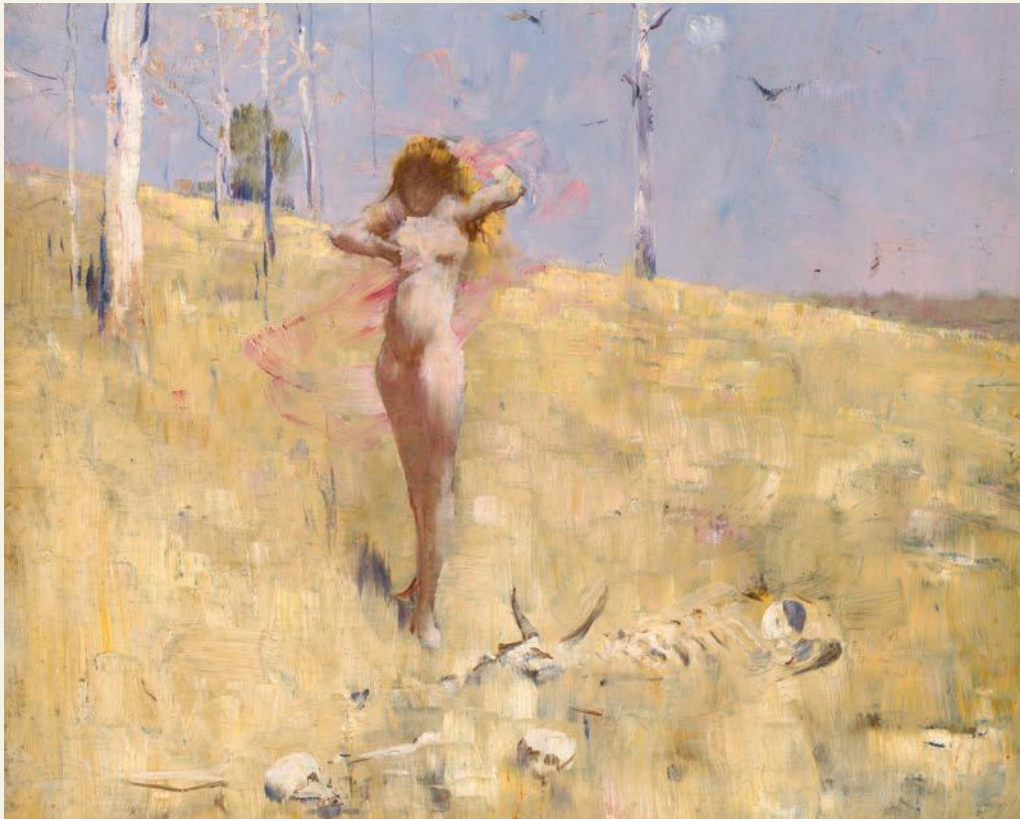
ART OF DISASTER

The following paintings depict natural disasters in the Australian environment – flood and drought. Describe some of the ways in which the artists have represented the disasters. What do you think is the purpose of the artwork? What is the artist of each trying to do or say? Find other examples of artworks (such as paintings, photographs or other forms) that represent natural disasters in the Australian environment, or come up with some of your own.



Art Gallery of NSW

William Piquenit, *The Flood in the Darling 1890* (1895)



National Gallery of Australia, Canberra Joseph Brown Fund

Arthur Streeton, *The Spirit of the Drought* (c.1896)

Fire and Australian plants

Archaeological studies suggest that fire has been a major part of the Australian environment since the final breakup of Gondwana. We can see the cultural importance of fire events in our recent history with the way that we name many of the biggest:

- Black Thursday – 1851
- Red Tuesday – 1898
- Black Sunday – 1926
- Black Friday – 1939
- Ash Wednesday – 1983
- Black Saturday – 2009.

Australian plants are very heavily adapted to survive, and in many cases thrive from large-scale fires. Some adaptations of Australian plants for fire conditions include the following:

- *Eucalyptus* species (gum trees) produce shoots from burned trunks, which help provide nourishment to trees.
- Eucalypts also produce **volatile** leaf oils and highly flammable bark, and also drop large amounts of leaves as litter. These features are thought to help promote and expand fires, which may help to kill off competitors for the soil nutrients, water and sunlight.
- Eucalypts are sometimes known as ‘suicide trees’, since some species are killed by fire that they help to promote (although this is seen as a useful adaptation since it helps promote regeneration).
- Grass trees flower heavily after fire, helping to promote the release of seeds.
- Some native orchids flower after a fire.

volatile
(substance)
Easily evaporated
to produce a
flammable vapour

- *Eucalyptus regnans* (mountain ash trees) regenerate from seeds that germinate after fires. The sprouts require large amounts of light – more than would be available with a lot of tree cover, which of course a fire has probably removed.

LEARNING ACTIVITY



FIRE OR OTHER NATURAL DISASTERS IN A SPECIFIC ENVIRONMENT

Research a natural disaster that has affected an environment you have visited or studied during the course of this year. Write about how the disaster affected this place. Find examples of adaptations in the plants and/or animals from this place that are a result of previous natural disasters. How has the disaster affected the ways in which humans relate to this place?

Examples of adaptations of Australian plants and animals

Plants	Animals
<ul style="list-style-type: none"> • Hard, glossy leaves resist water loss through transpiration • Evergreens reduce energy usage • Long, narrow leaves that hang vertically presenting a small surface area to the sun • Small leaves, or none • Dormancy 	<ul style="list-style-type: none"> • Water storage • Metabolic adaptations to minimise water loss • Energy-efficient movement (e.g. hopping) • Energy-saving adaptations (e.g. koala's brain)

Megafauna

Many of the animals that lived in Australia before humans first arrived are known collectively as megafauna, which literally means 'large animals'.

The term megafauna is not only used in Australia; in the past, you could find megafauna in many parts of the world, such as dinosaurs, fish, crocodiles and many mammals. Today, there are still many examples of megafauna around the world, including whales, elephants, hippos and rhinos, bears and others.

EXAMPLES OF EXTINCT AUSTRALIAN MEGAFUNA



Zaglossus hacketti: a sheep-sized echidna



Procoptodon goliath: a 2–3 metre tall short-faced kangaroo



Thylacoleo carnifex, the marsupial lion

Diprotodon optatum, commonly known as the diprotodon, was a massive wombat 3 metres long and 2 metres tall. *Dromonis stirtoni* was a massive flightless bird that grew up to 3 metres tall.

Varanus priscus was a 7-metre long carnivorous goanna, and weighed in at almost 2 tonnes. You can research pictures of all of these. While all these examples of megafauna species are now extinct, others remain in Australia (although smaller in size when compared with their cousins). Kangaroos, wombats, emus, cassowaries, goannas and crocodiles are all examples of species that today are large enough to be considered megafauna.

But a question arises when we look back in time at these other species – what happened to them? Why are they gone? We'll consider this question in the next section.

NOTES FOR THE EXAM



For the exam, you should:

- know some examples of adaptations of plant or animal species that suit Australian conditions
- be able to connect at least one of the three conditions (biological isolation, geological stability and climatic variation) to an environment you have visited.

LEARNING ACTIVITY



SAMPLE EXAM QUESTIONS

- 1 Choose one of the following three characteristics of Australian environments: biological isolation, geological stability and climatic variations. Describe, with reference to a particular environment you have visited or studied, how this characteristic has helped to shape Australian environments. (2 marks)
- 2 Describe what a particular environment you have visited or studied might have been like before human settlement of Australia. Include in your description a reference to at least one of the characteristics: biological isolation, geological stability and climatic variation. (2 marks)

INDIGENOUS RELATIONSHIPS WITH THE ENVIRONMENT

Indigenous Australians are recognised as those people who are descendants of the first humans to live on this continent. To help us think about and analyse Indigenous relationships with the Australian environment, we break up the history of Indigenous Australians into two main categories:

- 1 before non-Indigenous settlement
- 2 after non-Indigenous settlement.

Relationships before non-Indigenous settlement

ARRIVAL OF THE FIRST AUSTRALIANS – MODERN NON-INDIGENOUS VIEWS

There is some evidence that suggests humans were living in Australia as early as 120 000 years ago. This is based on analysis of changing patterns of fire across the continent that could indicate human settlement, but it is considered at the very best unreliable and is quite contentious.

The Madjedbebe (formerly called Malakunanja II) rock shelter in Arnhem Land has been dated to around 55 000 years old. Given that it occurs near a region that is likely to be an early entry point to the continent, it is probably our best guess for when humans first settled in Australia. Even if it overestimates the time, it still represents one of the longest continuous settlements of one place anywhere in the world.

ARRIVAL OF THE FIRST AUSTRALIANS – INDIGENOUS VIEWS

Indigenous Australian communities have the view that their habitation of Australia is essentially continuous, dating back into the mists of time. For Indigenous communities, they've always been here. This changes the perspective of their claim to the Australian environment – although whether it's 55 000 years, 120 000 years, or forever, hardly seems to make much difference from our 21st century place in time.

This longer-term Indigenous view of settlement connects very closely with Indigenous spiritual and creation myths. In Indigenous communities, the creation of Australia and the creation of the people themselves are one and the same – or at least part of the same group of myths and stories.



SahulTime

LEARNING ACTIVITY



SAHULTIME

SahulTime is an interactive animation developed by Monash University that allows the user to simulate the sea level around Australia at different times in the past.

Visit the SahulTime website via the link at <http://oes.nelsonnet.com.au> and explore how sea level is thought to have varied at different times in the past. Use your explorations to write a report on the implications for the Indigenous arrivals in Australia, as well as their ability to travel within Australia – in particular, how hard or easy would it have been to reach Australia at different times, and for how long Tasmania was a part of the mainland.

INDIGENOUS RELATIONSHIPS – PERCEPTIONS

The perceptions Indigenous communities had of their land developed over an incredibly long time period, and the way contemporary Australia characterises Indigenous now are as a result of the trial and error, mistakes and successes of the Indigenous people over tens of thousands of years.

Indigenous communities across Australia are, and were, incredibly diverse. The languages spoken by Indigenous communities are varied and linguistically very distinct. Some features seem to be consistent, or at least common, across many Indigenous communities, including the way the environment is viewed.

Indigenous perceptions of the Australian environment are closely connected with spirituality, sometimes called the Dreaming (also known as the Dreamtime).

The Dreaming is a collective name that is sometimes given to the variety of stories, myths and legends that Indigenous communities used to make sense of the environment, and to understand both the ways in which the environments worked and the ways in which people were formed or created.



Gariwerd creation
story

LEARNING ACTIVITY



A DREAMING STORY

Read the Gariwerd creation story. Write your own story of the Dreaming to explain the creation of an environment, or a particular feature in an environment, that you've visited or studied.

There are some key elements of Indigenous perceptions that flow from their stories of the Dreaming:

- The sense that the land is filled with ancestors – the rocks, the trees, the waterholes and creeks, the valleys and mountains, even the sky and stars are ancestors, transformed from their human

characteristics into those of the land around them. By implication, this view of the land also suggests a view of a kind of afterlife, whereupon after death we all become a feature of the land.

- From the notion of a land full of ancestors comes the deep connection with the land. Unlike later European settlers who perceived that humans were quite different from the land around them, Indigenous communities were a part of the land – related to it, born from it and destined to return to it at death.
- The hunter–gatherer life of Indigenous communities (which will be examined shortly as a practice) helped to fuel this connection with the land. Hunter–gatherer communities live completely in an environment. There are no permanent walls separating people from the land, and so there is no disconnection between land and people. As a result, the land was not separated from other aspects of life.
- This connection with the land helped to build a perception in Indigenous communities that the land was simultaneously both their protector and something to be protected.

A metaphor that is sometimes used to characterise Indigenous perceptions of the environment is the ‘land as my mother’. While this has a useful sense of the land as a protector and the land as the origin of the person, the Indigenous perception may be somewhat more complex than this.

From modern perceptions of the outdoor environment, many of the practices that we engage in spring to mind, and this is no different for the early Indigenous communities across Australia. One of the key features of hunter–gatherer communities across the world is the common lack of a historical record through writing. The Indigenous communities in Australia used cave paintings and other forms of rock art as a means of recording thoughts, ideas, events and histories. But, as with other hunter–gatherer communities, they were part of a largely oral tradition – the myths, legends, communication and relationships with others was all filtered through the telling of stories or the singing of songs, or through physical communication forms such as dance.

LEARNING ACTIVITIES



TEN CANOES OPENING MONOLOGUE

Watch the first few minutes of the film *Ten Canoes* (2006) where the narrator sets the scene for the story that is about to follow. Describe the narrator’s perceptions of the environment indicated in this part of the film.

INDIGENOUS WEATHER KNOWLEDGE

Explore the site created by the Bureau of Meteorology that examines a number of different Indigenous communities and the way they divided the year into different seasons, then complete the following questions:

- 1 How do the seasonal calendars of some of these communities differ according to their location?
- 2 Can you explain these differences by the location?
- 3 What does this tell you about the connection Indigenous communities had with their land?
- 4 Write about how the perceptions of people could be connected with their knowledge of weather and the seasons.



Ten Canoes



Bureau of Meteorology

INDIGENOUS RELATIONSHIPS – PRACTICES

Case studies of modern hunter–gatherer societies show that they spend only a small number of hours each day actually hunting for and gathering food, so there’s a lot of downtime to fill in. We can imagine that the sort of things that take up some of our time (conversations, arguments and jokes with friends and others, singing along to favourite tunes, and so on) probably took up some of the time of the people in early Indigenous communities as well.

For this course, we are particularly interested in the practices that were connected to their interactions with, and uses of, the environment around them. These practices, like many aspects of a person and the community they are part of, varied from place to place. As a simple example, for the communities living in and around the Victorian Alps, it made sense to use the furs from animals they hunted to clothe themselves. In the hot north and west of the country, this would have made no sense.

For many Indigenous communities, there are four key practices we can examine that shed some light on their relationships with their environment.

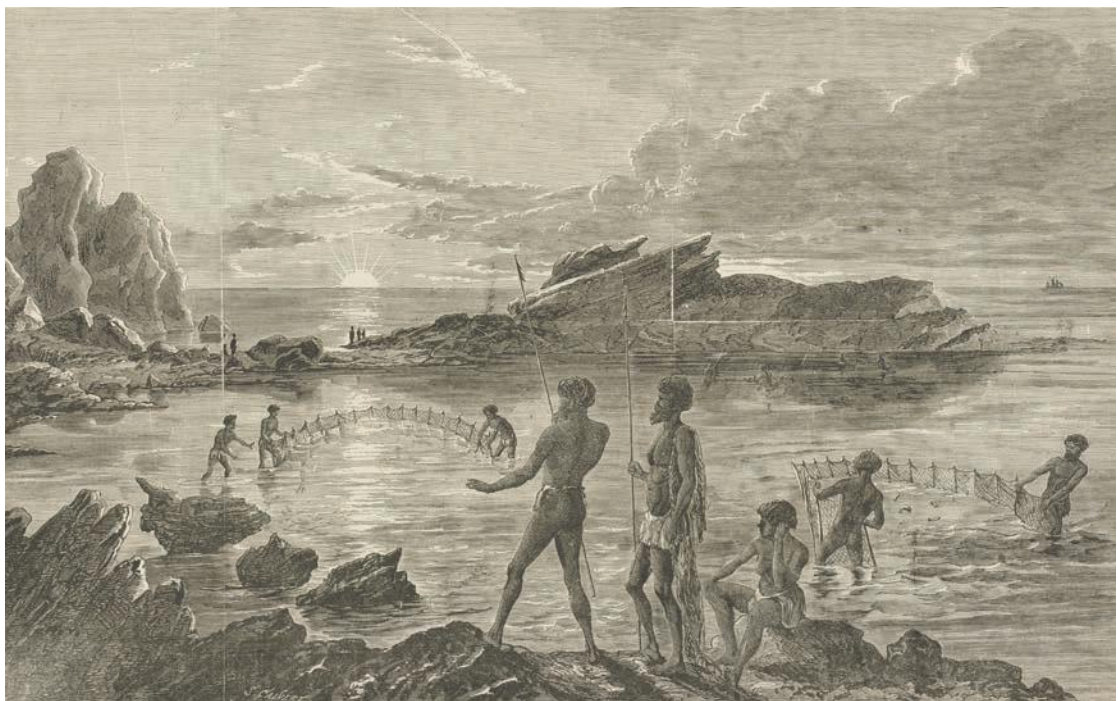
1 Hunting and gathering

Hunting and gathering is sometimes known more roughly as ‘living off the land’, which is a nice way to see the practice. It basically refers to a community or society that hunts animals for meat and other useful materials, and gathers wild fruit, vegetables, roots, nuts, grasses and other edible plants.

Hunting and gathering in more modern communities is often divided on a gender basis, with the men spending time hunting and women and children spending their time gathering. This seems to be the way most Indigenous communities allocated these tasks as well.

Exactly what communities would hunt for and gather depended on where they were and what types of plant, fish and animal species were present in these areas, but we see evidence for hunting of kangaroos, wallabies and other mammals, emus, crocodiles, lizards and snakes, and fish. Gathering would have included a huge range of edible plants, many of which we now recognise by the term ‘bush food’.

Hunting for and gathering food develops in people a very close connection with a place. When you can’t just drop into the local supermarket to buy your next meal, but must instead find it, kill it and prepare it, this changes the way you look at the environment around you. Where are the best places to hunt for a particular animal? Where might be the best places to look for a tasty plant? Hunting and gathering requires that people know these things intimately. If they don’t, they die.



Samuel Calvert, *Natives Fishing* (c.1873) wood engraving

LEARNING ACTIVITY



BUSH FOOD

Find out about some plants from your local area that are considered edible and might be part of what we would call bush food. Develop a menu that could sustain an active person for a day using only bush food that could be gathered locally.

2 Nomadism and semi-nomadism

A close connection with a place through living off the land can lead to a need to be able to move around easily. You might find that a particular animal species that is being hunted is itself moving into a different place, and you need to move your community to follow it. Or you might find that hunting and gathering in one place has depleted the resources available, and it is time to try and find better supplies somewhere else. Or maybe it's the environment that has changed, perhaps with a change in season (getting hotter or colder), and a move to another place might improve your level of comfort.

It's likely that one, two or even all of these reasons can be applied to many of the Indigenous communities across Australia that were **nomadic** or **semi-nomadic**. The early records of European settlers and explorers show that most Indigenous communities across Australia moved from place to place following resources or as the seasons changed. Alpine Indigenous communities and the Wurrundjeri around Melbourne are good examples of semi-nomadic groups.

nomadic

Communities that move across large distances and to many different locations

3 Fire-stick farming

First noticed as a practice in some modern hunter-gatherer communities in other parts of the world, the evidence is overwhelming that many (if not all) Indigenous communities in Australia practised some form of **fire-stick farming**.

To many modern communities, the idea of lighting fires as a way to manage their environments is scary. We tend to see fires as destructive and devastating, and of course Australia has been the victim of a number of very large fires in recent years. But we do actually use fire as a management tool. Fuel reduction burns are a common practice by many land management agencies.

Fire-stick farming refers to the consistent and repeated use of fire to clear vegetation in a particular place.

It appears that Indigenous communities used fire in conjunction with their nomadic and semi-nomadic movements. As a community would begin to move to another location, some of the people would use fire-sticks from their campfires to light vegetation. It seems that they would often light these fires as they moved from place to place, creating a patchwork (sometimes called a mosaic) of burned and unburned land.

Wouldn't the fires have destroyed everything, burning out the environment and potentially threatening the very communities that had lit them? This may have happened at times, but because fire seems to have been a common part of everyday life in Indigenous communities, there was significantly less undergrowth than we find today. It seems that the constant use of fire kept the environments looking more like parks than much of the dense bush that we are now familiar with. The first European settlers commented on the way the Australian environment seemed to be park-like, with large trees and shrubs, separated by spaces with only grasses, and easy access for people travelling through.

This type of constant burning produced what we call 'cool burns', since the small amount of undergrowth tended to limit fires so they quickly burned out.

semi-nomadic

Communities that move from one location to another and back again in regular cycles

fire-stick farming

The consistent and repeated use of fire to clear vegetation in a particular place



Joseph Lycett, *Aborigines Using Fire to Hunt Kangaroos* (c.1817)

This constant burning made it much easier to travel through the environment, which was very important for nomadic or semi-nomadic communities. There are some other reasons that fire-stick farming could have proven very useful:

- **To hunt ('the fire drive')** – Fire could be a useful hunting tool. Fire is dangerous. We recognise this and other animals do too. When faced with a fire, animals will tend to try and escape, and if the fire is constructed in a suitable pattern, then the escaping animals may be herded directly into the path of a group of hunters.
- **To promote growth of grasses to encourage grazing animals into an area** – After a fire has burned out, the ash that covers the soil acts as a rich source of nutrients for plant regrowth, and grasses are often the fastest to reappear in a burned environment. Kangaroos, wallabies and other grass grazers will be enticed back into an environment after such regrowth, and this could have helped in hunting.
- **To cultivate plants near campsites** – It's not only grasses that use fire to help in regeneration and regrowth. Many other useful bush food plants regrow after fire, making gathering easier.
- **To clear for ceremonial pathways** – Keeping an environment clear for nomadic movement is one thing, but Indigenous communities also kept sacred and significant sites in and around their environment, and the pathways to access these could have been kept clear using fire.

4 Sacred sites

All societies have sacred places. In our modern society, these sacred places might be a cathedral, church, mosque or synagogue (or perhaps the local Apple store!). Indigenous communities also had sacred places – what we call sacred sites.

These places had many purposes for Indigenous Australians. Some were for the burial of their elders, while others were for the initiation ceremonies for adolescent boys and girls, marking their transition into adulthood.

Another purpose for these places has been discovered in recent years when scientists and archaeologists found interesting connections between some Indigenous sacred sites and the breeding grounds of particular species. At least some of these sacred sites were being used as conservation zones or protected areas. Indigenous communities banned access to certain places that were breeding grounds for important food species. This makes sense, since if you hunt in the limited breeding grounds then soon you'll hunt the species to extinction. Alternatively, if you make the breeding grounds off limits in terms of any sort of activity, then you allow your food animals to grow and mature, and move out into the rest of the environment – after which you can hunt them. This is a smart and sustainable use of resources.

LEARNING ACTIVITY



A DAY IN THE LIFE

Write a day in the life of an Indigenous person in an environment you've visited or studied. Include practices and perceptions relevant to the communities that lived in and around this environment.

AGRICULTURE AND INDIGENOUS FARMERS

In recent years, a number of historical and archaeological findings have given rise to the ongoing development of a new perspective on the practices of many pre-European Indigenous communities, including those spread throughout Victoria.

The hunting and gathering, semi-nomadism, fire-stick farming practices, and the use of sacred sites, aren't being challenged by these new writings and research. But, our view of the complexity of Indigenous communities is.

Historian Bill Gammage, in his book *The Biggest Estate on Earth*, and Indigenous writer Bruce Pascoe, in his book *Dark Emu*, both describe and discuss the growing evidence that Indigenous communities practised a large-scale and long-term form of agriculture. Pascoe, citing much of his evidence from the eyewitness accounts of early European settlers and explorers, describes communities that were practising plant domestication, sowing, irrigation, harvesting and storing of food stuffs.

For Gammage, this is evidence of a sophisticated form of land management – developed and refined over the many thousands of years of Indigenous communities' engagement with Australian environments. Pascoe goes further to suggest that we need to reconsider the use of the term hunter-gatherer for Indigenous practices. His view is that by calling the pre-European Indigenous communities hunter-gatherers, we are minimising (and in some ways trivialising) their engagement as land managers of Australian environments.

For us (both as students of Outdoor and Environmental Studies, and as citizens of 21st century Australia), we need to continue to learn about the relationships of the early Australians and use their example as models for our own engagement with environments.

INDIGENOUS RELATIONSHIPS – IMPACTS

Hunter-gatherer societies are typically what we would call today 'low impact,' or 'minimal impact', as is evident in examining the practices of early societies in the previous section. Their practices developed to be sustainable and to allow them to be passed down from generation to generation. This by itself will probably result in a low impact on the land.

Certainly, beyond the occasional scarred tree, rock-art site, midden or other small-scale feature that still exists, we really see no obvious evidence of an incredibly long residence across this country.

Or do we?

Fire

We looked at fire-stick farming as a practice in the previous section. As mentioned, one of the key features that early European settlers noticed about the Australian environment was its park-like appearance, with trees and shrubs separated by large swathes of grass. Our bush today appears much more dense, and one of the key differences between then and now is that we don't allow a lot of burning to take place.

Could this process of burning (sometimes known as the fire regime) have changed the Australian environment, perhaps even permanently?

Certainly there are many species of plants that are adapted to fires, needing the heat of a fire for seed germination and the ash afterwards for nutrients. Did the Indigenous communities create this situation?

The most likely answer is no, since the evolution of these fire-dependent features probably occurred many millions of years before humans arrived here. The constant burning of the early Indigenous communities may well have accelerated or enhanced features that were common in Australia, however, and the use of fire could have had large-scale impacts on the land.

Dingos

Over the course of many thousands of years, the communities of northern Australia had ongoing trading relationships with other communities in the countries that are now known as Indonesia, Timor and Papua New Guinea. South-East Asian fishermen are known to have travelled to Australia to trade fish, turtles and other food and goods.

Between 5000 and 10 000 years ago, dingos were introduced into Australia as part of this international trade. The dingo is closely related to native dogs in Asia. As with dogs in other parts of the world, once the Australian Indigenous communities began to interact with dingos, they quickly formed close bonds. The dingo became a companion, a tool for assisting hunting, a protector and a pet.

But the dingo is not native to Australia and dingos quickly became a threat to many other native species. It seems that the thylacine (Tasmanian tiger) probably became extinct on the mainland close to the time when dingos were introduced – it's likely that the competition for food and habitat from these dogs may have contributed to their disappearance, and perhaps to that of other species too.

Decline in megafauna

Some years ago, as a result of evidence from archaeological sites across the world, a theory was developed to explain what happened to the megafauna in Australia and some other parts of the world where their numbers had dramatically declined or where they had disappeared altogether. This was known as the Blitzkrieg model, and essentially was built on the idea that early humans to a new environment may have hunted large animals to extinction or near extinction.

In Australia, the model had some well-known proponents, but also led to competing models and an argument that became, at times, very contentious.

The Blitzkrieg model (named from a method of blanket-bombing practised by German forces during World War II), suggested that the largest mammals in Australia may have had no natural fear of the new human arrivals to the continent, and didn't develop caution towards human hunters until it was too late.

A problem with the Blitzkrieg model is the dates. Some fossil evidence suggests that many megafaunal species coexisted with Indigenous communities for perhaps as long as 20 000 years, yet the Blitzkrieg model works on a much faster extinction.

An alternative model suggests that climate change caused a drop in the numbers of larger mammals, to the point where the viability of individual species was threatened and eventually they became extinct. Climate records on Australia since human habitation have helped to support this theory somewhat, although debate remains.

For many people, this debate matters since it influences the way in which early communities might be viewed. Should they be best seen as sustainable, careful land managers with a view to conservation, or should we see them as a people who made mistakes and caused, or helped to cause, the extinction of many species before they were able to develop a different way of living with the land? We may never know what actually happened to the megafauna. Similar scientific debates in other parts of the world suggest it may be a mixture of these two theories – or neither of them.

LEARNING ACTIVITY



INDIGENOUS IMPACT ON AN ENVIRONMENT

- 1 Walk through a local environment and try to imagine what it might have been like 10 years ago. What about 100 years ago? And 1000 years ago? How about 10 000 years ago? What signs are there of Indigenous practices in this area?
- 2 Using the same environment, or a more urban/built environment, try to imagine into the future 10 years, 100 years, 1000 years or even 10 000 years. What signs might there still be of the existence of modern Australian society?

INDIGENOUS TOOLS

You can find many examples of the ways Indigenous people use, and have used, the resources from their environments. The ways in which Indigenous communities utilise as much as possible from every resource is in stark contrast to the westernised world where people use little and throw away a lot.

A local example from Victorian Indigenous communities is the construction and use of stone axes, which were used particularly for stripping bark from trees to make containers and canoes.

Near Lancefield, north of Melbourne, is the Mount William quarry where local communities collected greenstone to make axe blades. Blades from this quarry were traded with other communities. Some have been found in South Australia and even Queensland.

Greenstone outcrops at the quarry were superheated with large fires set close to the rock faces. The heat from the fires created cracks in the rock into which branches were wedged. Greenstone pieces were then levered off the main rock faces. The blunt greenstone pieces were considered incredibly valuable, in the same way that gold and other precious metals are today (remember that these were communities who had no access to metals, and so none of the knives and other cutting instruments that we can easily access today existed).

The axe heads were sharpened (requiring immense skill) through long, slow grinding on wet rocks by rivers and creeks. There are many places around the state today where these grinding holes can be seen.

Black wattle branches were used to create handles. The wattle branch was bent back on itself to form a loop into which the axe head was placed. Sap collected from the fronds of grass trees was used to make a glue to help bind the axe head to the wattle handle. Kangaroo sinew was used to finally bind the handle tightly so that the wattle loop didn't spring free.

The axes were often specifically made for bark stripping in suitable eucalypt trees. The axe was used to create an outline of the canoe (or whatever was going to be cut) on the tree. Toe holds were cut into the tree to help the canoe builder get up high enough. The outline was gradually and carefully deepened, and then stone wedges were placed along the length of the outline. By carefully hitting the wedges, the bark outline could gradually be peeled off the tree in one complete piece.

If the bark was removed at the right time of year when the tree was rich in sap, then it would be fired directly – laid over a fire to help soften the bark. If not, it would have to be soaked in water before firing. The firing helped make it easier to bend and shape the canoe, particularly the ends that

Auscape/Jean-Paul Ferrero. All rights reserved



A canoe tree

could be bunched up and tied. Just the right amount of fire needed to be applied – too much and the bark would burn up.

Once made, the canoe could be used for travelling up or down a river, for transporting things and people across a river, or for fishing on lakes or in bays. Smaller versions of the canoes could be used as carrying containers for food or water.

At every stage of the process, lots of different things were being used, and incredible levels of skills and knowledge were required. Modern Australians, including descendants of Indigenous canoe builders themselves, have marvelled at the difficulty of constructing these axes and canoes using only the materials that were available.

SUMMARISING INDIGENOUS RELATIONSHIPS BEFORE EUROPEANS

Debates and discussions about fire regimes, introducing dingos and killing off megafauna tell us that Indigenous communities may have had some impacts on Australia. We shouldn't let these possible impacts hide the major lesson from Indigenous relationships, which is the low impact on the Australian environment.



National Museum of Australia

An Australian bark canoe

Summary of Indigenous relationships with outdoor environments

Perceptions	Practices and interactions	Impacts
<ul style="list-style-type: none"> • Spiritual connection with land • Land as mother • The creators of the land are their ancestors and they live in the features of the land • People are related to and part of the land 	<ul style="list-style-type: none"> • Hunting and gathering • Nomadism and semi-nomadism • Fire-stick farming • Sacred sites/conservation zones • Agricultural practices 	<ul style="list-style-type: none"> • Largely a low impact on the environment • Early overhunting may have helped in the extinction of some of the megafauna • Introduction of the dingo and possible impacts on some marsupials • Fire-stick farming and other agricultural practices may have changed forest environments

While the table is a useful starting point to thinking about Indigenous relationships with Australian environments, it shouldn't be the end. Any relationships, Indigenous or non-Indigenous, are much more complex than a few simple lists. At the very least, you should be able to take some of these points and think about them, analyse them, and consider what they mean both for the nature of the people who thought and acted in these ways as well as for people, including you and I, now.

LEARNING ACTIVITIES



TEN CANOES (PART 2)

Go back to the film *Ten Canoes* (which you examined in an earlier learning activity for the opening monologue). How closely do you think it might represent the sort of relationships that early Indigenous communities had with their environment? The film is a 21st-century recreation of how we imagine life might have been for early Indigenous communities. Can you think of any ways that the filmmakers might have gotten it wrong?

INDIGENOUS COMMUNITIES IN VICTORIA

Find out about the relationships that a local Victorian Indigenous community had with their environment. Find out about specific perceptions (including stories of the Dreaming), practices specific to this community, and some of the impacts on the environment local to this community.



Ten Canoes

After the arrival of Europeans

While much of the focus of this part of the course is to examine the relationships Indigenous communities had with outdoor environments before Europeans and others arrived, it's not as if these communities just disappeared. They had lives after colonisation and settlement by farmers and convicts, and they continue to have lives in the Australian environment today.

The conflicts that arose between local Indigenous communities and the European settlers varied dramatically from place to place, but several things seem to be common across our shared history.

- The nature of land ownership practised by Europeans meant that many Indigenous communities were encouraged initially to relocate, and later, in many instances, forcibly removed from and dispossessed of their traditional homes.
- Nomadic and semi-nomadic movement was discouraged by roads, fences and other permanent structures.
- Fire-stick farming was seen as dangerous to livestock and homes, and quickly began to disappear as a common practice.
- Sacred sites were sometimes inadvertently, and other times deliberately, desecrated and destroyed.
- Many Indigenous communities suffered from murderous rampages of extermination by some European landowners, newly formed police or government authorities, or even other Indigenous groups.

Many of these effects continued into the recent past as more remote communities were first discovered and then forced to assimilate to the new European-like society that was forming in Australia.

The language and debate about the nature of the history of colonisation in Australia has been fiery in recent decades. Much discussion has arisen about the way that **contemporary** generations of Australians should feel about the sometimes violent and brutal colonial past. This is an area that goes well beyond the scope of this book and course, but we would suggest that a balanced approach would include recognition of the faults and failures of past generations, as well as their strengths and successes.



Andrew Mannion

In many places across Australia, Indigenous Australian connections with the land are being recognised. Bilingual signs such as this have become common.

contemporary

Events or actions that have occurred within the last 15 years

CONTEMPORARY INDIGENOUS RELATIONSHIPS WITH THE AUSTRALIAN ENVIRONMENT

The second half of the 20th century saw improvement (although sometimes agonisingly slow) in the way Indigenous people and communities were treated in Australia. The assimilation policy that led to the practices of removing Indigenous children from their parents (known as the Stolen Generations), changed to the notion of integration that led to the successful 1967 referendum on the recognition of Indigenous people as Australian citizens, and the sometimes-successful fights for land rights.

More recently, the notion of **reconciliation** has characterised many efforts between Indigenous and non-Indigenous individuals and communities to forge improved relationships.

reconciliation

Restoration of friendly relations, especially between Indigenous and non-Indigenous individuals and communities in Australia

Health, education and social issues

Common problems associated with indigenous communities around the world are poor physical and mental health, low education and income levels, lower life-expectancy ages, alcohol and drug abuse, increased incarceration rates, domestic violence, and other related social issues. Many communities around the world suffer from these, but indigenous communities seem to be especially susceptible to them and Australian Indigenous communities are no different.

Reduced access to land and sacred sites, relocation of whole communities, and the loss of traditional practices are some of the factors that may lead to these problems. Conversely, the reinstatement of access to lands and the development of a new appreciation for Indigenous relationships of the past can help to revitalise and repair the relationships that Indigenous people have, not only with the land but with other Australians as well.

Native title

The High Court decision of 1992 that led to the development of native title in Australia was one of a number of recent events that have helped to repair relationships between Australian communities, and have helped to restore Indigenous access to many of their traditional lands.

The High Court decided that the colonial notion of *terra nullius* – the land belonged to no-one – was founded on an incorrect perception of Indigenous connection to their lands. They determined that it should be possible for Indigenous communities to access and use traditional lands alongside other contemporary users of these lands, such as graziers and miners. This helped many Indigenous communities to begin the process of reclaiming some of their traditional lands.

terra nullius

A Latin expression derived from Roman law meaning, 'land belonging to no-one'

Indigenous land management

In many parts of Australia, public lands such as national and state parks are managed cooperatively with state land authorities and local Indigenous communities. Although, as discussed previously, it's probably incorrect to think of historical Indigenous practices as land management in any sort of modern sense; modern Indigenous communities are taking advantage of the thousands of years of collective knowledge of living on and in this land.

LEARNING ACTIVITY



INDIGENOUS LAND MANAGEMENT

Find out about an Indigenous group that helps to manage a natural environment. How do their management practices differ from those of state government land authorities? How are their practices informed by historical Indigenous practices? Could we direct these sorts of land management practices into other places?

NOTES FOR THE EXAM

For the exam, you should:

- be able to name an Aboriginal group or community that lived in an area you visited or are familiar with
- know about Indigenous relationships relevant to places you've visited or are familiar with, both before and after European colonisation.

LEARNING ACTIVITY**SAMPLE EXAM QUESTIONS**

- 1 Identify a particular Indigenous community you have studied during this year. Analyse the relationships with the environment that this community showed before the arrival of European settlers. (3 marks)
- 2 Some Indigenous people use the metaphor 'the land as mother' to characterise their relationship with outdoor environments. For a particular Indigenous community that you have studied this year, analyse what this metaphor means. Give specific examples of interactions and/or impacts that might support your analysis. (3 marks)
- 3 For a particular environment you have visited or studied this year, analyse the relationships a particular Indigenous community have had both before and after the arrival of European settlers. (6 marks)

NON-INDIGENOUS RELATIONSHIPS WITH THE ENVIRONMENT

First non-Indigenous settlers

The first non-Indigenous settlers to Australia were the Europeans – specifically the British and Irish farmers, explorers, administrators and convicts. Australia's history shows several different instances of 'discovery' of the continent by the Portuguese, Chinese and Dutch, among others, but the First Fleet marked the beginning of a new phase of permanent settlement.

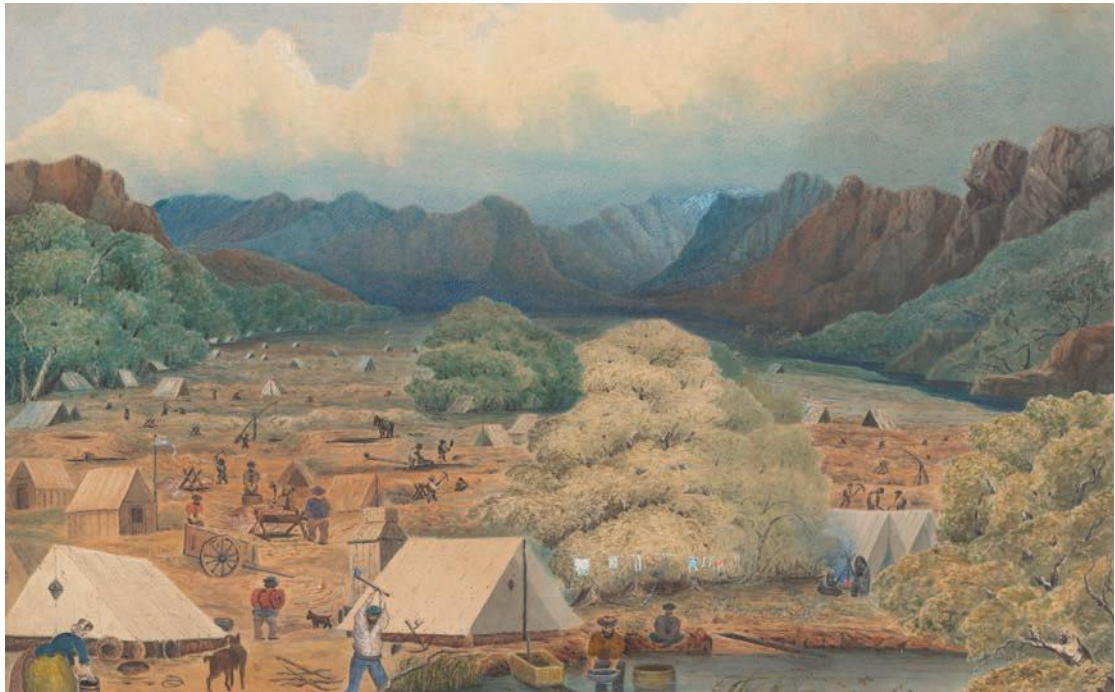
SETTLERS' PERCEPTIONS

Fear

The first perception we'll look at is the fear that many of the new arrivals had of Australia. The British and Irish settlers originated from a place where January was cold and dark and snowy – Australia was hot and bright and dry. The settlers were used to bright green plants and small furry animals as the backdrop to their land – Australian plants were dull greenish grey, and while there were some furry animals, there were also snakes and spiders. The settlers came from a place that was 'civilised', where people wore clothes and lived in houses and farmed in 'appropriate' ways – the Australian 'natives' didn't match any of these images.

In many countries today, when groups of new immigrants from a particular country or society arrive, they tend to stay close together in small 'island' communities. This is a result of that same fear of the unknown that we can see in the first European settlers arriving in Australia.

While many of the first settlers had no choice in their journey to Australia (that is, the convicts), there were many others who chose to come here as a chance to start a new life for themselves. And, so, another common perception among the first settlers was the wonder and opportunity that this new place represented.



Edward Roper, *Gold Mining, Australia* (c.1860)

National Library of Australia, an6617901-v

Opportunity

How do you come to a new place where people already live and take over their land to use for yourself? As we've already seen, many Indigenous communities were often on the move and so there were times when early settlers might have assumed that no-one lived in a particular place. But Indigenous people could be found across the country, so this assumption would have been problematic. The early settlers were unable to find in the many Indigenous communities anything resembling the governmental authority that they were familiar with in Europe. Of course, the harsh nature of the Australian environment combined with the hunter-gatherer lifestyle of Indigenous communities didn't support the formation of anything like a central government. But the lack of such an organisation, coupled with the apparent lack of any sort of organised use of the land (such as European-style farming) meant that it was easy to simply see the land as without owners. As mentioned earlier, this came to be known as *terra nullius* – land belonging to no-one.

To be saved

Related to the previous perception of opportunity was the view among many of the European people at this time that humans were given divine dominion over the environment – a sense that it was right to develop and 'improve' lands that were 'wild' and 'untamed'. This stems from the biblical creation story in Genesis, the first chapter of the Bible. So, not only did the European settlers see the land as belonging to no-one, but since it seemed to be largely wild and untamed, many of them saw it as their divine purpose to improve it, farm it, build on it and tame it.

SETTLERS' PRACTICES

The perception of fear led directly to a consequence that we still live with today – a society that is heavily concentrated around the coast. The coast was close to the ships that had brought the settlers and represented the last connection with their homes. There were a number of expeditions inland, and as confidence with the Australian environment grew, many farmers and others trickled inwards. But the comfort that settlers found near the coast meant that it was here that the first towns, and later the large cities, formed.

The fear of the Australian unknown, and the familiarity with things and practices from another part of the world, meant that the early settlers brought many things with them – cows, sheep, cats, dogs, pigs, rabbits, wheat, potatoes, corn and ornamental plants among many others. The animals were for farming, companionship and working. The plants were to eat or to quell the homesickness that many felt.

The perception of opportunity, of starting a new and perhaps more successful life, led some to push inland. Explorers were followed by graziers, farmers and prospectors all looking for something that would make the incredibly long and harsh voyage south worthwhile.

The combination of the development of towns, the introduction of new species and the opening up of the land led to the sort of practices that we would be familiar with today:

- land clearing – for houses, towns and farms
- infrastructure development – such as roads and other transport features, and public buildings and services.



State Library of Victoria/J. P. Campbell collection

Taken in the 1920s, this photograph shows a settler’s house in what is now Yallourn. The early settlers used similar constructions for their first homes.

SETTLERS’ IMPACTS

The impacts on Australia of the early settlers’ practices were probably small, since the numbers of settlers was relatively small. However, these small impacts increased as the population grew, both through births of new Australians and ongoing waves of immigration. The following factors have had major impacts on the Australian environment as the numbers of people increased:

- **Cessation of lit fires** – Fear of the casual way Indigenous communities lit fires led to a cessation of this practice and a subsequent increase in the levels of undergrowth. The large fires that periodically rage through many parts of Australia, particularly the south-eastern corner, probably stem from this.
- **Forest clearing** – Clearing of forests began as a natural need for timber and land in what must have seemed an endless abundance of trees and, therefore, the presumption that it would not possibly have any impact. But this clearing continues today and has severely reduced the native vegetation cover found across Australia.
- **Introduction of species** – Introduced species have created ongoing problems for land managers across the country: the hard hooves of sheep, cattle and horses; the incredible expansion of rabbit and fox numbers; the predation of cats and dogs; and the unchecked growth of many exotic plants.

Summary of first non-Indigenous settlers’ relationships with outdoor environments

Perceptions	Practices	Impacts
<ul style="list-style-type: none"> • Fear of this harsh, new, distant and different place – seasons, weather, local inhabitants, light • Opportunity – to start fresh, make a fortune, build a family, get away from struggle in other places • No-one owned the land – <i>terra nullius</i> • Humans as improvers and tamers of the land 	<ul style="list-style-type: none"> • Colonisation usually meant bringing most things with you – settlers struggled to live off the land as the Indigenous communities did • Development of towns and first cities – mostly near the coast • Exploration of land for farms and for treasure and adventure • Introduction of many species – animals for farming, hunting, companionship; plants for farming and homesickness 	<ul style="list-style-type: none"> • Initially small, due to numbers, but began an approach to treating the land that would create larger effects as the population grew • Reduced use of fires meant heavy undergrowth • Clearing of forests for farming and construction • Impacts of introduced species

Increasing population

At different times through the settler history of Australia, different parts of the country saw rapid increases in population, often as a result of a resource boom. In Victoria, the largest increase in population occurred in the 1850s as a result of the discovery of gold in a number of different places around the state.

Melbourne and several regional centres, including Ballarat, Bendigo and Geelong, saw enormous increases in population in a very short time period. Fortune-hunters were followed by merchants and others looking to make money from the gold seekers.

Population estimates show there was a steady increase of population in Australia from 1800 (although this ignores the Indigenous population at that time) through to 2010. If you look carefully at the figures for 1850 and 1860, you'll notice an almost threefold increase – the settler population of Australia in 1860 is almost three times bigger than the population was 10 years earlier. In modern terms, that would be like the population of Australia in 2020 increasing to around 60 million people. This massive relative increase is not seen in any of the later figures, which is why we focus particularly on what was happening around this time in Australia.

Population of Australia (estimate from 1800 to 2010)

Year	Population estimate
1800	5200
1810	11 600
1820	33 600
1830	70 000
1840	170 400
1850	405 400
1860	1 145 600
1870	1 647 700
1880	2 231 500
1890	3 151 300
1900	3 765 300
1910	4 525 100
1920	5 411 000
1930	6 501 000
1940	7 078 000
1950	8 307 000
1960	10 392 000
1970	12 663 000
1980	14 726 000
1990	17 169 000
2000	19 169 100
2010	20 971 000

Note: In 1967, a referendum agreed to count Indigenous Australians in the national census for the first time. Prior to this, states had only intermittently measured or included statistics relating to Indigenous communities in their census taking. The figures that are included in the table are only estimates – the figures before 1960 should be read as a count of non-Indigenous Australians only.

PERCEPTIONS DURING INCREASING POPULATION

Many of the same sorts of perceptions towards the Australian environment continued during the stage of dramatically increasing population. Fear of the bush remained common, particularly among the new arrivals, most of whom were either from Europe, North America or China.

The environment, however, was becoming increasingly seen as a resource – one that could make your fortune. This perception of the Australian environment remains today and continues to drive the search for new veins of mineral deposits. During the initial stage of increasing population, seeing the environment as a resource encouraged many of the expeditions that set out to explore the Australian environment.

PRACTICES DURING INCREASING POPULATION

The sort of practices that occurred during this stage of Australia's non-Indigenous settlement were like those from any other stage. People farmed, people cleared land, people built things, and so on. Life continued as it had during the early settler stage, and as it would after the population had stabilised somewhat.

Of course, there were practices specific to the new pursuits – gold mining, in particular, required a number of activity-specific practices.

But it is the scale of practices that occurred during this time that we are particularly interested in, rather than the practices themselves. During this stage, with a dramatically increasing population, the small frontier towns went through a boom. Shops, libraries, schools, theatres, police stations, and many of the other buildings that the miners and their families needed, had to be built. Communities expanded dramatically as a result, and the requirement for food pressured farmers to expand their clearing for crops and grazing animals. The construction of mines and mine equipment led to dramatic deforestation of the lands around these towns.

State Library of NSW/Edward Roper. a9298798



Edward Roper, *Gold Diggings, Ararat* (c.1858)

State Library of NSW; a2824746



Small gold minehead and six miners, without shelter Gulgong (c.1875)

IMPACTS DURING INCREASING POPULATION

With increasing people came the associated impacts. Land clearing scaled up and produced dramatic and (in some cases) devastating erosion and runoff effects. The introduction of new species continued with impacts that reverberate still today. The impacts that had begun to appear during the early settler stage increased significantly now, as the numbers of people influencing these impacts increased.

Summary of non-Indigenous relationships with outdoor environments during increasing population

Perceptions	Practices and interactions	Impacts
<ul style="list-style-type: none"> • Many saw the land as an opportunity to make a fortune • Fear of 'bush' remained among many – particularly in the cities and towns • Connection to the land was growing with the rise of nationalism – this helped with early formation of preservation societies 	<ul style="list-style-type: none"> • Similar to early settler practices but at a larger scale – mining, forestry, farming, grazing • Expansion of cities and development of regional towns and centres • Development of transport infrastructure – roads and railways • First national parks created • Acclimatisation societies and ongoing introduction of exotic species • Corporatisation of primary industries – farming, mining, forestry 	<ul style="list-style-type: none"> • Land clearing and deforestation impacts – rising salinity levels, erosion and runoff • Increasing urbanisation and industrialisation – pollution, unrestrained use of resources

Industrialisation

In the years after the dramatic population increases began, Australia underwent constant development – existing cities grew and new ones were founded, agricultural enterprises expanded, land clearing and development accelerated, and new industries began.

As with other events, the timing of this phase of Australia's non-Indigenous settlement and development varies across the continent. In Victoria, we will specifically focus mostly on the last decade or two of the 19th century.

PERCEPTIONS DURING INDUSTRIALISATION

While new settlers to Australia continued to view the bush environment as a dangerous and fearful place (and some new immigrants even today have similar perceptions of the Australian bush), these perceptions were being replaced by others as a number of generations were becoming familiar and comfortable with this place:

The two key views of the environment during this stage were probably environment as a resource and environment in danger:

- 1 **Environment as a resource** – Despite the rapidly increasing population in Victoria and across the country, there were still huge areas of land that were uninhabited. State governments saw these places as important in the economic development of the state and land (for urban development and agriculture). Minerals, forests and waterways were all seen as resources that could be extracted and used to profit all of the population.
- 2 **Environment in danger** – While there had been some concern about environmental degradation in the early years following the European settlers, the size of the land that the new colonies had to move into meant that any damaging impacts could essentially be hidden from the sight of small towns and farms. But with increasing population had come increasing pressures on environments and a new perception arose (particularly coming from a similar trend in the United States) of the need for preservation and protection of environments.

PRACTICES DURING INDUSTRIALISATION

People in the 1880s and 1890s did the same things as they had done before: exploration, opening up of new lands, land clearing and development. But during this time, there were three key events or changes that had an ongoing impact on environments – one largely seen as negative now, the second perhaps in a mixed way and the third as a positive for the Australian environment.

1 Machinery

Industrialisation normally refers to the expansion and development of a state's or country's manufacturing system – rather than simply extracting and selling raw materials, instead other things are made out of raw materials that are then sold. Victoria and Australia were in the midst of a manufacturing boom at this time, but we'll extend the notion of industrialisation for this first key change to consider the machinery and subsequent processes that were being introduced and used. Mining for gold and other precious minerals, harvesting timber, and agriculture were all being boosted and expanded by the introduction of machinery. The necessary jobs could be done faster, longer and more efficiently than human labour, but of course there were more expansive impacts as well.

It was some of the new processes introduced during this time that had perhaps even more long-term impacts on the Australian environment. In Victoria, the first irrigation projects were started at this time. In 1886, the Canadian Chaffey brothers were invited by the Victorian Government to begin an irrigation project at Mildura. This would be the start of many to come, and changed the nature of agricultural practices across the state and throughout Australia.

industrialisation

The development of industry on an extensive scale

State Library of Victoria/H. B. Hammond
(Harry Beaumont) 1866–1951



Reaper and thresher by oil engine power at Mr Les Bowman's, Maffra, 1914



The development of much of north-western Victoria in the era of industrialisation was based on irrigation schemes, as seen here near Mildura.

State Library of Victoria/V.A.N. Hood collection

2 Working conditions

The second change that occurred at around this time was the improvement in the conditions of workers. The rise of labour movements and of trade unions throughout the 19th century (particularly in its last two decades) brought about significant improvements in both the working conditions and pay of the many people that were finding employment in the era of industrialisation. The successful campaign for the eight-hour working day (which we celebrate in Victoria on Labour Day in March) led to higher standards of living, and workers with both more time on their hands and more disposable income to spend in that time. For many workers, this was a chance to spend time with their families exploring the parks and bushlands on the fringes of the cities and towns, and this led to the foundation of many naturalist and recreational organisations. Bushwalking, skiing and cycling all became popular pastimes during this period.

3 National parks

The third and most positive change that occurred around this time was the foundation of the first national parks. Yellowstone in the United States was founded in 1872 as the world’s first national park, and was followed by the Royal National Park in Sydney in 1879 (see chapter 4). In Victoria, the first national park was declared at Tower Hill in the state’s west in 1892, followed by Mount Buffalo and Wilsons Promontory in 1898. These began a process of protection, preservation and management that has seen more and more of the world’s natural environments set aside in conservation areas.

IMPACTS DURING INDUSTRIALISATION

The impacts of the increasing uses of machinery during this time simply extended those already occurring with the increasing population – ongoing erosion and loss of topsoil chief among them. From the use of irrigation and other agricultural practices, new impacts could be seen with the beginnings of the dryland **soil salinity** problem and the decrease in the health of inland waterways across the country.

The rise in recreation saw both positive and negative impacts on the environment. More people had a chance to visit outdoor environments and could begin to see why it was so important to protect these places. But more people could visit them – and with more people came greater burdens on these very same places.

Summary of non-Indigenous relationships with outdoor environments during industrialisation

Perceptions	Practices and interactions	Impacts
<ul style="list-style-type: none"> Environment seen as a resource by some to use for profit Environment seen as a place to protect by some 	<ul style="list-style-type: none"> Irrigation used to foster more introduced crops including cotton and rice Conservation through national parks began Recreation developed – including bushwalking and skiing Forestry, mining, grazing and agriculture continued to grow 	<ul style="list-style-type: none"> Erosion and other negative effects of land use grew Dryland soil salinity began Environmental health of rivers decreased with excessive use of water and change in flows from irrigation Positive effect of first national parks

soil salinity

The salt content in the soil; the process of increasing the salt content is known as salination

nation building

The process of constructing a national identity including the development of national myths as well as major infrastructure development

Nation building

Federation of the individual states in 1901 saw the foundation of the Commonwealth of Australia and, with it, pressure to build a self-sustained and independent nation. For at least the next 50 years, this process of **nation building** continued as a major force in the development and events of Australia.

PERCEPTIONS DURING NATION BUILDING

Perceptions of the Australian environment as a fearful place had disappeared during this time, at least as anything other than a nostalgic look back to the early settlers and their views. The perception of the environment as a place to protect continued from the beginnings of industrialisation, but during the first half of the 20th century they tended to be drowned out by the clamour for a strong and prosperous nation. This came from, and resulted in, perceptions of the Australian environment as a place on which to shape the national identity.

From our perspective, many decades later, this is sometimes seen as a creative process – making something new (the Australian nation) from separate pieces (the states). Nation building is sometimes described in metaphorical terms, with the landscape as a blank canvas on which to paint the new Australian nation, and to foster patriotism and national pride.

PRACTICES DURING NATION BUILDING

Farming and other agricultural practices, mining and logging, as well as the ongoing expansion of cities and towns, all continued throughout this period of nation building – growing as the population continued to grow.

There were a couple of new developments that were important both for the expansion of Australia as a nation and for the impacts that they were to have on the environment and the way people saw the environment.

Transportation network

Following on directly from the beginning of industrialisation came the creation of a national transportation network. The individual states had already developed extensive railway systems, but these were all slightly different – particularly in the gauge or distance between tracks. One of the first jobs of the federal government was to begin the process of trying to standardise this system to allow easier interstate transportation of people and goods.

The nation-building period also saw the continuing development and upgrading of the road network throughout the country. The post-World War II period of prosperity saw a massive increase in the private ownership of cars, leading to a massive development of highways and other road systems from the 1950s.

In Victoria, however, one of the major developments in the transportation network came after the Great War (World War I). With the return of many Australian soldiers came the need to find them suitable employment. In Victoria, many of these soldiers formed the work crews that helped to build the Great Ocean Road. Constructed between 1919 and 1932, the road, which links Torquay and Warrnambool and travels along some of the most spectacular coastal cliffs and scenery anywhere in the world, was conceived as both a project for returned soldiers and as a memorial to their fallen comrades. It now stands as the largest war memorial anywhere in the world.

Electrical power

Apart from transportation, the other key requirement in the development of 20th-century Australia as a nation was electrical power. The expanding industries and growing cities had a huge appetite for electricity, and, just as they had after the Great War, the returning soldiers from World War II were seen as a rich resource to tap.

Combined with the immigration of refugees from war-ravaged Europe, particularly Italy and Greece, federal and state governments saw a way to continue the nation's postwar development by constructing massive dams and hydro-electric power stations. In the 1940s and 1950s, the Snowy Mountains **hydro-electricity** scheme (in New South Wales and Victoria), and the smaller Rocky Valley and Pretty Valley schemes (in Victoria) started a period of dam construction that had major impacts both on Australian environments and on the people of Australia for many years to come.

hydro-electricity
Using water power
to produce electricity

Introduced species

Finally, this period also saw some major introductions of non-native species. In particular, the cane toad, a native of South America, was introduced into Australia in 1935 in an effort to control the beetles that were impacting lucrative sugar cane crops. Over 100 young toads were released; they now number more than 200 million. (Unfortunately, the toads failed to have any impact on the cane beetles.)

IMPACTS DURING NATION BUILDING

Salinity and land degradation

The environmental impacts of the ongoing development practices continued to increase during this period, particularly dryland soil salinity. By the 1920s, salinity was beginning to be recognised as a

major environmental problem. Coming up with a solution to it was another thing altogether, however, and the pressure to develop and build in nature meant that protecting the environment was only a secondary concern. This is still a debate that we fight today.

To recognise their efforts during the war, many returned soldiers were given access to cheap land – so that they might develop farms and Australia might reap the agricultural rewards. Often these farms were on marginal land, and coupled with continuing practices of irrigation and large-scale clearing, led to widespread land degradation – top soil erosion, declining water quality and dust bowls.

Road and rail

The expansion and nationalisation of road and railway networks had both negative and positive impacts. Negative impacts were the development of land for the infrastructure itself, and the larger scale of impacts from the increasing industrial, commercial and urban practices. The positive impacts we covered earlier – increasing access of people to the natural environment. It was becoming easier and easier to see the beautiful outdoor environments, and this helped with the ongoing development of environmental and conservation perspectives.

Water

The construction of dams in the great hydro schemes of the 1940s and 1950s had a number of impacts, both positive and negative:

- The reduction and change in flow of many alpine rivers had devastating effects on sensitive ecosystems. Some of these are only now being repaired, while others continue to remain threatened.



Rocky Valley construction camp and dam site in 1947

- Many of the new immigrants who worked on the hydro schemes were European refugees who brought with them cultural practices that filtered into the Australian way of life. Pizza, pasta and souvlaki have become Australian dishes, and downhill skiing has become a popular recreation pursuit.
- The construction of the dams sparked a series of similar developments across the country, which eventually led to major environmental conflicts and important changes in the nature of many Australians’ relationships to the outdoor environment. (We’ll examine this more in the next section.)
- The construction of the many hydro dams was also the first and still the largest renewable energy scheme in Australia.

Introduced species

The impact of introduced species continued to worsen throughout this period. Rabbit plagues led to serious erosion problems and reduced native plant cover. The introduction of the cane toad reduced food sources for native insect eaters, and also poisoned native animals, as well as pets and humans. The crown-of-thorns starfish had a devastating impact on corals across Australian reefs.

Positive impacts

While it’s easy for us to focus on the negative and environmentally damaging impacts, we should remember that every time period has negative and positive impacts. Perhaps most positive during the nation-building period was the increasing level of concern for environments and the growing awareness of the need for environmental protection.

Native fauna advisory committees were established in many states after dramatic programs of culling koalas, Tasmanian tigers and Tasmanian devils, leading to early legislation to protect some native animal species. Field naturalists, recreationalists and others began to lobby for further environmental protections, including more national parks. Many of these groups, and the people who worked within them, would help to ignite the larger-scale environmental movements that were to come.

Summary of relationships with outdoor environments during nation building

Perceptions	Practices and interactions	Impacts
<ul style="list-style-type: none"> • Environment seen as the canvas on which to paint a nation • Belief that humans can control nature 	<ul style="list-style-type: none"> • Nation building takes place after Federation – large-scale developments • Conservation through national parks continued • Postwar projects and infrastructure projects included building of Great Ocean Road (WWI) and Snowy Mountains Scheme (WWII) • Major dams built • Cities continued to grow with most of the population residing in major centres 	<ul style="list-style-type: none"> • Excessive farming created dust bowls in some parts of southern Australia • Dryland soil salinity became a major problem • Water, soil and air pollution continued to grow, especially around cities • Conservation movement grew and protected areas increased • Introduced species began to threaten biodiversity and agriculture

Non-Indigenous relationships: Alternative perspectives

MICHAEL CATHCART’S PERSPECTIVE

An interesting perspective on Australia’s non-Indigenous history and development was written in 2009 by Australian historian and radio presenter Michael Cathcart, called *The Water Dreamers*. It examines the Australian obsession with water – finding it, tracing water sources in exploration, and the ways this has shaped the Australian identity.

One of the themes of Cathcart’s work is the ‘tyranny of silence’ that European settlers felt in the Australian landscape. This ‘silence’ didn’t literally exist (the Australian bush is full of sounds), but

it related to the isolation and the completely strange world that the settlers found themselves in. Cathcart describes three responses to this ‘silence’:

- 1 **Fear and congregation around coastal settlements** – The silence compelled the settlers to remain on the coast, fearful of the inner heart of the land. Close to the coast meant close to the transportation that could get them back to their familiar and comfortable lands of Europe.
- 2 **Embracing a kind of necro-nationalism** – That is, celebrating the silence by making legends and myths of death in the bush. Australians like to celebrate failure in many ways. Examples include the memorialisation of the failed ANZAC assault on the Gallipoli Peninsula, the failed Burke and Wills expedition, the disappearance of Ludwig Leichhardt, and the fictional story of Picnic at Hanging Rock.
- 3 **The push to change and progress** – Improvement, modification and progression have all been part of the words and concepts that have led to some of the massive damming and irrigation projects, along with many of the outlandish engineering projects to pipe water across the Australian deserts.

ANOTHER PERSPECTIVE: *ONE NIGHT THE MOON*

Another perspective on Australia’s non-Indigenous history comes from the Australian film *One Night the Moon*. This 2001 film is the fictionalised account of the search for a lost child in rural South Australia in the early part of the 20th century. A racist farmer, played by singer-songwriter Paul Kelly, refuses to allow a black tracker, played by Kelton Pell, to help in the search – with tragic consequences. The story is mostly told through songs, written and sung by Paul Kelly. The silence described by Michael Cathcart is apparent throughout the film, but a duet between the farmer and the black tracker gives a nice perspective on relationships with environments in Australia.



*This land is mine/
This land is me*

LEARNING ACTIVITY



THIS LAND IS MINE/THIS LAND IS ME

The song *This land is mine/This land is me* by Kev Carmody and Paul Kelly is well worth listening to, as the lyrics offer a good comparison between the two groups – Indigenous and non-Indigenous – based on land ownership.

Summary of non-Indigenous relationships

The problem with comprehension is, it often comes too late.

Rasmenia Massoud

As we wrap up this section, let’s get rid of a common oversimplification about non-Indigenous relationships – that the Indigenous relationships were good for the environment and the non-Indigenous relationships were bad. While the effects of these relationships may cause us to side with Indigenous communities in terms of their relatively low impact on the Australian environment, we need to recognise several important points:

- The Indigenous communities were relatively small and lived mostly through a time in human history when the overall human population on Earth was small. The European and subsequent settlers to Australia, on the other hand, arrived here at a time when the world population was in an incredible rise upwards. More people almost always means having a negative impact on environments compared to fewer people.
- The Indigenous communities that the early settlers came across were the product of over 40 000 years of learning to live in this place – probably the longest uninterrupted habitation by a group

of humans anywhere on the planet. We shouldn't be surprised that they had developed skills and practices through this lengthy experience that would allow them to survive sustainably. The early settlers might also have been able to develop similar practices given enough time, but they didn't have that time – more of them were coming, then more and more.

- The non-Indigenous settlers had agricultural, social and cultural practices that had held them in good stead, allowed the development of a rich and capable society, and had worked well for them in the places these practices developed – Europe. It was only natural for them to take these practices and continue to use them when they arrived in Australia. From our vantage point over 200 years later, we recognise the error. Hindsight is always a wonderful thing.

Finally, and perhaps most importantly, is to keep in mind the driving force behind the early settlers – to live, to survive, to thrive. No-one goes into an environment with the purpose of destroying or damaging it. Damage and destruction are simply by-products of the things that some people do, and have done, in outdoor environments. This isn't to explain it away and forget about. But we should understand and use our understanding to help us not repeat the mistakes that (inadvertently or otherwise) our ancestors made.

NOTES FOR THE EXAM

For the exam, you should:

- know about a variety of non-Indigenous relationships relevant to places you've visited or are familiar with;
- be able to identify connections with
 - the first non-Indigenous settlers
 - increasing population
 - industrialisation
 - nation building.

LEARNING ACTIVITY

SAMPLE EXAM QUESTIONS

- 1 Compare and contrast the relationships that Indigenous communities and non-Indigenous settlers had with a specific Australian environment, by analysing in detail the perceptions, interactions and impacts of both of these groups on this specific place. (6 marks)
- 2 Choose any two of the key groups or events: the first non-Indigenous settlers, increasing population, industrialisation, nation building. Analyse the relationships that people from these groups, or during these events, had with a specific environment. (6 marks)
- 3 In the film *One Night The Moon*, Paul Kelly and Kelton Pell, respectively playing an early settler and an Indigenous tracker, sing alternately – *This land is mine, this land is me*. Compare Indigenous relationships with a specific Australian environment, with those of one specific key non-Indigenous group or event (first non-Indigenous settlers, increasing population, industrialisation, nation building). In your analysis, refer to the song lyrics to help characterise these relationships. (6 marks)
- 4 Analyse the relationships that non-Indigenous Australians have had with a particular environment. Include in your analysis a detailed consideration of the changing nature of these relationships by referencing the following key groups or events:
 - The first non-Indigenous settlers
 - Increasing population
 - Industrialisation
 - Nation building (12 marks)

ENVIRONMENTAL MOVEMENTS IN AUSTRALIA

In this section, we'll examine modern environmental movements – that is, events and organisations that have arisen in the last 30 or 40 years.

A brief environmental history of Australia

We generally don't recognise a lot of concern for the Australian environment in the practices of the first European settlers. However, this is slightly misleading.

It seems to be at least partly true today that environmental concern is more prevalent among people from nations with higher standards of living. This isn't to say that people from developing countries don't care for their environments. Many of the key figures in environmental history have come from poor backgrounds, but if you don't have to worry too much about accessing food, clean water, shelter, healthcare and many of the other things that we take for granted, then it's a whole lot easier to be concerned for more than just you and your family.

This is no less true of the early settlers who, faced with a struggle to survive in a harsh and threatening and inexplicable land, focused more on their own survival than the protection of the surrounding environment. Little concern for environmental protection wasn't just a feature of the Australian colonies at this time – it wasn't generally a feature of any of the European societies or their many colonies dotted across the globe.

Yet, in the early history of non-Indigenous settlers in Australia, there are moments and developments that indicate environmental concern. Captain Phillip, the first Governor of the colony at Sydney, put in place punishments for anyone caught polluting the new colony's main water source, the Tank Stream. But, for the most part, these developments were infrequent – there was just too much space, and too few people, to really pressure the non-Indigenous settlers into making much effort to protect their environment.

In the middle of the 1800s, especially after the voyages and publications of Charles Darwin and other biologists, interest in the natural environment increased. In Australia, societies were formed to celebrate an interest in and promote an understanding of the local flora and fauna. The Field Naturalists Club of Victoria began in 1880, and the club still exists today as the oldest environmental group in the state.

Acclimatisation societies followed and, towards the end of the century, the growing recognition of the wonder and beauty in natural environments led to the first national parks.

With the rise in standards of living and the increase in participation in recreational activities in the early part of the 20th century, more and more people began to experience the outdoor environments of Australia. The Field Naturalists Club of Victoria around this time advocated for the protection of endangered native species, particularly the thylacine or Tasmanian tiger, and later helped to found the Healesville Sanctuary in 1920. In Queensland, there was outcry over the culling of millions of koalas, with the species recognised as being vulnerable. The Lone Pine Koala Sanctuary was formed in 1927.

Although it took farmers and governments a while to realise the extent of the problem, dryland soil salinity was first identified as one of the results of extensive clearing for agriculture in 1924. But the developmental pressures from nation building resulted in this being ignored, as well as many other problems, through to the 1960s.

Courtesy of Sydney Water



What remains of the Tank Stream – the water source used by the First Fleet after their arrival now flows through tunnels beneath the streets of Sydney.

CSIRO/Willem van Aken



As land degradation from clearing, topsoil loss, erosion and salinity increased, the push to save, protect and preserve the land also increased.

Landcare

In the early 1960s, the first Landcare movements began (formed by farmers), the anti-litter Keep Australia Beautiful campaign was founded in 1968, and other similar movements and campaigns were beginning across the nation and around the world.

It was a confluence of a number of issues (both here in Australia and in other parts of the world, particularly the United States) that turned the 1960s into the beginnings of the modern environmental movement.

- A number of books were published critiquing the use of manufactured chemicals and over-population issues, including Rachel Carson's *Silent Spring* in 1962 and Paul Ehrlich's *The Population Bomb* in 1968.
- The post-World War II baby boom and economic progressions saw a huge rise in the number of affluent teenagers and young people.
- The cold war stand-off between the United States and its allies (including Australia) and the Soviet Union and its allies flared up in a number of regional conflicts, particularly Vietnam.
- Tensions began to develop between the youth and the generation of their parents over the war in Vietnam, race relations, women's rights and human sexuality.
- Experimentation with psychoactive drugs increased and new trends in music, art and culture were prominent.

All of these led to tensions over the uses and abuses of natural environments. In Australia, these tensions boiled over through the late 1960s and into the early 1980s in a number of important environmental protests and campaigns that would change dramatically the way Australians viewed natural places.

- Victoria – the struggle over the use of Crown land at the Little Desert (finishing in 1969)
- Tasmania – the battles over dams at Lake Pedder (lost in 1972) and the Franklin River (won in 1983)
- New South Wales – the disputes over logging at Terania Creek (in 1979) and the South East Forests (in 1989)
- Queensland – the battle to stop sand mining on Fraser Island (stopped in 1974) and the ongoing effort to protect the Daintree Rainforest (throughout the 1980s)
- South Australia – the attempt to prevent uranium mining at Roxby Downs (in 1983)
- Northern Territory – the efforts to prevent uranium mining at the Ranger mine next to Kakadu National Park (opened in 1981)
- Western Australia – campaigns to stop or reduce logging in old growth Jarrah forests of the South-West (through the 1970s and 1980s).

Lake Pedder

If we can revise some of our attitudes to the land under our feet; if we can accept a role of a steward, and depart from the role of the conqueror; if we can accept the view that man and nature are inseparable parts of the unified whole – then Tasmania that is truly beautiful can be a shining beacon in the dull, uniform and largely artificial world.

Olegas Truchanas

Lake Pedder was a small glacial lake ringed by mountains in the south-west wilderness of Tasmania.

A prominent feature of the lake and what drew many bushwalkers, photographers and artists to the place was the pale pink quartz sand beach that each summer emerged from the waters to one end of the lake as the water level dropped.



Courtesy of Keep Australia Beautiful National Association



David Nielson, Snowgum Press

Lake Pedder from the Frankland Range, Southwest Tasmania by Dave Nielson, in 1972. Flooding had started in the Serpentine River but had not yet reached the lake.



National Library of Australia with permission Melva Truchanas vn-3885846-s13

Bushwalkers and their blue tent at Lake Pedder, Tasmania in 1968 (photo by Olegas Truchanas)

It was to become a key battleground in what would eventually lead to new ways of thinking about and interacting with the Australian environment.

- The lake was the centre piece of the Lake Pedder National Park, which the Tasmanian Government declared in 1955.
- Tasmania, decades before the electrical connection to Victoria across Bass Strait (Basslink), was keen to develop (like the rest of the nation). Access to electrical power was a key part of this. Tasmania was rich in mountains and water, and so damming and hydro-electric schemes were a natural progression.
- The state-run Hydro-Electric Commission (HEC) planned, built and managed the dams and the hydro power stations – similar to concurrent developments in Victoria (Rocky and Pretty valleys) and New South Wales (Snowy River).
- In 1967, Tasmanian Premier Eric Reece announced that the Middle Gordon Power Scheme, then under development, would require ‘some modification to the Lake Pedder National Park’.
- Concerned bushwalkers and artists soon discovered that the ‘modification’ was in fact the complete flooding of the lake under a much larger Middle Gordon scheme.
- The Southwest Tasmania Action Committee and the Lake Pedder Action Committee (LPAC) were both formed to protest the damming. In 1972, LPAC joined with one of the world’s first green political party, the United Tasmania Group, to try to win seats in the Tasmanian State Parliament and effect change (and stop the dam) from within.
- The protests and attempts at electoral change failed, and the incredibly beautiful lake was submerged under the rising dam waters in 1973. The dam was called Lake Pedder to the disgust of the protesters.
- The Southwest Tasmania Action Committee changed their name to the Tasmanian Wilderness Society (later becoming just The Wilderness Society) in 1976, after the flooding of the lake.

The Little Desert

The Little Desert is a part of the dry, nutrient-poor, far west of Victoria. The Wotjobaluk people are the traditional Indigenous occupants of the region. It’s sandy and arid, but it is not bare – supporting a dense vegetation of heath and wildflowers.

- Across Australia, nation building occurred at the state level as public lands were released for development, particularly agricultural.
- In neighbouring regions across the border, South Australian Governments, combined with new scientific and agricultural techniques, had expanded farming into marginal arid lands.
- A number of developments were proposed in the Little Desert area during the 1950s.
- Conservationists urged the development of reserves to protect species before development occurred.
- A planned development in the mid-1960s was abandoned due to low wheat and wool prices, and the difficulty in establishing roads into the area.
- In 1968, the state government decided to go ahead with the development, seeing it as a part of their priority to continue Victoria’s economic growth.
- Economists, scientists and public officials argued the development was not economically viable.
- Conservationists, including the recently formed VNPA (Victorian National Parks Association), wanted to preserve the area.
- The government scaled back their plans from 44 new wheat farms to only 12 sheep farms, and a massive extension of the existing national park from 945 hectares to over 35 000 hectares.
- Conservationists were unhappy, claiming the proposed increases in the national park were not representative of the region, and they demanded scientific surveys before any development.
- A push from conservationists in Melbourne continued pressure on the government, with a number of public meetings attracting over 1000 people.
- The media joined the campaign with all three major newspapers opposing the development.

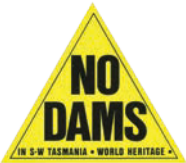


Alamy/David Foster

Dry, rocky and scrubby – the Little Desert doesn't seem initially to be worthy of protection, but this arid environment is home to a huge variety of plant and animal species. It also helps remind us that environments have intrinsic value, not associated with just what we humans can get from them.

- Opposition political parties used the dispute to wedge the government by setting up a parliamentary inquiry into the development.
- In the 1969 state election, the government was re-elected but the Lands Minister lost his seat.
- The new Lands Minister was restyled as the Minister for Conservation and helped to develop the Land Conservation Council (LCC), which would act as an independent body charged with guiding government decisions. The LCC later became the ECC (Environment Conservation Council) and more recently the VEAC (Victorian Environment Assessment Council).

The Little Desert was saved from development, and the introduction of a new body (the LCC) to help guide government decision-making on the use of environments marks a major change in the way land was considered. Before this, the environment had often been viewed as a frontier to tame and develop and control, in order that money might be made and the nation (or in this case, the state) improved. After this, the environment came to be seen as fragile and needing our protection and management.



The Franklin River

The Franklin Dam (or the Gordon-below-Franklin Dam) was a proposed part of the Tasmanian Government's hydro schemes, following on from the damming of Lake Pedder.

The Franklin River is one of the major tributaries of the Gordon River, rising in the south-west of the island and eventually flowing out to sea at the west coast town of Strahan. Initially, it was relatively unknown, very remote and largely inaccessible. The campaign to stop the dam made it an iconic environment around the world.

- The Tasmanian Hydro-Electric Commission announced their plans to dam the river as a part of a new hydro scheme in 1978.
- Tasmanian society was immediately polarised, with 70% of the population in favour of the construction, and a very vocal minority of 30% against.
- Immediately after the plans had been announced, the Tasmanian Wilderness Society and Australian Conservation Foundation began a publicity program to raise awareness of the environment. This began initially in Tasmania, but quickly moved to the mainland and would eventually become an international campaign.



One of the most iconic wilderness photographs ever, Morning Mist, Rock Island Bend, was captured by Australian landscape photographer Peter Dombrovskis, and was instrumental in raising awareness of the beauty of the Franklin River across the world.

- In June 1980, 10 000 people marched through the streets of Hobart demanding an end to the project (Tasmania's largest ever rally).
- The Labor Premier, Doug Lowe, proposed a modified Gordon-below-Franklin scheme, which would save most of the Franklin River from the dam. The environmental groups rejected the modification.
- In December 1981, the state government held a referendum – the power referendum – asking the Tasmanian people to decide. They had only two options: the original dam or the modified proposal. 47% voted for the original plan, 8% for the modified scheme and 45% voted informally, supporting neither proposal.
- In the Tasmanian Parliament, the modified proposal was defeated anyway and a period of chaos began. In May 1982, a pro-dam Liberal government, under Premier Robin Gray, was elected.
- The new Premier ordered the dam construction to proceed.
- Meanwhile, in the Australian Federal Parliament, a senate inquiry was begun into the natural values of south-west Tasmania, and what responsibility the federal government had to preserve the area.
- On the mainland, rallies were starting to be held, and people voting in elections in Sydney and the ACT wrote anti-dam slogans on their ballot papers.
- In November 1982, Bob Brown, head of The Wilderness Society, announced a blockade of the dam construction by peaceful protesters; 2500 people showed up, many from interstate and overseas and over 1200 were arrested, including Brown, who spent 19 days in jail.
- At about the same time, 2500 people rallied in Hobart in support of the dam. The issue continued to divide.
- Folk rock singer Shane Howard, a member of the band Goanna, wrote the song *Let the Franklin Flow*, which became an anthem for the campaign.

Fairfax Photos/The Age 18 December 1982



The Gordon River was used to transport materials and machinery to the site of the dam construction. A blockade organised by opponents of the dam involved protesters in rafts and canoes spread across the Gordon River to stop the supply boats.



Newspix/Andrew de la Rue

Blockade leader Dr Bob Brown speaks at a protest rally against the proposed hydro-electricity dam across Tasmania's Franklin River in 1983.

- Prime minister Malcolm Fraser had struggled to come to terms with the division among members of the federal and state Liberal parties. In March 1983, he and his party lost the federal election to Labor, led by Bob Hawke.
- Hawke had vowed to stop the dam, and one of his first acts as the new prime minister was to introduce legislation to create a new World Heritage area blanketing the disputed area.
- The Tasmanian Government ignored the legislation. Robin Gray had at one point threatened that Tasmania would secede from Australia if they were forced to stop the dam.
- The issue was brought to the High Court. In July 1983, they ruled (with a vote of four to three) that the federal government was in its constitutional right to protect the Franklin environment.
- The dam construction ended. The conservation protests had won a significant victory, which became a template for future campaigns around the world. It also marked an end to most large-scale dam construction across Australia.

The three campaigns are important, but they're not the only ones that have occurred in the last 40 years. Across Australia, using the lessons learned from these three campaigns, people have protested and fought to protect and preserve pieces of the landscape, or to reduce what many have seen as abuses of the environment. From protests to stop logging or uranium mining, to movements to prevent freeway construction or a new fast-food restaurant in their local neighbourhood, many environmental campaigns have been fought.

LEARNING ACTIVITIES



TIMELINE OF AN ENVIRONMENTAL MOVEMENT

Research the conflicts and events associated with Lake Pedder, the Little Desert or the Franklin River. Create an annotated timeline that details the conflicts and events. Compare the work of other students on the other environments. What similarities and differences can you see in the conflicts and events associated with these three environments?

ENVIRONMENTAL MOVEMENT ROLE-PLAY

Role-play some of the key events or debates that occurred between groups involved in one of the environmental movements – Lake Pedder, the Little Desert or the Franklin River. Have groups of students in the class take on the role and positions of the different groups involved in the movement.

ENVIRONMENTAL MOVEMENTS – AN OVERVIEW

How have these environmental movements and their associated campaigns and organisations changed the way we relate to our environments? More specifically, how might they have changed your relationship with outdoor environments across Australia?

There are many possible answers to these questions. We'll focus on a smaller, more representative number.

Greater awareness of the need to protect, and importance of, natural environments

From the failures of Lake Pedder to the successes of the Little Desert and the Franklin River, we are now more aware than ever that these beautiful places exist and that we should protect them in some way. This isn't to say that people, communities and organisations don't still use and exploit natural environments. They do; we do. But the efforts of the environmentalists remind us that when we use the environment there are multiple perspectives we need to take – not only what we can get from them, but also how we can sustain them beyond just our own immediate needs and desires.

Recognition of an individual's ability to effect change

The impacts of protesting, letter writing, marching or voting have never been denied, but it's more common nowadays to see these (and other) actions as being useful and important. In part, we can attribute this to the modern environmental movement. It's often said that individuals can 'make a difference', and this ability to believe in your own power to effect change is an important result of these movements.

Rise of tourism and adventure tourism to remote areas

The appearance of many beautiful environments in public media created a desire among many people to visit these places and to participate in the sometimes-difficult activities required to access them. This is possibly one of the reasons you chose to study this course. While there are some negative aspects to increased participation in outdoor activities and access to outdoor environments, the rise in a shared understanding of our place in nature is absolutely enhanced by our being able to see this nature.

Mainstreaming environmental issues in society and in politics

The failures and successes of environmental protest over dams, logging, mining and other developments sparked the formation of a number of new, and initially, fringe political parties. These organisations were often fleeting in their existence, coming to life in the adrenalin rush of one protest or another, and then disappearing as arguments among their members about methods and causes raged. Gradually from these groups emerged a number of prominent people who would go on to try to keep environmental issues foremost in the minds of Australians.

In the next part of this chapter we'll look at some of these people and the organisations they helped create.

NOTES FOR THE EXAM



For the exam, you should:

- know about the history of a particular environmental movement – perhaps including conflicts and associated events, and the development of organisations and interest groups. This should include one of the following:
 - Lake Pedder
 - The Little Desert
 - The Franklin River
- be able to explain how this movement has influenced and affected people's relationships with natural environments.

LEARNING ACTIVITY



SAMPLE EXAM QUESTIONS

- 1 Choose one of the environmental movements associated with Lake Pedder, the Little Desert, or the Franklin River. Describe the movement and then evaluate its role in changing human relationships with outdoor environments. (5 marks)
- 2 Describe some of the changing relationships with outdoor environments influenced by environmental movements. Evaluate the role a specific movement – associated with Lake Pedder, the Little Desert, or the Franklin River – had in these changing relationships. (5 marks)

POLITICAL MOVEMENTS FROM ENVIRONMENTAL AWARENESS

We've already seen the rise of environmental activism and political organisation stemming from environmentalism connected with some of the movements discussed. In this section, we'll take a look at the new green political movements and emerging environmental **policies** of the established political parties, particularly through the 1980s.

policies

The positions that political parties take regarding the management of the outdoor environment; policies can also refer to formal plans of environment management

Tasmania

As we've already seen, the attempts to stop the damming of Lake Pedder helped give rise to modern Australian environmental movements. The United Tasmania Group (UTG) was formed in March 1972 – one of the first 'green' political parties in the world at the time. When Kevin Lyons (an independent member and holder of the balance of power in the Tasmanian Parliament) resigned, the state government collapsed and a general election was called for April. The Lake Pedder Action Committee called a public meeting in late March, forming the UTG and fielding 12 candidates across Tasmania's electorates – including Dick Jones and Brenda Hean. They were unsuccessful, but continued to pressure members of the Tasmanian Parliament to act on conservation and environmental issues.



Newspix/Greg Newington

In 1983, Bob Brown was elected to the Tasmanian Parliament as an independent and three years later helped to form the Green Independents.

Dr Bob Brown joined the UTG briefly in 1975, and the party continued to field candidates unsuccessfully until the early 1990s. Dr Brown put his focus into the formation of the Tasmanian Wilderness Society and the emerging issue of the proposed dam in the Franklin River catchment. In 1983, Dr Brown was elected to the Tasmanian Parliament as an independent. He was joined in 1986 by Gerry Bates, Christine Milne, Dianne Hollister and the Reverend Lance Armstrong (no, not the cyclist!) and they became known collectively as the Green Independent. This small group would become the first politicians of the Tasmanian Greens party and later, the Australian Greens, which Dr Brown would lead until his retirement in 2012.

Victoria

While environmental politics in Tasmania was based around activism and the organised protests surrounding Lake Pedder and the Franklin River, things were different in Victoria. In the aftermath of the Little Desert dispute, a different approach was taken.

The Liberal government of Henry Bolte formed the Land Control Council (LCC) in 1971, with the purpose of providing independent advice on the use of public land. To emphasise the importance of their work, the Minister for Lands and Conservation at the time, Bill Borthwick, told the newly appointed LCC councillors to make their recommendations about land use ‘as if for a thousand years’.

The LCC and later incarnations – the ECC (Environment Control Council) and VEAC (Victorian Environmental Assessment Council) – pioneered a new way of making decisions about the use of public lands across the state. Instead of ad hoc decisions made to suit small interest groups, the LCC instigated systematic reviews based on comprehensive information and including public input and feedback. Flora and fauna surveys were conducted by scientists for the LCC as a part of their information gathering, and helped broaden the understanding of environments and ecosystems across the state.

The Victorian approach was less confrontational and more bureaucratic than the efforts going on in Tasmania, but they are generally recognised today as world-leading in the planning for the use of public lands.

Mainland activism

The increasing environmental awareness coming out of the movements associated with Lake Pedder, the Little Desert, the Franklin River, and others, continued in a number of different campaigns and events across the mainland throughout the 1970s and 1980s.

Sand mining on Fraser Island, logging across south-eastern Australia’s forests and in the northern tropical rainforest of the Daintree, and uranium mining at Roxby Downs and Kakadu National Park, were among many environmental hot spots throughout this time.

The attempts to expand uranium mining across South Australia and the Northern Territory particularly struck a chord with a community that was concerned about the increasingly militaristic rhetoric of US president Ronald Reagan and the ongoing proliferation of nuclear weapons, and who was watching the protesters on the Franklin River in Tasmania on their television screens each night.

Nuclear Disarmament Party

The People for Nuclear Disarmament was founded in Victoria in 1981 and organised a series of May Day protest marches that culminated in over 300 000 people marching through Melbourne in 1983 to protest uranium mining, US military bases in Australia, visits by nuclear ships and submarines, and nuclear weapons. This groundswell of support led to the formation of a political party in 1984 – the Nuclear Disarmament Party (NDP).

The NDP flared brightly. By the end of 1984 it had over 8000 members and could claim to be the fastest growing political party in Australia’s



News Ltd/Newspx

Lead singer of Midnight Oil, Peter Garrett, speaks to the media as a candidate for the newly formed Nuclear Disarmament Party in 1984. Garrett failed to be elected, but later joined the Australian Labor Party and served as Environment Minister under prime ministers Kevin Rudd and Julia Gillard.

history. Jo Vallentine, one of the NDP representatives in Western Australia, was elected to parliament as a senator in 1985. But, just as quickly as the party flared, it burned out. Racked by internal squabbles and the direction of the party, the NDP broke apart. Senator Vallentine remained in the Senate until 1992, but she would become the first green senator when she helped to form the Greens (WA) party, which would later merge with the Australian Greens.

PROFESSIONAL ENVIRONMENTALISTS

As the activists were squabbling, the environmentalists who had helped to save the Franklin River began to see another approach to help have their say. Instead of chaining themselves to bulldozers or forming small, niche political parties, what about building the skills needed to lobby the politicians in the major parties who actually had the chance to run the country and make the decisions?

Phillip Toyne, a lawyer from Alice Springs who became director of the Australian Conservation Foundation (ACF) in 1986, exemplified this new professionalism and helped to develop a number of relationships with politicians from both of the major parties – to help secure environmental and conservation gains in ACF campaigns through into the early 1990s.

POLITICAL ENVIRONMENTAL POLICIES

Bob Hawke, prime minister from 1983, recognised the growing electoral power of environmental movements and the people that joined them. It's probably a stretch to claim that the environmental movement helped elect him to power in the wake of the Franklin River events, but certainly he recognised the importance to the Labor Party and government of supporting conservation efforts. He, and his environment ministers Barry Cohen, John Brown and particularly Graham Richardson, promoted policies that phased out ozone-depleting chlorofluorocarbons, set up the national Landcare program, recognised climate change as a pressing problem, and developed programs focusing on reducing pollution and deforestation, and improving efforts at conserving endangered flora and fauna.

The Liberal Party (in opposition for most of the 1980s), pushed by shadow environment spokesperson Chris Puplick, pursued a similar agenda to the Hawke government. They supported efforts to curb greenhouse gas emissions and conserve environments.

In opinion polls after the 1990 federal election, concern for the environment was rated as the second-most important reason for choosing a particular candidate. The 1990 election result (the Hawke government was returned for a fourth term) was very much influenced by the environmental movement. The activism and support for threatened but remote places in the 1960s and 1970s had created a movement that could be said to influence the most powerful people in the country. Concern for the environment, fuelled by environmental movements, had helped give rise to political movements that continued to push this agenda.



Fairfax Syndication/ Joe Sablajak

Prime Minister Bob Hawke (far left) plants the first of the Labor Party's 'One Billion Trees', with ACT Chief Minister Rosemary Follett, Victorian Premier John Cain, NSW Premier Nick Greiner and SA Premier John Bannon in July, 1989.

LEARNING ACTIVITY



ELECTION CANDIDATE

Select a time during the 1980s or 1990s and pretend you are a candidate in an election. Give a brief campaign presentation to your class. You will need to address the following questions:

- 1 To which party do you belong (or are you an independent)?
- 2 What are your environmental views?
- 3 What do you think are the concerns of the community at this time?

NOTES FOR THE EXAM



For the exam, you should:

- know a little about some of the key individuals and groups through the 1970s and 1980s, including the UTG, Bob Brown and the Green Independents, and the Nuclear Disarmament Party (Who were they? What were their goals? What happened?)
- know some of the policy proposals, successes and/or failures of the major political parties through to 1990.

LEARNING ACTIVITY



SAMPLE EXAM QUESTIONS

- 1 Describe how environmental movements became political movements in Australia in the 1980s. Make sure to include at least one clear example in your description. (2 marks)
- 2 Evaluate the impact of political movements in the 1980s on a particular environment you have visited or studied this year. (3 marks)
- 3 Identify a political movement or an environmental policy of one of the political parties from before 1990. Describe how this movement or policy may have come from an environmental movement and evaluate this movement or policy's effect on changing relationships with a specific outdoor environment. (7 marks)



CHAPTER

6

RELATIONSHIPS WITH AUSTRALIAN ENVIRONMENTS SINCE 1990

KEY KNOWLEDGE

- societal relationships with outdoor environments reflected in different forms of conservation, recreation, primary industries and tourism practice (page 189)
- the factors influencing societal relationships with outdoor environments, including:
 - the effects of different technologies (page 200)
 - commercialisation of outdoor environments and outdoor experiences (page 206)
 - depictions of outdoor environments and outdoor experiences in the media, music, art, writing and advertising (page 215)
 - social responses to risk taking (page 218)
- social and political debates about climate change, water management and renewable energy and the impacts of these debates on societal relationships with outdoor environments (page 223)
- an overview of environmental politics in Australia, including:
 - environmental policies of the major Australian political parties (page 241)
 - the role of the Victorian Environmental Assessment Council (VEAC) (page 246)

KEY SKILLS

- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected during these experiences
- compare different societal relationships with outdoor environments
- analyse and evaluate factors influencing societal relationships with outdoor environments
- analyse environmental politics in Australia
- analyse social and political debates about environmental issues

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

SOCIETAL RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

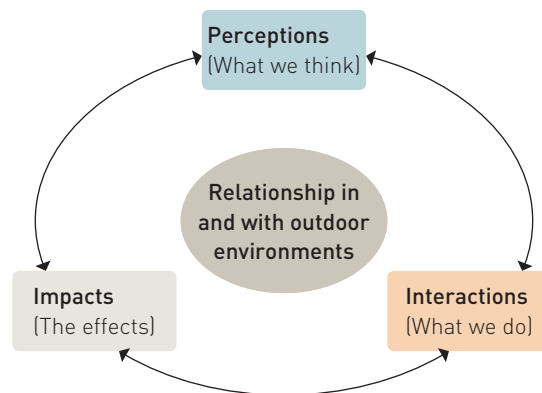
The previous area of study explored relationships with outdoor environments in Australia in a historical setting. We have investigated how these relationships have changed, some key events and issues that influence the relationships, and the effects of these relationships on people and on the Australian environment.

In this area of study, we will continue to examine relationships through the interconnectedness of:

- perceptions – what we think about the outdoor environments
- interactions – what we do in, and with, the outdoor environments
- impacts – what happens as a result of our relationship.

Within this chapter, we will concentrate on a range of more recent relationships. That is, relationships that have existed since 1990 and are happening today.

The focus here, too, is on the relationships that occur within the wider society rather than a reflection on your own personal experience. Although you will be involved in participation in specific outdoor environments and experience how certain factors might influence your own relationships, it is important to be able to identify how groups of people relate to these environments.



Types of interaction with outdoor environments

As individuals, we interact with the outdoor environment in a variety of different ways at different times of our lives. At one time, you may be surfing at a local beach, where you are enjoying the freedom of movement and the challenge offered by the dynamic characteristics of that particular marine and coastal environment. On another occasion, you may be at that same local beach collecting and disposing of plastic and other rubbish while participating in a Beach Clean Day run by an interest group such as Clean Ocean. Why might you do this? How might this have an effect on this environment?

Think about reasons why someone would participate in bird watching. Data collected can lead to some very specific information such as the population of an endangered or threatened species, or an indication of the condition of an environment. But there are other reasons too. There is enjoyment that some people get out of doing this activity. Bird watching is a reason, but the actual drawcard is time spent outdoors, being alone for a while, and so on.

These are only two simple examples of how we might interact with a particular outdoor environment. Within our society, different people or groups of people may interact with a particular outdoor environment in many different ways. A forest environment could be used by a logging company to extract timber for resources such as building materials or paper manufacture. Government bodies such as the Department of Environment, Land, Water and Planning (DELWP) might monitor these operations and provide a management framework that enables the sustainable use of the forest environment. This same outdoor environment may also be visited by bushwalkers seeking a wilderness experience, far away from city life and its structures. Such interactions are part of complex societal relationships with outdoor environments.

In this chapter, we will identify a range of different relationships with outdoor environments that different groups within our society have today and in recent times. To do this, we will investigate specific types of interaction in which these relationships are reflected. You will also be required to reflect on your own outdoor experiences and compare and contrast different relationships.



iStock.com/Josef Mohyla

Extracting timber from a plantation forest

Four types of interaction

We have determined that human interactions with outdoor environments refers to what people do in environments. These interactions can be many and varied. To assist us to examine the wide variety of the relationships that people have with outdoor environments, we can categorise human interactions into four broad categories:

- 1 recreation
- 2 conservation
- 3 primary industries
- 4 tourism practices.

While many of our experiences in the outdoors are for recreational experiences and are often the basis for our interest in the outdoors, we must also be aware of other types of interaction in the environment. As well as participating in camps, bushwalks, canoeing expeditions or surfing classes during Outdoor and Environmental Studies, you might also find yourself on a trip to a farm or logging coupe, on an observational field trip, bird watching, fishing or visiting museums and art galleries. No matter what your destination, however, the common link will be society’s varied relationships with the outdoor environment.

LEARNING ACTIVITY



OUTDOORS – WHY?

Think of an activity where you have participated in an outdoor setting out of school hours. Write a paragraph that is designed to convince somebody to try this activity by explaining your motivations to participate and the feelings that the activity or outdoor environment evoked in you.

FOUR DIFFERENT FORMS OF INTERACTION WITH OUTDOOR ENVIRONMENTS

Recreation	Conservation	Primary industries	Tourism practices
<p>Active recreation activities:</p> <ul style="list-style-type: none"> • Bushwalking • Surfing • Rock climbing • Skiing and snowboarding • Canoeing • Mountain-bike riding • Fishing <p>Passive recreation activities:</p> <ul style="list-style-type: none"> • Strolling • Sightseeing • Bird watching 	<ul style="list-style-type: none"> • Revegetation • Erosion control • Weed and pest control • Habitat restoration • Track development and maintenance • Clean-up programs • Wildlife sanctuaries • Ranger activities 	<ul style="list-style-type: none"> • Mining • Grazing • Agriculture • Forestry • Commercial fishing • Energy production • Dams • Desalination 	<ul style="list-style-type: none"> • Tour companies • Tourist attractions • Outdoor adventure companies • Sightseeing • Cultural tours • Ecotourism

LEARNING ACTIVITY



INTERACTIONS

For each of the four types of interaction outlined in the table, list a specific outdoor venue that would be appropriate for that interaction.

1 RECREATION

Recreation can be defined as pastimes that are a diversion from day-to-day routines. It may include active or passive activities that provide the participant with fun, relaxation, enjoyment or fitness. For many of us, our interest in the environment begins with such experiences. It is these experiences in the outdoors that can lead to an appreciation and understanding of outdoor environments. Examples of popular recreation activities include bushwalking, surfing, rock climbing, skiing and snowboarding, canoeing, mountain-bike riding and fishing.

At the beginning of Unit 3 we discussed the use of metaphors to assist us in our descriptions of human relationships with outdoor environments. Metaphors are also a handy way to describe how humans perceive the outdoors.

When participating in recreational activities, the outdoors can be perceived as a playground, or venue, that provides the scope for activity. It might be a route through a national park that someone takes during a hike or a child climbing a tree in the backyard. The outdoors can also be perceived as a gymnasium, or a range of apparatuses that provide a series of problems and challenges to be completed during physical activity. A cliff face can become a collection of holds and bollards that are used to climb the wall. The climber attaches ropes and finds hand and foot holds in order to achieve the objective of reaching the top. Here, the outdoors is also perceived as an object that provides risks for those that seek the thrill of participation. In these examples, people are separating themselves from the outdoor environment. This does not always need to be the case. Recreation interactions can also provide a more intimate human–nature relationship. Bird watching has at its core an ecological focus on the study of another species.

Recreation interactions will inevitably have an impact on the outdoor environments in which they take place. Quite often, these impacts are negative ones as venues are altered or under continual pressure from regular use. The rock-climbing venue may require modification to cater for visitor numbers. Paths and climbing sites can be constructed, resulting in clearing of vegetation and habitat loss. Anchors can be provided for climbers and magnesium chalk left behind, defacing the rock face.

Not all impacts need to be negative, however. Those who interact with the outdoor environment for recreation will often develop a bond with the specific environments they use. This bond can foster an allegiance between people and those environments that is based on sustaining their interactions to enable future participation for themselves and others. By promoting and adopting minimal-impact behaviours, such as leaving a venue in better condition than when you arrived, environments can sustain regular human use more resiliently. Have you performed an ‘emu parade’ before leaving a campground while on a school trip? If so, you have probably picked up a lot of rubbish left behind by previous campers.

Allies for a particular environment don’t always stop there. Recreation-based **interest groups** are often among the first to take up the fight against threats to the environments they love. The work of such groups is discussed further in the next section.

2 CONSERVATION

Interacting with an outdoor environment for conservation involves human efforts that are aimed at protecting environments from potential damage. It can also involve restoring an environment or elements of an environment. For example, physical actions performed by private land managers such as revegetation of an area that has previously been cleared or planting trees along waterways through grazing properties. Erosion control of sand dunes is often required around access points at busy beaches

interest groups

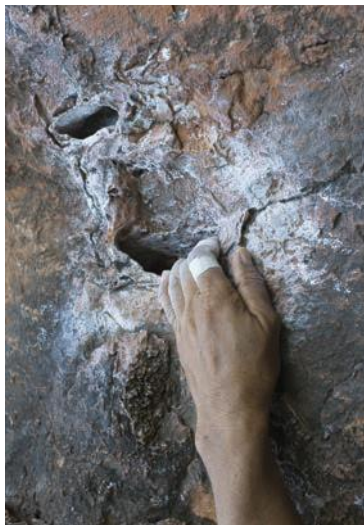
Individuals with similar values that form an interest group with the aim of promoting their views about the issue; government or government agencies are not considered to be interest groups



Shutterstock.com/Olga Kashubin

Tracks and lookouts in popular parks and reserves are designed to direct visitors to places where impact can be managed.

Shutterstock.com/adirekjob



Impacts left behind by climbers on 'The Gallery' at the Grampians National Park



CSIRO/Nick Pitsas. Released under a Creative Commons Attribution 3.0 license creativecommons.org/licenses/by/3.0/

Revegetation of non-productive grazing land in Gippsland

management plan

A document that contains guidelines on how an area of public land is managed; it articulates the vision, goals, outcomes, measures and long-term strategies for parks within planning areas

in popular coastal areas. Track and campsite development and maintenance in popular parks and reserves aim to concentrate impacts of bushwalkers and campers to particular pockets of land that can be managed more efficiently than if impacts were widespread.

It is not only the 'hands-on' efforts that protect and restore our outdoor environments. Strategies and policies are developed and implemented by the government and other land managers that focus on conservation. For example, **management plans** are drafted by Parks Victoria for all parks and reserves that they are responsible for. These plans outline long-term strategies that guide the way public lands are managed.

The promotion of minimal-impact behaviours and campaigning against threats to environments also acts to protect them. These efforts are often more effectively performed by the forming of a group that, by pooling their resources, aim to gain maximum exposure of their collective views. Surfrider Foundation was founded by a handful of surfers worried about the potential impact of development around their local surf break in California. From these humble beginnings, the organisation spread across the globe and now provides surfers worldwide with the platform to campaign against threats to their own local areas. Five branches of Surfrider Foundation now combine to represent the entire Victorian coastline.



Management efforts at the Bunurong Marine National Park. These management strategies are conducted by the local Parks Victoria branch to minimise the impacts of visitors to this accessible venue.

SURFRIDER FOUNDATION

Surfrider Foundation Australia is a not-for-profit sea-roots organisation dedicated to the protection of Australia's waves and beaches through Conservation, Activism, Research and Education (CARE) ...

'We are a branch-based organisation with 25 volunteer branches and beach representatives Australia-wide, and the head office based in Sydney. We are also part of a global Surfrider family, with international affiliates worldwide' (Surfrider Foundation Australia).

Some recreation interactions with outdoor environments provide humans with enjoyment, fun and excitement, whereas conservation interactions tend to focus primarily on the environment before human benefits. The conservationists' perceptions of the environment will therefore reflect this focus. The environment can be regarded as a museum, or storehouse of living and non-living components that interact to support ecosystems. Such a perception highlights the importance of preservation and maintenance of all components to enable future generations to experience the outdoors. Some may find spiritual connection to the environment and perceive it as a temple or place of worship. Whether it is the aesthetic beauty that the outdoors provides or the intrinsic right of its existence, what's being worshipped will be up to the individual.

John Seed, an environmentalist, says the following about conservation: '... our relationship to the Earth is that of a leaf to a tree. We have no independent existence – the pain of the Earth is our own pain and the fate of the Earth our fate also. No tree – no leaf ... If we look at indigenous cultures, we may notice that without exception rituals affirming and nurturing the sense of interconnectedness between people and nature play a central role in the lives of these societies ... Deep ecology remains a concept without the power to transform our awareness, unless we allow ourselves to feel – which means feeling the pain within us over what is happening to our world ... Often it arises as a deep sense of loss over what is slipping away – ancient forests and clean rivers, birdsong and breathable air.'

By focusing on the preservation and restoration of the outdoors, conservation interactions will either directly or indirectly lead to positive environmental impacts. It is these human efforts that will assist in maintaining biodiversity and landscapes, and enabling future generations to experience and enjoy them. A well-managed park or reserve with infrastructure to contain and reduce the

impact of visitors and protect the natural habitat can provide a sustainable venue for the public. The owner of a grazing property who adopts sustainable farming practices, such as fencing off and revegetating fragile or damaged land and waterways, will improve the health of that environment as well as the sustainability and productivity of their industry. The efforts of conservation groups can influence others' views in favour of the environment, including those who make the ultimate decisions about its fate. Furthermore, by raising awareness of the threats to outdoor environments, conservation groups can influence everyday decisions of a wide section of society and contribute to wider positive impacts.

LEARNING ACTIVITY



YOUR FAVOURITE PLACE

Choose an outdoor environment you love in which you have participated in a recreational activity, then complete to the following:

- 1 Make a list of the human impacts on this environment that you can recognise at this venue.
- 2 What has been done by managers of this venue to try to minimise human recreational interactions?
- 3 Have the efforts of managers been effective in minimising human impacts? Explain.
- 4 List three things you could do to minimise your impact on this outdoor environment when participating.

3 PRIMARY INDUSTRIES

Primary-industry interactions involve utilising the outdoor environment to grow, harvest and extract natural resources for use by humans. These interactions contribute to our wealth and wellbeing by producing food, fibres, energy, minerals and building materials, all of which are essential to our quality of life. These resources are treated as commodities, which are bought and sold and used to generate profit for these industry companies. Mining brown coal in the Latrobe Valley for electricity production, cattle grazing across the Western District and Gippsland for dairy production and **desalination** of sea water to provide drinking water to sell to Melbournians are all examples of primary-industry interactions.

One aspect of primary industry is the increasing need to adopt sustainable practices to ensure that the outdoor environments they exploit continue to be productive. As humans have become more aware of the finite nature of the ability of environments to provide for us, primary industries are continually under pressure to develop and implement practical ways to restore the resource potential of these environments. The forestry industry in Victoria includes the harvesting of plantation timber as well as native forest hardwoods. Our consumption of timber as a resource for industries such as building and paper manufacture is far greater than native forests could possibly provide for. Currently, about two-thirds of the wood used in Victoria comes from plantations and this proportion is increasing to further reduce pressures on native habitats, although this will require the further expansion and manipulation of the plantation crops.

desalination

Large-scale removal of salt from sea water to produce fresh water



VicForests

LEARNING ACTIVITY



PLANTATION

Visit the VicForests website via the link at <http://oes.nelsonnet.com.au> and read the fact sheet on plantations: softwoods, hardwoods and native forest hardwoods.

The overlying perception of the outdoor environment reflected in these interactions is that of a resource for human needs. Exploiting environments to provide for our own comfortable living suggests a human superiority over the environment where our needs are more important than the ecological balance. This can be evident in the way we continue to impact on environments and landscapes that provide for us despite our awareness of the extent of the damage that we are doing. Around three quarters of Victoria's electricity supply relies on brown-coal-fired generators in the Latrobe Valley. Although we are aware of the impacts this industry has on atmospheric carbon levels and associated climate changes as well as environments around the open-cut mines, the industry is set to expand in the future to meet society's increasing demand for energy.

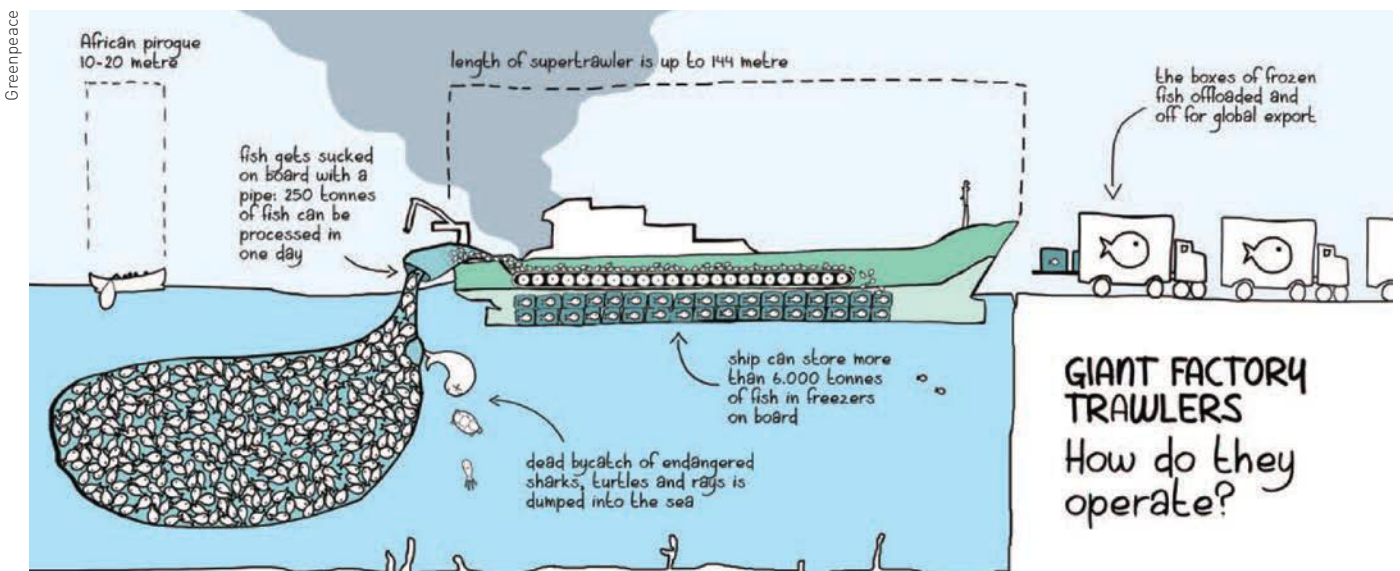
Although primary industries are beginning to recognise the need for some consideration toward the environment, it is the economic importance of the resources that are often valued the most. In periods of economic strain, profit margins are usually the subject of concern before environmental responsibility. In such a situation, cost-cutting measures will usually be at the detriment of environmentally sound practices rather than productivity.

Many of the environmental impacts of primary industries are profound and long-lasting: the alteration of landscapes through mining practices; the removal of habitat for the harvesting of native timbers; the modification of habitat and reduction of biodiversity that results from clearing for grazing and other agricultural practices; pressures on specific species from excessive harvesting such as commercial fishing; and pollution of the atmosphere and other environments through energy production and other industries. Many of these impacts are continuing and increasing in scale today as our demand for resources increases throughout our expanding society. Although today we are making some efforts to sustain these industries and maintain the environments on which they depend, societies' level of consumption continues to deplete our resources at a rate never seen before on this planet.



Greenpeace

A Greenpeace campaign poster in May 2009, using this photo, declared: 'Hazelwood power station in Victoria's Latrobe Valley is the most polluting power station in the developed world. Prime Minister Kevin Rudd needs to get real about climate change and decommission dirty, polluting power stations such as this'.



Greenpeace poster for campaign against overfishing.

4 TOURISM PRACTICES

Tourism refers to people travelling to visit outdoor environments that are away from their usual surroundings. Tourism can involve recreational activities at venues visited such as those already mentioned in this chapter. Tourism also provides the opportunity for commercially based recreation as adventure companies take advantage of the visitor who is seeking the outdoor experience during their stay. Besides passive or physical activities, the outdoor environment itself can be the focus of tourism. Victoria boasts a range of environmental features that tourists may simply want to witness for themselves. The Great Ocean Road, The Nobbies on Phillip Island, the goldfields and the alpine resorts are all examples of such attractions, and they attract commercial operators who see the opportunity to profit from their appeal.

The buying and selling of the outdoor experience by commercial companies reflects the perception of the environments they operate in as a resource in which they are the main financial beneficiary. They might be selling the experience or the 'specialness' of an environment feature, and in doing so are treating it as a **commodity**. The negative impacts of these perceptions can be profound when tourism is rationalised. That is, if profits can be increased by methods such as increasing participant numbers or revisiting the same place regularly for efficiency of operation, the environment will be neglected, leading to negative impacts.

The tourists themselves will vary in their perceptions of the outdoor environments they visit depending on their reasons for travelling to a venue. They might be sightseeing and marvelling at unique or historical features of the environments as if they were in a museum. They may be seeking the thrill of adventure as they play in the environment as if it were a huge outdoor gymnasium. There are countless reasons why people desire to experience the outdoors, which itself illustrates the endless possibilities the outdoor environment provides us.

Ecotourism in recent times has been a response to the continual expansion of mass commercial-based tourism. Profit margins usually involve maximum possible participation and have been the focus of many commercial ventures. Ecotourism attempts to address the threat to the outdoor environment that this brand of tourism can bring. Ecotourism involves travelling to more 'natural' environments that have experienced less human intervention. Participants adopt minimal impact practices and embrace the notion of leaving the environment in a better condition than it was found. If money is spent, at least a proportion is channelled into management of the venues visited. Ecotourism also incorporates aspects of education about the specific outdoor environments visited and suggests sustainable ways to enjoy them.

Elements of ecotourism

The elements of ecotourism are:

- travel to 'natural' or 'intact' outdoor environments
- use of minimal-impact practices
- money spent goes back into benefiting environments
- incorporates education about environments.

Acknowledging the impacts caused by large visitor numbers and lack of consideration of the environments visited has led to the rise in ecotourism. The ecotourist perceives the environment as a place to be protected, as well as enjoyed, and through minimal-impact interaction aims to reduce the impacts that occur through human visitation.

The increasing appeal of venues such as Wilsons Promontory (the Prom) is an indication of the popularity of ecotourism. Ballots are held for camping at Tidal River during peak periods for camping and accommodation. The Prom provides a natural backdrop that has been preserved and restored in various ways for over a century. Most of the accommodation is basic and relatively sympathetic to environmental values.

commodity

Something that can be used for commercial advantage – it can be bought or sold

ecotourism

Responsible travel to natural areas that conserves the environment and improves the wellbeing of local people



Crowds await the arrival of the fairy penguins on Phillip Island. Regular high-volume visitor rates continually challenge the managers of this habitat.

A wide range of minimal-impact regulations are adopted in the management of recreation in the park such as maximum camper numbers and group sizes. Charges for camping and accommodation subsidise Parks Victoria's operations and visitors are provided with information through a range of methods, including interpretation boards, published park notes, a comprehensive visitor information centre, and the provision of guided tours and activities led by an employed education officer. Friends of the Prom and the Prom Campers Association are specific interest groups formed to protect the Prom's conservation values and promote it as an ecotourism venue. They continue to campaign and raise awareness of the constant threat of commercial and **mass tourism** to this outdoor environment.

mass tourism
Large-scale tourism that focuses on maximising numbers of participants of intensive leisure activities

CASE STUDY: RELATIONSHIPS WITH THE BUNURONG COAST

1 CONSERVATION ON THE BUNURONG COAST

Interaction

- formation of the Bunurong Marine National Park
- ongoing management of Bunurong Marine National Park and Wilsons Promontory National Park (Parks Victoria)
- activities of South Gippsland Conservation Society (revegetation, weeding, construction, education).

Perceptions

- outdoor environment is a place to appreciate
- outdoor environment is worth protecting, preserving and restoring for the future
- outdoor environment has an intrinsic value – it has the right to exist in its own right independently of humans
- understanding of the detrimental consequences of human interactions with the outdoor environment.

Impacts

- protection of marine and coastal environment from development, habitat loss, pollution
- revegetation of natural habitat along the Bunurong Marine National Park, reclaiming cleared grazing land
- species population protection and recovery along coastal fringe (e.g. BMNP, Inverloch Foreshore and Andersons Inlet).

2 RECREATION ON THE BUNURONG COAST

Interaction

- surfing a variety of breaks of varying levels of difficulty (Kilcunda, Powlett River, Eagles Nest, Inverloch)
- Wilsons Promontory camping and wilderness experience
- recreational fishing along extensive coastline
- bird watching – bird hide in Wonthaggi Wetlands.

Perceptions

- outdoor environment is a place to participate in outdoor leisure activities
- outdoor environment is a challenge to overcome by completing an activity
- outdoor environment is a place to escape day-to-day routines in human-dominated landscapes
- outdoor environment needs to be protected to enable future participation.



Impacts

- pressures on sensitive areas due to numbers of participants (e.g. erosion of dunes, paths to beaches)
- environment 'loved to death' by participants wanting to enjoy it for its provision of fun and enjoyment
- positive impacts from participants being more likely to be protectors of the environments they enjoy through recreation.

3 PRIMARY INDUSTRIES ON THE BUNURONG COAST**Interaction**

- diverse farming practices:
 - beef cattle grazing
 - dairy cattle
 - crops (potato)
 - some sustainable practices
- commercial fishing:
 - abalone
 - southern rock lobster.

Perceptions

- environment is used as a resource to provide for human needs
- emergence of sustainable development
- environment should be used in a way that it can provide for humans into the future.

Impacts

- native habitat loss (clearing), soil compaction and decreased water quality through grazing and agriculture
- decreased biodiversity – grazing land dominated by only a few species instead of natural heath or rainforest habitats
- reduced marine populations due to fishing
- some biodiversity recovery in areas through revegetation to provide habitat and natural processes (e.g. water quality, soil nutrients).

4 TOURISM PRACTICES ON THE BUNURONG COAST**Interaction**

- large number of dwellings only used during peak holiday periods provides infrastructure for dramatic seasonal population increases
- commercial recreation providers operating to sell outdoor experiences (e.g. Offshore Surf School)
- ecotourism to provide wilderness experience in natural settings (e.g. the Prom, Bunurong Marine National Park).

Perceptions

- environment is a place to enjoy for leisure
- environment is a place to make a profit from participants paying for an experience
- environment is a place that should be protected to provide wilderness experience in the future (ecotourism).

Impacts

- dramatic population increase during peak periods places pressures on specific outdoor environments (beaches, dunes)
- increased development of coastal areas (e.g. urbanisation, Lifesaving Club)
- commercial operators relying heavily on a particular venue can cause overuse issues (e.g. paths to beaches, car parks)
- positive impacts – ecotourism providing funds for conservation management; being educated about environment issues; becoming 'protectors' of specific environments visited.

NOTES FOR THE EXAM



For the exam, you should:

- know about a variety of examples of each type of interaction with environments you have visited or are familiar with; i.e. examples of:
 - recreation
 - conservation
 - primary industries
 - tourism
- be able to compare and contrast relationships reflected in specific human interactions including:
 - how the specific outdoor environment is being perceived
 - possible impacts on the outdoor environment
 - similarities and differences between various relationships.

LEARNING ACTIVITY



RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

Answer the following questions and in your answer provide:

- a definition (an example of how societal relationships are reflected in this interaction with a specific venue)
 - a specific example of the interaction
 - perceptions linked to your particular example
 - an outline of the impacts linked to your particular example.
- 1
 - a What is meant by a 'conservation' interaction with the outdoor environment?
 - b Give an example of how societal relationships are reflected in this interaction with a specific venue.
 - 2
 - a What is meant by a 'recreation' interaction with the outdoor environment?
 - b Give an example of how societal relationships are reflected in this interaction with a specific venue.
 - 3
 - a What is meant by a 'primary industries' interaction with the outdoor environment?
 - b Give an example of how societal relationships are reflected in this interaction with a specific venue.
 - 4
 - a What is meant by a 'tourism practice' interaction with the outdoor environment?
 - b Give an example of how societal relationships are reflected in this interaction with a specific venue.
 - 5 Choose two of the interactions above and compare and contrast the relationships with the chosen outdoor environment reflected in them. (In other words, how are the perceptions of the environment, interactions with the environment and impacts on the environment similar and different between the two examples chosen? You may find it helpful to start with a Venn diagram.)

FACTORS INFLUENCING RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

The relationship that humans have with the outdoor environment is influenced by a range of factors. In relation to our investigation of relationships, this includes how these factors can have an effect on how we perceive, interact with and impact on these environments. We have previously examined how particular historical events have influenced human relationships over time due to **societal** changes that occurred during these times. This chapter will deal with how certain factors are having an influence on societal relationships (since 1990) with today's outdoor environments.

There are many different aspects of our society that influence how we relate to outdoor environments. Background factors such as our family, friends, ethnicity, race, gender, religion and education all influence how we react. What is the background of the type of individual who

societal

Relating to society or social relations



Alamy Stock Photo/Chris Putnam

Differing aspects of our society influence how each of us relates to outdoor environments, such as choosing cross-country skiing rather than downhill skiing.

Our changing lifestyles will also continue to influence our relationships with the outdoors. Our interests and desires are in a constant state of modification in today's society. A 'wilderness experience' that included elements of solitude was once an integral component of outdoor recreation. Not many of us have a desire to be constantly connected to others. Consider the waning popularity of activities such as bird watching, which was common in the past. Also consider the connection to the environment of the bushwalker who travels to their destination with their attention focused on a GPS monitor and then, on arrival, posts their achievement on a social media site for all to see.

These are just a few examples of influencing factors in our relationships with outdoor environments. We will concentrate on five specific factors to see how they can influence societal relationships with the outdoor environment. The five factors can be summarised as:

- 1 the effects of different technologies
- 2 commercialisation of outdoor environments and outdoor experiences
- 3 portrayals of outdoor environments and experiences
- 4 social responses to risk-taking
- 5 social and political **debates**.

The effects of different technologies

Ongoing technological advancement continues to influence almost every aspect of our society. The function of technology is basically to make our lives easier by providing tools that enable us to solve everyday problems. The advent of such tools gives us an increasing level of control over our environments. Innovations in a number of areas have changed the way we experience outdoor environments, including:

- materials and clothing
- communication and navigation
- information technology
- transport and infrastructure
- activity-specific equipment
- safety equipment.

These innovations can allow us access to outdoor venues that would otherwise be too difficult to reach without technological assistance. It can provide us with the means to participate in a wide range of environmental conditions or enable us to enjoy year-round participation despite the climatic variation.

becomes a mountaineer? Why might a person become a cross-country skier rather than a downhill skier? Our background profile is likely to have an effect on such outcomes. Our standard of living is also an important factor in determining aspects of our relationships with outdoor environments. In Australia, our standard of living has generally afforded society the luxury of disposable income, or money that we are able to spend on things that are not really essential. Our working conditions generally include set work hours and the availability of leisure time. What do we do with this time and spend this money on? There are countless possibilities that involve the outdoor environment that can be considered.

debate

Extended discussions, conversations or debate between different parties regarding a particular issue

EXAMPLES OF TECHNOLOGICAL CHANGES OVER TIME

Surfing	Camping	Rock climbing
<ul style="list-style-type: none"> • Use of different materials in the construction of boards, from various woods, to foam and fibreglass, to plastic (epoxy) and carbon fibre • Changes in the shape, size and curvature of boards • Changes in the number, design and placement of fins • Different mechanisms for fin attachment on boards • Changes in wetsuit materials • Changes in wetsuit design • Use of web cams for viewing breaks offsite • Use of the Internet for weather analysis and surf break prediction • Use of wax and deck grips 	<ul style="list-style-type: none"> • Changes in design and materials of tents, tent poles and pegs • Development of lightweight gear, including fuel stoves • Development of sleeping bags and sleeping mats • Development of packs and walking poles • Changes in the design and materials of shoes and footwear • Development of navigation supplements from compasses to GPS units • Development of breathable waterproof and water-resistant fabrics 	<ul style="list-style-type: none"> • Design of new types of ropes • Development of specialist climbing shoes and footwear • Development of climbing harnesses • Development of climbing aids – such as carabiners, belay plates and camming devices • The use of helmets and other safety equipment • Changes in clothing used • Development of portable ledges and other devices to extend climbs • Introduction of simulated climbing environments

LEARNING ACTIVITY



TECHNOLOGICAL ADVANCES

- 1 Copy and complete this table using an outdoor activity of your choice.
- 2 Choose four technological advances and describe how these have progressed over time.

Technological advances	80 years ago	20 years ago	Today
1			
2			
3			
4			

While technology can do all of this, it can also act as a mediator between us and the outdoor environment. Basic household devices have drastically altered the way we live. They provide us with the means to perform a majority of what we need to do to survive in the confines of our own homes. Information and communication technologies allow us to maintain social contact and entertain us without having to leave the house. There is less and less reason to venture into the outdoors than ever before. A child today will spend less time exploring the neighbourhood and playing with other children than in the past, as they are likely to be indoors consumed by gaming and interacting through social media. Adults are increasingly finding it hard to escape the ease and comfort of a more sedentary indoor lifestyle.



Shutterstock.com/Dragon Images

Indoor rock climbing is an artificial environment that provides the physical activity of climbing, yet diminishes our connection with the outdoors.

with that environment? Perhaps if a climb is too easy for us, we do not fully respect the challenges of that environment?

We are now creating our own artificial environments designed to mimic the outdoors, but with ‘improvements’ that provide more controlled levels of participation. Indoor rock climbing will provide you with the physical activity of climbing, but with a multitude of graded routes all in one contained venue, with a roof over your head to keep out the weather. There will be no actual rock in sight.

Artificial wave pools are considered the next step in surfing participation. At one time this concept was thought of as far-fetched and unachievable, but wave pools are now springing up around the world, even in areas far removed from the beaches that we usually associate with surfing. They produce waves that can be used by competent surfers. Surfing legend Kelly Slater has invested heavily in this concept with his Kelly Slater Wave Company in the belief that such an artificial environment can bring the experience of surfing to those away from surf beaches. The structure also eliminates the reliance on environmental variables that surfing conditions rely on such as swell sizes and directions, tides and wind strengths and directions. How does this experience differ from actually travelling to the coast looking for waves?

The table on page 203 outlines some of the different ways that technology has an influence on relationships with outdoor environments. That is, the influence on:

- the way outdoor environments are perceived
- how we interact with outdoor environments
- the impact that we have on outdoor environments.

But even when we do venture into the outdoors, technology can still alienate us from the environments we visit. It can do this through the same innovations already listed. Can the use of Gore-Tex clothing, hi-tech tents, sleeping bags and other camping equipment detract from the outdoor experience? Does it remove us from the environmental conditions that are present? Consider the rock-climbing venue that includes bolts and hangers strategically placed across a cliff face to provide the climber with anchor points to attach to during an ascent. Does modifying the environment to assist us in our participation actually diminish the connection we make

LEARNING ACTIVITY



TECHNOLOGY PARADOX

The paradox is that each new layer of invention and innovation simultaneously enhances and separates us from the outdoor experience.

Mike Bartle, *Technology and Outdoor Education*, 2000

- 1 Discuss this quote using an example of outdoor adventure that you have participated in.
- 2 How has technology influenced your outdoor experience in this example?
- 3 Was it enhanced? Did you feel that you had been separated from the outdoors?

INFLUENCE OF TECHNOLOGY ON RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

Influence	Perception	Interaction	Impact
Alienation	<ul style="list-style-type: none"> • Separation from outdoor environments • Removal from outdoor environments • Outdoor environments are uncomfortable 	<ul style="list-style-type: none"> • Less participation in the outdoors • Participation in a wider range of indoor pursuits: social media, game consoles, information technology • Greater use of creature comforts: air conditioning, heating, lighting 	<ul style="list-style-type: none"> • Increased urbanisation causing loss of habitat • Less people travelling to outdoor environments less often has less impact on certain environments
Easier participation	<ul style="list-style-type: none"> • Outdoor environment is more attractive as a venue for participation • Can decrease 'wilderness experience' as not so exposed to environmental conditions • Can decrease the thrill of participation 	<ul style="list-style-type: none"> • More participation by more people as it is easier to do so • Participation in a greater range of activities (e.g. body boards, soft surfboards, wetsuits, surf forecast websites; camping equipment, GPS navigation) 	<ul style="list-style-type: none"> • Increased numbers participating can have a negative impact on specific environments (e.g. campsite overuse, beach/dune erosion)
Activities are safer	<ul style="list-style-type: none"> • Environment is a safe place to participate • Participants have a sense of security in the outdoors 	<p>Greater participation in the outdoors is possible through:</p> <ul style="list-style-type: none"> • More venues available • People being able to participate in a wider range of weather conditions • People being able to participate even if they are less skilled/experienced (e.g. GPS, wetsuits, surf forecast websites) 	<ul style="list-style-type: none"> • Greater number of people will put stress on specific environments
Performance is improved	<ul style="list-style-type: none"> • Environment is a venue for physical activity • Environment is a series of problems to solve through recreational activities 	<ul style="list-style-type: none"> • Participation encouraged in 'sensation seekers' • Increases higher participation rates (e.g. mountaineering equipment, mountain bikes, thrusters, surfboards, jet skis for tow surfing) 	<ul style="list-style-type: none"> • Equipment costs can reduce numbers participating • Increased participation can put stress on specific environments
Better access	<ul style="list-style-type: none"> • The outdoor environment is an accessible resource for leisure participation 	<ul style="list-style-type: none"> • Increased participation through improved transport (e.g. better alpine roads) • Access to remote areas • Snowmaking facilities to enable more skiing 	<ul style="list-style-type: none"> • Increased participation can put stress on specific environments • Widespread impacts due to increased accessibility to a greater range of venues



Alamy Stock Photo/DNOKY - Photonstop

Increased urbanisation and people living in suburban environments make it more difficult to reach the outdoors for leisure. Game consoles provide easily accessible indoor entertainment (even active), which reduces the need to go outdoors.



Shutterstock.com/Roman Mik hailiuk

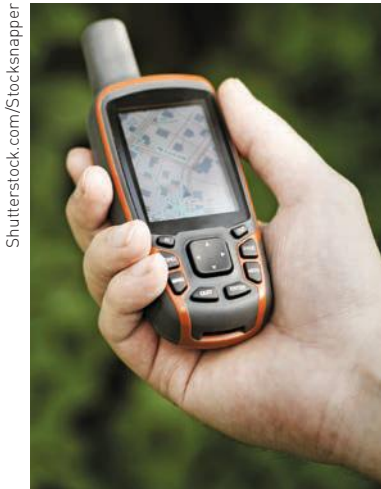
Modern tent designs can enable access to otherwise inhospitable outdoor environments.

EXAMPLES OF TECHNOLOGICAL INNOVATIONS

- **Bodyboards** enable easy entry-level participation in surf environments, which promotes a greater number of surfers at selected venues. Advances in wetsuit technology have enabled participation in a wide range of aquatic activities, in a wider range of environmental conditions, at more aquatic venues, more often and for longer.
- **Hiking/camping equipment** has enabled:
 - participation in a wider range of environmental conditions
 - participation in a greater numbers of outdoor environments
 - people to get out more often, despite the seasons
 - people to get out for longer periods at a time
 - people to enjoy these activities in a more comfortable way.
- **Surf forecast websites** provide surf predictions into the immediate future to enable participants to plan on when to surf, what venue to surf to minimise travel time.
- **Wetsuits** protect from cold (hypothermia), abrasion and provide floatation during aquatic activities with minimal influence on levels of performance. Participation in extreme conditions can be considered when protected from hypothermia.
- **Climbing equipment** enables mountaineering or rock-climbing participants to climb higher, harder and faster. The technological advancement of mountaineering equipment enables a mountaineer to tackle extremely hazardous terrain in a wide range of environmental conditions.
- **Tow-in surfing** using jet skis and specialised equipment has opened up a new discipline of surfing that opens new horizons of performance, utilises new venues and

- captures the imagination of the public. Websites can provide a range of data to enable surfers to match their level of ability to the difficulty of conditions to maximise safe participation.
- **Snowmaking** facilities enable participants to access alpine resorts for greater numbers of days per year with less dependence on natural snow falls (see chapter 4). The Mount Baw Baw Alpine Road has improved access to the resort village, enabling increased participation numbers to access the skiing facilities. Before this road was built, access was by the village chairlift and all luggage and equipment had to be carried individually.

- **GPS navigation** enables participants to map routes and find their location at the touch of a button. This is far safer, easier and more reliable than mapping with a compass and greatly reduces chances of getting lost.
- **Mountain bike** advancements provide riders with the ability to participate in a wide range of terrains with decreased levels of risk to them. Gradients never thought possible are now sought-after venues for riders.



With GPS, people can find their location with the touch of a button.



Mountain-bike technology makes difficult terrains more possible.

LEARNING ACTIVITY



SURF WEBSITES

Visit a surf forecasting website such as Swellnet, Magic Seaweed, Surfline or Willi Weather, then complete to the following:

- 1 What is the form of technology being investigated?
- 2 How can the use of this technology influence:
 - a the ease of participation in surfing?
 - b safety during surfing participation?
- 3 How can this technology influence our relationship with the environment? Think about:
 - a how we perceive the environment:
 - understanding conditions
 - desire to participate at a venue
 - personal connection to a venue
 - b how we interact with an environment:
 - which environments are used for surfing
 - rates of participation in surfing
 - when we participate in surfing.
- 4 How could this technology impact on specific surfing environments (positively and negatively)?
- 5 Visit a surf forecasting website and choose a venue to go surfing at tomorrow. Include reasons why you chose this venue.



Swellnet
Magic Seaweed
Surfline
Willi Weather

Commercialisation of outdoor environments and experiences

Commercialisation refers to the process of bringing a product into the market. This means that it refers to anything that can be bought or sold – a commodity. In Outdoor and Environmental Studies, both the outdoor environment and the outdoor experience can be considered commodities. The environment can be used to sell adventure and outdoor adventure experiences that can be bought and sold. How can this influence human relationships with outdoor environments? How does it influence our ability to access specific environments and activities? How do we regard the environment when we use it in this way? Will commercialisation have a positive or negative impact on the environment, or are both of these possibilities? In the following section we will examine these questions.

Outdoor experiences have become a booming industry in recent times. Social and economic conditions have enabled us to pursue outdoor recreation through the availability of leisure time and disposable income. Many people who live a busy working lifestyle will want to maximise their use of this time. They may seek out activities in which they can pay a person or company to provide them with an experience quickly and efficiently rather than having to devote the time themselves to all the planning and organisation required. This has led to the establishment of an industry based on selling the experience. These companies package the experience by organising everything for you. Travel, equipment, documentation, safety measures, knowledge, instruction, and so on, can all be included in the price of the activity so that the participant only needs to pay and turn up. This type of participation is considerably different to the way we have encountered and pursued outdoor experiences in the past.

Early outdoor experiences were generally pursued through a club or organisation, and many clubs still provide these experiences today. Those seeking such experiences could contact these organisations, attend trips and activities designed for beginners, and build up their skills and levels of experience while learning from other members. Although such experiences were able to be purchased in the past, they were not available to the extent we see today.

Melbourne Women's Walking Club Inc.



The Melbourne Women's Walking Club was founded in 1922 to encourage outdoor activity for women.

MELBOURNE WOMEN'S WALKING CLUB INC.

The Melbourne Women's Walking Club was founded in 1922 and continues to provide outdoor experiences for active women.

Club goals

The Melbourne Women's Walking Club summaries their goals as:

- to promote and encourage walking and an appreciation of the environment
- to organise walking trips and other outdoor activities
- to foster social activities among its members.

Recently, outdoor experiences have been regarded as commodities that can be packaged and sold according to consumer demands.

Through this commercialisation of outdoor experiences, far more people have access to what has been, in some cases, an exclusive world, where access can be dictated by knowledge, equipment, location, gender and cost. Now these experiences are available to anybody that has the financial resources to purchase them. Although this can put pressures on environments being utilised in this way, it may also provide exposure to many more people who develop an appreciation of the environments they visit.

This is not to say that everyone will be able to afford all types of commercialised adventure. The cost of participation may act to exclude those who cannot afford the price-tag that companies place on their experience. This can promote the emergence of a tiered system of interaction with specific outdoor environments. Extreme, remote and exotic locations may command a high price that only the privileged can afford. Companies may even obtain exclusive rights as the sole operator at a particular venue, enabling them to decrease access. In business terms, this can act to block ‘supply’ to the public, which increases ‘demand’. The greater the demand, the more a company can charge for the privilege to access the venue. However, those who cannot afford such activities will be confined to other activities or venues. While these might not necessarily be inferior in nature, they might not be the first choice of participants. Furthermore, some may not be able to afford much or any of these types of commercial outdoor activities at all.

As larger numbers of people access outdoor experiences, there is opportunity to educate about natural and cultural histories, and minimal-impact practices for sustainable participation, to foster an appreciation for outdoor environments. Operators can choose to adopt and promote environmentally sensitive practices, as well as provide participants with the reasons why they are doing this. Instructing participants about practices such as rotating venues to enable regeneration of native plant life, organising smaller group sizes to reduce the footprint left behind, or even carrying out all wastes (including the use of ‘poo tubes’), not only have an immediate lessening of impact on the outdoor environment, but reduce such impacts when these people participate in the future.

This is not always the case when outdoor experiences are viewed as commodities. If the adventure company is solely focused on making money (the profit margin), the environment can suffer. Companies with a more commercial focus may be more interested in ways of increasing profit. To achieve this, such companies will look at ways of streamlining their procedures to increase the difference between what they have to spend to run their operation and what participants are paying for the outdoor experience. In such cases, they may use practices such as large instructor/participant ratios to reduce employment costs or repeated use of single venues to accommodate numerous groups or streamline transport.

The environment used by the adventure company to generate revenue is itself being treated as a commodity. It can be simply regarded as one of the items of equipment that is utilised in the delivery of the outdoor experience. In this way, commercial interest will take priority over conservation, and environmentally sensitive practices can suffer if they threaten the ‘bottom line’. For example, if small group sizes are adversely affecting profits, the operator will more likely increase group numbers irrespective of the potential negative impacts this decision might have on the specific venue environment. Even when environmentally sensitive practices are used, sometimes the motivation can be to attract a particular type of participant.

The environmentally sensitive market is not only evident in the rise of the sustainable operator, but also in the rise in popularity of outdoor apparel as everyday wear for those assigning themselves to such an image. Choosing to wear clothes that suggest outdoor participation has become a fashion statement in recent times. Is this using the environment to sell a product?



Large numbers of participants and regularly used venues can impact negatively on outdoor environments.

Shutterstock.com/PiyachatS

INFLUENCE OF COMMERCIALISATION

The table on page 208 outlines some of the different ways that commercialisation has an influence on relationships with outdoor environments. That is, the influence on:

- the way outdoor environments are perceived
- how we interact with outdoor environments
- the impact that we have on outdoor environments.

INFLUENCE OF COMMERCIALISATION ON RELATIONSHIPS WITH OUTDOOR ENVIRONMENTS

Influence of commercialisation	Perceptions	Interactions	Impacts
<ul style="list-style-type: none"> Companies focused on using the environment to make as much money as possible by organising and running outdoor experiences 	<ul style="list-style-type: none"> Environment a resource Environment used to make money 	<ul style="list-style-type: none"> Large numbers of clients in groups Frequently revisit the same venue in a standardised format Failure to follow codes of conduct Failure to use minimal-impact techniques (e.g. a rafting operator continually using the same entry point with large numbers of participants each day) 	<ul style="list-style-type: none"> Selected environments will suffer from overuse and will be unable to recover due to continual use (e.g. bank erosion and loss of vegetation at raft entry point)
<ul style="list-style-type: none"> Companies use opportunity to promote and educate participants about appropriate outdoors behaviours 	<ul style="list-style-type: none"> Environment not a limitless resource Need for preservation to allow for outdoor experiences in the future 	<ul style="list-style-type: none"> Adopt and teach minimal impact practices Adhere to codes of conduct Educate about features of environments visited Rotate sites used by groups Appropriate group size (e.g. strict rules on carrying out all waste when hiking in sensitive areas) 	<ul style="list-style-type: none"> Small groups don't impact on environment Rotating sites enables regeneration of vegetation Minimal-impact practices means the environment needs less time to recover Education promotes appropriate behaviour in the future
<ul style="list-style-type: none"> Companies package, market and sell outdoor experiences to anyone who chooses to spend their money that way 	<ul style="list-style-type: none"> Environment an avenue to use as a resource in which the experience is easily bought or sold Environment a place of fun and adventure 	<ul style="list-style-type: none"> Increased participation in activities due to ease of participation Only need to turn up and spend money and the rest is organised (e.g. surf schools providing all equipment, instruction, supervision necessary for easy participation) Surf schools can provide: <ul style="list-style-type: none"> coaches to instruct soft learner surfboard wetsuit hoods/boots if required helmets if required appropriate venue <p>All of this is packaged to make it as easy to participate as possible, as long as you pay!</p>	<ul style="list-style-type: none"> Increased numbers can negatively impact on specific environments
<ul style="list-style-type: none"> Companies package, market and sell outdoor experiences to anyone who chooses to spend their money that way 	<ul style="list-style-type: none"> Environment an exclusive commodity and only available to those who can afford to pay for the outdoor experience 	<ul style="list-style-type: none"> Decrease participation in outdoor experiences that are expensive Experience only available to those who can afford it (e.g. surfing boat trips are available to those willing to spend the money needed) Surf charters are an expensive and extravagant way to experience the outdoors Some operators even have exclusive rights to particular venues and use this as a selling point in their marketing 	<ul style="list-style-type: none"> Lower participation rates can keep environmental impact to a minimum

LEARNING ACTIVITY



OUTDOOR RECREATION COMPANY

Research a commercial outdoor recreation company, then respond to the following:

- 1 Explain why the chosen provider is a commercial operation.
- 2 Outline the venues utilised by this commercial operator.
- 3 How is the environment perceived in their advertising?
- 4 Outline two ways this company is interacting with the outdoor environment.
- 5 How could this type of outdoor experience:
 - a encourage greater participation rates?
 - b cause decreased participation rates?
- 6 How could the operations of this commercial operator impact negatively on the natural environment?
- 7 Outline two ways that this commercial operator can minimise their environmental impact.

Portrayals of outdoor environments and experiences

In today's world, we are subject to many different influences that contribute to shaping our relationship with the outdoor environment. This includes views or attitudes about the environment that we are subjected to from a very early age. Initially, our interaction with those close to us, such as our parents, will be a major influence on our own views. If we were to grow up on a farm, for example, our family's livelihood would be based on particular interactions with that land that we live on. The role of the outdoor environment is very specific in this instance as the importance of the productivity of the land is fundamental to the farming family's values.

Later though, as we become more independent, we generally gather our information in one of two ways. We firstly rely on our personal experiences where we will synthesise our own interpretation of the things we encounter. We also rely on second-hand information, or information that is being provided to us from another source – whether it be through written, oral or visual methods. It is this second-hand information that provides the portrayals of the outdoor environment and outdoor experiences that can have an influence on our relationship with the outdoors.

A **portrayal** refers to the way the outdoor environment or experiences are represented. Specific environments are portrayed in certain ways depending on the message that a person or group is trying to make. It can reflect an opinion or attitude about that environment, or it can indicate the perceived purpose of that outdoor environment.

Different people or groups can portray the same outdoor environment in different ways, depending on what they see as the purpose of the land. Although there are countless possibilities for how this can be done, the following points outline some different ways the outdoor environment, and experiences in them, can be portrayed. The outdoor environment can be portrayed as:

- an adversary
- a gymnasium
- a resource
- a museum
- a cathedral.

(Some of these concepts, you will notice, have been touched on earlier when we looked at relationships reflected in different types of interaction with outdoor environments.)

portrayal
The way in which something is represented



Beachsafe

OUTDOOR ENVIRONMENTS AS AN ADVERSARY

When the outdoor environment is portrayed as an adversary, it is being considered as something that is fundamentally working against us. This requires us to overcome the challenge that the environment sets for us. This could include portraying the environment as a threat to our safety, or even to our life.

Consider the information provided by the Surf Lifesaving Association on its Beachsafe website. This service is set up to provide an assessment of the safety of the beaches on our coastline. It tells us what we need to consider when using them for recreation and includes a standardised hazard rating. This information can be extremely valuable to visitors to this environment, especially if they have not been to the beaches before, and can assist people in choosing an appropriate venue in which to participate in aquatic activities. How is this influencing our relationship with these specific environments?

CASE STUDY: GUNNAMATTA BEACH

GENERAL BEACH HAZARD RATING: 8/10
(HIGHLY HAZARDOUS)



Leigh Park

Gunnamatta Beach is an exposed, high-energy beach with a wide, rip dominated surf zone. It is located in the Mornington Peninsula National Park and is part of the 30 km long sandy and rocky coast that extends from Cape Schanck to Point Nepean. The Gunnamatta section is 3 km long, with extensive intertidal calcarenite reefs and rocks forming the boundaries, with some smaller reefs on the beach and in the surf. Truemans Road runs out through the dunes to the beach, where there is a large car park and the surf lifesaving club.

The beach faces south-west, exposing it to high westerly winds and waves. The waves average 1.9 m and combine with the medium sand to produce a 150 m wide single bar surf zone. The bar is cut by strong rips every 300 m, together with additional permanent rips next to major reefs and rocks. The rips intensify around low tide.

The Gunnamatta Surf Life Saving Club was founded in 1966. This is a very hazardous beach, with an average of 113 rescues a year, second only to its neighbouring Portsea Beach.

SWIMMING

This is a potentially hazardous beach for swimming, with usually high waves and strong rips close to shore. Definitely stay between the flags, on the bar and away from the rips, rocks and reefs.

SURFING

Gunnamatta offers the best beach breaks on the Mornington Peninsula, with consistency guaranteed by the high swell and reefs. Good breaks are found down the beach past the surf club, in front of the first and second car parks, and up the beach at the Pumping Station, which is, however, polluted by the sewerage outfall. Best conditions are with a low to moderate swell and north-easterly winds.

FISHING

Deep rip holes and gutters, together with rocks and reefs, are a permanent feature of this beach and make it a popular spot for beach and rock fishing.

GENERAL

A high energy, hazardous beach backed by extensive sand dunes. Best suited for experienced bathers and surfers.

Beachsafe

A characteristic of the Australian environment is its climatic variation including its susceptibility to long periods of low rainfall. The existence of drought has traditionally provided Australian farmers and agriculturalists with significant challenges to their productivity. For this reason, the Australian environment is often portrayed as harsh and unforgiving, and a threat to the livelihood of those trying to make a living from it.

The challenge that elements of the outdoor environment can present during recreation can also be portrayed as the thing to be overcome. It might be a feature such as a rock or cliff face, a high-altitude mountain, severe conditions, or anything that poses a threat to the safety of the participant.

OUTDOOR ENVIRONMENTS AS A GYMNASIUM

When the environment is portrayed primarily as a place for humans to participate in recreational activities, it is being regarded as a gymnasium. Here, it is the venue for human activity – whether it be to run, walk, jump, climb, swim, paddle, or whatever. It provides terrain, gradients, rapids, holds or waves that are the playground in which we engage in and enjoy activity. The challenges that these different elements of the environment present are what is attractive to the participant. They can be seen as problems that need to be solved or a series of achievements. Portrayals of these types can often incorporate an element of thrill as the challenges that the environment provides include an element of risk. There has been a rise in popularity of ‘extreme’ activities, whether actual participation or to promote a product, and these rely heavily on this type of portrayal.

There are many ways to describe a river environment. For someone who is interested in using the river to test their paddling skills and to experience the thrill of shooting the rapids while successfully completing a set course, they would probably describe the river in terms of its degree of difficulty. The components of the river, such as flow rate, obstacles, drops and eddies, are dissected and analysed to determine the amount of physical skill required to safely participate in recreation in this environment. The river to them is the gymnasium.



Shutterstock.com/Ammit Jack

The challenges involved are often what attract people to particular outdoor activities.

RIVER GRADES

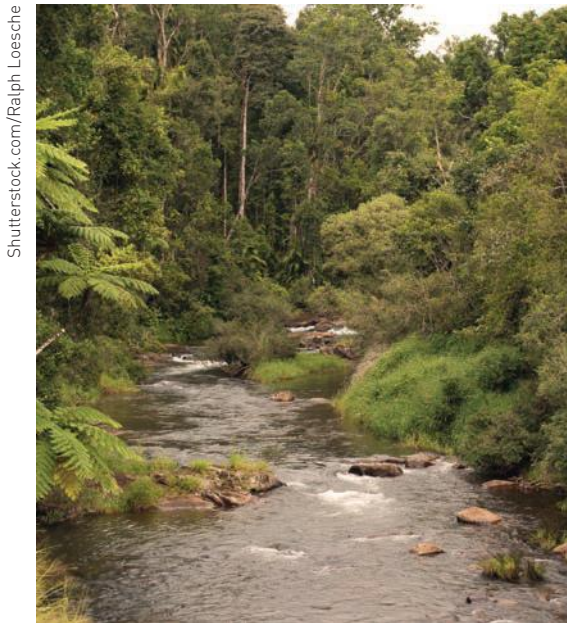
When looking at the grades for a river, it is important to remember that the grading is based on normal flows. The grading of a rapid will change when the water is lower or higher than the river's regular level. The following information from Paddle Australia is based on the International River Classification System.

CLASS I – Easy

Moving water with few or no obstacles. Passages are wide open and easily seen from the river.

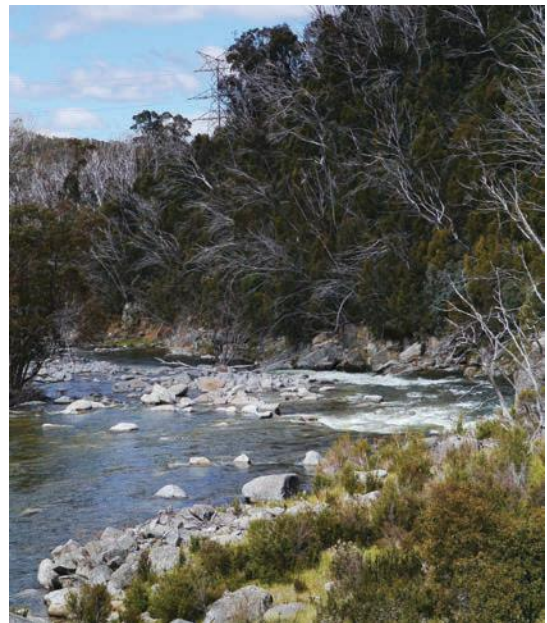
CLASS II – Medium

Rapids with small obstacles and regular features. Passages are open and obvious without scouting, but may require manoeuvring.



Shutterstock.com/Ralph Loesche

Class I – Easy



Shutterstock.com/InavanHateren

Class II – Medium

CLASS III – Difficult

Rapids with regular features that require manoeuvring to negotiate. Passages can be narrow and features such as holes and irregular waves must be run to negotiate the rapid. Risk of injury.

CLASS IV – Advanced

Rapids with highly irregular features. Complicated passages that often include vertical drops and may require scouting to find safe passages. Linked manoeuvres are required in convoluted passages. Risk of injury and possible risk to your life.



Class III – Difficult



Class IV – Advanced

CLASS V – Expert

Rapids with violent and irregular features. Extremely congested passages that almost always require scouting to determine safe routes. Most class V rapids include vertical drops and require running large-scale features in a complex series of manoeuvres. Definite risk of serious injury and possible risk to your life.

CLASS VI – Extreme

The difficulties of class V taken to the extreme. Rapids with extremely violent and unpredictable features where experts require considerable advance scouting and planning to determine possible passages. All class VI rapids require the paddler(s) to negotiate vertical drops and very large features. Always a risk to your life. Generally only possible at certain water levels.

Courtesy of AdventurePro, www.adventurepro.com.au



Class V – Expert



Class VI – Extreme

sustainability

The ongoing capacity of Earth to maintain all life

OUTDOOR ENVIRONMENTS AS A RESOURCE

Portraying the outdoor environment as a resource reflects the attitude that it should be used to support our needs. This can include our survival needs or the things that we need to live on such as foods and other materials. These are harnessed from the environment by taking them directly or by utilising and modifying the environment to produce them.

A cattle grazer or dairy farmer will provide pasture on land cleared specifically for the raising of their herd. This industry is required to support the human population's need for food. Although the purpose of the land here is primarily for resource production, there is an increasing awareness of conservation and **sustainability** issues associated with their interactions with their land. Many farmers are today involved in groups such as Landcare, Land for Wildlife and the Victorian Farmers Federation. Although the focus of such groups is often on sustainability of their industry, the way farmers regard their land and the understanding of the benefits of a healthy environment is leading to increasingly positive impacts.

The production of resources can also be driven by human desires for improvement and enhancement. This may include aspects such as making money from the environment or utilising the environment to advance human standards of living. Power companies are increasingly searching for the expansion of existing power production or new power sources. Our reliance on power such as electricity for domestic and industrial purposes provides the demand for this resource and makes it a rich commodity. The potential to make money will encourage continual exploration of the environment, and industries such as these will put pressure on specific environments in the pursuit of resources.

OUTDOOR ENVIRONMENTS AS A MUSEUM

When the environment is portrayed as a museum, it is presented as a place of history that can be used to help us understand human relationships with the outdoor environment. When we think of a museum, we think of a storehouse of items from history. Not only do these things help us with our understanding of the past, they also help us with our understanding of where we are going in the future. The environment can be thought of in this way too.

Due to the rapid rate of vanishing wilderness in both the past and present, the areas that remain intact can help us understand the effect humans are having on certain venues. The use of reference zones in the management of national parks involves demarked areas of minimal to no human access. These zones can be used to compare with other areas that are subject to a higher level of human impact (such as recreation zones) to determine what effect we are having and to formulate management strategies to reduce these effects.

The preservation of the natural components of the environment does not only have to be for research purposes. Someone might simply enjoy visiting a natural outdoor environment to escape the human-dominated landscapes that surround them in their day-to-day lives. With an ever-increasing separation of humans from nature and intact environments becoming more and more rare, the environment becomes a small example of what was once all around us and where we came from. To highlight this, we might portray it as something that is continually threatened by the impacts our lifestyles cause.

OUTDOOR ENVIRONMENTS AS A CATHEDRAL

This portrayal involves regarding the outdoor environment in a spiritual way. Often, such a portrayal will highlight the 'specialness' of an environment or an aspect of an environment, and emphasise how its existence and health is essential to human wellbeing. Here, we are not necessarily talking about formal religious doctrines, but rather a connection that one makes with the outdoors that is fundamental to their existence. This type of connection is becoming increasingly more popular in developed cultures such as ours and can spring from a range of factors.

Indigenous rights and awareness movements have an increasing influence on our perceptions of the outdoor environment. They bring with them integral human–nature connections, which have been the basis for successful long-lasting sustainable relationships with the environment.

Social movements, including those centred on the environment, have endured and grown since the 1960s and have provided alternative belief structures to traditional religions. With a decline of formal religion among young people today, many are in search of a spiritual meaning for life and the environment can sometimes provide this.

The notion of kinship in relation to outdoor environments, despite not necessarily fitting in with the cathedral portrayal, also has at its core a fundamental link between humans and nature. This environment is portrayed as something that is subjectively identified with self. In this instance, humans are not separate or superior to nature and there is little distinction between the two. This portrayal of outdoor environments is consistent with Indigenous Australian perspectives and more recent perceptions such as **deep ecology**.

deep ecology
 Conservationist philosophy that regards humans as one of many equal components of a global ecosystem

What is deep ecology?

Chris Johnstone from the Institute for Deep Ecology (UK) says: ‘Deep Ecology is a holistic approach to facing world problems that brings together thinking, feeling, spirituality and action. It involves moving beyond the individualism of Western culture towards also seeing ourselves as part of the Earth. This leads to a deeper connection with life, where Ecology is not just seen as something “out there”, but something we are part of and have a role to play in’.

Where do we find these portrayals?

Portrayals such as those previously described can be found in the second-hand information that is being provided to us through written, oral and visual methods. These portrayals of the outdoor environment and outdoor experiences can influence our relationship with the outdoors. Portrayals of the outdoor environment and experiences occur in many mediums including:

- media (magazines, newspapers, television, Internet)
- music
- art
- advertising.

The following table outlines some of the different ways that these portrayals have an influence on relationships with outdoor environments. That is, the influence on:

- the way outdoor environments are *perceived*
- how we *interact* with outdoor environments
- the *impact* that we have on outdoor environments.

PORTRAYALS OF OUTDOOR ENVIRONMENTS

Medium	Portrayal	Perception	Interaction	Impact
Media	Gymnasium <ul style="list-style-type: none"> • Steep hill, rock face or wave that appears challenging and exciting 	<ul style="list-style-type: none"> • Environment seen as a challenge • A place to do physical activities 	Recreation <ul style="list-style-type: none"> • Encourage participation in a range of activities in a range of venues (e.g. rock climbing, mountain biking, surfing) 	<ul style="list-style-type: none"> • Increased impacts through greater numbers of people
Music	Threatened due to: <ul style="list-style-type: none"> • Urbanisation • Loss of habitat • Commercialisation • Pollution • Agricultural techniques 	<ul style="list-style-type: none"> • Tell people that the environment is a limited resource • People may consider the environment worth protecting 	<ul style="list-style-type: none"> • Promote conservation • People consider the environment more in their decisions 	<ul style="list-style-type: none"> • Can encourage people to use more sustainable practices through lyrics

Medium	Portrayal	Perception	Interaction	Impact
Art	Special <ul style="list-style-type: none"> Man is continually disillusioned with urban lifestyle and needs to reconnect with nature to live a fulfilled life 	<ul style="list-style-type: none"> Highlights our separation from the environment People may see the environments as a place to be mentally refreshed 	Recreation <ul style="list-style-type: none"> Can inspire more people to visit the outdoors to reconnect Conservation <ul style="list-style-type: none"> Can encourage some to preserve the environment for its healing qualities 	<ul style="list-style-type: none"> Fosters an appreciation of the environment and so minimises impacts
Advertising	Resource <ul style="list-style-type: none"> Environment is a thing to use to produce goods for human needs 	Promotes: <ul style="list-style-type: none"> Resources for human needs People are superior to the environment People have power over the environment 	Primary industry promotes: <ul style="list-style-type: none"> Forestry: timber extraction for building and chipping for paper products Cattle grazing to produce food 	<ul style="list-style-type: none"> Significant impacts associated with alterations we make to the environments we use



Advertising portrays the environment as a resource for human needs.

LEARNING ACTIVITIES



MEDIA



Michael Leunig's 'Understandscope'

Image by Michael Leunig (first published by Fairfax Media, March 1984)

How is the environment being portrayed in this image?

- 1 Describe the scene in Michael Leunig's 'Understandscope' cartoon.
- 2 What is the specific message being suggested?
- 3 How can it influence relationships with the environment?
- 4 What is the portrayal of the outdoor environment being suggested in the Tourism Australia advertisement and on the *Surfing Life* magazine cover?
- 5 How can it influence our relationships with the environment?

MAGAZINES

Survey a set of outdoor-themed magazines in your school or local library (e.g. *National Geographic*, *Wild*, *Tracks*, *Rock and Ice*, *Cumec*, *Habitat* [ACF], etc.).

- 1 Using the types of portrayals described above as a guide, record examples of how different portrayals are used.
- 2 Are they used in advertisements or articles?
- 3 Does a particular magazine rely heavily on a particular type of portrayal?
- 4 Why do you think the advertiser/magazine chose these portrayals?
- 5 How could these portrayals influence the reader?

FIND SONGS

'I wrote "Big Yellow Taxi" on my first trip to Hawaii. I took a taxi to the hotel and when I woke up the next morning, I threw back the curtains and saw these beautiful green mountains in the distance. Then, I looked down and there was a parking lot as far as the eye could see, and it broke my heart ... this blight on paradise. That's when I sat down and wrote the song.' Joni Mitchell

Search online for other songs with an environmental theme (or use one that you already know).

- 1 Provide the lyrics to the song.
- 2 How is the environment portrayed in the song?
- 3 How effective is this portrayal in providing the intended message (i.e. how successfully have they been able to influence perceptions of the environments and why)?
- 4 How could this influence show how a listener might interact with the outdoor environment?

ART

- 1 Describe the scene in the Leunig cartoon on page 217. What is the specific message being suggested? How can it influence our relationships with the environment?
- 2 Refer to earlier chapters in this book or conduct an online image search to find four Australian artworks that portray the outdoor environment in different ways.
- 3 Describe how the environment is portrayed in each.
- 4 How does the artist achieve this imagery?
- 5 How can it affect those who witness the artwork?

Fairfax Syndication/Jon Reid



High ropes activities are perceived by many to be extremely high risk. In reality, the use of harnesses, belay ropes, helmets and spotters, along with regular risk assessment, makes this activity quite low in real risk.

Social responses to risk-taking

For some people in society, adventure and risk-taking are important; for others, these activities are perceived to be senseless and dangerous. The ways in which people respond to risk-taking behaviour vary and they are generally related to perceived risk rather than real risk. That is, what a person thinks the dangers associated with a particular pursuit may be versus the actual or real risk.

People respond in a variety of ways to others engaging in what they perceive as risk-taking behaviour or to incidents that occur during adventure activities. These responses relate to the way society defines roles for different people and can lead to changes in the way we perceive, interact with and impact on the outdoor environment.

Often, society's responses are shaped by the way a pursuit or endeavour, and any associated incidents, are portrayed by the media. They can include exaggerated reports that sensationalise

an account of what has occurred by over-emphasising or under-emphasising particular aspects. Reports can concentrate on implications such as the costs incurred by taxpayers through the use of emergency services, amount of harm or trauma suffered by the participants, alleged negligence on the part of operators or instructors, or suggested lack of responsibility of participants by putting themselves in harm's way. Although the intention of the media here is not necessarily to provide an inaccurate report of what has happened, the language used and details provided may be chosen more to spark interest of potential readers by capturing their imagination or encouraging controversy. These reports can influence what we believe is appropriate in terms of the level of risk we or others pursue, or are subjected to, in the outdoors.

If an incident does occur in the outdoors that involves near miss, injury or death, a fairly typical chain of events can often follow. This chain of events, which begins with media coverage, will usually result in responses that are aimed at preventing any future reoccurrence of the incident by reducing the specific risks involved in the activity.

Media reports can often include quotes from witnesses or members of the public with a specific interest in the incident. These quotes provide the initial public response that can often lean towards negative accounts of disbelief, shock or outrage over what has transpired. Again, the sensational aspect of the media report will be enhanced. The media report then provokes further responses from the public that can be aired through channels such as social media posts, newspaper editorials or radio talk-back. These responses can often mirror media perceptions and attempt to lay blame and search for a guilty party, or attempt to appease the grief of those affected by the incident. There also exists the opportunity to respond with reason and balance, which is usually the role taken on by authorities or the adventure industry.

The investigation into an incident will attempt to determine the actual events that have occurred during the adventure activity. Here, subjective perception of risk is less important than the real risks involved as those in charge of the investigation will be more interested in what has gone wrong and how it can be avoided in the future. Who the investigation is conducted by will depend on the severity of the incident. If a death is involved, the coroner will usually conduct the investigation, which provides a high level of formality in a legally sound setting. People involved will be interviewed along with others with expert knowledge and experience in the particular activity or outdoor environment. A report containing the findings of the investigation, including those liable and recommendations for future participation, will then be presented to authorities. Similar proceedings will follow less severe incidents and might be conducted by other authorities such as police or by the outdoor adventure industry itself.



Media report

STUDENTS OFFERED SUPPORT AFTER WATCHING TEACHER DROWN

Several Melbourne schoolgirls involved in a traumatic rescue from dangerous ocean swells have returned to school a day after their teacher drowned in the tragedy. Shelford Girls' Grammar principal Polly Flanagan said her school's community was suffering and was concerned for the 40-year-old teacher's wife and young daughter. Ms Flanagan said students at the Caulfield school were coping 'as well as they can' and had been offered counselling.

Paul Simpson drowned while trying to rescue some of his students who were pulled into rough surf during a Year 10 snorkelling excursion to Bells Beach about 4.40 pm yesterday. Three teachers and 15 schoolgirls were heading back to shore when a wave knocked them off a reef and into deeper water, where they became caught in a rip. Mr Simpson was trying to help the students when he got into trouble himself. He suffered cardiac arrest and was dragged from the water unconscious. Those at the scene and paramedics couldn't revive him.

Local resident Russell Allan, who was first on the scene yesterday and has surfed the area for many years, said he would not have gone swimming in yesterday's rough, blustery conditions ... Asked if he would have gone swimming at the beach yesterday, the experienced surfer said: 'No'.



Newspix/News Ltd.

The scene at Bells Beach where a male teacher died after students from Shelford Girls' Grammar in Caulfield were rescued from the surf.

'Surf conditions were very rough and [there was] a large swell yesterday and with a pretty strong south-westerly wind blowing at that stage,' he said. He said the reef where the group was snorkelling was about 100 metres off-shore, and could be accessed on foot when the tide was low. 'But when the tide comes in that reef's completely covered,' he said.

Police said the maths and science teacher was snorkelling with a group of 16 Year 10 students on a reef at Southside Beach, south-west of Bells Beach, when he and four schoolgirls were washed off by large waves. Four operators who were with the group rescued the students, and then returned for Mr Simpson who was unconscious.

By Megan Levy, Maris Beck and AAP,
The Age, 4 March 2011

LEARNING ACTIVITY



RESEARCH AND DEBATE

- 1 Analyse a media response to a misadventure that has occurred in the outdoors. Include print, television and radio responses.
- 2 Interview your family and friends about how media coverage can influence the attitudes of participants to an outdoor experience. Combine your responses with those of others in your class. What similarities and differences did you find?
- 3 As a class or in small groups, debate the following statement: 'Media portrayal of misadventure in outdoor experiences is exaggerated when compared with other mishaps in the community'.

Legal proceedings may follow if an investigation suggests that negligence has actually occurred. Although a vast majority of outdoor adventure activities are conducted by suitably qualified staff or instructors in appropriate environments adhering to relevant guidelines, there are rare circumstances where this is not the case and a legal precedent needs to be set to ensure future participant safety. In doing this, however, the level of inherent real risk of outdoor adventure is not completely ignored and is considered in the context of the legal decisions.

Response to tragedy by authorities such as local, state or federal governments and statutory bodies, such as Parks Victoria, usually involves the imposition of regulations. Often such regulations take the form of training (as has occurred in rock climbing and canoeing) and registration requirements. Another response is to restrict access. For example, at Hanging Rock, rock climbing has been banned in part because of the risk to other users of the area from dislodged rocks and debris. Sometimes sites are closed altogether.

One way of implementing these measures is to introduce or redefine zoning restrictions on public land such as national parks. A direct effect of such restrictions is to reduce the sense of freedom experienced by users and, in some cases, reduce the opportunity for friction to occur between groups with different values, such as bush walkers and trail-bike riders. Such restrictions can also increase the safety of both users of the natural environment and its inhabitants.

Introducing and enhancing safety regulations is also a response that can be initiated by other participants in a particular pursuit following an incident. They may work together with authorities in order to introduce a code of conduct or encourage and implement a certification system so participants are knowledgeable about the skills and safety techniques required for particular activities to help safeguard themselves and/or the public. An example of this type of certification is in Surf Life Saving where members must earn a Bronze Medallion in order to patrol beaches and coastlines. While such measures certainly lead to safer activities, for some they can also reduce their sense of freedom of choice and escape from everyday expectations. They also increase the cost of pursuits due to new equipment requirements and perhaps training. Increases in insurance premiums based on calculated risk of injury can further contribute to increasing operator costs, which will be ultimately worn by the paying participant.

Shelters, huts, snow pole lines, signs, fences and barriers at lookouts are other tangible signs of the way in which society can respond to risk-taking activities. Such infrastructure improves safety, sometimes even providing a false sense of security, but can also diminish one's sense of wilderness and adventure due to its visual impact.



Alamy Stock Photo/Antonio Siwiak

Guide/participant ratio: Many outdoor experience industries regulate how many participants can be in a guided group. Usually, the smaller the group, the safer the activity. What does this mean to the costs of running activities?



Surf Lifesaving Victoria

Certification can improve the perception of safety, but also increases costs of activities.

LEARNING ACTIVITIES



SAFETY AUDIT

- 1 While on a practical experience, observe and record any evidence of regulation or attempts to increase safety and reduce risk. This may include: fences at cliffs, 'beware of ...' signs, snow pole lines, shelter huts and steps.
- 2 Why are these items in place?
- 3 Do you feel they are necessary? Give reasons for your answer.

EXPERIENCE AND REFLECT

Visit a local adventure playground or make use of equipment in your gym.

- 1 Work in pairs and complete the course laid out over, under and through a variety of objects.
- 2 When you are familiar with the course, complete it wearing a blindfold while your partner acts as a spotter. Swap roles.
- 3 Change the circuit around. Discuss how you felt after completing the circuit first with sight and then without.
- 4 What would have made you feel safer?
- 5 Give a definition of perceived risk.

Alamy Stock Photo/charistoone-photo



SUMMARY OF SOCIAL RESPONSES TO RISK-TAKING

Society’s responses to risk-taking behaviour are an influence on the relationship we have with outdoor environments. Whether it is media reports, regulation of industry operation standards, restricted participation in specific environments or provision of infrastructure, all can have an effect on how we perceive, interact and impact with the outdoors. The following table outlines some of the ways this can occur.

Medium	Perception	Interaction	Impact
Media reports: <ul style="list-style-type: none"> • exaggerated • dramatised 	<ul style="list-style-type: none"> • Can promote outdoor environment as unsafe and hostile 	<ul style="list-style-type: none"> • Participation decreased in those that are fearful or impressionable 	<ul style="list-style-type: none"> • Lower participation rates can lead to decreased impacts on certain environments • Can lead to negative views and reduced care
Regulation of activities by: <ul style="list-style-type: none"> • industry • government 	<ul style="list-style-type: none"> • Promote outdoor environment as a safe and conducive venue for participation 	<ul style="list-style-type: none"> • Increased participation in a wide range of people 	<ul style="list-style-type: none"> • Increased negative impacts on specific venues used regularly by larger groups • May increase positive appreciation
Including: <ul style="list-style-type: none"> • rules and regulations • restricted venue access • mandatory safety equipment • instructor: participant ratios • training requirements • infrastructure 	<ul style="list-style-type: none"> • Outdoor environment could be seen as an unaffordable luxury due to increased costs of running activities 	<ul style="list-style-type: none"> • Decreased participation by those who cannot afford it 	<ul style="list-style-type: none"> • Less negative impact if lower participation rates
	<ul style="list-style-type: none"> • Outdoor environment unpredictable and only certain venues are appropriate for activity 	<ul style="list-style-type: none"> • Increase in participation in activities and venues perceived as safe 	<ul style="list-style-type: none"> • Less human impacts in restricted areas • Negative in areas with increased pressures of greater numbers
	Infrastructure may: <ul style="list-style-type: none"> • decrease wilderness experience • provide false security 	<ul style="list-style-type: none"> • Discourage participation in those seeking escape from human influences and comforts • Encourage participation due to decreased perception of risk 	<ul style="list-style-type: none"> • Infrastructure can attract participation and limit impact to certain areas • Can provide visual impacts

SOCIAL AND POLITICAL DEBATES ABOUT ENVIRONMENTAL ISSUES

With Australia and the world facing what many consider an environmental crisis, there are many strong and vocal opinions about what we need to do to avert disaster for our civilisation and environment. There are also many who oppose the swift and urgent action being suggested, instead calling for a more moderate response measured against other factors such as the economy and existing industry. As a result, debate exists among those in the community and those in government who are responsible for the decisions that will be made.

Social debate may include points of view, conversations or arguments that are expressed through different media such as conversations, tweets, blogs, Facebook pages, and so on. It can involve anyone who wishes to comment on a particular topic: an expert opinion or just someone with a personal interest in the matter. Conservation interest groups, construction companies, mining firms or farmers might all engage in debate to express their opinions.

Political debate includes discussions among government agencies such as Parks Victoria and the Department of Environment, Land, Water and Planning (DELWP). Companies with commercial interests in public land also communicate with government about managing the environments.

In this section, we are expected to understand how outdoor environments are threatened, possible causes of the issues, and the reasons people, groups or governments are talking about the issues. However, we are more interested in the actual discussions and debates: importance of the issues, whether or not we should deal with them, and how we might do this, and how these debates can influence our relationships with outdoor environments.

We will now analyse current debates about the following environmental issues:

- climate change
- water management
- renewable energy.

Debates about climate change

As well as being an environmental issue, climate change has been a hotly debated topic during this century. The media has played an important part in how opinions have been shaped regarding climate change issues, especially in the social setting where views have become polarised in many instances.

Climate is changing around the globe, with increased average atmospheric temperatures. Over the past century, global average temperature has risen by over 0.7°C. Australia has had an average of almost 1°C warming since 1950. This trend is occurring all over the planet, and increases in temperature are faster than expected.

Changes in temperature correspond to rising carbon dioxide (CO₂) levels in the Earth's atmosphere. The increased CO₂ observed is more rapid than for at least 1800 years. CO₂ is known as a greenhouse gas as it holds in heat radiated from the Earth after it has been heated from solar radiation. CO₂ is not the only greenhouse gas, but is a main contributor to the natural greenhouse effect (the Earth's atmosphere holding in heat, at an average of 15°C, which allows life to exist).

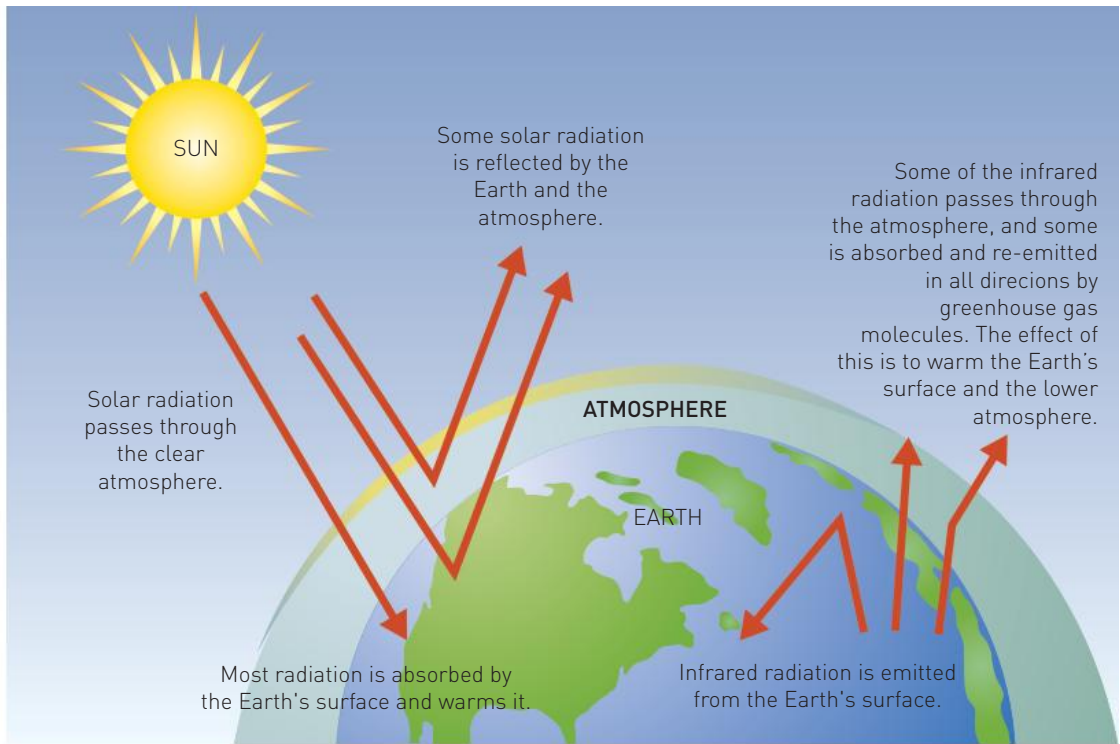
The level of CO₂ in the Earth's atmosphere has been rising steadily since the Industrial Revolution. Burning fossil fuels produces CO₂ that is released into the atmosphere.

CO₂ levels have been measured back to 800 000 years ago by analysing microscopic gas bubbles in the **ice record** – the layers of ice in the arctic. In the records, there is a large spike at the end of the graph – known as a hockey stick graph. The spike shows the sudden increase since the Industrial Revolution and suggests what might happen to global temperatures in the future if current CO₂ level increases continue.

CO₂ measured in polar ice shows fluctuations throughout the last 800 000 years, but highlights a spike in recent decades. Estimates for the near future are for an increase in this spike. How will this affect the climate and us?

ice record

Pockets of air trapped in ice of known age used to examine changes in atmospheric gas concentrations



The greenhouse effect

We are only beginning to find out how these changes in climate will affect humans and the planet. Our understanding of the climate is only basic due to the many variables involved. We know that increased CO₂ holds in more of the heat radiated from the Earth's surface, and that sea levels are rising.

THE CLIMATE CHANGE DEBATE

Despite the changes observed around the planet, there is still debate over the validity of the theories that support global warming and associated climate changes. They often centre on whether humans have a major influence in the climate. It also questions the importance of the changes we are seeing and whether we need to do anything about them.

Opinions surrounding the climate change debate include beliefs by:

- **Greenhouse sceptics:**
 - CO₂ is an inert gas and not a pollutant.
 - The Earth's atmosphere has warmed and cooled naturally over thousands of years and what is occurring now is another natural change.
 - Warming is not caused by increased CO₂ levels through human activities like burning fossil fuels (coal, oil, gas) for energy production.
 - The climate is too complex to predict.
 - Humans are powerless to do anything about climate change.
 - CO₂ is actually good as it assists in **greening** the planet.
- **Climate scientists** – The views held by greenhouse sceptics are in conflict with those held by a majority of the climate scientists who agree that if we fail to reduce carbon pollution caused by human activities such as burning fossil fuels, climate change will have profound impacts on our planet.
- **The media perspective** – The debate about this issue has been distorted by media reports that suggest a relatively even split in scientific opinion about human influence on climate change.

greenhouse sceptic

Those with the belief that claims by climate scientists and environmentalists that the climate is changing due to human activities are false or exaggerated

greening

Process of transforming a space into a more environmentally friendly version, with increased plant growth

WHAT TO DO?

How we should respond to climate change is also a subject of debate. Humans have been able to adapt to environmental pressures throughout history and we need to be prepared for the climatic changes in the future. A range of responses are possible:

- adapt
- **mitigate** the extent of climate change
- introduce economic incentives to modify human practices that contribute to climate change.

Some greenhouse sceptics are reluctant to respond at all to the threat of climate change. Their arguments justify their position that we do not need to take any action, as balance will be naturally restored over time. Most people believe that some combination of each type of response will need to occur. There is debate about what we do and how much.

Adapting to climate change involves changing the way we live so we can acclimatise to the effects on our environments. For example, sea level rises that are associated with rising atmospheric temperatures are forecast to threaten existing established coastlines through storm surges and coastal erosion. An adaptation strategy could involve building sea walls to protect existing property.

Changes do not occur suddenly, but there are small, gradual impacts. These small impacts do not require immediate action, so it can appear there is no urgency to respond.

mitigate

The action of attempting to slow, reduce or reverse the severity of something

LEARNING ACTIVITIES



OZCOASTS SEA LEVEL RISE MAPPING

Visit the OzCoasts website and find a coastal venue you have visited.

- 1 What are the possible sea level rises for this area?
- 2 Do you think something needs to be done to adapt to this? What?

COASTAL EROSION

Sand was washed away from beneath the Inverloch Surf Life Saving Club's patrol tower. Read about it on the Great Southern Star website.

In your opinion, was this a natural occurrence or a result of climate change?



OzCoasts
Great
Southern
Star



Leigh Park

Protective sea walls constructed in front of the Yacht Club on Somers Beach, Victoria



Philip Hughes

Sign at access tracks to Inverloch Surf Beach



Joe Lewit

Kyoto Protocol

International agreement between developed countries aimed at reducing global greenhouse gas emissions

Climate Change Act 2010 (Vic)

State policy that outlines targets for reduction of greenhouse gas emissions

biofuel

Fuels made from renewable living raw materials (e.g. ethanol produced from common crops such as sugar cane and potato and added to petroleum)

clean coal

Technology intended to enable continued use of coal as an energy source with reduced impact on the environment

carbon capture and storage

Process of trapping CO₂ so that its effect on the climate is minimised

Erosion to the dunes. Are sea level rises due to climate change or natural cyclical phenomenon? What can be done to stop this occurring or what needs to be done to protect the beach and infrastructure beyond?

KYOTO PROTOCOL

Mitigation can involve a number of technological means. However, government policy is needed to implement ways to meet targets. The **Kyoto Protocol** is an international agreement created under the United Nations Framework Convention on Climate Change (UNFCCC) in Kyoto, Japan in 1996. The Kyoto Protocol aimed to reduce the collective greenhouse gas emissions of developed countries that had agreed to the terms of the convention by at least 5% below 1990 levels during 2008 to 2012. Australia signed in 2008 after a change of government and much political debate regarding the social and economic effects of meeting the targets set. In Victoria, parliamentary discussion resulted in the **Climate Change Act 2010 (Vic)**. This policy is designed to ultimately reduce carbon emissions in Victoria by 20% by 2020. This figure was revised following the United Nations Framework Convention on Climate Change Paris Agreement (2016) to zero net emissions by 2050. This aims to decrease emissions as far as possible and offset any remaining emissions through alternative activities such as tree-planting. In line with the Paris agreement, these targets are intended to hold the increase in global temperatures to below 2°C from pre-industrial times.

Reducing our dependence on fossil fuels is one of the most significant opportunities to mitigate climate change. Methods of achieving this include: renewable energy production (solar, wind, **biofuels**); nuclear energy; **clean coal** technologies; **carbon capture and storage**; and greater use of less carbon-intensive fossil fuels (for example, natural gas). Energy-saving techniques include: improved building techniques (insulation, passive solar); consuming less (buy less goods that require energy and natural resources to be made); and being more efficient in our behaviour (turn off and unplug). And, of course, we can try to protect our forests that use CO₂ for respiration.

New industries will appear and develop in response to these techniques, and some existing industries may decline (brown coal power generation). This is the source of debate as to whether to pursue such mitigation methods as the economic and social impact of required change may be seen by some as outweighing the threats posed by climate change.

LEARNING ACTIVITIES



ALTERNATIVE ENERGY

- 1 Research two forms of alternative energy production available to Victorians.
- 2 Outline how energy is produced from these methods.
- 3 How could these methods of energy production contribute to mitigation of climate change?
- 4 List the advantages and disadvantages of these methods of energy production.

LOCK THE GATE ALLIANCE

Visit the Lock The Gate Alliance website and respond to the following:

- 1 Why was this interest group formed and who are the members of this group?
- 2 Outline the energy production method central to this environmental issue.
- 3 What is the interest group's position on this issue, including their justification for their position.
- 4 Do you think that this is an appropriate solution to climate change? Why/why not?



Lock
The Gate
Alliance

Economic responses to climate change have also caused debate. Examples of economic responses include a **carbon tax** and **emissions trading** schemes. A carbon tax is simply a tax that is charged to large CO₂ polluters, which is intended to promote less polluting industrial processes. For example, Australia introduced a tax of \$23 per tonne of CO₂ produced, which was to be paid by the 0.02% of businesses considered the top polluters. This tax was subsequently repealed in 2014. Emissions trading involves buying or allocating permits for set CO₂ emission levels produced. The more a company produces, the more permits that company requires. These permits can also be traded among companies. So money can be made by reducing CO₂ emissions by selling permits no longer required due to processes being adopted that pollute less.

These responses have sparked debate that largely centres on environment versus economy. It was estimated that by 2020, a carbon tax would reduce CO₂ emissions equivalent to taking 45 million cars off the road. Others suggested that a carbon tax would have a negative social effect that could include an increase in the price of essential goods (for example, electricity) that would affect households and would put pressure on businesses, potentially leading to job losses. Each argument is valid, but the value and importance of conservation of the outdoor environment is quite different.

carbon tax

Tax charged to industries based on their level of greenhouse gas (primarily CO₂) production

emissions trading

Market-based approach used to control pollution by providing market incentives and requiring permits, which can be traded among companies, being required to use processes that produce CO₂

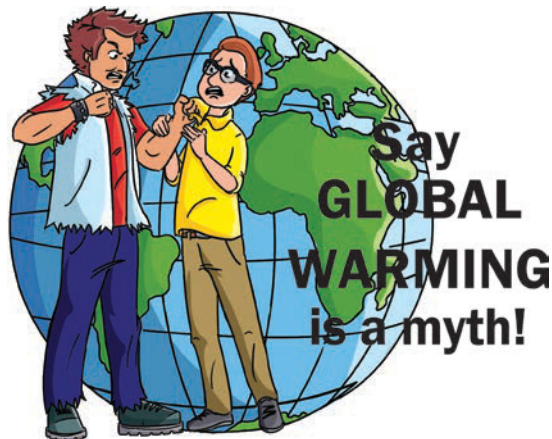
INFLUENCE ON RELATIONSHIPS

How do debates about climate change influence our relationship with outdoor environments?

That is, the influence on:

- the way outdoor environments are perceived
- how we interact with outdoor environments
- the impact that we have on outdoor environments.

Although climate change is a multifaceted topic that involves a multitude of points of view, one method of investigating debate about this issue is by categorising it into two sides – people who see it as a human-influenced change that needs our immediate attention, and those who do not. Each position will influence our relationship with the outdoor environment in a general direction.



POSITIONS ON CLIMATE CHANGE

Position	Debate	Perception	Interaction	Impact
Climate change is being caused by human activity	<ul style="list-style-type: none"> • CO₂ causes temperature increase • Increased temperature creates impacts (e.g. environmental groups, 98% climate scientists, political parties) 	<ul style="list-style-type: none"> • Environment is not a limitless resource • Environment needs to be looked after • Environment needs to be preserved for future resource use (i.e. sustainability) 	<ul style="list-style-type: none"> • Reduce fossil fuel use • Increase renewable energy use (e.g. solar energy, wind farms) • Improve building techniques (e.g. green building designs) • Town planning (e.g. sea level overlays, energy ratings) • Protect forests to absorb CO₂ • Alternative energy use due to economic responses such as carbon tax and emissions trading 	<ul style="list-style-type: none"> • Increased natural habitat and biodiversity through protection of forests • Less CO₂ pollution due to alternative energy use • Decreased coal-powered energy production through more efficient housing
Climate change is natural	<ul style="list-style-type: none"> • Human activities not responsible for climate change • CO₂ temperature changes are natural • Science is flawed • Nothing can be done (e.g. 2% climate scientists, energy-producing companies) 	<ul style="list-style-type: none"> • Environment is a resource to be used for production of energy for human activities 	<ul style="list-style-type: none"> • Fossil fuels continue to be used for energy • No need to alter current human interactions 	<ul style="list-style-type: none"> • Biodiversity loss • Increased sea levels • Coastal erosion (e.g. dune destruction during storm surges) • Drought • Severe weather events • Decreased snow cover (less skiing)

LEARNING ACTIVITIES



PHILOSOPHICAL CHAIRS – CLIMATE CHANGE

Divide the classroom into three sections. Each section of the classroom is designated different opinions regarding what is the cause of climate change. Students move to the section that best describes their position:

- One side of room: 'Climate change has been caused by humans.'
- Opposite side of room: 'Climate change is a natural phenomenon – it has occurred throughout the planet's history.'
- Middle of room: 'Climate change is naturally occurring; however, humans have had some contribution.'

The idea of this activity is for students to loosely debate this issue using their own opinion or other evidence and try to convince classmates to move to their section of the room.

Rules

- 1 Only one student can talk at any time during a section's turn. No calling out!
- 2 Students raise their hands to be chosen to talk.

- 3 Sections take it in turns to talk.
- 4 Students can move to another section any time whenever they may change their mind. However, if they move, they need to state what has changed their mind.

Hint: You don't necessarily have to agree with the point of view of the section they choose. You might want to see if you can convince others to change their own viewpoint!

SURVEY – CLIMATE CHANGE BELIEF

- 1 Using the questions below, interview at least 10 people – preferably a mix of ages.
- 2 Using the data collected, construct a bar graph of the results for each item.
- 3 Discuss your results, including the following points:
 - Are the results in line with your own opinion on climate change?
 - Are the results what you expected and why?
 - Do your results reflect the way the media has reported on climate change? Explain.
 - Discuss some of the reasons given for responses on the survey.

Survey: Belief in climate change

Do you believe the climate is changing now or will change in the next 30 years?	Tick one box
• Yes, it is already happening.	
• It will happen in the next 30 years.	
• No, it is not happening.	
• I don't really know.	
Please provide a reason for your answer (about four lines):	

Debate about water management

As we have investigated in earlier parts of Outdoor and Environmental Studies, one of the conditions that Australia's climatic variation results in is periods of prolonged less-than-average rainfall – or drought. The reoccurrence of drought has led many to describe Australia as the 'driest inhabited continent on the planet'. This condition has traditionally created challenges for humans as we try to manage the supply of water for our own needs and for the needs of the environment.

Water-management issues have been debated in recent times, especially in Victoria, due to water shortages. Victoria has experienced water storage shortages that have forced the government to implement water restrictions and other water-saving techniques. These occurred during an extended dry weather period (**El Niño**) during much of the first decade of this century. The water shortages also highlighted that:

- Victorian catchments were unable to supply sufficient water for Melbourne's population and industries
- water-management techniques were not sustainable.

Therefore, debates on both a social and political level occurred regarding what should be done about how to manage the water crisis.

Water management, however, is much more than simply providing drinking water for large populations, and requires us to think about more than water catchments for storage reservoirs. It involves management strategies for a wide range of uses in a diverse range of waterways. How we do this may be even more critical due to the uncertainties of possible future climate changes. A wide range of adaptive strategies are required to provide water for developed cities and towns, for irrigation for farming and agriculture, and for healthy rivers and ecosystems.

El Niño

Extensive warming of the central and eastern tropical Pacific, associated with an increased probability of drier conditions

Shutterstock 7009978



The vision for Victoria’s waterways is: ‘Victoria’s rivers, estuaries and wetlands are healthy and well-managed; supporting environmental, social, cultural and economic values that are able to be enjoyed by all communities’. (DELWP)

THE WATER-MANAGEMENT DEBATE

Much of the debate surrounding water management in Victoria, especially in the media, has involved the issue of water shortages, primarily for domestic and industrial consumption in Melbourne.

Storage levels were so depleted during the first decade of the 21st century that, without the intervention of the state government (Labor at the time), Melbourne might have run out of water completely. The urgency of the lack of water availability during such periods of lower-than-average rainfall, which was compounded by the increasing population of Melbourne and no new catchment reservoirs, sparked much political and social discussion about what needed to be done.



Victorian Waterway Management Strategy

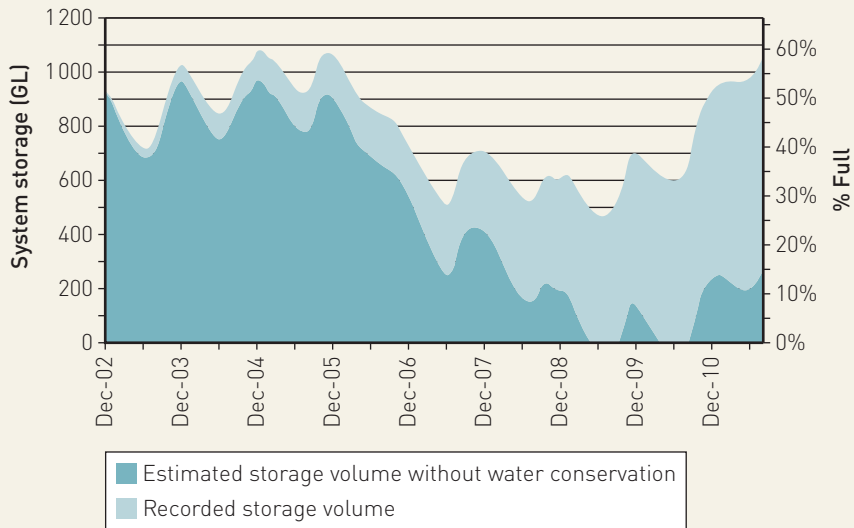
LEARNING ACTIVITIES



MELBOURNE’S WATER STORAGE

Refer to the graph of Melbourne’s storage volume 2002–2011.

- 1 What would have happened if no water conservation techniques had been adopted in 2008–2010?
- 2 How did climate conditions differ from the first half of the graph to the period in the second half?
- 3 List four methods of water conservation that contributed to the difference in the two lines of the graph.
- 4 Research Melbourne’s storage volume since 2011. How do you see Melbourne’s water storage coping in the future? Explain.



Melbourne’s storage volume 2002–2011.

DOMESTIC WATER CONSUMPTION

Aims:

- to investigate the types of water usage in your home
- to measure the extent of water usage in your home
- to identify methods of reducing domestic water consumption.

Task

- 1 At the start of a weekend, record the reading on your water meter.
- 2 Over a 24-hour period, record the following:
 - number of showers taken
 - approximate time taken for showers
 - number of washing loads
 - times dishes were done
 - approximate times toilet was flushed.
- 3 List any other uses of water over this period.
- 4 At the end of the 24-hour period, record the reading on your water meter.
- 5 Divide the difference of the two meter readings by the number of people living in the house over the 24-hour period. This gives you how much water is used by each individual in the house.
- 6
 - a Research what the global average water consumption is per person and the range for various countries, using World Health Organization (WHO) data.
 - b How does your household's individual water usage compare to the average water consumption on a global level?
 - c Provide five methods your household could adopt to reduce its water consumption.

NEW SOURCES OF WATER

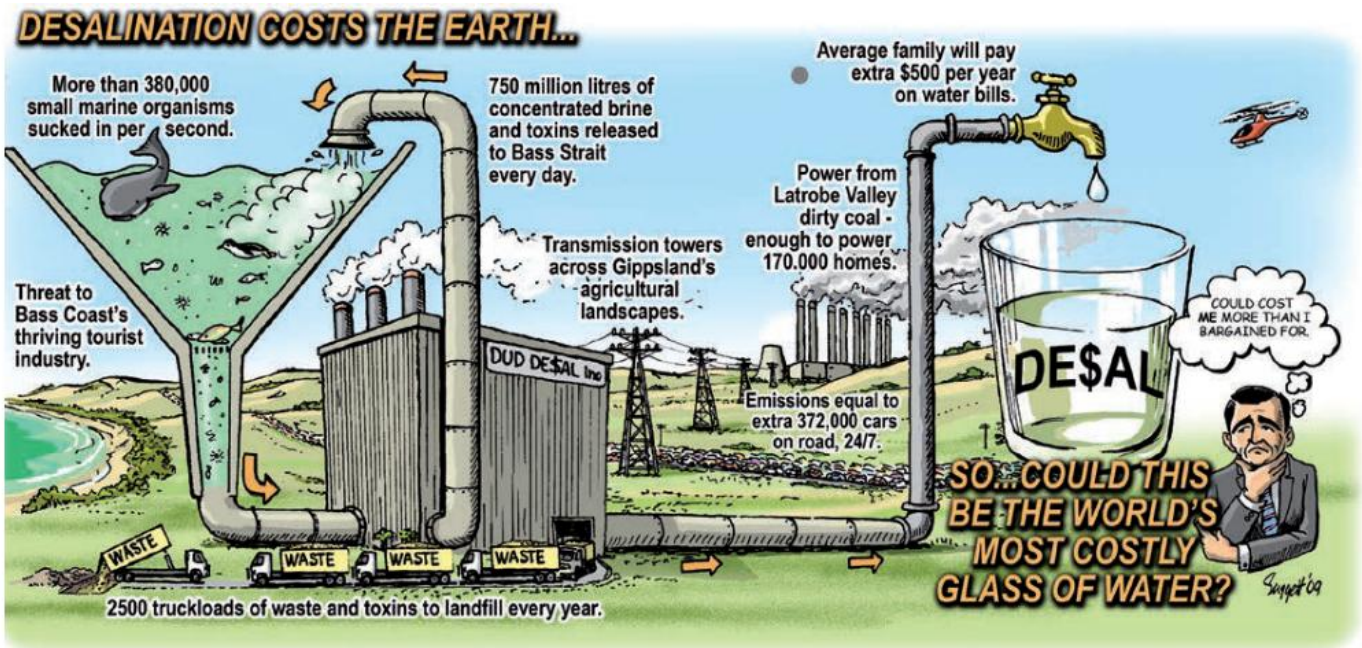
Melbourne water storage levels in 2006 were critically low. In response, the Victorian Government unveiled a long-term plan for the securing of water supplies, mainly with Melbourne's supply in mind. The policy, titled 'Our Water, Our Future', outlined initiatives for water conservation such as capturing, recycling and saving. It also outlined measures to provide water from new sources including:

- the construction and operation of a reverse osmosis desalination plant near Wonthaggi, which was designed to produce drinking-quality water from seawater to provide up to 30% of Melbourne's water needs
- the Foodbowl Modernisation Plan, which included the interconnection of water supplies such as the Sugarloaf Interconnector (or North–South Pipeline), which redirected water from the Eildon catchment away from its normal course towards the Goulburn Valley to the Sugarloaf Reservoir, north-east of Melbourne.

Not all of these directives were supported by all political parties or across society. The Greens, environmental groups and other non-government organisations also have their points of view regarding water management. Although many agreed with the principle of the water-saving, recycling and capturing initiatives put forward by the government, some believed they did not go far enough with these conservation techniques and that these could be enough to significantly increase water storage levels. In fact, some within society felt so strongly against some of the initiatives outlined by the policy, they formed specific interest groups to bring attention to their concerns and fight to convince the government to rethink their plans.

Desalination plant

Watershed Victoria was made up of a committed group within the community that believed a desalination plant to be energy-intensive, which contributes towards climate change and possibly further drought. They were also concerned, along with other existing environmental groups, about the impacts on the nearby marine and coastal environment. The proximity of the Bunurong Marine National Park made these concerns even more significant in the eyes of conservationists.



Artist: Colin Suggett

Environmentalist impression of the desalination plant in 2009, with Victorian premier John Brumby

Sugarloaf Interconnector

Opposition to the North–South Pipeline included farmers who saw irrigation water security and productivity being diminished by the ill-conceived Foodbowl Modernisation Plan and Sugarloaf Interconnector, which became known as the North–South Pipeline. Environmentalists were also opposed, as they considered the scheme a wasteful plundering of water supplies, which would degrade highland catchments. The Murray River system tourist operators and businesses were opposed to the North–South Pipeline as well, as they saw the removal of water resources affecting their long-term viability.

CASE STUDY: PLUG THE PIPE – OPEN LETTERS

LETTER 1

We are concerned about the Victorian State Government’s Sugarloaf Interconnector (or North–South Pipeline) from the Goulburn River to Melbourne. We believe that this pipeline will not solve Melbourne’s water problems, especially as the Eildon reservoir is practically empty. It appears that the plan is to take from the Environmental Reserve of water to try to deliver water to Melbourne before the next election.

I urge you to contact the Plug the Pipe group. They have many people who are finding the flaws in the government’s planning, so are against the ‘theft of water’. Even the Victorian Auditor-General queried the government’s plans. Melbourne Water and the Sugarloaf Alliance were supposed to stop work until environmental approval was received, but have not done so.

This pipeline will result in less food being grown, leading to higher food prices. The huge amount of power required to pump so much water will put further demands on our inadequate power system. Although the government announced a renewable energy scheme to deal with our water issues, it is



inadequate as the pipeline will account for 20% of the power allocation with the rest being nowhere near enough for the desalination plant.

The state government is also treating rural Victorians as if we do not exist. After repeated requests to simply attend to hear our claims, they seem to be afraid to come and personally talk to us. They send contractors and consultants who openly tell us they are unable to answer questions – they either say ‘we don’t know’ or ‘we cannot answer policy questions’.

We rely on you to get our message across to the government. In view of the large body of scientific evidence from many sources, including the CSIRO, which casts doubt on the availability of water in the north for Melbourne, and the damage that taking so much water from the Murray–Darling Basin will have, it is critical that a full environmental, social and economic evaluation of the loss of so much water from the Food Bowl be completed before proceeding.

Beverley Ridd

LETTER 2

It was announced on the 14th November 2011 that water would not run down the pipe unless Melbourne’s water storages went below 30% in November of any year. It was also mentioned, that during the drought conditions of 2007–2010, that dams never went below 30% in November. In other words, it is very unlikely that water will ever run in the pipe.

We thank all those thousands of Australians who have helped fight this shameful project which set about to deprive the environment and food producers of precious water from the Murray–Darling Basin and send it to Melbourne.

Only Melbourne

LEARNING ACTIVITY



PLUG THE PIPE

The objective of Plug the Pipe is to protect the rural economies and environment of country communities by stopping the North–South Pipeline from being built. Consider the following:

- 1 Who would benefit from the North–South Pipeline and how?
- 2 Who would be disadvantaged by the North–South Pipeline and how?
- 3 Who are the parties on each side of the debate about the North–South Pipeline and what is each party’s point of view?
- 4 How could this debate influence the way we perceive the outdoor environment?
- 5 How could human interactions with outdoor environments be influenced by this debate?
- 6 What are the potential impacts to outdoor environments that could occur through:
 - a water flowing through the pipe?
 - b no water flow through the pipe?
- 7 Research the outcome of the North–South Pipeline. Was Plug the Pipe successful?

DESALINATION PLANT DEBATE – HOW IT CAN INFLUENCE RELATIONSHIPS

There are many examples of debate regarding the management of water in Victoria influencing relationships with specific outdoor environments. The following table outlines the influence of discussion and debate about the construction of the Wonthaggi desalination plant on the Bass Coast environment, including the type of debate and the influence on perceptions of, interactions with and impacts on, the outdoor environment.

Debate	Perceptions	Interactions	Impacts
Political: <ul style="list-style-type: none"> Victorian Government 'Our Water, Our Future' Water conservation initiatives Desalination plant 	Environment a resource that provides water for: <ul style="list-style-type: none"> Residential use Industrial use Mainly in densely populated areas such as Melbourne 	Water-saving initiatives such as: <ul style="list-style-type: none"> Water-efficient appliances Promotion of water-saving behaviours (full wash loads, shorter showers, watering at night, Target 155) Water capture (tanks) Water recycle (grey water) Desalination plant construction and operation 	<ul style="list-style-type: none"> Improve water storage levels Increased energy use/CO₂ emissions due to demands of reverse osmosis desalination plant Unknown impacts on marine and coastal environment due to altered salt concentrations and industrial pollutants from desalination plant
Social (e.g. environmental groups): <ul style="list-style-type: none"> Your Water Your Say/ Watershed Water-saving techniques should be sufficient to sustain water storage and supply Recycling and conservation is the key Alternative sources such as desalination not necessary and damaging to environment 	<ul style="list-style-type: none"> Environment not a limitless resource Environment should be protected from human activities if possible 	<ul style="list-style-type: none"> Campaign against construction of desalination plant Lobby for government subsidies for water conservation techniques (tank rebate) Divert floods to catchment areas Capture, recycle, save water wherever possible 	<ul style="list-style-type: none"> Improve water storage levels Maintain biodiversity of marine and coastal environment Help reduce CO₂ emissions through no desalination plant



Desalination: Drop by Drop (video)

LEARNING ACTIVITY



DESALINATION

Watch the video *Desalination: Drop by Drop* (2012), then respond to the following:

- 1 How did the government initially address Melbourne's water storage issues?
- 2 What is the reason given for 'urgent action' being required by the state government?
- 3 Other than costs of the desalination scheme, what other reasons are given for desalination being 'on the nose'?
- 4 Which countries do rely on desalination, and why?
- 5 How could this debate influence the way we perceive the outdoor environment?
- 6 How could human interactions with outdoor environments be influenced by this debate?
- 7 What are the potential impacts to outdoor environments of the scheme?

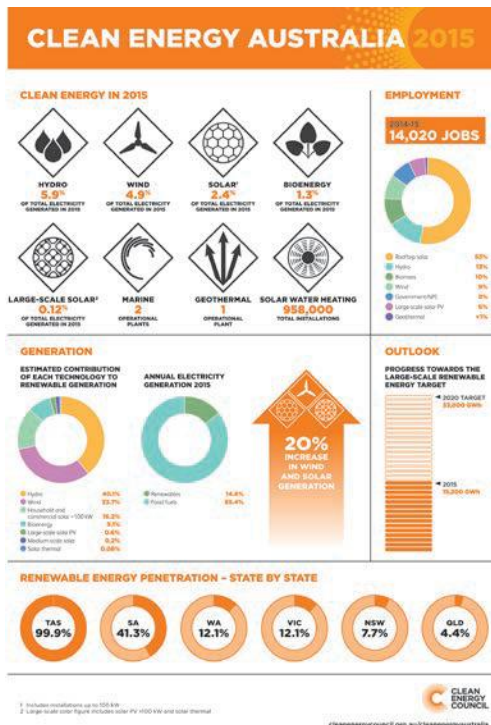
Debates about renewable energy

The vast majority of the energy that is consumed in Victoria is derived from **fossil fuels**, or the decomposed organic matter that is mined and then burned to release heat energy. The big three are oil (and its derivatives – petrol, diesel, etc.), coal and natural gas. We have come to depend on fossil fuels to make electricity, heat homes and other buildings, drive cars, and so on. However, the problem is in our dependence and overuse and the issues these have created.

- We are consuming fossil fuels 100 000 times faster than they are being produced. They cannot last forever (that is, they are non-renewable) and this is beginning to show in the decline of new deposits being discovered.
- Burning fossil fuels contributes more carbon dioxide emissions than any other human activity. We have already examined the potential impact of global warming and climate change on the outdoor environment and society earlier in this text. The vast majority of Victoria’s electricity is currently produced by brown coal-powered generators. This technology is considered ‘dirty’ as it is a big polluter. About 60% of Victoria’s carbon emissions come from coal-powered electricity generators alone.

Because of these issues, we are going to need to find new ways of providing energy to support our lifestyles. These sources will need to be generated from natural resources that can quickly replenish themselves and are usually available in a never-ending supply (renewable energy), and have little or no impact on the outdoor environment if they are to address the issues.

Renewable energy is energy produced from sources that can be replenished or replaced. It includes energy that is generated from natural resources such as wind (wind farms), sunlight (solar panels), the water cycle (hydro-electricity), tidal and wave movement, geothermal energy and biofuels.



Clean Energy Australia Report 2015

From the Clean Energy Council www.cleanenergycouncil.org.au

fossil fuel

A deposit, such as petroleum, coal or natural gas, derived from the accumulated remains of ancient plants and animals and used as fuel

renewable energy

Energy that can be obtained from natural resources that can be constantly replenished

LEARNING ACTIVITY

CLEAN ENERGY COUNCIL

The range of current renewable energy resources can be examined in detail on the Clean Energy Council website.



Clean Energy Council

WIND

Wind energy, currently one of the cheapest sources of renewable energy, involves the generation of electricity from the naturally occurring power of the wind. Wind turbines capture wind energy within the area swept by their blades, with power output proportional to the wind speed cubed and the air density. The spinning blades drive an electrical generator to produce electricity for export to the grid. Areas where winds are stronger and more constant, such as offshore and high-altitude sites, are preferred locations for wind turbines.

wind energy

The generation of electricity from the naturally occurring power of the wind

There have been a number of small residential wind turbines appearing on houses in recent times. These are evolving into a more and more practical means of charging a solar cell to provide electricity to run smaller household appliances, especially in consistently windy areas such as the coast.

The environmental impact of wind energy is negligible, but concerns have been raised over the noise produced by the rotor blades, visual impacts and deaths of birds that fly into the rotors (bird mortality).



Fairfax Syndication/Paul Rovere

Wind farm in Toora, South Gippsland



Phil Hughes

Residential wind turbines

LEARNING ACTIVITY



IS THE ANSWER BLOWIN' IN THE WIND?

Not everyone is pleased with the increasing number of wind farms in Victoria. Investigate an interest group that is against this form of renewable energy.

- 1 What is the basis for their point of view?
- 2 What are some of the environmental impact issues associated with wind farms?
- 3 Provide an argument for or against the use of wind energy using information to justify your position.

SOLAR PANELS

Solar photovoltaic (PV) panels on the roofs of homes and businesses capture the sun's energy to generate **solar energy** (electricity) cleanly and quietly. Light energy is converted directly into electricity by transferring sunlight photon energy into electrical energy. This conversion takes place within cells of specially fabricated semiconductor crystals.

Solar doesn't generate electricity all the time, but it does generate electricity when it is needed most – during the day and on hot sunny days when electricity demand (driven by air-conditioners) is at its peak. Importantly, electricity is generated at the point of demand (where people live and work), which means there is no need to transfer the energy long distances across expensive infrastructure.

The main concerns with solar energy include land disturbance/land use, visual changes to the landscape, impacts associated with hazardous materials and potential impacts on water and other resources (the extent of the impact depends on the solar technology). Energy is also required to manufacture and install solar components. Any fossil fuels used for this purpose will also generate emissions.

SOLAR WATER HEATERS

Solar water heating involves drawing in warmth from the sun to heat water in a tank. It can refer to either a stand-alone solar hot water system, or a solar system with a gas or electric 'booster'.

solar energy

Using light energy from the sun to produce electricity

HYDRO-ELECTRICITY

Hydro-electricity uses the energy of flowing water to spin a turbine connected to a generator that produces electricity. The amount of electricity generated depends on the volume of water and the height of the water above the turbine. Hydro-electricity does not actually consume water, as the water is returned to the river – rather, it only uses the force of it to spin the turbine.

Hydro-electricity does not produce significant greenhouse gas emissions but does have other major environmental impacts. The reservoirs often destroy vast areas of highly productive forest and wildlife habitat. The dams also damage freshwater ecosystems by blocking the movement of fish and other organisms.

hydro-electricity

Using water power to produce electricity

WAVES AND TIDAL ENERGY

Tidal energy comes from local regular flows caused by the tidal cycle. Tides cause kinetic movements, and constrained topology near coastlines can accelerate these movements.

Waves are generated by wind passing over the surface of the ocean. Wave energy is greatest where there are trade winds and ocean swells. The energy in the waves is harvested from the up and down motion. In Australia, the wave energy resources are greatest along the southern coastline.

GEOHERMAL ENERGY

Geothermal energy is produced by extracting the natural, internal heat of the Earth to create electricity and heat. Geothermal energy can be stored in granite rocks (often called ‘hot rocks’) or trapped in liquids such as water and **brine** (hydrothermal process).

The primary impacts of geothermal plant construction and energy production are gaseous emissions, land use, noise and potential ground disturbances (also known as subsidence).

brine

Solution of salt in water, which is also used to refer to the by-product of the desalination process

BIOENERGY

Bioenergy is produced from energy crops or from waste materials. Heat, electricity and transportation fuels can be made from plant materials and wastes such as agricultural residues, forest underbrush and organic human wastes. The food you eat, plants that die, woodchips and seaweed are all sources of biomass energy.

Most rubbish we throw out is buried in the ground (also known as a landfill). The gas generated by a landfill as it rots (biomass) is another form of renewable (green) energy. Landfill gas is created when the waste you throw away starts rotting (or decomposing) in the ground. This gas can be captured and processed to create electricity. Biomass may also include biodegradable wastes that can be burned as fuel.

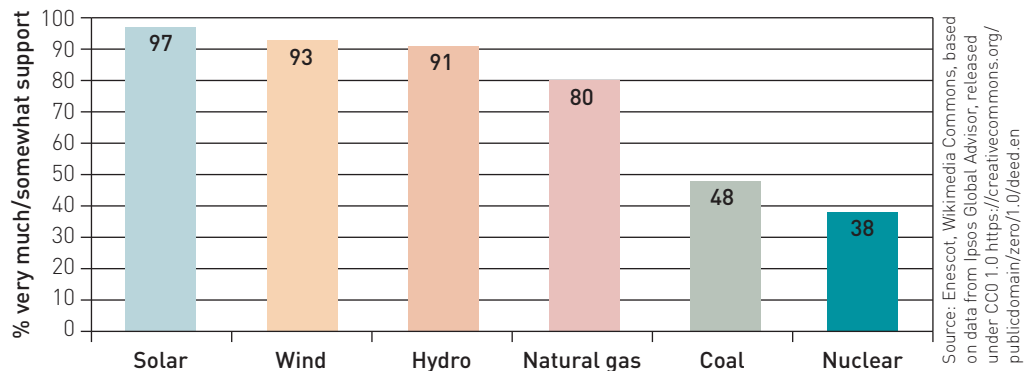
Bioenergy can have a negative environmental impact if there is too much CO₂ produced, contributing to global warming.

bioenergy

Energy produced from energy crops or from waste materials

SUMMARY OF THE RENEWABLE ENERGY DEBATE

Although the case for development and investment in renewable energy technology often seems universally accepted, there are a range of opinions regarding the various elements of renewables. Public support for renewable energy is increasing as awareness of environmental issues increases. Governments at federal, state and local levels are recognising public opinion and are all influencing the transition towards renewables by setting renewable energy targets, although not all sides of politics agree on what these targets should be. At the time of writing (in 2017), the federal Coalition government had committed to a renewable energy target (the proportion of energy produced by renewable sources) of 20% by 2020. This target has been criticised by many environmental groups as insufficient, and they believe it reflects the support of continued expansion of fossil fuel industries.



Global public support for various energy sources: 'Please indicate whether you strongly support, somewhat support, somewhat oppose, or strongly oppose each way of producing energy'

The Australian Labor Party have an alternative target of 50% renewable energy sources by 2030. They claim their strategy involves 'growing industries and the creation of more jobs while fostering a cleaner environment'. They also criticise the government's commitment to renewables and credit them with influencing the recent drop in investment in renewable technology.

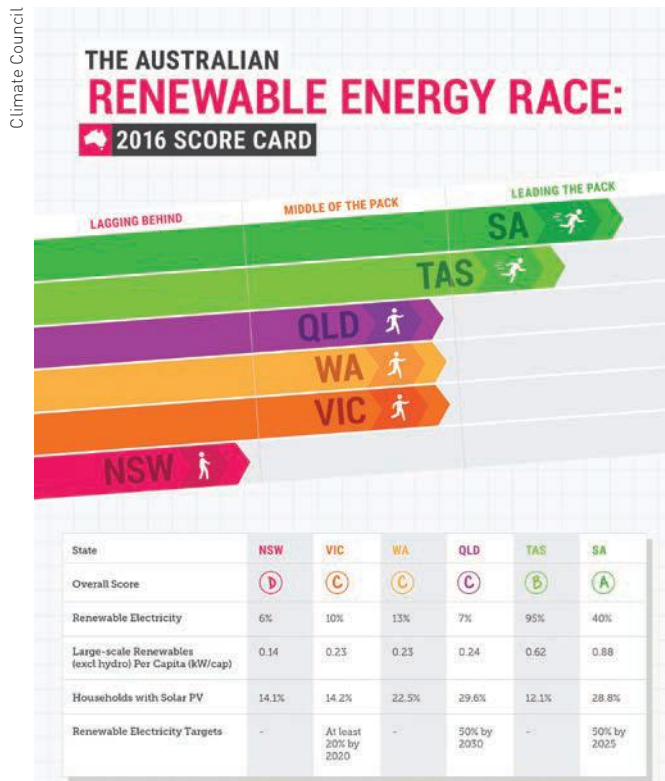
An argument against the pursuit of renewables often put forward is the economic impacts of the move away from traditional fossil-fuelled power generation. The cost of the transition is said to be passed onto industry that relies on fossil fuels, and even onto the public through increased power bills.

Opponents to this view regard the transition towards renewables as an opportunity for investment in the renewable technology industry, which would ultimately lower power prices, reduce pollution and create jobs in the sector.

The various forms of renewable energy are all considered to have their pros and cons. Environmentalists argue that the greater good is served by renewables both on a local and global level. However, the adaptations we are required to make during the transition toward renewables can create opposition in certain circumstances.

To examine these debates, we can consider the various 'not in my back yard' concerns regarding the potential impacts of wind power generation by turbines when they are concentrated in wind farms. These concerns include:

- visual impacts, affecting local land prices and tourism
- bird and bat collisions with turbine rotors
- noise pollution and health impacts from low-frequency noise created by turbines



The Australian Renewable Energy Race: 2016 Score Card – How the Australian states match up in their transition toward renewables, according to the Climate Council

Note: Due to the lack of comparable data on percentage of renewable energy in electricity supply for the territories, we have not given the territories a grade.

- community impacts of residents leaving areas near wind farms
- increased carbon emissions due to coal-powered stations remaining on stand-by to provide shortfalls of intermittent wind power
- high initial costs of setting up wind power industry compared with hydro-electricity, coal or gas
- detrimental effects to productivity of grazing animals in the vicinity of wind farms due to low-frequency noise.

While environmentalists reject these concerns (citing lack of empirical evidence and research into them) and promote the benefits of wind power, opponents from a range of backgrounds argue against wind power for one or more of the reasons mentioned above. Local residents, farmers and community groups fight against wind farms being constructed close to them. Interest groups representing many opponents, such as Stop These Things, gather evidence and raise support against wind power. Government representatives have even expressed their personal views. In 2015 when Tony Abbott was prime minister, he described wind farms as ‘visually awful’, opposing his own Liberal party’s renewable energy target and effectively banning government investment in wind power. Opponents and the media labelled Abbott’s stance as his personal ‘war on wind power’.



Alamy Stock Photo/talldwarf

INFLUENCE ON RELATIONSHIPS

Our relationship with outdoor environments can be influenced in many ways by the debate over renewable energy. This might be our relationship with a specific local environment or the global environment in general. Specific debates can be investigated, such as the Bald Hills Wind Farm, or we can investigate general discussion regarding the pros and cons of a particular renewable.

Solar energy, for example, has been debated against on a number of grounds. Variability of sunlight due to times of the day, cloud cover, position in the sky and the seasons mean that energy production still requires a backup, often supplied by fossil fuels. Storage technology such as battery walls are still considered expensive. Production of batteries and solar cells requires energy, often derived from fossil fuels. The ‘energy payback time’ refers to the time required to generate the same amount of energy as it took to produce a solar generating system. Although currently an issue to some, payback times are decreasing as production methods are refined. When installed on a large scale, solar cells require large amounts of land, therefore consideration needs to be given to the potential impact on habitats and species when choosing where large solar installations are to be built. Factors such as these are debated against the fundamental advantage of zero carbon emissions of functioning solar cells. As with all renewable debates, we are weighing up the overall current and future benefit to the environment, economy and society against their potential shortcomings. We must also consider the investment in our standard of living by securing future energy sources in the face of dwindling fossil fuel reserves.

It is an interesting time as we transition towards renewable energy. Society, industry and governments will be forced to adapt, and there will have to be a period where the environmental and economic viability of new energy sources will be questioned. Yet this is not the first time that energy transition has required us to adapt. We ran out of whale oil in the 1860s (the preferred fuel for lamp illumination) when whale populations started to decline. Fossil fuels (mainly kerosene) replaced whale oil, public opinion changed and we moved on. The question is, is it time to move on again?



Alamy Stock Photo/Alex Gittits

The Portland Wind Farm; a similar and controversial 52-turbine installation was constructed at Bald Hills despite local opposition. An attempt was also made to stop the project in parliament, citing it breaking environmental law as a threat to internationally and nationally listed migratory birds, namely the endangered orange-bellied parrot.



Image courtesy of AGL Energy

The Nyngan Solar Power Plant, Western NSW. A 102 MW installation that uses 1 350 000 photovoltaic solar cells. The site was chosen due to it receiving strong and consistent solar radiation, and the nearby energy demands. It is currently the largest solar power plant in the Southern Hemisphere, covering 250 hectares.

RENEWABLE ENERGY DEBATE – BALD HILLS WIND FARM

Debate position	Perception	Interaction	Impact
For Bald Hills Wind Farm	<ul style="list-style-type: none"> Environment not a limitless resource and must be protected Climate change an urgent threat requiring an alternative method of producing energy Wind power a zero emission alternative Amount of energy produced represents planting over half a million trees a year in reduced CO₂ in atmosphere Fossil fuels are a finite resource 	<ul style="list-style-type: none"> Construction of 52-turbine 'farm' capable of meeting energy demands of 62 000 homes Reduction of mining of coal for energy production 	<ul style="list-style-type: none"> Net reduction of CO₂ emissions Lessened impacts of climate change Visual impacts Suggested tourism decrease Possible decreased local land values Noise pollution and possible health impacts Possible bird collisions with turbine blades
Against Bald Hills Wind Farm	<ul style="list-style-type: none"> Environment a resource for production of energy for human use Environment's visual integrity should be preserved Biodiversity should not be threatened 	<ul style="list-style-type: none"> Continue mining coal for energy production No construction of wind farm at Bald hills 	<ul style="list-style-type: none"> Bald Hills' agricultural environment remains intact Climate change impacts continue Alternative sites investigated for future wind power projects Preserve bird species

Bald Hills Wind Farm

The Bald Hills Wind Farm project is an example of the influence of the debate over wind-generated power on the relationship with the Tarwin Lower environment, 170 kilometres south-east of Melbourne in South Gippsland. This was a particularly interesting debate as both sides argued, at least to some extent, on environmental grounds. Those for the project argued that renewable energy is a solution to the urgent issue of climate change. Those against argued that visual impacts, public health concerns and threats to local bird species should stop the project.

NOTES FOR THE EXAM



For the exam, you should:

- know about examples of each factor influencing relationships with a specific outdoor environment, including:
 - the effects of different technologies
 - commercialisation of outdoor environments and outdoor experiences
 - portrayals of outdoor environments and outdoor experiences in the media, music, art, writing and advertising
 - social responses to risk-taking
 - social and political debates about climate change, water management, renewable energy and other environmental issues.
- be able to evaluate the influence each factor has on relationships with a specific outdoor environment
- both understand the basis of specific environmental issues (including climate change, water management, renewable energy and any other issues) as well as analyse the debates about these issues and how they influence relationships with a specific outdoor environment.

ENVIRONMENTAL POLITICS IN AUSTRALIA

Australian environmental policy has come a long way since issues regarding the environment in the 1960s and 1970s caught the public eye. Some important issues during this time have already been discussed when we investigated the foundation and role of environmental movements and their influence in the development of political movements. As a result of these, there has been an increased public awareness of the urgency of many environmental problems and issues in Australia and around the world.

Public awareness of the environment has demanded political responses, and all major parties have adopted their own policies that outline their position on major environmental challenges that Australia faces. Such challenges include the potential impacts of climate change, the protection of biodiversity, the conservation and rehabilitation of land and water resources, and reductions in air and water pollution. Although sometimes utilised for political purposes, the environment will often benefit as these and other environmental issues are investigated, debated and, ideally, acted on.

Environmental policies of the major Australian political parties

Although environment-based political groups had existed in various states throughout Australia in the 1970s and 1980s, in 1992 these groups shared their vision and resources to form the new Australian Greens federal party (often called ‘the Greens’). While the party’s stance was developed around ecological sustainability, it also regarded social justice, peace and nonviolence, and grassroots democracy as equally important principles.

The Australian Greens party states: ‘We have the courage to put people and our future first. This means that along with meaningful and smart solutions to ensure future generations of Australia can have clean air, clean water and clean soil, the Greens are working in many other areas to champion integrity, decency and fairness’ (greens.org.au).

Source: The Greens greens.org.au



The Greens first came into prominence in Tasmania, where five Greens senators held the **balance of power** in the Legislative Assembly between 1989 and 1992. Throughout the 1990s, the Greens were also able to exert their influence, mainly via state-based senators in Western Australia,

balance of power

Where a minor party in the state or federal government holds key roles in passing Acts of parliament



AAP Image/Alan Porritt

Bob Brown and his deputy, Christine Milne, celebrating the passing of the carbon tax legislation in Federal Parliament.

New South Wales and Tasmania. However, Senator Bob Brown, the leader of the Federal Greens, was the only representative in the Federal Parliament between 1996 and 2005. By 2007 there were five federal Greens senators.

The Greens party had their greatest success at the 2010 and 2013 federal elections. From July 2011, nine Greens senators held the balance of power in the Senate. Following the 2013 federal election, 10 Greens senators shared the balance of power with a range of crossbenchers and nine senators were retained in the 2016 election.

Throughout this time, support for the Greens has gradually increased to where nearly 1.5 million votes were cast their way in the 2016

federal election. The party has been able to influence policy and decision-making about a range of social and environmental issues, especially when holding the balance of power. When negotiating with other political parties, the agenda of the Australian Greens is clearly outlined in their charter.

Not only did the Australian Greens have a voice in parliament, but their voting preferences indeed influenced the political landscape in Australia during elections. Greens preferences have regularly strengthened the Australian Labor Party's election results since becoming a national party. Despite this, not all believe that this necessarily reflects a type of Greens-ALP alliance. Many environmentalists believe that the major parties align with the Greens for political purposes rather than environmental reasons. For example, the Keating Labor government of the 1990s has been considered by many as being somewhat anti-environment, especially compared to previous Labor governments. In fact, during this time, the Liberal opposition's environmental policies are often seen as more progressive. Some even believe that the emergence of the federal Greens may have weakened the influence of non-government environment interest groups as the governing parties felt less inclined to discuss issues with them – instead bargaining directly with the Greens for voting preferences.

In the recent political landscape, the environment and climate change have become prominent in all political parties' policy framework. Social awareness of environmental issues (some of which must be attributed to the Greens' influence) has indeed necessitated political parties committing to the conservation of the environment. Environmental policy has even become part of the flagship statements that describe party direction.

The Australian Greens Charter

Ecology

1. To ensure that human activity respects the integrity of ecosystems and does not impair biodiversity and ecological resilience of life-supporting systems.
2. To encourage the development of a consciousness that respects the value of all life.

Democracy

1. To increase opportunities for public participation in political, social and economic decision making.
2. To break down inequalities of wealth and power which inhibit participatory democracy.

Social justice

1. To eradicate poverty by developing initiatives that address the causes as well as the symptoms of poverty.
2. To provide affirmative action to eliminate discrimination based on gender, age, race, ethnicity, class, religion, disability, sexuality, or membership of a minority group.
3. To introduce measures that redress the imbalance of wealth between rich and poor.

Peace

1. To adopt and promote the nonviolent resolution of conflict.
2. To develop an independent, nonaligned foreign policy and a non-nuclear, defensive, self-reliant defence policy.

An ecologically sustainable economy

1. To develop economic policies that will ensure greater resource and energy efficiency and development and use of environmentally sustainable technologies.
2. To reduce dependence on non-renewable resources and ensure sustainable use of renewable resources.
3. To adopt more comprehensive social, environmental and technology assessment practices.
4. To facilitate socially and ecologically responsible investment.

Meaningful work

1. To encourage, develop and assist work that is safe, fairly paid, socially useful, personally fulfilling and not harmful to the environment.
2. To encourage and facilitate more flexible work arrangements (such as job sharing, part-time work, self-employment), on-going education, training and social welfare (including child-care) so that more people can engage in meaningful work.

Culture

1. To respect and protect ethnic, religious, racial diversity.
2. To recognise the cultural requirements of the original Australians and to assist in ensuring the achievement of Aboriginal land rights and self-determination.

Information

1. To facilitate a free flow of information between citizens and all tiers of government.
2. To ensure that Australians have the benefit of a locally responsible, diverse, democratically controlled and independent mass media.

Global responsibility

To promote equity between nations and peoples by:

1. facilitating fair trading relationships.
2. providing for increased development assistance and concerted international action to abolish Third World Debt
3. providing increased green technology transfer and skills to developing countries
4. opposing human rights abuses and political oppression
5. ensuring that Australia plays an active role in promoting peace and ecological sustainability.

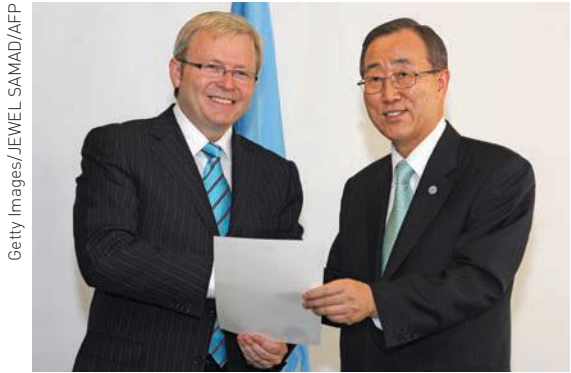
Long-term future focus

1. To avoid action which might risk long-term or irreversible damage to the environment.
2. To safeguard the planet's ecological resources and values on behalf of future generations.

greens.org.au

KYOTO PROTOCOL

When the Australian Labor Party (ALP) was elected in 2007, the prime minister Kevin Rudd brought climate change to centre stage at the United Nations' climate meeting in Bali where he declared that Australia would ratify the Kyoto Protocol, committing Australia to internationally agreed reductions in greenhouse gas emissions. Australia had previously refused to do this in 1997. This was the first official act of the new government, with Rudd signing the agreement the same morning he was sworn in as prime minister. Under the Kyoto agreement, Australia was required to limit its average annual greenhouse gas emissions over the 2008–2012 period to 108% of 1990 levels. As well as



Getty Images/JEWEL SAMAD/AFP

Kevin Rudd hands over the ratification of the Kyoto Protocol

pledging that the Australian Government would do all in its power to help Australia meet its Kyoto obligations, Rudd highlighted setting a target to reduce emissions by 60% of 2000 levels by 2020.

The prominence of their climate policy during this period saw the ALP as the ‘pro-climate’ choice of the major parties. Party leader Kevin Rudd had already described climate change as ‘the great moral challenge of our generation’. Further to their Kyoto signing, the ALP pledged to tackle climate change with the implementation of an Emissions Trading Scheme (ETS). The scheme is designed to make it more difficult for large polluters to emit greenhouse

gases by requiring them to purchase permits for polluting, which in turn encourages investment in renewable energy. The scheme was criticised by those in favour of climate change action as not doing enough, and also criticised by those against climate change action on economic grounds. Both the opposition Greens and the opposition Liberal–National parties did not therefore support the scheme, and it did not pass in parliament.

Many consider the inability to introduce the ETS as a reason for Kevin Rudd losing the leadership of the ALP to Julia Gillard in 2010. Gillard led the ALP to the next election; however, was only able to form government with the support of the Greens and other **crossbenchers**. Part of the negotiations with the Greens included the implementation of the Carbon Price Scheme (similar in theory to the ETS) – referred to by many as the ‘carbon tax’. Despite this scheme being considered by many to have contributed to 2013’s biggest recorded annual reduction in greenhouse gases, Kevin Rudd (who had regained the ALP leadership) announced that the ALP would terminate the tax. However, ALP lost the election and the subsequent Abbott government abolished the scheme in 2014.

Climate change and other environmental policy has continued to evolve as the major parties modify their stance on the environment. Today, all major parties include a comprehensive environmental component to their policy framework, and there are both similarities and differences in their direction.

crossbencher

A member of parliament not aligned with either of the major political parties



AAP Image/Julian Smith

Prime minister Julia Gillard faced both support and opposition to the carbon tax. She has stated her decision not to argue against a carbon price being labelled a ‘tax’ hurt her politically.



Fairfax Syndication/Craig Abraham

Prime minister Tony Abbott campaigned against the carbon tax during the 2013 federal election campaign. Abbott abolished the Carbon Price Scheme the next year.

COMPARISONS OF EXAMPLES OF POLICY POSITIONS ON ENVIRONMENTAL POLICIES

LEARNING ACTIVITY



ENVIRONMENTAL POLICIES OF AUSTRALIAN FEDERAL POLITICAL PARTIES

Research the environmental policies of the following Australian federal political parties:

- Liberal-National Coalition
- Australian Labor Party
- The Greens

Any aspect of environmental policy can be investigated. Specific areas of the environment could include:

- greenhouse gas emissions
- renewable energy
- threatened species
- environmental law.

- 1 Assess each of the parties' policies based on their level of commitment to each area of the environment. For example, how much are they prepared to do for the environment?
- 2 Prepare a scorecard of how each party rates in relation to their policies.
- 3 Why do you think there are differences in the environmental policies of the different parties?

Aspect	ALP	Liberal–National Coalition	Greens
Greenhouse gas emission targets	<ul style="list-style-type: none"> • Accepts science linking human impacts to climate change • 45% reduction of carbon pollution on 2005 levels by 2030 • Net zero pollution by 2050 	<ul style="list-style-type: none"> • Accepts science linking human impacts to climate change • 26–28% reduction on 2005 levels by 2030 • Net zero pollution by 2050 	<ul style="list-style-type: none"> • Promotes science linking human impacts to climate change • 25–50% reduction on 1990 levels by 2020 • Net zero emissions by 2050
Renewable energy targets	<ul style="list-style-type: none"> • 50% renewable energy by 2030 	<ul style="list-style-type: none"> • 20% renewable energy by 2020 	<ul style="list-style-type: none"> • 90% renewable energy by 2030
Mining	<ul style="list-style-type: none"> • Modernisation review into transition from coal-powered electricity • Some support for coal seam gas with relevant approvals • Supports investigation of new gas reserves • Supports uranium mining 	<ul style="list-style-type: none"> • Restore coal-fired power plants to profitability • Renew exploration for oil and gas reserves • Supports coal seam gas with relevant approvals • Supports investigation of new gas reserves • Supports uranium mining 	<ul style="list-style-type: none"> • Tax coal exports • Oppose any new coal seam gas mines and ban fracking • Some support for gas mining with environmental impacts considered • Against mining and export of uranium • No nuclear waste dumps
Emissions trading	<ul style="list-style-type: none"> • ETS to cap large polluters' emissions 	<ul style="list-style-type: none"> • No ETS • Emissions reduction fund of \$2.5 billion to pay polluters to reduce emissions 	<ul style="list-style-type: none"> • Carbon pricing to drive investment away from coal toward renewables

World Heritage areas

Places listed by the United Nations as having special cultural or physical significance

Climate Change Authority (CCA)

Government authority providing expert advice on climate change mitigation initiatives

Australian Renewable Energy Agency (ARENA)

Government-funded independent agency to increase supply of affordable renewable energy

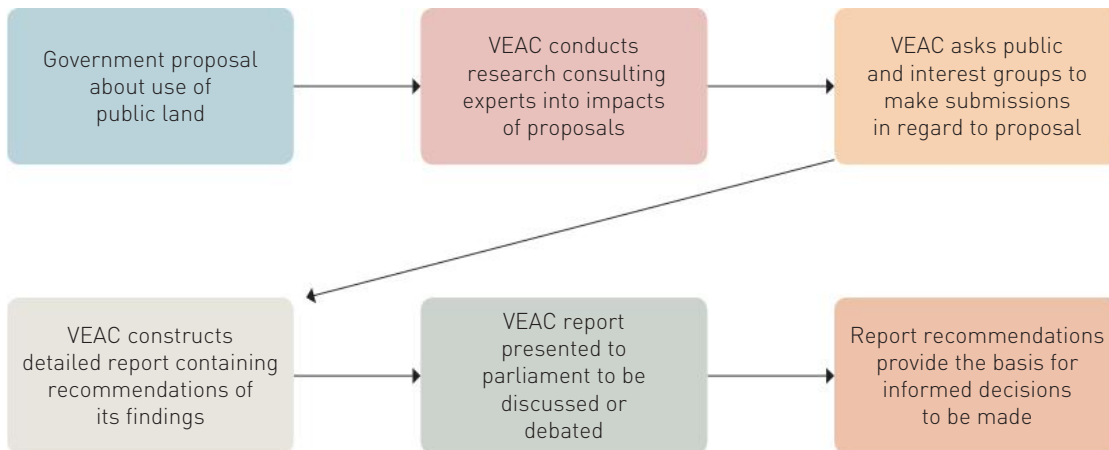
Aspect	ALP	Liberal–National Coalition	Greens
Habitat and species conservation	<ul style="list-style-type: none"> Strengthen environmental law protecting habitat for rare, threatened and endangered species 	<ul style="list-style-type: none"> 'Threatened Species Recovery Fund' of \$200 million to support vulnerable flora and fauna 	<ul style="list-style-type: none"> Strengthen environmental law protecting habitat for rare, threatened and endangered species \$130 million specifically for 'Threatened Species Plan'
Landcare	<ul style="list-style-type: none"> Landcare supported with some reduction and reallocation of funding 	<ul style="list-style-type: none"> Landcare supported \$1 billion to fund regional grants 	<ul style="list-style-type: none"> Return previous higher levels of funding for Landcare
Marine parks	<ul style="list-style-type: none"> Expand marine park network Fisheries Adjustment Package to compensate fisheries losses 	<ul style="list-style-type: none"> Suspension of marine reserve management plans 	<ul style="list-style-type: none"> Reinstate management plans for marine reserves Expand marine park network Commercial fisher compensation
National parks	<ul style="list-style-type: none"> Improve laws controlling proposed developments in national parks Expansion of World Heritage areas 	<ul style="list-style-type: none"> Commit to improvement of existing national park structure via maintenance, revitalisation and management 	<ul style="list-style-type: none"> Seek national laws to provide extra layers of protection for national parks Improve laws controlling proposed developments in national parks
Climate Change Authority (CCA)	<ul style="list-style-type: none"> Retain and increase resources for CCA 	<ul style="list-style-type: none"> Increase CCA role through shutting down of Climate Commission 	<ul style="list-style-type: none"> Increase CCA resource availability and funding Reinstate Climate Commission
Australian Renewable Energy Agency (ARENA)	<ul style="list-style-type: none"> Reverse recent funding cuts to ARENA 	<ul style="list-style-type: none"> Cut funding to ARENA 	<ul style="list-style-type: none"> Reverse recent funding cuts to ARENA

Victorian Environment Assessment Council

The Victorian Environmental Assessment Council (VEAC) was established under the *Environmental Assessment Council Act 2001*. The council is made up of five members including a chairperson. The members are collectively required to have a range of experience, skills and knowledge in a number of areas related to management of public land and natural resources. The role of the council is to conduct investigations that are requested by the Victorian Government relating to the protection and ecologically sustainable management of the environment and natural resources of public land.

VEAC does not make decisions about public land, and will only investigate the use of public land at the request of the Minister for the Environment and Energy. Any investigations and recommendations must consider social impacts, resource use and the needs of the environment. Consultation with the community and community responses to reports are key requirements of any investigation undertaken by VEAC.

VEAC replaces the Environment Conservation Council (ECC), which, in turn, replaced the Land Conservation Council (LCC).



VEAC AND THE MARINE ENVIRONMENT INVESTIGATION

The creation of marine national parks required legislation to be passed by the Victorian Parliament, but this was not the only process used by the Victorian Government to decide whether or not to establish the parks system. In the early 1990s, the Victorian Government requested that VEAC (then ECC) carry out an investigation of the marine and coastal environment. VEAC subsequently conducted an investigation into the establishment of Victoria's marine-protected areas. It was established that Victoria's marine and coastal environment is considered unique in its diversity and accessibility to the public for recreation, and that it also has economic value for the fishing and shellfish industries. It was identified that these environments are under increasing pressures from:

- agricultural, urban and industrial runoff
- physical disturbance (development)
- fishing
- exotic species.

These findings required that VEAC provide recommendations for how to protect specific areas through a system of marine parks and aquaculture areas, which began a 10-year process and included six periods for public comment. It also involved ongoing consultation with community groups, industry and government agencies. VEAC conducted many briefing sessions and public meetings, and received over 4500 submissions. The final recommendations for the environments to be included in the legislation were:

- 13 marine national parks
- 11 marine sanctuaries (smaller)
- 18 special management areas (lower-level protection)
- 12 aquaculture zones (for primary industry).

NOTES FOR THE EXAM

For the exam, you should have an overview of environmental politics in Australia, including:

- environmental policies of the major Australian political parties
- the role of the Victorian Environmental Assessment Council (VEAC).



UNIT

4

SUSTAINABLE OUTDOOR RELATIONSHIPS

- **Area of Study 1**
Healthy outdoor environments
Chapter 7 (page 250)
- **Area of Study 2**
Sustainable outdoor environments
Chapter 8 (page 290)

HEALTHY OUTDOOR ENVIRONMENTS

KEY KNOWLEDGE

- understandings and critiques of sustainability and sustainable development (page 252)
- observable characteristics of healthy outdoor environments (page 263), including:
 - quality and adequacy of water, air and soil (page 264)
 - amount of biodiversity (page 268)
 - amount of pest and introduced species (page 270)
- the state of outdoor environments in Australia, with reference to common themes used in the current national State of the Environment report (page 272)
- the importance of healthy outdoor environments for individual physical and emotional wellbeing, and for the future of society (page 276)
- the potential impact on society and outdoor environments of land degradation, introduced species, climate change, urbanisation and other significant threats (page 282)

KEY SKILLS

- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected during these experiences
- analyse definitions of sustainability and the concept of sustainable development
- use observations to evaluate the health of outdoor environments
- evaluate the contemporary state of Australian outdoor environments
- analyse the importance of healthy outdoor environments for individuals and society
- identify and predict the potential impact of significant threats on society and outdoor environments

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

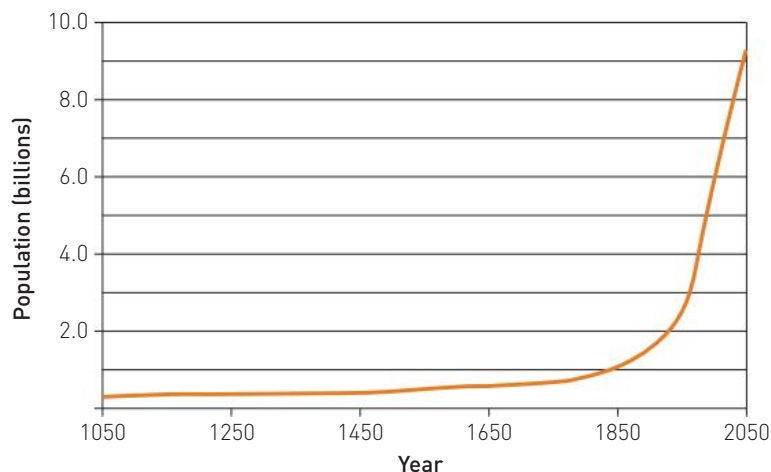
SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

The concept of **sustainability** has been linked to many aspects of contemporary society – from its use to describe the packaging protecting our most recent electrical device to its use in the media to persuade our choice of car and energy supplier. Over the years, the term ‘sustainable’ has been associated with being environmentally friendly, **renewable** and green. These are ambiguous terms used to refer to products and policies that claim to reduce harm to the environment. It is no wonder that confusion arises regarding its meaning. The word ‘sustain’ is derived from the Latin *sustinere*, which means ‘to hold up’. Other words synonymous with the term sustainability include to prolong, support and endure. The word sustainability can be defined as ‘capable of being maintained in existence without interruption or diminution’.

Put simply, we live on a planet with a limited amount of resources and we need to use these resources to survive – if we use too many, we will run out of them. The challenge for society is to enable the Earth’s resources to be shared for the survival of current and future generations of all species while ensuring ongoing healthy outdoor environments. This is the key principle of the term sustainability. This chapter will explore the historical and contemporary development of the concept of sustainability and its critiques.

Historically, the concept of sustainability can be traced back many thousands of years throughout different parts of the world. The more than 60 000-year-old practices of the Australian Indigenous cultures, such as fire-stick farming and nomadism, demonstrated their understanding of sustainability and the need to ensure life-dependent resources were maintained. The Native American Indigenous cultures are attributed the proverb, ‘We have not inherited the Earth from our fathers, we are borrowing it from our children’. This reflects the necessity to consider impacts on future generations of our current-day decisions.

Since the period of **industrialisation**, our race for **economic growth** has been highly resource-dependent, resulting in devastating costs to the environment. **Fossil fuels** such as coal were used to power machines and generate energy. In their chase of economic and social prosperity, developing countries were adopting cost-effective agricultural and manufacturing methods with high environmental impacts. The world was becoming dependent on **non-renewable** energy resources. Our exponential world population growth has intensified our dependence on the Earth’s resources, which provide a range of products and services that are essential for life and wellbeing. Population growth is a significant threat to the health of the environment (as discussed in further detail later in the chapter). With developments in recording technologies, we are now able to accurately measure the extent of our impacts on the natural environment and understand the environmental challenges associated with economic growth.



Approximate growth in world population from 1050 to predicted 2050

sustainability

The ongoing capacity of Earth to maintain all life

renewable

A commodity or resource, such as solar energy or firewood, that is inexhaustible or replaceable by new growth

industrialisation

The development of industry on an extensive scale

economic growth

The increase in the market value of the goods and services produced by an economy over time

fossil fuels

A deposit, such as petroleum, coal or natural gas, derived from the accumulated remains of ancient plants and animals and used as fuel

non-renewable

A resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes



Worldometers
The Natural Step
*Shining a Light
on Sustainability*
(video)

LEARNING ACTIVITY



RESEARCH SUSTAINABILITY

- 1 Watch the world's population soar at the Worldometers website.
- 2 View the resources on sustainability by The Natural Step, a non-profit environmental education organisation working to build an ecologically and economically sustainable society.
- 3 *Shining a Light on Sustainability* is a video from the Australian Research Institute for Environment and Sustainability (ARIES) at Macquarie University. It features an introduction to the challenges facing humanity and our efforts to become more sustainable. There are other sustainability videos as well.



CASE STUDY: DEMISE OF RAPA NUI PEOPLE

Read the online resources detailing the plight of the Rapa Nui people, which present a theory to explain why the original inhabitants of Easter Island died out due to unsustainable practices, and then answer the following questions. You can link directly via <http://oes.nelsonnet.com.au>.

QUESTIONS

- 1 Who were the Rapa Nui people?
- 2 Describe their relationships (interactions between perceptions, interactions and impacts) with the outdoor environment.
- 3 What can contemporary societies learn from the plight of the Rapa Nui people?



Moa at Rano
Raraku, Rapa Nui
(Easter Island)

Shutterstock.com/Amy Nichole Harris



Rapa Nui
people

Understandings of sustainability and sustainable development

WORLD COLLABORATIONS

Since the late 1960s there have been a number of collaborations with representatives from many of the world's countries focused on raising awareness of the plight of the environment and increasing our understanding of sustainable practices – namely, the Brundtland Commission 1987, the Earth Summit 1992, the World Summit 2005 and Earth Summit 2012. What follows is a summary of the contributions each of these three collaborations has made to our understanding of the concept of sustainability.

Brundtland Commission 1987

In December 1983, the World Commission on Environment and Development was established to unite countries to pursue sustainable development together. It is more commonly known as the

Brundtland Commission – named after its chairperson, the former prime minister of Norway, Gro Harlem Brundtland, who was selected for her strong background in the sciences and public health. The Brundtland Commission's focus was to identify worldwide sustainability problems and suggest solutions due to the realisation of severe human-induced deterioration of the natural environment. In 1987, the Brundtland Commission officially dissolved after it published a report titled 'Our Common Future', written by 23 experts from two different countries. The report officially defined sustainable development for the first time as, 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Many contemporary definitions of sustainability are based on this definition.

The success of the acceptance of this definition can be attributed to it being interpreted in many ways, enabling the underlying concept of 'maintaining resources for all' to be applied to many diverse aspects of our society – such as the way we manage our forests, our use of fossil fuels and in our everyday choices at supermarkets. The 'Our Common Future' report describes sustainable development as 'a process in which the **exploitation** of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations'. Sustainable development involves more than growth. It requires a change in the content of growth – to make it less material-intensive and energy-intensive, and more equitable in its impact.

Earth Summit 1992

The Brundtland Commission's 'Our Common Future' report influenced the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992. It was also known as the Rio Summit, Rio Conference and Earth Summit. Government officials from 178 countries and over 20 000 individuals from governments and non-governmental organisations met to discuss the application of sustainable development to prevent further environmental degradation. A wide range of subjects was discussed including poverty, excessive consumption, alternative sources of energy, cities and agriculture, health problems caused by polluted air, natural resource management, poisonous waste disposal, and the Earth's life-supporting capacity. A key achievement of the conference was an important agreement on climate change, which in turn led to the Kyoto Protocol (an international agreement proposing specific targets for the reduction of **greenhouse gas** emissions) and what is known as **Agenda 21** (which has become the blueprint for sustainability outlining a range of sustainable development strategies). Agenda 21 outlined actions to be taken globally, nationally and locally in order to make life on Earth more sustainable. Agenda 21 led to a greater understanding of how sustainability can be applied to many aspects of our lives.

World Summit in 2005

September 2005 saw the largest gathering of world leaders at the United Nations World Summit in New York City. A wide range of global issues were discussed, including improved environmental sustainability. One of the findings of the summit refers to the three 'interdependent and mutually reinforcing pillars' of sustainable development as economic development, social development and environmental protection. For any development to be truly sustainable, it must consider each of the three pillars equally. Historically, countries worldwide have placed greater emphasis on economic development, which has caused a high level of environmental degradation, which in turn influences the wellbeing of the population and social development. This can be represented as a Venn diagram. This view has also been expressed as a diagram indicating the relationship between the three pillars of sustainability, suggesting that society sits within the constraints of the environment and the economy sits within the boundaries of society and the constraints of the environment.

exploitation

Making use of and benefiting from resources, often in an unsustainable way and accompanied by environmental degradation

greenhouse gas

A gas in an atmosphere that absorbs and emits radiation; examples include carbon dioxide, methane, nitrous oxide and ozone

Agenda 21

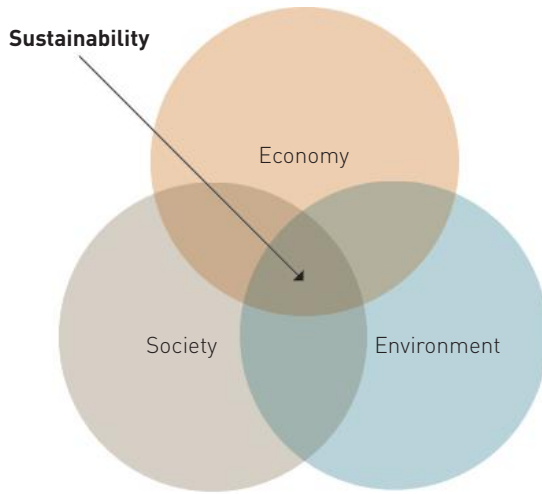
A comprehensive plan of action that encourages the development of national strategies, policies and processes encouraging sustainable development

Many companies have incorporated each of the three pillars into their operations and decision-making. Rather than traditionally focusing on their financial performance, companies are taking into account the social and environmental performance of their actions – this is known as the triple bottom line (abbreviated as TBL or 3BL, and also known as people, planet, profit). Firms are considering the social, environmental and economic aspects of their business. This may include ensuring products are manufactured without child labour, with fair wages for all, and with minimal impact on the environment.

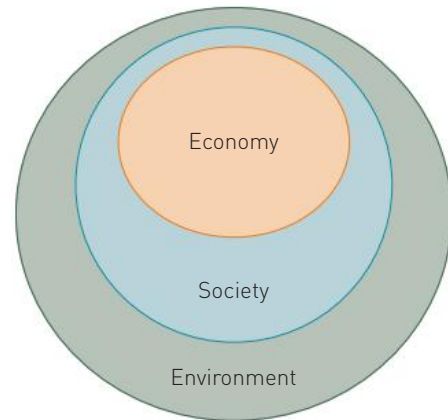
United Nations Conference on Sustainable Development (Earth Summit 2012)

United Nations Conference on Sustainable Development (UNCSD), also known as Rio 2012, Rio+20 or Earth Summit 2012, was held in Rio de Janeiro from 13 to 22 June 2012. The conference was organised to renew global political commitment to the three dimensions of sustainable development: economic growth, social improvement and environmental protection.

The outcome of the conference included a document titled ‘The Future We Want’, which outlined the United Nations’ Sustainable Development Goals (SDGs) – a set of measurable targets aimed at promoting sustainable development globally.



The three key elements that need to be integrated for sustainability



Adapted from Herman E. Daly, *Beyond Growth: The Economics of Sustainable Development*, 1996

The three pillars of sustainability

LEARNING ACTIVITY

UNDERSTANDINGS OF SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT

Outline the contributions to our understanding of sustainability and sustainable development of the following collaborations:

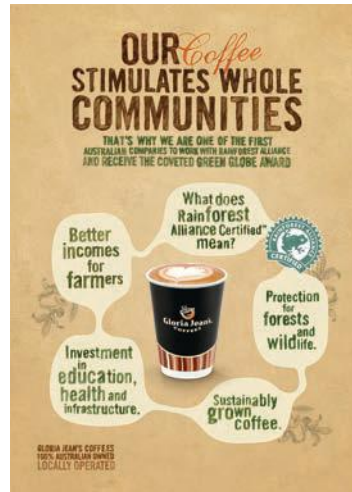
- 1 Brundtland Commission 1987
- 2 Earth Summit 1992
- 3 World Summit 2005
- 4 United Nations Conference on Sustainable Development 2012.



CASE STUDY: GLORIA JEAN'S COFFEES

Explore the sustainable section of the Gloria Jean's Coffees website to learn about the sustainable practices adopted by the company. Gloria Jean's Coffees has an ongoing collaboration with the fair-trade organisation Rainforest Alliance. The Rainforest Alliance has strict standards and a certification system to promote sustainable, responsible trading.

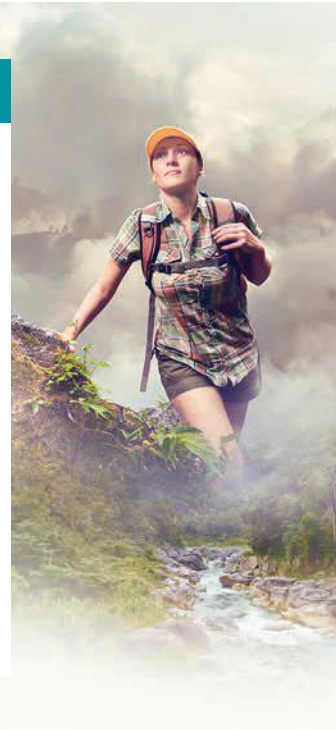
Also, explore the Body Shop's policy on ethical consumerism and sustainability.



Courtesy of Gloria Jean's Coffees



Gloria Jean's
Coffees
Body Shop



ECONOMIC DEVELOPMENT

Economic development refers to the promotion of standards of living and market productivity of a country. Many countries have focused on resource extraction and manufacturing processes, which have detrimental environmental impacts when attempting to improve their economic growth. World consumption levels are ever-increasing – approximately 80% of the world's private consumption is consumed by about 20% of the world's population. Over half of the world's population live on less than \$2 a day. In pursuing the 'Australian dream' of owning a house, a couple of cars and a white picket fence, Australians have fallen for what some call 'affluenza' – the never-ending craving for larger homes, bigger televisions and the latest gadgets to make us think we are happy and content. This is the environment-damaging lifestyle of choice by many in developed countries, while up to 20% of the world's population go to bed hungry. With consumption and population rates increasing, the demand for products derived from the Earth's resources continues at an alarming rate. We are now starting to understand that the economy that we socially depend on is a part of the environment.



Getty Images/Don Arnold



*The Story
of Stuff*
(video) – Tides
Foundation
Ikea Australia



The Conversation

LEARNING ACTIVITIES



WATCH THESE VIDEO CLIPS

- 1 Watch the Tides Foundation's video *The Story of Stuff* to learn about the social and environmental issues linked to our production and consumption patterns.
- 2 Visit Ikea's Australian website. Click on the 'People and Planet' link to read about and watch the video of sustainable practices Ikea has adopted, which have been good for business and the environment.

ENVIRONMENTAL PROTECTION INDUSTRY A JOB CREATOR

Read the article 'Environmental protection industry a job creator' by Chris McGrath in *The Conversation* from 20 August 2013. How is China's approach to environmental protection policies different to Australia's current approach?

Fairfax Syndication/Wade Laube



Ensuring an equitable distribution of resources for current and future generations will help end poverty and promote sustainability.

enable all humanity to access basic needs, education and a high quality of life, which is not beyond our current capabilities.'

SOCIAL DEVELOPMENT

Social development refers to the social wellbeing of all people with an ability to meet all basic needs for survival. We live in a world with excessive inequality – the gap between the rich and poor is increasing. The richest 1% of the world's population own 40% of the world's wealth, and the poorest 50% own around 1%. Of the 2.2 billion children in the world, about 1 billion live in poverty. In January 2017, an Oxfam International report stated that 'eight men own the same wealth as the 3.6 billion people who make up the poorest half of humanity. A major focus of sustainability is social equalisation – to

ENVIRONMENTAL PROTECTION

All we need to do to destroy the planet's climate and ecosystem and leave a ruined world to our children and grandchildren is keep doing exactly what we are doing today.

James Gustave Speth, *State of the World 2013*

Environmental protection was either non-existent or was a low priority in worldwide governmental policies for many years, with education, health and economic development being of main concern. The environment suffered due to this neglect. However, over the past 30 years we have begun to understand the links between environmental health and social and economic development. So much of our social and economic development relies on the precious resources provided by the environment. With the help of technologies to monitor the health of environments and the impact of our practices, we now understand the need to adopt 'cleaner' methods to survive. We now see the environment highly positioned on governmental agendas. Companies are investing in environmental 'greener' technologies, the term 'eco-friendly' is commonplace on supermarket shelves, and every year we see an increase in renewable energy sources. An environmentally sustainable system must maintain the Earth's resources for utilisation of current and future generations.

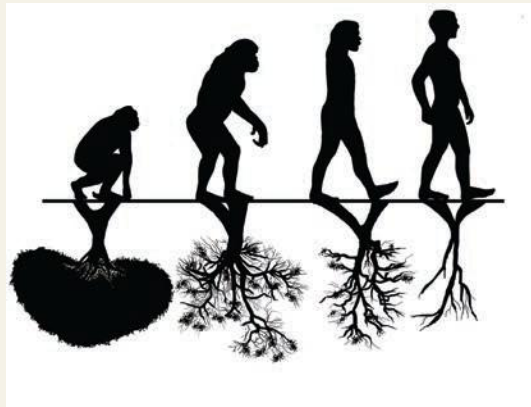
In our everyday lives we are bombarded with products claiming to be sustainable. It is difficult to distinguish between what is a marketing ploy, appealing to our moral compass, and the products that truly maintain a balance between social, environmental and economic growth to ensure a continued supply of resources for future generations without environmental degradation.

LEARNING ACTIVITIES



PROGRESSION OF EVOLUTION

Write a 250-word response to this progression of evolution image, which represents relationships over time between humanity and the environment.



Evolution?

POPULATION AND SUSTAINABILITY

- 1 Research different ideas about sustainability and create your own definition of sustainability.
- 2 What are the main concepts to include in a definition of sustainability and why?
- 3 Describe two traditional cultures that have implemented sustainability practices into their lifestyle for thousands of years.
- 4 Using data from the graph on page 251, describe the pattern of world population growth over the past 1000 years.
- 5 Visit the Worldometers website. What is the world's current population and growth rate per year?
- 6 In what ways is population growth linked to sustainability?



Worldometers



Shutterstock.com/Pavels Arsenjans

ECOLOGICAL FOOTPRINT

More recently, the concept of **ecological footprint** has been used to understand our impact on the Earth's resources. An ecological footprint is a measure of how much productive land (global hectares) is required to produce the goods and services and dispose of the waste necessary to support a particular lifestyle. Put simply, the ecological footprint compares how many resources we use with how many resources we have.

Our everyday activities consume the Earth's resources. Globally, society is using these resources faster than they can be replenished – for example, we are cutting down trees faster than they can regrow. The Earth's capacity to produce materials and absorb waste generated by humans is known as biological capacity or **biocapacity**, and it is expressed in global hectares.

By completing a short questionnaire on a person's lifestyle, including their transport habits, diet and household energy use, a value is calculated that indicates how many global hectares would be required to support their consumption. The Earth can support 1.8 global hectares per person, but currently the average global footprint is 2.7 global hectares. A global hectare refers to 1 hectare (approximately one soccer field in size) of biologically productive space. Obviously, our current lifestyle choices are unsustainable. The calculation also provides a value representing the number of Earth's worth of resources that would be required if the world's population lived the same lifestyle. If everyone in the world lived the lifestyle of the average Australian today, we would require 3.76 planets worth of resources. As indicated in the following graph, the average global footprint in 2007 was 1.5 planets; however, this has increased steadily due to higher **consumerism** and demands for the Earth's resources (Global Footprint Network, 2012).

ecological footprint

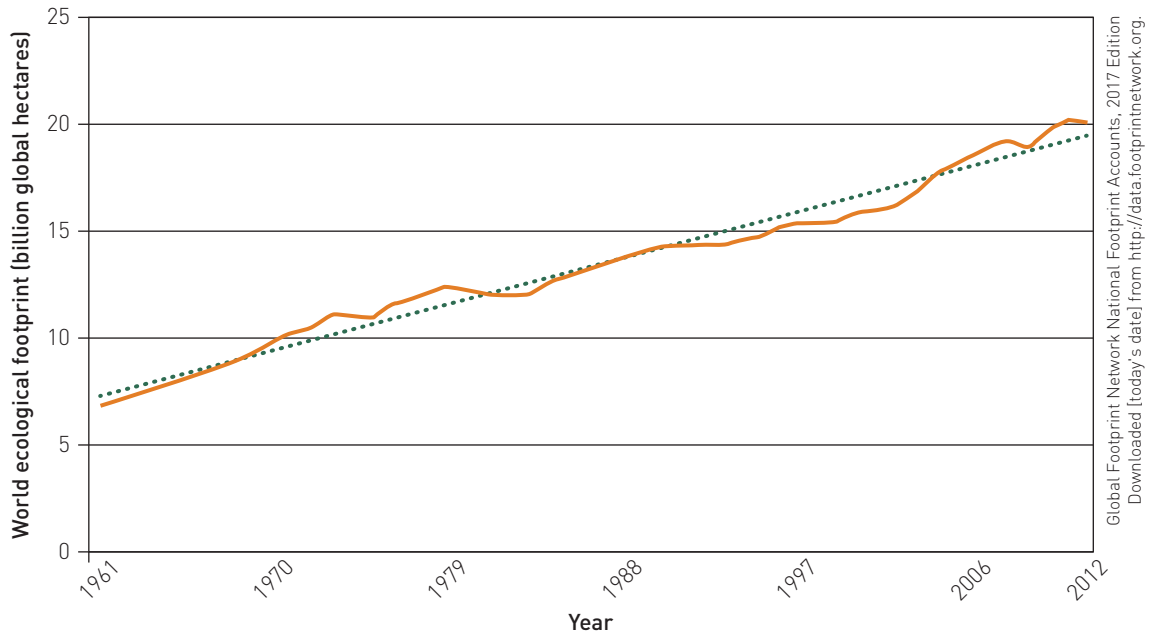
A measure of how much productive land [global hectares] is required to produce the goods and services and dispose of the waste necessary to support a particular lifestyle

biocapacity

The Earth's capacity to produce materials and absorb waste generated by humans

consumerism

A social and economic ideology that encourages acquiring goods and services in ever-increasing amounts



Countries with the largest ecological footprint per capita

WWF LIVING PLANET REPORT SHOWS AUSTRALIA'S ECOLOGICAL FOOTPRINT IMPROVING BUT WORLD LIVING BEYOND ITS MEANS

Australia's environmental ranking has improved in the past few years according to an analysis of the world's largest ecological footprints.

But the WWF's biennial *Living Planet Report* warned that the world was struggling to sustain the demands of modern society.

Launched at the United Nations in Geneva, the report ranked 152 nations' ecological footprints and warned the world was living beyond its means.

It found Australia had the 13th largest ecological footprint per person in the world, mostly because of carbon emissions and the amount of land required for crops and grazing.

Australia's ecological footprint was ranked the seventh largest in 2012.

The report found global wildlife populations had fallen by more than half in just 40 years, according to the Living Planet Index.

The index was maintained by the Zoological Society of London and tracked more than 10 000 vertebrate species populations from 1970 onwards.

'The scale of biodiversity loss and damage to the ecosystems essential for our wellbeing is alarming and a direct consequence of the way we produce and consume,' WWF Australia chief executive Dermot O'Gorman said.

Ecological footprint per capita

- | | | |
|-------------------------|------------------------|-----------------|
| 1. Kuwait | 6. Trinidad and Tobago | 11. Canada |
| 2. Qatar | 7. Singapore | 12. Netherlands |
| 3. United Arab Emirates | 8. United States | 13. Australia |
| 4. Denmark | 9. Bahrain | 14. Ireland |
| 5. Belgium | 10. Sweden | 15. Finland |

The report said if the rest of the world lived like Australians, we would need 3.6 Earths to sustain our total demands on nature.

High-income countries had a per-capita ecological footprint on average five times that of low-income countries.

But while low-income countries had the smallest footprint, they generally tended to suffer the greatest ecosystem losses.

The report provided some positive news for water quality on the Great Barrier Reef in Queensland.

It found that pioneering farming practices on the Queensland coast helped achieve a 15% reduction in pesticide pollution and 13% reduction in fertiliser pollution on the reef.

'Investment in innovative farming practices on the Queensland coast has seen significant reductions in pesticide and fertiliser pollution on the reef over the past five years,' Mr O'Gorman said.

'The good news is that Australians are pioneering innovative production methods that are good for businesses, communities and the environment and which show the way forward for a growing world population.'

By environment and science reporter Jake Sturmer,
abc.net.au, 29 September 2014



iStock.com/BeyondImages

Australia has the 13th largest footprint per person, in part because of carbon emissions.

The average Victorian ecological footprint is 6.8 global hectares to support their lifestyles for one year. This is slightly higher than the average for all Australians (6.7 global hectares). The main reason for this difference is due to the vast majority of Victorian energy being produced by the burning of fossil fuels.

The ecological footprint provides an indication of how unsustainable our lifestyle choices are and identifies the need to make smarter decisions in the way we consume resources. Choosing **green energy** suppliers, having shorter showers, using public transport more and adopting 'reduce, reuse, recycle' practices all can make a difference in reducing our footprint.

green energy

An alternative name given to renewable energy that comes from resources that are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat

LEARNING ACTIVITIES



WORLD WILDLIFE FOUNDATION

Watch the World Wildlife Foundation video clip *Change the way you think about everything* to find out about the hidden water resources required for one takeaway coffee.



World
Wildlife
Foundation

TOP 10 COUNTRIES' ECOLOGICAL FOOTPRINTS

Calculate your ecological footprint using the footprint calculator on the World Wildlife Foundation website, and then answer the following questions:

- 1 What is an ecological footprint?
- 2 Produce a line graph of the data from the WWF top 10 countries with the biggest ecological footprint per person.
- 3 Based on the data, which three countries have the largest ecological footprint?
- 4 How does the average Australian ecological footprint compare with the average footprint from other developed nations and average footprint from developing nations?
- 5 Describe reasons for the difference in size of ecological footprints across different countries in the world.
- 6 What are the implications for the environment of high ecological footprints?
- 7 What is a limitation of calculating ecological footprints?
- 8 What could be done globally to reduce ecological footprints?
- 9 What are the difficulties that nations across the globe face in reducing ecological footprints?



Ecological
footprint
calculator
WWF

AURORA RESIDENTIAL DEVELOPMENT: PROGRESSING TOWARDS 'ONE PLANET LIVING'

Aurora is a housing estate 20 kilometres north of the city of Melbourne that has been designed to have homes with an energy efficiency rating of at least 6 stars. Aurora is a good example of how urban and housing design can have a significant influence on reducing our environmental impact. Over the next 10 years, Aurora will comprise approximately 8000 homes with an anticipated population of 25 000. Envisioned as one of Australia's most innovative and unique communities, Aurora seeks to achieve a pioneering level of sustainable outcomes.

To see how far this sustainable community goes toward achieving sustainable living, VicUrban partnered with EPA Victoria, the Global Footprint Network and the Centre for Design at RMIT to undertake an assessment comparing Aurora's ecological footprint to the footprint of a conventional 5-star development.

The average Victorian resident's footprint is now more than four times the amount of biologically productive land available per person worldwide. The ecological footprint analysis found that the total ecological footprint of an Aurora resident is 7.03 global hectares, a saving of 9% on a conventional development footprint, which is a significant feat, but still three-and-a-half times the biocapacity available per person.

The major ecological footprint findings at Aurora are:

- The total Aurora residents' footprint is approximately 9% less than for residents of a 5-star greenfields development, and less than that of the average Victorian. If this saving could be replicated globally, humanity would be able to eliminate a substantial amount of its current ecological deficit.
- The housing footprint of Aurora achieves a 53% reduction compared to 5-star developments now being built in Victoria.
- 11% reduction in the mobility footprint at Aurora due to the pedestrian and bike-friendly design combined with greater housing densities.

The ecological footprint study findings demonstrate the commitment required from all sectors of the community to work towards 'one planet living'.

EPA Victoria

LEARNING ACTIVITY



YOUR ECOLOGICAL FOOTPRINT

- 1 What is the value in calculating an ecological footprint?
- 2 How many global hectares of the Earth's productive area does it take to support your lifestyle?
- 3 If everyone lived like you, how many planet Earths would be required to provide enough resources?
- 4 How do you compare to the average Australian ecological footprint?
- 5 How do you compare to the average global ecological footprint?
- 6 What aspects of your lifestyle impact the greatest on the size of your ecological footprint?
- 7 What changes could you make to reduce the size of your ecological footprint?

Critiques of sustainability and sustainable development

The term 'sustainability development' (or 'ecological sustainable development') has applications across a broad range of public and private sectors, highlighting the need to consider the environment in decision-making; however, it has also raised criticisms. These include:

- concerns over the vagueness of the term; therefore, it is basically meaningless
- the concept of sustainable development is an oxymoron
- the belief that it is difficult to measure
- the assertion that it disadvantages developing nations
- claims that it is too expensive.

VAGUENESS OF THE TERM

In 2010, *Advertising Age* named sustainability one of the ‘jargoniest jargon’ words of the year. They justify this choice by describing sustainability as ‘a good concept gone bad by mis- and overuse. It’s come to be a squishy, feel-good catchall for doing the right thing’. Sustainability has been used indiscriminately, from promoting government policies to selling cars. Robert Engelman, former president of the Worldwatch Institute, has been critical of the overuse of the term ‘sustainability’, and has coined the term ‘sustainababble’ illustrating how the term has lost both meaning and impact. Due to its vagueness in meaning, it is able to be applied to a multitude of facets in society with very little accountability or understanding and consequence for the Earth’s resources; therefore, it can be deemed meaningless – some say we have been **greenwashed**.

OXYMORON

An oxymoron is a figure of speech in which apparently contradictory terms appear in conjunction. The terms ‘sustainable’ and ‘development’ can be seen as contradictory terms. Sustainable means to maintain at a certain level (such as the world’s resources) – it must have no lasting environmental impact. Whereas, for development to be achieved, the Earth’s resources need to be utilised. With an ever-expanding population, more resources will be required to feed, house and educate humanity. Is it truly possible for society to develop and sustain at the same time?

MEASUREMENT

As the concept of sustainability is complex, it has complicated attempts to measure the effectiveness of sustainability practices. There is no set criteria or universal measurement indicators that exist. The calculation of ecological footprints does provide a basic understanding of our reliance on the Earth’s resources; however, this highlights the existence of problems rather than providing direction towards solutions. With no universal system to measure if so-called ‘sustainable’ practices are effective in ensuring ongoing supply for future generations, it may be difficult to justify their continuation. With a spiralling world population, the demands on the world’s resources are ever-increasing; therefore, it is difficult to know how many resources future generations will require and to measure if our current level of sustainability is sufficient.

DEVELOPING NATIONS

With the inequalities of economic growth around the world, it is difficult to expect all countries to adopt expensive renewable energy sources and impose restrictions on carbon **emissions** caused by the unsustainable use of fossil fuels set by richer developed nations. Developing countries have larger emissions, causing greater environmental impact; however, this is not by choice. The notion of sustainability can be thought of as preserving the present, which is of no benefit for those who go hungry every night. It would be difficult to expect a society who is unable to meet its own basic needs to reduce consumption and be mindful of the needs of future generations. A key consideration of sustainable development is to ensure a fair and equitable access to resources for current generations to meet their most basic requirements – this can then be used as a platform to adopt more environmentally friendly practices in the future.

COST

Adopting sustainable practices is expensive. Installing rooftop solar panels and backyard **grey-water systems** seems a straightforward decision; however, the associated costs are beyond many household budgets, even with government subsidies. Yet, many sustainable practices are cost-effective over an extended period of time. A household solar panel system takes approximately seven years to pay itself off and will, therefore, offer savings and low environmental impact beyond these initial years.

greenwashing

The practice of promoting the perception that an organisation’s products are ‘green’ or environmentally friendly

emissions

A gas in an atmosphere that absorbs and emits radiation

grey-water systems

Wastewater generated from wash basins, showers and baths, which can be recycled for uses such as toilet flushing and garden watering

With increasing demand for the Earth’s resources due to rapid population growth and high levels of consumerism, the planet’s ability to meet these demands is rapidly declining. The Earth’s systems involve complex relationships between society, the economy and the environment. Each component of this relationship must be considered equally important. There are wide-ranging changes required throughout all of the Earth’s societies to be truly sustainable – it is only through understanding what sustainability means that humanity can embrace this essential challenge.

LEARNING ACTIVITIES



SUSTAINABLE DEVELOPMENT QUOTES

Poverty eradication, changing unsustainable patterns of production and consumption and protecting and managing the natural resource base of economic and social development are overarching objectives of and essential requirements for sustainable development.

United Nations Agenda 21

Perhaps the biggest change will come with the realization that we can never be fully ‘sustainable’ – that sustainability is a never ending journey, a learning process to explore what it means to be fully human in an interconnected world.

Kathia Castro Laszlo, PhD, 2010

Look at some more quotes on sustainable development on the Phil Harding Quotes Corner website.

SUSTAINABILITY CHALLENGES

- 1 Summarise each of the criticisms of sustainable development.
- 2 Write a 200-word response to the statement: ‘It is impossible to develop sustainably’.
- 3 What are the biggest challenges the world faces in achieving true sustainability?
- 4 What changes need to be made in your own life and globally to promote the concept of sustainability?
- 5 Discuss how the concept of sustainable development can be used to manage an outdoor environment you have visited or investigated this year.



Phil Harding
Quotes Corner

FAST FACTS

- Australia is the largest emitter of greenhouse gases in the world, largely due to its dependence on fossil fuels (CO₂ Energy Emissions Index).
- It takes the same amount of energy to make 20 aluminium cans out of recycled material as it does to make one new can.
- Waste paper accounts for about 40% of all solid waste.



What is the real message here?

Courtesy of Moss Research <http://www.mossresearch.com/>



Waste to Waves is a program from a company called Sustainable Surf that produces surfboards made from recycled styrofoam packaging.

LEARNING ACTIVITY

SUSTAINABLE COMPANIES

Investigate a company that claims to implement sustainable practices, such as Patagonia outdoor equipment or Waste to Waves: sustainable surfboard manufacturing. More sustainable company case studies can be found at the New South Wales Office of Environment and Heritage website.

- 1 Name the company and describe it and the product(s) it produces.
- 2 List the practices the company implements that it claims are sustainable.
- 3 What does the company claim to be the benefits of such practices?
- 4 Critically analyse these practices and make a judgement regarding their true level of sustainability.



Patagonia

Sustainable Surf:
Waste to Waves

NSW Office of
Environment and
Heritage website

NOTES FOR THE EXAM

For the exam, you should be able to analyse understandings and critiques of sustainability and sustainable development.

OBSERVABLE CHARACTERISTICS OF HEALTHY OUTDOOR ENVIRONMENTS

All things share the same breath – the beast, the tree, the man ... the air shares its spirit with all the life it supports.

Chief Seattle, 1854

A healthy and sustainable outdoor environment is central to a high quality of life. Outdoor environments provide us with the necessities of life such as clean air, water and food, and offer places to recreate and inspire us. It is important that we monitor the health of outdoor environments to identify damaging activities and immediately take action when required. Environments involve complex interactions and are therefore difficult and time-consuming to measure. Common environmental characteristics have been identified to assess the overall condition of an environment. These characteristics can be used by governments, organisations, community groups and the public in decision-making.

Environmental characteristics can be used as an early warning sign of environmental deterioration, such as increases in carbon dioxide (CO₂) or **salinity** levels, and to monitor positive effects of human activities, such as increasing biodiversity levels due to revegetation works.

salinity

The concentration of dissolved salts in water or soil

Environmental health is closely linked to the surrounding land use, and can be influenced by:

- urbanisation
- land clearing
- overgrazing
- pollution and erosion from livestock and mining practices
- chemicals used in industrial and farming practices
- modification of natural stream flows by dams and weirs
- climate (such as long periods or drought)
- invasion of waterways by exotic weeds.

It is possible to make judgements about the health of a specific outdoor environment by observation. The observable characteristics of healthy outdoor environments include:

- water quality and adequacy
- air quality and adequacy
- soil quality and adequacy
- amount of biodiversity
- amount of pest and introduced species.



Leigh Park



Leigh Park

Students collecting data from an outdoor environment

Water quality and adequacy

Water is essential to healthy outdoor environments, and any change in its quality or quantity (or adequacy) can have an adverse effect on all components of an environment. Humans rely on water for fulfilling our most basic needs such as drinking and production of foods. If water quality is not maintained, it is not just the environment that will suffer – the commercial and recreational value of our water resources will also diminish.

Testing water quality and adequacy can indicate how healthy the water is in our rivers, oceans, creeks and wetlands. The Australian Government has set water quality standards for healthy aquatic ecosystems, known as the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines. The guidelines provide trigger values that are considered 'safe'. Below the level of the trigger value there is a risk that life (plant or animal) will be harmed. The characteristics of water that can be tested include taste, odour and appearance (turbidity), temperature and pH.

TASTE, ODOUR AND APPEARANCE (TURBIDITY)

The appearance, taste or odour of water from a water source offer some information about the quality and health of the environment. The advantage is that no additional equipment is required to take these readings.

As our sense of taste is very sensitive, having a small taste of water will provide some sense of its quality.

Undesirable tastes may be caused by any of numerous organic compounds. These may be present naturally in the water or due to sewage or other surface contamination sources. The odour of the water will provide some indication of the level of hydrogen sulfide (rotten egg smell), which, when present, will impart an undesirable odour and taste. The appearance of the water will provide information on its turbidity or the measure of water clarity (how far light can travel through water). Eroding banks and soil runoff are major causes of elevated turbidity. The 'cloudiness' could be particles of clay, sand, silt, algae or plankton.

Turbidity can affect water quality and water life due to the following:

- not as much light gets into the water and so plants may not receive the light they need for growth
- the water warms due to the particles absorbing heat
- particles can get into gills of fish and other aquatic animals, making it harder for them to get oxygen
- habitat is lost as holes and crevices are filled with silt.

WATER TEMPERATURE

Water temperature is a measure of how warm or cold the water is. Temperature is affected by:

- removing trees and other plants, as there is less shade and more direct sunlight on the water
- particles in the water (turbidity), which can absorb heat and increase temperature
- runoff from roads that have been warmed by the sun or the release of warm water from industry and power plants, or cold water from dams.

Temperature affects the rate of photosynthesis by algae and larger aquatic plants, the metabolic rates of aquatic organisms, and the sensitivity of organisms to toxic wastes, parasites and diseases.

Aquatic species have evolved to live in specific water temperatures, and changes can affect how they function and how they could be affected by parasites and diseases. With extreme temperature change, many organisms will die. Changes in long-term temperature averages may cause differences in species that are present in the ecosystem. Warmer water holds less oxygen, which is necessary for the plants and animals living in the water.

pH OF WATER

pH is a measure of the level of acidity or alkalinity in the water. It is measured on a scale of 1 (acid) to 14 (alkaline). Pure water has a pH of 7 (neutral).

Water with a pH of less than 4.8 or greater than 9.2 can be harmful to aquatic life. Most freshwater fish prefer water with a pH range between 6.5 and 8.4.

pH is affected by:

- soils and rocks in the catchment
- chemicals released from industry
- carbon dioxide dissolved in water.

Plants use carbon dioxide for photosynthesis. During the day, when plants are photosynthesising, pH can go up. At night, when plants release carbon dioxide, pH goes down. (Adapted from *Waterwatch Australia National Technical Manual*.)

Additional tests that can be completed on water samples include the following.



Science Photo Library/MARTYN F. CHILLMAID

Turbidity is a measure of water clarity – how much the material suspended in water decreases the passage of light through the water. High turbidity reduces photosynthesis, clogs fish gills and affects fish breeding patterns.

NITROGEN IN WATER

Nitrogen is an important nutrient for plant growth. Excessive amounts in freshwater and marine ecosystems can lead to the growth of algae. Algal growth can reduce water quality, contribute to fish kills and weaken coral reefs. Water samples can be tested to determine the level of nitrogen.

PHOSPHORUS IN WATER

Water samples can also be tested for the level of phosphorus, an important nutrient for the growth of plants. When soil particles are eroded, they are washed into creeks and drains and the phosphorus remains attached to the soil in the water. Like nitrogen, phosphorus promotes excessive plant growth and the growth of algae, which can reduce the number of species in streams and wetlands and cause fish kills. Once transported into the marine environment, phosphorus can promote the growth of algae and seagrass and can weaken the structure of coral reefs.

FAST FACT

The same water that existed on the Earth millions of years ago is still present today.

DISSOLVED OXYGEN

A good indication of water quality can be found from the concentration of dissolved oxygen in a water sample from a stream or water body. Pollution or decomposing vegetation in the water can cause reduced dissolved oxygen; insufficient oxygen in the water can lead to fish and other organisms dying.

Air quality and adequacy

Air is the colourless, tasteless, gaseous mixture that is also known as the atmosphere. It contains roughly 78% nitrogen, 21% oxygen, and smaller amounts of other chemicals including hydrogen and carbon dioxide. Air is needed by almost all the living things on Earth. It affects the health of the community, and directly influences the health and sustainability of outdoor environments and humans. Air also protects life on Earth by absorbing harmful ultraviolet solar radiation and by reducing temperature extremes. Photosynthesis in plants is possible because of carbon dioxide in the air. Nitrogen present in the air is necessary for the growth of plants.

Air pollutants mainly come from the discharges of gases and particles, mostly from industry, motor vehicles and domestic wood-burning.

Natural phenomena, such as the eruption of a volcano, also cause air pollution. Some forms of air pollution create global problems requiring solutions; for example, ozone depletion and the enhanced greenhouse effect. Air pollution can cause health problems such as asthma and bronchitis, and increases the risk of respiratory problems (EPA Victoria).

There are scientific methods of studying the quality of air to determine how polluted it is. When we measure air quality, we measure the most widespread pollutants including carbon monoxide, ozone, nitrogen and sulfur dioxide. The amount of pollution in the air is usually measured by the proportion of the total volume that it accounts for, and this is expressed as a percentage. These measures require specialised equipment; however, it is possible to make a judgement on the quality of air while in the outdoor environment by using your sense of sight and smell.

It is possible to see **smog**, which is one of the most widespread forms of air pollution in built-up environments. Smog occurs when emissions from industry, motor vehicles, incinerators, open burning and other sources accumulate under certain climatic conditions. These emissions are harmful to humans and to the health of outdoor environments.

A judgement of air quality can be made on the smell of the air. Sulfur dioxide is an invisible gas, yet it has a nasty, sharp smell. The main source of sulfur dioxide in the air is industrial activities that burn fossil fuels and in motor vehicle emissions, as the result of fuel combustion.



Earth's atmosphere backlit by the sun in an eclipse observed from deep space on board *Apollo 12* in 1969

smog

A mixture of smoke, fog and chemical fumes

FAST FACT

A person breathes about 16 kilograms of air every day. Needless to say, the quality of the air around us does have a significant impact on our health.

LEARNING ACTIVITY



AIR QUALITY

The Victorian Environmental Protection Authority (EPA) measures a range of pollutants at each of its monitoring stations around Melbourne and Victoria. Explore the EPA's most recent air quality recordings on the EPA website.



Victorian
Environmental
Protection
Authority

Soil quality and adequacy

Dirt, mud, dust ... most of us consider the many forms of soil as nothing more than an inconvenience. However, without soil, the biodiversity around us, such as the crops we harvest for food and fibre and the animal products we consume (meat, milk, eggs, wool), would not exist. Soil enables plant growth, resists erosion, stores water, retains nutrients and is an **environmental buffer** in the landscape. Soil supplies nutrients, water and oxygen to plants, and is populated by soil **biota** essential for decomposing and recycling. Soil is formed as rock is broken up by ice, wind and water.

Soil takes many years to form, but it can be destroyed very quickly by destructive practices such as deforestation. Soil holds 0.01% of the Earth's water. Soil is a composition of about 49% oxygen, 33% silicone, 7% aluminium, 4% iron and 2% carbon. Air and water make up 50% of the soil; minerals and organic matter make up the rest.

In our efforts to meet the demands of an ever-increasing population, we are having a devastating effect on soil quality (including widespread soil erosion). We are overgrazing and over-cultivating fields, which is leading to salinated water supplies and desertification.

The quality of soil is vital and is an indicator of healthy outdoor environments. The characteristics of soil that can be tested include colour, salinity, moisture, texture, structure, organic content, temperature and pH.

Basic soil testing can be done with minimal equipment. The following basic tests will help you to understand the quality of the soil, and therefore help you to understand the health of the outdoor environment.

BASIC SOIL TESTS

- 1 **Soil colour** – colour is an initial guide to soil properties. It can indicate moisture and organic content. Some minerals such as phosphorous, iron and aluminium can alter the colour. Grab a handful of soil and place it on a white background [i.e. piece of paper]. If it is dark then it has humus, which means it is more fertile. If it is light in colour, then it is less fertile.



Shutterstock.com/jianghaistudio

environmental buffer

An area of land maintained in permanent vegetation that helps to control air, soil and water quality and other environmental problems

biota

The combined flora and fauna of a region

Soil is composed of distinct layers ranging from organic upper layers (humus and topsoil) to lower layers (subsoil and bedrock).

- 2 **Soil salinity** – salt occurs naturally in many parts of Australia, but human activity can exacerbate this problem and cause damage to water (e.g. groundwater, streams) as a result. Soil salinity can decrease crop yields, damage infrastructure and reduce biodiversity. Look at the vegetation around you.
- 3 **Soil moisture** – water transports minerals and nutrients needed by plants. The amount of moisture in the soil determines the amount and type of plants that survive there. Compare plant growth in different areas. Thick lush growth indicates high moisture, while sparse growth indicates less moisture in the soil.
- 4 **Soil texture** – texture affects the movement and availability of air, nutrients and water. By estimating the amount of sand, silt and clay particles, other soil properties can also be estimated. Moisten some soil or take some moist soil in your hand. Squeeze it and then open your hand. If the soil holds together (i.e. forms a cast) then it has a higher percentage of clay.
- 5 **Soil structure** – soil structure is the arrangement of particles and pores in soils. It affects the degree of rainfall infiltration and retention, aeration and soil strength, which then has direct effects on crops and pastures. Poor soil structure can reduce fertility. Well-structured soils have room for the storage and movement of water. Insert a tent peg into the soil. Note how easy or difficult it is to break the soil. This is an indication of susceptibility to erosion and how much the soil is compacted.
- 6 **Organic content in soil** – organic content influences the number of plants, animals and micro-organisms in the soil. Decomposing organic material provides nutrients for all these living things. Without it, the soil becomes deficient. Dig up a handful of soil and look at what else might be in the soil.
- 7 **Soil temperature** – soil temperature affects climate, plant growth, germination, life cycle of small creatures, availability of nutrients, and rate of decomposition of material. It is directly linked to the temperature of the atmosphere. Is the soil around you cool or icy or very hot?
- 8 **Soil pH** – soil pH tells us what nutrients are available to aquatic life. Metals tend to be more toxic at a low pH because they are more soluble. There are several tests for soil pH, depending on what equipment you have. Your teacher can tell you what is best.

Adapted from WWF Global and NSW Department of Education and Training.



FAST FACT

It takes more than 500 years to form 2 centimetres of topsoil.

ecosystem diversity

The variety of habitats, natural communities and ecological processes in the biosphere



FAST FACT

One square metre of soil can hold a billion living things. These include insects, spiders, worms, centipedes, mites, fungi and bacteria.

endemic

A feature that is unique to a defined geographic location

Amount of biodiversity

An important indicator of the health of outdoor environments is the amount of different types of flora and fauna in an area. This is known as biological diversity or biodiversity. Biodiversity is the total of all living organisms on Earth. It includes the full variety of all life forms – different plants, animals, microorganisms, the genes they contain and the ecosystems to which they belong.

There are three levels of biodiversity: genetic diversity, species diversity and **ecosystem diversity**.

- **Genetic diversity** is the total genetic information contained in the genes of all species. It also refers to the variation in genetic information between species as well as the variations between individuals of the same species. The different colouring found in one species of kangaroos is an example of genetic diversity.
 - **Species diversity** is the variety of species. It refers to both the number of species and the number of individuals within each species; for example, the different types of trees, shrubs, birds and insects, and the number of each species you can find in your backyard.
 - **Ecosystem diversity** is the variety of habitats, natural communities and ecological processes in the biosphere. Examples in Victoria include coastal, alpine, agricultural, urban and woodland ecosystems.
- Because of a variety of ecosystems and the diverse and unique species within these ecosystems, Australia is considered to have high levels of biodiversity. Australia has about 450 000 species, representing approximately 10% of the species estimated to inhabit the Earth. Australia has over twice the number of species of Europe, Canada and the United States of America combined. Approximately 80% of Australia's species are **endemic** to Australia – that is, they only occur in this country.

Since European settlement of Australia, at least 20 species of mammals have become extinct. This is half of all the mammal species known to have become extinct throughout the world over the past 200 years. Australia has also lost in excess of 10 species of birds, 3 species of frogs and a minimum of 97 plant species. It is extremely likely that these figures are an underestimate as some species could have disappeared before they were collected, described and named. There are also many species of mammals, birds, invertebrates, amphibians, reptiles, fish and plants considered to be endangered (in danger of extinction) or vulnerable (likely to become endangered in the future), and others are becoming rare.



© Andrew Smith. All rights reserved

The southern leaf green tree frog (*Litoria nudidigitus*) is endemic to coastal areas and the ranges of south-eastern Australia.

The reasons for the loss of biodiversity include habitat destruction, introduced species, soil, water and air pollution, and climate change. These and other threats to the health of outdoor environments are discussed later in the chapter.

Making a judgement on the health of a specific outdoor environment using the observable characteristics of biodiversity would require an investigation of the amount and variety of different types of flora and fauna. It would be possible to use a biodiversity audit tool, such as the Biodiversity Snapshots project developed by Museum Victoria or the MV Field Guide to Victorian Fauna app. Biodiversity investigations are completed by government organisations such as Parks Victoria.

FAST FACT
One method to collect data on the biodiversity of an outdoor environment would be to set up remote motion-sensor cameras to capture photos of fauna in their natural habitat.

AUDIT ON THE GRAMPIANS: PLANTS AND ANIMALS IN FIELD SURVEY

Parks Victoria rangers and Museum Victoria scientists have started an extensive biodiversity scan of the Grampians.

The Grampians Bioscan started yesterday and continues for two weeks, finishing on November 29.

Ranger in charge David Roberts said the bioscan was a rapid survey to trap, spotlight, sample and record wildlife, geology and human history throughout the national park.

He said it was also a health check for the Grampians' wildlife and habitats.

'This partnership presents a great opportunity for scientists and rangers to collaborate to improve our collective knowledge following the recent floods in the Grampians,' he said.

'During the past decade we've had major fires and floods, which have altered the landscape and directly affected wildlife habitats.

'With recovery from the recent floods well underway, and much of the major infrastructure now repaired, this is a golden opportunity to check in on the park's wildlife and biodiversity.'

The bioscan will explore and study: wildlife of wetlands and streams; fauna and flora in wet gullies in the Victoria Range, with a focus on invertebrates and the endangered smoky mouse; the distribution of significant small mammals in the Grampians and Black Range State Park; and identifying rich moth fauna inhabiting upland rocky outcrops.

The project will also include reptile studies in rocky knoll environments; surveys of the park's geology and fossils; a pilot survey to investigate if the introduced sallow wattle affected wildlife in the northern Grampians; and recording oral histories of the park, including with families with a long-term connection, plus former forestry and parks staff.

Mr Roberts said the information, images and recordings would be combined and made available to use in research programs, education activities and interpretation.

Museum Victoria head of sciences Mark Norman said his team was excited to work with Parks Victoria in the Grampians.

'Behind the dramatic geology of the Grampians there is a stunning array of habitats ranging from grasslands to woodlands, tall eucalypt forest, rocky slopes, moist gullies with ancient tree ferns, swamps and rivers,' he said.

'What we discover about the wildlife in these habitats will help protect, manage and spread the word on these special animals and plants.'

By Cassandra Dalgleish, *The Wimmera Mail-Times*, 19 November 2012



Museum Victoria
Parks Victoria
Greening
Australia's
Biodiversity Audit
Pack

LEARNING ACTIVITY



GRAMPIANS BIOSCAN

- 1 Visit the Museum Victoria and Parks Victoria websites to learn more about the joint Grampians Bioscan, surveyed by them in November 2012.
- 2 Learn about the biodiversity of your school by using Greening Australia's Biodiversity Audit Pack.

Amount of pest and introduced species

A pest is an animal or plant that interferes with human land use. Farmers are often in conflict with weeds and animals that interfere with their crops and stock. Many pest species such as rabbits, foxes, feral cats, wasps, cane toads, blackberries and Japanese kelp have been introduced to Australia by humans for food or hunting practices.

Many native animals have been forced to compete for food and shelter, and have become extinct by introduced species. The introduction of rabbits has caused widespread erosion, and hard-hooved animals compact the fragile soil, leading to a degraded and unhealthy outdoor environment.

Weeds may be either native Australian species or introduced species from overseas. A weed can be defined as a plant that grows where it is not wanted. Weeds can be spread through the transfer of spores or seeds. This can happen in many ways, including:

- the hooves of farm animals
- in the wind
- waterways
- tyres and mud on the undercarriage of a vehicle
- soil on camping equipment such as tent pegs and walking boots.

Weeds become a problem when they take nutrients and water from other plant species that are endemic to an area or from plants that have been planted deliberately (such as crops).

The existence of pest and introduced species can be used as an observable characteristic of the health of an outdoor environment. An environment with little to no pest or introduced species may indicate a healthier environment than one with many. By identifying the pest and/or introduced species and its prevalence within the area, a judgement of the environment's health can be made. It would be possible to complete an audit of introduced pest and weed species within a visited outdoor environment.

A range of observable characteristics can be used to evaluate the contemporary state of outdoor environments and enable us to identify and predict the potential impact of significant threats on society and outdoor environments.



In 1859, 24 European rabbits were introduced for hunting near Geelong. By 1950, rabbit numbers had reached 600 million.

LEARNING ACTIVITY



OBSERVABLE CHARACTERISTICS OF HEALTHY OUTDOOR ENVIRONMENTS

- 1 Why is it important to assess the health of outdoor environments?
- 2 Which organisations monitor the health of outdoor environments?
- 3 Identify the factors that could influence the health of an outdoor environment.
- 4 Who sets water quality standards in Australia?
- 5 Why is maintaining a high quality of water, air and soil important?
- 6 Define biodiversity.
- 7 Name, describe and provide an example of each of the three levels of biodiversity.
- 8 Distinguish between a native and introduced pest species.
- 9 What is a weed? List the ways weeds can be spread throughout an outdoor environment.
- 10 Use the information in the text and your own resources to complete the table below to summarise the different observable characteristics of healthy outdoor environments. This table could be used to complete a field assessment of the health of a visited or investigated outdoor environment.

Indicators	Description of indicator	How the indicator is tested	How the indicator assesses the health of the outdoor environment
Water quality and adequacy: <ul style="list-style-type: none"> • Taste • Odour • Appearance • Temperature • pH 			
Air quality and adequacy: <ul style="list-style-type: none"> • Sight • Smell 			
Soil quality and adequacy: <ul style="list-style-type: none"> • Colour • Moisture • Texture • Structure 			
Amount of biodiversity: <ul style="list-style-type: none"> • Range • Number 			
Amount of pest and introduced species: <ul style="list-style-type: none"> • Range • Number 			

NOTES FOR THE EXAM

For the exam, you should be able to:

- describe a range of different indicators that can be used to identify healthy outdoor environments
- evaluate the contemporary state of Australian outdoor environments.

THE STATE OF OUTDOOR ENVIRONMENTS IN AUSTRALIA TODAY

According to the Australian Department of Environment and Energy:

The key to Australia's sustainable future lies in ourselves: our attitudes towards the environment, our heritage and each other. Positive change can be achieved when people see options for improvement in their quality of life and opportunities for their children and grandchildren. This change is accelerated when public awareness is translated into political action that influences the activities of our society to care for our country.

Department of Environment and Energy, Australia

Landcare

A community-based approach dedicated to managing environmental issues in local communities

As we rely on the environment for our survival, it is vitally important we closely monitor its condition to identify threatening processes and modify our relationships to promote sustainable practices. This occurs at local, state, federal and international levels in State of the Environment (SoE) reports. These reports are produced by governments, non-government organisations and community groups such as **Landcare** groups, and provide an analysis of the quality of the environment and the functioning of important environmental processes.

State of the Environment reports

Australian State of the Environment reports have been produced every five years by the federal government since 1996. They contain key information on the state of the environment in terms of:

- its value and current condition
- the pressures affecting it
- the drivers of those pressures
- the effectiveness of management
- the outlook for the environment into the future.

The purpose of national state of the environment reporting is to:

- provide all Australians with authoritative information on the state of the environment
- provide the Australian public, the Australian Government and other decision-makers responsible for managing our environment with an assessment of how effectively the Australian environment is being managed and what the key national environmental issues are.

SoE reports are often constructed around a framework of major groupings of the environment called themes. The *Australia SoE 2016* report includes the following themes; atmosphere, built environment, heritage, biodiversity, land, inland waters, coasts, marine environment, and Antarctic environment. Each theme utilises a variety of indicators to provide a snapshot assessment of the condition of the particular environment.

The following provides a findings summary of each theme within the *Australia SoE 2016* report.

ATMOSPHERE

This theme assesses the state of Australia's atmosphere through an assessment of Australia's climate and the effects of climate change and **ambient** air quality. Both climate and air quality are influenced by the emission of pollutants to the atmosphere from anthropogenic (human) activities and natural processes.

The key findings for the theme of atmosphere in the *Australia SoE 2016* report were:

- Australian average temperatures have increased by 1°C since 1910.
- Australian rainfall has been variable during the past 100 years, particularly the past 40 years, with declining long-term rainfall observed across much of southern Australia.



State of Environments reports provide a snapshot of the current health of specific outdoor environments.

ambient

The immediate surroundings of something

- Air quality is generally good in our urban areas, with some local areas of concern.
- Adverse human health impacts appear to occur at lower concentrations of air pollution than previously thought.

BUILT ENVIRONMENT

‘Built environment’ refers to the human-made surroundings that provide the setting for people to live, work and recreate. It encompasses physical buildings and parks, and their supporting infrastructure such as transport, water and energy networks. The built environment puts pressure on the natural environment, primarily by using land, water and energy resources, as well as through the waste and emissions produced by these consumptive activities.

The key findings for the theme of built environment in the *Australia SoE 2016* report were:

- Australia’s urban amenity is generally good. Our urban populations continue to consume significant resources, but are using energy more efficiently than in 2011.
- Population growth in our major cities, along with Australia’s reliance on private cars, is leading to greater traffic volumes, and increasing traffic congestion and delays.

HERITAGE

Australia’s heritage is an important element of the environment. Our land and surrounding waters feature extraordinary geodiversity, unique ecosystems and profound cultural traditions that extend back thousands of years. Heritage includes places that are listed and protected at the global, national, state and territory, or local level; it also includes many places that have not been formally identified or listed, but nevertheless contribute to the nation’s natural and cultural inheritance.

The key findings for the theme of heritage in the *Australia SoE 2016* report were:

- Australia’s extraordinary and diverse natural and cultural heritage generally remains in good condition, despite some deterioration and emerging challenges.
- In some places, natural, Indigenous and/or historic heritage values have been affected, including destruction of significant sites.

BIODIVERSITY

Biodiversity is defined as the variety of all living organisms on Earth at all levels of organisation. SoE reports consider the biodiversity changes since 2011 and those since the European settlement of Australia (approximately 1750).

The key findings for the theme of biodiversity in the *Australia SoE 2016* report were:

- Australia’s biodiversity is continuing to decline (with some exceptions noted in SoE 2016 thematic reports), and new approaches are needed to prevent accelerating decline in many species.
- Rapid improvement in technology is likely to lead to significant improvements in our understanding of Australia’s species and genetic diversity. Improved tools and technical advances are becoming more available for biodiversity assessment, monitoring and management, including for organisms that have previously been difficult to identify and monitor.

LAND

This theme considers the state of our soil and vegetation resources, the pressures they face, and issues and priorities for management.

The key findings for the theme of land in the *Australia SoE 2016* report were:

- We continue to lose agricultural land through urban encroachment.
- In the past five years, land-clearing rates have stabilised in all states and territories, except Queensland, where clearing has increased.

- Although mining developments have slowed in recent years, the ongoing environmental impact of former mining sites and the expansion of unconventional gas extraction are emerging concerns, particularly because of concerns for safety and competition with other land uses.
- Since 2011, there have been significant gains in the extent of Australia's terrestrial conservation estate. The National Reserve System now covers 17.9% of Australia's land area, compared with 13.4% in 2011.
- Indigenous Protected Areas and conservation covenants on private land are playing an increasingly important role in our protected area estate, although concerns have been expressed regarding the availability of ongoing funding for Indigenous Protected Areas.

INLAND WATERS

This theme looks at the evolving state of water resources in the world's driest inhabitable continent, in the context of a major drought and a period of ambitious water policy reform. The inland waters theme considers the pressures of climate, development, management and pests, and the resulting state and trends of surface waters, water quality, ecological processes and species populations.

The key findings for the theme of inland waters in the *Australia SoE 2016* report were:

- Since 2011, there have been noticeable local improvements in water quality in the Murray–Darling Basin. In more populated regions, inland water quality is in moderate to very poor condition.
- In most regions, the condition of Australia's groundwater is poor.

COASTS

Coasts are considered to be the zone of interface between **terrestrial**, aquatic and marine environments. Australia's coastal zone holds tremendous national significance. It contains many of the country's most prized environmental and ecological assets, some of which are World Heritage listed, and accommodate habitats and species found nowhere else on Earth. This theme considers the special features of the interface between ocean and land, the challenges to coasts posed by climate change and management responses to pressures on our coastlines.

The key findings for the theme of coasts in the *Australia SoE 2016* report were:

- The state of Australia's coastal environment is mixed, being largely good in the north–west and far north–east of the country, and largely poor in the east, south–east and south–west.
- The condition of some coastal species and communities is deteriorating. Of most concern is the continued decline of migratory shorebird populations and saltmarshes. Other species, such as saltwater crocodiles, are stable or improving because of protection.
- Coastal waterways are threatened by new classes of pollutants. These include microplastics and nanoparticles, which are largely unregulated and whose effects are poorly understood.
- Since 2011, the coast has experienced several extreme weather events, including cyclones, heatwaves and floods. Climate–related pressures of sea level rise, more frequent severe storms, and subsequent erosion and recession of the shoreline are expected to become increasingly significant for coastal regions in the future.

MARINE ENVIRONMENT

Australia's marine environment is home to a diverse array of marine species, many of which occur nowhere else in the world. Our oceans also contribute to the lifestyle of many Australians, 85% of whom live within 100 kilometres of the ocean. This theme identifies the key pressures affecting the marine environment as a result of the social and economic drivers associated with population growth, energy production and consumption, food production and recreation.

terrestrial

Living or growing on
the land

The key findings for the theme of marine environment in the *Australia SoE 2016* report were:

- Most marine habitats, communities and species groups assessed for SoE 2016 are in good condition overall.
- Generally, marine habitats and communities in the Temperate East Marine Region and the south-east marine region have been subject to higher historical impacts, such as bottom trawling impacts on shelf and slope communities, than in other regions.
- No marine species has been removed from the *Environment Protection and Biodiversity Conservation Act 1999* threatened species list since 2011; eight species and one ecological community have been added, and two species have been uplisted.
- Record high water temperatures have caused widespread coral bleaching, habitat destruction and species mortality in 2011–16.

ANTARCTIC ENVIRONMENT

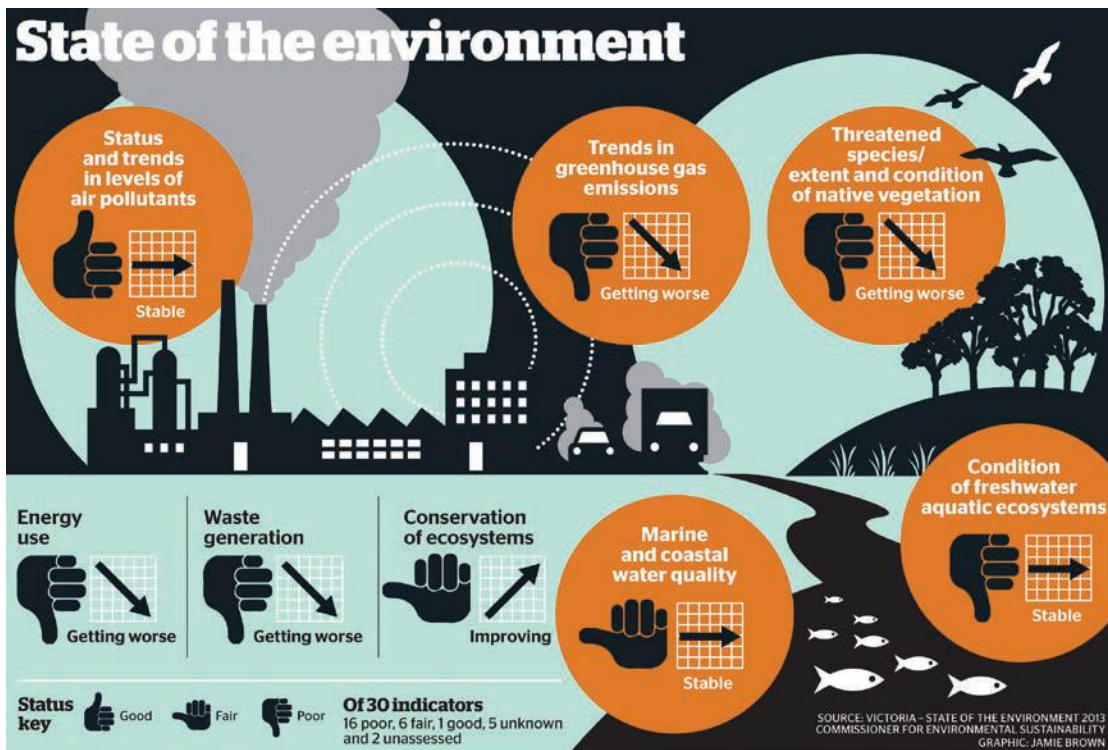
Antarctica, including all islands and ice shelves, covers an area of about 13.9 million square kilometres – nearly twice that of Australia. This theme looks at the global importance and evolving state of the Antarctic environment, the ongoing changes to marine and terrestrial ecosystems resulting from human activity, and the significance of climate change in the region.

The key findings for the theme of Antarctic environment in the *Australia SoE 2016* report were:

- The Antarctic environment is generally in good condition.
- There is increasing evidence that the ozone layer is starting to recover as a direct consequence of international controls on the use of human-made ozone depleting substances.
- The Antarctic environment is showing clear signs of impact from climate change.

Adapted from the *Australian State of the Environment 2016* report, Australian Government, Department of the Environment and Energy

Source: Australian State of the Environment report 2016, Australian Government, Department of the Environment and Energy



The value of a healthy environment and potential losses of an unhealthy environment as identified in the *Australia State of the Environment 2013* report



Worldwatch
Institute State of
the World annual
reports



Bellarine
Catchment
Network

LEARNING ACTIVITY



ENVIRONMENT REPORTS

International SoE reports are documented in the annual Worldwatch Institute's *State of the World* series.

- 1 What are SoE reports and who are they produced by?
- 2 Identify and describe each of the themes used in the latest SoE report.
- 3 List two positive and two negative aspects of environmental health for each of the themes in the latest report.
- 4 Consider an outdoor environment you have visited or investigated this year. Examine the current state of this specific outdoor environment and respond to the following:
 - a Describe the positive and negative aspects of this environment's health.
 - b Identify the threats (pressures) that are influencing the health of the specific environment.
 - c Describe the management initiatives in place to address the threats and environmental concerns.
- 5 Visit the Bellarine Catchment Network website and find out about the state of the Swan Bay environment and their 2016 action plan.

THE IMPORTANCE OF HEALTHY OUTDOOR ENVIRONMENTS

Why is our outdoor environment so important? To answer this question, we need to understand the connections between the outdoor environment and our everyday lives. With 89% of Australians

living in urban areas, these connections are not obvious to most. The majority of all products contain ingredients directly or indirectly derived from outdoor environments. From clean air and water to recreation and educational opportunities, healthy outdoor environments are essential and enrich our lives.

Investigating the value of outdoor environments helps us to understand the range of human relationships and our dependence on healthy ecosystems. Outdoor environments are under enormous pressure from an increasing demand for goods and services, as well as threats such as introduced species, climate change and **urbanisation**. We need to understand why healthy



Shutterstock.com/Olga Kashubin

The quality of our lives depends on healthy outdoor environments and the continued supply of its resources.

outdoor environments are important to individuals and society in order to allocate sufficient resources to protecting and conserving them.

Most of the value of outdoor environments is associated with what we might gain from them. For example, passive or semi-passive values may include recreation, wilderness and aesthetics; consumer values may include timber- and wood-based products, honey production, charcoal, grazing, mining and firewood; and ecological values may include water catchment, soil protection and genetic diversity.

We will explore the importance for individuals, and for society for:

- aesthetic value
- recreation and adventure
- physical and emotional wellbeing

urbanisation

The physical growth of urban areas as a result of rural migration

- intrinsic value
- maintenance of environmental stability (including biodiversity)
- education
- economic value
- future food and medicine sources
- scientific research.

Aesthetic value

Aesthetic value is a judgement of value based on the appearance of an object and the emotional responses it causes. Outdoor environments provide us with an amazing collection of sights – from snow-capped mountain ranges and tranquil flowing rivers to pristine ancient rainforests, all of which conjure an assortment of emotional responses. In Unit 1, the range of differing personal responses to outdoor environments, such as fear, appreciation, awe and contemplation, was discussed. These responses were based on the appearance and presence within a particular outdoor environment.

If you have ever been in the bush and taken a photograph or conveyed an animated description of a spectacular mountain range, a waterfall, a snow gum or another aspect of your outdoor experience, you have been affected by the aesthetic value of the outdoor environment. Aesthetic value can refer to the ability of the outdoor environment to inspire creativity.

Many of Australia's celebrated artists have derived the inspiration for their work from the aesthetic value of outdoor environments. The writings of Henry Lawson, Banjo Patterson and Judith Wright are celebrated for their strong focus on outdoor environments. More recently, Australian author Tim Winton has been recognised for his use of the coastal environment as a major theme and the setting for some of his stories. Music by groups such as Midnight Oil, Yothu Yindi, Xavier Rudd and John Williamson contain emotional responses to the appearance and plight of outdoor environments.



Shutterstock.com/3523studio

aesthetic value

A judgement of value based on the appearance of an object and the emotional responses it causes

Aesthetically pleasing outdoor environments can inspire creativity and motivate participation in recreational activities promoting positive mental and positive health.

Recreation and adventure

People need places where they can remove themselves from the pressures of their everyday lives, and have a simple and more relaxed existence, even if for a short period of time. Outdoor environments provide opportunities for individuals to undertake positive risk-taking behaviours, which allow them to find out more about themselves, to extend themselves, and to have a part of their lives where not everything can be controlled by the modifications made by our human-built, everyday world.

Outdoor environments are used for activities such as bushwalking, camping, driving tours, picnicking, boating, orienteering, rock climbing, horse riding, skiing and fishing. The provision of activities like these may, in turn, provide employment in fields such as **ecotourism**, environmental management and interpretation. There may also be a flow-on effect for sectors within the manufacturing and service industries that produce the equipment and resources needed to participate in these activities.

ecotourism

Responsible travel to natural areas that conserves the environment and improves the wellbeing of local people



River Runs Red
by Midnight Oil

LEARNING ACTIVITY



MIDNIGHT OIL SONG

Read the lyrics from the Midnight Oil song *River Runs Red* from their album *Blue Sky Mining*, and think about your emotional response to it.

Leigh Park



Recreational activities such as kayaking can improve participants' physical and mental health while revealing a greater appreciation for the outdoor environment.

Physical and emotional wellbeing

Participating in passive or active recreational activities in the outdoor environment can influence a person's physical and emotional wellbeing. The physical benefits of exercising are well known; however, studies have shown that exercising in a natural setting is more effective than in a gym.

Parks Victoria, through their 'Healthy Parks Healthy People' resource, commissioned Deakin University to research the human health benefits of contact with nature. The findings showed that access to nature plays a vital role in human health, wellbeing and development. The research indicated that humans are, among other things, dependent on nature for psychological, emotional and spiritual needs that are difficult to satisfy by any other means.

The Royal Children's Hospital building in Melbourne was built to encompass the power of environmental design and nature in reducing stress and improving patient healing. The building has been designed to integrate nature; some of the design features include maximising access to daylight and parkland views and the inclusion of an aquarium and meerkat enclosure.

Healthy Parks Healthy People



Healthy Parks
Healthy People

LEARNING ACTIVITY



HEALTHY PARKS

Read about other health benefits of human contact with the natural world as identified in the 'Healthy Parks Healthy People' research.

Intrinsic value

Humans tend to view outdoor environments in terms of their objective value. We measure the usefulness of an area by considering what resources it can provide us and whether it meets our needs. However, it is important to realise and acknowledge that outdoor environments exist of their own accord and have a value in their own right, which is not dependent on human use or the relationship with that outdoor environment. The **intrinsic value** means that it is valued for what it is, rather than for what it can provide.

While there are various reasons for the creation of national parks, reserves or wilderness areas, one important reason is to recognise the uniqueness of these areas and their right to be protected for their intrinsic value. Many people are happy just knowing that outdoor environments and wilderness areas exist. They don't have any desire or need to visit these places and they recognise their value for the flora, fauna and ecosystems that constitute that outdoor environment.

intrinsic value

Something that is prized for what it is, rather than for what it can provide

Maintaining environmental stability

Environmental stability is the ability to maintain the qualities that are valued in the physical environment. A key component in maintaining environmental stability is biodiversity. Biodiversity provides opportunities for human communities to adapt to change. Diverse ecosystems are usually associated with stability. They are resilient in the face of environmental stress, disruption and change.

BIODIVERSITY

Biodiversity is the basis for the continuation of life and is important for the stability of specific species, ecosystems and regions. Biodiversity is an essential element of the sustainability of human societies and outdoor environments. There are four major reasons for maintaining biodiversity:

- 1 All species have a right to exist. Compassion and moral responsibility require that humans respect non-human species.
- 2 Species reduction reduces the richness of a human experience. The aesthetic value of biodiversity lies in the beauty, symbolism and intrinsic worth of species.
- 3 Many species in the future may be found to have new properties in terms of food, medicine, and renewable and biological resources. These are just some of the utilitarian and economic values of biodiversity crucial to human survival.
- 4 Other species provide the life-support systems of our planet, maintain the atmosphere, influence the climate, generate and recycle essential nutrients within the topsoil, dispose of wastes, control pests and diseases, pollinate crops and provide a genetic store from which we may benefit in the future. These are the ecological values of biodiversity.

Reduced biodiversity results in ecosystems that are susceptible to environmental change. These ecosystems are impaired by stress and disruption. The consequences of human activities such as farming and industrial development have been severe for many indigenous species. Floral and faunal communities have been modified, populations have been displaced and species have become extinct.

environmental stability

The ability of environments to restore and reconstruct their structure and function following human-induced stress

LEARNING ACTIVITY



BIODIVERSITY

Watch the UNESCO video discussing the importance of biodiversity, and then answer the following questions:

- 1 What has influenced the biodiversity on Earth?
- 2 How many different species have been identified on Earth and how many may be currently living on our planet?
- 3 Describe the value of biodiversity as presented in the video.
- 4 What processes are leading to the rapid decrease in the Earth's biodiversity?
- 5 Why should the Earth's biodiversity be protected?
- 6 What can you do to protect the Earth's biodiversity?



UNESCO

Education

Usually when we think of an educational setting, we immediately think of classrooms and lecture theatres. These provide a controlled and efficient location to learn, yet they are disconnected with the presented content. Learning while being physically within the environment allows visible examples to be experienced, enabling effective consolidation of the curriculum. Outdoor environments provide



Leigh Park

Being physically present in the environment provides memorable experiences to aid in the understanding of natural processes.

an endless array of educational opportunities. Education in outdoor environments may take the form of organised school excursions (such as your Outdoor and Environmental Studies trips), field trips undertaken by naturalist or bushwalking clubs, or a personal trip to a favourite venue. Education within and about outdoor environments is important for the future of human society because people value places they have personally experienced. Consequently, people are more likely to want these places protected and conserved for future generations.

The development and success of ecotourism, natural history documentaries and cultural tourism reflects community interest in ongoing education about our world and human relationships with the outdoor environment. The success of national park visitor centres, where visitors can gain information about the specific history and uniqueness of the environment they are interacting with, is an indication of people's desire for knowledge about the outdoors and the environments they visit.

Economic value

Healthy outdoor environments are integral to the strength of the Australian economy. The high standard of living enjoyed by many Australians has been the direct result of wealth gained by the exploitation of resources provided by the outdoor environment. From the gold of the 1850s to the minerals of contemporary mining, Australians have benefited greatly from the environment's abundance of natural resources.

Once known for 'riding on a sheep's back' (the notion arising from Australia's history as a major exporter of wool), Australia is now known for its export of minerals such as iron ore, and energy in the forms of liquefied natural gas and coal. Australia has relied on the economic value of the environment for its prosperity for many years.

It is difficult to place a dollar value on outdoor environments; however, it is possible to measure the value of goods and services produced directly from Australia's natural resources such as those from the timber, agriculture, mining, fishing, manufacturing, pharmaceuticals and tourism industries.

The following outlines the contribution of outdoor-environment-dependent industries to the Australian economy in 2016, according to the Australian Bureau of Statistics:

- Tourism expenditure from domestic and international visitors was approximately \$100 billion and employs over 600 000 people.
- Agricultural production was worth approximately \$85 billion and employs over 477 000 people.
- Mining (oil, gas, coal and metal ore) contributed approximately \$210 billion and employs over 173 000 people.
- The timber industry contributes over \$20 billion of economic value each year and employs over 60 000 people.
- The Australian fishing industry is worth more than \$2 billion to the economy every year and employs over 4000 people.

Future food and medicinal sources

Securing reliable sources of nutritious food and effective medicines for an escalating global population will be a difficult challenge for future generations. It is estimated that the food supply will need to increase by 70% over the next 30 years to meet growing demand. Australians play an important global role in the production of food, with Australian farmers exporting around 60% of what they grow.



FAST FACT

There are approximately 134 000 farm businesses in Australia, 99% of which are family owned and operated. Each Australian farmer produces enough food to feed 600 people: 150 at home and 450 overseas. (National Farmers' Federation, 2014)

Around 60 years ago, the answer to increasing food production was the introduction of chemical fertilisers – this worked, but at a great ecological price. Scientific research, technology and, most importantly, the outdoor environment will play a crucial role in feeding future populations. Current research is investigating future food sources such as algae, insects, artificial meat grown in giant vats, and ‘greening’ the world’s arid areas for crop production.

Indigenous Australians have used the healing properties of plants for thousands of years. The majority of medicines in contemporary society are derived from the natural environment. More than two-thirds of medicines used to fight cancer come from rainforest plants. Compounds in rainforest plants are used to treat heart disease, malaria, arthritis, diabetes and are used in antibiotics and antiseptics. However, less than 1% of rainforest plants have been tested for their medicinal purposes – with research, the untapped potential of outdoor environments is immense.

Tea tree oil provides an example of a natural plant with medical and economic benefits. Australian tea tree oil is extracted from the plant *Melaleuca alternifolia*. Tea tree oil is a naturally occurring antiseptic, germicide, antibacterial and fungicide. Australia exports tea tree oil to many countries, and also manufactures tea-tree-oil-based products locally. Buying Australian-made products provides a valuable boost to this country’s exporters.



Shutterstock.com/AYA images

Access to a continued supply of fresh food for current and future generations depends on the maintenance of healthy outdoor environments.

LEARNING ACTIVITY



BUSH MEDICINE

- 1 Visit the Department of the Environment and Energy website and watch the Parks Australia *Bush Medicine and Tools* video. In this video, Bernie McLeod, traditional owner and Booderee Botanic Gardens curator, discusses traditional bush medicine techniques and tools used by the Wreck Bay people.
- 2 Research one example of a bush medicine used by Indigenous people. Present your findings to your class.



Department
of the
Environment
and Energy

Scientific research

Through scientific research, natural sciences such as biology, chemistry, physics and astronomy have provided society with an ever-developing understanding of the complexities of outdoor environments. We have discovered how to utilise outdoor environments for many of our daily requirements including food, medicine and building materials. Scientific research has provided us with technologies enabling the monitoring of natural processes. This has allowed us to understand natural and human-induced changes, and our impacts on the outdoor environment. For example, salinity has had a significant impact on productive land in Victoria. Scientific research that compares outdoor environments with salinity-affected environments has provided evidence that the loss of trees and other vegetation was a major contributing factor to salinity. Revegetation programs in salinity-affected areas are an effort to overcome this problem by attempting to return some naturalness to these modified environments.

NOTES FOR THE EXAM



For the exam, you should be able to analyse the importance of healthy outdoor environments for individuals and society.



University of Minnesota

LEARNING ACTIVITIES



WHAT IS NATURE WORTH?

Watch the University of Minnesota’s video animation *Big Question: What is nature worth?* Using the information presented in the video, write a 200-word response to the ‘big’ question, ‘What is nature worth?’

THE IMPORTANCE OF HEALTHY OUTDOOR ENVIRONMENTS

- 1 Copy and complete the table below to summarise the reasons why healthy outdoor environments are important for individuals and for the future of society.

Reason	Description	Example
Aesthetic value		
Recreation and adventure		
Physical and emotional wellbeing		
Intrinsic value		
Maintenance of environmental stability (including biodiversity)		
Education		
Economic value		
Future food and medicinal sources		
Scientific research		

- 2
 - a Define biodiversity.
 - b Describe three reasons for maintaining high levels of biodiversity.
 - c Identify and describe the three types of biodiversity.

POTENTIAL IMPACTS OF ENVIRONMENTAL THREATS

The isolation of the landmass of Australia for over 40 million years created a unique and diverse outdoor environment with around 10% of the world’s biodiversity. This rich variety of species has evolved and adapted to harsh climatic conditions – creating a diverse but fragile environment vulnerable to change. Any modifications from external forces, such as the introduction of new species or changes in the climate, will pose serious threats to the native species of flora and fauna and to society, which relies on the productivity of the land.

Older farming practices, industrial pollution, urbanisation, introduced species and climate change are such environmental threats that have had a devastating impact on the Australian outdoor environment. What follows is an analysis of some of these significant threats, their causes, and some of their impacts on society and outdoor environments.

Land degradation

Land degradation refers to detrimental changes in the condition of the land due to human interactions. These changes are linked to a reduction in the productive capacity of land and its economic value. Such interactions include older farming practices, industrial pollution and urbanisation. It is important to note that naturally caused undesirable changes are excluded as a cause of land degradation; however, human activities can indirectly affect phenomena such as floods and bushfires.

Over the past 200 years, land degradation has been occurring at an alarming rate across Australia. Land degradation is a serious threat to outdoor environments as reductions in the quality and quantity of productive land threatens our capacity to feed a growing world population. It also reduces native habitats and water resources, leading to reduction in biodiversity. The major types of land degradation are dryland soil salinity, soil contamination and erosion.



CSIRO/Cart Davies

Australia's natural environment cannot sustain excessive grazing by sheep and other hard-hooved animals.

DRYLAND SOIL SALINITY

Salinity describes the salt content of soil or water – excessive concentrations are toxic to most life forms. Salinity is one of the major threats to the health and productivity of many catchments, as well as to the rural and urban communities that live in them. It affects rural landholders, urban developments, infrastructure (roads and bridges), water users and the environment.

Low concentrations of salt occur naturally in soils, rivers and streams, and in high concentrations in bays and oceans. Plants such as mangroves have a high salt tolerance and are able to grow in salty environments around the coast.

Salinity is caused by land clearing, cropping and irrigation practices (among other factors). Although the causes of rising soil salinity began soon after European settlement, the symptoms of this problem were not widely obvious until into the 20th century. When areas of land are cleared for farming, trees with deep root systems are replaced with crops. The water table begins to rise as the shallow root systems of crops cannot reach into the groundwater supply. Gradually, the rising groundwater brings salt to the surface.

Most plants are salt sensitive and will die if the salt level escalates in their environment. Salty soil can only support salt-tolerant plants or, in severe cases, no vegetation at all. When vegetation dies, the topsoil becomes vulnerable to wind and rain erosion, potentially increasing the rate of valuable nutrients blowing away.

In irrigated farming areas, the salinity problem is exacerbated by excess surface water seeping into the groundwater table. The water table rises and salt moves up to the surface. Salt can also seep laterally into waterways and be transported to areas downstream, spreading degradation.

Salinity has devastated almost 6 million hectares of land across all Australian states and territories. It threatens wetlands, wildlife, farmland, drinking water, town services and infrastructure. Improvements in land management are helping to maintain sustainable yield and protect land from salinity. Accurate assessment of conditions for cropping, **rotation planting** of salt-tolerant perennial plants and land restoration are costly but necessary processes for the future.

SOIL CONTAMINATION

Soil contamination is caused by over-fertilising crops, continuous legume cropping and wetland drainage for agriculture. All of these practices alter the acidity of the soil and can render the land

rotation planting

The successive planting of different crops on the same land to improve soil fertility and to help control insects and diseases

useless for cropping or natural vegetation cover. The damage can be rectified by the costly application of lime to the soil, but it is preferable to address this problem by adopting prevention strategies. Rotation cropping, regular soil testing and moderating the application of fertilisers can help farmers achieve sustainable land use.

EROSION

Wind and water erosion are natural phenomena. Land clearing, overgrazing of farm and pest animals, and salinity, however, all contribute to the acceleration of erosion across the landscape. On coastal dunes, the impacts of beach access by recreational users is damaging valuable sand dune vegetation. Plants and their root systems help the sands maintain their shape and form. Once the vegetation is removed or damaged, the sands literally blow away.

Steps taken to repair or halt the damage include revegetation programs; rest and rotation grazing periods for farmlands; control of pest species; increased farming of native animals; and reduced farming of cows and sheep.

The Australian Government Department of Agriculture and Water Resources estimates that the impact of land degradation across Australia in terms of lost production value is in excess of \$1.5 billion per year.



Fairfax Photos/Darren Pateman

The dust storm of 23 September 2009 covered most of eastern Australia. It was caused by the naturally occurring severe drought conditions and above-average temperatures, combined with human-induced reductions in vegetation cover and topsoil erosion due to overgrazing.



CSIRO

LEARNING ACTIVITY



SOIL

Watch CSIRO's video *Soil Salinity in Australia*. Using the information presented in the video, create a visual display in your books describing the natural and human processes that have led to soil salinity problems in Australia.

Introduced species

More than 2800 weeds, between 100 and 400 marine species, 34 fish species, 25 mammal species, 26 bird species, 6 reptile species, 1 amphibian and an unknown number of invertebrates have been introduced to Australia since 1770. Species that have been introduced to the country have had a major impact, and some have resulted in dire consequences (Australian Museum).

The introduced species that have the most devastating impact on Australian native species include blackberries, rabbits, foxes and cane toads. Because of the impact they have on native flora and fauna, these species are considered pests. They cause damage to land and water resources, can carry disease and prey on the native wildlife, and they may also compete with the native plants and animals for food and shelter.

BLACKBERRIES

The blackberry was introduced into Australia in the mid-1800s as a horticultural plant. Blackberry grows vigorously and can infest large areas quickly. It reduces native wildlife habitat, limits access to water sources, displaces native plants and provides habitat and food for introduced pest species such as rabbits and foxes. Blackberry impacts on society by reducing available grazing land and productivity due to competition for soil moisture and nutrients, and it reduces the aesthetic and conservation value of public lands, parks and reserves.



Shutterstock.com

Blackberries are recognised as one of the worst weeds in Australia.

RABBITS

Rabbits were first introduced to Australia in the 18th century with the First Fleet as a food source, and became widespread after an outbreak caused by a release near Geelong in 1859. Rabbits contribute to soil erosion by burrowing, removing vegetation and disturbing soil. Economic damage by feral rabbits in Australia is estimated at around \$600 million annually in lost production.

FOXES

Foxes were introduced into Australia in the 1940s for the sport of hunting, and have spread through all parts of Australia. The fox has played a major role in the decline of ground-nesting birds, small- to medium-sized mammals such as the greater bilby, and reptiles such as the green turtle. The fox causes significant economic losses to farmers by preying on newborn lambs, kid goats and poultry (Department of the Environment and Energy).



iStockphoto/sjullenphoto

European red foxes (*Vulpes vulpes*) prey on native species, leading to a reduction in biodiversity and extinctions.

LEARNING ACTIVITY



FOXES

Visit the Foxscan website and read the maps and information on the distribution and management of foxes in Australia.



Foxscan

Alamy Stock Photo/Jack Picone



Cane toads (*Bufo marinus*) can be accidentally transported to new locations; for example, in pot plants or loads of timber.

CANE TOADS

Cane toads became pests after being introduced into Australia to control the destructive cane beetle in Queensland in 1935. Cane toads have spread across all parts of Queensland and across the Northern Territory into Western Australia.

Adult cane toads produce toxin from glands over their upper surface as a defence mechanism. Native Australian predators such as goannas, quolls, snakes and some birds have decreased in numbers in areas overtaken by cane toads. They die rapidly after ingesting the cane toad toxin.



Feralscan

LEARNING ACTIVITY



FERALSCAN FIELD GUIDE APP

Visit the Feralscan website and read the information about feral species in Australia. You can also download the Feralscan free pest mapping app, which can be used on outdoor experiences.

mariculture

The cultivation of marine organisms for food and other products in the open ocean, an enclosed section of the ocean, or in tanks, ponds or raceways that are filled with seawater

MARINE PESTS

Victoria's marine environment is under serious threat from a range of introduced species. Species such as *Sabella* worm, Northern Pacific seastar and *Undaria* (a seaweed from Japanese waters) have reached Australia via the ballast water in ships. The Northern Pacific seastar (*Asterias amurensis*) is a major threat to the scallop industry and has wreaked havoc in Tasmanian fisheries for the last 30 years. It breeds prolifically, and some estimates indicated the population had reached 12 million two years after they were first detected in the bay. The seastar eats mussels, scallops and clams, threatening the **mariculture** industry.

Our Century
(video)

LEARNING ACTIVITY



INVADERS

View the episode of *Our Century* (presented by Ray Martin) that discusses feral animals and pests in Australia. Investigate one introduced species to Australia presented in the video (or another introduced species if approved by your teacher).

Address the following questions in your investigation:

- 1 Explain why, how and when the species was first introduced into Australia.
- 2 Indicate on a map of Australia the location of the initial introduction and current-day distribution of the species.
- 3 Describe the impacts on the environment and society of the introduction of the species.
- 4 Describe the methods used to control the species.

Climate change

Climate change is the significant and lasting change in weather patterns over an extended period of time. It is a natural process of the atmosphere due to factors such as the energy output of the sun, variations in the Earth's orbit, and volcanic, meteorite and tectonic activity. However, it is the climate

changes caused by human activity since the Industrial Revolution (known as anthropogenic global warming, or the enhanced greenhouse effect) that is of most concern. The burning of fossil fuels (coal, oil and gas) for energy generation has dramatically increased the amount of greenhouse gases such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbons into the atmosphere. Most scientists believe that in the last 50 years, greenhouse gas increase is the main cause of climate change. Records indicate the global average air temperature has increased by around 0.85°C since 1880.

Scientific evidence indicates that climate change will cause significant impacts on society and outdoor environments, agricultural production, human health, water and food security, and infrastructure.

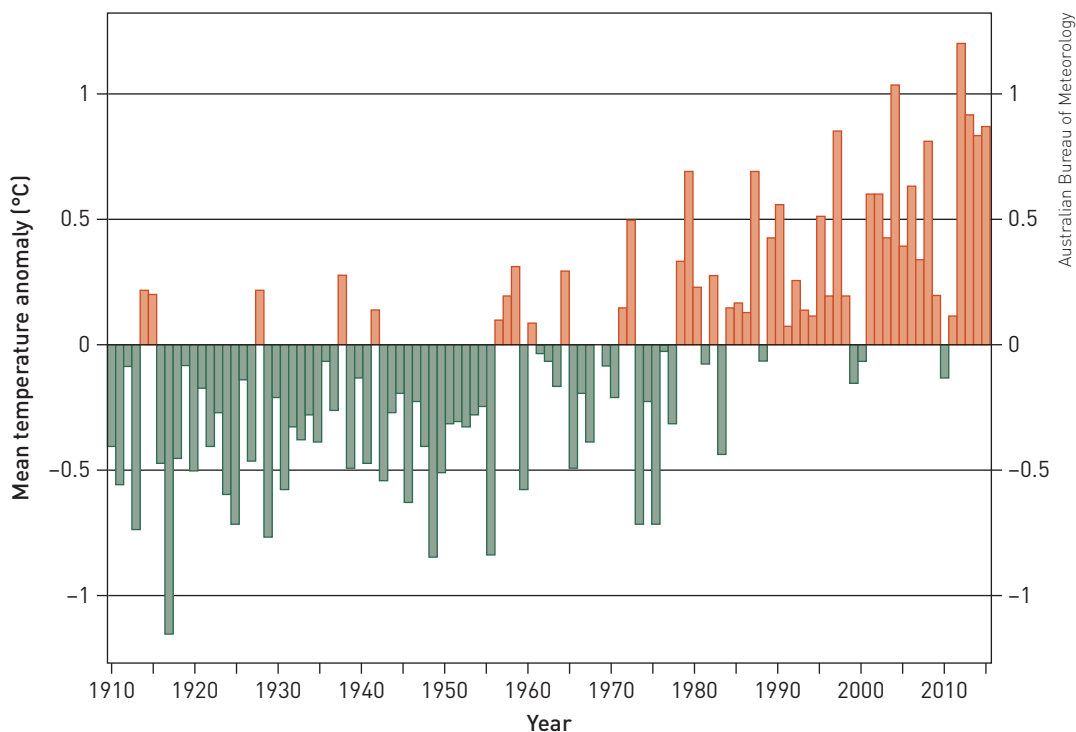
Potential impacts of climate change on society include:

- reduced availability of water for nature and human consumption, agriculture and manufacturing
- likelihood of irrigated cropping to be severely restricted in some years by limited water availability
- less snow fall, causing greater dependence on artificial snowmaking for recreational pursuits
- melting of ice in the Arctic and Antarctic regions, leading to rising sea levels, causing widespread flooding, affecting millions of people and a trillion dollars' worth of buildings and roads
- reduction in egg and milk production due to heat stress
- increases in extreme heat days, leading to increases in heat-related deaths and health problems costing millions of dollars (adapted from NSW Government Department of Primary Industries).

Potential impacts of climate change on outdoor environments include:

- increase in intensity of droughts and in some areas more floods
- reduction in fish stocks due to reduction in stream flow and salt-water incursion into estuaries
- increased risks of bushfires
- loss of coral reefs as seas become too warm and acidic
- species with low adaptability or mobility facing extinction
- ecosystems changing as new species of animals and plants appear or disappear (Australian Museum).

Society will need to learn to adapt to increased temperatures and the associated changes. However, we must act now to reduce greenhouse gas emissions and adopt more environmentally friendly practices, such as renewable energies, to limit the severity of climate change impacts.



Australian annual mean surface temperature changes using 1910–2016 data



'State of the Climate' video series – CSIRO
ABC Landline

LEARNING ACTIVITY



CLIMATE CHANGE

- 1 Watch the 'State of the Climate' series of videos on the CSIRO website.
- 2 Watch the Australian greenhouse calculator animation that discusses the greenhouse effect and climate change.
- 3 Watch the ABC Landline video discussing climate change and its impacts on agriculture.
- 4 Create a poster or digital presentation of one aspect of climate change as presented in the one of the videos.

You can link directly to these websites via <http://oes.nelsonnet.com.au>.

Alamy Stock Photo/William Caram



The development of towns and cities causes dramatic impacts on the immediate and surrounding outdoor environment.

Urbanisation

Urbanisation refers to the development of towns and cities, and the increasing number of people that live in urban areas. An additional component of urbanisation is the movement of people from rural to urban areas. Reasons for this shift include increases in education and employment opportunities, and greater access to healthcare systems. Approximately 90% of Australians live in urban areas, with a growth rate of 1.58% in 2016. Any increase in population and development in an urban area will increase the demands for goods and services provided by outdoor environments. The 'great Australian dream' of owning a house has caused what is referred to as 'urban sprawl' – ever-increasing suburbs encroaching on and destroying the natural environment. This can lead to issues regarding access to infrastructure such as public transport networks, roads, schools, shopping centres, parks and sporting fields, and hospitals. Larger cities demand more energy, creating increased greenhouse gas emissions.

Impacts of urbanisation include increased:

- demands for land, leading to a loss of vegetation, habitat and biodiversity
 - demand for water, reducing availability for the native flora and fauna
 - air, water and soil pollution due to runoff from developed areas and chemicals from agriculture
 - need for waste disposal
 - concentrations of greenhouse gases, leading to environmental and health issues
 - retention of heat, causing increased burning of fossil fuels to cool houses, cars and places of work
 - strain on sanitation and health systems
 - cost of living with payment for services such as water and electricity supply and sewage disposal
 - land degradation such as salinity and erosion caused by loss of water for irrigation.
- Other significant threats to the health of Australian outdoor environments include habitat modification, loss of river flows and vegetation loss.

HABITAT MODIFICATION

Modifying outdoor environments for human use, such clearing of native vegetation for housing and agriculture, have had a dramatic impact on native biodiversity. The vast majority of Victoria has been highly modified to provide resources for human consumption and utilisation. Removing one or more species or a feature from an environment will always impact the entire ecosystem. This may occur through the introduction of species (such as the blackberry or European carp) that take over an environment at the expense of other species, or through logging a forest, damming a river or dumping chemicals into a creek. On a small or large scale, the impacts on entire ecosystems are extensive.

Habitat modification accounts for much of the extinction of native Australian species. Over 310 species of native animals and over 1180 species of native plants are at risk of extinction.

LOSS OF RIVER FLOWS

In addition to drought (which is naturally occurring), **hydro-electricity** schemes, irrigation and town water supply systems have all drastically altered river flows within Victoria. Rivers and streams have been diverted and dammed (or, in some cases, both), causing a range of problems – from waterways drying up, to complete inundation. Ecosystems have been severely affected or even completely destroyed. Since 1967, the **Snowy Mountains Scheme** diverted 99% of the upper flows of the Snowy River for hydro-electricity, and into irrigation systems on the Murray and Murrumbidgee rivers. The impact on the river environment and the communities along the Snowy River and its tributaries has been dramatic. Since 2002, there has been an increase to 15% of original flow levels to increase the environmental health of the river and surrounding environment.

While the Snowy Mountains Scheme provided employment and increased farming opportunities in arid areas, biodiversity has been severely disrupted along the rivers, and small townships have lost tourism dollars.

hydro-electricity
Using water power to produce electricity

Snowy Mountains Scheme
One of the most complex integrated water and hydro-electric power schemes in the world

VEGETATION LOSS

Victoria is losing around 2500 hectares of native vegetation every year. Clearing land for human settlements, grazing, mining, logging and growing crops have altered environments and, in some cases, totally removed all natural vegetation and habitats for animals, birds and insects. Around 1% of multiple-use forests are harvested each year, and rotational regeneration efforts attempt to ensure that the industry is sustainable. Ideally, plantation timber will soon meet all demands for timber and forest products. **Clear felling** is one of the most damaging practices that can occur in the outdoor environment – it wipes out trees of all ages and slows regeneration as plants struggle to survive without the sheltering protection of older, larger trees. Animal and bird habitats and nesting places are also lost, which can threaten species survival.

clear felling
The practice of cutting down all the trees on a site

LEARNING ACTIVITY



THREATS TO SOCIAL AND OUTDOOR ENVIRONMENTS

- 1 Summarise the potential impact on society and outdoor environments of land degradation, introduced species, climate change and urbanisation.
- 2 Research a significant threat to society and outdoor environments not presented in the text. Describe the threat, its causes and its potential impact on society and outdoor environments.
- 3 Choose an outdoor environment you have visited or investigated this year. Identify and describe three significant threats to the health of this outdoor environment. For each threat identified, explain its causes and the threats of potential impacts on society and on your chosen outdoor environment.

This chapter has examined the contemporary state of environments in Australia and the importance of natural environments for individuals and society. The next chapter analyses conflict over the use of outdoor environments, and evaluates practices and strategies for sustaining outdoor environments

NOTES FOR THE EXAM



For the exam, you should be able to identify and predict the potential impact of significant threats on society and outdoor environments.

KEY KNOWLEDGE

- at least two recent or current conflicts over the use of outdoor environments, including at least one from the following:
 - marine national parks and sanctuaries (page 295)
 - grazing in the Alpine National Park (page 296)
 - desalination plant at Wonthaggi (page 296)
 - proposed Great Forest National Park (page 297)
 - extraction of coal seam gas (page 300)
- methods used by individuals and groups to influence decisions about the use of outdoor environments (page 302)
- processes followed by land managers and/or governments or their agencies relating to conflicts over the use of outdoor environments, including community consultations, use of court systems, legislation and management plans (page 305)
- management strategies for achieving and maintaining healthy and sustainable outdoor environments that may be adopted by public and private land managers (page 325)
- Acts or conventions related to the management and sustainability of outdoor environments, including the following:
 - *Flora and Fauna Guarantee Act 1988* (Vic) (page 332)
 - Ramsar Convention (international treaty, 1971) (page 334)
- actions undertaken to sustain healthy outdoor environments, including at least two of the following:
 - green building design (page 337)
 - integrated farming (page 339)
 - Landcare (page 342)
 - urban planning (page 343)

KEY SKILLS

- plan for and reflect upon a range of practical sustainable outdoor experiences and analyse relevant information collected during these experiences
- explain the actions undertaken by individuals and groups with respect to conflicts over the use of outdoor environments
- analyse methods used by individuals and groups to influence decisions about the use of outdoor environments
- evaluate processes relating to conflicting interests over the use of outdoor environments
- analyse specific management strategies for maintaining outdoor environments
- describe and evaluate the effectiveness of specific acts and conventions related to managing and sustaining outdoor environments
- analyse specific actions undertaken to sustain healthy outdoor environments

Extract from the *VCE Outdoor and Environmental Studies Study Design 2018–22* (2017)
© The Victorian Curriculum and Assessment Authority (VCAA). Used with permission.

CONFLICTS OF INTEREST OVER THE USES OF OUTDOOR ENVIRONMENTS

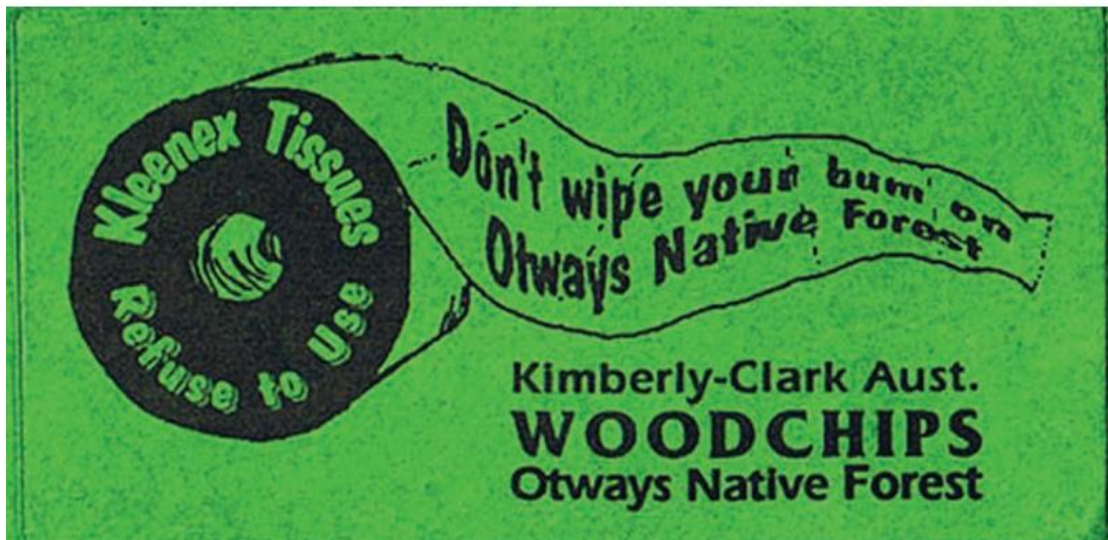
As we have discovered throughout Outdoor and Environmental Studies, there is a vast array of human relationships with outdoor environments within our society. Many individuals or groups of people have different opinions about how natural environments should be used. **Conflicts** occur because different individuals or groups have different interests in a specific outdoor environment and different beliefs about how to use, or interact, with it. For example, the perception that the outdoor environment is a resource that humans use primarily to provide for their own needs would be at odds with the notion that humans should be trying to live in harmony with the environment.

However, it is rarely this clear-cut or obvious. Usually, competing views regarding the use of the outdoor environment involves quite specific aspects about a particular environment – the extent of the impacts different human uses could cause, perceived threats to a specific significant species, disagreement about the conservation value of an environment, one user impeding another user's access to a particular venue, and so on. Conflicts can occur between groups who have very different types of interactions with the outdoors. These interactions may reflect different perceptions of how the environment in question should be used.

Conflict

a serious disagreement or argument, typically a protracted one; a serious incompatibility between two or more opinions or interests

Otway Ranges Environmental Network



Sticker outlining the Otway Ranges Environment Network's campaign against logging old-growth forest for the production of woodchips. These stickers were placed on toilets in the region to provide community awareness about the brand of Kleenex toilet paper that utilised woodchips from Otway Ranges operations and to promote the use of alternative brands.

The use of an outdoor environment for primary industry focuses first and foremost on what this environment is able to provide in the way of resources for human needs. While the impacts of such interactions might be considered and even minimised as much as possible, they tend to be tolerated in favour of production. However, if this specific environment was also valued by others in society as a place worth protecting and preserving with conservation the focus, then a conflict may arise.

Conflicts can also occur between groups who have similar uses or types of interactions with the outdoor environment. In this instance, the same venue could be used by people with very similar perceptions of how the particular environment should be used. Different recreational users of the same venue have been known to disagree with each other's interactions for different reasons. Surfers and recreational fishers often share similar beach venues as well as similar times for their pursuits. As both activities have become increasingly popular in recent times, beach use has increased significantly

in popular areas during peak times. Conflict based on the impact of these activities has occurred, often due to surfers objecting to litter being left behind by some fishers such as discarded cans, bottles, bait and tackle. Many local surfing groups have responded by conducting beach clean-up days and informing the media of the impacts they encounter.



Shutterstock.com/Tom Grundy

Entanglement in discarded fishing gear has been identified as a threat to sea birds and smaller cetaceans. For large ocean-dwelling mammals, however, swallowing such refuse is also emerging as a serious cause of disability.



Getty Images/Ian Waidie / Stringer

Discarded litter disrupts the experience for people in natural environments.

piste
A marked ski run or path down a mountain for snow skiing, snowboarding or other mountain sports

Other types of conflict can occur between recreational users based on the experience they desire through participation. Skiers and snowboarders have an ongoing feud regarding many aspects of their chosen activities, including skiers claiming that boarders don't follow the laws of the **piste**, scrape off all the best snow and are a danger to others, while boarders berate skiers for being 'uncool' and elitist. Both, however, rely on the downhill resort complete with lifts, accommodation and modified slopes and are at odds with the cross-country skier who visits the alpine environment for solitude in an undeveloped pristine landscape.

There will always be competing, if not diametrically opposed, views about natural environments and their use by humans. Often, the fate of outdoor environments depends on the outcome of negotiations that occur between land users and land managers to resolve conflicting views about whether, when or how humans should interact with natural environments.

Interest groups

When conflict over the use of the environment arises, individuals with similar values may form an interest group with the aim of promoting their views about the issue. The value of forming an interest group is the ability to draw on a greater degree of resources than might be available to an individual. Some interest groups are 'single-issue' – they are formed in response to a particular concern.



Save Bastion Point

SAVE BASTION POINT

An example of a single-issue group was Save Bastion Point. This group was formed in 2005 by another group, Friends of Mallacoota, to fight the East Gippsland Shire Council's proposal for a large-scale breakwater and boat ramp development at Bastion Point, Mallacoota. Their campaign aimed to protect the cultural, environmental and recreational values of Bastion Point, to promote safe and sustainable use of the area and to oppose what they considered the inappropriate development of the Bastion Point headland. This development included the loss of marine habitat by the blasting

of existing reef and rock platforms to create a break-wall and deep boating channel. Despite the construction of the structures going ahead, the group continued to fight the local and state governments' decision to approve the proposal. After a 10-year fight, they were finally defeated by the completion of a 3-metre-high break-wall that extended 130 metres offshore to bisect the waves frequented by local and visiting surfers.

© 2014 by Save Bastion Point by Julie Parker



Bastion Point, Mallacoota – site of the proposed break-wall and boat-ramp development

© 2014 by Save Bastion Point by Libby Greig



Construction goes ahead at Bastion Point, Mallacoota.

AUSTRALIAN CONSERVATION FOUNDATION

Other groups exist irrespective of a specific issue. The largest environmentally focused interest group in Australia is the Australian Conservation Foundation (ACF). The ACF was formed in 1964 in Canberra by a group of scientists, business people and public servants who felt that conservation was a major issue facing humanity, and was formally incorporated in 1966. It has addressed a

Courtesy of the
Australian Conservation
Foundation: www.acf.org



**AUSTRALIAN
CONSERVATION
FOUNDATION**

The Australian Conservation Foundation (ACF) is the largest environmentally focused interest group in Australia.

range of national environmental issues such as protected areas, sustainable agriculture and land management, climate change and energy, nuclear issues and water management. There are currently over 10 000 members of the ACF, with many more supporters and donors. As well as an informative website, the ACF provides members with a magazine that contains stories and images from advocates, campaigners, writers and artists who hold the belief that we are able to do better by our environment.

AUSTRALIAN FOREST PRODUCTS ASSOCIATION

Not all interest groups are formed with conservation as their primary focus. The Australian Forest Products Association declared, after its creation in 2011, that it aimed to be 'a single voice ... to present the forest products industry to governments, the media and the people of Australia in a united fashion'.

Government and their agencies are not considered to be 'interest groups' despite their own interests and their influence during the decision-making about specific environmental issues. The perceptions and views of these stakeholders in regard to specific outdoor environments will often be in line with their policies, which in turn are intended to reflect the views of their supporters. The conflict case studies outlined later in this chapter include descriptions of the role of these types of government stakeholders as well as specific interest groups.

Other high-profile interest groups that are active in conflicts over the use of natural environments include:

- Victorian National Parks Association
- National Association of Forest Industries
- The Wilderness Society
- Australian Forest Products Association
- Mountain Cattlemen's Association of Victoria
- Greenpeace
- Watershed Victoria
- Friends of the Earth
- Lock the Gate Alliance.

There is more than one aspect of the definitions of the term 'conflict' (defined on page 291) that are particularly relevant to the outdoor environment. Environmental conflicts are being considered increasingly serious in light of the numerous environmental issues that require urgent responses. Campaigns waged against the destruction of the environment often become protracted due to the passion, dedication and persistence of modern environmentalists whose values about the use of outdoor environments fundamentally differ from those who have more commercial interests. Such conflicts also become extremely complicated with varying points of view of different interest groups, numerous stakeholders involved, legal issues, and so on.

In order to easily describe conflicts of interest, we can summarise the main points as:

- the outdoor environment involved
- issue about that outdoor environment causing the conflict

- group 1's name
- group 1's interaction with the specific outdoor environment
- group 1's position on issue
- group 2's name
- group 2's interaction with the specific outdoor environment
- group 2's position on issue.

Examples of environmental conflicts

The following examples summarise some current high-profile environmental conflicts and some that have occurred in the past decades. These conflicts will be examined in more detail later in the chapter.

MARINE NATIONAL PARKS AND SANCTUARIES (VICTORIA)

Summary of conflicts of interest regarding marine national parks

Environment	Marine environments along approximately 12% of the Victorian coastline
Issue	Creation of marine national parks, restricting how these areas are used, including some restriction of commercial and recreational fishing
Group 1	Victorian National Parks Association (VNPA)
Interaction	Actively promote and campaign for the conservation of marine environments and species, and the restocking of depleted fisheries
Position on issue	Support the creation of marine national parks including the restrictions on how these can be used
Group 2	Seafood Industry Victoria (SIV) – commercial fishermen Victorian Recreational Fishers (VRFish)
Interaction	Commercial fishing/recreational fishing
Position on issue	No marine parks, unrestricted recreational fishing, continued commercial fishing

Victorian National Parks Association (VNPA) – Justification/arguments for supporting marine national parks:

- support the extension of the national park system into marine environments
- maintain biodiversity and natural processes, particularly within coastal, **intertidal** and subtidal ecosystems
- current commercial fisheries are overfished and marine national parks would provide environments with the ability to recover and restock adjacent fisheries
- recreational and commercial fishing would become more sustainable in other areas, and be able to be enjoyed further into the future by all Victorians.

Seafood Industry Victoria (SIV) – Justification/arguments for no marine national parks:

- they would lose access to fisheries resource
- they have fished in these waters for generations
- loss of income
- at least want some financial compensation for the loss of income.

Victorian Recreational Fishers (VRFish) – Justification/arguments for no marine national parks:

- they would lose access to recreational fishing venues
- Victorian coastlines are public land and should be used by all Victorians for their own preferred form of recreation
- they have fished in these waters for generations.

intertidal

The area that is above water at low tide and under water at high tide

GRAZING IN THE ALPINE NATIONAL PARK (VICTORIA)

Summary of conflicts of interest regarding cattle grazing

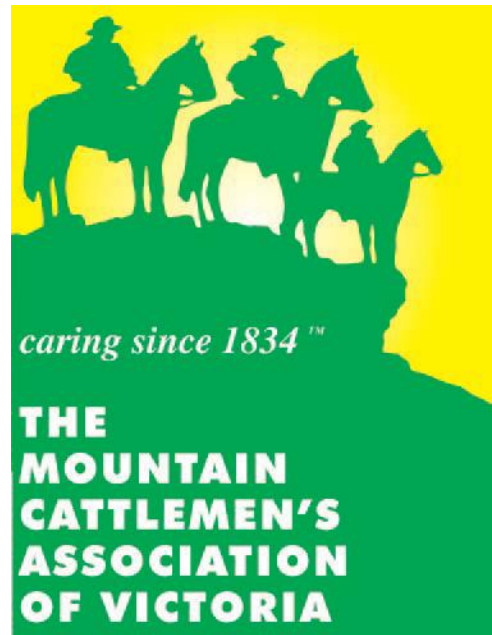
Environment	Alpine National Park
Issue	Cattle grazing
Group 1	Mountain Cattlemen’s Association of Victoria (MCAV)
Interaction	Move cattle onto the Victorian High Country during warmer months for grazing
Position on issue	Continue the practice of seasonal cattle grazing
Group 2	Victoria National Parks Association (VNPA)
Interaction	Conservation of alpine environment so it can be enjoyed for recreation
Position on issue	End cattle grazing

Mountain Cattlemen’s Association of Victoria – Justification/arguments for cattle grazing:

- it reduces potential for bushfire
- cattle eat noxious weeds
- cattle control the spread of woody shrubs
- it maintains the heritage of the mountain cattleman
- mountain cattlemen control feral animals (such as dogs and pigs).

Victorian National Parks Association (VNPA) – Justification/arguments for no cattle grazing:

- cattle spread weeds through faeces
- cattle trample and damage ancient peat beds
- grazing threatens some plants with extinction (such as wildflowers) through selective grazing
- cattle pollute waterways
- cattle grazing increases the amount of bare ground
- conservation rather than primary industry (grazing) should be the focus of Victorian national parks.



DESALINATION PLANT AT WONTHAGGI

Summary of conflicts of interest regarding the desalination plant

Environment	Powlett River coastal environment and Bunurong marine environment
Issue	Construction and operation of desalination plant
Group 1	Watershed Victoria (originally Your Water Your Say)
Interaction	Recreation activities in local environment; conservation activities and campaigning for the intrinsic value of the environment
Position on issue	Stop construction, preserve environment, use alternative water-management techniques
Group 2	Victorian Government
Interaction	Environment used as resource to exploit for human needs
Position on issue	Build a desalination plant near Powlett River mouth for production of water

The Mountain Cattlemen’s Association of Victoria (MCAV) represents people whose families have grazed their cattle in the Victorian High Country since 1834.

desalination

Large-scale removal of salt from seawater to produce fresh water

Watershed Victoria – Justification/arguments against the desalination plant construction:

- possible effects on local marine and coastal environment
- energy use for desalination plant operation
- desalination proposal conflicts with policies of conservation
- risk to cultural (Indigenous) heritage
- water-saving/recycling techniques should be tried first.

Fairfax Photo/Justin McManus



A beach protest, organised by Watershed Victoria, was covered by the media with photos appearing in most major papers.

Victorian Government – Justification/arguments for the desalination plant construction:

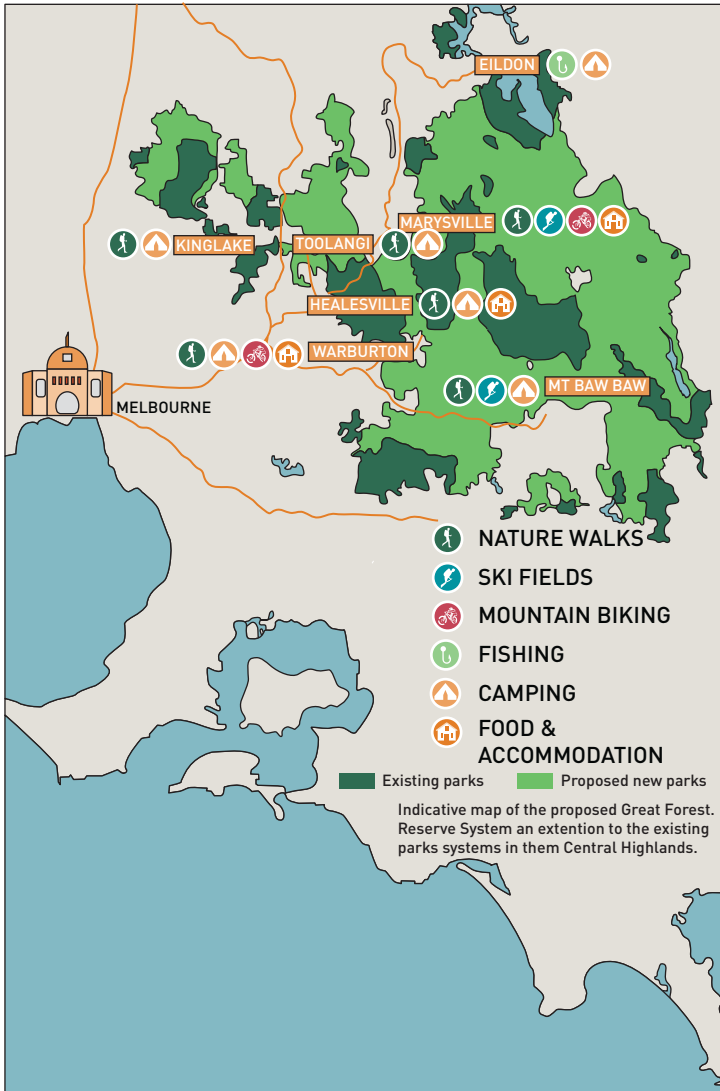
- Melbourne faces water shortfalls in the future due to population growth, drought and climate change
- water-saving/recycling processes are not sufficient
- desalination plant required to provide water security through diversity of water supply
- Wonthaggi site provides clean water source, safe waste dispersal and low marine impact.

PROPOSED GREAT FOREST NATIONAL PARK (GFNP)

Summary of conflicts of interest regarding the proposed GFNP

Environment	Central Highlands rainforests – roughly 60 kilometres east of Melbourne, in an area that spans inside Kinglake in the east, Mt Baw Baw in the west, Eildon in the north and Warragul in the south
Issue	Proposal to declare a national park of over 5000 square kilometres that incorporates existing national parks, reserves and state forests
Group 1	Great Forest National Park Working Group
Interaction	Campaigning for the creation of the GFNP that focuses on a balance of conservation management and broad recreational possibilities, and the discontinuation of exploitive interactions
Position on issue	The GFNP will recognise and protect the natural and cultural values of the unique forests covering the Central Highlands of Victoria

▶ Group 2	Forestry industry Some recreational interest groups
Interaction	Timber harvesting; exploitive recreational activities (e.g. deer hunting)
Position on issue	State forests should remain to enable continued primary industry, and the hunting of deer and other introduces species, as these provide better environmental management and the greatest benefit for the Victorian public



Location of the proposed Great Forest National Park

GFNP working group – An advocacy group including the following groups:

- Friends of Leadbeater’s Possum
- Friends of Toolangi
- Healesville Environment Watch Inc.
- My Environment
- Warburton Environment
- The Wilderness Society (Victoria)
- Victorian National Parks Association (VNPA)
- Australian Conservation Foundation (ACF)
- local residents
- independent conservationists.

Justification/arguments for the proposed GFNP:

- protection of the forest environment and biodiversity from the timber industry
- restore regional economy via nature-based tourism
- save the critically endangered Leadbeater’s possum and sooty owl from extinction by protecting a broadened and less fragmented habitat
- 9 out of 10 Victorians back the proposal
- protecting forest environments safeguards against climate change by providing a carbon sink to remove atmospheric CO₂
- protection of water catchments in the proposed area for domestic and industrial use
- conservation of places of spiritual nourishment for traditional owners to secure the story of the land for future generations.

Forestry industry – Including the following groups:

- VicForests
- Institute of Forests Australia
- Friends of Forestry
- local forestry employees.

Justification/arguments against the proposed GFNP:

- Victorian forestry industry in crisis
- 3000–5000 jobs will be lost if GFNP proposal goes ahead
- tourism cannot make up for the losses in the extended timber industry (such as management, harvesting, cartage and processing)
- logging is not carried out in the Leadbeater’s possum habitat
- fire is more of a threat to endangered species and requires forest management
- timber industry is in reserves that are sustainably managed
- wood production is planned and controlled by forestry workers on a scientific basis that includes sustainable practices
- social, economic and environmental impacts all need to be considered and compromises made.

Recreational users – Including the following groups:

- Australian Deer Association
- Combined Firearms Council of Victoria.

Justification/arguments against the proposed GFNP:

- game hunting contributes to management of invasive species
- hunting contributes \$400 million to the Victorian economy
- water catchment area within the proposed site is not significant
- hunters should maintain current level of access to the region
- climate change benefits are speculative only
- fear that motorised transport within GFNP will be restricted.

Fairfax Syndication/Meredith O'Shea



The Knitting Nannas of Toolangi, shown here protesting against logging, are in favour of the proposed Great Forest National Park.

EXTRACTION OF COAL SEAM GAS (GIPPSLAND, VICTORIA)

Summary of conflicts of interest regarding coal seam gas extraction

coal seam gas

Flammable gases obtained from underground coal seams that can be used as a fuel

Environment	Farming land across the Gippsland region
Issue	Exploration of coal seam gas (CSG) reserves in areas of Gippsland including privately owned farms with the intention of extracting the gas (sometimes involving 'fracking') for use in energy production and other industrial processes
Group 1	Lock The Gate Alliance – an alliance of private land owners and conservationists
Interaction	Primary industry (such as beef and dairy farmers); conservation of environment by campaigning against harmful processes
Position on issue	Oppose the exploration of CSG and extraction techniques such as hydraulic fracturing or 'fracking'
Group 2	Energy companies/associations/stakeholders Department of Environment, Land, Water and Planning (DELWP)
Interaction	Explore and extract natural resources (CSG) for energy production and industrial processes
Position on issue	Enable mining permits to allow exploration of CSG deposits throughout region for potential future extraction

Lock the Gate Alliance – Justification/arguments against CSG extraction:

- although founded in Queensland in 2010, the Gippsland branch formed in 2012 to unite the large number of protesters of CSG in the region
- fight for rights to refuse what happens on their own private land
- hydraulic fracturing (fracking) poses environmental and public health risks
- groundwater is contaminated by fracking, and flow-on effects community and agriculture
- CSG is a fossil fuel and therefore contributes to climate change impacts
- should be looking toward renewable energy alternatives.



Atamy Stock Photo/David Hewison

Protesters marching in Melbourne against GSC exploration and extraction

Energy companies/associations/stakeholders – Justification/arguments for CSG extraction:

- CSG has been extracted safely for over 30 years in Australia and the practice has only recently come under scrutiny
- CSG is a cleaner alternative to coal-fired power plants
- CSG can provide constant power to meet demand spikes that renewable energy is not currently able to do
- CSG provides energy security in face of dwindling fossil fuel reserves
- CSG availability will boost the economies through creation of jobs, domestic power generation, export and taxes
- the Australian Petroleum Production and Exploration Association (a gas industry lobby group) deny that CSG exploration is dangerous
- Esso and Ignite have current exploration licences and should be able to use them
- Lakes Oil have already drilled onshore wells at Seaspray and Longford in Gippsland, and want to continue production
- Icon Energy has exploration permits between Sale and Yarram, and wants to continue operations.

Department of Environment, Land, Water and Planning (DELWP) – Justification/arguments for CSG extraction:

- have stated that they are ‘well-fitted to deal with any issues arising from CSG extraction’.

At the time of writing in 2017, the Victorian Government was introducing a permanent ban on further CSG exploration in the state.

LEARNING ACTIVITY



DEBATE

Choose any of the conflicts outlined (or another relevant local conflict).

- 1 Students are divided into two teams on either side of the debate with five students on each team.
- 2 The remainder of the students is the audience award points.
- 3 The first members of both teams give one point of their argument and the audience chooses which team to award the point to.
- 4 The second members of each team then give their argument point and the audience chooses who receives the point.
- 5 Continue this until all the debaters have presented one point of their argument, and then add the points to determine the winning team.

NOTES FOR THE EXAM



For the exam, you should know what a conflict of interest is.

- A conflict of interest is when two groups have opposing views.
- Conflicts of interest over use of natural environments have:
 - an outdoor environment involved
 - a contentious issue over its use
 - at least two groups with different interactions
 - at least two groups with opposing perceptions.

You will be required to examine at least two recent or current conflicts of interest between people involved in different uses of a particular outdoor environment. At least one of the conflicts needs to be of those five prior examples; but you may choose any other conflict for your second example. Although the five examples listed in this chapter have particular significance within the environmental movement in Australia, your teacher may wish to investigate a current or recent issue closer to home.

Here are some other conflicts over the use of Victorian outdoor environments:

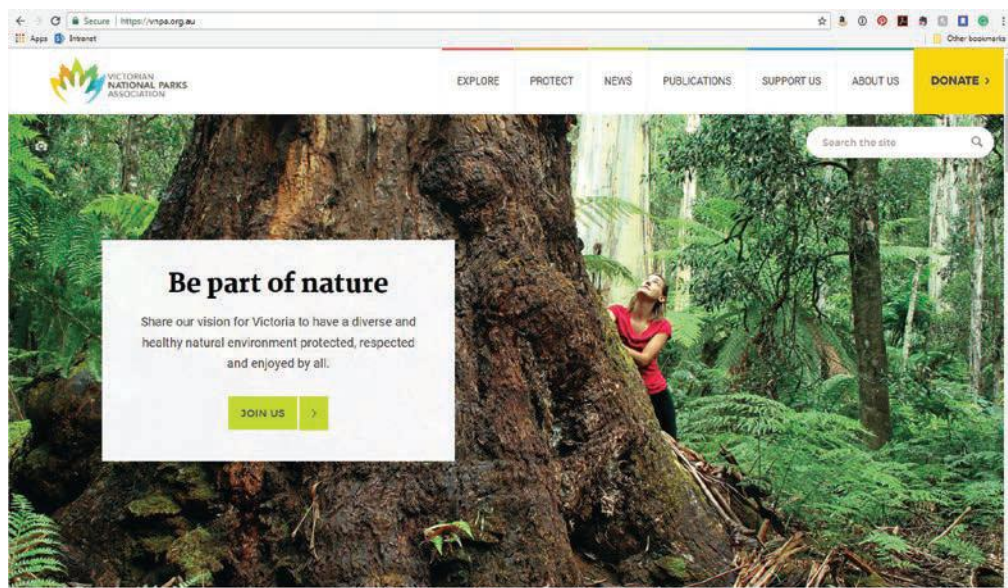
- dredging of Port Phillip Bay shipping channel
- Sugarloaf Interconnector (North–South Pipeline)
- logging in the Otway Ranges
- development of Tidal River, Wilsons Promontory
- protection of the Little Desert
- East West Link road development
- old-growth forest logging in East Gippsland
- Bastion Point break wall and boat ramp construction
- wind turbines across rural Victoria (e.g. Bald Hills, Gippsland).

METHODS USED TO INFLUENCE DECISIONS ABOUT OUTDOOR ENVIRONMENT USE

First they ignore you, then they ridicule you, then they fight you, and then you win.

Mahatma Gandhi

Most Australians over the age of 18 are eligible to vote to elect governments in Australia at three levels: local, state and federal. This system allows members of the community to apply pressure to elected representatives within the relevant level(s) of government and, therefore, influence decision-making processes. Interest groups and individuals adopt a range of methods to influence decision-making processes about the use of the natural environment. Although they are not interest groups themselves, governments and their agencies are also in the business of gaining support for their environmental policies. While they generally do not engage in the same sort of publicity as environmental groups, they can employ their own methods to influence public opinion on their intentions for a particular outdoor environment. During the marine national park issue in Victoria, the state government and agencies such as Parks Victoria promoted the benefits of the proposed system through print and electronic media to reach as many Victorians as possible. Videos were produced illustrating the unique biodiversity of all of the proposed park sites, and the government advertised its intentions to protect these venues in the media.



The Victorian National Park Association website

From: Victorian National Park Association, www.vnpa.org.au

Methods of influencing decision-making

There are many and varied methods that can be used effectively to influence decision-making processes about natural environments. The effectiveness of these methods often depends on what decision-making process is being applied to the particular conflict. Methods are used to raise community awareness and support, and to apply direct pressure to decision-makers. Which methods are used and the extent of their use will often depend on the scale of the conflict and the resources at the disposal of the interest group. It is not uncommon, for example, for campaigns to wain in their intensity as the ability to fight is hindered by lack of finances or costly legal battles. This is especially so in the case of smaller interest groups involved in localised issues against highly resourced corporations or governments.

The following table outlines a range of methods that may be utilised by interest groups when trying to influence decision-making processes relating to conflicts of interest over natural environments, and the possible advantages and disadvantages of these methods.

Summary of methods of influencing decision-making

Method	Advantages	Disadvantages
Direct action Protesting, marching, demonstrations, blockades, protests boycotts, bans	<ul style="list-style-type: none"> • Gains free media attention • Brings the issue to the public eye • Shows level of support • Can disrupt earnings of a company encouraging a compromise 	<ul style="list-style-type: none"> • Small groups have little impact • May alienate groups in the community • Requires significant preparation and organisation
Lobbying decision-makers Direct contact with those making decisions or their representatives	<ul style="list-style-type: none"> • Conducted directly by individual/ interest group • Ensures decision-makers have a clear understanding of your position 	<ul style="list-style-type: none"> • Can be difficult to access decision-makers • Time-consuming
Letter writing Letters sent to newspapers or decision-makers	<ul style="list-style-type: none"> • Handwritten letters show a high level of commitment • Letters to newspapers are often published and inform the public/ generate support • Good way to get media attention on small issues in community newspapers 	<ul style="list-style-type: none"> • Prepared letters can have little impact as they require minimal effort from those involved
Petitions Petitions signed by supporters and sent to decision-makers and tabled in parliament	<ul style="list-style-type: none"> • Petitions are easy to conduct and gain a lot of support • Online petitions can reach a high number of people and gain awareness of an issue 	<ul style="list-style-type: none"> • People sign petitions with little knowledge about the issue, so petitions have little impact unless numbers of signatures are high
Manipulating the media Using media to promote positions through interviews, newspapers, on the news or advertising	<ul style="list-style-type: none"> • Get clear message and information to a large number of people 	<ul style="list-style-type: none"> • Interviews are hard to organise • Advertising is very expensive
Forming partnerships Partnerships between groups aiming to achieve a similar outcome on the issue	<ul style="list-style-type: none"> • Greater number of people supporting a position • Greater resources pooled to influence decision • Gives arguments/positions increased public credibility when there is diversity of groups involved 	<ul style="list-style-type: none"> • Different groups may need to compromise on some issues or strategies • Wide number of groups with different agendas may become difficult to coordinate
Gathering evidence/presenting reports Scientific or social reports gathered to provide evidence for an interest group's position	<ul style="list-style-type: none"> • Provides credibility to group's position • Arguments for position can be clearly understood 	<ul style="list-style-type: none"> • Time-consuming and expensive • Opposing groups/companies may gather opposing evidence negating the work

Method	Advantages	Disadvantages
Use of prominent people Groups seek support from well-known people in the community	<ul style="list-style-type: none"> Media attention raises profile of group's position Provides credibility to group's position 	<ul style="list-style-type: none"> May be argued that the prominent person has little understanding of the issue
Meetings and information evenings Take the issue to the community to engage individuals and gather support	<ul style="list-style-type: none"> Members of wider community are able to ask questions and become better informed Shows level of support on the issue 	<ul style="list-style-type: none"> Time-consuming to organise Often poorly attended



Fairfax Syndication/Peter Mathew

Blockading access to a site has been used successfully in conflicts in areas such as the Franklin River and in the Otway Ranges.



Fairfax Photo/Wayne Taylor

Tree climbing is a form of direct action.



Keep Australia Fishing

Keep Australia Fishing rallied against expansion of the Victorian marine park system.



Fairfax Photo/Justin McManus

Mallacoota town demonstration against the Bastion Point development proposal.

LEARNING ACTIVITY



PROMOTE YOUR POINT OF VIEW

Design your own campaign poster to promote one point of view for a conflict of your choice. The poster will need to contain some key points of information to enable someone with no prior knowledge of the conflict to understand your point of view. For your poster:

- create a catchy campaign slogan that could capture the attention of the public
- use images that relate to the environment involved and that support your argument
- include information about where someone can go to find out more about the issue.

GATHERING EVIDENCE AGAINST THE DESALINATION PLANT

Watershed Victoria used the method of ‘gathering evidence’ to influencing decision-making about Victoria’s desalination plant in Wonthaggi. Numerous experts were consulted, including Dr Jochen Kaempf, to gather evidence it believed strengthened their argument against Victoria’s desalination project. A range of expert opinions can be viewed on their website.

Watershed Victoria cited Dr Kaempf’s expert opinion:

Dr Jochen Kaempf, oceanographer, Flinders University, Adelaide, raises major concerns regarding the damage that desalination has on marine ecosystems from the huge brine and **ecotoxin** effluent discharge from such factories. In particular, with reference to the location of Victoria’s Desalination Project, Dr Kaempf explains how the poor flushing characteristics of Bass Strait will exacerbate those effects. He raises concerns that Government is accepting a risk of severe environmental damage, that cost blowouts are being built into the project and that the inquiry for the environmental effects statement has ignored significant questions.

Watershed Victoria (www.watershedvictoria.org.au)



Watershed Victoria

ecotoxin

Products containing ingredients that present specific hazards to the environment

NOTES FOR THE EXAM



For the exam, you should be able to:

- analyse a range of methods used by individuals and groups and their relative effectiveness in the use of outdoor environments.

PROCESSES FOLLOWED IN CONFLICTS OVER OUTDOOR ENVIRONMENTS

When a conflict occurs about the use of an outdoor environment, a decision has to be made to resolve it in some way. When the conflict is over the use of Crown land (for example, grazing in the Alpine National Park) the decision is the responsibility of the organisation or authority in charge of the management of that land. Such organisations are referred to as **statutory authorities** and have been established by the government (federal or state) to manage public land. For example, Parks Victoria and the Victorian Environmental Assessment Council (VEAC) are statutory authorities. They are not interest groups and they report to the government.

When conflict occurs over the use of outdoor environments, a process must occur through which some form of resolution can be achieved. The ideal resolution to any conflict is a compromise between opposing interest groups that ensures all groups have been heard and can live with the decisions that are made. This is not always the case. More often than not, a compromise cannot be achieved and interest groups may find themselves having to accept a decision made through another process.

statutory authority

Government organisation or authority in charge of the management of an outdoor environment

A range of processes may be utilised to resolve conflict over the use of outdoor environments, and these can have varying levels of effectiveness in providing a resolution. The process of resolving conflict can take different forms in terms of how they are implemented. Examples of different forms of decision-making processes are summarised in the following table.

Different forms of decision-making processes

Process	Explanation	Advantages	Disadvantages
Community consultation e.g. VEAC report of recommendations on the protection and sustainable use of Victoria's system of marine parks	<ul style="list-style-type: none"> A consultative group can be formed or enlisted to consult interest groups, public and experts with specialised knowledge of the issue 	<ul style="list-style-type: none"> Provides the opportunity for all views to be heard Accurate information is gathered Promotes the possibility for compromise between groups, creating a win-win situation 	<ul style="list-style-type: none"> May be time-consuming and expensive, and may result in no agreement being found Requires skilled and respected mediator (VEAC)
Use of court systems e.g. Corporate law being used by the state government to enforce bankruptcy of the environmental group Watershed Victoria to silence them during the desalination conflict	<ul style="list-style-type: none"> Use of court system to clarify existing laws regarding the legal and appropriate use of an environment Often used when laws exist that relate to the conflict and need some clarification or interpretation 	<ul style="list-style-type: none"> Results in a clear decision Independent decision made by courts 	<ul style="list-style-type: none"> Court process can be expensive and can take a long time After a decision is made, government can change laws, creating more uncertainty A win-lose situation
Legislation (creating laws) e.g. Federal government's creation of new laws in 1986 putting all World Heritage sites under the control of the federal government, allowing it to halt damming of the Franklin River	<ul style="list-style-type: none"> Laws may be created to allow something to take place or to prevent something from occurring 	<ul style="list-style-type: none"> Clear decision is made Definitive decision, avoiding a drawn-out dispute 	<ul style="list-style-type: none"> One interest group gets what they want while the other remains opposed to the decision made May strengthen the fight against the law promoting further conflict A win-lose situation
Management plans e.g. The Greater Alpine National Parks Management Plan guiding the management of Alpine, Baw Baw, Errinundra, Mount Buffalo, Snowy River, Avon, Tara Range, Walhalla, Howqua Hills, Mount Wills, Mount Murphy (900 000 hectares in total)	<ul style="list-style-type: none"> The <i>National Parks Act 1975</i> (Cwlth) requires that DELWP prepare a plan of management for each national and state park; park management plans articulate the vision, goals, outcomes, measures and long-term strategies for parks within planning areas Essentially a document containing guidelines on how an area of public land is managed Zones may be created with specific focus for different areas of the environment 	<ul style="list-style-type: none"> Plans adopt a landscape-wide approach, taking into account elements bordering the park that influence how a park operates Confines impacts to certain areas, enabling efficient management Can address different needs through zones with different levels of restriction Wide range of values protected including Indigenous, environmental and historic 	<ul style="list-style-type: none"> Can create conflict between user groups, especially if one is excluded from their activities Management is left to one organisation (e.g. Parks Victoria) rather than sharing workload Management has a narrow focus that doesn't allow other uses (e.g. conservation versus primary industry)

Process	Explanation	Advantages	Disadvantages
Use of the political system e.g. Victorian State Government water-management policy, 'Our Water, Our Future', intended to secure Melbourne's water supply including the Wonthaggi desalination plant	<ul style="list-style-type: none"> Government formulating ideas and policies on how the environment is to be used Political parties using parliamentary processes to influence decisions made by government 	<ul style="list-style-type: none"> Can be used to represent views of the majority of the public Can be debated by different sides of an argument in a conflict 	<ul style="list-style-type: none"> Decisions can be held up by disagreeing political parties Policies and decisions can be good for some and not others Majority governments might make decisions despite opposing views
Referendum e.g. 1981 referendum for the Tasmanian public to decide on whether the Franklin Dam should be built	<ul style="list-style-type: none"> Vote by all registered voters on whether or not the people accept or reject a proposed change to the constitution Generally used for larger-scale decision-making Conflicts often become part of a larger process (e.g. a political party may use a conflict as a part of their political campaign to help gain the votes of a particular group of voters) 	<ul style="list-style-type: none"> Democratic process where everyone has their say Clear decisions can be made 	<ul style="list-style-type: none"> Very expensive process where outcomes can be manipulated through media groups with lots of money Decision-making process is often at the mercy of the political process and compromises, and back downs can occur Process is not generally suitable for small, local conflicts

NOTES FOR THE EXAM



For the exam, you should be able to evaluate a range of processes that are/were used to make decisions for specific outdoor environments.

LEARNING ACTIVITY



MANAGEMENT PLAN INVESTIGATION

Visit Parkweb, the main information website of Parks Victoria. Navigate to a national park of your own choice and read the information page. In the related publications section, access the management plan for this national park and respond to the following:

- Outline the range of interactions available to visitors of this venue.
- Describe any pressures on this outdoor environment.
- Outline the different sections of the management plan.
- Outline any management-based zoning of the national park.
- List strategies for the management of visitors to the national park.
- Referring to the management plan for a park or reserve that you have visited, outline the key management objectives of the park or reserve.
- Using observations and experiences from your visit to this natural environment, develop a concept map or poster that provides practical examples of actions occurring to support the management objectives.
- Provide practical examples of actions that are in conflict with the management objectives.



Parkweb

The conflicts outlined on pages 291–302 of this chapter are examined here in more detail, including methods employed by the groups involved and the processes they used to make their decisions.

Marine national parks and sanctuaries (Victoria)

In 1991, the Land Conservation Council (LCC) commenced an investigation into the state of the marine environment within Victoria and the possibility of protection for some aspects of it. The investigation involved research and public consultation into both the state of the marine environment and the impact that the creation of marine parks would have on communities, including commercial and recreation activities.

In October 2000, the Environment Conservation Council (ECC) (which had replaced the LCC in 1997) presented a recommendation to the Victorian Parliament that 13 marine national parks and 11 marine sanctuaries be established in Victoria's coastal waters. These marine parks and sanctuaries represented 6% of all of Victoria's marine waters.

In 2001, the Victorian Government announced that it would introduce legislation to create 12 marine national parks and 10 marine sanctuaries. The reason for creating these parks and sanctuaries was to conserve and protect areas of Victoria's unique marine environment in their natural state. These areas would be protected and conserved in order to:

- maintain biodiversity and natural processes, particularly within coastal, intertidal, subtidal and pelagic ecosystems
- provide scientific reference areas
- allow non-extractive activities to take place, such as scuba diving, snorkelling, boating, swimming and surfing.

Late in 2001, the Victorian Labor Government withdrew the legislation to create the marine national parks and sanctuaries from parliament when the opposition Liberal Party would not support the legislation without what they considered 'justified' compensation being paid to the commercial fishers, who would no longer have access to some fishing areas as a result of the parks and sanctuaries being created. The withdrawal of the legislation from parliament meant that both the groups supporting the marine parks and reserves, and those opposed, needed to work towards influencing the decision-making process and the people involved in making the decisions over the creation of marine national parks.

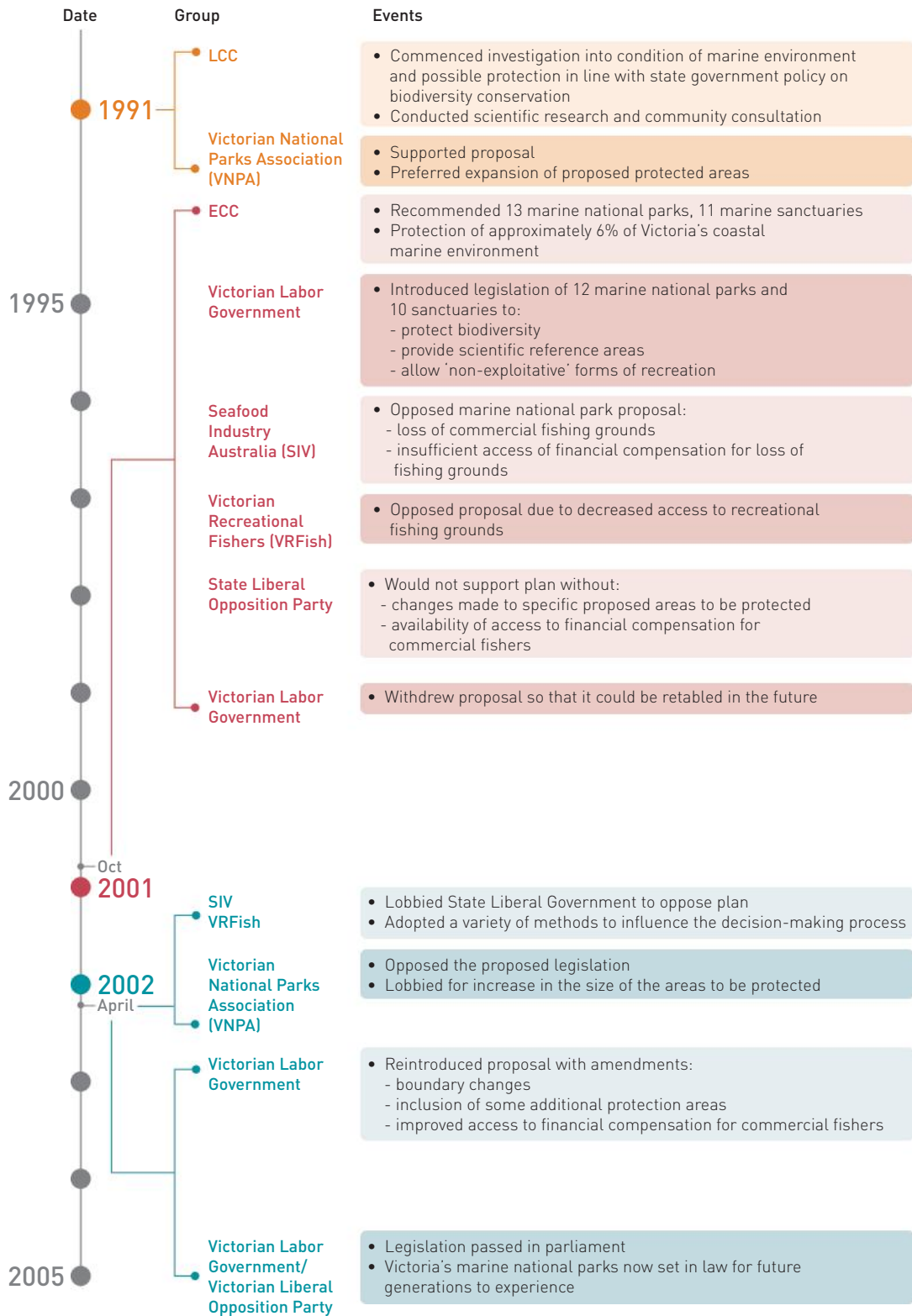
In April 2002, revised legislation was tabled in the Victorian Parliament and, after negotiation with the Opposition, passed on 13 June 2002. The revised legislation included the Cape Howe Marine National Park in East Gippsland, a marine sanctuary near Rickett's Point (Sandringham), and a number of amendments to the boundaries of some of the parks and sanctuaries. The legislation also allowed for a system of compensation for eligible fishery licence holders, the establishment of an independent compensation assessment panel and independent compensation appeals tribunal.

REASONS FOR CONFLICT

The proposal to create marine parks and sanctuaries was well supported by environment groups across Victoria, led by the Victorian National Parks Association (VNPA). Although disappointed at the reduction of the size of the original EEC proposal, the VNPA viewed the legislation as a significant move in gaining protection for the marine environment. The proposal was widely opposed by the commercial fishing industry and parts of the recreational fishing sector because they believed that fishing should not be excluded from many of the coastal areas around Victoria.

The conflict occurred because of a change in the long-term use of an area, and the loss to a group of people (the fishing industry) of access and use of what they considered a commercial and recreational resource.

TIMELINE



METHODS THAT INFLUENCED DECISION-MAKING REGARDING MARINE NATIONAL PARKS

Group	Views held	Methods used
Victorian National Parks Association (VNPA)	<ul style="list-style-type: none"> Supported conservation of Victoria's unique marine and coastal biodiversity Supported campaign for proposed marine parks expansion of the areas proposed 	<ul style="list-style-type: none"> Emails distributed, promoting the use of following methods: <ul style="list-style-type: none"> contact local members of parliament email state government your support for the proposal contact local media encourage recreational fishers to support proposal Media stunts (e.g. 'messages in bottles' petitions delivered to Parliament House) Rallies protesting against exclusion of areas in proposal (e.g. Ricketts Point in Port Phillip Bay) Publications outlining the value of conservation of the environments included in the proposal
Seafood Industry Australia (SIV)	<ul style="list-style-type: none"> Opposed to marine national parks as 'no-take zones' Supported sustainable use of fishing resource Sought compensation for commercial fishers Local fishing communities would suffer due to financial losses 	<ul style="list-style-type: none"> Protests/marches to steps of Parliament House Formed partnerships with other groups (e.g. VRFish) to oppose the proposal Contacted electronic and print media Contacted local members of parliament to voice their opposition Boat trips organised to take politicians to proposed exclusion sites and convince them that commercial fishers' livelihoods were at stake
Victorian Recreational Fishers (VRFish)	<ul style="list-style-type: none"> Opposed marine national parks proposal Believed their access to recreational fishing venues would be decreased 	<ul style="list-style-type: none"> Letters to newspapers Supported SIV in its opposition and joined their action Enlisted prominent people to voice their opinion (e.g. Rex Hunt)

PROCESSES USED TO MAKE THE DECISION

Process	Explanation	How related to issue
Community consultation	<ul style="list-style-type: none"> A consultative group can be used to consult with interest groups, public stakeholders and individuals with specialised knowledge of the issue 	<ul style="list-style-type: none"> ECC (now VEAC) investigated the protection and sustainable use of Victoria's system of marine parks 10-year process to examine environmental, economic and social impacts of proposed marine parks system Communities and experts consulted and encouraged to contribute to process Led to recommendation to state Labor government to create 13 national parks and 11 smaller sanctuaries
Legislation (creation of laws)	<ul style="list-style-type: none"> Laws may be created to allow something to take place or to prevent something from occurring 	<ul style="list-style-type: none"> After further consultation with community and state opposition, the proposal was tabled in parliament and passed in 2002 The marine national parks were set in Victorian legislation and protected by law
Use of the political system	<ul style="list-style-type: none"> Use of parliamentary system to represent views of constituency (people who voted for the local members) 	<ul style="list-style-type: none"> Opposition Liberal Party refused to support the proposal and would not vote for it in parliament, blocking it from becoming law Opposition Liberal Party supported commercial fishers in their fight for access to financial compensation over lost fishing grounds Legislation passed only after negotiations enabled changes to park venues and access to compensation

Desalination plant at Wonthaggi (Victoria)

In 2006, Melbourne's water storage levels dropped to a 100-year low of 25.6%. In response, the Victorian Government unveiled a long-term plan for the securing of water supplies, mainly with Melbourne's supply in mind. The policy was called 'Our Water, Our Future', and included measures to provide water from new sources including a reverse osmosis desalination plant near Wonthaggi. Local people and environmentalists had their own point of view regarding water management.

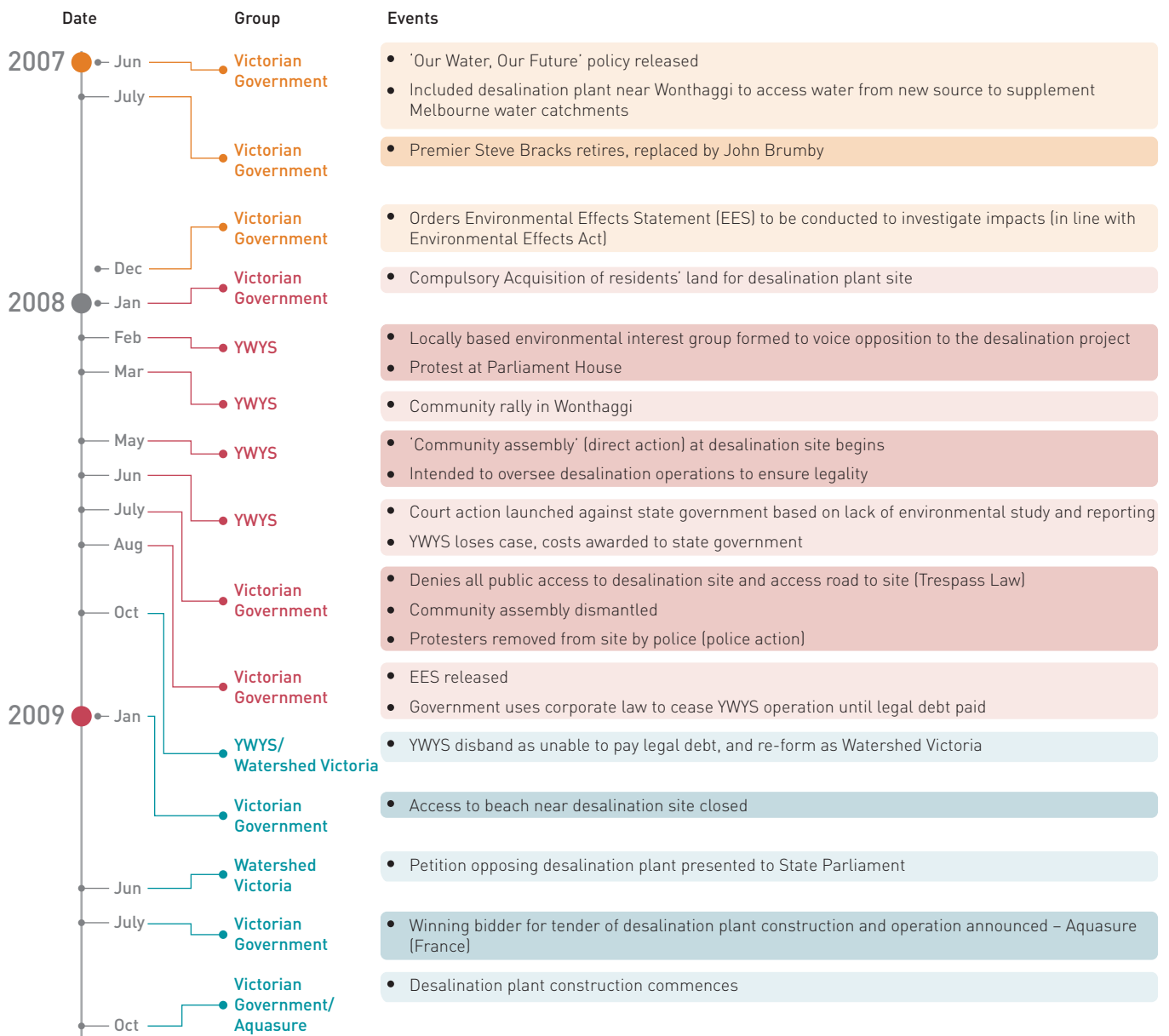
Your Water Your Say (later Watershed Victoria) was formed by locals as the environmental interest group to oppose the government’s plan. Your Water Your Say (YWYS) agreed with the principle of the water-saving, recycling and capturing initiatives put forward by the government. However:

- YWYS believed the government did not go far enough with these conservation techniques, and that these could not be enough to significantly increase water storage levels.
- YWYS disagreed with the government policy of accessing alternative water sources, such as a desalination plant.
- YWYS believed this technique to be energy-intensive, which contributes towards climate change and possibly further drought.

Concern was also shown by environmental groups about the impacts on the nearby marine and coastal environment. The proximity of the Bunurong Marine National Park made these concerns even more significant in the eyes of conservationists.

The following timeline summarises aspects of this conflict.

TIMELINE



METHODS INFLUENCING DECISION-MAKING REGARDING THE DESALINATION PLANT

Group	Views held	Methods used
Victorian State Labor Government	<ul style="list-style-type: none"> Melbourne faces water shortfalls in future due to: <ul style="list-style-type: none"> – population growth – drought – climate change – water-saving/recycling not sufficient Desalination plant required to provide water security through diversity of water supply Wonthaggi site provides: <ul style="list-style-type: none"> – clean water source – safe waste dispersal – low marine impact 	<ul style="list-style-type: none"> Media releases Published fact sheets Television/print media advertisements (e.g. Premier of Victoria in helicopter over Bunurong coast) Opened project information centre in Wonthaggi Newspaper features Brochures and poster displays
Watershed Victoria (originally Your Water Your Say)	<ul style="list-style-type: none"> Formed to coordinate opposition to desalination plant proposal due to: <ul style="list-style-type: none"> – possible effects on local marine and coastal environment – energy use for desalination plant operation – desalination proposal conflict with policies of conservation – risk to cultural (Indigenous) heritage – water-saving/recycling techniques should be tried first 	<ul style="list-style-type: none"> Protests/marches (local, Melbourne, Parliament House) Community meetings Media stunts (e.g. ‘gags’ used during Wonthaggi protest) Lobby government and opposition to prepare an Environmental Effects Statement (EES) Community assembly (direct action) Petition Fundraisers (concerts, auctions) Enlisted prominent people (e.g. Bob Brown) Arrests covered by media Launched informative website

NewsPix/David Crosting



Bob Brown visited the Wonthaggi region to voice his and the Greens Party’s opposition to the desalination project proposal.

NewsPix/Ellen Smith



Protesting against the Wonthaggi Desalination Project on the steps of Parliament House in Melbourne.

PROCESSES USED TO MAKE THE DECISION

Process	Explanation	How related to issue
Use of the political system	<ul style="list-style-type: none"> Government formulation of ideas and policies on how the environment is to be used 	<ul style="list-style-type: none"> Government included the desalination plant into the long-term water policy 'Our Water, Our Future'
Use of the court system	<ul style="list-style-type: none"> Tackling opposing groups in court to make a decision 	<ul style="list-style-type: none"> YWYS versus state government Claim: Desalination plant should not go ahead until EES completed in line with environmental policy Claim unsuccessful; YWYS ordered to pay all legal costs
		<ul style="list-style-type: none"> State government versus YWYS Corporate law used to force YWYS to cease operations until legal debt paid YWYS disbanded as it went bankrupt

LEARNING ACTIVITY



AQUASURE

View some videos produced by Aquasure about Victoria's desalination plant. Identify some of the methods used to influence decision-making. Do you think they were successful?



Aquasure videos

Proposed Great Forest National Park

The proposal for the Great Forest National Park (GFNP) was influenced by the 2013 findings and recommendations of the Leadbeater's Possum Advisory Group. The proposal involved adding 355 000 hectares of protected forest to existing 170 000 hectares of parks and protected areas in the Central Highlands of Victoria.

While political parties and other stakeholders generally agreed with many of the recommendations, which were aimed at the support and recovery of Leadbeater's possum while maintaining a sustainable timber industry, the GFNP proposal created significant conflict.

Despite wide public support (89% of Victorians, according to one opinion poll) and support of many interest groups and prominent advocates for the environment (including David Attenborough, Tim Flannery and Bob Brown), debate continues, with many fearing that they will lose out if the GFNP goes ahead.

The debate has also become a political one with different opinions both within and between the major parties, and the unequivocal support of the Greens.

This conflict is ongoing (as at the time of writing in 2017), so the decisions are yet to be made regarding the GFNP proposal. The Victorian Labor Government has stated that it will consider legislating the proposal rather than allow continued timber harvesting in the area, but only once a commitment and plan around the protection of local jobs has been made. This is despite their reluctance to actively support the plan during their election campaign.

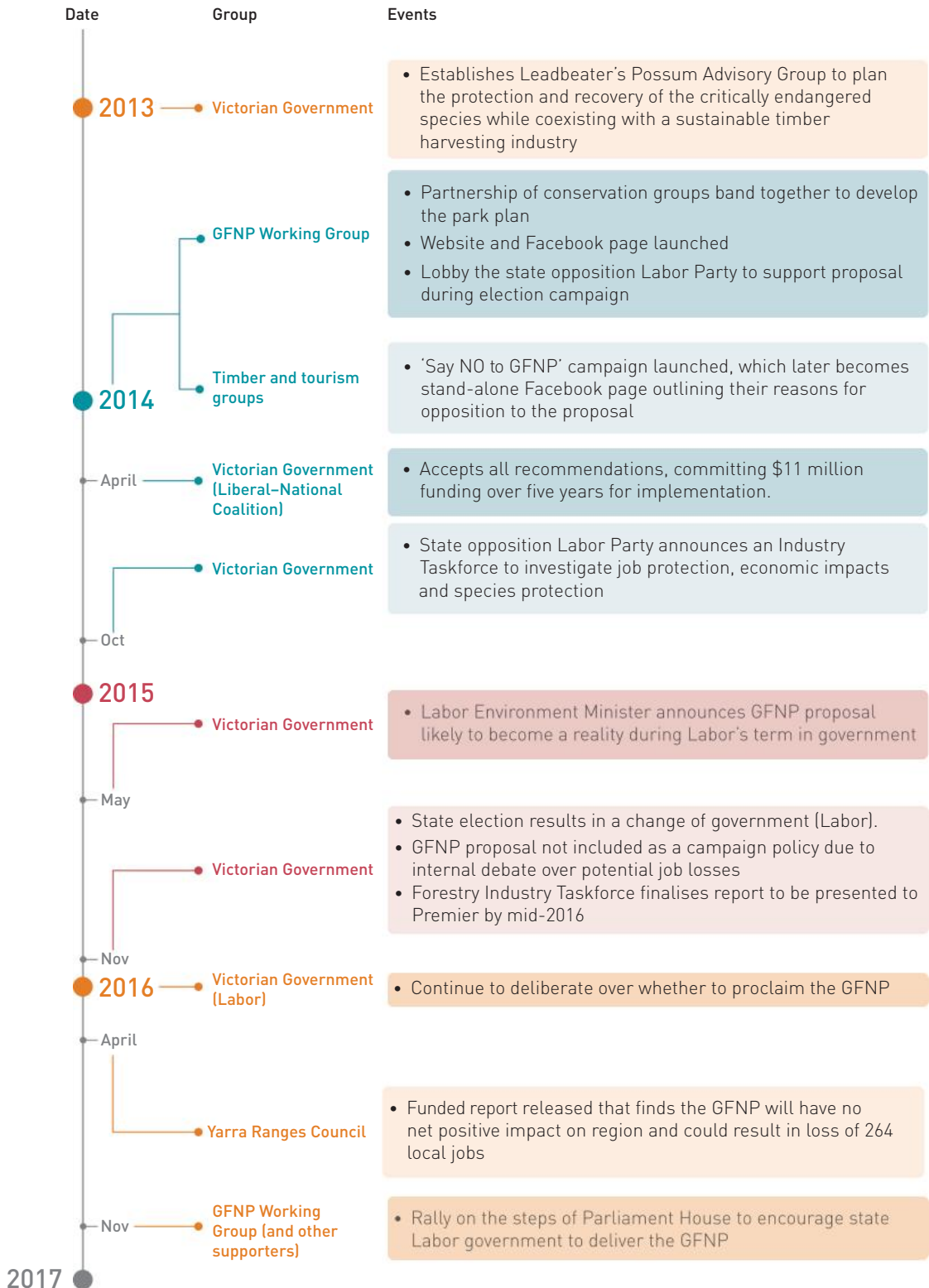


Fairfax Syndication/JOE ARMAO

The critically endangered Leadbeater's possum

The proposal is set to be hotly debated and subjected to various political and other processes before any definitive decision is made about whether legislation is passed proclaiming the GFNP or a compromised version of it.

TIMELINE





METHODS USED TO INFLUENCE DECISION-MAKING REGARDING THE PROPOSED GFNP

Group	Views held	Methods used
GFNP Working Group (and other supporters)	<ul style="list-style-type: none"> • Conservation of biodiversity against logging • Protection of endangered species from extinction (e.g. Leadbeater's possum) • Protect water catchments for household and other uses • Encourage ecotourism to regional towns • Tackle climate change by providing a 'carbon sink' to remove atmospheric CO₂ • Preserve Indigenous heritage of the area 	<ul style="list-style-type: none"> • Formed this partnership to develop a joint statement of more than 30 environmental groups in favour of the proposal • Website and multimedia campaign • Gathered evidence to produce the GFNP plan • Published GFNP Summary Report • Organised tours of the environment to assist people to experience the environment • Direct action protests and blockade of logging sites (e.g. Toolangi State Forest) • Organised opinion polls to express support for GFNP • Organised petitions in support of GFNP • Lobbied state government to deliver the GFNP • Enlisted prominent people to support the GFNP (e.g. David Attenborough, Tim Flannery, Bob Brown, Peter Garrett, Dave Hughes, Jane Goodall – UN messenger of Peace)
Say NO to GFNP (timber and tourism groups, and other supporters)	<ul style="list-style-type: none"> • Oppose the expansion of national park boundaries • Retain forestry industry in the state forests • Forestry provides jobs and a sustainable resource for community • Recreation (e.g. fishing, hunting, horse, motorbike and 4WD transport, firewood collection) should continue without restriction • Management of environment by forestry industry is superior to national park management 	<ul style="list-style-type: none"> • Launched Facebook page and campaign against GFNP • Gathered evidence into economic impact of abolishing local timber industry, potential threats (including fire) to Leadbeater's possum, control of invasive species through hunting, value-added tourism of recreational activities • Community meetings to provide information on potential local employment and economic impacts of GFNP • Lobbied political parties to consider the opposing position on the GFNP • Rallies held to voice opposition to GFNP

CSIRO Images / Robert Kerton. Released under a Creative Commons Attribution 3.0 licence: www.creativecommons.org/licenses/by/3.0/



Shutterstock.com/Greg Brave

Part of the proposed Great Forest National Park

PROCESSES USED TO MAKE THE DECISION

Process	Explanation	How related to issue
Community consultation	<ul style="list-style-type: none"> Advisory group established to consult with community and other groups to investigate the potential social, economic and environmental impacts and benefits of an issue or proposal Recommendations can be provided to government 	<p>Leadbeater's Possum Advisory Group</p> <ul style="list-style-type: none"> Established to develop recommendations to support the recovery of Leadbeater's Possum while maintaining a sustainable timber industry Consulted community and other groups including: <ul style="list-style-type: none"> Zoos Victoria Victorian Association of Forest Industries Parks Victoria VicForests Leadbeater's Possum Recovery Team Recommended actions aimed at managing threats and ensuring persistence of species in coexistence with timber industry Included further research of possum colony, habitat protection, restoration and fire management <p>Yarra Ranges Council-funded Report</p> <ul style="list-style-type: none"> Independent external consultation on the economic, social, cultural and environmental costs and benefits of the GFNP proposal Report findings included: <ul style="list-style-type: none"> questionable increase in tourism-based employment potential loss of 264 local jobs unknown impact on recreation without knowledge of proposed restrictions positive environmental impact on areas currently logged Consulted community and other groups including: <ul style="list-style-type: none"> DELWP Department of Economic Development, Jobs, Transport and Resources Game Management Authority Melbourne Water Parks Victoria Victorian Association of Forest Industries GFNP Working Group Visit Victoria Yarra Valley Hunting and Recreation numerous local council agencies



Supporters of the Great Forest National Park rallying at the steps of Parliament

Extraction of coal seam gas (Gippsland, Victoria)

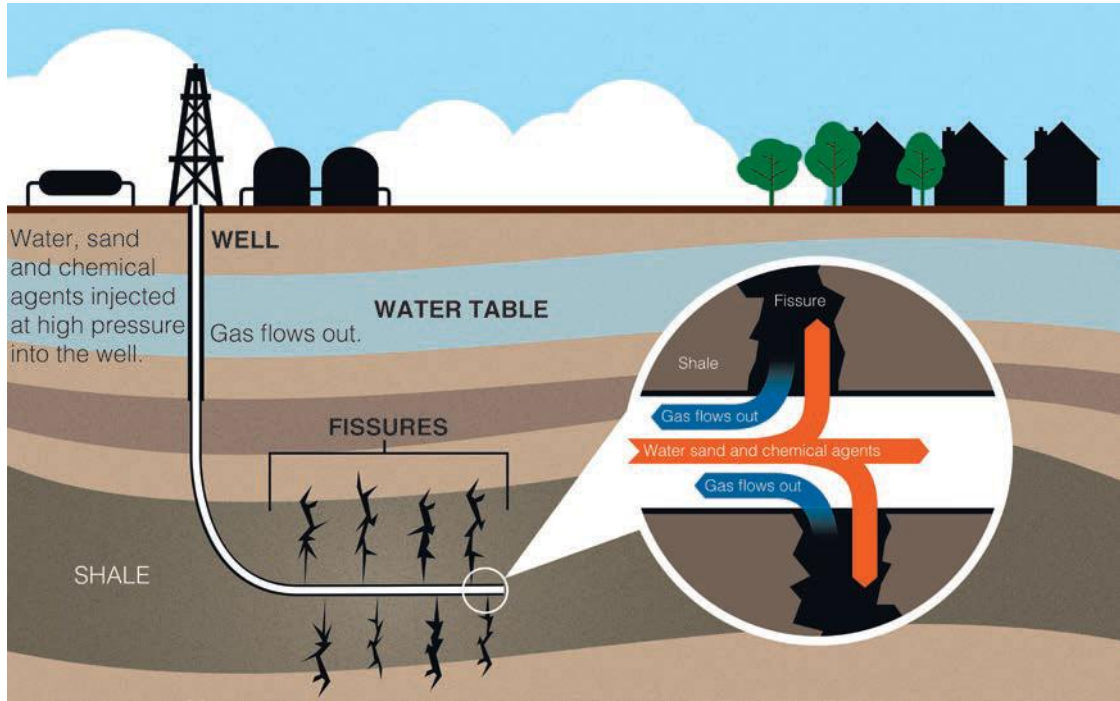
Coal Seam Gas (CSG) refers to the extraction of a naturally occurring gas (mainly made up of flammable methane formed from decaying organic matter) to be used as a fuel for the production of usable energy. Gases such as these are usually used for stoves, heating water and generating electricity. Industrial processes also use these gases for production of materials, such as fertiliser, steel and fabrics. Coal seams exist 300–1600 metres underground, and the gas in these is removed or 'extracted'. This extraction process involves digging a well to enable water (containing the gas) to rise. The gas is then separated from the water.

Another way of extracting CSG is through a process known as hydraulic fracturing or 'fracking'. In this process, a mixture of water, sand and chemicals is pumped into the coal seam to produce cracks in the ground that helps free the gas. Many people, including land owners and environmentalists, are concerned that this process can release contaminants into the soil and have a negative impact



CSG exploratory well drilled on a property at Seaspray, Victoria

on primary industry (grazing and other agriculture) as well as the environment. Drilling holes and producing cracks that are not fully sealed can also leak chemicals that contaminate nearby water supplies, especially groundwater, which is used for agriculture.



Shutterstock.com/jaddingt

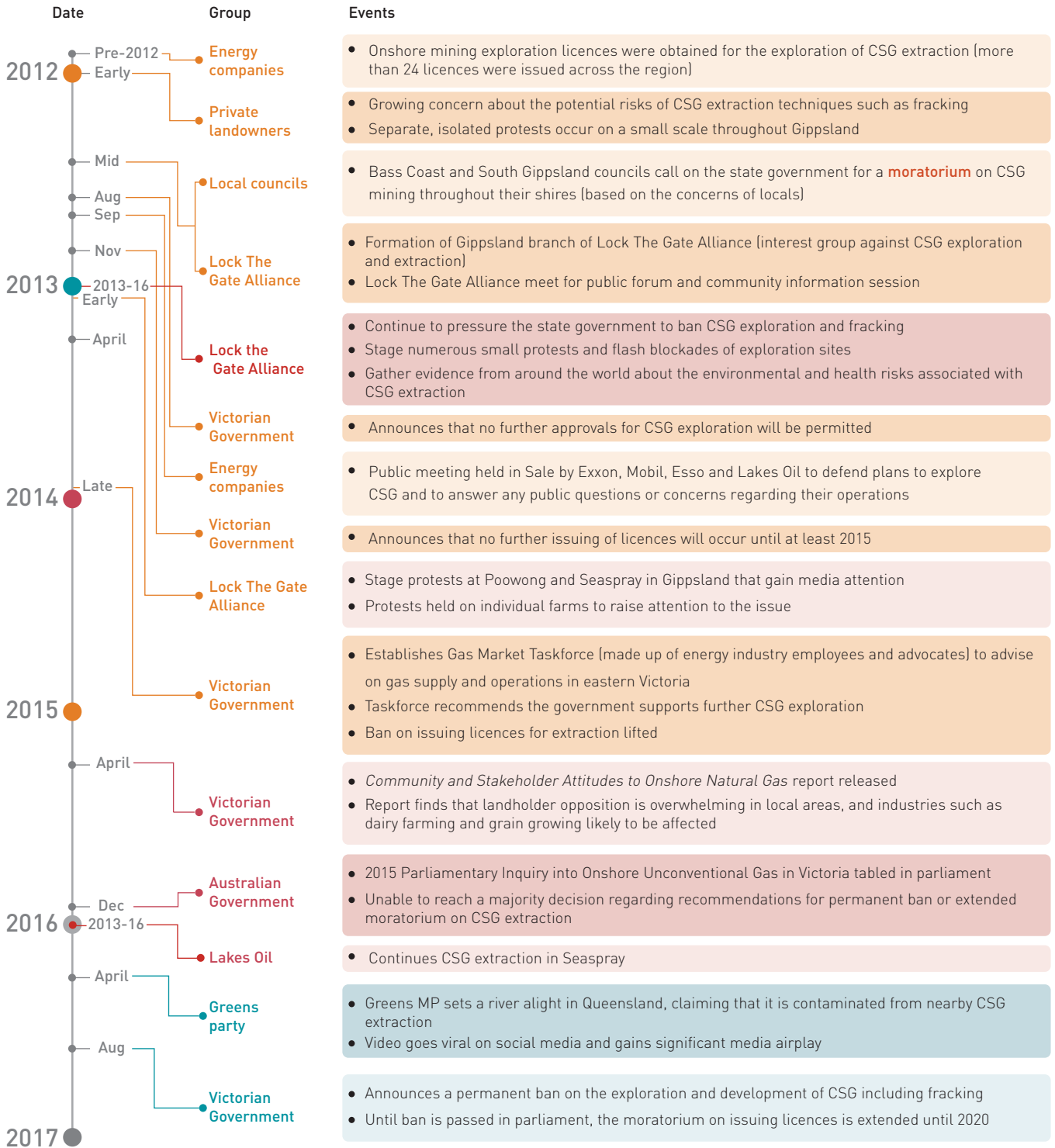
Drilling holes and producing cracks that are not fully sealed can leak chemicals that contaminate nearby water supplies.

At the time of writing in 2017, the Victorian Government was introducing a permanent ban on fracking and further CSG exploration in the state. The ban is intended to protect the state's primary industries as well as being a response to other health concerns associated with CSG extraction. An inquiry into CSG exploration received overwhelming opposition to fracking, and concluded that the environmental risks outweighed the benefits of further exploration. Although the ban on fracking united farmers and environmentalists, not everyone agreed with it. Other stakeholders (including political parties, energy companies, technology innovators and energy consumers) believe that the benefits of this source of natural gas are too good to ignore.



Shutterstock.com/Jason Winter

TIMELINE



moratorium
A temporary prohibition of a particular activity

METHODS USED TO INFLUENCE DECISION-MAKING

Group	Views held	Methods used
Energy companies	<ul style="list-style-type: none"> • Environment is a resource for human use • CSG is a cleaner fossil fuel than coal • CSG bolsters economy through jobs, exports, electricity, etc. • CSG provides energy security that renewables cannot • Benefits of CSG outweigh any risks to the environment or people 	<ul style="list-style-type: none"> • Media releases • Published fact sheets • Community information sessions • Lobbied government to support CSG exploration and extraction
Lock The Gate Alliance	<ul style="list-style-type: none"> • CSG contaminates water and land resources • Mining industry competed for fertile agricultural land and water supplies • CSG and large energy companies' business models conflict with rural values • Public health at risk 	<ul style="list-style-type: none"> • Partnership formed to form Gippsland branch • Held local protests • Marched in Melbourne • Held public meetings/forums • Gathered evidence of risks of CSG extraction • Lobbied local and state governments to enforce bans on CSG exploration and extraction to protect rural properties and values • Direct action, including: <ul style="list-style-type: none"> – flash blockades of exploration sites – protests on Gippsland properties with potential reserves – private landholders denying access to energy exploration companies



Alamy Stock Photo/David Hewison

Lock The Gate Alliance pledged to blockade any CSG exploration in Seaspray, Gippsland.

Image courtesy of Gasfield Free Seaspray, photographer Cam Cope.



The town of Seaspray formed a human sign in protest at of onshore unconventional gas mining in the area: one of the growing number of protests held in Gippsland against this type of mining.

Max Phillips, released under Creative Commons Attribution 2.0
<https://creativecommons.org/licenses/by/2.0/>



The video titled *Watch Greens MP set fire to Condamine River due to fracking* went viral in 2016, gaining significant media attention to the issue of fracking.

PROCESSES USED TO MAKE THE DECISION

Process	Explanation	How related to issue
Community consultation	<ul style="list-style-type: none"> Advisory group established to consult with community and other groups to investigate the potential social, economic and environmental impacts and benefits of an issue or proposal Recommendations can be provided to government 	<p>Gas Market Taskforce</p> <ul style="list-style-type: none"> Advisory group made up mainly of energy company employees and advocates Prepared report and recommendations for state government regarding the economic importance and viability of CSG exploration and extraction Suggested the moratorium on further exploration and mining licences to be lifted Recommended that the state government support the expansion of onshore gas industry <p>CSIRO</p> <ul style="list-style-type: none"> Government agency for scientific research in Australia Report on CSG extraction concluded the risks to water systems, agricultural land use and biodiversity are serious Stated that 'no regulation of CSG will potentially lead to degraded and collapsing landscapes' <p>2015 Parliamentary Inquiry into Onshore Unconventional Gas in Victoria</p> <ul style="list-style-type: none"> Inquiry by the Parliamentary Environment Planning Committee Received more than 1600 submissions, most of which opposed CSG exploration From the best available evidence, acknowledges that the risks outweigh the potential benefits Evidence gained from a wide range of sources including submissions, hearings, site visits, correspondence, reports Perspectives heard from: <ul style="list-style-type: none"> farmers and other landholders environmental and community groups gas industry and market analysts hydrogeologists manufacturers tourism operators local government general public Commission could not reach a decision on recommending a ban on CSG extraction Recommendations were numerous and highlighted that the industry involved many unknowns that require further investigation Highlighted the overwhelming opposition to CSG by those who were most likely to be affected – farmers and other landowners
Legislation (creation of laws)	<ul style="list-style-type: none"> Laws created through Acts of parliament to allow a particular activity to take place or to prevent something from occurring 	<ul style="list-style-type: none"> Moratorium on fracking and the further issuing of exploration licences put in place by the Victorian State Government in 2012 Moratorium remained in place until 2015 In response to the recommendations of the 2015 Parliamentary Inquiry into Onshore Unconventional Gas in Victoria, state government announces a permanent ban on fracking and further expansion of CSG industry Moratorium is extended until 2020 pending the passing of the legislation in state parliament

Grazing in the Alpine National Park (Victoria)

Cattle grazing has occurred in Victoria's alpine areas since the early 1800s when pastoralists took their herds of sheep or cattle into the High Country to escape drought and disease. The alpine areas receive higher yearly levels of rainfall – as a result, the grasses and herbs are lush, even in times of severe drought at lower elevations.

It wasn't until the 1960s, however, that cattlemen recognised the need for a formal organisation to represent their interests. The Mountain Cattlemen's Association of Victoria (MCAV) was formed in 1969. In 1984, MCAV was incorporated with the following aims:

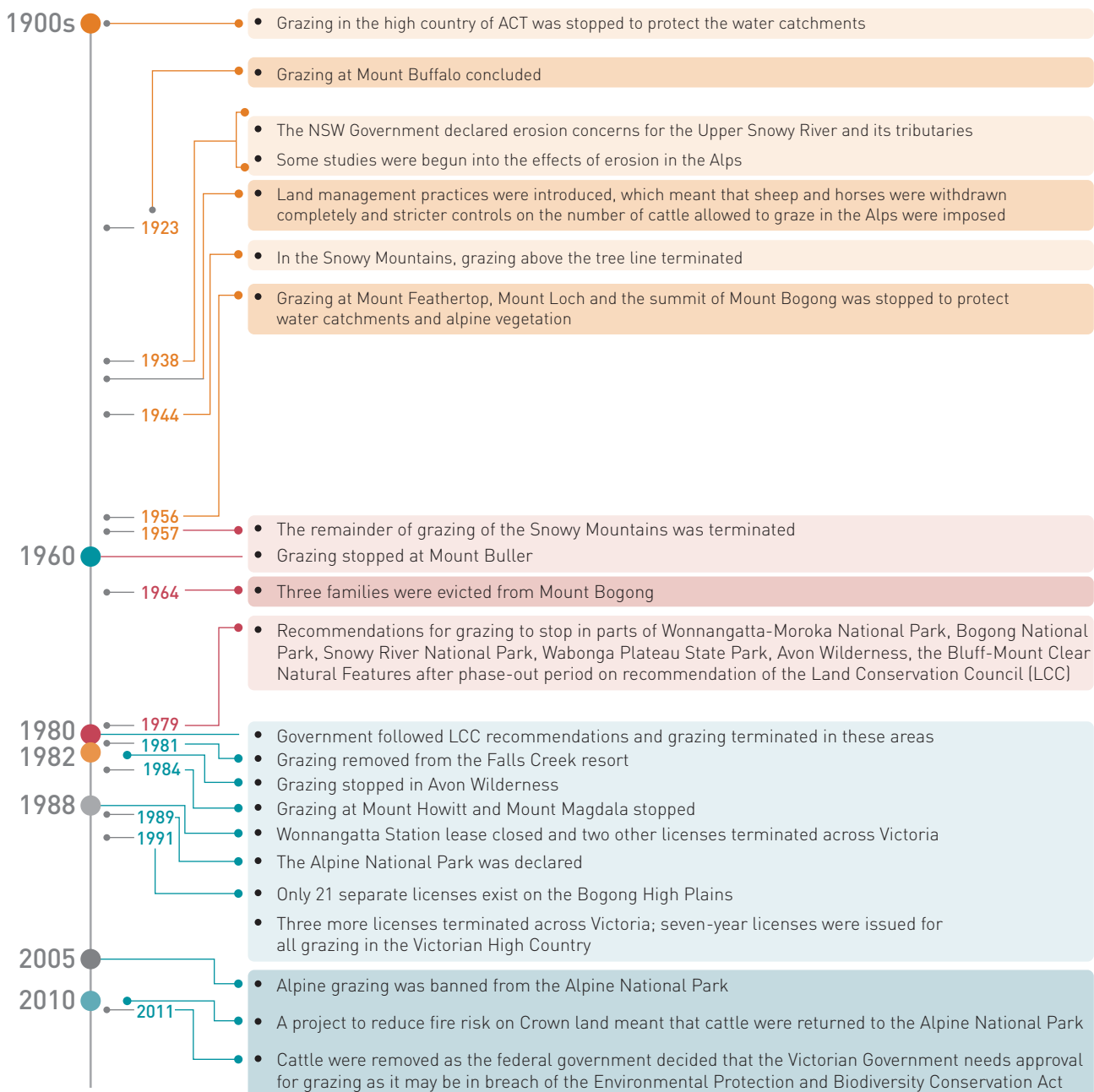
- to promote and protect the interests of cattlemen who graze cattle on Crown land
- to promote better understanding by the public of the value of grazing cattle on Crown land
- to encourage good relations and working relationships with all other persons and/or organisations interested in grazing cattle on Crown lands.

Grazing in the Alpine National Park is a very topical and relevant issue as the issue continues to this day.



MCAV, Australian Alps National Parks

TIMELINE





Newspix/Robert Leeson

Australian families such as the Lovicks from Merrijig, near Mansfield, have been grazing cattle on Victoria's High Country for generations.



Mountain
Cattlemen's
Association of
Victoria

Victorian National
Parks Association

Australian Alps
national parks



The Cow Paddock

DELWP

The Conversation

LEARNING ACTIVITY



GRAZING IN THE ALPINE NATIONAL PARK

Students are to conduct their own research on the alpine grazing issue. Search online to research the fundamental groups involved, which are:

- Mountain Cattlemen's Association of Victoria (MCAV)
- Alpine National Park
- Victorian National Parks Association.

Websites for each of these groups contain fact sheets that describe the issue from a particular point of view (try looking in the 'education' or 'publication' tabs).

Some other useful websites include:

- Victorian National Parks Association: Alpine cattle grazing – it's a park, not a paddock – Presents information from both the point of view of the MCAV and Victorian Government's taskforce on alpine grazing
- DELWP: Bushfire risk management in Victoria's High Country – Offers an investigation of fuel and fire management in Victoria's High Country using strategic cattle grazing
- *The Conversation*: 'Science the loser in Victoria's alpine grazing trial'.

- 1 Outline the basis of the conflict:
 - a What is the specific environment that the conflict is about?
 - b What interactions with the environment are causing the different points of view?
- 2 Outline the major opposing groups, including:
 - a their name
 - b their views of the specific environment
 - c their interactions/intended interactions with the specific environment.
- 3 Outline the methods used by the groups to try to influence the decisions over the use of the specific environment:
 - a Name the methods (e.g. direct action).
 - b How they were used in relation to the specific conflict – describe them.
 - c Mention how effective these methods were and why.
- 4 Outline the processes used to make decisions about the specific environment:
 - a Explain the type of process (e.g. court action).
 - b Outline the details about how this process was used and by whom.
 - c Evaluate how effective this process was in resolving the conflict and why – was the conflict resolved?

NOTES FOR THE EXAM



For the exam, you should:

- have detailed knowledge about at least two conflicts, including:
 - the basis of a conflict (specific outdoor environments, groups, opinions)
 - the methods the groups used to influence public and decision-makers' opinions
 - the decisions that were made and the processes used to make them
 - whether the conflict was resolved or not (was it a compromise of opinions or a one-sided result?)
- choose at least one conflict from the following:
 - marine national parks and sanctuaries (Victoria)
 - grazing in the Alpine National Park (Victoria)
 - desalination plant at Wonthaggi
 - proposed Great Forest National Park
 - extraction of coal seam gas (Gippsland).

MANAGEMENT STRATEGIES FOR HEALTHY AND SUSTAINABLE OUTDOOR ENVIRONMENTS

This topic investigates some ways, or strategies, that we can use to look after outdoor environments for the future. Strategies usually involve the allocation and deployment of physical and human resources to manage the land. Policies refer to statements regarding the positions that political parties take concerning the management of the outdoor environment – they act as a guide for those who are involved in land management. Policies can also refer to formal plans of environment management.

Strategies and policies can be used to restore outdoor environments that have been damaged or altered to make them healthy again, or to achieve healthy outdoor environments. Strategies and policies can also be used to preserve, or maintain, environments that are healthy. When considering how we manage the outdoor environment, we need to consider both public and private land.

Public land management

When we participate in outdoor recreation activities, we often travel to venues that are considered public land. These areas, not being privately owned and managed, are usually under the control of the government and its agencies, such as the Department of Environment, Land, Water and Planning (DELWP) and Parks Victoria. Although there are many categories of public land that are managed for a range of purposes, we will concentrate mainly on the type of venues you are likely to visit and enjoy for recreation.

Summary of general land use categories and management arrangements in Victoria

Land use category	Manager
National and state parks	Parks Victoria
Regional parks	Parks Victoria
Nature conservation reserves	Parks Victoria
Historic and cultural features reserves	Mostly Parks Victoria

Land use category	Manager
Natural features reserves	Parks Victoria
Forest park (Otways)	DELWP
State forest	DELWP
Coastal reserves	Often committees of management (through DELWP regions)
Community use areas	Often committees of management (through DELWP regions)
Water production areas	Water authorities
Softwood production	Private company as licensee
Other reserves (e.g. services and utilities, stone reserves, coal production areas, etc.)	Various (under DELWP regions)

Adapted from Public Land Use Framework, VEAC

Who manages this land and what strategies do they use? Although there are many categories of employees within the management agencies listed in the table, we often collectively refer to those that enact these strategies as rangers. By investigating the role of a ranger, we can identify an array of management strategies that are employed to try and balance the impacts of the various interactions that humans have with public outdoor environments. For example, a ranger in a popular national park such as Wilsons Promontory will be attempting to provide a venue for a range of recreational pursuits while attempting to manage the impacts of these pursuits. This can be considerably challenging in areas of high use such as the Tidal River recreation zone, especially in peak visitation periods. The following sections examine some of the strategies used to achieve this balance.

MANAGEMENT STRATEGIES

When you have visited a public outdoor venue, you will have no doubt noticed some of the strategies that have been put in place to manage environmental impacts. Many of these are practical and quite obvious to the visitor; however, a ranger’s job is far from straightforward given the complexities of balancing the impacts of an array of human interactions.

ROLE OF A PARK RANGER

The role of a park ranger is as varied as the parks and environments they manage. To get an idea of the many responsibilities of a ranger, let’s look at some examples.

The following examples of ranger duties have been split into two areas: conservation (making sure that both the natural and cultural assets are protected and maintained) and recreation (helping visitors to enjoy and understand parks).

Conservation

- Protection, enhancement and management of natural and cultural assets.
- Identify weeds and pest animals and eradicate or control those that hold the most threat to native plants and animals.
- Organise and conduct prescribed burning operations.
- Assist with fire suppression (firefighting) for fires on public land throughout the state.
- Promote and maintain historic assets, such as gold mining sites and historic huts.
- Develop cooperative relationships with local Indigenous groups.
- Identify and protect populations of threatened or endangered animals.

- Work with volunteers on projects such as weed control, maintaining tracks and other infrastructure.
- Issue permits and oversee researchers studying within the park.
- Monitor and issue permits to businesses operating within parks, such as tour operators, ski resort operators, hydro-electricity, cafés and beekeeping.

Recreation

- Maintain and develop visitor facilities such as picnic areas, camping areas and toilets.
- Create and maintain trails for hikers, mountain bike riders, four-wheel driving, etc.
- Respond to emergency situations such as ‘Search and Rescue’.
- Management and development of staff, volunteers, contractors and work-experience students.
- Delivery of interpretation and education services including guided tours, demonstrations and talks.
- Plan, implement and manage projects, programs and contracts.

On a broader level, the role of a park ranger involves extensive planning, researching, strategic thinking and people management to effectively balance conservation and recreational values of each asset.

Excerpt from ‘Role of a Park Ranger’, Parks Victoria



Fairfax Photos/Graham Tidy

Park rangers have both conservational and recreational duties.

LEARNING ACTIVITY



NATIONAL PARK AUCTION

Complete the National Park Auction activity sheet, an activity designed by Parks Victoria to demonstrate some of the aspects of the management of public land in Victoria’s parks. Its purpose is to ‘highlight the interdependence of all living and non-living things and the complexities of managing a national park’.

The activity is run like an auction in that students compete for resources that will meet their own needs depending on the role they have been assigned in relation to the park.



National Park Auction activity sheet

Private land management

While ultimately in the hands of the land owner, the management of private land is also influenced by organisations that aim to improve the health of these outdoor environments. Although the public generally have less access to these venues, the majority (more than 60%) of land in Victoria is privately owned and includes large areas of land with significant conservation value.

TRUST FOR NATURE (VICTORIA)

Trust for Nature is a not-for-profit organisation that works to protect native plants and wildlife in cooperation with private landowners. According to Trust for Nature, two-thirds of Victoria is privately owned and much of the flora and fauna may not be getting necessary protection. Trust for Nature was established under the *Victorian Conservation Trust Act 1972* (Vic) to enable people to contribute to nature conservation by donating land or money.



Trust for Nature

Trust for Nature is now one of Victoria's primary land conservation organisations, with several tools to help people protect biodiversity on private land.

In 1978, Trust for Nature developed conservation covenants as a way to protect native plants and wildlife on private land. They have now protected more than 58 000 hectares through over 1300 perpetual conservation covenants. Trust for Nature has also purchased and preserved more than 59 properties across Victoria through its Revolving Fund, as well as currently owning and managing 44 properties that cover over 36 000 hectares of Victoria.

Adapted from Trust for Nature

Trust for Nature's vision for the future is:

. . . protecting native plants and wildlife on private land will be recognised and valued as a central part of mainstream Australian environmental practice ... There will be a shared expectation and responsibility among communities, landowners and governments that significant natural areas on privately owned land should be conserved, just as national and state parks are protected.

Trust for Nature

The main components of the organisation's conservation program include:

- conservation covenants
- stewardship program
- Trust for Nature properties (property purchase and ongoing management)
- Revolving Fund.

Conservation covenants – providing permanent protection

The **conservation covenant** program was developed by Trust for Nature so that landowners would be able to permanently protect native wildlife and plants on their properties. This remains one of the most effective ways to protect wildlife and native plants on private land. The *Victorian Conservation Trust Act 1972* backs conservation covenants (there are currently more than 1200 conservation covenants). The agreement is voluntary and negotiated between Trust for Nature and each individual landowner. Each conservation covenant is then considered by Trust for Nature's Board of Trustees before being sent to the Victorian Environment Minister for approval.

Stewardship – the support program

Trust for Nature helps landowners to better manage their land through its stewardship program once a property has had a covenant placed on it. Trust for Nature helps covenantors maintain and improve the health of native wildlife and plants on their property by offering conservation management advice and property maintenance tips to landowners. They also offer information about land-management incentives available, technical advice, practical assistance with land management, and habitat and species monitoring.

Trust for Nature properties

Trust for Nature buys and maintains properties that have a high conservation value in order to protect native wildlife and plants to allow for regeneration of damaged habitats as well as protection for the future. On some of these properties, private land conservation practices are in place. The Statewide Conservation Plan that outlines the objectives of Trust for Nature's Private Land management can be found at the Trust for Nature website.

Revolving Fund – a cycle of success

Trust for Nature's Revolving Fund uses the real-estate market to attain conservation outcomes. Environmentally significant land is purchased through funds from donations and the government,

conservation covenants

Management agreement placed on a property's title to ensure native plants and wildlife on the property are protected forever



Trust for Nature

which are then sold on with a conservation covenant attached. The Revolving Fund enables the protection of native vegetation in places where other methods have been found to be less effective. It also helps to introduce new participants to conservation via land protection. The funds revolve in perpetuity as all the money that is generated through the sales is returned to replenish its reserves and enable future purchases.

Old Port Albert Reserve – example of a Trust For Nature property

Trust for Nature purchased this 18-hectare property in Port Albert, near Yarram, in 1992 at the request of the local community. It contains an important remnant of coastal scrub and grassland, and is in very good condition with minimal or no weed invasion. It is located close to the coastal Nooramunga Marine and Coastal Park. The vegetation is an intact mature manna gum and banksia coastal heathy woodland with a heathy understorey dominated in some areas by grass trees. The land is a long narrow strip running parallel with the coastline.



Trust for Nature/Peter Barnes

Trust for Nature purchased Ned's Corner, a 30-hectare former grazing property, in 2002. It is bordered by a national park and the Murray River and is an important habitat for native plants and wildlife. With an eye to regenerating the property, Trust for Nature has stopped sheep grazing and removed fences, allowing wildlife to roam freely.

Australia's Biodiversity Conservation Strategy 2010–2030

Australia's Biodiversity Conservation Strategy 2010–2030 is a guiding framework devised by the government for conserving our nation's biodiversity over the coming decades. The vision of this strategy is that Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence.

WHY SHOULD WE CONSERVE BIODIVERSITY?

Conserving biodiversity is an essential part of safeguarding the biological life-support systems on Earth. All living creatures, including humans, depend on these life-support systems for the necessities of life. For example, we need oxygen to breathe, clean water to drink, fertile soil for food production, and physical materials for shelter and fuel. These necessities can be described collectively as ecosystem services. They are fundamental to our physical, social, cultural and economic wellbeing.

WHY IS AUSTRALIA'S BIODIVERSITY UNDER THREAT?

In Australia, more than 1700 species and ecological communities are known to be threatened and at risk of extinction. Degradation of our environment continues and many ecosystems are increasingly vulnerable to collapse. Our biodiversity is declining because of the impacts of a range of threats, including:

- habitat loss, degradation and fragmentation
- invasive species
- unsustainable use and management of natural resources
- changes to the aquatic environment and water flows
- changing **fire regimes**
- climate change.

fire regimes

The pattern, frequency and intensity of the bushfires and wildfires that occur in an area

Lost biodiversity can never be fully recovered, but through our conservation efforts we can help to ensure that species are able to persist and to restore the capacity of ecosystems to adapt to changes and disturbances – in other words, to build ecological resilience.

The strategy is a guiding framework for biodiversity conservation over the coming decades for all sectors: government, business and the community. The strategy sets out three main priorities, which will direct efforts to achieve healthy and **resilient** biodiversity, and provide us with a basis for living sustainably.

resilience

The power or ability to return to the original form or position

STRATEGY A: ENGAGING ALL AUSTRALIANS IN BIODIVERSITY CONSERVATION

Engaging all Australians in biodiversity conservation is more than just raising awareness. It also means finding ways to get more Australians (whether individuals or private organisations) to participate in biodiversity conservation. Additionally, it includes cooperation between different parts of the community.

STRATEGY B: BUILDING ECOSYSTEM RESILIENCE

Building ecosystem resilience can occur by:

- protecting diversity by maintaining existing habitat
- re-establishing biodiversity
- reducing threats to biodiversity.

STRATEGY C: GETTING MEASURABLE RESULTS

Getting measurable results involves:

- improving and sharing knowledge about biodiversity conservation
- delivering conservation initiatives
- monitoring, reporting and evaluation of conservation efforts.

These strategies are in no way an exhaustive list. There are a wide range of strategies that are used for management of both public and private outdoor environments. The management of farmland in Victoria, for example, is primarily the responsibility of the landholder. Farmlands will not necessarily be managed the same way as different agricultural techniques, environment types and fluctuating environmental conditions will all result in different management strategies. The personal philosophy of individual farmers will also dictate how their farm is managed.

Later in this chapter we will investigate Landcare as an action undertaken to sustain a healthy outdoor environment. While a Landcare member will embrace particular management strategies intended to improve the sustainability of their primary industry by restoring the health of their land, there will also be those who choose to neglect such strategies and prefer to focus on productivity. For example, a Landcare member might exclude cattle from a south-facing slope to reduce the chance of soil erosion. This is because the soil on these slopes can remain waterlogged in the winter months, with the lack of direct sunlight making it susceptible to washing or slipping down the incline. Conversely, another farmer might not want to decrease the amount of grazing land so that the pasture and number of cattle is maximised. This latter philosophy might yield more cattle; however, may also result in significant soil loss over time. A more comprehensive list of management strategies adopted by Landcare member farmers is provided on page 343.



South-facing slope fenced off from livestock and re-vegetated to combat erosion

LEARNING ACTIVITY



BIODIVERSITY CONSERVATION

Visit the Biodiversity Conservation Strategy website and access information regarding biodiversity conservation, then complete to the following:

- 1 Provide a brief description of the outdoor environment in the case study.
- 2 Outline the conservation efforts being made, including how each of the three main strategy priorities are being addressed.



Biodiversity
Conservation
Strategy

NOTES FOR THE EXAM



For the exam, you should know:

- about a range of management strategies achieving and maintaining healthy and sustainable outdoor environments
- how these have been adopted in relation to a specific outdoor environment (one you have visited or studied would be an advantage).

ACTS OR CONVENTIONS RELATED TO THE MANAGEMENT AND SUSTAINABILITY OF OUTDOOR ENVIRONMENTS

There are three levels of government in Australia: federal, state and local. Each level can create and enact legislation (laws) in order to manage the areas for which they are responsible. This legislation may take the form of by-laws (in the case of local government authorities), or Acts of parliament (in the case of state and federal governments). Usually legislation is enacted because a government, reflecting the views of the people they represent, has developed policies relating to particular issues. Legislation is a process by which to formalise these policies. An example is the *World Heritage Properties Conservation Act 1983*, a law that the federal Labor Party created that gave the federal government the power to decide on matters regarding sites that Australia was obliged to protect under international law.

A treaty is an agreement in written form between nations that is intended to establish a relationship governed by international law. Each party assumes obligations in line with the agreement – if either party fails to live up to these obligations, they can be held liable under international law. These can also be known as a ‘convention’; however, this term can sometimes be applied to agreements prior to an execution of an official treaty.

In this section, we will be considering some examples of Acts and conventions that relate directly to the natural environment.

Flora and Fauna Guarantee Act 1988 (Vic)

The *Flora and Fauna Guarantee Act 1988* is a key piece of legislation that provides for statewide programs preventing further loss of habitat, and maintenance of extant habitats and species. It is an important law designed to maintain natural ecological processes. Victoria’s threatened species and communities have been identified, along with the processes that threaten their survival. The legislation recommends action to be taken for protection, as well as identifying critical habitat.

The flora and fauna conservation and management objectives, as outlined under the Act, are:

- a to guarantee that all **taxa** of Victoria’s flora and fauna can survive, flourish and retain their potential for evolutionary development in the wild
- b to conserve Victoria’s communities of flora and fauna
- c to manage potentially threatening processes
- d to ensure that any use of flora or fauna by humans is sustainable
- e to ensure that the genetic diversity of flora and fauna is maintained
- f to provide programs:
 - i of community education in the conservation of flora and fauna
 - ii to encourage cooperative management of flora and fauna through, among other things, the entering into of land management cooperative agreements under the *Conservation, Forests and Lands Act 1987* (Victoria)
 - iii of assisting and giving incentives to people, including landholders, to enable flora and fauna to be conserved
- g to encourage the conserving of flora and fauna through cooperative community endeavours.

The listing process records animals and communities of flora and fauna, which are identified as threatened.

The listing process commences with the submission of a nomination. Any person may make a nomination by providing specific prescribed information. The nomination is considered by an expert advisory committee and, if considered a valid item for listing, it is recommended and advertised for public comment. The committee then reconsiders the nomination in light of any further evidence provided during the public comment period and makes a final recommendation. The final recommendation is then forwarded to relevant parliamentary members for a final decision.

ACTION STATEMENTS

Action statements are prepared by DELWP after careful and thorough research and investigation. These detailed documents describe the recommended conservation management practices for specific threatened species. Action statements are essentially the recovery plans that set out how to get species off threatened lists, which is considered the basic intention of the Act.

taxon (plural taxa)

A group of any rank, such as a species, family or class

action statements

Detailed documents that describe the recommended conservation management practices for specific threatened species

FLORA AND FAUNA GUARANTEE ACT 1988 NOMINATION OF A TAXON FOR LISTING OR DELISTING www.depi.vic.gov.au	
Nominator's name	Signature
Nominator's address	
Scientific name of taxon	
Common name of taxon	
Description	Provide a brief, general description of the taxon. A reference to a detailed description could be included.
Habitat	Describe the typical environmental conditions where the item occurs, e.g. climatic conditions, land or water type (e.g. fast-flowing streams, alpine heaths, rocky coasts in areas of high wave action), or particular species with which the taxon is associated.
Distribution and abundance	Distribution and abundance of the item throughout Victoria, with more detailed description of specific localities if relevant. If distribution has declined, this could best be demonstrated by including maps of past and present recorded distribution.
Threats	Identify any threats that are affecting the item or might do so in the future.
Eligibility criteria	Indicate which of the primary criteria and sub-criteria stated in the regulations the item satisfies, on what evidence the case is based and cite the sources of this evidence. The evidence may have been presented in full in the sections on 'Distribution and abundance' or 'Threats', above, but in this section a summary of the logic of the case should be provided. Unsupported statements that need to be verified delay the SAC's consideration of the nomination.
References	Provide full details of references that have been cited as sources of evidence in the nomination.

Put simply, action statements identify what has to be done where and by whom in order to conserve a species or community. The system is based on:

- items (species, communities or threatening processes)
- locations (the defined area that management strategies are to be implemented)
- threats (what processes need to be considered)
- actions (what practical strategies are adopted)
- organisations and individuals who carry out actions
- results (to assess the success of the management strategies implemented).

Although many have considered this law to have broken new ground in terms of the acknowledgment of real action to protect flora and fauna, not all people in the community have been happy with its impact. Some environmental interest groups believe there has been an ongoing failure to prepare action statements after species or threatening processes have been listed. Furthermore, they have been critical of the lack of legislation to ensure that action statements are actually acted upon and reviewed in terms of their success. For these reasons, the *Flora and Fauna Guarantee Act 1988* is under review (at the time of writing in 2017) to improve the outcomes for rare or threatened Victorian species.



NewsPix/Mark Smith

Action statements resulting from the *Flora and Fauna Guarantee Act 1988* describe the conservation strategies that should be applied to protect native fauna and flora such as the hooded plover.



DELWP

LEARNING ACTIVITY



SHORT REPORT

Access action statements for two animals and/or plants that are relevant to a region that you have visited or studied. These documents are a valuable resource for land managers, government agencies and conservation groups, and can be accessed at DELWP offices and on their website.

- 1 Name and briefly describe the habitat of these species.
- 2 Suggest reasons for its extinction or decline in numbers.
- 3 List any current threats to these species.
- 4 How could its current conservation status be described?
- 5 Outline four management actions (including who carries them out) that can be adopted to assist these species.

Ramsar Convention (international treaty, 1971)

The Ramsar Convention is an international (or intergovernmental) treaty that ‘provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources’. Wetlands are defined in the treaty as ‘swamps, marshes, billabongs, lakes, salt marshes, mudflats, mangroves, coral reefs, fens, peat bogs, or bodies of water – whether natural or artificial, permanent or temporary’. Wise use refers to ‘the conservation and sustainable use of wetlands and their resources, for the benefit of humankind’.

Under the three pillars of the convention, the parties have committed themselves to:

- 1 work towards the wise use of all their wetlands through national land-use planning, appropriate policies and legislation, management actions and public education
- 2 designate suitable wetlands for the List of Wetlands of International Importance (‘Ramsar List’) and ensure their effective management
- 3 cooperate internationally concerning **transboundary wetlands**, shared wetland systems, shared species, and development projects that may affect wetlands.

The purpose of the treaty is to ensure migratory birds have habitats maintained at both ends of the migratory path, and that countries have designated wetlands of international significance, which they protect. For a wetland to be designated to this list, it must satisfy one or more of the nine criteria for identifying wetlands of international importance. These can be found on the Australian Government Ramsar website.

There are currently 11 Ramsar sites listed in Victoria. Management plans have been developed for each of these sites based on the management objectives intended to maintain the ecological character of Victoria’s Ramsar sites through conservation and wise use. These include:

- 1 Increase the scientific understanding of wetland ecosystems and their management requirements.
- 2 Maintain or seek to restore appropriate water regimes.
- 3 Address adverse processes and activities.
- 4 Manage Ramsar sites within an integrated catchment management framework.

transboundary wetlands

Wetlands that exist across one or more borders



Ramsar

Ramsar Convention



CONVENTION ON WETLANDS

(Ramsar, Iran, 1971)

- 5 Manage resource utilisation on a sustainable basis.
- 6 Protect and, where appropriate, enhance ecosystem processes, habitats and species.
- 7 Encourage strong partnerships between management agencies.
- 8 Promote community awareness and understanding and provide opportunities for involvement in management.
- 9 Ensure recreational use is consistent with the protection of natural and cultural values.
- 10 Develop ongoing consistent programs to monitor ecological character.

These objectives are applied to each site where specific management strategies are adopted to achieve them. This can involve the cooperation and coordination of efforts from a range of stakeholders including government agencies and private parties.

WESTERN PORT RAMSAR SITE

The Western Port site was chosen for its abundance of foraging, nesting and nursery areas for a variety of animals including threatened bird species. It contains more than 350 native plant and 330 native animal species ranging from reptile, amphibian, mammal, fish and bird species. It is important as a habitat for migratory shorebirds frequenting Victoria. It is an important breeding grounds of 32 rare and threatened species including the endangered hooded plover. It is a refuge for water birds during summer and drought. Due to its marine nature, the site provides habitat all year round. Overall, the Western Port site satisfies eight of the criteria for identifying wetlands of international importance.

There are numerous ways the management objectives have been addressed for this site. Some examples of these include:

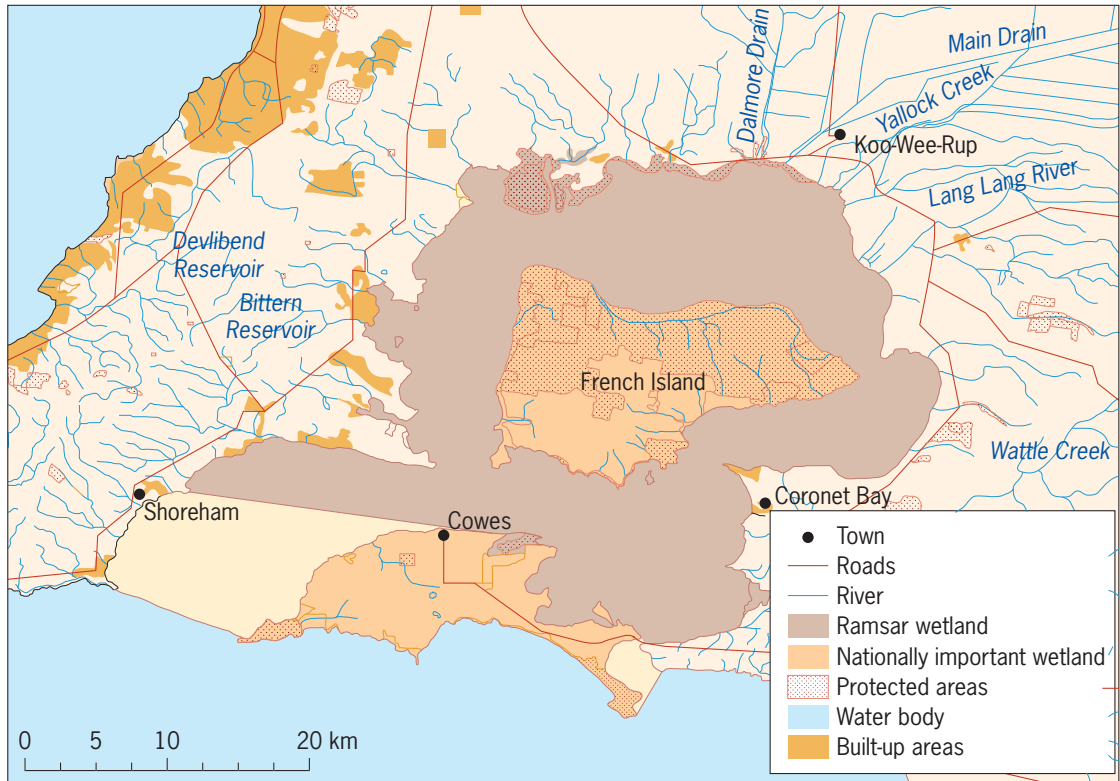
- ensure future coastal development has minimal impact on coastal hydrodynamic characteristics and associated features and habitats
- minimise dredging within Western Port
- take all precautions to avoid accidental and deliberate oil and other chemical spills into Western Port
- develop contingency plans for dealing with threatening infestations and establish a marine pest monitoring and reporting program for Western Port
- develop an interpretation program to educate the public and tourism operators on wetland values and risks
- ensure coastal erosion in the north-eastern arm of Western Port is recognised as a priority for action
- monitor the recreational fish catch as a basis for determining revision of **bag limits** for recreational fishers
- ensure that no further clearing of native coastal vegetation occurs in or adjacent to the Ramsar site for agriculture or urban development
- ensure implementation of the provisions of action statements under the *Flora and Fauna Guarantee Act 1988* for all listed species
- consult with local Indigenous people to ensure that other site management strategies in this plan do not adversely impact on Indigenous cultural heritage values
- support local ecotourism initiatives that are compatible with the maintenance of Ramsar values.

bag limits

The law imposed on hunters and fishermen restricting the number of animals of specific species that can be killed and kept

Other Acts, conventions and policies

There are many more Acts, conventions and policies related to the management and sustainability of outdoor environments. These can be examined in relation to specific venues that you have visited



Location of the Western Port Ramsar site

or studied during Outdoor and Environmental Studies. These might include by-laws where local government, in the form of municipal and shire councils, is empowered to pass by-laws relating to the areas for which they have responsibility. These by-laws may address issues such as burning off, appropriate guidelines for housing development, waste disposal, streetscape development and parks and gardens.

Other state or national Acts, conventions and policies that may be considered are listed in the following table.

State level	National and international level
<ul style="list-style-type: none"> • Coastal Management Act 1995 • Environment Protection Act 1970 • Conservation, Forests and Lands Act 1987 • Crown Lands (Reserves) Act 1978 • Fisheries Act 1995 • Forests (Timber Harvesting) Act 1958 • Heritage Rivers Act 1992 • National Parks Act 1975 • Planning and Environment (Planning Schemes) Act 1996 • Water Act 1989 • Wildlife Act 1975 	<ul style="list-style-type: none"> • Environment Protection (Sea Dumping) Act 1981 • National Environment Protection Council Act 1994 • National Environment Protection Measures (Implementation) Act 1998 • Natural Heritage Trust of Australia Act 1997 • Regional Forest Agreements Act 2002 • Water Act 2007 • Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) 1973 (international convention) • Convention on Biological Diversity (CBD) 1992 (international convention)

LEARNING ACTIVITIES



INVESTIGATE AN ACT OR CONVENTION

Research an Act or convention listed on page 336 that could be applied to a place you've visited or studied.

- 1 What is it for?
- 2 How does it work?
- 3 Where is it applied?
- 4 Who uses/manages it?
- 5 Does it work?
- 6 What are some problems with its use?

INVESTIGATE AN ENVIRONMENTAL MANAGEMENT POLICY

Obtain a copy of your own municipality's environmental management policy.

- 1 What are the key objectives of this policy?
- 2 How does the council propose to meet these key objectives?
- 3 What other laws or policies are related to the environment policy?
- 4 Using your observations, what evidence is there within your area to demonstrate that the environment policy is being successfully implemented?
- 5 What further actions need to occur from your local council to ensure that all objectives of their environment policy are achieved?

NOTES FOR THE EXAM



For the exam, you should:

- describe at least two Acts or conventions related to the management and sustainability of outdoor environments, including at least one of the following:
 - *Flora and Fauna Guarantee Act 1988* (Vic)
 - Ramsar Convention (international treaty, 1971)
- describe how these have been applied to a specific outdoor environment you have visited or studied.

ACTIONS TO SUSTAIN HEALTHY OUTDOOR ENVIRONMENTS

In this section, we will investigate specific actions that can be carried out to assist in sustaining healthy outdoor environments. These actions refer to the more practical and hands-on techniques that contribute towards sustainability. Sustaining healthy outdoor environments refers to the practice of ensuring an equitable, healthy future for all people and their environments. It involves utilising natural resources while taking measures to maintain the ecological balance. Maintaining healthy and sustainable environments is not just the responsibility of governments and land managers. As concerns about the state of natural environments grow, the future of these environments is increasingly becoming the responsibility of all members of society.

There are many actions available to individuals and groups that are designed to contribute to sustainability. Some of these will be discussed further in this section; however, this is only a small sample of what is currently available.

Green building design

Green building is the practice of creating structures (such as homes, offices and factories) using processes and materials that are environmentally responsible and resource-efficient. Green building design refers not only to sustainable building techniques, but also to designs that enable living techniques within the structures that are resource-efficient into the future.

The **Environment Protection Authority (EPA)** acknowledges five main principles for green building design:

- 1 **A sustainable building site** – minimise disturbance and destruction of valuable land, restore natural habitat/plants, orient building for passive solar access, reduce urban sprawl, promote higher-density living in smaller dwellings.
- 2 **Water quality and conservation** – use local drought-resistant indigenous plants and grasses, use efficient water appliances, collect rain water, collect stormwater, reuse grey water, establish a water budget.
- 3 **Minimising energy consumption and environmental impacts** – design and orientation of houses to maximise solar energy during winter (incorporating the heating of **thermal mass** internal structures such as brick, concrete and tiles) and shade during summer; cross-flow ventilation rather than using air-conditioning; double or triple glazing of windows; wall, roof and floor insulation; optimise natural lighting; energy-efficient lighting; solar and wind energy generation.
- 4 **Indoor environment quality** – non-toxic paints and finishes; maximise natural lighting, ventilation and cooling; provide smoke-free building; clean with environmentally friendly products.
- 5 **Sustainable materials and resource usage** – prefabricated structures (such as engineered wood) that minimise wastage, recycle building wastes, recycled building products or materials, plantation timbers from sustainably managed sources, bio-based products (such as sheathing and/or insulation board made from agricultural waste), use quality products that do not need replacing.

An increasing number of residential developers are employing green building design principles. Ecoliv is a building company designing and constructing its products using green building techniques. Ecoliv markets itself as ‘environmentally friendly’, and lists a number of actions as sustainable building practices:

- **Siting and design efficiency** – **passive solar principles** to take advantage of natural lighting and reduce reliance on artificial heating and cooling.
- **Energy efficiency** – solar hot water, electricity, energy-efficient light globes, electricity usage meters and maximum star rated appliances, 7-star thermal performance rating.
- **Water efficiency** – 10 000 litre water tank to eliminate the need for mains water and water-saving plumbing fittings appliances to conserve water usage.
- **Materials efficiency** – building materials manufactured with sustainable techniques of recycled materials, wall and ceiling insulation, double-glazed windows to reduce carbon footprint.
- **Indoor environment quality** – non-toxic paints, low-chemical timber, strategically placed windows for air circulation to improve air quality.
- **Waste reduction** – standard size and length materials to minimise off-cut wastes, accurate material estimation through prefabricated construction.

Commercial properties are also beginning to embrace green building principles. Commercial buildings are the fastest growing source of greenhouse gas emissions in Australia, exceeding the growth in transport emissions. Since 1990, emissions from the commercial building sector have increased by about 50%, and in total account for about 17% of stationary energy emissions.

Environment Protection Authority (EPA)

Government agency whose role is to be an effective environmental regulator and an influential authority on environmental impacts

thermal mass

The ability of building materials to absorb and store heat energy so that it can be used to provide warmth to living spaces

passive solar principles

Building design that uses the sun's energy for heating and rejects it for cooling of living spaces

The Australian Conservation Foundation (ACF) and the Victorian National Parks Association (VNPA) are both tenants of the 60L Green Building (outlined in the following case study). Both organisations are committed to policies designed to minimise human impacts on natural environments. Participating in a project such as 60L is one way to implement their policies. The implementation of policies such as these, designed with sustainability in mind, acts as a role model and educational tool for other organisations as well as reducing impacts on the natural environment.



The 60L Green Building is close to 100% greenhouse emission-free.

60L GREEN BUILDING: 60 LEICESTER STREET, CARLTON

The Australian Conservation Foundation (ACF) is a foundation tenant of this sustainable building, and assisted with its environmental design. The building is an example of ‘walking the talk’ – a practical application of sustainability.

This building’s environmental performance is unique in Australia in combining water, energy and materials efficiency. The design of the building is focused around the reduction of energy and water use, and minimising waste and toxic exposure. The building materials were chosen with this in mind.

The front half of the building is a refurbished 1870s warehouse. Although the back half is new, it was constructed with reused and recycled, as well as new, materials. The cost of the building was on par with a conventional building and its running costs are less.

The concrete has a 60% recycled component. The timber is about 80% recycled (some from the old building), with the remaining 20% from plantations. All bricks are reused and were cleaned without acid. Reinforcing steel was recycled. Low-energy galvanised steel has been used in preference to high-energy stainless steel. PVC use has been reduced by 50% and wherever possible low-toxic materials have been used. The carpets are made from recycled and low-toxic materials.

A computerised environmental management system automatically adjusts external louvres around the building according to the conditions, which are monitored by a rooftop mini-weather station.

Overall, the building uses 80% less energy on lighting and 60% less energy on ventilation, heating and cooling than a similar conventional building.

By using the photovoltaic arrays on the roof and green power, the building is close to 100% greenhouse emission free. The embodied energy in the materials (which have been chosen for their low energy) has been offset by a green building partnership involving the establishment of purpose-specific tree-planting in western Victoria.

The 60L building uses 90% less mains water than a similar conventional building. Two 10 000-litre rainwater tanks collect a total of 500 000 litres of water off the roof in an average rainfall year. The water is micro-filtered and UV sterilised for use in the taps and water-efficient showers throughout the building. Showers and bike-parking facilities have been provided to make it easier for people to cycle to work.

Waste water passes into an in-house biological sewage treatment plant after which it is used for toilet flushing, the rooftop and internal gardens. Any excess is discharged as treated water to the municipal sewerage after being polished in a botanical water feature near the front of the atrium. The residual solid sewage waste is utilised on farms in western Victoria. The urinals are waterless and odourless due to an oil seal cartridge system.

Without accounting for the contribution of the green power or the photovoltaic panels, 60L reduces energy use, and therefore emissions, by two-thirds compared to a conventional building of this size. This is achieved through a variety of cost-effective means:

- utilising north and west windows for winter sun
- purging trapped summer heat at night
- utilising light shelves, light wells and the atrium to maximise daylight
- using high-efficiency fluorescent lights when daylight is not sufficient
- utilising thermal mass, double-glazed and low-energy glass
- including tenant-controllable and central-controlled natural ventilation.

Each of the tenants in 60L has signed a binding green lease that empowers them to behave sustainably. This is made easier than in other commercial buildings by having facilities available for residual materials handling and by providing feedback on energy and water use, but this style of living requires commitment.

One of the greatest advantages of green buildings is not directly environmental, but in regard to worker productivity. Although the savings from water and energy costs are real, the savings from productivity gains are estimated to be as much as 15% through the comfort of natural lighting and ventilation, and the avoidance of ‘sick building syndrome’ – there are no air-conditioning towers and minimal toxic off-gassing materials in buildings such as 60L.

monoculture

Cultivating a single crop in an area

integrated farming

An approach to farming combining traditional methods with modern technology to achieve higher levels of productivity without increasing the environmental impact

permaculture

The development of agricultural ecosystems intended to be sustainable and self-sufficient

Integrated farming

Much of Australia’s farming processes are based on a **monoculture** approach. This involves compartmentalising landscapes and manipulating them to mass-produce a particular species for human consumption. Crops, horticulture, pasture for livestock (including the dairy and wool industries) and aquaculture are all usually based on this approach. **Integrated farming** is a broad term that suggests a more integrated approach to farming techniques where the livestock and crops and other harvests are not necessarily produced independently of each other.

PERMACULTURE

Permaculture is an example of integrated farming. Originally derived from the words ‘permanent agriculture’, permaculture has gone beyond its roots in looking at strategies to create sustainable food-growing methods. It has now become a worldwide movement encompassing all aspects of how we, as human beings, can live harmoniously in relation to our Earth and its finite resources: a permanent culture. Permaculture now probably has as many definitions as there are practitioners, but one that is particularly useful might be ‘creating sustainable human habitats by following nature’s patterns’.

Proponents of permaculture suggest that putting massive effort into attempting to ‘tame nature’, such as by damming valleys and floodplains or creating and maintaining bare soil by plough, is not only energy consuming, unsustainable and destructive, but it is also unnecessary when we can meet the needs of people and the environment by working in harmony with (or even directly utilising) natural systems. Instead of using massive chemical inputs to control pests, why not encourage predators such as ladybirds and flies to do our work for us?

Unlike many contemporary cultivated gardens, nature does not neatly compartmentalise landscapes with ornamentals growing in one place, vegetables in another, and fruit trees in yet a third location. In woodland, several plants such as standard and half-standard trees, shrubs, climbers and ground cover occupy the same area of space – each plant is ‘stacked’ to find its own requirements within its particular ‘level’ in the system. The forest garden system is an attempt to replicate this ‘layering’, replacing the wild plants of the woodland with fruits, herbs, vegetables and other plants that are useful to humans.

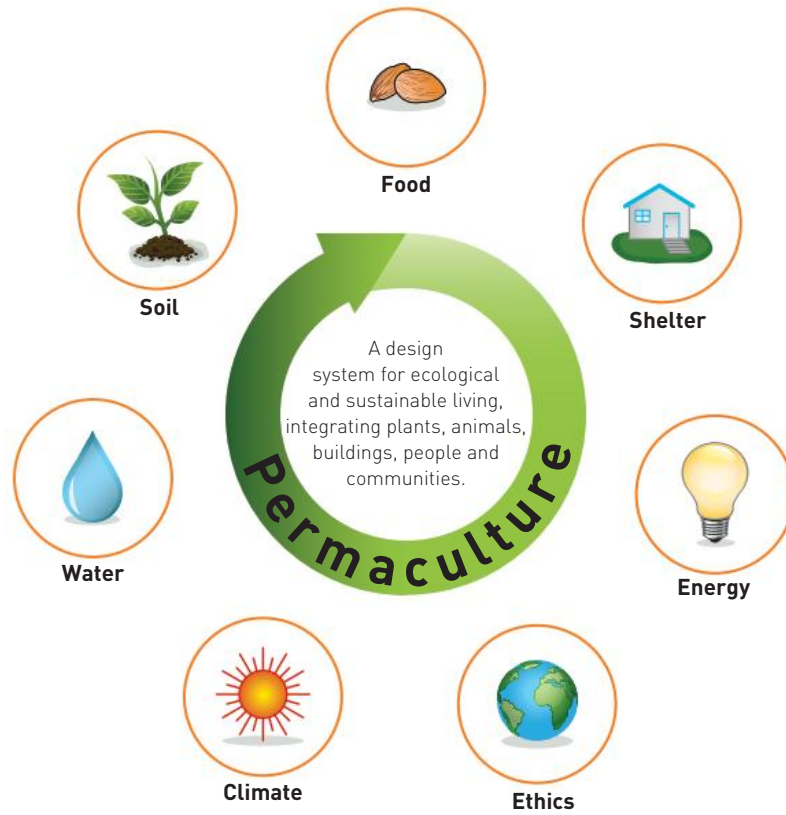
In designing a permaculture system to produce resources, there are 12 basic principles that are considered:

- 1 **Observe and interact** – by taking time to engage with nature we can design solutions that suit our particular situation.
- 2 **Catch and store energy** – by developing systems that collect resources at peak abundance, we can use them in times of need.
- 3 **Obtain a yield** – ensure that we are getting truly useful rewards as part of the work that we are doing.
- 4 **Apply self-regulation and accept feedback** – we need to discourage inappropriate activity to ensure that systems can continue to function well.
- 5 **Use and value renewable resources and services** – make the best use of nature’s abundance to reduce our consumptive behaviour and dependence on non-renewable resources.
- 6 **Produce no waste** – by valuing and making use of all the resources that are available to us, nothing goes to waste.
- 7 **Design from patterns to details** – by stepping back, we can observe patterns in nature and society. These can form the backbone of our designs, with the details filled in as we go.
- 8 **Integrate rather than segregate** – by putting the right things in the right place, relationships develop between those things and they work together to support each other.
- 9 **Use small and slow solutions** – small and slow systems are easier to maintain than big ones, making better use of local resources and producing more sustainable outcomes.
- 10 **Use and value diversity** – diversity reduces vulnerability to a variety of threats and takes advantage of the unique nature of the environment in which it resides.
- 11 **Use edges and value the marginal** – the interface between things is where the most interesting events take place. These are often the most valuable, diverse and productive elements in the system.
- 12 **Creatively use and respond to change** – we can have a positive impact on inevitable change by carefully observing, and then intervening, at the right time.

Permaculture systems have been developed for a range of large-scale production methods; however, the theory has yet to gain any widespread popularity. Some suggest this could be due to the lack of current mainstream scientific acceptance of permaculture’s ability to provide for larger populations.

Needless to say, a range of permaculture practices are being employed today, including the following:

- **Agroforestry** – Integrating the interactive benefits of combining trees and shrubs with livestock and crops. This practice promotes biodiversity and health of the outdoor environment while providing a more productive and sustainable yield.
- **Natural building** – Similar to green building design, natural building involves a range of sustainable construction practices such as using primarily abundantly available, renewable, reused or recycled materials; energy-efficient orientation and design; natural lighting and ventilation; compact structures to minimise ecological footprint; and onsite water capture and management.
- **Capturing rainwater** – Capturing rainwater for purposes such as drinking, livestock and irrigation, and harvesting greywater (drain water) for irrigation purposes.
- **Mulching** – Providing a protective, nutrient-rich cover over the soil (such as mulch, stones, leaves, cardboard, wood chips and gravel) to collect and hold water, to break down to replenish soil nutrients, prevent weeds, and provide habitat for decomposing soil organisms such as bacteria, worms and slaters.
- **Rotational grazing** – Moving grazing animals systematically to fresh pasture to enable previously grazed areas to recover.
- **Fruit tree management** – A method of minimal pruning to achieve yields similar or greater than high-density, pruned, fertilised trees. The trees are left to follow their natural form rather than being modified by continual pruning.



Landcare

Landcare is a program that facilitates a national network of private land owners and locally-based community groups who care for the natural resources of our country. Originally conceived in Victoria, Australia is proud to boast more than 5400 community Landcare groups, 2000 Coastcare groups and many thousands of volunteers across the country. Through Australia’s people and communities, the Landcare movement is striving to make a difference in caring for the outdoor environment primarily through employing sustainable farming practices. Landcare volunteers coordinate their actions to repair natural resources and to manage them in a more sustainable way.

Members join Landcare groups voluntarily and coordinate their management efforts with surrounding land owners. The government contributes knowledge, expertise and some funding to assist in the combined efforts of Landcare members.

The actions of Landcare members are aimed at the following:

- **Improving our farmlands** – Many **primary producers** are active participants in Landcare. They make significant contributions to combating soil salinity and erosion through sound land management practices and sustainable productivity. More than 40% of farmers are involved in Landcare and many more practise Landcare farming.
- **Bringing back trees** – Each year, Landcare members plant many millions of native trees, shrubs and grasses for a range of benefits, including improved soil and water quality. They restore bushland and conserve sensitive areas on both public and private land.
- **Restoring wildlife habitats** – Volunteers have provided protection for thousands of native species, including threatened and endangered flora and fauna.

Much of the effort of Landcare members is in a response to the declining health of the outdoor environment due to the impacts of agricultural practices on the land. Loss of habitat, degradation



primary producers

The people and organisations that work with our natural resources to grow, harvest or extract primary products; most products from the primary industry sector are considered raw materials for other industries

of soil biodiversity reduction, and so on, have a negative influence on ecological services that both sustain native species and ecosystems as well as livestock, pasture and crops. Restoring a portion of the ecological balance will increase agricultural productivity in the present and also enable the sustaining of their primary industries into the future.

SUSTAINABLE FARMING PRACTICES – ARCHIES CREEK LANDCARE NETWORK

Impact	Cause	Management
Topsoil erosion	<ul style="list-style-type: none"> Clearing of vegetation increases soil runoff Cattle trample steeper ground, taking soil downhill 	<ul style="list-style-type: none"> Revegetate land to decrease water runoff and hold soil together Remove cattle from steeper inclines and south-facing fields
Decreased water quality	<ul style="list-style-type: none"> Clearing of vegetation increases soil and fertiliser runoff Unfenced waterways increase pollution and stream-bank erosion from cattle trampling soil Agricultural fertiliser and animal effluent in water runoff Eutrophication due to phosphate fertilisers 	<ul style="list-style-type: none"> Fence off waterways to exclude cattle Revegetate stream banks to decrease runoff Use vegetation that 'filters' runoff to remove phosphate fertilisers and soil sediments
Decreased biodiversity (above and below ground)	<ul style="list-style-type: none"> Clearing, thus decreasing habitat Where once there were 25 000 organisms per square metre, there are now only 2000 90-metre tall forests, including rich soils from leaf litter 	<ul style="list-style-type: none"> Revegetate Create wildlife corridors Plant an 'ecosystem' – a variety of species 25 species of plants used to provide habitat
Stream-bank erosion (water cutting into river banks)	<ul style="list-style-type: none"> Lack of stream-bank vegetation to hold soil Erosion from trampling 3 tonnes of soil per year per hectare lost through erosion 	<ul style="list-style-type: none"> Fence off waterways Revegetate to hold soil together (Bay-Bass Straight wildlife corridors) Only 2% completed in region
Land slips (erosion)	<ul style="list-style-type: none"> Water soaks into soil and lubricates rock base, which eventually falls away from incline Influenced by terracing of slopes 	<ul style="list-style-type: none"> Remove cattle from steeper inclines and south-facing fields Remove terracing Revegetate site

terracing

Make or form (sloping land) into a number of level flat areas resembling a series of steps (cattle and other livestock can create this as they travel on inclined land)

LEARNING ACTIVITY



LANDCARE CASE STUDY

Visit the Landcare website and access the case studies section. Select a case study for an area you have studied, visited or are familiar with. Prepare a short report on this particular Landcare group, considering the following:

- 1 What is the outdoor environment involved?
- 2 Who are the members of the group?
- 3 What are the environmental issues involved?
- 4 Briefly describe their project.



Landcare case studies

Urban planning

CBD

Central business district of an urban region

Sustainability, livability and economic prosperity are inexorably linked, and this principal must be at the heart of every city's strategy for accommodating the growth of urban populations. Melbourne's **CBD** is set to grow five fold over the next 40 years, revitalising over 600 hectares of under-utilised industrial land into dense mixed-use communities. Leading the Sustainable Urban Development network enables Melbourne to connect with and support the world's largest cities on urban development to ensure municipal decision-makers deliver sustainable and liveable communities, both globally and at home.

Lord Mayor Robert Doyle, City of Melbourne, 2011

The Australian Bureau of Statistics expects Australia's population will grow by 60%, reaching approximately 35 million people, by 2056. Most people choose to live in capital cities, which means nearly 85% of our population will be concentrated in urban areas.

As discussed earlier, urbanisation is a threat to society and the outdoor environment due to a range of impacts such as biodiversity loss, waste production, transport emissions, energy consumption and resource depletion. These impacts highlight the need for increasing focus on sustainability in Australian urban areas.

To sustain healthy environments in urban Victoria, planning needs to address these impacts in the face of an ever-increasing population. Our ability to remain concentrated in cities will be influenced by ecological limits and natural resource constraints, a changing climate, the growing need for employment opportunities, and access to affordable, livable and enjoyable places.

In late 2009, the Department of Infrastructure and Regional Development announced new reforms requiring states and territories to develop capital city strategic plans that meet national criteria for transport, housing, urban development and sustainability.

PLAN MELBOURNE

Plan Melbourne is the Victorian Government's metropolitan planning strategy for the city to 2050.

It provides us with a clear vision for our future that responds to the challenges of population growth, driving economic prosperity and liveability, while protecting our environment and heritage ... For the first time, the strategy addresses Melbourne's infrastructure, housing, employment and environmental challenges with an integrated approach to planning and development that includes land use, transport, and social and community infrastructure.

Plan Melbourne Metropolitan Planning Strategy

Some of the key concepts contained in this strategic plan relating to sustaining healthy environments include the following:

- **Transition to a more sustainable city** – Plan Melbourne will help us transition to a more sustainable city by delivering density in defined locations; greening metropolitan areas; improving energy and water supply use; protecting and restoring our natural habitats; and making better use of transport infrastructure, while encouraging more active forms of transport, such as walking and cycling. The Biodiversity Conservation Strategy will manage the impacts of the continued growth of Melbourne's urban corridors on the natural environment.
- **Better use of existing assets** – By investigating smart technologies we can recycle more water, plan for better waste management and reduce our energy consumption.
- **20-minute neighbourhoods** – Creating 20-minute neighbourhoods will give residents access to local shops, schools, parks, jobs and a range of community services within 20 minutes of their home across Melbourne's suburbs. As well as improving health and wellbeing, and reducing travel

costs and congestion, this concept will lead to a reduction in transport emissions, which are considered one of the most rapidly increasing sources of emissions in Australia. The concept will be achieved through supporting local governments to plan and manage their neighbourhoods, making them pedestrian friendly, and accommodating housing close to public transport.

How does the plan intend to use these concepts to sustain healthy environments in Melbourne's urban areas? Plan Melbourne lists the following solutions:

- Accommodate the majority of new dwellings in established areas within walking distance to the public transport network and ensure settlement planning in growth areas and **peri-urban** areas responds to natural hazards.
- Address threats to the health of Melbourne's waterways as part of the whole of water-cycle management planning process, including protecting and restoring biodiversity areas, the values of our waterways and the coastlines and waters of Port Phillip Bay and Western Port Bay.
- Protect high-quality agricultural land in Melbourne's non-urban areas for food production and assess and protect strategically significant agricultural land through the development of appropriate planning provisions.
- Integrate noise and air-quality guidelines into land use and transport planning provisions, and strengthen mechanisms (such as clearer standards and guidance) to protect separation, buffer and interface distances for existing facilities and uses that create noise and air quality issues.
- Develop and implement whole of water-cycle management plans in Melbourne's subregions.
- Protect our water and sewerage assets and open space waterway corridors from inappropriate development.
- Facilitate the delivery of clean-energy projects.
- Establish our city's long-term needs for waste management sites by working in consultation with local governments and key stakeholders to identify areas where these sites may be located and, through planning, securing adequate sites for these purposes by re-zoning land in planning schemes.
- Protect waste-management and resource-recovery facilities from urban encroachment and assess opportunities for new waste facilities to meet the logistical challenges of medium- and higher-density developments.

peri-urban
Areas immediately adjoining urban areas (e.g. between the suburbs and the countryside)

Adapted from Plan Melbourne

ECOVILLAGES

Another novel and increasingly popular response to the environmental pressures of urbanisation is the concept of the ecovillage. Environment Australia defines an ecovillage as a rural or urban 'human scale, full-featured settlement, in which human activities are harmlessly integrated into the natural world'.

Ecovillages can be isolated as a part of pre-existing villages to which they are integrated, or developed in the heart or in the suburbs of cities. Their main focus is to reduce their ecological footprint and promote sustainable activities/concepts such as permaculture, green building, green production, renewable energy, self-sufficient agriculture and more.

Ecovillages will allow a certain number of rules to apply at different levels of the human activities, including:

- **an ecological level** – planning, buildings, agriculture, renewable energy management, water management, waste management
- **an economic level** – stimulation of local production through the integration of small local businesses
- **a social level** – creation of a centre enabling residents to propose and participate in meetings.



Cape Paterson Ecovillage (video)

LEARNING ACTIVITY



CAPE PATERSON ECOVILLAGE

Watch a video clip on the Cape Paterson Ecovillage. This is a digital animation of the planned Cape Paterson Ecovillage.

List all of the aspects of this type of urban planning that contribute to the sustainability of a healthy outdoor environment.



Philip Hughes

NOTES FOR THE EXAM



For the exam, you should:

- analyse a range of specific actions undertaken to sustain healthy outdoor environments, including at least two of the following:
 - green building design
 - integrated farming
 - Landcare
 - urban planning.

Your responsibility

If we are to sustain healthy outdoor environments, both in Australia and globally, then individuals and society will need to be environmentally responsible. Through your studies in Outdoor and Environmental Studies and your practical experiences, you have developed your understanding of the contemporary state of environments and the knowledge and related skills for interacting sustainably with outdoor environments.

Healthy outdoor environments and biodiversity are important for the future of individual physical and emotional wellbeing. You have learnt to identify the potential impact on societies of significant threats to outdoor environments together with strategies that can be implemented and adopted to address these issues. Your challenge is to continue to develop your knowledge and skills, and to implement your understanding and be an environmentally responsible citizen in the future.

GLOSSARY

abiotic

A non-living feature of an environment

action statements

Detailed documents that describe the recommended conservation management practices for specific threatened species

aesthetic value

A judgement of value based on the appearance of an object and the emotional responses it causes

aestivate

Animal dormancy similar to hibernation

Agenda 21

A comprehensive plan of action that encourages the development of national strategies, policies and processes encouraging sustainable development

ambient

The immediate surroundings of something

atmosphere

The thin layer of gases that surrounds the Earth

Australian Renewable Energy Agency (ARENA)

Government-funded independent agency to increase supply of affordable renewable energy

bag limits

The law imposed on hunters and fishermen restricting the number of animals of specific species that can be killed and kept

balance of power

Where a minor party in the state or federal government holds key roles in passing Acts of parliament

ballast water

Water taken on board to provide stability for ships

biocapacity

The Earth's capacity to produce materials and absorb waste generated by humans

biodiversity

The number and variety of organisms found within a specified area

bioenergy

Energy produced from energy crops or from waste materials

biofuel

Fuels made from renewable living raw materials (e.g. ethanol produced from common crops such as sugar cane and potato and added to petroleum)

biogeochemical

The cycle in which simple substances and chemical elements are transferred between living elements and the environment

biome

A large, naturally occurring community of flora and fauna occupying a major habitat

biorhythms

Cyclic pattern of changes in activity of living organisms

biosphere

The place on Earth's surface where life dwells

biota

The combined flora and fauna of a region

biotic

A living organism

built environments

Areas that have been created or modified by people and include buildings, parks and transport systems

brine

A solution of salt in water, which is also used to refer to the by-product of the desalination process

carbon capture and storage

The process of trapping CO₂ so that its effect on the climate is minimised

carbon dioxide (CO₂)

A colourless, odourless gas that is the fourth-most abundant in the atmosphere (approximately 0.04%); it is produced from the burning of fossil fuels and acts as a greenhouse gas

carbon tax

Tax charged to industries based on their level of greenhouse gas (primarily CO₂) production

carnivore

Animals or plants that feed on animals

catchment area

The area of land where water from precipitation drains into a body of water

CBD

Central business district of an urban region

cinnamon fungus

A soil-borne water mould that produces an infection that causes root rot or dieback

circadian rhythms

A 24-hour cycle in the physiological processes of living organisms

clean coal

Technology intended to enable continued use of coal as an energy source with reduced impact on the environment

clear felling

The practice of cutting down all the trees on a site

climate

The prevailing weather conditions of a region

climate change

A significant and lasting change in weather patterns over an extended period of time

Climate Change Act 2010 (Vic)

State policy that outlines targets for reduction of greenhouse gas emissions

Climate Change Authority (CCA)

Government authority providing expert advice on climate change mitigation initiatives

climax community

The development of vegetation in an area over time that has reached a steady state

climax vegetation

Vegetation that establishes itself in an area over a long time in the absence of any major disturbances

coal seam gas

Flammable gases obtained from underground coal seams that can be used as a fuel

code of conduct

A set of rules outlining the responsibilities of, or proper practices for, an individual, group or organisation

colonised

Occurs when a species populates an area

commodity

Something that can be used for commercial advantage – it can be bought or sold

community

A group of interdependent plants and animals inhabiting the same region and interacting with each other

conflict

A serious disagreement or argument, typically a protracted one; a serious incompatibility between two or more opinions or interests

conservation

The preservation, protection, management or restoration of the natural environment, inclusive of ecosystems, vegetation, wildlife and natural resources, such as soil and water

conservation covenants

Management agreement placed on a property's title to ensure native plants and wildlife on the property are protected forever

consumerism

A social and economic ideology that encourages acquiring goods and services in ever-increasing amounts

contemporary

Events or actions that have occurred within the last 15 years

coupes

The removal of almost all vegetation from an area of forest

crossbencher

A member of parliament not aligned with either of the major political parties

cultural background

Patterns of thinking, feeling and acting that stem from the social context of your life experience, such as ethnicity, race, socioeconomic status, gender, language, religion, sexual orientation and geographical area

debate

Extended discussions, conversations or debate between different parties regarding a particular issue

deep ecology

Conservationist philosophy that regards humans as one of many equal components of a global ecosystem

delineations

Indicating the exact position of a border or boundary

desalination

Large-scale removal of salt from seawater to produce fresh water

diurnal

Animals and plants that are active during the day

dredging

An excavation activity or operation usually carried out to gather up bottom sediments and dispose of them at a different location

drought

A long period of abnormally low rainfall, especially one that adversely affects growing or living conditions

ecological footprint

A measure of how much productive land (global hectares) is required to produce the goods and services and dispose of the waste necessary to support a particular lifestyle

economic growth

The increase in the market value of the goods and services produced by an economy over time

ecosystem diversity

The variety of habitats, natural communities and ecological processes in the biosphere

ecosystem

A community of interdependent species and their environment

ecotourism

Responsible travel to natural areas that conserves the environment and improves the wellbeing of local people

ecotoxin

Products containing ingredients that present specific hazards to the environment

El Niño

Extensive warming of the central and eastern tropical Pacific, associated with an increased probability of drier conditions in Australia

emigration

Leaving one's country or region with the intent to settle permanently in another

emissions

A gas in an atmosphere that absorbs and emits radiation

emissions trading

Market-based approach used to control pollution by providing market incentives and requiring permits, which can be traded among companies, being required to use processes that produce CO₂

endemic

A feature that is unique to a defined geographic location

Environment Protection Agency (EPA)

Government agency whose role is to be an effective environmental regulator and an influential authority on environmental impacts

environmental buffer

An area of land maintained in permanent vegetation that helps to control air, soil and water quality and other environmental problems

environmental stability

The ability of environments to restore and reconstruct their structure and function following human-induced stress

evaporation

The change of a liquid into a vapour

exotic species

A species living outside its native distributional range

exploitation

Making use of and benefiting from resources, often in an unsustainable way and accompanied by environmental degradation

extinct

No longer existing or living

extrinsic motivations

Motivations we get from outside ourselves, which are external to us

fire regimes

The pattern, frequency and intensity of the bushfires and wildfires that occur in an area

fire-stick farming

The consistent and repeated use of fire to clear vegetation in a particular place

Flora and Fauna Guarantee Act 1988 (Vic)

Key piece of legislation that provides for statewide programs preventing further loss of habitat, and maintenance of extant habitats and species

fossil fuels

A deposit, such as petroleum, coal or natural gas, derived from the accumulated remains of ancient plants and animals and used as fuel

fragmentation

The reduction or breaking up of one area of habitat into several smaller separate areas

gender

The state of being male or female, but also typically used with reference to social and cultural differences rather than biological differences

geochemical cycles

The circulation of biological, geological and chemical substances

geology

The scientific study of the origin, history and structure of the Earth

GPS

(global positioning system) A satellite-based navigation system that can determine accurate and precise locations and give directions to other destinations

green energy

An alternative name given to renewable energy that comes from resources that are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat

greenhouse gas

A gas in an atmosphere that absorbs and emits radiation; examples include carbon dioxide, methane, nitrous oxide and ozone

greenhouse sceptic

Those with the belief that claims by climate scientists and environmentalists that the climate is changing due to human activities are false or exaggerated

greening

Process of transforming a space into a more environmentally friendly version

greenwashing

The practice of promoting the perception that an organisation's products are 'green' or environmentally friendly

grey-water systems

Wastewater generated from wash basins, showers and baths, which can be recycled for uses such as toilet flushing and garden watering

habitat

An area or environment where an organism or ecological community normally lives or occurs

habitat fragmentation

Habitat that is divided or broken down into smaller habitats (e.g. when a road is constructed in a swamp and it is separated into two)

herbivore

An animal that feeds on grass and other plants

hydro-electricity

Using water power to produce electricity

ice record

Pockets of air trapped in ice of known age used to examine changes in atmospheric gas concentrations

immigration

The movement of people into another country or region to which they are not native in order to settle there

impervious surfaces

Areas that have been covered by any material that impedes the infiltration of water into the soil

industrialisation

The development of industry on an extensive scale

integrated farming

An approach to farming combining traditional methods with modern technology to achieve higher levels of productivity without increasing the environmental impact

interest groups

Individuals with similar values that form an interest group with the aim of promoting their views about the issue; government or government agencies are not considered to be interest groups

interrelationship

The way in which two or more things affect each other because they are related in some way

intertidal

The area that is above water at low tide and under water at high tide

intertidal zone

Area of foreshore and seabed exposed to air at low tide and submerged at high tide (i.e. the area between low-tide and high-tide marks)

intrinsic motivations

Motivations we get from within ourselves

intrinsic value

Something that is prized for what it is, rather than for what it can provide

irrigation

Artificial application of water to arable land for agricultural use

kinetic

Relating to or resulting from movement

Kyoto Protocol

International agreement between developed countries aimed at reducing global greenhouse gas emissions

La Niña

Extensive cooling of the central and eastern tropical Pacific Ocean, associated with increased probability of wetter conditions in Australia

land reclamation

The process of creating new land from the ocean, riverbeds or lakes

Landcare

A community-based approach dedicated to managing environmental issues in local communities

management plan

A document that contains guidelines on how an area of public land is managed; it articulates the vision, goals, outcomes, measures and long-term strategies for parks within planning areas

mariculture

The cultivation of marine organisms for food and other products in the open ocean, an enclosed section of the ocean, or in tanks, ponds or raceways that are filled with seawater

matter

In physics, that which has both a mass and volume, which occupies space and possesses a rest mass (as distinct from energy)

mass tourism

Large-scale tourism that focuses on maximising numbers of participants of intensive leisure activities

media

The main means of mass communication, including television, newspapers and magazines, film, billboards and posters, books, artworks, the Internet and social media

microclimate

The prevailing weather conditions of a small, specific place within a larger area

migration

A species that moves from one location to another in response to changes in habitat

migratory path

The geographic route along which birds seasonally migrate

minimal impact

To have as little environmental impact as possible

mitigate

The action of attempting to slow, reduce or reverse the severity of something

monoculture

Cultivating a single crop in an area

moratorium

A temporary prohibition of a particular activity

Mother Nature

The Earth's biosphere – all of the living things on Earth and the processes and systems that are part of, or related to, these living things

mud maps

Rough sketches of a place or journey that show key features and likely routes, but are not drawn to scale

nation building

The process of constructing a national identity including the development of national myths as well as major infrastructure development

nature

The living things, the ecosystems and the processes that form them, and the places in which we find all of these

nocturnal

Animals that are primarily active at night

nomadic

Communities that move across large distances and to many different locations

non-renewable

A resource that does not renew itself at a sufficient rate for sustainable economic extraction in meaningful human timeframes

outdoor environment

Environments that have minimal influence from humans, but may also include those that have been subjected to human intervention

passive solar principles

Building design that uses the sun's energy for heating and rejects it for cooling of living spaces

perennially

Lasting or active through the year or through many years

peri-urban

Areas immediately adjoining urban areas (e.g. between the suburbs and the countryside)

permaculture

The development of agricultural ecosystems intended to be sustainable and self-sufficient

photosynthesis

A process used by plants to convert light energy into chemical energy to grow

physical ability

The quality of being able to perform some type of physical action

piste

A marked ski run or path down a mountain for snow skiing, snowboarding or other mountain sports

plateau

An elevated, comparatively level expanse of land

policies

The positions that political parties take regarding the management of the outdoor environment; policies can also refer to formal plans of environment management

portrayal

The way in which something is represented

position and aspect

Geographical location and the direction facing of a location

precipitation

When water is released from clouds in the form of rain, freezing rain, sleet, snow or hail

primary producers

The people and organisations that work with our natural resources to grow, harvest or extract primary products; most products from the primary industry sector are considered raw materials for other industries

primary succession

When a community is established where it has never been before

reconciliation

Restoration of friendly relations, especially between Indigenous and non-Indigenous individuals and communities in Australia

remnant vegetation

Small patches of native plants that remain after conversion of landscapes to agricultural or other use

renewable

A commodity or resource, such as solar energy or firewood, that is inexhaustible or replaceable by new growth

renewable energy

Energy that can be obtained from natural resources that can be constantly replenished

resilience

The power or ability to return to the original form or position

respiration

The physiological process that enables animals to exchange carbon dioxide

riparian vegetation

Plant habitats and communities along a river's margins and banks

rotation planting

The successive planting of different crops on the same land to improve soil fertility and help control insects and diseases

salinity

The concentration of dissolved salts in water or soil

sclerophyll

Sclerophyll forests are a typically Australian vegetation type having plants (typically eucalypts, wattles and banksias) with hard, short and often spiky leaves

secondary succession

When a community that develops over time is similar to the original community

sedge

A grass-like plant with triangular stems and inconspicuous flowers, growing typically in wet ground

semi-nomadic

Communities that move from one location to another and back again in regular cycles

smog

A mixture of smoke, fog and chemical fumes

Snowy Mountains Scheme

One of the most complex integrated water and hydro-electric power schemes in the world

societal

Relating to society or social relations

socioeconomic status

An individual's or family's economic and social position in relation to others based upon income, education and occupation

soil salinity

The salt content in the soil; the process of increasing the salt content is known as salination

solar energy

Using light energy from the sun to produce electricity

sphagnum bogs

Species of mosses; alpine sphagnum bogs are found in permanently wet sites in high rainfall alpine, sub-alpine and montane areas of NSW, ACT, Victoria and Tasmania

stakeholder

A person, group or organisation that has interest or concern in an issue

statutory authority

Government organisation or authority in charge of the management of an outdoor environment

subtidal

The area that is permanently covered with water

succession

The process of change in the species structure of an ecological community over time

sustainability

The ongoing capacity of Earth to maintain all life

swales

Shallow troughs between sand dunes

taxon (plural taxa)

A group of any rank, such as a species, family or class

technology

The application of scientific knowledge for practical purposes to extend our human abilities and to manipulate nature to satisfy our wants and needs

tectonic

In geology, relates to the structure of the Earth's crust and the forces and movements that take place within it

terracing

Make or form (sloping land) into a number of level flat areas resembling a series of steps (cattle and

other livestock can create this as they travel on inclined land)

terra nullius

A Latin expression derived from Roman law meaning, 'land belonging to no-one'

thermal mass

The ability of building materials to absorb and store heat energy so that it can be used to provide warmth to living spaces

terrestrial

Living or growing on the land

topographic maps

Maps showing detailed graphical representations by contour and lines of features that appear on the Earth's surface

topography

The landforms or surface features of a region

transboundary wetlands

Wetlands that exist across one or more borders

transpiration

The evaporation of water into the atmosphere from the leaves and stems of plants

trophic level

A feeding level; organisms that form one link in a food chain; either producers, consumers or decomposers

urban environments

Areas of permanent infrastructure designed to support higher population densities such as cities and towns

urbanisation

The physical growth of urban areas as a result of rural migration

volatile

(substance) Easily evaporated to produce a flammable vapour

weed

Any plant that grows wild and profusely among cultivated plants, depriving them of space and food

whiteout

Lack of daylight visibility due to snow or fog

wilderness

An environment that is big, remote and untouched (or relatively untouched) by humans

wind energy

The generation of electricity from the naturally occurring power of the wind

World Heritage area

A place that is listed by the United Nations as of special cultural or physical significance

 INDEX

- abiotic 85, 91
- abseiling 45
- absolute risk 64
- action statements 332–3
- acts or conventions 331–7
- actual risk 64
- adventure 28–9
- adventure tourism 183, 277
- aesthetic values 277
- aestivate 72
- age 57
- agriculture 121
 - and indigenous farmers 157
- air quality and adequacy 266–7
- alpine environment 71–2
- Alpine National Park (Victoria), grazing in the 296, 322–5
- alpine responsibility code 46
- alpine travelling 44
- Alps 16–17
- Antarctic environment 275
- arid environment (Mallee) 79–80
- artificial 5
- artistic understandings of outdoor environments 109–11
- atmosphere 85, 272–3
- Aurora Residential Development 260
- Australia
 - arrival of first Australians 151–3
 - before humans 144–51
 - climatic variations 147–8
 - biological isolation 147
 - fire 149–50
 - geological stability 147
 - megafauna 150–1
 - prehistory 144–6
 - State of the Environment SoE 272
- Australian Conservation Foundation (ACF) 294, 338–9
- Australian Forest products Association 294–5
- Australian Greens 241–3
- Australian Labor Party 238, 242, 243, 245–6
- Australian Renewable Energy Agency (ARENA) 246
- Australia's Biodiversity Conservation Strategy 2010–2030 329–31
- Bader, Douglas 59
- Bald Hills Wind Farm 240–1
- ballast water 73
- Beach Clean Day 189
- Bells Beach 118
- biocapacity 257
- biodiversity 69
 - alpine 71–2
 - arid (Mallee) 79–80
 - Australia 329–31
 - coastal 74
 - dry forest 77
 - grassland 76
 - and healthy environments 268–70, 273, 279
 - heathland environment 81
 - marine 72–3
 - wet forest/rainforest 78
 - wetland 75
- bioenergy 237
- biofuels 226
- biogeochemical 85
- biological isolation 147
- biomes 16
- biorhythms 93
- biosphere 4, 85
- biota 267
- biotic 85, 91
- blackberries 285
- blizzards 54
- bodyboarding 45, 204
- brine 237
- Brundtland Commission 1987 252–3
- built environments 7, 273
- Bunurong coast (case study) 197–8
- bushfires 54
- bushwalking 44
- Butler, John 109
- campfires 52
- camping 43, 204
- cane toads 286
- canoeing 44
- Cape Howe Marine National Park 308
- carbon capture and storage 226
- carbon dioxide (CO₂) 86, 223
- carbon-oxygen cycle 86–7
- carbon tax 227
- carnivores 89
- Carson, Rachel 177
- Cathcart, Michael 173–4
- catchment areas 74, 102–3
- cinnamon fungus 77
- circadian rhythms 93
- clean coal 226
- Clean Ocean 189
- clear felling 289
- climate 70
 - alpine 71
 - arid (Mallee) 79
 - coastal 74
 - dry forest 77
 - grassland 76
 - heathland environment 80
 - marine 72
 - wet forest/rainforest 78
 - wetland 75
- climate change 5, 100, 223–9
 - debate 224
 - environmental threat 286–8
 - Kyoto Protocol 226
 - influence on relationships 227
 - positions on 228
- Climate Change Authority (CCA) 246
- climate scientists 224
- climatic variations 147–8
- climax community 99
- climax vegetation 92
- climbing equipment 204
- coal seam gas (Gippsland, Victoria) 300–2, 317–23
- coast environments 19, 73–4
 - Australia SeO 274
 - succession 98
- code for minimal impact living 51–2
- codes of conduct 42–7
- cognitive reward 21
- commercial activities 117–22
 - large-scale 119
- commercialisation of outdoor environments 206–9
- commodity 196
- community 85
- community-based environmental action 125–7
- compas or GPS 50–1

- conflicts, environmental
 examples 295–302
 processes 305–25
 conflicts of interest (uses of outdoor environments) 291–302
 conservation activities 114–17
 conservation and outdoor environments 190, 191–3, 246
 conservation covenants 328
 conservation zones (public lands) 107
 consumerism 257
 contemporary outdoor adventures 62
 coupes 78
 creeks 49
 Csikszentmihalyi, Mihaly 21
 cultural background 56–7
- day to night and outdoor environments 93
 decision-making and outdoor environment use 302–5, 306–8
 deep ecology 215
 delineations 102
 desalination 194, 231–2
 plant (Wonthaggi) 296–7, 305, 310–13
 development 121
 dingoes 158
 distribution
 alpine environments 71
 arid environment (Mallee) 79
 coastal environments 73
 dry forest environments 77
 grassland environments 76
 heathland environment 80
 marine environments 72
 wet forest/rainforest environments 78
 wetland environments 75
 diurnal animals 93
 dredging 73
 drought 70, 96–7
 dry forest environments 76–7
 dry forests 18
 dry land soil salinity 283
- Earth Summit 1992 253
 ecological footprints 136, 257–60
 ecological perspectives 33
 economic development 255
 economic growth 251
 economic perspectives 33
 economic value 280
 ecosystem diversity 268
- ecosystems 5
 components 85–6
 ecotoxin 305
 ecotourism 196, 277
 ecovillages 345
 education 279–80
 Ehrlich, Paul 177
 El Niño–Southern Oscillation (ENSO) 97, 144, 148, 229
 electrical power 171
 elevation
 alpine environments 71
 arid environment (Mallee) 79
 coastal environments 74
 dry forest environments 77
 grassland environments 76
 heathland environment 80
 marine environments 72
 wet forest/rainforest 78
 wetland environments 75
 emergency procedures 36–7, 54–5
 emissions 261
 emissions trading 227, 245
 emotional wellbeing 278
 endemic 73, 147, 269
 energy *see* renewable energy
 environment
 Indigenous relationships 151–61
 non-indigenous relationships 163–75
 potential threats 282–9
 see also outdoor environments
 Environment Conservation Council (ECC) 246, 308
 Environment Protection Society (EPA) 337
Environmental Assessment Council Act 2001 (Vic) 246
 environmental buffer 267
 environmental conflicts 295–302, 305–25
 environmental history 32–3
 environmental issues, social and political debates 223–41
 environmental movements in Australia 176–87
 Franklin River 180–2, 183
 history 176–7
 Lake Pedder 177–9, 183
 Landcare 177
 Little Desert 179–80, 183
 mainland activism 185–6
 Nuclear Disarmament Party 185–6
 overview 183
 political environmental policies 186
- political movements 184–6
 professional environmentalists 186
 Tasmania 183, 184
 Victoria 183, 185
 environmental policies 241–6
 environmental politics in Australia 241–7
 environmental protection 256–7
 environmental sustainability 279
 environmental threats
 climate change 286–8
 habitat modification 288–9
 introduced species 285–6
 land degradation 283–4
 loss of river flow 289
 potential impacts 282–9
 urbanisation 288–9
 vegetation loss 289
 environmentalists, professional 186
 environments, natural 7
 environments, natural changes and effects on people and places 92–101
 climate change 100
 day to night 93
 drought 96–7
 flood 94
 migration 97–8
 seasons 93–4
 short-term/long-term 92–3
 succession 98–100
 tides 95
 equipment 53
 broken 54
 manufacture 132
 erosion 284
 evaporation 70
 exotic species 75
 experiential knowledge 32
 exploitation 27
 extinct 80
 extrinsic motivations 19–20
- farming 121
 integrated 126, 339–41
 fauna
 alpine 71–2
 arid (Mallee) 79–80
 coastal 74
 dry forest 77
 grassland 76
 heathland 81
 introduced 165, 171, 173, 270–1, 285–6
 marine 72–3
 wet forest/rainforest 78
 wetland 75

- Field Naturalists Club of Victoria 176
- fire 149–50
- fire-stick farming 155–6, 165
- first aid 55
- flood 94
- future 280–1
- flora
- alpine 71–2
- arid (Mallee) 79–80
- coastal 74
- dry forest 77
- grassland 76
- heathland 81
- introduced 165, 171, 173, 270–1, 285–6
- marine 72–3
- wet forest/rainforest 78
- wetland 75
- Flora and Fauna Guarantee Act 1988* (Victoria) 332–4
- food 53–4
- food chains/webs 89–90
- forest clearing 165
- forestry 119–20
- fossil fuels 86, 235, 251
- foxes 285
- fragmentation 77, 119
- Franklin River 180–2, 183
- fuel stoves 131
- gender 58
- geochemical cycles 89
- geographical location 79–80
- geological stability 147
- geology 70
- geothermal energy 237
- Gloria Jean's coffees 255
- Glover, John 109
- GPS 50–1, 205
- Grampians National Park 108, 269–70
- grassland environments 75–6
- grasslands 17
- grazing in the Alpine National Park (Victoria) 296, 322–5
- Great Forest National Park (GFNP) 297–9, 313–17
- green building design 337–9
- green energy 259
- greenhouse gas 100, 245
- greenhouse sceptics 224
- greening 224
- greenwashed 261
- grey water systems 261–2
- Gunnamatta Beach 210–11
- habitat fragmentation 119
- habitat modification (environmental threat) 288–9
- habitats 12, 246
- Hawke government 186
- healthy outdoor environments 263–72, 276–82
- actions to sustain 337–46
- air quality and adequacy 266–7
- aesthetic values 277
- and biodiversity 268–70, 273, 279
- economic value 280
- education 279–80
- environmental stability 279
- future food 280–1
- importance of 276–82
- intrinsic value 278
- management strategies 325–31
- medicinal sources 280–1
- physical and emotional wellbeing 278
- recreation and adventure 277
- scientific research 281
- soil quality and adequacy 267–8
- species, pest and introduced 270–1
- water quality and adequacy 264–6
- heathland environment 80–1
- heathlands 17
- herbivores 89
- heritage 273
- hiking 204
- historical understandings of outdoor environments 111–12
- human impacts 8
- on outdoor environments 114, 136–7
- human influences and threats
- alpine environments 72
- arid environment (Mallee) 80
- coastal environments 74
- dry forest environments 77
- grassland environments 76
- heathland environment 81
- marine environments 73
- wet forest/rainforest environments 78
- wetland environments 75
- human lifestyles 136–7
- hydro-electricity 171, 237, 289
- ice record 223
- immigration 97
- impervious surfaces 96
- Indigenous relationships with the environment 151–61
- agriculture 157
- before europeans 160–1
- contemporary 162
- dingoes 158
- and europeans 161–3
- fire 158
- fire-stick farming 155–6
- health 162
- hunting and gathering 154
- impacts 157–9
- indigenous views 152
- land management 162
- modern non-indigenous views 151
- Native Title 162
- nomadism 155
- non-indigenous relationships 163–6
- practices 153–7
- reconciliation 162
- sacred sites 156–7
- tools 159–60
- Indigenous understandings of outdoor environments 111
- industrialisation 168–70, 251
- injuries 54
- inland waters 18–19
- Australia SeO 274
- integrated farming 126, 339–41
- interest groups 191, 292–5
- International Union for Conservation of Nature (IUCN) 14–15
- interrelationships 30
- intertidal 72
- intertidal zone 95
- intrinsic motivations 19–20
- intrinsic value 112
- introduced species 165, 171, 173, 285–6
- irrigation 75
- Johnstone, Chris 215
- kayaking 44
- kinetic 91
- Kyoto Protocol 226–7, 243–4, 245–6
- La Niña 148
- Lake Pedder 177–9, 183
- land
- Australia SeO 273–4
- degradation 171–2, 283–4
- private and public 104
- reclamation 75

- Land Conservation Council (LCC) 246
- land managers' understandings of
 outdoor environments 101–8
 landform and catchment areas 102–3
 management zones 107–8
 public and private land 104
 types of parks and reserves 105–6
 vegetation type 104
- Landcare 177, 246, 342–3
- landform 102–3
- Letch, Mike 'wheelie' 59
- Liberal–National coalition 239, 242, 244, 245–6
- life threatening dangers 35–6
- Little Desert 179–80, 183
- local parks 16
- Longstaff, John 109
- long-term changes to outdoor environments 92–3
- McCubbin, Fredrick 109
- mainland activism
 (environmentalism) 185–6
- mallee 17–18
- management plans 192
- management zones (public lands) 107
- maps 50–1
- marine environments 19, 72–3
 Australia SeO 274–5
 and VEAC 247
- marine parks 15, 106, 246
 and sanctuaries (Victoria) 295, 308–10
- marine pests 286
- Maslow, Abraham 65
- mass tourism 197
- matter 91
- media 40, 215, 217, 218–19
- media perspective 224
- media portrayals 40–2
 motives 41
- media report 219–22
- medicinal sources 280–1
- megafauna 150–1
 decline 158–9
- Melbourne Women's Walking Club Inc. 207–8
- metropolitan parks 16
- microclimates 72, 101
- Midnight Oil 109, 111, 277
- migration 97–8
- minimal impact 51–4
- mining 120, 245
- mitigate 225
- monoculture 339
- Mother Nature 5
- motivation for seeking outdoor experiences 19–22
- mountain biking 45, 205
- Mountain Cattleman's Association of Victoria 296
- mud maps 50
- Naismith, William 49
- nation building 170–3
- national parks 106, 170, 246, 325–7
- natural 5
- natural changes to environments,
 effects on people and places 92–101
- natural environments 7
- natural history 32–3
- natural systems, structure of 85–90
 carbon-oxygen cycle 86–7
 ecosystems 85–6
 food chains/webs 89–90
 nitrogen cycle 87–8
 water cycle 89
- nature
 beauty in 6
 meanings of 5
 use of term 3–4
- navigation 50–1
- nitrogen cycle 87–8
- nocturnal animals 93
- Nolan, Sidney 109, 110
- non-indigenous relationships with
 the environment 163–75
 alternative perspectives 173–4
 industrialisation 168–70
 Michael Cathcart's perspective 173–4
 nation building 170–3
 population increase 166–8
 settlers' impacts 165
 settlers' perceptions 163–4
 settlers' practices 166–5
 summary 174–5
- non-renewable energy resources 119, 251
- Nuclear Disarmament Party 185–6
- Old Port Albert Reserve 329
- One Night the Moon* 174
- organism 85
- outdoor environments
 acts or conventions 331–7
 artistic understandings 109–11
 as an adversary 143
 as a cathedral 143, 214–15
 characteristics of different 69–81
 commercialisation 206–9
 conflicts over use 305–25
 and conservation 190, 191–3, 246
 factors affecting 70–1
 factors influencing responses 26
 definition 85
 experiencing 27–31
 as a gym 143, 211, 213
 historical understandings 111–12
 impacts on 113–37
 indigenous understandings 111
 influencing relationships with 199–222
 knowing 27–34
 land managers' understandings 101–8
 media portrayals on personal responses 40–1
 minimal impact 51–4
 as a mother 143
 as a museum 143, 214
 negative responses 24
 personal responses 22–6
 planning interactions 47–55
 portrayals of 209–18
 positive responses 23
 and primary industries 190, 194–5
 as recreation and adventure 28–9
 recreational users 82–3, 190, 191
 relationships with 141–4
 as a resource 27–8, 214
 responding 27–31
 and renewable energy 239
 safe participation 34–8, 83
 scientific understandings 85–101
 societal relationship with 189–200
 as a spiritual connection 29–30
 state of in Australia today 272–6
 as a storehouse 143
 as a study site 30–1
 and technology 61–3, 128–33, 200–5
 and tourism 190, 196–7
 types of 16–19
 use, methods used to influence 302–5
 varying responses 24
 as a web 143
see also environment; healthy outdoor environments; sustainable outdoor environments
- outdoor experiences
 factors that affect your 55–60
 motivation for seeking 19–22
 and risk 34–8, 64–5, 215–19
 safe participation 34–8, 83
 and technology 61–3

- park rangers 326–7
- parks 105–6
- passive solar principles 338
- perceived risk 64
- peri-urban 344
- permaculture 340–1
- personal responses to outdoor environments 22–6
- photosynthesis 86
- physical ability 58–9
- physical wellbeing 278
- piste 292
- Plan Melbourne 344–5
- plateaus 16
- policies, environmental 241–6
- political debates about environmental issues 223–41
- political environmental policies 186
- political movements 184–6
- politics, environmental 241–7
- population 85, 166–8
- Population Bomb, The* 177
- portrayals of outdoor environments/ experiences 209–18
- precipitation 88
- primary industries and outdoor environments 190, 194–5
- primary succession 98–9
- private land management 327–9
- professional environmentalists 186
- protected areas 14–16
 - in Victoria 15
- public land management 325–7

- rabbits 285
- rafting 44
- railways 172
- rainforest environments 78
- rainforests 18
- Ramsar Convention (international treaty, 1971) 334–5
- recreation 28–9
 - and outdoor environments 190, 191, 277
- recreational activities 122–4
- recreational development zones (public lands) 107
- recreational users 82–3
- recreational vehicles 129–30
- reference area zones (public lands) 107
- relationships with outdoor environments 141–4
- remnant vegetation 80
- renewable 251
- renewable energy 95, 235–40
 - bioenergy 237
 - definition 235
 - geothermal energy 237
 - hydro-electricity 237
 - and outdoor environments 239–40
 - solar panels 236
 - solar water heaters 236
 - targets 245
 - waves and tidal energy 237
 - wind energy 235–6, 240–1
- reserves, public land 105–6
- respiration 86
- Ricketts Point marine sanctuary 59, 308
- ridges 48
- riparian vegetation 75
- risks
 - competency vs difficulty 65
 - definition 64
 - in outdoor experiences 34–8, 64–5, 218–19
 - types of 64–5
- risk-taking, social responses to 218–22
- river flows, loss of 289
- river grades 212–13
- rivers 49
- roads 172
- Roberts, Tom 109
- rock climbing 45
- rocky environments
 - succession 98–9
- rotation planting 283
- route planning 47–8
- Royal National Park 115
- Rudd, Xavier 109, 111, 277

- safe participation in outdoor experiences 34–8, 83
- safety for specific activities 38, 83
- salinity 27, 170, 171, 263–4, 268
 - dry land soil 283
- Save Bastion Point 292–3
- scientific research 281
- scientific understandings of outdoor environments 85–101
 - biotic and abiotic components 91
 - effects of natural changes to environments on people and places 92–100
 - structure of natural systems 85–90
- Seafood Industry Victoria (SIV) 295
- seasons 93–4
- secondary succession 99–100
- sedge 77
- Seed, John 193
- settlers
 - and fear 163
 - impacts 165
 - and opportunity 164
 - perceptions 163–4
 - practices 166–5
 - to be saved 164
- short-term changes to outdoor environments 92–3
- Silent Spring* 177
- sketch maps 50
- snowmaking 130–1, 204
- Snowy Mountains Scheme 289
- social debates about environmental issues 223–41
- social development 256
- social perspectives 33
- social responses to risk-taking 218–22
- socialisation 21
- societal relationships with outdoor environments 189–200
 - Surfrider Foundation 193–9
 - types of interaction 189–93
- socioeconomic status 56
- soil contamination 283–4
- soil quality and adequacy 267–8
- soil salinity 27, 170, 171–2, 263–4, 268, 283
- soil tests 267–8
- solar energy 236
- solar panels 236
- solar water heaters 236
- species 85
 - conservation 246
 - diversity 268–9
 - introduced 165, 171, 173, 270–1, 285–6
- specific outdoor environments 82–3
- sphagnum bogs 72
- spurs 48
- stakeholders 42
- state parks 15, 106
- statutory authorities 305
- steep climbs 49
- stewardship 328
- Streeton, Arthur 109
- subtidal 72
- succession 98–100
- surfing 45, 204, 205, 210–11
- Surfrider Foundation 193–9
- sustainable development 251–63
 - Aurora residential development 260
 - critiques 260–3
 - ecological footprints 257–9
 - economic development 255
 - environmental protection 256–7
 - social development 256
 - world collaborations 252–5

- sustainable outdoor environments 290–346
 - actions to sustain healthy 337–46
 - conflicts, processes followed 306–25
 - conflicts of interest 291–302
 - environmental conflicts 295–302
 - management, acts or conventions related to 331–7
 - management strategies 325–31
 - methods used to influence decisions 302–5, 306–8
- sustainability 15, 214, 251–72

- Tasmania (environment) 177–9, 180–2, 183, 184
- technological change over time 201
- technological innovations 204
- technology
 - impacts on outdoor environments 128–33, 200–5
 - used in outdoor environments 61–3
- tectonic activity 102
- tides 95
- timber harvesting 119–20
- toilets 53
- topographical maps 50
- topography 72
- tourism 183
 - ecotourism 196, 277
 - and outdoor environments 190, 196–7
 - mass 197
- transpiration 88
- transport 132–3, 171

- transport to and from a trip 52
- trip planning 55
- tropic level 90
- Trust for Nature 327–8

- United Nations Conference on Sustainable Development (Earth Summit 2012) 254
- unnatural 5
- urban environments 7
- urban planning 343–5
- urbanisation 75, 121, 134–6, 276, 288–9

- vegetation loss 289
- vegetation type 104
- Victoria (environment) 179–80, 183, 185
- Victorian Environmental Assessment Council (VEAC) 246–7, 305
- Victorian National Parks Association (VNPA) 295, 296, 308
- Victorian Recreational Fishers (VRFish) 295

- walk time, predicting 49
- water
 - cycle 88
 - desalination 194, 231–2, 234
 - domestic consumption 231
 - grey water systems 261–2
 - loss of river flows, 289
 - and nation building 172–3
 - nitrogen in 266
 - oxygen 266
 - pH 265
 - phosphorus in 266
 - quality and adequacy 264–6
 - taste, odour and appearance 264–5
 - temperature 265
 - water management 229–35
 - debate 230
 - Melbourne water storage 230
 - new sources of water 231–3
 - Sugarloaf Interconnector 232
 - Watershed Victoria 297
 - waves and tidal energy 237
 - weeds 72, 101, 270–1
 - Western Port Ramsar site 335
 - wet forest environments 78
 - wet forests 18
 - wetland environments 74–5
 - wetlands 18–19
 - wetsuits 204
 - white-out 82
 - wilderness 7, 10–13
 - critiques 11–12
 - definition 10–11
 - parks 15, 106
 - zones (public lands) 107
 - Williamson, John 111, 277
 - wind energy 235–6, 240–1
 - Winton, Tim 277
 - woodlands 18
 - World Heritage Protected Areas 15
 - World Summit 2005 253–4
 - World Wildlife Fund (WWF) 16
 - Wright, Judith 277
 - WWF Living Planet Report 256–7
- Yothu Yindi 111, 277

 OVERVIEW

- › Completely updated to match the new Study Design's key knowledge and skills
- › Current environmental issues
- › Now also available as an interactive ebook.