

# Teacher Notes

## Themes

- Shoreline habitats
- Coastal pollution
- Marine life
- Taxonomy

## Key learning outcomes

- Identify coastal plants and animals
- Develop an appreciation for scientific discovery and exploration
- Understand the taxonomic system
- Identify the Indigenous groups associated with South-Eastern Australia

## Key curriculum areas

- **Science:** Earth and Environmental Science Units 1, 2 and 3; Science Inquiry
- **English:** Language; Units 1 and 3
- **Geography:** Unit 1
- **Cross-curriculum Priority:** Aboriginal and Torres Strait Islander Histories and Cultures

## Publication details

*Field Guide to the Seashores of South-Eastern Australia*

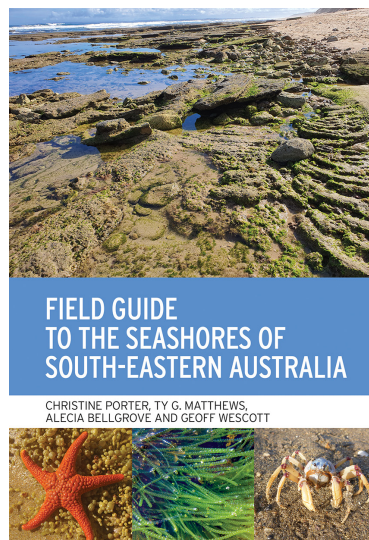
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# Field Guide to the Seashores of South-Eastern Australia

Christine Porter, Ty G. Matthews,  
Alecia Bellgrove and Geoff Wescott

## About the book

The types of plants and animals that live on seashores in temperate regions are similar around the globe, but many of the individual species in south-eastern Australia are found only in this region.

*Field Guide to the Seashores of South-Eastern Australia* features colour photographs, descriptions and ecological notes for around 240 species of the more common plants and animals found on rocky, sandy and muddy shores along the coastline from Port Lincoln, South Australia, to the Hawkesbury River, New South Wales, and Tasmania.

This guide will allow beachgoers to learn interesting details about the plants and animals they come across, while also having sufficient scientific detail for natural history enthusiasts and biology students to develop their understanding of these shore ecosystems.

## Recommended for

Readers aged 15 to 17 (upper secondary: Years 10 to 12)



PUBLISHING

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## About the authors

Dr **Christine Porter** has a PhD in environmental management from Deakin University. Christine has a long-held interest in the biology, ecology and conservation of marine invertebrates.

Dr **Ty G. Matthews** is a senior lecturer based at the Deakin University Queenscliff Marine Science Centre. Ty has 25 years of research and teaching experience associated with marine and freshwater ecosystems.

Dr **Alecia Bellgrove** is a Deakin University academic and leads the DeakinSeaweed Research Group at Warrnambool campus.

Dr **Geoff Wescott** is an Honorary Research Fellow at the University of Melbourne and Deakin University. He is also the co-editor of *Big, Bold and Blue: Lessons from Australia's Marine Protected Areas*.

## Pre-reading questions or activities

Discuss how seashores are products of the interaction between the hydrosphere, the biosphere, the geosphere and the atmosphere. Refer to factors such as liquid water, the rock cycle, living organisms and photosynthesis. Invite students to see how the range of this book fits into the Great Southern Reef.

## Discussion questions

### Science

1. The authors provide guidelines for exploring seashores in an environmentally friendly way (see Conservation Code on page 1). Discuss what consequences might unfold if a plant or animal dies because of mishandling, beyond the loss of that one plant or animal. What other guidelines could be added to the Code? You can use this pamphlet and the benefits listed there to explore additional possibilities:  
<https://www.dcceew.gov.au/sites/default/files/documents/nrsmpa-protect.pdf>.

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As an extension to this topic, students can view this brief video description of the zones that apply to Commonwealth marine protected areas (<https://parksaustralia.gov.au/marine/management/>) and how the Australian Government manages these areas. For more local restrictions and management specifics, students need to search for each state to discover the sanctuary names and locations and what activities are permissible. For example, check what activities are restricted in Victoria's marine sanctuaries and decide if any of them could be applied to the national marine parks: <https://vnpa.org.au/wp-content/uploads/2017/02/Pr-M-Fact-sheet-Marine-national-parks.pdf>.

2. On page 11 the book directs you to the Australian Citizen Science Association. Have a look at their Project Finder page (<https://citizenscience.org.au/ala-project-finder/>) and locate a program that you would like to contribute to. Explore the filters you can apply. Report on what the project is about, where the project is running and why you find it of interest.
3. All creatures and plants that scientists discover are described and named, and then slotted into their place in the vast and complex table of taxonomy. This systematic approach to recording our knowledge of the living world continues to grow and change as more species are found and the relationship between species becomes clearer. There are several entries in this book whose classification has been unsettled or disputed: Sea lettuce, Globe algae, Sargassum weeds, Eelgrass and Common blue mussel. Why do you think that scientists have been unsure about how to classify these species? How did they come to realise that the original classification was made in error? As a class, prepare a graph that shows the current classification for these plants and animals, including the entire taxonomic rank.

*A similar looking species was subsequently placed in a different genus, which led scientists to re-evaluate their original classification. Or perhaps a closer look, under a microscope, revealed information that led to a correction.*

## English

1. Make sure you understand the meanings for the following words which are used throughout the book: carapace; intertidal; endemic; invertebrate; algae; genera; phylum. Some of these words will be in the glossary but others may not be. As a class, discuss how each one is connected to seashores, finding examples from the book.

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2. Read the paragraphs on page 8 in the sections 'Waste and pollution on our seashores' and 'Other human impacts'. In small groups ensure everybody understands the meaning of the following words and how they fit with the intent of the paragraphs: ballast, effluent, microplastics, pernicious, sedimentation and compaction. Can you suggest synonyms for each word (although some may not have direct equivalents)?

*Ballast: often water that a ship carries when it is not laden with cargo*

*Effluent: sewage that has been treated, or waste from an industry, that is then discharged*

*Microplastics: microbeads, nurdles, microfibrils, tiny plastic debris that is smaller than 5 mm in diameter*

*Pernicious: subtle but very harmful*

*Sedimentation: deposit of fine solids (e.g. soil) from a fluid (e.g. water)*

*Compaction: the result of making something more dense after applying pressure*

## Activities

### Science

#### *The best chlorophyll*

Using this map of marine parks in Australia, <http://bitly.ws/zabH>, figure out which of the four seasons provided is the best season for chlorophyll presence, and therefore the best season for photosynthesis and the production of seaweeds in the region that the book covers.

*Students will need to study the web page and can then discover that the box in the top left corner will allow them to isolate each season if they uncheck the overlay boxes that aren't needed. The answer could be autumn or winter, and students can defend their choice.*

#### *Animal or plant?*

Using the photos from the book that are on the worksheet provided on pages 7 and 8, decide whether they are images of a plant or of an animal. In the space below each photo, write your answer and why you think it's an animal or a plant (for example, fronds, eyes, attached to a rock). As a class, discuss and defend your choices. Your teacher will provide the answers and then you can look up each photo and discover which elements helped or hindered you.

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## Answers:

### Page 7

*Plant (p. 18)*

*Animal (p. 145)*

*Animal (p. 162)*

*Animal (p. 203)*

### Page 8

*Plant (p. 43)*

*Animal (p. 167)*

*Plant (p. 38)*

*Animal (p. 156)*

## Human use

Some of the fauna and flora found within these pages are possible sources of food, pharmaceuticals or other products that humans could use. You are an entrepreneur who wants to start a business farming one of these animals or plants. Refer to the pages listed below. Choose one of the plants or animals and construct questions that would need to be answered before your farm could be started up. Address issues like the food web, harvesting techniques, ethical concerns, impact on the local biome and longer-term outcomes given the effects of climate change. Select from the following pages: 18, 19, 20, 35, 36, 38, 40, 41, 46, 47, 48, 54, 55, 56, 82, 110, 112, 113, 131, 142, 144, 175, 177, 178, 181, 183, 184.

## Cleaning up

Watch this short clip about a project called 'Ending plastic waste' that engages industry groups, government agencies and private citizens in an effort to count, monitor and measure the amount of coastal plastics: <https://research.csiro.au/ending-plastic-waste/> (scroll down the web page – the video is near the bottom). Read this follow-up media release (<https://www.csiro.au/en/news/news-releases/2022/plastic-on-australias-beaches-cut-by-almost-a-third>) to see what the scientists found almost 10 years later, and match the successful strategies to those mentioned in the field guide. No matter where you are, you can locate an action that will impact the amount of plastic waste that may end up on our shorelines. What can you do?

## English

### My neighbour

Choose one animal and one plant whose ranges overlap on the maps, and write an imaginative piece about an incident where the two of them intersected in some way. Make reference to the habitat where they live. The plant may be food, shelter, a nursery or simply another thing in the neighbourhood.

## Geography

### Using a field guide

In order to make full use of a field guide like this one, your efforts will be more successful if you understand how the book is arranged and where to find the information you're seeking. Usually, you only need to do this the first time you use a book like this, so let's practise here.

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On page vii is a section called 'Start here to get the most out of this guide'. Read this section and check out the other parts of the book you are directed to. In discussion with a partner, make sure you understand the words that are used and where to locate definitions. Write down any words you're unsure of so you can find out their meanings.

Then do a little test with your partner: choose an item from the book and give your buddy the common name, a rough description of the plant or animal and where on the map it is found. Your partner should use the key on page viii plus the instructions provided there to narrow down the creature or plant to a genus and even species. The Contents page will direct you to the relevant section of the book (Is it a lichen? Does it have jointed limbs?) so you have more information to work with.

Now swap roles.

## Aboriginal and Torres Strait Islander Histories and Cultures

### *Whose land is it?*

Using the map found at <https://aiatsis.gov.au/explore/map-indigenous-australia> you will record which groups of Aboriginal and Torres Strait Islander peoples have a cultural history with animals and plants found in the book.

Firstly, it is important to understand that the AIATSIS map is not a definitive map, it's a guide only and the boundaries displayed there are deliberately fuzzy.

Secondly, this seashore field guide applies to the region that extends from the Hawkesbury River, New South Wales, right round Tasmania and along the mainland coast to Port Lincoln, South Australia (page vii).

Choose two plants and two animals at random from the book, checking the range of these species printed in blue on the map provided. You may need to add in some place names so you can compare the book's maps with the AIATSIS map. Record the names of the Indigenous Saltwater groups that already have a long history with these specific animals and plants.



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## Worksheet: Animal or plant?

Refer to page 4 for instructions on this activity.





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## Australian Curriculum Links

Year level	Learning area: Science	Other learning areas
Year 10 [Version 9.0]	<p><b>Science Inquiry: Processing, modelling and analysing</b></p> <ul style="list-style-type: none"> <li>Analyse and connect a variety of data and information to identify and explain patterns, trends, relationships and anomalies (<a href="#">AC9S10I05</a>)</li> </ul> <p><b>Science Inquiry: Questioning and predicting</b></p> <ul style="list-style-type: none"> <li>Develop investigable questions, reasoned predictions and hypotheses to test relationships and develop explanatory models (<a href="#">AC9S10I01</a>)</li> </ul>	<p><b>English: Language</b></p> <ul style="list-style-type: none"> <li>Use an expanded technical and academic vocabulary for precision when writing academic texts (<a href="#">AC9E10LA08</a>)</li> </ul>
Years 11/12 [Version 8.4]	<p><b>Earth and Environmental Science: Unit 1: Science Understanding, Development of the biosphere</b></p> <ul style="list-style-type: none"> <li>In any one location, the characteristics (for example, temperature, surface water, substrate, organisms, available light) and interactions of the atmosphere, geosphere, hydrosphere and biosphere give rise to unique and dynamic communities (<a href="#">ACSES027</a>)</li> </ul> <p><b>Earth and Environmental Science: Unit 2: Science Understanding, Energy for biogeochemical processes</b></p> <ul style="list-style-type: none"> <li>Photosynthesis is the principal mechanism for the transformation of energy from the sun into energy forms that are useful for living things; net primary production is a description of the rate at which new biomass is generated, mainly through photosynthesis (<a href="#">ACSES053</a>)</li> </ul> <p><b>Earth and Environmental Science: Unit 3: Science as a Human Endeavour</b></p> <ul style="list-style-type: none"> <li>ICT and other technologies have dramatically increased the size, accuracy and geographic and temporal scope of data sets with which scientists work (<a href="#">ACSES064</a>)</li> </ul>	<p><b>English: Unit 1: Examine similarities and differences between imaginative, persuasive and interpretive texts</b></p> <ul style="list-style-type: none"> <li>Explaining the ways language features, text structures and conventions communicate ideas and points of view (<a href="#">ACEEN004</a>)</li> </ul> <p><b>English: Unit 3: Create a range of texts</b></p> <ul style="list-style-type: none"> <li>Making innovative and imaginative use of language features (<a href="#">ACEEN051</a>)</li> </ul> <p><b>Geography: Unit 1: Collecting, recording, evaluating and representing</b></p> <ul style="list-style-type: none"> <li>Evaluates the reliability, validity and usefulness of geographical sources and information (<a href="#">ACHGE005</a>)</li> </ul>
All	<p><b>Cross-curriculum Priority: Aboriginal and Torres Strait Islander Histories and Cultures</b></p> <ul style="list-style-type: none"> <li>First Nations communities of Australia maintain a deep connection to, and responsibility for, Country/Place and have holistic values and belief systems that are connected to the land, sea, sky and waterways (A_TSICP1)</li> </ul>	

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## Related books from CSIRO Publishing

For readers aged 6–9:

- *The Great Southern Reef* (<https://www.publish.csiro.au/book/8042>)

For older readers:

- *Beachcombing: A guide to seashores of the Southern Hemisphere* (<https://www.publish.csiro.au/book/8023>)

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Packed with fun, exciting and quality articles, Double Helix magazine is created to inspire young readers. It covers a range of topics across science, technology, engineering and maths.

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## Other CSIRO resources

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