

Case Study “Environmental change and management of the coastal environment”

Activity Sheet 13 “The impacts of shipping and boating on the coastal environment”

Introduction

Given Australia’s comparative isolation, shipping is an important industry for Australia. In 2016, 5,540 cargo ships made a total of 30,056 calls to Australian ports. Of these calls 16,520 were from overseas ports. It is commonly cited that 99% of Australia’s exports are shipped. In 2016 Australia’s exports by sea amounted to \$218.9 billion whilst Australia’s imports by sea totalled \$201.8 billion.

Melbourne is cited to be Australia’s busiest docks. In Port Phillip Bay approximately 3,000 cargo ships enter the bay annually.

In 2017, 1031 cruise ships visited 40 ports in Australia. Of these 88 visited Melbourne. Further the Spirit of Tasmania enters the bay daily.

Australia’s lifestyle also lends itself to recreational boating. According to Roy Morgan Research in 2012 almost 2.1 million Australian’s (11.1% of the population) reported living in a household with a boat. By 2016 this figure had risen to 2.6 million Australians representing an increase of approximately 400,000 new boats.

For Victoria 10% of Victorian population over 14 (representing 477,000) owned a watercraft including a motor boat, speedboat, yacht, jet ski, row boat or windsurfer. 68% of registered boats are operated on Port Phillip and Westernport Bays each year. (Boating Industry Snapshot 2015)

As noted in the report “Australia: State of the Environment – Coasts 2016 “ when discussing the pressures to the coast arising from mining, vessels and infrastructure and invasive species, shipping can have a high impact on the coastal environment.

Activity Sheet 13 examines a range of the impacts to the coastal and marine environment that is associated with the rising number of shipping and boating activities. Where possible, reference to local examples, such as Port Phillip Bay are made.

The content of this activity sheet relates to the following Geographic Concepts and Skills and Geographic Knowledge.

Geographic Concepts and Skills

Place, space and interconnection

- Identify, analyse and explain significant interconnections within places and between places over time and at different scales, and evaluate the resulting changes and further consequences

Geographic Knowledge

- Environmental, economic and technological factors that influence environmental change and human responses to its management

Introduction Task

As an introduction go to http://wwf.panda.org/our_work/oceans/problems/shipping/

List the potential problems that shipping could create.

The impacts of ballast water

1. Go to <https://clearseas.org/blog/importance-ballast-water-management/>

Using the information and clip contained at this site (Invaders from the sea) complete the following tasks

- a. What is ballast water? Why is ballast water important for sea transportation?
- b. Cite statistics regarding the amount of ballast water used.
- c. Explain how ballast water results in the introduction of foreign species into waterways.
- d. Summarise the case studies regarding the impacts of ballast water by completing the table below.

Location of Case Study	Name and brief description of introduced species	Origin of introduced species	Impact of introduced species

e. Describe the strategies that have been implemented to reduce the problems associated with ballast water.

f. Research the strategies that Australia has introduced to limit the impacts of ballast water.

2. Go to <http://parkweb.vic.gov.au/park-management/environment/weeds-and-pests/marine-pests>

Using the content contained on this site complete the following tasks.

- a. How many marine species have been introduced to Australia? How many of these can be found in Port Phillip Bay?
- b. What are the potential impacts of these marine pests?
- c. Using the information found in “Marine Pests – A Quick Reference Guide” and “Northern Pacific Seastar – A Pocket Guide” complete the following table.

Most concerning marine pests in Victoria (name and brief description).	Locations found.	Impact to surrounding marine environment.

d. What actions does Parks Victoria recommend to prevent the further spread of these pests?

As an alternative to the above or as an extension activity your class could research introduced marine species for Australia as a whole or concentrate on a specific species such as the Crown of Thorns Seastar.

Noise Pollution

1. This issue was raised in Blue planet 2 Episode 7 mentioned in Activity Sheet 2. As an introduction, either refer back to or show the relevant section of this clip.
2. Read over the article at Effects of Noise Pollution from Ships on Marine Life - Marine Insight
<https://www.marineinsight.com/.../effects-of-noise-pollution-from-ships-on-marine-lif>

If you wish you could also look at more indepth articles such as “Impacts of Noise on Marine Mammals - Sonic Sea”
https://sonicsea.org/sites/default/files/IFAW_OceanNoiseReport_WEB_spreads.pdf

Using the content from either article, answer the following questions.

- a. What are the sources of ocean noise pollution?
- b. According to this article what is the number and type of marine species impacted by noise pollution?

- c. With reference to the headings below describe the impacts of ocean noise pollution to marine life

Communication
Movement to new locations
Changing dive patterns
Health of marine life

Artificial Structures

1. Go to “Australia state of the environment 2016: coasts”
”<https://soe.environment.gov.au/sites/g/files/net806/f/soe2016-coasts-launch-17feb.pdf?v=1488793015>”

Once on this site go to the section on “Artificial structures” (page 53 of the PDF version).

Using the information contained here answer the following questions.

- a. According to this report what constitutes artificial structures?
- b. What are the potential impacts of artificial structures?

Dredging

1. Read over <https://geoforinternational.com/sediment-removal-101/>

With reference to the content contained at this site answer the following questions.

- a. What is dredging?
- b. What can dredging be used for?
- c. What are the benefits associated with dredging?

As an example of the above points watch the clip “[Dredging | Gold Coast Waterways Authority](https://gcwa.qld.gov.au/dredging/)” <https://gcwa.qld.gov.au/dredging/>

2. Research the potential impacts of dredging by referring to articles such as
 - “Effects of Dredging on the Marine Environment” - Marine Insight
<https://www.marineinsight.com/environment/effects-of-dredging-on-the-marine-environment/>
 - <https://www.theguardian.com/environment/2013/dec/11/the-facts-about-dredging>

Describe the potential environmental problems associated with dredging.

3. The legislation surrounding dredging is summarised by the following passage

In Australia dredging and dredged material relocation is closely regulated and monitored. Australia is a signatory to global conventions (the London Convention and London Protocol) that works to prevent marine pollution by the dumping of wastes and other matter at sea. The London Protocol aims to 'protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter' (Article 2, London Protocol 2006). The London Protocol is given effect via the Environment Protection (Sea Dumping) Act 1981 (the Sea Dumping Act), which applies to all Australian waters. All at-sea placement of material is prohibited, however, permits may be issued to allow the placement of specified materials. Clean dredged material may be permitted for at-sea placement under certain strict conditions. All States and the Northern Territory also have independent governance and regulations relating to dredging and placement of dredged material. These laws and conventions are designed to make sure that dredging activities are properly assessed and managed and that unacceptable impacts to our natural environment are avoided

Source: "Environmental Code of Practice for Dredging and Dredged Material Management, August 2016" Ports Australia

For more detail of this report go to

<http://www.portsaustralia.com.au/assets/Publications/Ports-Australia-Dredging-Code-of-Practice.pdf>

Once at this site go to "Code of Practice Principles" Table 1 provides a summary of the key elements of the Code of Practice

4. Good examples of the above content are

- Abbott Point
<https://www.sbs.com.au/news/thefeed/story/real-impact-dumping-dredge-spoils-near-great-barrier-reef>
- Gladstone Harbour
<http://www.abc.net.au/catalyst/stories/3593812.htm>
- Port Phillip Bay
<https://www.youtube.com/watch?v=EIVCd2xfKyM>

Please note that this site also contains fieldwork activities at the Portsea Pier/ Front Beach that is highly relevant to this case study. Please refer to the Fieldwork section of this site.

Select one of the above or similar case studies. After showing the clip as an introduction get students to undertake the necessary research to complete the following tasks. This task could be done either in pairs or small groups.

- a. Download a map showing the location of the specific harbour/bay. Describe the relative location.
- b. Describe what was involved in the dredging operations. This could include the location (shown on a map), purpose, duration, scale of operations and the procedures involved.
- c. Outline and evaluate the environmental controls put in place to prevent damage to the surrounding environment.
- d. Outline the positive and negative impacts associated with the dredging.
- e. Based on the information that you have obtained comment on
 - Other strategies that could have been implemented to limit impacts on the surrounding environment.
 - Whether you think that the dredging program should have proceeded.