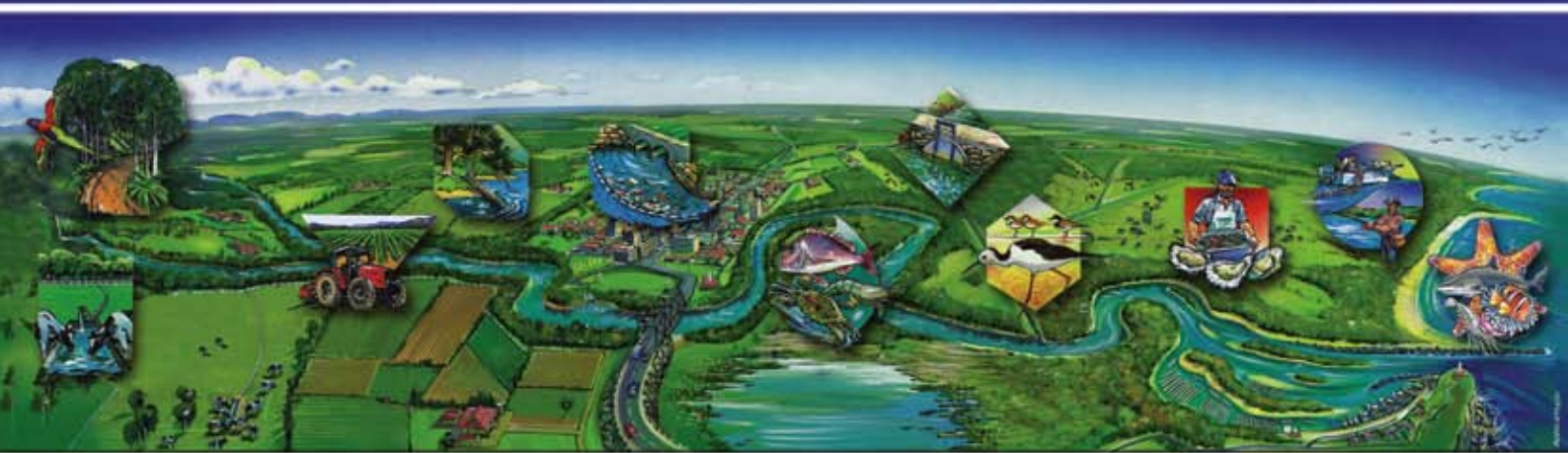




Our Valuable Estuaries, Coasts and Marine Environs – Making Connections



TEACHING PROGRAM

YEARS 7 – 10 GEOGRAPHY

5A3: ISSUES IN AUSTRALIAN ENVIRONMENTS

INCORPORATING A CASE STUDY OF
THE LOWER CLARENCE RIVER CATCHMENT
FOR WASTE MANAGEMENT AND LAND AND WATER MANAGEMENT



Our Valuable Estuaries, Coast and Marine Environs – Making Connections

Teaching Program

*Years 7-10 Geography: 5A3: Issues in Australian Environments
Incorporating a Case Study of the Lower Clarence River Catchment
For Waste Management and Land and Water Management*

OceanWatch Australia Ltd, 2008

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OceanWatch Australia is a national environmental, not-for-profit company that works to achieve sustainability in the Australian seafood industry through protecting and enhancing fish habitats, improving water quality and advancing the sustainability of fisheries through action based partnerships with the Australian seafood industry, government, natural resource managers, private enterprise and the community.



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TEACHING PROGRAM

YEARS 7 – 10 GEOGRAPHY

5A3: ISSUES IN AUSTRALIAN ENVIRONMENTS

INCORPORATING A CASE STUDY OF THE LOWER CLARENCE RIVER CATCHMENT FOR WASTE MANAGEMENT AND LAND AND WATER MANAGEMENT

Introduction

This resource has been developed by **OceanWatch Australia** (OWA) in partnership with the **NSW Department of Education and Training** (NSW DET), the **NSW Geography Teachers' Association** and the **NSW Commercial Fishermen's Cooperative Association**, and funded by the **NSW Environmental Trust – Education Program**.

The resource is designed to follow the Years 7-10 Geography Syllabus, Focus Area 5A3: Issues in Australian Environments. The focus issues are land and water management and waste management in a coastal environment.

The resource consists of a teaching program, poster and double-sided A3 broadsheet. There is a support document and fact sheets to support the program on the OceanWatch Australia website www.oceanwatch.org.au as well as links to other relevant websites.

The teaching program follows the structure of the sample program developed by the Curriculum K-12 Directorate, NSW Department of Education and Training. The sample programs for all the geography topics can be found on the website at: www.curriculumsupport.education.nsw.gov.au. This teaching program takes the sample program for 5A3 and modifies the tasks to focus on a coastal environment, using the *Lower Clarence River Catchment* as a case study.

A resource for all schools

In Task 1 students are introduced to the six issues addressed and the connections between them. It is anticipated that teachers reinforce this connectedness by encouraging discussion on the impacts of various activities within catchments and the downstream effects of these activities. The implications of unhealthy rivers on commercial and recreational fishing, tourism, water sports, and agriculture should be emphasised.

Task 2 provides all the resources for teachers to investigate waste management using the *Lower Clarence River Catchment* as a case study.

Task 3 has been written using the *Lower Clarence River Catchment* as a model for investigating land and water management through research with a fieldwork component. Where schools are not able to access the Lower Clarence River, teachers will need to adapt this task to be locally appropriate. In this task students will demonstrate their understanding of sustainability

and apply their geographical knowledge in addressing the challenges of climate change, flood mitigation and dam building. They will also understand the connections between land and water management, waste management, water quality and the commercial fishing industry.

Teachers are encouraged to adapt the teaching programs and the resources provided, to suit the specific needs of their school.

Syllabus fit

This program has been 'mapped' against the syllabus and it meets syllabus content requirements, including geographic tools and Information and Communication Technologies (ICT) demands.

Terminology

The terminology used in this program comes from the syllabus, specifically the '*learn about*' and '*learn to*' statements. It is essential that all students are exposed to these terms. If students do not know or understand the meaning of any of the concepts or terms used in tasks, teachers will need to explicitly teach these terms and concepts before proceeding with the tasks.

Student fit

This program has been written for an average student. Teachers with students in the higher and lower ability ranges in their classes will need to modify the tasks to meet the full range of student abilities in the class. There are a small number of large tasks to cover the syllabus requirements. These tasks encourage students to undertake responsibility for their own learning.

Many of the tasks are student-centred and rely on groupwork to engage students and to immerse them in learning. Where teachers are not comfortable with groupwork, the tasks can be varied to have students working individually, in pairs or as a whole class (teacher-centred). Groupwork is more time-efficient for this topic with so much content to cover.

Timing

The syllabus does not allocate time to each of the focus areas because the time spent on each topic will depend on the school and the class, pedagogy and prior learning. Therefore no time allocation has been indicated but every attempt has been made to make the tasks achievable by an average class.

Assessment for learning and assessment of learning

All the tasks provided in this program are *assessment for learning* tasks. Some activities in these tasks can be selected to be *assessment of learning* as well. *Assessment of learning* tasks require marking guidelines to be constructed. All assessment tasks must fit the school and faculty policies and procedures and be part of their assessment schedule for the prescribed stage.

Focus**Ways in which geographical understanding contributes to the sustainable management of issues affecting the Australian environment****Outcomes**

A student:

- 5.1 identifies, gathers and evaluates geographical information
- 5.2 analyses, organises and synthesises geographical information
- 5.3 selects and uses appropriate written, oral and graphic forms to communicate geographical information
- 5.4 selects and applies appropriate geographical tools
- 5.5 demonstrates a sense of place about Australian environments
- 5.6 explains the geographical processes that form and transform Australian environments
- 5.7 analyses the impacts of different perspectives on geographical issues at local, national and global scales
- 5.10 applies geographical knowledge, understanding and skills with knowledge of civics to demonstrate informed and active citizenship.

Suggested ICT

Design and create a multimedia presentation or webpage to communicate geographical information to a particular audience, including maps and diagrams as appropriate.

Resources (Include resources available within your school and community.)

There are a variety of commercial textbooks that can support the tasks outlined in this topic. The use of the Internet is assumed as a source of information.

Publications

Harte, J., *The New Geography Dictionary: Key Geographical Terms for the 21st Century*, Geography Teachers' Association of New South Wales Inc, 2003.

OceanWatch Australia, *Our Valuable Estuaries: Teaching Resource for Primary Schools*, 2005.

Websites

ABC Rural www.abc.net.au/rural

Australian Government Department of the Environment, Water, Heritage and the Arts
www.environment.gov.au/settlements/industry/corporate/eecp/case-studies/nswsugar.html

Australian Government Land and Water Australia www.rivers.gov.au/

Australian Government National Resource Management www.nrm.gov.au

Clarence Valley Council www.clarence.nsw.gov.au

Coastal CRC www.coastalzone.org.au

Department of Environment and Climate Change NSW www.epa.nsw.gov.au

Healthy Rivers Commission. Independent Inquiry into the Clarence River System
www.planning.nsw.gov.au/programservic/pdf/clarence_final.pdf

NSW Department of Primary Industries – Fishing and Aquaculture
www.dpi.nsw.gov.au/fisheries

NSW Government Department of Environment and Climate Change. NSW Greenhouse Plan
www.greenhouse.nsw.gov.au

OceanWatch Australia www.oceanwatch.org.au

WetlandCare Australia www.wetlandcare.com.au

See the OceanWatch Australia www.oceanwatch.org.au website for more relevant websites

Learn abouts Learn tos

Geographical Issues

- geographical issues affecting Australian environments including:
 - air quality
 - coastal management
 - land and water management
 - spatial inequality
 - urban growth and decline
 - waste management

- describe each geographical issue in relation to:
 - its nature
 - its impacts
 - the responses by individuals, groups and governments to the issue

- outline how a range of geographical issues are affecting Australian environments

Teaching and learning activities

Task 1 Overview of syllabus issues

A community newspaper in a town located on a NSW coastal floodplain has asked your class to produce a six-page supplement to educate the town's residents on the geographical issues below:

- coastal management
- land and water management
- urban growth and decline
- waste management
- air quality
- spatial inequality.

Divide into six groups, with each group having:

- a copy of the poster (*A Vision For Sustainable Coastal Environments*)
- enough copies of the *Task 1: Overview of issues: Worksheet 1*.

Spatial Inequality has been completed as a guide.

Each group will discuss the variety of geographical issues raised in the poster and record the following information on *Worksheet 1*:


- the nature of the issues as identified from the poster
- relevant geographical processes
- the groups affected.

Each group will read and discuss the following Fact Sheets found on the OceanWatch Australia website at www.oceanwatch.org.au: *Estuaries, Catchments, Land and Water Management Issues, The Fishing Industry, Climate Change, Sustainable Catchments, Waste Management Issues*.

Using the poster and the fact sheets, students then complete *Task 1: Overview of issues: Worksheet 2* for this activity:

- the main characteristics of aquatic habitats in estuaries
- the activities which most threaten water quality and aquatic habitats
- the importance of commercial and recreational fishing
- the consequences of the loss of aquatic habitats and deterioration of water quality on estuarine and marine fishing industries, oyster farming and other downstream activities.

Each group contributes to a class discussion on the issues, processes and impacts determined from their study of the poster. The connection between the health of the catchment, aquatic habitats and downstream users such as the fishing industry and oyster farming should be made clear.



Each group is given one issue to consider in more detail, with the aim of using ICT to publish a one-page document incorporating at least one photograph, diagram, table or graph for the newspaper supplement. Spatial inequality has been prepared for you as a guide.

- Group 1: urban growth and decline
- Group 2: land and water management –focusing on landuse activities
- Group 3: land and water management – focusing on water-based activities
- Group 4: air quality issues
- Group 5: waste management
- Group 6: coastal management

Each group will:

- identify the issue and describe its nature (main features)
- outline the processes involved in the issue.

Using the poster and/or your table for ideas, find a simple Australian case study (use texts, Internet, broadsheet, fact sheets). Based on your case study:

- describe the major impacts this issue had
- describe how two different individuals might have responded to the issue
- describe how two groups in the community might have responded differently to the issue
- outline how different levels of government responded to the issue.

Each student will receive a copy of the six-page supplement.

Learn about Learn to

First geographical issue affecting Australian environments

- the geographical processes relevant to the issue
 - the perceptions of different groups about the issue
 - individual, group and government responses to the issue
 - decision-making processes involved in the management of the issue
 - management of the issue and implications for sustainability, social justice and equity
- *explain the interaction of the physical and human elements of the environment*
- *recognise the responsibility of the levels of government to the issue*
- *propose actions that promote:*
- sustainability
 - social justice
 - equity
- *evaluate the success of individuals, groups and the levels of government in managing the issue*

Teaching and learning activities

Task 2 Waste management in Lower Clarence River Catchment

The local primary school needs to teach their Year 6 students about the importance of waste management for sustainability in the *Lower Clarence River Catchment*. They have asked your group from Task 1 to develop an interesting lesson that will teach the students about waste management issues and how these issues can be sustainably managed.

In your groups identify sources of waste in Australian communities, using:

- the poster (*A Vision For Sustainable Coastal Environments*);
- the summary created in Task 1
- *Task 2: Waste Management: Worksheet 1*.

Using the topographic map on page 3 of the *Lower Clarence River Catchment* broadsheet and the outline map on *Worksheet 1*:

- construct a simple landuse map of the Maclean district
- identify sources of waste in and around Maclean.

Using the map and images on pages 1 and 4 of the *Lower Clarence River Catchment* broadsheet, the Catchment Map and your Maclean landuse map, identify the waste management issues for the Lower Clarence River floodplain and estuary.

Issues that will be identified will fit into this classification:

- Urban and industrial waste – from the major urban centres of Grafton, Maclean, Yamba and Iluka including household garbage, sewage, litter and industrial waste
- Fishing waste – from recreational and/or commercial fishing
- Agricultural waste – from cane, beef cattle, aquaculture and logging.

Study the information contained in the Fact Sheets at www.oceanwatch.org.au: *Waste Management Issues, The Clarence River Catchment, Waste Management in the Lower Clarence River Catchment, The Lower Clarence River Catchment Fishing Industry*.

Discuss the issues related to waste in the *Lower Clarence River Catchment*. In your discussion refer to the impact of the geographical features below on waste management (Record your findings on *Task 2: Waste Management: Worksheet 1*).

- Gradient: calculate the gradient of the slope from GR 170388 to GR 175300
- Local relief: calculate the local relief between the spot height at GR 174417 and the trig station at GR 288414
- Building density: calculate the building density in AR 2140
- Topography: complete a cross section on the Maclean map along Northing 42 from Easting 20 to Easting 23.

Consider locations where topography, gradient, and building density might create waste management issues. Choose one of these waste related issues in the *Lower Clarence River Catchment* (from the classification given above) and create a lesson, using *Task 2: Waste Management: Worksheet 2* to organise your lesson, covering the following information:

- the issue
- the location – this may be one specific site or a section of the valley (construct a simple map and collect digital images)
- the geographical processes related to your waste issue (refer to the relationship between people and environments)
- the main impacts of this issue on the *Lower Clarence River Catchment* and different groups in the valley e.g. fishers, tourists, farmers, businesses
- perceptions of different groups on the issue (e.g. you might interview a commercial fisherman or oyster farmer to see how waste issues affect them, both as a contributor to waste in the river and as a user of the water in the river)
- the meaning of sustainability
- the impact of this issue on sustainability in the *Lower Clarence River Catchment*
- the groups involved in decision making about this issue; how these decisions are made; the role of government in this process
- what individuals, groups and governments have done to respond to and manage the issue (e.g. look at initiatives taken by both commercial fisherman and oyster farmers to reduce the impact of their activity on the environment).
- the strategies implemented so far that have been successful.

Present the lesson to the class.

Learn about Learn to

Research Action Plan

To develop a Research Action Plan the following steps should be taken:

Step 1: Identify the aim/purpose of the investigation.

Step 2: Generate a number of focus questions to be addressed by the investigation.

Step 3: Decide which primary and secondary data are needed to answer the focus questions.

Step 4: Identify the techniques that will be used to collect the data.

Step 5: Collect primary and secondary data.

Step 6: Process and analyse the data collected.

Step 7: Select presentation methods to communicate the research findings effectively.

Step 8: Propose individual or group action in response to the research findings and, where appropriate, take such action.

Teaching and learning activities

Task 3 Land and water management issues in the Lower Clarence River Catchment

Your task is to study land and water management issues in The *Lower Clarence River Catchment* by developing a research action plan, and using a local fieldwork study to investigate the key issues.

Teacher note

Schools visiting the *Lower Clarence River Catchment* may choose one or more of these locations or any other suitable site:

- Maclean Fishing Co-operative
- Swan Creek
- Hickey Island.

Other schools may choose local locations that illustrate similar land and water management issues. Ideally sites should illustrate some land and/or water management strategies and allow students to make connections between parts of a catchment.

Individual research action plan

- Develop a research action plan to investigate one issue identified in the area selected for fieldwork. Use *Task 3: Land and water management: Worksheet 1*.

Gather information from secondary sources to inform your research. Visit the OceanWatch Australia website at www.oceanwatch.org.au. Good websites include local government websites, NSW Department of Primary Industries, Wetland Care Australia, NSW Catchment Management Authorities, NSW Waterwatch, NSW Department of Environment and Climate Change and environmental groups in your study area.

Review the Fact Sheets related to land and water management at www.oceanwatch.org.au: *Land and Water Management Issues in the Lower Clarence River Catchment*.

Determine the primary data you will need and how it will be collected (methodologies and equipment).

Pre fieldwork activities

- Review general land and water management issues using:
 - the poster (*A Vision For Sustainable Coastal Environments*)
 - the summary created in Task 1.
- Study the broadsheet to determine specific land and water management issues in the *Lower Clarence River Catchment*.
- Study the synoptic chart on page 2 of the broadsheet. Use this chart to determine one geographical process that will affect land and water resources in the *Lower Clarence River Catchment*.
- Study a topographic map of the area you will visit with your class and locate the fieldwork site(s). Determine the aspect of the site(s) and measure the bearing of the site(s) from your school.
- Research the land and water management issues for the area you are going to visit.

Second geographical issue affecting Australian environments (including fieldwork)

- the geographical processes relevant to the issue
 - the perceptions of different groups about the issue
 - individual, group and government responses to the issue
 - decision-making processes involved in the management of the issue
 - management of the issue and implications for sustainability, social justice and equity
 - investigate a geographical issue through fieldwork by developing and implementing a research action plan
-
- *explain the interaction of the physical and human elements of the environment*
 - *recognise the responsibility of the levels of government to the issue*
 - *propose actions that promote:*
 - sustainability
 - social justice
 - equity
 - *evaluate the success of individuals, groups and the levels of government in managing the issue*
 - *develop a research action plan*
 - *apply fieldwork techniques*
 - *present geographical information in an appropriate format*
 - *demonstrate active citizenship by proposing individual/group action to address the issue*

Fieldwork

Use *Task 3: Land and water management: Worksheet 2* to organise your fieldwork.

During the fieldwork students should :

- draw a sketch map of the site(s). Include a compass with both cardinal points and bearings.
- make line drawings or take photographs of the issues being observed and/or management strategies implemented.
- construct a transect to show changes in vegetation or landuse across one location.
- use practical methodologies such as measuring (for example, water quality testing), estimating (for example, the size of structures, amount of cleared land), quadrats, line transects, observing and recording, and conducting surveys or questionnaires of relevant stakeholders.
- determine the impact of the issue on different groups and the perceptions of these groups on the issue Interviews with stakeholders such as commercial fisherman and oyster farmers should be considered.
- consider the impacts of climate change and dam building on the selected site.

Post fieldwork

- Determine how the data collected will be processed and analysed using graphs, tables, maps, sketches and photographs.
- Describe the geographical processes occurring at the site, for example, flooding, erosion, siltation, pollution, urbanisation, resource depletion, habitat destruction, drought, flood mitigation, waste disposal.
- Outline the individual, group and government responses to the issue.
- Describe the management processes and strategies implemented to manage the issue, especially those promoting social justice and equity, and an evaluation of their success.
- Outline the perceptions of different groups on this land and water management issue.

Students are to provide the following information about the area being studied:

- a map of the area (remember B.O.L.T.S.)
- photographs or field sketches of the site to illustrate:
 - the water quality issue(s) or
 - management strategies
- a reference to the significance of this issue for the sustainability of the Clarence River (or your site) and for industries dependent on water quality and water quantity such as fishing, tourism, recreation, agriculture and aquaculture.

Present your information as a multimedia presentation.

For example using:

- a website
- a PowerPoint presentation
- an oral report using overhead transparencies
- a documentary presentation on video /DVD

