

Module 1: Marine Parks



NSW Marine Parks

The NSW Government established the Marine Parks Authority in 1997 to meet national and international obligations to support the conservation of the state's marine biodiversity, and to protect some of the state's fragile marine systems. Each state in Australia and the Northern Territory has established a network of marine protected areas to fulfil such obligations. Marine protected areas include aquatic reserves, marine parks, intertidal protected areas and marine extensions to national parks.

The network of six multiple use marine parks along the NSW coast now incorporates one third of the state's waters and has considerably improved the protection of estuarine and marine habitats and associated biodiversity in each bioregion, including threatened species such as green turtles, dolphins, penguins, sea birds and the endangered grey nurse shark. In line with international and national research, initial research in NSW marine parks also shows that fish numbers, density and mass have increased in marine protected areas.

The six marine parks in NSW are all zoned as multiple use. The four zone types allow for different levels of protection, depending on the types of habitats and species in an area. Some zones are more restrictive than others, allowing a balance between conservation and ongoing recreational and commercial activities.

The four zone types used in NSW marine parks are:

Sanctuary zones

Sanctuary zones provide the highest level of protection for habitats, areas high in biological diversity, key sites for threatened or other significant species, or areas that contain important natural or cultural features. The only activities permitted in sanctuary zones are those that do not involve the harming or taking of any plants or animals. All fishing is prohibited in these zones so that marine life can continue to thrive and reproduce.



Habitat protection zones

Habitat protection zones offer a high level of protection by only allowing activities, such as line fishing and trapping, that do not harm habitat or significantly impact fish populations. High impact activities such as trawling are not allowed in habitat protection zones.

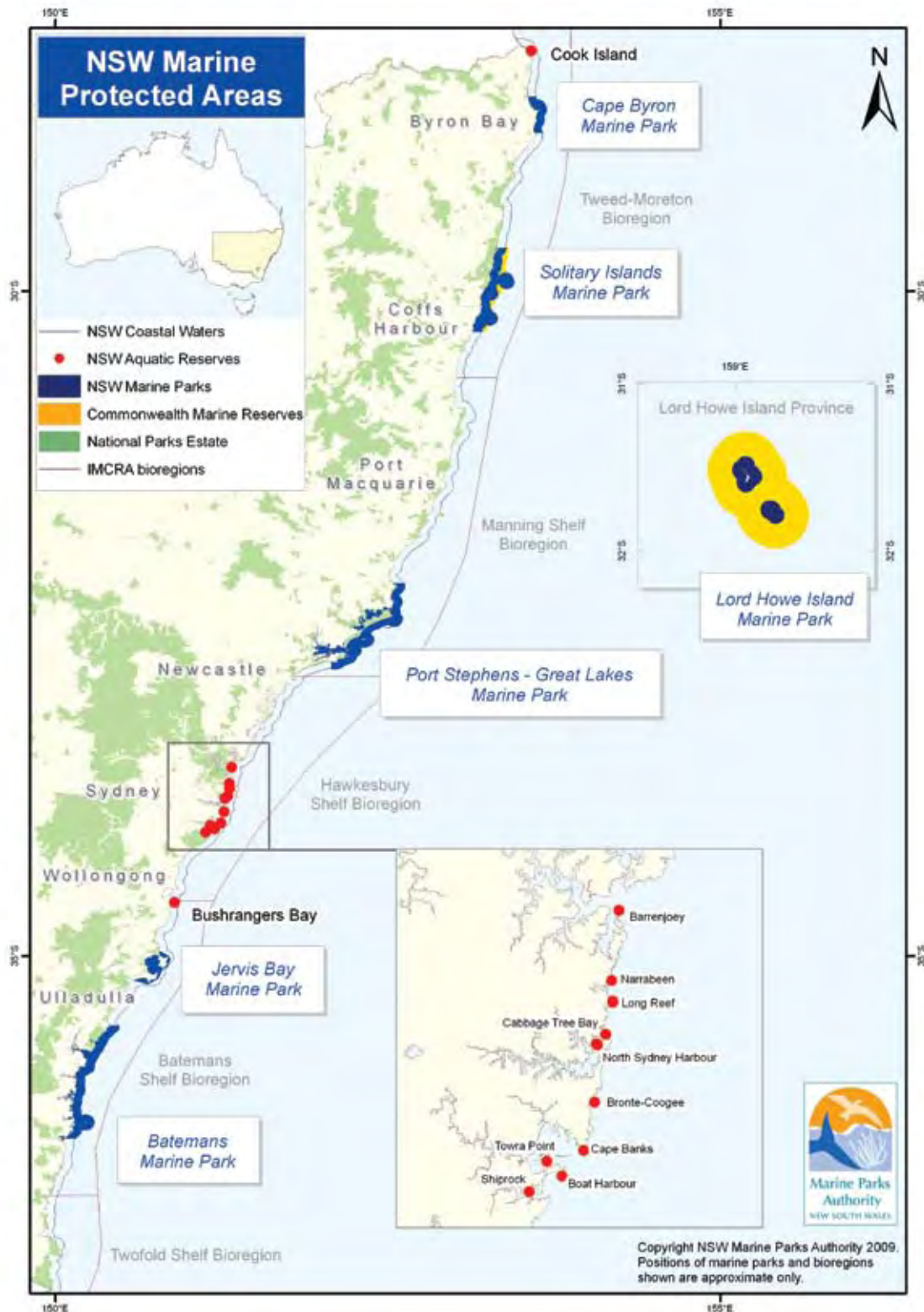


General use zones

Most traditional recreational and commercial uses of the marine environment are permitted in this zone, provided they are considered to be ecologically sustainable. However, each marine park has restrictions depending on the specific habitats and species they protect. For example, in the Solitary Islands and Cape Byron marine parks, the collection of corals, destruction of most marine plants, and some commercial fishing methods (purse seining, drop-lining and set-lining) are banned throughout the entire marine park. Commercial aquarium collecting and mining are prohibited in all NSW marine parks.



There are six marine parks and 12 aquatic reserves in NSW.



Copyright NSW Marine Parks Authority 2009. Positions of marine parks and bioregions shown are approximate only.

Special purpose zones

Special purpose zones cater specifically for areas requiring special management. These include port facilities and marinas, in addition to areas for Aboriginal cultural use, research or rehabilitation, and some types of aquaculture.

Popular activities in marine parks

Fishing and collecting

Recreational fishing and collecting are popular activities in NSW marine parks and are of high economic value to local communities. Some activities include line fishing, spearfishing, lobster trapping, crab trapping and bait gathering.

Commercial fishers access marine park waters, contributing to an essential part of local industry on which many people depend. Many types of commercial fishing techniques are used throughout marine parks, including prawn trawling and fish trapping; however, to minimise the impacts of fishing and collecting on biodiversity, certain restrictions apply to commercial fishing methods, such as gear restrictions or seasonal closures. Permitted activities vary between marine parks, so check the local guide for information.

Charter fishing is another popular activity catering for recreational fishers and tourists which generates income for the local community. Restrictions may apply to the number of charter fishing vessels permitted in each park.

Recreational activities

Scuba diving is popular throughout NSW Marine Parks, both privately and through commercial operators. Divers experience the natural values of the park first hand, encountering tropical species, such as coral, in the northern parks, and temperate species, such as seals, in the southern parks.

Whale and dolphin watching are increasingly popular recreational and commercial activities. Humpback whales are the main focus for whale watching activities as they pass the NSW coast in the winter months on their northward migration from feeding grounds in the Southern Ocean to breeding grounds in the tropics. The return journey takes place from around September to November.

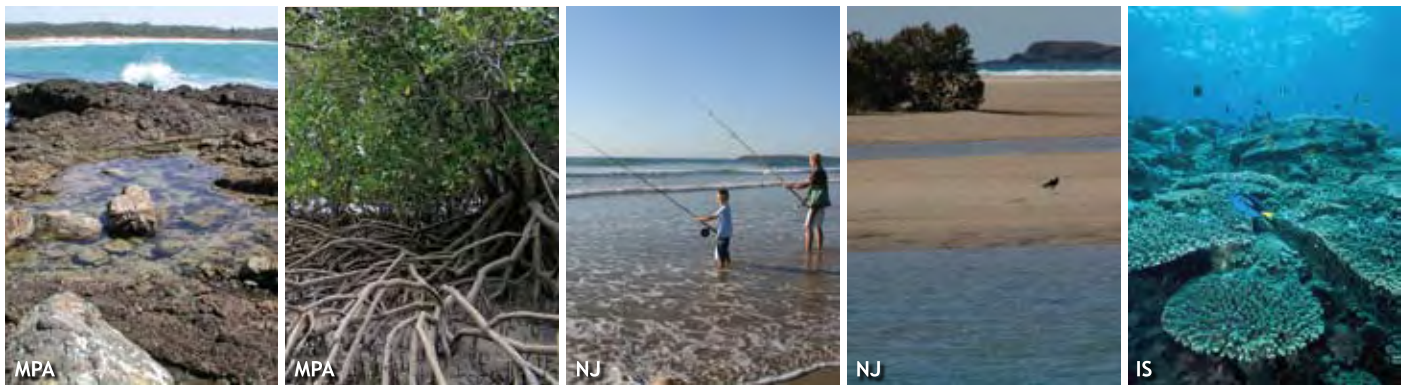
Other popular recreational activities in marine parks which provide the public with many opportunities to enjoy the natural features of the NSW coastline include surfing, beach walking, swimming, canoeing and kayaking, and inshore boating and sailing.



How do we decide where to put marine parks?

A set of national guidelines is used around Australia to determine where marine parks are most appropriately placed. The NSW coast is divided into five marine and coastal bioregions and one province (see map p. 8), and each bioregion has been assessed to identify the most suitable areas for marine parks. (Bioregions are areas with similar physical and biological characteristics.)

The areas selected for marine parks contain, among others, the range of different habitats present in the bioregion (reefs, rocky shores, estuaries, beaches, sub-tidal soft sediment and oceanic habitat), key sites for threatened or protected species, and significant cultural sites.



How do we zone a marine park?

Once the external boundary of a marine park has been determined, the area within it is assessed at a finer scale to identify all the different habitats, and to ensure the features that the marine park was created to protect are all properly protected. This means that in NSW marine parks:

- Sanctuary zones generally include samples of different habitat types, threatened species habitat, nursery or breeding areas, important cultural sites, and internationally and nationally recognised areas.
- Much of each park is included in habitat protection zones to allow ongoing sustainable use, such as recreational fishing and some commercial fishing activities, while still protecting habitat.
- Social and economic factors influence the placement of zones to ensure that communities are not affected.
- Tourism operations are an important aspect of each park, often enabling visitors to better appreciate and understand the park and its values. Commercial operators need a permit, however, which allows them to operate in any zone, depending on their activity type.
- Some areas are very important for research, so that we can continue to learn more about the marine park, detect changes and manage for change.

Community support is very important to the success of a marine park, so when a zoning plan is prepared, the community is heavily involved in its design to ensure a balance of conservation and use is achieved.

Solitary Islands Marine Park

Established in 1991, the Solitary Islands Marine Park (formerly a marine reserve) is one of the oldest marine parks in NSW. The marine park stretches from Muttonbird Island in the south to Plover Island (at the Sandon River) in the north, and incorporates five "Solitary" islands, rock outcrops and reefs, and an array of beaches, rocky shores and estuaries.

Its location along the NSW coast ensures it is bathed by both the warm tropical waters of the East Australian Current from the north, as well as cooler currents from the south. The result is a unique "mixing zone" where tropical, subtropical and temperate marine species can coexist.



BV

To date, over 550 species of reef fish have been observed throughout the marine park. This is diverse for New South Wales and is mainly due to the range, extent and complexity of reef habitat in the Solitary Islands area, combined with the mixed influence of the tropical and temperate currents. The extensive reef habitat is due in part to the offshore continuation of rock from the adjacent coastal range.

North Solitary Island has the highest reef fish diversity with Anemone Bay, at the northern end of the Island, being particularly diverse. Anemone Bay also supports the densest aggregation of anemones and anemone fish world-wide. Only certain types of anemones (known as "host anemones") are suitable for anemone fish to live in. There are only two species of host anemones in the marine park, both found at North Solitary Island. Although anemones have stinging tentacles, the anemone fish actually "bathe" in the stinging tentacles of their host anemone to gain protection from larger predators. Special chemicals in the mucous that coats the skin of anemone fish stops them from being stung. Coral diversity is also high at North Solitary Island; of the 91 species recorded in the marine park, over 46 are found here.

At the northern end of South Solitary Island, reef fish are particularly diverse. Large aggregations of blue and red morwong, tarwhine, snapper and seaperch can be found here, along with pelagic species such as kingfish and amberjack, and a community of the protected black cod. South Solitary is also rich in mollusc diversity with many types of shelled gastropods and soft-bodied nudibranchs. It is also the northernmost breeding site of the large and mobile mollusc, the giant cuttlefish (below right).



MPA

DH

Estuaries within the marine park are reported as some of the most pristine in NSW; in particular, and largely because the majority of adjacent land is located in Yuraygir National Park, the Sandon River, Wooli Wooli River and Salt-water Creek arm of the Corindi River. In the Sandon and Wooli Wooli Rivers, it is possible to find all of the seven known species of mangroves that occur in NSW. (Further information on estuaries is available in the estuary fact sheet.)



Protected species occurring in the marine park include sharks, fish, molluscs, corals, birds, sea-turtles, whales and dolphins. The endangered grey nurse shark is found throughout the marine park, but is known to aggregate at sites at North Solitary Island, South Solitary Island and Pimpernel Rock (in the Commonwealth Marine Reserve). The threatened great white shark also occurs in this area, and individuals are occasionally sighted.

Three species of sea-turtle: loggerhead, green and hawksbill, which are all threatened, are also found in the marine park throughout the year, with resident turtles at some sites. Both common and bottlenose dolphins are regularly seen throughout the marine park, as well a number of whale species.



A zoning scheme is in place to protect the range of habitats and species in the marine park. A copy of the zoning scheme is available from the Solitary Islands Marine Park office or on the MPA web site. Marine park officers are often present on the waters and foreshores of the marine park and are happy to assist with any zoning and management enquires.

Stage 1 - Local Places

Teacher Activity Plan

Level

Stage 1 - Local Places
COG Group A - Exploring Our Place

Key Learning Areas

ENS1.5, ENS1.6, BES1.1

Objectives

The objectives of this activity are: to study a natural environment, the local marine park, and the ways in which people interact with this area; and to identify management responsibilities as they apply to the environment.

Equipment Used

- computer with Microsoft Windows Media Player or a DVD and TV
- coloured pencils

Teacher Resources

Please contact the marine park office on 6652 0900 for a copy of all educational material on CD or to request staff attendance for excursion support. Additional resources are available on:
<http://www.mpa.nsw.gov.au>
<http://australianmuseum.net.au/Fishes>

About this program

This module is designed to cover ENS1.5, ENS1.6 and BES1.1, and when combined with the other three modules in this kit addresses the key learning areas for COG Group A, Stage 1 - Local Places. Follow up this module with the Rocky Shores, Estuaries and Sea Country modules for further insight into the local environment. The modules are designed to address the NSW DET primary school curriculum, and can be used to complement current teaching programs.

Education material for Stage 1 of this module consists of this **Activity Plan** to guide teachers through this classroom-based activity. **Video Footage** is supplied to give students a “diver’s-eye view” of life at Anemone Bay, North Solitary Island in the Solitary Islands Marine Park. The **Fact Sheet** has extra facts to assist in the delivery of the video footage. An **Activity Sheet** is supplied for students to use their imagination to create an animal that might live in an anemone garden.

Activity 1

Play the video segment filmed at Anemone Bay in the Solitary Islands Marine Park and try to identify some of the different types of fish that can be seen. Play the segment a few times (at least twice) and encourage the students to see how many different types of fish they can identify. The second viewing includes the names of animals to assist teachers with identification. This footage was taken by a diver.

Discuss the following:

- how the anemone fish react when the camera comes closer to them
- human interactions with undersea animals and habitats (fishing/anchoring/diving)
- why anemone fish stay close to their anemone home
- what type of environment anemone fish prefer (e.g. warm or cold water, calm or rough water, etc.).

Question how we can look after an underwater environment such as this anemone garden. (Suggest a comparison to terrestrial national parks, and introduce marine parks using the fact sheet for guidance.)

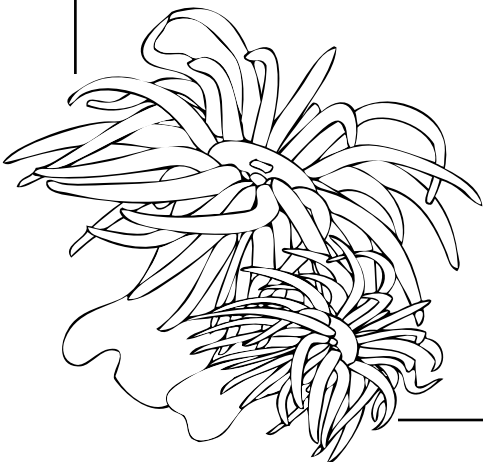
Activity 2

Using the activity sheet, ask the students to design and draw a make-believe animal that might live in an anemone garden. The animal might be a strange shape and have wonderful colours to camouflage itself amongst the anemones; perhaps it has tentacles, too. Encourage the students to think about: how it moves (does it use fins or legs, or move like an eel/snake?); how it eats (does it have big, sharp, pointy teeth to catch and eat fish, or a long, narrow mouth to get creatures out of cracks, or a little mouth to graze on seaweed?); and how it would protect itself from predators. Extend the drawing to include the environment the animal lives in. How is its environment used? Where does it get its food from? Where does it sleep? How does it use its living area? Finally, ask the students to explain their animal to the class.

Activity Sheet - My Anemone Garden Animal

Design and draw a make-believe animal that might live in an anemone garden.

My Anemone Garden Animal is called:.....



Stage 2 - Local Environments

Teacher Activity Plan

Level

Stage 2 - Local Environments
COG Group A - Exploring Our Place

Key Learning Areas

ENS2.5, ENS2.6

Objectives

The objectives of this activity are: to study human interactions and impacts on the local marine environment; and to identify ways to minimise these impacts.

Excursion Timing

The excursion must be undertaken at low tide. Check the tide times at:

<http://www.bom.gov.au/oceanography/tides>

Equipment Used

- computer with Microsoft PowerPoint

Teacher Resources

Please contact the marine park office on 6652 0900 for a copy of all educational material on CD or to request staff attendance for excursion support. Additional resources are available on:

<http://www.mpa.nsw.gov.au>

<http://www.cma.nsw.gov.au>

<http://www.environment.gov.au/biodiversity/threatened/publications/marine-debris.html>

<http://www.stormwater.org.au/media/thunderberg.swf>

http://www.pittwater.nsw.gov.au/environment/cec/teacher_resources

About this program

This module is designed to cover ENS2.5 and ENS2.6, and when combined with the other three modules in this kit, addresses the key learning areas for COG Group A, Stage 2 - Local Environments. Follow up this module with the Rocky Shores, Estuaries and Sea Country modules for further insight into the local environment. The modules are designed to address the NSW DET primary school curriculum, and can be used to complement current teaching programs.

Education material for Stage 2 of this module consists of this **Activity Plan** to guide teachers through this classroom-based activity. The **Fact Sheet** provides information on the local marine park. A **Microsoft PowerPoint Presentation** is supplied, showing some images of a marine park, and some of the activities that people enjoy doing in the park. It also shows some of the things that we do in our local environment that may impact the marine park. **Activity Sheets** are supplied for students to take into the playground so that they can look for potential impacts on the marine environment.

Activity 1

The Microsoft PowerPoint presentation describes people's interactions with the marine and estuarine environments. Show this presentation to illustrate the differences between natural and built environments. Using the activity sheet, focus on the built structure and how that would influence animal habitats and behaviours, their use of the environment and food sources, etc. What are the benefits of the built environment for people? Compare these to the effects on animals. What are the benefits for the animals?

Activity 2

Using the activity sheet, take the students out into the playground to conduct a local study to see what might make its way into the marine environment. Look for litter from the playground and canteen, plastic bags, plant and organic impacts (e.g. soil erosion, green waste and dog poo), and chemical pollution (e.g. oil, fertilisers and detergents). Discuss the effects of these different items or substances. For example, pesticides can accumulate in the fatty tissue of animals such as whales and dolphins. This can then lead to health issues such as reproductive failure, an increased risk of cancer and immunosuppression. Consumption of plastic bags kills around 100,000 birds, whales, seals and turtles every year. Discuss how we can prevent these impacts. For example, make sure that rubbish goes in the bins, participate in clean ups, ask the school to use safe pesticides on the gardens, etc.

This study can be extended to the broader catchment; that is, an area of land where rainwater drains into a water body, such as a river or an estuary, and ends up in the marine environment. Compare the playground issues identified with the issues that may occur in the broader catchment. (Teachers can view catchment boundaries at: www.cma.nsw.gov.au)

Optional excursion

Find a local shoreline (coast or estuary) that has been altered or developed and compare that to an area that is still natural. What is the new and altered habitat like for the marine/estuarine animals? Are there still nooks and crannies for animals to hide in? Can you see fish, sea stars, seaweed, limpets or other marine or estuarine life living there? Is the water clean or dirty? Design a table to record the differences between the two areas. Refer to the Rocky Shores Risk Analysis (pp.50-51) or the Estuaries Risk Analysis (pp.75-76) to ensure student safety.

Activity Sheet 1 - Humans and the Marine Environment

Think about what humans have built in the marine environment and list them below.

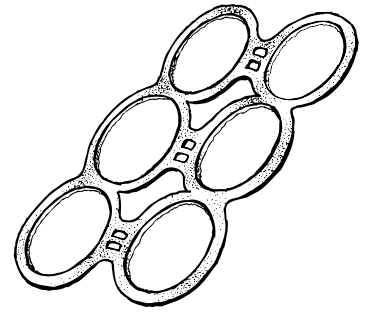
How does what we build affect marine life?

Built Structure	Does it help people? How?	Does it help marine creatures? How?
<i>For example: Jetty</i>	<i>People can park their boats there and get on and off them easily.</i>	<i>Sponges and seaweed can grow on the jetty and make homes for creatures like mussels.</i>



Activity Sheet 2 - Playground Study

You are going to try to find items in the playground that might make their way into the marine environment. Look for litter from the playground and canteen, plastic bags, plant and organic material (e.g. eroded soil, green waste and dog poo), and chemical pollution (e.g. oil, fertilisers and detergents). Fill out the table and think about how your item of pollution will affect the environment, and how you can stop it.



Litter or Pollution Found	How will this affect the environment?	How can we stop the pollution going into the water?
<i>For example: Plastic bag</i>	<i>It could wash into a drain, then into the ocean, and then a turtle might eat it and get sick.</i>	<i>Reduce use of plastic bags at school; make sure there are enough bins; have regular clean-ups at school.</i>

Stage 3 - Living Land

Teacher Activity Plan

Level

Stage 3 - Living Land
COG Group A - Exploring Our Place

Key Learning Areas

ENS3.5, ENS3.6, DMS3.8, BES3.1, UTS3.1

Objectives

The objectives of this activity are: to study human interactions with the marine environment; to understand how we can act in an ecologically responsible manner; to learn how marine parks are zoned; and to incorporate the different needs of the marine environment and humans into a zoning plan.

Excursion Timing

The excursion must be undertaken at low tide. Check the tide times at:

<http://www.bom.gov.au/oceanography/tides>

Equipment Used

- computer with internet access
- pink, yellow and blue coloured pencils

Teacher Resources

Please contact the marine park office on 6652 0900 for a copy of all educational material on CD or to request staff attendance for excursion support. Refer to the Rocky Shore module for risk analysis. Additional resources are available on:

<http://www.mpa.nsw.gov.au>

<http://www.cma.nsw.gov.au>

<http://www.environment.gov.au/biodiversity/threatened/publications/marine-debris.html>

<http://www.stormwater.org.au/media/thunderberg.swf>

http://www.pittwater.nsw.gov.au/environment/cec/teacher_resources

About this program

This module is designed to cover ENS3.5, ENS3.6, DMS3.8, BES3.1 and UTS3.1, and when combined with the other three modules in this kit, addresses the key learning areas for of COG Group A, Stage 3 - Living Land. Follow up this module with the Rocky Shores, Estuaries and Sea Country modules for further insight into the local environment. The modules are designed to address the NSW DET primary school curriculum, and can be used to complement current teaching programs.

Education material for Stage 3 of this module consists of this **Activity Plan** to guide teachers through this classroom-based activity. The **Fact Sheet** provides information on the local marine park. The **Marine Park Zoning Guide** provides background to questions in Activity Sheet 1. **Activity Sheets** are supplied for students to learn about local zoning. They can then use their experience from Activity Sheet 1 to design their own marine park.

Program outline

The fact sheet provides information on the local marine park and its zoning. With this information, discuss the local environment, measures that can be taken to protect it, and ways that we can act ecologically towards the marine park. Discuss pollution, marine debris, ocean acidification and ocean warming. (See web site addresses for further information.) Ask what we can do to make changes, including picking up rubbish and joining clean up days (as civic participation in environmental activities).

Activity 1

Split the class into smaller groups, and give each group a zoning guide and Activity Sheet 1. Read through the questions on the activity sheet to figure out the zoning guide.

Activity 2

Using Activity Sheet 2, design a zoning scheme to both protect the biologically important areas yet still allow for ongoing use in popular areas. Keep a copy of the actual marine park zoning guide on display so students can refer to it.

- Give the Possum Creek map to students in small groups. The map shows several habitat types and features. Reiterate the protective zones that can be applied in a marine park (refer to fact sheets). Note the level of use of areas by the community.
- Read the place descriptions to the class and let them decide how to zone the areas.
- Points to think about are: Should the zones be straight-edged or round? How big should they be? Should they all link up? What is the impact on the local communities?
- Ask the groups to present their maps to the class, and compare how areas have been zoned.

Optional excursion

Take the students to the coast and conduct a litter survey. (See Module 3 - Stage 2, Activity 1, p.63). Use the Estuaries Risk Analysis (pp.75-76) to ensure student safety, take gloves and sun protection, and warn students against sharps. Once the survey is complete, tally your results. Tell the students the top five pieces of litter they found, then ask them to discuss what the litter would have been used for in its original form, and to suggest alternative reusable options that will reduce the amount of litter that enters our waterways.

Activity 1 - Marine Park Zoning

Open up the zoning guide so you can answer these questions:

1. What are the pink zones called?
.....
2. What are three activities you can do in a pink zone?
.....
.....
.....
3. Can you go fishing in a pink zone?
 Yes No
4. Why are some areas pink but not others? Think about what pink zones are for and what special things might live there.
.....
.....
5. List three of the special plants and animals you might find in a pink zone.
.....
.....
.....
6. What colour are habitat protection zones? (Colour the right answer)

7. List three activities you can do in a habitat protection zone.
.....
.....
.....
8. Can you prawn trawl in a habitat protection zone? Can you think why/why not?
.....
.....
.....
9. Are there any special purpose zones in the marine park?
 Yes No
10. Special purpose zones are used to protect or manage special features or activities. If there are special purpose zones in your marine park, pick one and write down what it is for.
.....
.....
.....

Pink	Yellow	Blue
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11. Look at the sizes of the zones. Do you think large or small zones are better at protecting habitats?

Large Small

12. Are there any pink zones in an estuary?

Yes No

13. Should estuaries have pink zones?

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.....
.....

14. Are any beaches in pink zones?

Yes No

15. Should beaches have pink zones?

.....
.....
.....



16. Which zones are you allowed to spearfish in?

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.....
.....

17. Using the scale bar, estimate how far offshore the marine park extends.

.....
.....
.....

18. List two species that you cannot take from a marine park.

.....
.....

19. Who manages marine parks in NSW? Hint: have a look at the logo!

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.....
.....

20. Bonus question (it's tricky): What does MHW stand for?

M.....
H.....
W.....
M.....

Activity Sheet 2 - Marine Park Zoning

A map of Possum Creek is to be given to each group. The map will show several habitat types and features (see numbers below), as well as the community's usage levels at each site. Design a zoning scheme to both protect the biologically important areas yet still allow for ongoing use in popular areas.


Use three coloured pencils to design your zone scheme.


Sanctuary Zone (pink)	Habitat Protection Zone (yellow)	Special Purpose Zone (blue)
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Place Descriptions

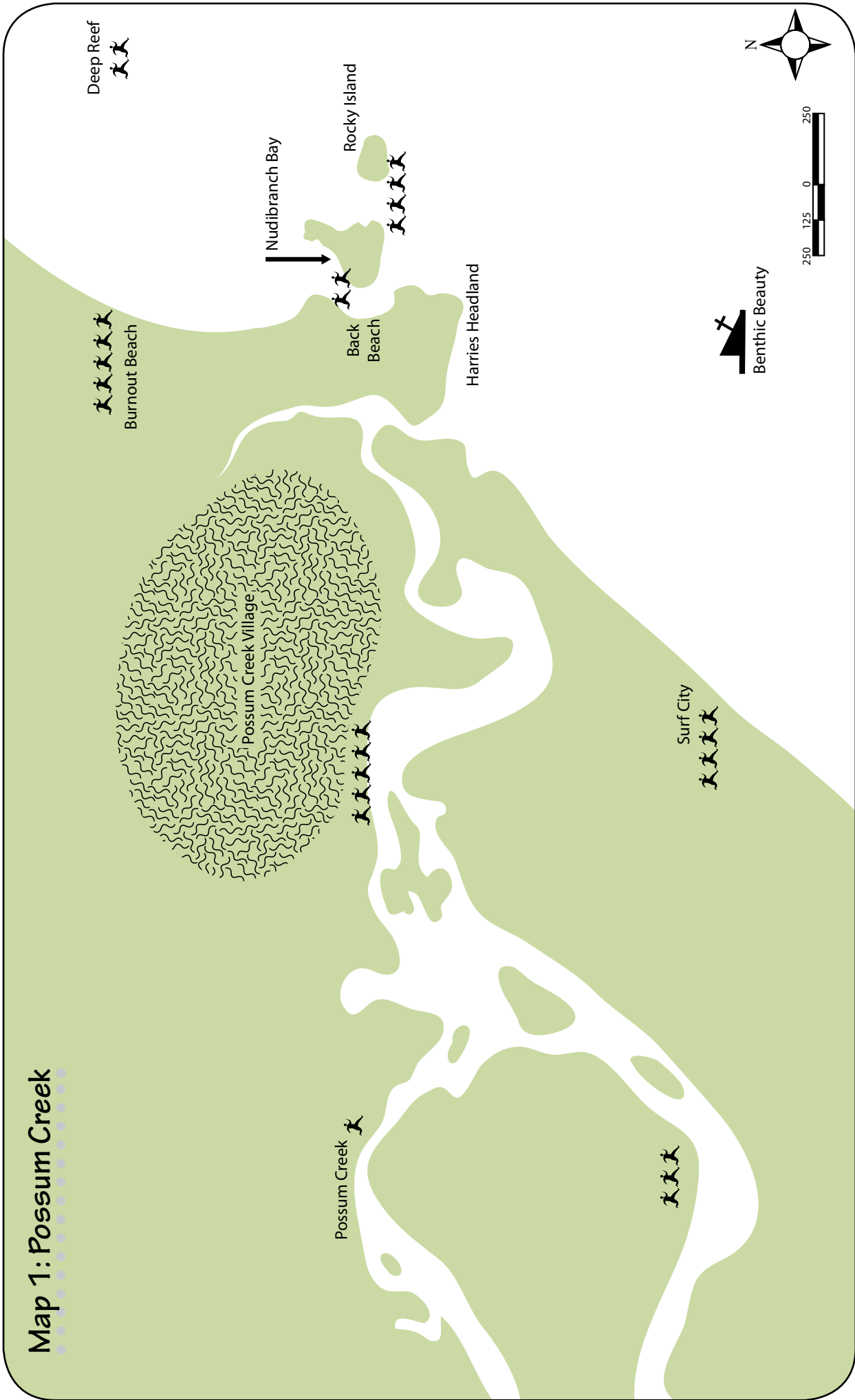
1. Shipwreck – The “Benthic Beauty”, which went down in a storm 77 years ago, is now home to over 50 different reef fishes. This site attracts many divers.
2. Nudibranch Bay – This site is home to the very rare purple-banded nudibranch. Anchor damage is becoming a problem here.
3. Harries Headland – The site of the first hut built by Islanders.
4. Surf City – A popular surf break.
5. Possum Creek – All seven species of mangrove found in NSW occur in the upper reaches of this estuary. It is also a good area for catching mud crabs.
6. Back Beach – One of four sites in NSW where the endangered little tern nests, breeds and feeds. Many other shorebirds occur here, too.
7. Deep Reef – This site has the greatest coverage of delicate plate coral in the marine park.
8. Rocky Island – This site boasts the greatest number of different types of reef fishes identified in one location in the marine park.
9. Burnout Beach – A popular beach where people drive their 4WDs to access a top fishing spot.
10. Just outside the front of Possum Creek village is a popular fishing spot.

Indicators of Community Use

 = low use of the area

 = high use of the area

Map 1: Possum Creek



Legend

Sanctuary Zone
(pink)

Habitat Protection Zone
(yellow)

Special Purpose Zone
(blue)

 = low use of the area
 = high use of the area