



# Sarina Catchment Schools Program Activity Book



## “Caring for Our Coasts”

Proudly supported by:



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*Delivered by Great Barrier Reef Marine Park Authority*



## **Marine Debris**

*Delivered by Eco Barge Clean Seas Inc*



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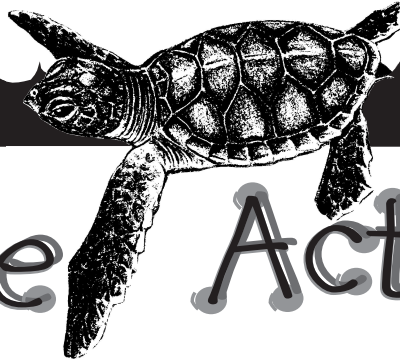
*Delivered by Sarina Landcare Catchment Management Association*

### **Acknowledgements**

*Sarina Landcare Catchment Management Association Inc. would like to thank local schools for participating in the program.*

*Thank you also to the following organisations for their contributions towards the: "Sarina Catchment School's Program: Caring for our coasts", without your support this would not have been possible.*

- **Great Barrier Reef Marine Park Authority**  
*(Katie Finch)*
- **Eco Barge Clean Seas Inc.**  
*(Libby Edge and Eco Barge Clean Seas Inc. volunteers)*
- **Sarina Landcare Catchment Management Assoc. Inc.**  
*(Saskia von Fahland, Nadine Hamill, Margaret Meng)*
- **Ouch Volunteers** *(Tony Fontes for "The Amazing Mangal" Activity)*
- **BMA Community Partnerships Program** *via "Sarina Community Coastcare" Program*
- **Mackay Regional Council** *via the Natural Environment Levy*



# Challenge Activities

## Sustainable Fishing - Page 1

### Challenge

Can your classmates guess your Animal X?

What does the word sustainable mean?

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When measuring a fish, you measure from the tip of its...  
to the tip of its ...

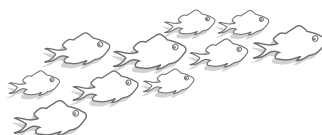
Investigate the legal-size limits and bag limits for the following seafood favourites.

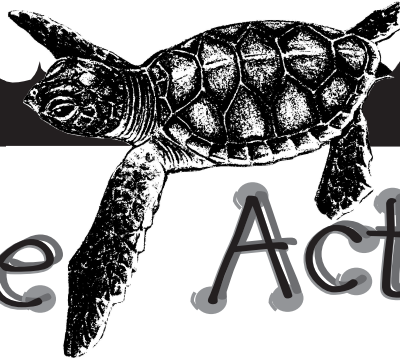
Seafood	Minimum Size	Maximum Size	Bag Limit
Flathead			
Whiting			
Mangrove Jack			
Mud Crab			
Barramundi			
Red Emperor			
Coral Trout			

What is the reason for Barramundi having a maximum size limit?

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# Challenge Activities

## Sustainable Fishing - Page 2

Why are bag limits so important?

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One important rule to remember when crabbing is, only take legal-size Bucks and all Jennys, no matter how big they are, have to be thrown back.

What is the difference between a Buck and a Jenny?

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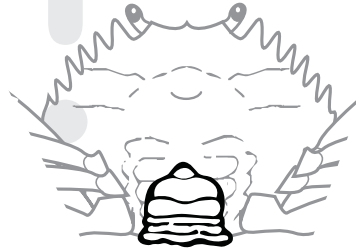
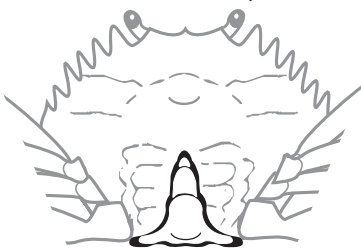
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Why is it so important that all Jenny's are thrown back?

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The two pictures below show the undersides of crabs. Which one is the Buck and which one is the Jenny?



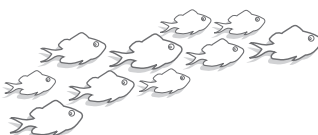
Make a list of the things that could or should be done to insure the sustainability of seafood.

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### What is Marine Debris??

Marine debris is any rubbish that is washed, blown or disposed of into the marine and coastal environment, with 80% of marine debris found worldwide being made up of the following 10 items (in order of abundance):

- (1) Cigarettes;
- (2) Bottle tops, caps and lids;
- (3) Plastic bottles;
- (4) Plastic bags;
- (5) Food wrappers and containers;
- (6) Cups, plates, forks and knives;
- (7) Glass bottles;
- (8) Straws and stirrers;
- (9) Aluminium cans; and
- (10) Paper bags.

It has been estimated that approximately 6.4 million tons of this marine litter ends up in the world's oceans and seas each year, with it also being suggested that over 13,000 pieces of plastic litter are floating within every square kilometre of ocean. Marine debris also takes a long time to break down in the marine environment, which means that unless we do something to remove it; we will get more and more marine debris in the ocean and on our beaches.



Marine debris can be dangerous to humans, animals and also to the beauty of our beaches. We need to do all we can to remove marine debris from our oceans because unfortunately some marine animals get tangled in marine debris, and other animals think marine debris is food, especially plastic bags and balloons. If animals get tangled in marine debris or eat it they could be injured, get really sick or maybe even die.

### *What do we do??*

Libby Edge created an organisation called Eco Barge Clean Seas which is focused on protecting the marine life and aquatic environment in the Whitsunday region by removing existing marine debris and reducing the amount of debris that enters the ocean. We do this through the Whitsunday Marine Debris Removal Program and the Mackay Coastal Clean Up - which encourages people from the community to come out with us and collect marine debris from our beaches and coastline, as well as undertaking education and awareness activities within the community concerning the issue of marine debris and the importance of thoughtful waste disposal.

### *What can you do??*

It is important that everyone does their bit to protect our beautiful ocean and beaches from marine debris. There are lots of little changes that you and your family can make at home which will help prevent marine debris, such as:

- (1) CAN IT – whenever you are out of the house make sure that any rubbish is put into a trash can and make sure that all lids are shut tight (even on your rubbish bin at home) to stop the rubbish blowing out of the bin.
- (2) REMOVE IT – if you see rubbish in the street or park pick it up and put it in the bin before it can blow or wash into the ocean.
- (3) REUSE IT – it is estimated that Australians use 3.92 billion plastic bags a year – that is over 10 million bags being used every day!! So, buy a reusable bag for your shopping or reuse your plastic bags the next time you go shopping.
- (4) RECYCLE IT – about 20,700 tonnes of plastic are disposed of into landfill sites in Australia every year. So try to mainly buy products that are recyclable and then make sure they are recycled to help minimise wastage.
- (5) REFUSE IT – in Australia we produce about 1 million tonnes of plastic litter every year in Australia. So try not to buy food and drinks that come with extra packaging as it is these plastics that often end up in the ocean!

**Questions:**

What is marine debris??

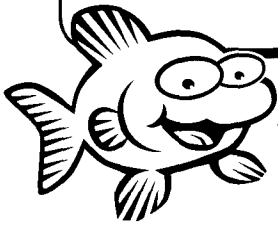
Where does it come from??

What can I do to help stop marine debris?

# Litterless Lunches



There are six packed lunches pictured. One of them is different from all the others. **Can you find the one that is different?**

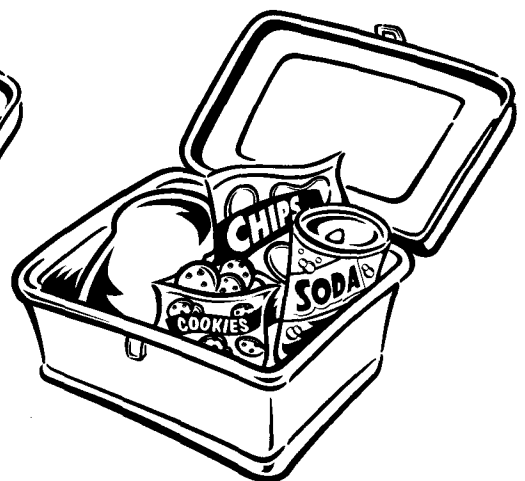
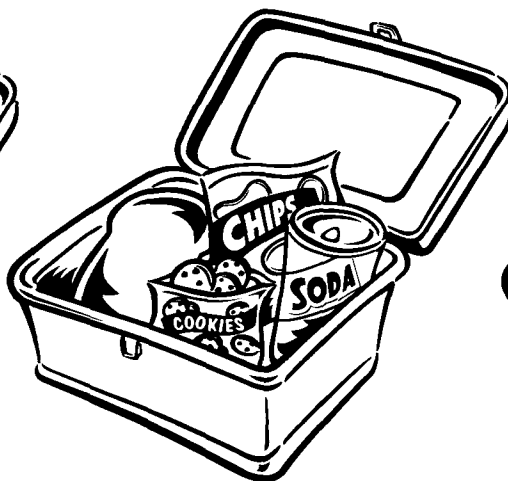
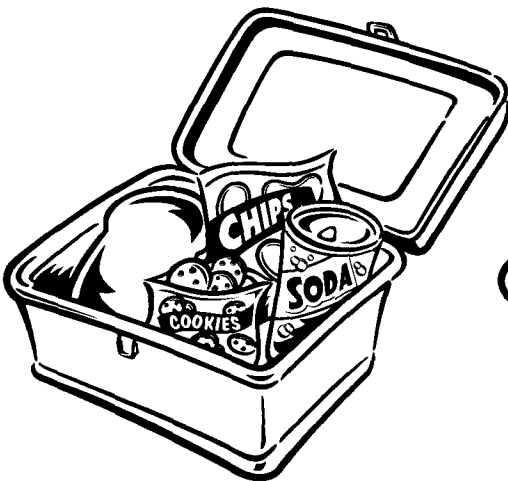
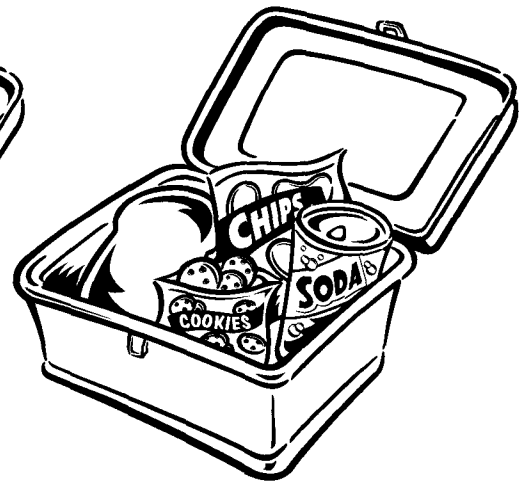
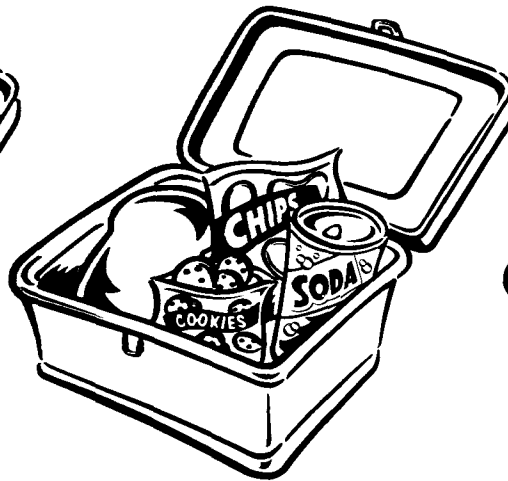
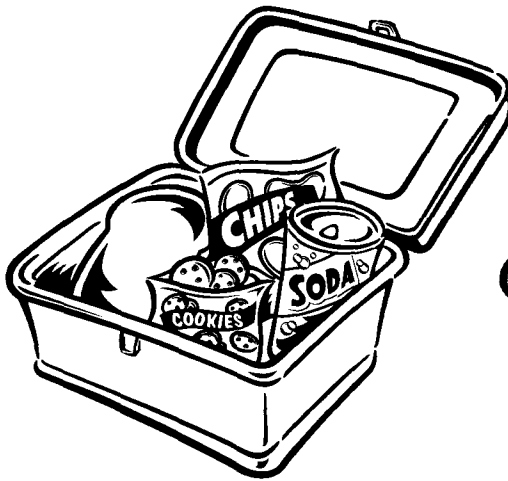


## HOW YOUR PACKED LUNCH CAN HELP MAKE LESS TRASH

Many kids carry a packed lunch to school. Food packaging can create a lot of trash every year. Here are some ways to reduce the amount of trash generated by a packed lunch.

- ◆ **Reduce the amount of food packaging needed.** When planning your packed lunches, instead of buying 12 individual bags of cookies, you can buy one larger bag of cookies and divide it into serving sized portions in reusable containers.
- ◆ **Reusable plastic containers** can store cookies, chips and just about everything else you find in a packed lunch. These containers can be brought home, washed and used again.
- ◆ **Always recycle** the aluminum cans, glass bottles, plastic bottles and plastic containers found in your packed lunch.

(Answer is on page 21)





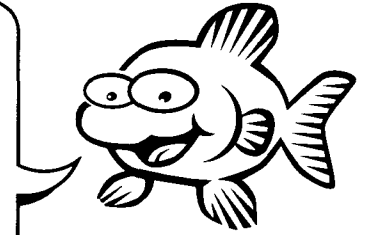
# No Excuses



## Have you ever littered and thought you had a good reason for it?

When people litter, they sometimes think that they have a good reason for it. But, there is NEVER a good excuse for littering. Take a look at the list of reasons people use for littering. Put a checkmark next to the excuses you have heard people use when they litter.

If your friends or family use these excuses, remind them that there are no good excuses for littering and ask them to throw their trash away in a trash can.



- |   |  |
|---|--|
| <input type="checkbox"/> There's already trash there.                                 | <input type="checkbox"/> Nobody told me not to.                        |
| <input type="checkbox"/> Why shouldn't I?   | <input type="checkbox"/> The trash can was too yucky to touch.         |
| <input type="checkbox"/> I don't want to mess up my back pack.                        | <input type="checkbox"/> Animals will eat the apple core.              |
| <input type="checkbox"/> It's too hard to find a trash can.                           | <input type="checkbox"/> It's so tiny, it won't matter.                |
| <input type="checkbox"/> Mom would get upset if she knew I ate a snack before dinner. | <input type="checkbox"/> Bees were around the trash can.               |
| <input type="checkbox"/> Everyone else does it!                                       | <input type="checkbox"/> I saw an adult do it.                         |
| <input type="checkbox"/> Someone else will pick it up for me.                         | <input type="checkbox"/> I don't care about the beach.                 |
| <input type="checkbox"/> It's JUST a candy wrapper.                                   | <input type="checkbox"/> There wasn't a sign telling me not to litter. |
| <input type="checkbox"/> It's too heavy to carry.                                     | <input type="checkbox"/> It fell out of my pocket.                     |



# The Amazing Mangal (Mangrove)

Written by Tony Fontes, Ouch Discovery Divers, Airlie Beach and Chair of the  
Whitsunday Local Marine Advisory Committee

Delivered by Sarina Landcare Catchment Management Association

## What is a Mangrove?

Mangroves are trees that grow in tropical and subtropical intertidal zones. These areas are tough places for plants to grow. During low tides, intertidal zones are exposed to air. During high tides they're covered by salt water. They flood frequently. The soil is poor. But mangrove trees survive and even thrive in these harsh conditions. Big groups of mangroves and other plants that live here are called mangrove swamps, mangrove forests, and sometimes, the Mangle.

## How do Mangroves survive?

Mangroves are survivors. With their roots submerged in water, mangrove trees thrive in hot, muddy, salty conditions that would quickly kill most plants. How do they do it?

- The dangers of salinity are avoided through a number of adaptations such as filtration systems (roots), shedding salt-storing leaves and leaf glands that excrete salt
- Breathing is accomplished through air-breathing roots which often take the form of stilts or snorkels. These take in aboveground air. These roots can also store air for when they are submerged at high tide.
- Support is provided by complex root systems that hold the mangrove upright in the shifting sediments.
- Fresh water is stored in the waxy leaves. The leaves can be directed away from the sun to reduce evaporation
- Reproductive strategies include vivipary where seeds develop into seedlings on the tree before dropping off to float to a new location

## **What is the importance of Mangroves?**

- Provide habitat and food for a large number of animals.
- Mangroves form dense barriers against storms and tsunamis, saving lives and protecting property.
- They stabilize shores by trapping sediments and building land.
- They improve water quality by filtering runoff and polluted waters.
- They protect the climate by absorbing carbon dioxide and reducing the amount of greenhouse gas.
- They also provide us with many other important benefits— mangroves produce seafood, fruits, medicines, fiber, and wood.
- Researchers estimate the world's mangrove forests provide human communities with many billions of dollars worth of free services.

## **What are the threats to Mangroves?**

Mangroves are disappearing at an alarming rate around the world.

- Forest clearing due to coastal development such as marinas, resorts and harbours
- Pollution such as sewage, pesticides and herbicides
- In the last decade, at least 35 percent of the world's mangroves have been destroyed.
- 

## **How can we protect the Mangal?**

- Reduce pollution
- Design riverfront structures such as jetties or boat ramps to avoid or minimise impacts to mangroves
- Avoid walking, riding or driving through mangrove areas at low tide
- Dispose of rubbish, oils and chemicals in the correct manner

# ***Mangrove Identification***

There are 41 species of mangrove found in Australia. This represents 57% of mangrove species in the world. Identifying the various mangrove species can be a bit tricky. It takes a sharp eye for detail. You need to consider the tree from the ground up including roots, trunk, bark, leaves and flowers.

*Have a go at identifying the following 5 mangroves.*

## **1. Red/Stilt Mangrove (*Rhizophora* species).....Ribbon\_\_\_\_\_**

*Salt excluder (see glossary)*

- |         |  |
|---------|--|
| Roots   | - prop roots, stilt-like, aerial roots hanging from branches   |
| Bark    | - cracked (heavily fissured) or smooth, red to grey in colour  |
| Leaves  | - spike on tip<br>- reddish speckles underneath: <i>R. stylosa</i><br>- not speckled underneath: <i>R. apiculata</i> |
| Flowers | - cream  |
| Fruits  | - brown, fleshy, oval<br>- propagule (see glossary) 20 - 40cm  |

**Draw Red Mangrove prop/aerial roots**



**2. Grey Mangrove (*Avicennia marina*).....Ribbon\_\_\_\_\_**

*Salt excluder, secretor & storer (see glossary)*

- Roots - pneumatophores (see glossary)
- Bark - smooth, sometimes flaky and white/grey
- Leaves - light green above, silvery grey below, yellowish veins, salt glands more abundant on underside
- Flowers - small flowers with orange centre
- Fruits - furry, green and almond sized

**Draw Grey Mangrove pneumatophores**

**3. River Mangrove (*Aegiceras corniculatum*)...Ribbon\_\_\_\_\_**

*Salt secretor*

- Roots - nothing above ground
- Bark - smooth and brownish
- Leaves - oval to 7cm, rounded tip (no indentation), salt glands more abundant on top of leaf
- Flowers - tiny white 'smelly' flowers
- Fruits - green to red, slightly curved propagules to 5cm, pointed tip, spiral patterned cap attached to tree

**Draw a River Mangrove leaf**



**4. Myrtle Mangrove (*Osbornia octodonta*).....Ribbon\_\_\_\_\_**

- Roots - nothing above ground
- Bark - fibrous, grey
- Leaves - opposite, to 3cm, red tinged leaf stems, distinct eucalypt smell when crushed, upper section finely toothed
- Flowers - tiny white flowers
- Fruits - similar size and shape of flowers

**What makes Myrtle Mangrove different from other mangroves?**

**5. Yellow Mangrove (*Ceriopes* sp).....Ribbon\_\_\_\_\_**

*Salt excluder & storer*

- Roots - buttressed or knee roots
- Bark - yellowish-grey, corky lenticels (air pores)
- Leaves -yellow-green, to 7cm, erect & clustered at ends of branches
- Terminal shoots - spear shaped
- Flowers - small, green-brown buds
- Fruits - pear shaped, brown
  - propagules to 35cm, ridged, club shaped, pointed tip

**What are the corky lenticels on the Yellow Mangrove for?**

# Life in the Mangroves

Mangroves provide habitat for a variety of animals and plants, some easy to find, some well-hidden. What can you find...?

Date: (\_\_\_/\_\_\_/\_\_\_) Name of Observer(s): \_\_\_\_\_

## Above the water

Birds

Snakes

Spiders

Insects

Snails

Other \_\_\_\_\_

## On or below the water

Crabs

Worms

Snails

Clams

Fish

Crocodiles

Other \_\_\_\_\_

## Glossary

- Salt excluder:* Roots filter out salt from the sea water  
*Salt secretor:* Plants secrete excess salt through glands on their leaves  
*Salt storer:* Plants store excess salt in their leaves and remove the salt from the plant by dropping their leaves  
*Propagule:* Seedling  
*Pneumatophores:* Pencil-like above ground roots

## For more information:

*Common Mangroves*, Department of Agriculture, Fisheries and Forestry,

[http://www.daff.qld.gov.au/28\\_9126.htm](http://www.daff.qld.gov.au/28_9126.htm)

*Mangroves*, Department of Environment and Resource Management,

<http://wetlandinfo.derm.qld.gov.au/wetlands/factsfigures/FloraAndFauna/Flora/mangroves.html>

*Field Guide to Mangroves of Queensland* (1993), Catherine Lovelock

*Mangroves of Australia* (1977), Richard Lear & Tom Turner

*Plants of Capricornia* (2007), Rhonda Melzer & Joel Plumb