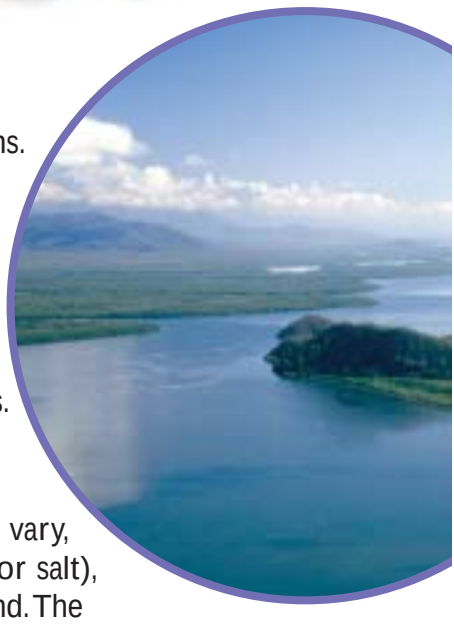
WETLANDS REEF Beat

What is a wetland?

Wetlands are amazing and complex ecosystems that occur in many different sizes and forms.

Wetlands are areas either temporarily or permanently covered by water and can be either natural or artificial with water that is still or flowing, fresh, brackish (slightly salty) or salty. This includes marine water which is no more than six metres deep at low tide.



Wetlands often include riparian zones (land which adjoins or directly influences a body of water) and coastal zones adjacent to the wetlands, as well as islands.

Types of wetlands

There are many different types of wetlands and their form and functions vary, depending on factors such as the water source, water quality (eg. fresh or salt), geographical location and the type of vegetation surrounding the wetland. The structure of a wetland also depends on the amount and frequency of flooding in the area. Largely, wetlands can be categorised into two main types:

- **Saltwater wetlands** are coral reefs, seagrass meadows, saltmarshes, mudflats, mangrove areas and estuaries.
- **Freshwater wetlands** can be flowing or still, such as swamps, billabongs, oxbow lakes or rivers. Freshwater wetlands can be further broken down into their local area impacts, for example farm and urban wetlands.

Role of wetlands – improving water quality

Wetland ecosystems provide many benefits and services to society, the environment, plants and animals, and the Great Barrier Reef. Wetlands are often described as "the kidneys of the landscape" because of their ability to filter and remove some pollutants from runoff waters and improve water quality.

When water flows through a catchment, it carries nutrients and sediments with it, which have originated from a range of land-based sources such as soil erosion, fertilisers, animal waste on farms or detergents from households. When water enters a wetland, it slows down and spreads out into a larger area. The slow moving water currents in a wetland allow the nutrients and sediments in suspension to settle out, which along with the dense vegetation in the wetland, helps to filter out many of the nutrients, sediments and other pollutants before they flow out of the wetland and potentially enter the Reef. This means that the water flowing out of a wetland will generally be cleaner than the water coming in.

The importance of wetlands

Wetlands are ecologically, economically and socially important as they:

- Buffer the effects of pollutants by filtering and removing some nutrients, sediments and chemical contaminants from run-off that would otherwise go into creeks and rivers and eventually the Reef.
- Absorb and slowly release floodwaters, therefore contributing to protecting surrounding areas against floods.
- Protect shores from coastal erosion, storm surges and flooding by creating a buffer.
- Provide breeding sites and habitat for both freshwater and marine fish species and crustaceans.
- Provide breeding and roosting sites for migratory birds and local waterbirds.
- Provide habitat for a variety of other animals and plants.
- Feature significantly in the cultural heritage, spiritual values and day-to-day living of Aboriginal and Torres Strait Islander peoples.
- Provide a source of water.
- Offer a variety of recreational activities.
- Are used for educational purposes and scientific research.
- Feature strongly in Queensland's tourism and recreational appeal.

Doing your bit to look after it!

There are many things that you can do to protect wetlands, such as:

- Always using biodegradable and phosphate-free products.
- Washing your car on the lawn to minimise runoff into nearby wetland systems.
- Contacting a conservation group or the local government in your area to become involved in wetland restoration activities.

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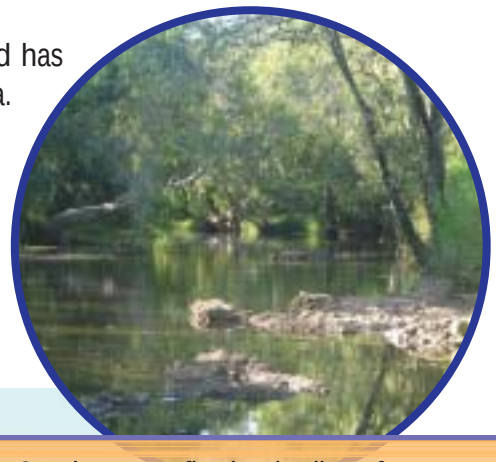
Wetland diversity

From extensive mudflat areas to mangrove forests to freshwater lakes, Queensland has at least 39 wetland types, making it the most diverse wetlands location in Australia. Wetlands can be divided into two broad groups:

- saltwater wetlands
- freshwater wetlands (including farm and urban wetlands).

Saltwater and freshwater wetlands each have their own unique characteristics and functions

Freshwater Wetlands can be broadly divided into two categories: flowing or still water bodies. They can also be broadly defined as permanent (always containing water), temporary (containing water on a seasonal basis) or temporal (containing water only after significant rain events).



Creeks – are flowing bodies of water that are generally smaller compared to rivers and can be permanent, temporary or temporal.

Rivers – are flowing bodies of water that are generally quite large. It is important that a connection always remains between rivers and saltwater wetlands, as many fish species will migrate between the two to breed.

Lakes and dams – are large still water bodies and can help to prevent flooding after significant rain events. They are also a great water supply.

Billabongs, lagoons and marshland – are overflows from creeks and rivers and therefore occur only after significant rain events. They are still water wetlands.

Saltmarshes and Mudflats – develop in estuaries (a partially-enclosed body of water formed where freshwater from rivers and streams flows into the ocean, mixing with the salty sea water) and are particularly important because they are among the most productive habitats on earth and are home to a wealth of plant and wildlife species.

Saltwater Wetlands are generally found in coastal areas and are permanent water bodies.

Mangrove estuaries – are woody plants or plant communities that live between the sea and the land and have the ability to survive in salt water. Many fish spend time in mangroves or have been dependent on food chains traced back to these coastal forests. Mangroves protect the coastline from waves and wind.

Seagrass meadows - are marine plants with the same basic structure as land plants. They have tiny flowers and oval leaves. They form meadows in estuaries and shallow coastal waters with sandy or muddy bottoms.

Coral reefs – are masses of limestone made from skeletons of millions upon millions of tiny marine animals and plants. There are three main types of reefs found on the Great Barrier Reef: Ribbon, Platform and Fringing reefs.

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Urban and farm wetlands

Farm wetlands

Because of their location, farm wetlands face unique circumstances as they are often affected by agricultural practices and farm animal management. Generally, farm wetlands should have a vegetated buffer to reduce the sediment and nutrient runoff from farms, or be fenced off to prevent cattle from damaging them.

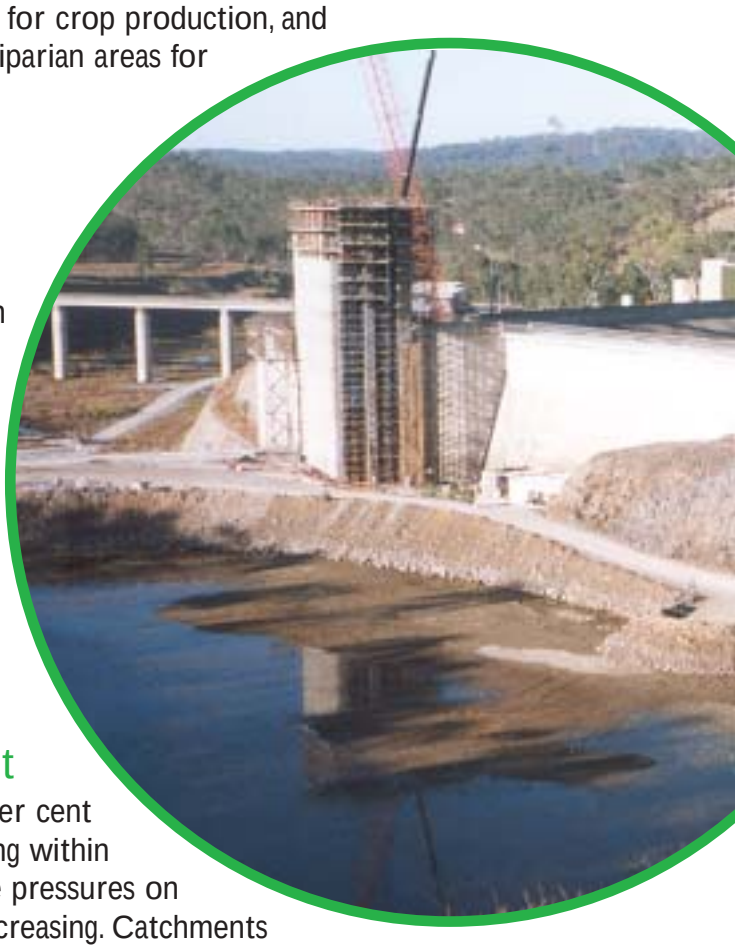
Impacts of agricultural activities

Today it is estimated that 80 per cent of the land adjacent to the Great Barrier Reef Marine Park supports agricultural production, primarily beef cattle grazing and cropping (eg. sugarcane, cotton).

Poor agricultural practices can result in the discharge of sediments, nutrients and pesticides into our wetlands and the Great Barrier Reef, particularly during flood events. Agricultural development has had a substantial impact on wetlands on the floodplains of coastal rivers in the Great Barrier Reef Catchment. Some examples include the draining of wetlands for crop production, and the use of wetland riparian areas for livestock grazing.

Urban wetlands

Urban Wetlands have been influenced or created by man in some way, and can be important recreational areas. A freshwater wetland located in an urban area is an innovative way of storing and reusing stormwater, and improving the quality of water entering the Reef.



Impacts of urban development

With more than 70 per cent of Queenslanders living within 40km of the coast, the pressures on coastal wetlands are increasing. Catchments adjacent to the Great Barrier Reef have been extensively cleared and modified for urban development. Until the importance of wetlands are recognised, wetlands will continue to be under pressure to be cleared or degraded by commercial, industrial and housing development.

Doing their bit to look after it!

Many communities and farmers are working together to rehabilitate and revegetate natural environments like wetlands. By revegetating riverbanks, wetlands and other areas around their farms, land managers are helping to decrease the amount of nutrients and sediments that are discharged into surrounding waterways and, in turn, are helping to improve the quality of water in the Great Barrier Reef. These actions will help to ensure the survival of the Great Barrier Reef and all the other habitats, plants, animals and industries it supports.

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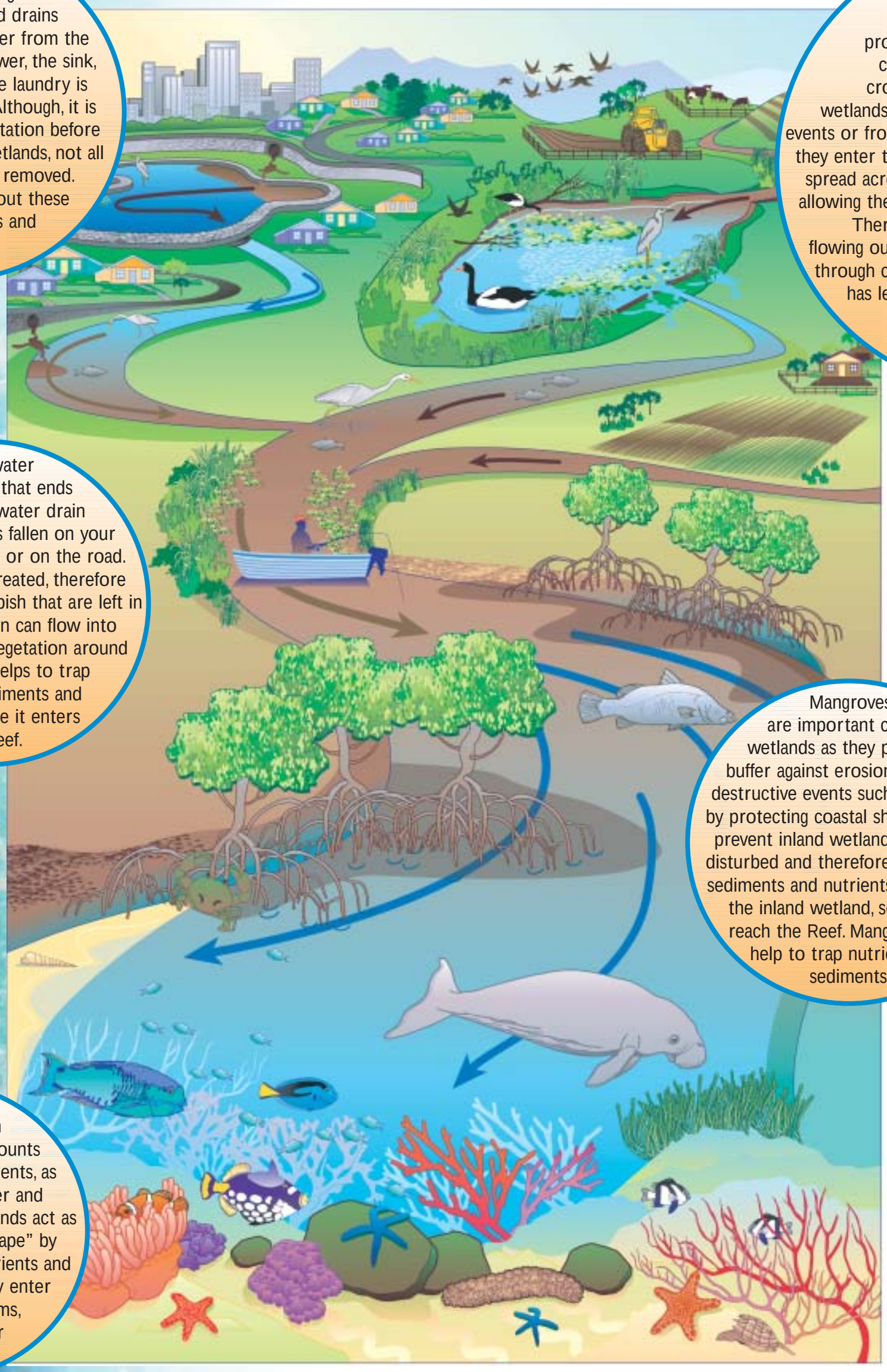
It's all connected



Wastewater is the water that goes down the sinks and drains inside your home. Water from the toilet, the bath, the shower, the sink, the dishwasher and the laundry is known as wastewater. Although, it is treated at a treatment station before being discharged into wetlands, not all of the impurities are removed. Wetlands can filter out these excess nutrients and sediments.

Stormwater is rainwater that ends up in a stormwater drain system after it has fallen on your roof, driveway, lawn or on the road. This water is not treated, therefore any chemicals or rubbish that are left in a stormwater drain can flow into creeks and rivers. Vegetation around the wetlands helps to trap nutrients, sediments and rubbish before it enters the Reef.

Corals prefer to live in waters with low amounts of nutrients and sediments, as they need clear water and sunlight to survive. Wetlands act as "kidney's of the landscape" by helping to filter out nutrients and sediments before they enter the Reef from farms, homes and your school.

Nutrients and sediments from agriculture production, such as cattle grazing and cropping, enter the wetlands after heavy rain events or from run-off. When they enter the wetland, they spread across a larger area allowing them to settle out. Therefore, the water flowing out of the wetland through creeks and rivers has less nutrients and sediments then when it first entered.

Mangroves are important coastal wetlands as they provide a buffer against erosion and other destructive events such as cyclones, by protecting coastal shorelines. They prevent inland wetlands from being disturbed and therefore allow settled sediments and nutrients to remain in the inland wetland, so as not to reach the Reef. Mangrove roots help to trap nutrients and sediments.

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Aquatic food webs and the connectivity between fish habitats

Both saltwater and freshwater wetlands provide essential habitat for a variety of plants and wildlife that depend on not only the wetland for habitat, but also one another for food.

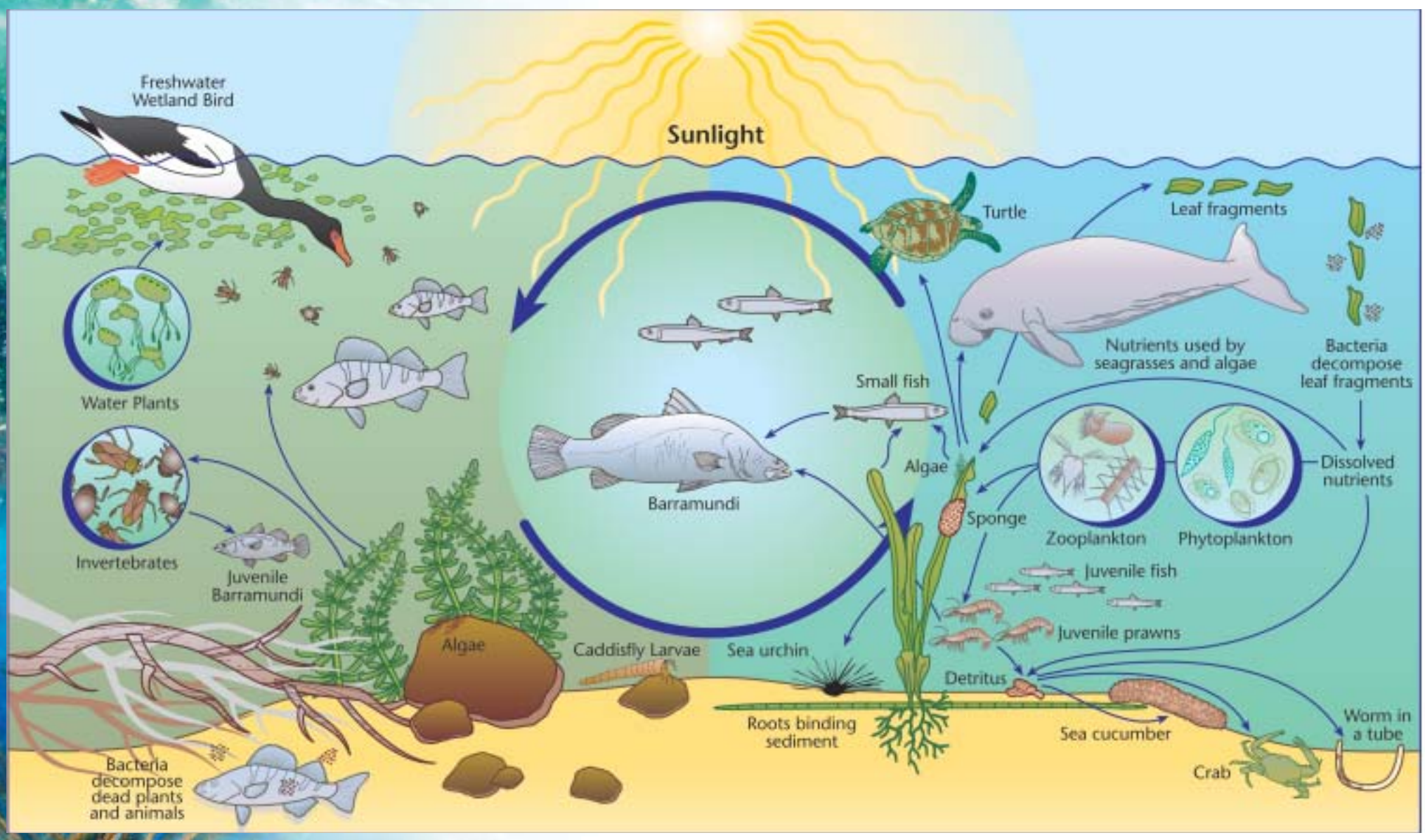
Keeping it all connected

A total of 79 fish species have been identified as using both freshwater and saltwater habitats along the Great Barrier Reef coast within the last 15 years. These species can be categorised by the way they use freshwater and saltwater habitats during their lifecycle. Some fish, such as the snubnose garfish, spend most of their lives in saltwater habitats and migrate to freshwater to breed, whilst others will spend most of their lives in freshwater and migrate to saltwater to breed. Not all fish species migrate for breeding however; the mangrove jack is an example of this.

Wetlands provide important breeding, nursery, and shelter habitat for a range of marine life, such as fish, crabs and prawns. Particularly in times of flood, fish may be encouraged to move up the river system for spawning. This is a technique of survival for the young fish as they can use things such as leaves and branches for shelter and protection from predators. Mangroves and their roots are an example of a quiet and well protected place. Juveniles can hide between the mangrove roots making it harder for larger predators to find them.

Wetland food webs

Wetland plant and animal communities exist in food webs, where one organism feeds on another, transferring nutrients and energy through the wetland system. There are four levels of a food web. Firstly, the sun is the primary source of energy and therefore is the source. Plants are the only living organism that can feed from the sun and store energy, therefore plants are the producers, as they produce energy/food for animals. Animals are the consumers. Small animals consume the plants and large animals consume the smaller animals. Once the larger animals such as fish and birds have lived out their lifecycle they are broken down by bacteria and fungi - these are decomposers.



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Wetland values

Wetlands offer a variety of values to the community and the environment, however the importance of wetlands has only recently been recognised and understood. Aside from improving water quality, wetlands offer many other economic, social and ecological benefits.

Economical benefits

- Wetland areas often have a high scenic value and can potentially increase the value of adjacent property.
- Tourism generates $5.1 billion in the Great Barrier Reef catchment each year and is the largest commercial activity on the Reef. These tourism activities rely on a beautiful and healthy Reef.
- Commercial fishing is an important industry for the Queensland economy generating millions of dollars every year. Wetlands provide nursery, breeding and feeding habitats to many fish and other marine species.

Social benefits

- Millions of people enjoy the wide range of recreational activities provided by wetlands including birdwatching, fishing, bushwalking, swimming and hunting.

Ecological benefits

- Wetlands conserve water and protect against flooding by absorbing and slowly releasing floodwaters.
- Coastal wetlands act as a buffer against erosion and storm surges.
- Wetlands provide essential nursery habitats for many Queensland fish and crustacean species.
- Wetlands offer important habitat areas for many animals (eg. waterbirds).

Role of wetlands in protecting the Great Barrier Reef

Because of a wetland's ability to improve water quality by filtering nutrients, sediments and other pollutants, they play an important role in protecting the Great Barrier Reef. Wetlands help to improve the quality of the water by removing sediments and nutrients before they reach the Reef.

Corals and other important marine animals and plants may be affected by poor water quality. For example, sediment smothers coral and reduces coral recruitment, while the phosphorous and nitrogen in fertilizer runoff can promote the growth of algae that compete with coral, restricting its growth and reproduction. Current practices of clearing and draining wetlands have increased the levels of sediment, nutrients and fertiliser entering the Reef, particularly during and following floods. These changes have also degraded the important links between the freshwater and marine environment for many fish species. It is important to protect wetlands in order to protect our Reef.

Do your bit to improve water quality

You can do your bit to reduce sediments and nutrients entering wetlands and the Reef:

- Design stand-alone paint disposal stands. They can then be given to your local council to dispose of correctly, so the paint chemicals do not go down the drain and enter waterways and wetlands.
- Stencil drains around your school, home or community advising, "This drain is only for rain" to raise awareness in your community.
- Composting and using garden beds or vegetation strips around your school and home will capture rainwater and minimise runoff.

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Cultural values of wetlands

Aboriginal people and Torres Strait Islander people are the Traditional Owners of the Great Barrier Reef region and hold a vast knowledge of the marine environment, marine animals, their habitats and their ecology. Traditions like hunting and fishing on the Reef are of high cultural importance and resources from the sea are used for different purposes.

Freshwater wetlands are significant sources of food and are places of ceremony, meeting and teaching. These wetlands are part of the Dreaming and natural beliefs of the Aboriginal people and most Dreamtime stories speak of wetlands. Aboriginal Elders use these stories to teach the young their beliefs, values and rules for living.

The following story tells the tale of the Rainbow Serpent as told by Russell Butler of the Bandjin (meaning saltwater) Tribe in the Hinchinbrook region, north of Townsville, Queensland.

The Rainbow Serpent

There were once two young fellas who were heading down to their local waterhole with a big bundle of bark under their arm. As they headed down to the waterhole, they passed an old man sitting under a tree.

"Where are you going?' asked the man. "We're going to poison the river and get some fish," replied the two young men. The old man asks the two younger men if they could bring just enough back for him and his family.

When the young men got to the river, they prepared the bark to make the sap run. They jumped in the water, making sure there were no crocodiles around and began to distribute the sap around the river.

A couple of hours later the men began to notice the first ripples in the river and saw the fish floating to the top of the water. They slipped into the water and took enough fish for themselves and the old man, however instead of stopping there and leaving the rest of the fish for others, they continued to take the fish and throw them on the bank to rot.

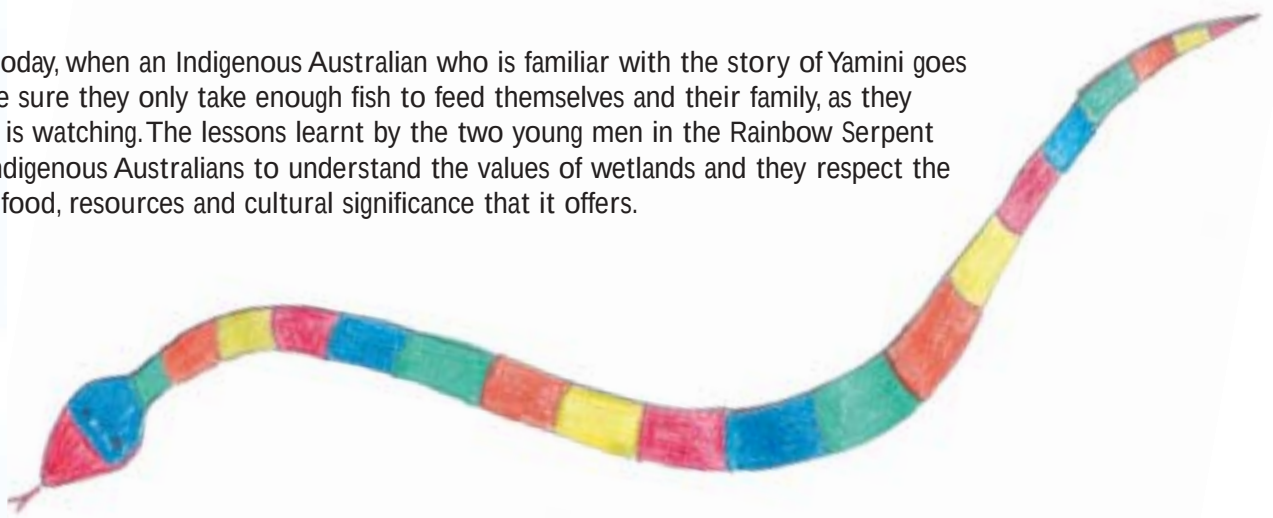
The Rainbow Serpent, Yamini, was watching the men from the far side of the waterhole and became very angry about their actions, as they killed and discarded of the fish for no reason. Yamini decided to set a big barramundi in the middle of the river and when the men went to get the barramundi Yamini grabbed them, swallowed them, and disappeared back into the waterhole.

It was getting late and the old man sitting under the tree had still not heard from the two young men. When he got down to the river, he saw all of the dead fish on the banks and the water was boiling over. The old man began to dance around the water and as he danced, he noticed a tunnel where the Rainbow Serpent had left the waterhole.

The old man followed the tunnel until he came to a large area of anthill plains where he caught up with the Rainbow Serpent. Using his spear, he jabbed Yamini who reared up out of the ground and spat the two men's bodies out, covered in slime. The old man covered the two young men in sand and propped them up against an anthill. As the ants crawled up the men's bodies and started to bite them, they began to move and the breath of life was put back into them.

By this time, the rest of the tribe had seen what happened at the riverbank and they too followed the Rainbow Serpent's trail. They arrived just in time to hear the old man telling the two younger men about how wrong it was to be so greedy and throw all of the fish on the bank to rot. "Your greediness is what upset the Rainbow Serpent," the old man said.

From that day on, and still today, when an Indigenous Australian who is familiar with the story of Yamini goes near a waterhole, they make sure they only take enough fish to feed themselves and their family, as they know the Rainbow Serpent is watching. The lessons learnt by the two young men in the Rainbow Serpent story have helped today's Indigenous Australians to understand the values of wetlands and they respect the waterhole for the precious food, resources and cultural significance that it offers.



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Disappearing wetlands

More than 50 percent of our wetlands have been destroyed through degradation or loss since European settlement. Aside from urban development and agricultural activities, other threats to wetlands survival include aquaculture development, man-made barriers and ponded pastures.

Aquaculture

Aquaculture is the commercial growing, holding and breeding of marine or freshwater animals and plants. Due to the nature of the activity, aquaculture farms are often located on the coast, in close proximity to good quality water. Aquaculture can either have a direct impact on wetlands through clearing or an indirect impact on the quality of the water in wetlands. However, current management practices strive for systems that fully recirculate the water within the aquaculture facility thereby minimising impacts on water quality.

Man-made barriers

Large and small barriers are preventing fish species that rely on both freshwater and saltwater wetland habitats from migrating between the two. These include tidal barrages, dams, weirs, floodgates, tide gates and road culverts. These barriers directly impact on fish life-cycles.

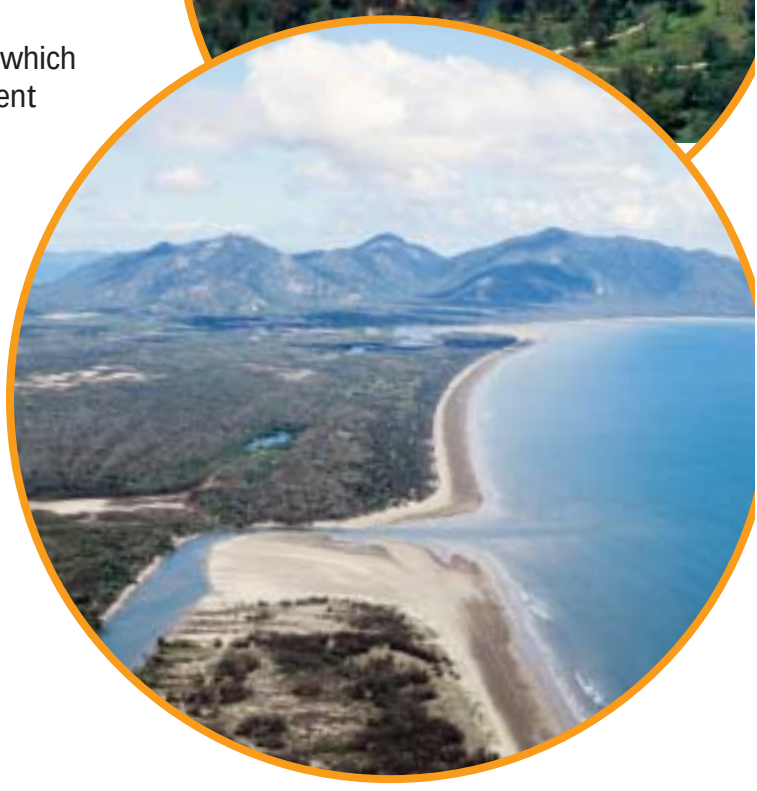
Ponded pastures

A ponded pasture is a permanent or periodic pondage of water in which the dominant plant species are pasture species used for grazing or harvesting. Use of wetlands for ponded pastures block fish migration or if they allow fish migration, they do not support the survival of fish (through drying out).

Other threats to wetlands

There are many other threats to wetlands, many of which could be prevented through improved management practices, these include:

- Pollution by insecticides, fertilisers and sewage from urban and rural areas.
- The build up of weeds in wetlands, substantially reducing habitat quality.
- Introduced fish preying on native species and in some instances, destroying native populations.
- Removal of fringing wetland plants is allowing wildfires to damage more temporal wetlands.
- Seagrass beds are being damaged by propellers.



Protecting wetlands - Ramsar sites

In 1971, Australia, along with 17 other countries, signed the Convention on Wetlands of International Importance, otherwise known as the Ramsar Convention. The Convention aims to reduce global loss of wetlands and also to conserve and manage remaining wetlands. Australia currently has 64 wetlands listed under the Convention, with five of these sites located in Queensland. Three Ramsar sites are located in or near the Great Barrier Reef - Shoalwater and Corio Bays, Bowling Green Bay and the Coral Sea Reserves.

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Protecting wetlands in Queensland

As the importance of wetlands is recognised, actions are being taken to protect our remaining wetlands. Until recently, wetlands were considered wastelands to many and thought to carry no value. Therefore, wetlands were drained, filled, dredged and cleared to make these areas more 'useful'. Today, wetlands are being recognised for their many values, and governments, industries and communities are helping to protect our wetlands.

Who is protecting our wetlands?

The loss and destruction of our wetlands is an issue that needs to be addressed and community groups and individuals are working together to restore their natural function and beauty. Community groups such as Landcare, Waterwatch, Seagrass Watch, Catchment Management Groups and Natural Resource Management groups are all doing their bit to protect wetlands.

What is the Great Barrier Reef Marine Park Authority's role?

The Great Barrier Reef Marine Park Authority, in association with many scientists and other government agencies, has identified increasing loads of sediment, nutrients and chemicals being discharged from the Catchment into the waters of the Great Barrier Reef as causing poor water quality and impacting on the health of the Reef. The Authority is involved in helping to restore our wetlands and halt and reverse the decline in water quality entering the Reef, and raising awareness within the community about how people can help to protect and restore wetlands.

Queensland Wetlands Programme

In 2003, the Australian and Queensland Governments established the Queensland Wetlands Programme. It is made up of The Great Barrier Reef Coastal Wetlands Protection Programme and the Natural Heritage Trust Wetlands Programme.

The Great Barrier Reef Coastal Wetlands Protection Programme

This programme will develop and implement measures for the long-term conservation and management of wetlands in the Great Barrier Reef Catchment and is funded by the Australian Government. It was developed in response to concerns about potential damage to the Great Barrier Reef due to increasing levels of sediment, pesticides and fertilisers reaching the Reef.

Natural Heritage Trust Wetlands Programme

This programme will develop and implement measures to support the conservation and management of wetlands in Queensland. This five-year $15 million programme is jointly funded by the Australian and Queensland Governments.

Wetlands in National Parks

More than 100 Queensland wetlands are now protected under National Park legislation. This protection helps to preserve the value of wetlands while ensuring people can continue to access and enjoy the National Parks without damaging these special places.

Doing our bit to look after it!

For more information on the Great Barrier Reef Coastal Wetlands Protection Programme, contact the Department of the Environment and Heritage on (02) 6274 2255.

For more information on the Queensland Natural Heritage Trust Wetlands Programme, contact the Queensland Environmental Protection Agency on (07) 3225 1638.

For information on the Reef Water Quality Protection Plan phone 1800 803 772. The plan is available at http://www.deh.gov.au/coasts/pollution/reef/index.html.

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Doing our bit to look after it!

Schools, councils, farmers and tourism operators are all doing their bit to protect our precious wetlands.

Schools

Currently there are more than 180 Reef Guardian Schools throughout Queensland that are doing their bit to help protect our wetlands and look after our environment. Schools have been adopting degraded wetlands close to them and revegetating the area.

CASE STUDY

Wonga Beach State School in Far North Queensland has been involved in rehabilitating a local wetland adjacent to their school. When the students first noticed the wetland, it was overgrown with weeds. The students worked with their local council to clear the weeds and plant over 1000 trees in the area. By doing this, students hope to trap nutrients and sediments that would otherwise flow into the Reef.

CASE STUDY

For over ten years, the Burdekin District Canegrowers in North Queensland have worked with the community to adopt best environmental practices and promote these practices to the wider community. The sugarcane farmers have now gone as far as employing an Environmental Liaison Officer to work with the farmers and the community on local water quality and salinity issues.

Farmers

Individual farmers are working together with the community, agricultural industry and governments to minimise the impact of agricultural activities on wetlands, therefore improving the quality of water entering the Great Barrier Reef. Many farmers are now restoring their wetlands and doing what they can to improve water quality.

Councils

Councils are also taking part in restoring wetlands by working with industry and community to address issues affecting wetlands and working to improve these issues.

CASE STUDY

The Creek to Coral programme developed by the Townsville and Thuringowa City Councils, as well as other consortium partners, maintains and enhances healthy waterways in the coastal dry tropics. The programme achieves this by focussing on science, research and infrastructure, and encouraging, educating and involving the community in integrated waterway management.

Tourism operators

Tourism operators are doing their bit to protect our coastal wetlands by employing best environmental practices when out on the Reef. These include:

- Anchoring in sand or mud and away from corals.
- Staying alert for dugong, sea turtles, whales and nesting or roosting seabirds, and slowing down when travelling in shallow inshore areas, especially over seagrass beds.
- Encouraging tourists to not rest or stand on coral.
- Ensuring all litter is brought back to the mainland and disposed of suitably.

What you can do – water quality and wetlands

- Keep your drains clean and free of chemicals by sweeping the drains and gutters around your school, reusing green waste (leaves, twigs etc) and never pouring chemicals or waste down the sinks. Everything that enters a stormwater drain has the potential to be discharged to local waterways and eventually the Great Barrier Reef.
- Raise awareness in your community about keeping our drains clean and clear of litter and chemicals by stencilling your drains, bins and gutters with messages such as “This drain is just for rain”.
- Encourage your teacher to have the class adopt a local wetland for you to rehabilitate and maintain.
- Implement a recycling programme at school or home so that litter does not end up in our wetlands.

Get involved!

If you are interested in discovering your local wetland, please contact one of the following:
Environmental Protection Agency - www.epa.qld.gov.au
Conservation Volunteers Australia – www.conservationvolunteers.com.au
Natural Resource Management – www.nrm.gov.au

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