The mangrove fringe

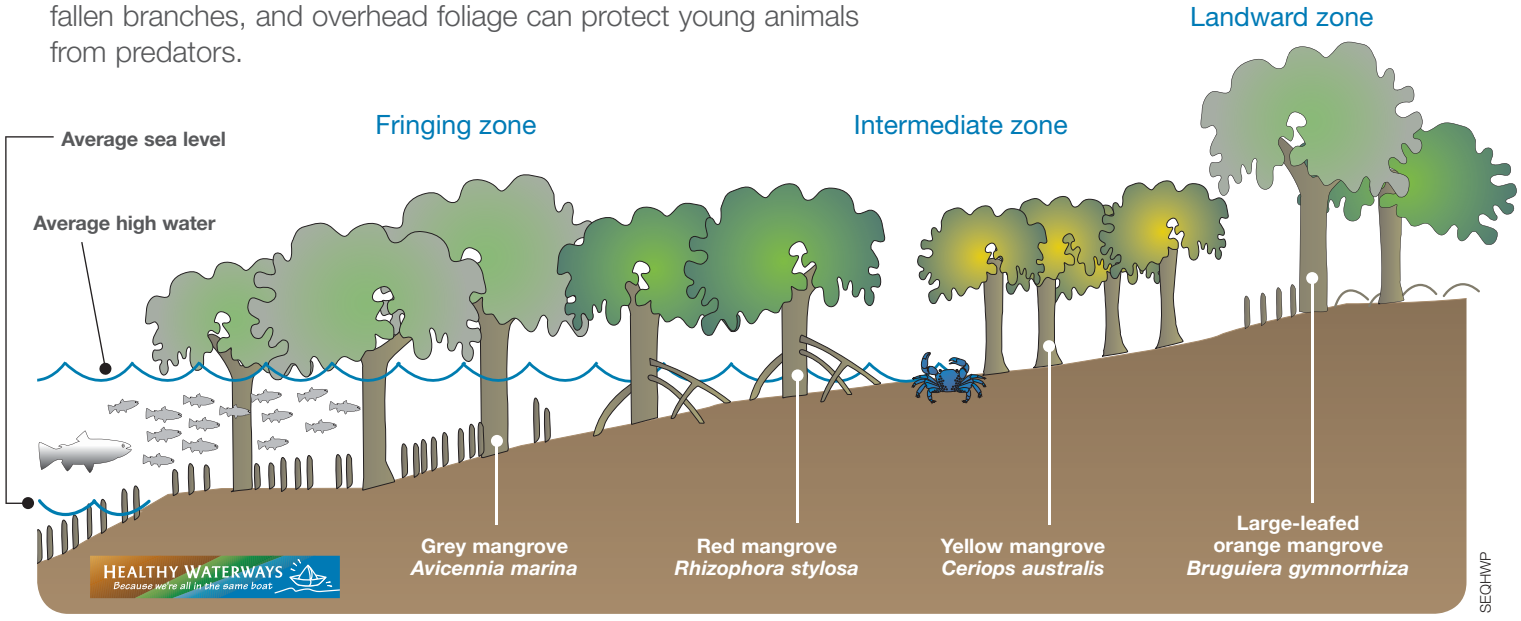
"Mangroves are one of the nursery areas of the sea. Young fish get food from mangroves and shelter there from predators."

Mangroves—perfectly suited to their environment

Mangroves are trees that grow in tidal areas where there is a mix of saltwater and freshwater. They have adapted their leaves, roots, and reproductive methods to survive in a harsh, dynamic environment of soft, low-oxygen soils and changing salinity. Mangroves prefer tropical and subtropical climates and are found on tidal riverbanks and in coastal areas. Mangroves protect coastlines, trap sediments, provide habitat for fauna, and help to cycle nutrients through the ecosystem. Different species of mangrove grow in the intertidal gradient between the zone fringing the ocean or estuary waters and the landward zone.

Mangroves have many roles

Mangrove forests are important habitat and nursery areas for juvenile fish, crabs, and prawns. Mangrove detritus, that is leaves and twigs that have fallen to the ground, is an important food source for these animals. The maze of mangrove 'peg' roots (pneumatophores) that stick up above the water and soil, fallen branches, and overhead foliage can protect young animals from predators.



Mangrove species differ along the intertidal gradient. The grey mangrove *(Avicennia marina)* is the dominant mangrove in South East Queensland and prefers habitat lower on the shoreline that is covered by water at high tide.

HEALTHY WATERWAYS
Because we're all in the same boat

Mangroves were once perceived to have little value and were seen as muddy, mosquito-infested swamps that needed to be cleared. Removing mangroves was regarded as a sign of 'progress' and so around the world vast areas of mangroves were destroyed.

The value of mangroves is now recognised, especially their role in fishery productivity, stabilising shorelines, and protecting coastlines by absorbing the energy from storm-driven waves and wind. This is particularly important given the predicted sea level rise and predicted increased storm activity as a result of climate change.

Mangroves in South East Queensland

Australia has 37 species of mangroves, which is more than half of the world's total of 65 species. Around 35 species and three hybrid species of mangroves grow in Queensland. Moreton Bay alone houses eight species of mangroves.

South East Queensland (SEQ) has many areas sheltered by off-shore islands that are ideal habitat for mangroves. Mangrove habitat can be found around river mouths, often growing as a thin band along river banks as far upriver as the tide reaches. The largest mangrove communities in Moreton Bay are found in Pumicestone Passage and the Southern Bay islands, south of Jacobs Well.

The dominant mangrove species in South East Queensland is the grey mangrove (*Avicennia marina*), which occupies around 15,300 hectares of Moreton Bay. The river mangrove (*Aegiceras corniculatum*) is, not surprisingly, common along river banks and the black mangrove (*Lumnitzera racemosa*) is at it's southern limit in Moreton Bay.

Saltmarsh habitat can be found behind some mangrove forests. Both mangroves and saltmarsh are vital for filtering nutrients and sediments from runoff before it reaches waterways. Moreton Bay supports one of the most extensive seagrass, mangrove, and saltmarsh areas adjacent to a highly urbanised coastline in Australia.

SEQHWP

Saltmarsh habitat contains plants such as grasses, herbs, reeds, sedges and shrubs that generally grow no more than half a metre in height and are very salt resistant.

SEQHWP

A boardwalk through grey mangroves at Wynnum.

SEQHWP

Migratory birds will often use mangrove and saltmarsh areas, even when they are located close to heavy industry.

Monitoring mangroves for change

Mangrove trees can live for more than 100 years and can be used to record changing conditions as a result of natural and human impacts. Natural impacts include hail and storm damage, changes in annual rainfall, sea level changes, or natural changes in water movement.

Impacts on mangroves

Human impacts on mangroves include direct cutting or clearing, and exposure to herbicides or oil spills. A rare genetic mutation in the grey mangrove, possibly caused by petrochemical pollution, produces 'albino' seedlings that lack the pigment (chlorophyll) needed for photosynthesis and they do not survive to maturity.

Excess nutrients in waterways may also cause rapid growth of algae, which can smother mangrove pneumatophores. This phenomenon is also known as 'eutrophication'.

Blooms of a particular species of marine blue-green algae (*Lyngbya majuscula*) can smother mangrove seedlings and their air-breathing roots, possibly causing seedling malformation and death. Yearly sampling of grey mangrove leaves is being used to monitor the long-term build-up of nitrogen content. The nitrogen indicator that is sampled in the leaves originates from wastewater entering the mangrove communities.

The SEQ Healthy Waterways Strategy

The SEQ Healthy Waterways Partnership is a collaboration between government, industry, researchers, and the community. *The SEQ Healthy Waterways Strategy 2007–2012* contains over 500 actions, committed to by the Partners, to improve the health and protect the values of our waterways.

Mangroves are often part of waterways that have high ecological value. Actions that prevent harm to these areas have priority in the *Protection and Conservation Action Plan* of the Strategy. One of the aims in the *Coastal Algal Bloom Action Plan* is to reduce the negative impacts of algal blooms on mangrove habitats.

QUEENSLASND PARKS AND WILDLIFE SERVICE

Mangrove seedlings can be smothered by blue-green algae, *Lyngbya majuscula*.

NORM DUKE

Petrochemical pollution can result in grey mangrove (*Avicennia marina*) seedlings that lack normal pigmentation and appear to be 'albino'.

Key Fact

Mangroves will play an increasingly important role in protecting coastlines from the impacts of climate change such as sea level rise and increased storm activity.

Key Learning Area	By the end of Year	Essential Learnings
Science	**7**	Ways of working—Students are able to collect and analyse first-and second-hand data, information and evidence. Knowledge and understanding—Science as a human endeavour: • Ethical considerations are involved in decisions made about applications of science. • Scientific knowledge can help to make natural, social, and built environments sustainable, at a scale ranging from local to global. Knowledge and understanding—Life and living: • Survival of organisms is dependent on their adaptation to their environment. • Different feeding relationships exist within an ecosystem.
	9	Ways of working—Students are able to research and analyse data, information and evidence. Knowledge and understanding—Life and living: • Changes in ecosystems have causes and consequences that may be predicted. • In ecosystems, organisms interact with each other and their surroundings. Knowledge and understanding—Science as a human endeavour: • Immediate and long-term consequences of human activity can be predicted by considering past and present events. • Responsible, ethical, and informed decisions about social priorities often require the application of scientific understanding.
SOSE	**7**	Ways of working—Students are able to collect and analyse information and evidence from primary and secondary sources. Knowledge and understanding—Place and space: • Sustainability requires a balance between using, conserving, and protecting environments, and involves decisions about how resources are used and managed. • Physical and human dimensions are used to define global environments.
	9	Ways of working—Students are able to research and analyse data, information, and evidence from primary and secondary sources. Knowledge and understanding—Place and space: • Interrelationships between human activity and environments result in particular patterns of land and resource use, and can cause environmental problems.

Source: Queensland Studies Authority, Essential Learnings and Standards, Years 1–9

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There are other fact sheets and educational resources available. For more information about the waterways of South East Queensland please visit the Partnership's website: **www.healthywaterways.org**

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