

Estuaries are the link

A river estuary is where freshwater flowing in rivers and streams mixes with saltwater from the sea. The point in the estuary where the freshwater and saltwater meet changes as the water flows backwards and forwards with the tidal movements of the sea. Natural estuarine systems are important habitats for many plants and animals, although some species can survive in modified estuaries such as canals.

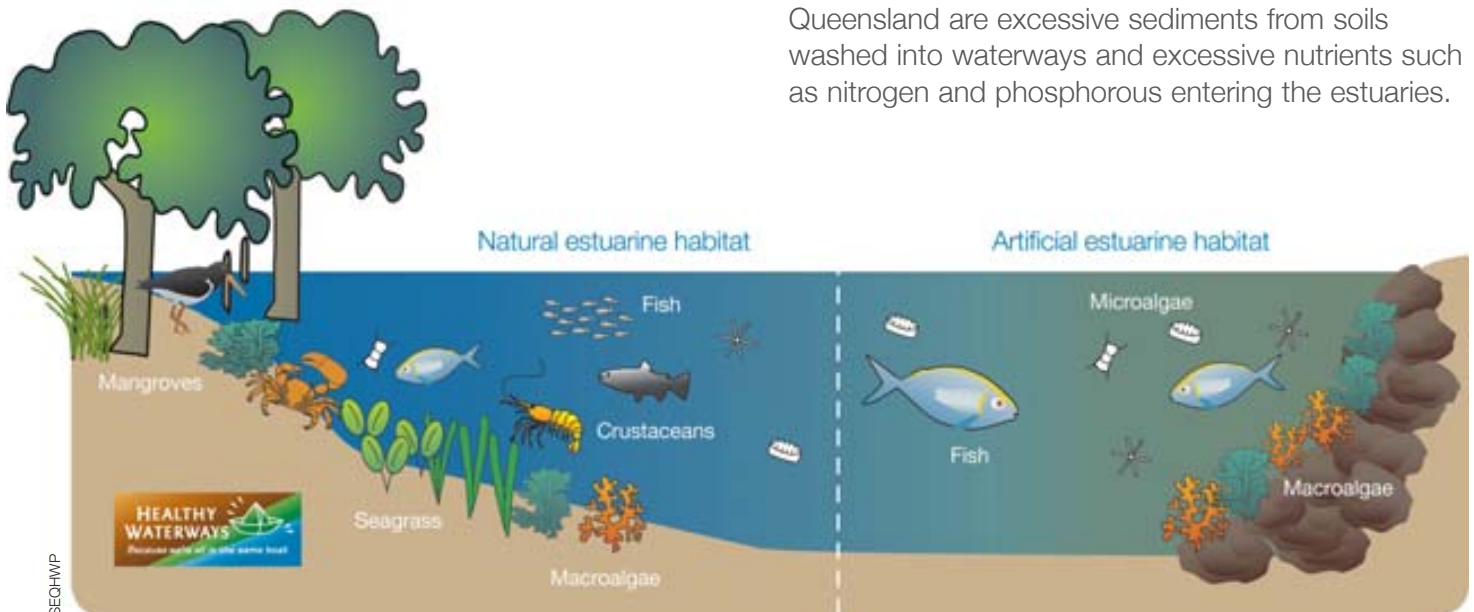
River estuaries in South East Queensland differ in water quality

Water quality and the health of ecosystems vary across the river estuaries of South East Queensland (SEQ). Some of this variation is due to natural factors such as wave, wind, and tidal action (hydrodynamics).

“An estuary is the zone that links the land with the sea.”



However, pressures such as population growth, activities on the land, and wastewater from industry and treatment plants also affect water quality and the health of ecosystems. Two key issues affecting the water quality in river estuaries of South East Queensland are excessive sediments from soils washed into waterways and excessive nutrients such as nitrogen and phosphorous entering the estuaries.



Natural estuarine systems (left) provide important habitats for diverse plant and animal communities. Artificial systems (right) such as canals have a modified habitat structure.

Estuaries are brown

As sediment is transported from the land into waterways and into the ocean, it is suspended in the water. These suspended sediments make the water 'turbid' so it looks cloudy or brown. Turbid water reduces the amount of light that can penetrate the water. Plants living beneath the surface of the water, like microscopic algae called phytoplankton, need sunlight to grow. In addition to sunlight, these plants also need nutrients. Nutrients are often attached



SECHWMP

A Secchi disk (named after its inventor) is a device for measuring water clarity. It is a white circle (around 20cm in diameter) with a black pattern that is attached to a rope and is lowered into water until the pattern is no longer visible. The depth when the disk can no longer be seen is called the Secchi depth and is a measure of water clarity. Water clarity decreases as turbidity increases.



SECHWMP

Floods can carry very high loads of sediment into waterways.



to sediment when it enters the water. While some phytoplankton is necessary for a healthy ecosystem, too many nutrients in the water act like fertiliser, making the phytoplankton grow out of control and resulting in an algal bloom.

The estuary of the Brisbane River is more turbid than it used to be. This is because of more sediment in the estuary and changes in tidal movements and flushing times of the river. Naturally high, but changing, turbidity can be an important feature of estuaries and is important for healthy ecosystems. But high rainfall events, such as floods, can carry too much sediment over land and down rivers into estuaries. Tidal movement in the estuary may then carry this sediment back and forth for a long time until the natural balance is restored.

Estuaries are valuable

The estuaries of South East Queensland are a valuable part of the environment. They support diverse habitats such as mangroves, saltmarshes, and seagrasses, which are important for nutrient cycling, fish breeding, and as habitat for a range of wildlife.

A number of estuaries in South East Queensland have high ecological values, that is, they are mostly undisturbed or have high conservation values. These include the estuary waterways of Lake Cootharaba and Lake Cooribah on the Noosa River; Lake Weyba; wetlands at the bottom of North Stradbroke Island; and waterways around the Southern Moreton Bay Islands National Park.



TOURISM QUEENSLAND

The estuary of Noosa River which flows into Lake Cootharaba is a waterway with high ecological values.



Canal estates are extensive in South East Queensland because estuary waterfront living is popular.

The land along estuaries has a high economic value because it is a prime site for ports, boat facilities, and residential areas. For example, the Australia Trade Coast lies either side of the Brisbane River estuary. It is one of the fastest growing industrial transport complexes in Australia, contributing \$10 billion to gross domestic product (GDP) and providing 45,000 jobs.

More than 90% of South East Queensland's population live within 50 kilometres of the coast and our waterways are a precious lifestyle resource we all enjoy. We value our access to riverside parks, with picnic facilities, bikeways, boat ramps, restaurants, and marinas. Estuaries are popular places to boat, fish, or paddle and they attract thousands of visitors from outside the region.

The SEQ Healthy Waterways Strategy

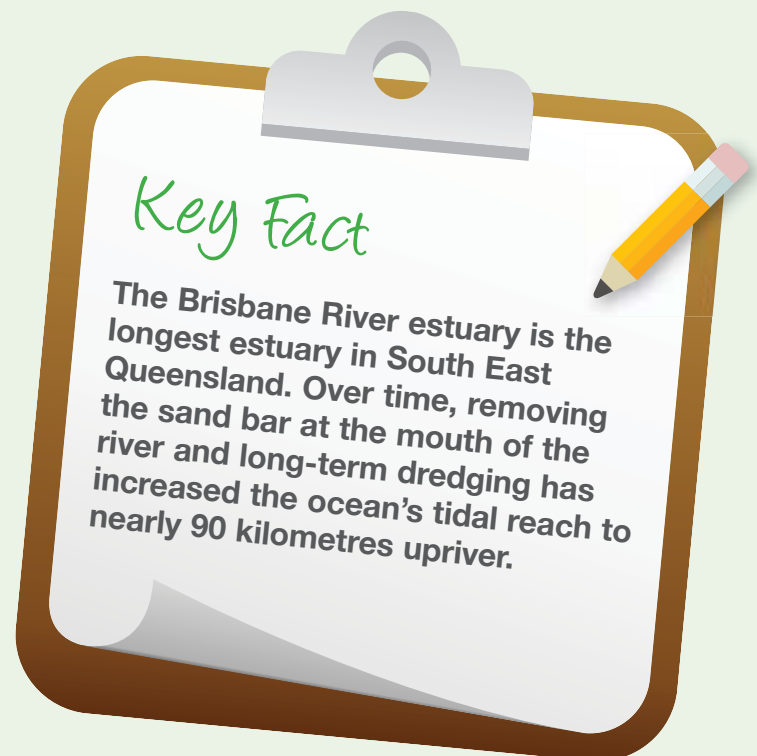
The SEQ Healthy Waterways Partnership is a collaboration between government, industry, researchers, and the community. The *SEQ Healthy Waterways Strategy 2007–2012* contains over 500 actions, committed to by the Partners, to improve the health and protect the values of our waterways.

Maintaining high ecological values for our waterways is covered in the Strategy by the *Protection and Conservation Action Plan*. The *Moreton Bay Action Plan* also acknowledges the economic values of tourism and recreation, industry, real estate, and ecosystem services provided by estuaries that are part of the Bay.

The *Northern Catchments Action Plan* aims to protect and improve coastal estuaries draining directly to the Pacific Ocean that have significant social and economic values.



Estuarine lakes and waterways are a great recreational resource for activities such as canoeing.





Key Learning Area

By the end of Year

Essential Learnings

Science	7	<p>Ways of working—Students are able to collect and analyse first-and second-hand data, information, and evidence.</p> <p>Knowledge and understanding—Science as a human endeavour:</p> <ul style="list-style-type: none"> • Ethical considerations are involved in decisions made about applications of science. • Scientific knowledge can help to make natural, social and built environments sustainable, ranging from local to global scales.
	9	<p>Ways of working—Students are able to research and analyse data, information, and evidence.</p> <p>Knowledge and understanding—Science as a human endeavour:</p> <ul style="list-style-type: none"> • Responsible, ethical, and informed decisions about social priorities often require the application of scientific understanding. <p>Knowledge and understanding—Life and living:</p> <ul style="list-style-type: none"> • Changes in ecosystems have causes and consequences that may be predicted.
SOSE	7	<p>Ways of working—Students are able to collect and analyse information and evidence from primary and secondary sources.</p> <p>Knowledge and understanding—Place and space:</p> <ul style="list-style-type: none"> • Australian environments are defined by patterns of natural processes, by human activities, and by the relationships between them, including climate and natural resource distribution, resource use, and settlement patterns. • 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	<p>Ways of working—Students are able to research and analyse data, information and evidence from primary and secondary sources.</p> <p>Knowledge and understanding—Place and space:</p> <ul style="list-style-type: none"> • Interrelationships between human activity and environments result in particular patterns of land and resource use, and can cause environmental problems. • Governments and communities need to balance economic, social, political, and environmental factors through sustainable development, consumption, and production.