

# AQUATIC ECOSYSTEMS

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## ***What do we know?***

Water covers the majority of the planet and people require freshwater for consumption, irrigation and industry.

Antarctica and Australia are the two driest continents on earth. For Australia this is further compounded by climatic systems renowned for their variability and large fluctuations over periods of years and decades. The nature and extent of aquatic ecosystems in regions like SEQ are accordingly both precious and very dynamic

Aquatic ecosystems are those ecosystems that are dominated by water. They are traditionally further separated into saline (marine and coastal ecosystems) as distinct from fresh (inland rivers and wetland ecosystems).

Aquatic biodiversity refers to the variety of life forms and habitats found in fresh and salt waters.

The thousands of aquatic species range from large aquatic mammals to the tiniest micro-organisms. They include invertebrates (e.g. crustaceans, molluscs and worms), aquatic insects, fish, reptiles (e.g. seasnakes, turtles), amphibians (e.g. frogs), seabirds and waterbirds, freshwater plants, seagrasses and algae.

Aquatic habitats also vary widely. In freshwater areas you'll find freshwater streams, rivers, lakes, floodplain wetlands, swamps, bogs and underground aquifers. Salty and brackish water habitats include beaches, rocky shores and reefs, seagrass beds, salt marshes, mangroves, and sandy or muddy bottom areas in estuaries, coastal lagoons and the ocean.

Aquatic biodiversity has many benefits. For example, aquatic ecosystems supply us with food, such as fish and shellfish, and products, ranging from medicines to pearls. They break down and recycle our waste products, keep water clean and healthy for drinking, and allow us to enjoy recreational activities such as fishing, boating, swimming, scuba diving and snorkelling.

Wetlands include swamps, marshes, billabongs, lakes, saltmarshes, mudflats, mangroves, coral reefs, fens, peatlands, or bodies of water — whether natural or artificial, permanent or temporary. Water within these areas can be static or flowing, fresh, brackish or saline.

Wetlands are vital to Australia. They protect our shores from wave action, reduce the impacts of floods, absorb pollutants and provide habitat for animals and plants.

Wetlands are important in other ways as well. They purify our water and are important for recreational activities. They form nurseries for fish and other freshwater and marine life and, because of this, they are critical to Australia's commercial and recreational fishing industries.

They also bear historical significance with some having high cultural value. In particular, many wetland areas throughout Australia are important to Aboriginal people. Consideration of these historical and cultural relationships is a fundamental part of wetland management.

### ***Current issues/knowledge gaps***

We exploit species in marine and freshwater environments, and a number of aquatic species and ecosystems have become the subject of conservation interest due to resource depletion, habitat loss or degradation.

Australia's aquatic ecosystems are home to a vast number of species, many of which are not found anywhere else in the world. But over the past 200 years, the Australian environment has been modified dramatically. Many rivers and streams are degraded and many native species are under threat. Coastal and marine areas are particularly under pressure, and large areas of seagrass and other habitats have been lost.

Management of aquatic ecosystems is important in terms of maintaining water quality for human utilisation, harvesting resources, and for species conservation. It is therefore essential for students of ecology and environmental science to understand the structure and function of marine and freshwater ecosystems.

### ***What is accessible?***

There is considerable information available through several Cooperative Research Centres (CRC), but the key organisation that is championing the

management and wise use of aquatic ecosystems in South East Queensland is the Moreton Bay Waterways and Catchments Partnership. Their website [www.healthywaterways.org](http://www.healthywaterways.org) is a great source of information as well as providing details of the current diversity of management actions underway.

### ***What is not so easily accessible?***

Naturally a considerable volume of academic research (grey literature) is more difficult, but not impossible, to access. The tertiary institutions have active research programs dealing with aspects of aquatic ecosystems, in most cases these are integrated with the work of the Moreton Bay and Catchments Partnership.

### ***Adaptive management principles***

- ◆ Management planning decisions on the protection and management of aquatic ecosystems need to be based on the application of best available information and experience. This should include the current documented understanding of the landscape, ecosystems and active processes.
- ◆ Management options need to be developed that explore the full range of opportunities that current information and experience provide.
- ◆ Management actions need to be selected with an emphasis on those with clear links to management objectives and defined outcomes.
- ◆ Management actions should be designed to also address knowledge gaps and facilitate the testing of existing assumptions on management best practice.
- ◆ Management actions need to be linked to a regular assessment of management performance.
- ◆ Assessment of management success needs to be focussed on triggering an improvement in the management actions implemented and the overall management strategy.

### ***People involved***

Moreton Bay Waterways and Catchments Partnership is the key organisation in SEQ that is addressing this issue it is composed of a broad range of government and non-government stakeholders including:

- ❖ Government (local, state and federal)
- ❖ Property owners (residents, farmers)
- ❖ Indigenous Traditional Owners
- ❖ Catchment Groups and
- ❖ Tertiary Institutions

### ***Information sources***

#### *Documents*

Australia State of the Environment 2001 Report (Coasts and Oceans, Inland Waters)

Ecosystem Health Monitoring reports for Moreton bay and Catchments accessed through <http://www.healthywaterways.org>.

#### *Legislation*

There is a significant body of legislation at all three levels of government that can be accessed through each agencies websites as listed below.

#### *Websites*

<http://www.healthywaterways.org/>

<http://www.science.murdoch.edu.au/centres/aer/>

<http://www.asl.org.au/>

<http://www.lwrrdc.gov.au/>

<http://www.dpiwe.tas.gov.au/inter.nsf/ThemeNodes/JMUY-4ZF4MP?open>

<http://www.wetlandcare.com.au/default.asp>

<http://www.wetlands.org/>

<http://www.ramsar.org/>

[http://www.csiro.au/index.asp?id=Land%20and%20Water\\_Rivers&type=researchProgram&xml=relatedResearchAreas,researchProjects](http://www.csiro.au/index.asp?id=Land%20and%20Water_Rivers&type=researchProgram&xml=relatedResearchAreas,researchProjects)

[http://www.epa.qld.gov.au/environmental\\_management/state\\_of\\_the\\_environment/state\\_of\\_the\\_environment\\_2003/](http://www.epa.qld.gov.au/environmental_management/state_of_the_environment/state_of_the_environment_2003/)

[http://www.fisheries.nsw.gov.au/thr/thr-species/aquatic\\_biodiversity.htm](http://www.fisheries.nsw.gov.au/thr/thr-species/aquatic_biodiversity.htm)

## **Department of the Environment and Heritage**

- <http://www.deh.gov.au/water/index.html>
- <http://www.deh.gov.au/coasts/index.html>
- <http://www.deh.gov.au/water/wetlands/database/index.html>

<http://enterprise.canberra.edu.au/WWW/www-crcfe.nsf/d87a31d8f4603d1d4a256641000e9021/7e16e5963b71476b4a25664a004a2493?OpenDocument>

[http://www.geocities.com/Waterose\\_Test/links.html](http://www.geocities.com/Waterose_Test/links.html)