Catchments and water quality

Catchments provide many of our essential needs including living space, as well as a supply of water and land for food production and industry. The waterways draining our catchments range from clear, mountain streams to the muddy and intermittently flowing rivers of the arid inland.

Water naturally contains a variety of substances both chemical and biological. These are collected as water flows over and percolates through the soil and underlying rock in its movement through the hydrologic cycle.

The health of a catchment depends on how we manage it. Human activity can add both organic and inorganic wastes and nutrients to streams as well as increase salinity levels, reduce oxygen levels and change pH and water temperature. These changes may alter the level of biological activity in water, increase treatment costs and impact on marine environments including estuaries and the Great Barrier Reef.

The invasion of exotic weeds such as water hyacinth and salvinia and exotic fish such as European carp and tilapia also degrade our creeks and rivers.

It is not possible to provide a simple summary of water quality across an area as large and varied as Queensland; however, water quality generally deteriorates as it moves downstream in a catchment.

Water quality issues

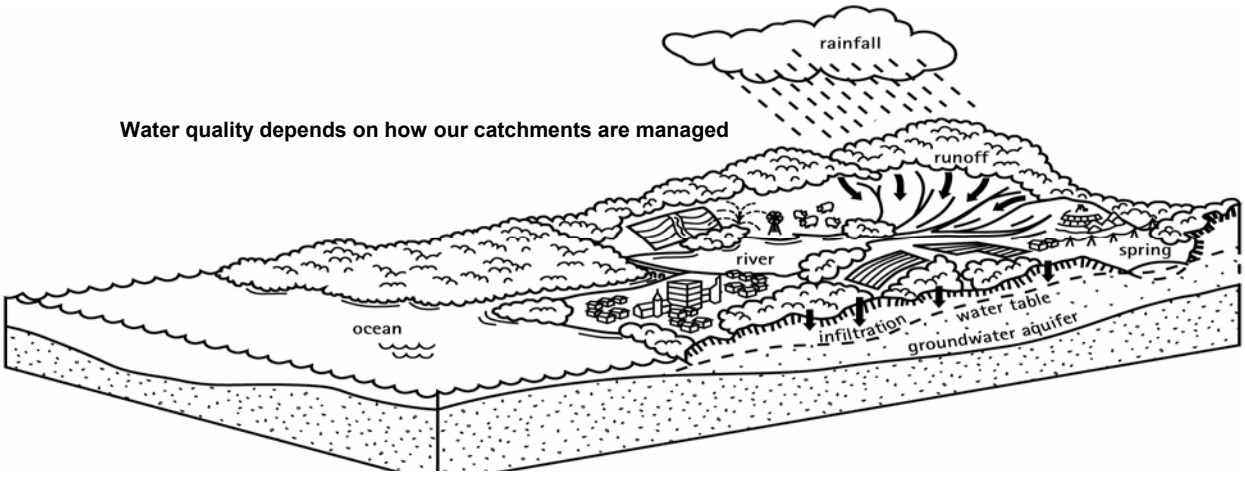
A number of processes affect water quality. An important concept is that all land should be used in accordance with its capability. Inappropriate land use can lead to land degradation and off-site effects impacting on water quality.

Dams modify the volume, speed and frequency of stream flow. Over-extraction of water from streams and dams can aggravate a range of water quality problems. Environmental flows need to be maintained to ensure the long-term health of our creeks and rivers.

Pollution by natural organics

Point source effluent from piggeries, dairies, feedlots, septic systems and sewage treatment works can result in immediate oxygen depletion and toxicity and longer term residual and water treatment issues. This effluent can hasten eutrophication, a natural process of accumulation of nutrients leading to algal blooms and deterioration of water quality. Effluent may also contribute disease causing viruses, protozoans and bacteria to water resources.

As all water must eventually return to the hydrologic cycle, careful planning and management are required to ensure that effluent releases are prevented from adversely affecting ground or surface water.



Water quality depends on how our catchments are managed

Erosion

Accelerated erosion may occur when land is grazed, cultivated, mined, or cleared for development such as new urban and commercial areas, or for transport, pipe and power line corridors. With all of these activities, good management practices can minimise the erosion risk and reduce the movement of sediment in runoff into streams.

When soil is eroded, any nutrients, fertilisers or pesticides in the soil may be removed as well. Eroded soil may not have a fast track to streams. It can be deposited where there is a change in the slope of the land, in sediment traps, along contour banks, or in grassed waterways, dams, or wetlands.

Erosion of stream banks during flooding is a significant source of sediment. Vegetated riparian areas can assist in stabilising the banks and improving water quality, but will not overcome problems created by poor catchment management.

Chemical contamination

A wide range of man-made organic and inorganic pollutants or contaminants find their way into groundwater and watercourses. Their sources may be urban areas, agricultural land, industrial plants, metal smelters or mining operations. They include pesticides, fertilisers, oil, paint, heavy metal compounds (mercury, molybdenum, cadmium, arsenic) and PCB's (polychlorinated biphenyls).

Pesticides enter waters by aerial drift, runoff or leaching into groundwater. The active ingredients in pesticides differ widely and it is necessary to understand how each pesticide functions and what happens after we use it before we can judge how it might affect the environment.

Many pesticides are broken down into harmless products by micro-organisms. Integrated pest management practices minimise pesticide usage by careful monitoring of pest species (and their predators) and utilising a range of control options.

Industrial wastes require special treatment and disposal to ensure that they do not have an adverse impact on water resources.

Salinity

Soils and groundwater contains varying amounts of 'salts' (eg. chlorides, bicarbonates and carbonates of sodium, calcium and potassium) depending on the local geology. Tree clearing or over-use of irrigation may cause groundwater to rise. The salts may enter streams via spring flow or when runoff removes salts previously deposited on the surface by evaporation.

In coastal areas, depletion of fresh groundwater reserves may cause the intrusion of seawater to inland sites.

Acid sulfate soils

Acid sulfate soils, found in many coastal areas, contain iron sulfides. When exposed to air by drainage or disturbance, these soils produce sulfuric acid, and may release toxic quantities of aluminium, iron and heavy metals. The acid and metals can seep into waterways killing fish, other aquatic organisms and vegetation.

Taking action

We all live in a catchment and have a responsibility to play our part in looking after it. Through the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT), Australian, and State Governments support the work of Regional Bodies to implement solutions for local problems. In Queensland, the Department of Natural Resources and Water (NRW) is a lead agency for the NAP.

Regional NRW Bodies are currently implementing regional plans to meet regional and national objectives to address water quality and salinity problems. This work is assisted by local groups such as Landcare and Waterwatch.

The NAP is complemented by the Reef Water Quality Protection Plan, a joint initiative of the Australian and Queensland Governments, in partnership with rural industry sectors and Regional NRW Bodies. The goal of the Reef Plan is to halt and reverse the decline in water quality entering the Reef within 10 years. It is underpinned by a range of strategies including self-management, education, research, partnerships, economic incentives, land use planning and monitoring and evaluation.

NRM, other government agencies, local government, industry and individuals monitor water quality at many sites throughout the state. This information is crucial to understanding and managing water quality issues.

Queensland legislation with a role in improving water quality includes the *Vegetation Management Act 1999*, the *Water Act 2000* and the *Environmental Protection Act 1994* which has established an *Environmental Protection Policy for water.*

Further information

Check other NRW facts as well as these web sites.

NRW	www.nrw.qld.gov.au
EPA	www.epa.qld.gov.au
Waterwatch Qld	www.qld.waterwatch.org.au/
Reef Plan	www.thepremier.qld.gov.au (enter 'reef water quality protection plan' in the search box on the home page)

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