

Catchments and water quality

Water naturally contains various physical, chemical and biological substances, which it gathers from the atmosphere, soils and underlying rocks as it moves through the water cycle.

These substances may be dissolved or carried as solids and they accumulate as the water moves downstream. They become pollution if they exceed natural levels to an undesirable extent.

Water pollution can be from:

- a point source—it has flowed from an identifiable location, such as a pipe in a sewage plant
- a diffuse source—it was discharged from a rural or urban area and flowed through many properties before it reached the stream or river.

The health of a catchment depends on how it is managed. Human activity can add organic and inorganic wastes, chemical contaminants and nutrients to streams, and increase salinity, reduce oxygen and change pH and water temperature. These changes may alter the level of biological activity in water, increase treatment costs and affect marine environments including estuaries and the Great Barrier Reef.

Water quality issues

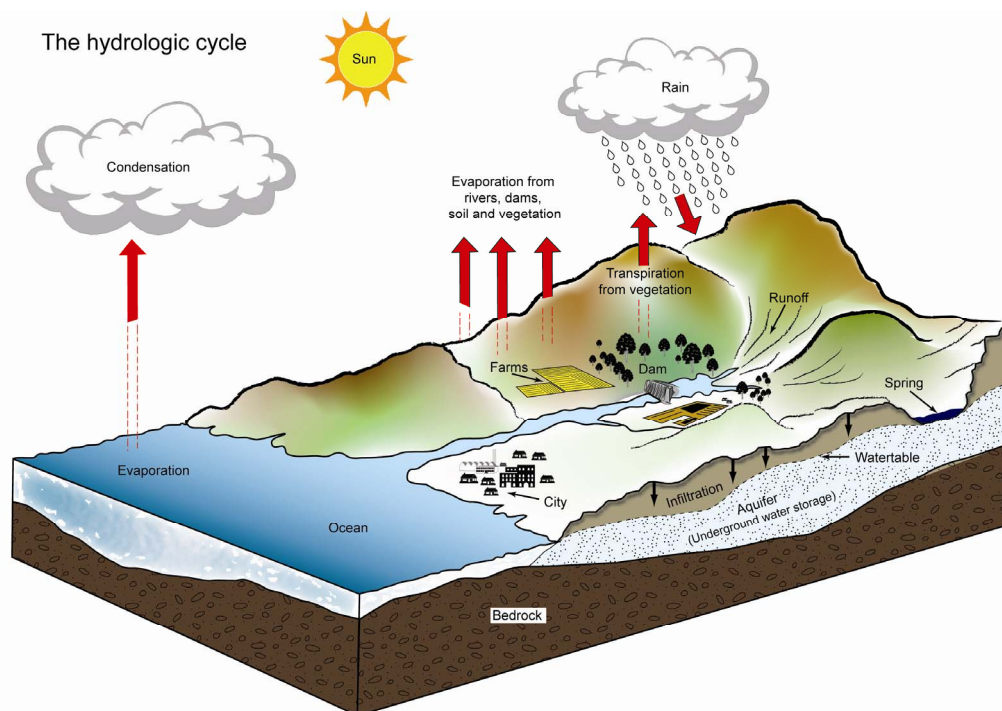
Inappropriate or unsustainable land-use practices can have a range of impacts on water quality. All land should be used in accordance with its capability.

Changes to natural drainage patterns also affect water quality.

Dams modify the quality, volume, speed and frequency of stream flow. Over-extraction or redirection of water may reduce flushing and drainage, leading to accumulations of salts, nutrients and sediment in parts of the catchment. Environmental flows need to be maintained to ensure the long-term health of 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, toxicity, and longer term residual and water treatment issues. This nutrient-rich effluent can hasten eutrophication—a natural process of nutrient accumulation leading to algal blooms and deterioration of water quality. Effluent may also add disease-causing viruses, protozoans and bacteria to water resources. Careful planning and management are required to prevent effluent releases from adversely affecting ground or surface waters.



Water quality depends on how our catchments are managed

Erosion

Erosion can accelerate when land is deforested, overgrazed, cultivated or mined, or cleared for development, transport or pipe and power line corridors. Good management practices can minimise erosion and reduce the sediment in run-off to streams.

When soil is eroded, any nutrients, fertilisers or pesticides travel with it. It may be deposited in sediment traps, contour banks, waterways, dams or wetlands before reaching a stream. Dispersible soils are highly erodible and break down into minute particles that remain in suspension so that water in streams is always turbid.

Erosion of stream banks during flooding is a significant source of sediment. Vegetated riparian areas can help stabilise the banks and improve water quality, but they will not overcome problems created by poor catchment management.

Chemical contamination

Thousands of man-made chemicals—including fertilisers, pesticides, solvents, paint, petroleum by-products and PCBs (polychlorinated biphenyls)—have contaminated the environment. Heavy metals such as mercury, molybdenum, cadmium and arsenic are also released in chemically active forms as a result of human activities.

Man-made chemicals enter surface waters through aerial drift, run-off or boating. Groundwater is contaminated by water leaching through soils—from stream flow or from direct sources such as leaky petrol tanks or waste disposal sites.

Water pollution can be minimised by adopting World's Best Practice management procedures. This includes Integrated Pest Management to minimise pesticide usage by monitoring pest species and their predators and using a range of control options.

Salinity

Soils and groundwater contain varying amounts of 'salts' (e.g. chlorides, bicarbonates and sulfates of sodium, calcium and magnesium), depending on the local geology and climate.

Tree clearing or over-use of irrigation may cause groundwater to rise, bringing excess salt to the surface where it may damage soils or affect surface water. In coastal areas, depletion of fresh groundwater reserves by over-use may cause the intrusion of seawater into coastal aquifers.

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

Numerous state and local government agencies, industries and individuals monitor water quality at many sites throughout Queensland. These programs and initiatives focus on improving the state's water quality:

- The Reef Water Quality Protection Plan aims to improve the quality of water entering the Great Barrier Reef lagoon <www.reefplan.qld.gov.au> and <www.reefwisefarming.qld.gov.au>
- The Healthy Waterways Partnership in south-east Queensland works towards improving catchment management, including the adoption of water sensitive urban designs <www.healthywaterways.org.au>
- The Environmental Protection Policy for water defines Environmentally Relevant Activities—e.g. chemical processing, waste treatment and intensive agriculture. Those involved in these activities require licences to discharge wastewater to waterways
- Under its Coastal Catchments Initiative, the Australian Government has funded the preparation of Water Quality Improvement Plans. DERM works with Regional NRM bodies and local governments to prepare and implement these plans
- Landcare <www.landcare.org.au> and Waterwatch <www.qld.waterwatch.org.au>
- Queensland Wetlands Program <www.epa.qld.gov.au/wetlandinfo>.

We all live in a catchment and have a responsibility to play our part in looking after it. The *Environmental Protection Act 1994* places a general environmental duty of care on everyone in Queensland.

Further information

As well as the websites listed above, the department's website <www.derm.qld.gov.au> contains information about issues such as erosion, salinity, chemical contamination and acid sulfate soils.

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