



WATER ON NORTH STRADBROKE ISLAND

Beneath North Stradbroke Island is an extensive aquifer; its precise capacity is unknown. The aquifer takes the form of water held in suspension in sand. In effect it is an invisible dam. Water is pumped from it to supply the three island townships (plus 400,000+ visitors annually), the mainland, and the sandmining operations.

Like a land-based dam, the aquifer is recharged only by rainfall. In the past 10 years, the average annual rainfall has declined from 1677mm to 1350mm.

Not all rain penetrates to the aquifer. Some evaporates, some is taken up by plants, some flows directly to streams, lakes and swamps. The rate of infiltration depends on the amount and duration of rainfall (it takes roughly two weeks of steady, heavy rain for infiltration to the aquifer); the depth of sand through which the water travels (it takes longer to penetrate high dunes); the presence of perched or indurated layers (hardened deposits of organic matter, clays or minerals) within the sand which can impede or deflect the flow of water. Recharge rates are not fully understood.

Climate change will alter the rainfall patterns: one scenario is heavier, sharper storm events, not the extended flooding rains needed to recharge the aquifer.

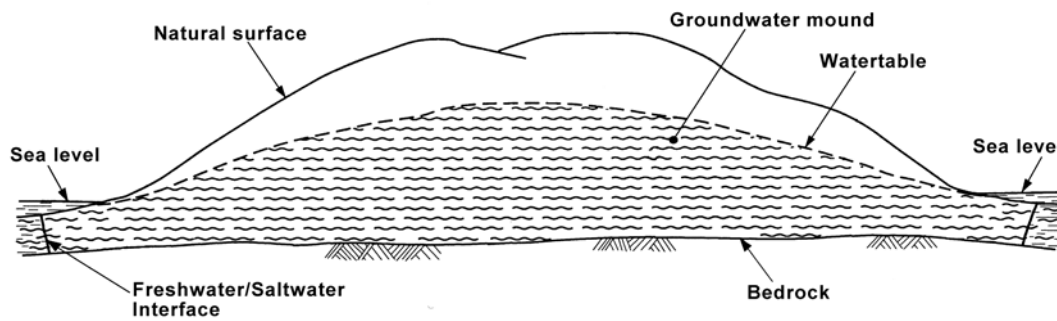
There is a hydrodynamic connection between the 'lens' of freshwater beneath the island and the surrounding seawater. This 'holds' the freshwater in place, even below sea level at the saltwater interface. Over-pumping would risk saltwater intrusion into the freshwater, polluting it and causing irreversible changes.

In 1990, Redland City Council began pumping water off the island through a pipeline under the bay. More than 70% of RCC's water is supplied from the island. The environmental effects of current extraction – approximately 30 megalitres (ML) per day – have not yet been assessed. The sustainable yield is not known.

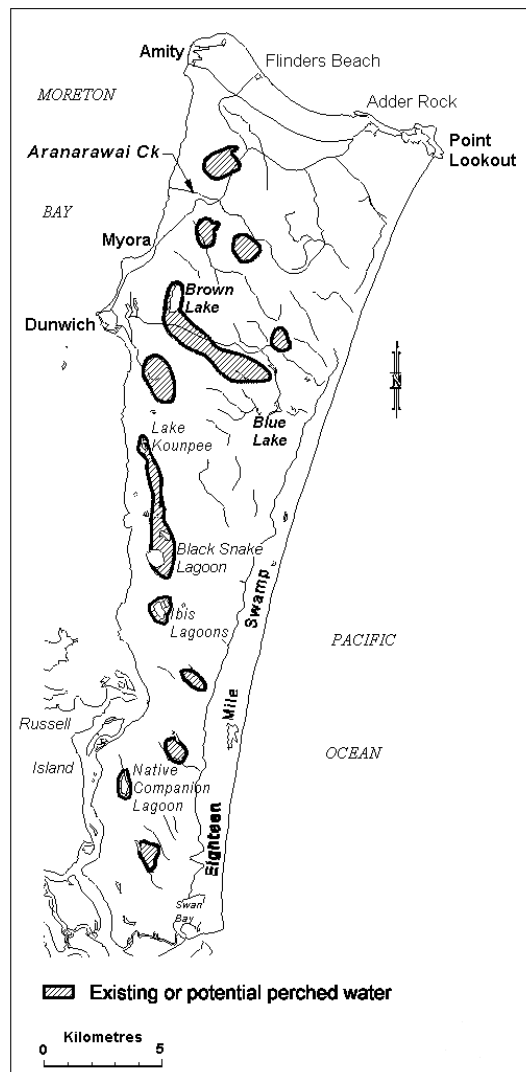
For 55 years, sandmining has used pristine island water to rinse out minerals from the millions of tonnes of sand it excavates. This involves moving around large quantities of water from one area to another (sandmining accounts for 80% of water use). The effects on water quality and habitat of redirecting the water from one side of the island to the other are not fully understood.

In 2006-07 the Government proposed to extract an additional 22ML per day. SIMO and others demanded that no extra water should be taken until better monitoring was in place. More monitoring bores have been installed on the island recently. As part of a Water Resource Plan, a whole-of-island groundwater model is being updated and refined. It will inform the management of the aquifer for the next 10 years. Trigger levels for key environmental assets are also being identified as part of an adaptive management program of the island's water.

A model is only as good as the data it crunches. While much catch-up monitoring is occurring, systematic measurements of many vital processes are still entirely missing. To manage the aquifer, the island's complex hydrological system must be well understood using accurate data.



The groundwater 'lens' extends under much of North Stradbroke Island. Recharge rates are not fully understood. It takes roughly two weeks of steady, heavy rain for infiltration to reach the aquifer.



There is still much uncertainty about how water flows through the dunes to reach the lakes, lagoons and streams on the island. For instance, does it flow vertically straight down through the dunes to perching layers that guide the water to the water bodies? Or does it flow just below and parallel to the surface of the dunes, heading down slope to the valleys and basins of the streams and lakes?

Diagrams supplied by Department Natural Resources and Water