# LOWER LAKES WATER QUALITY REPORT

**Report 5, July 2009**

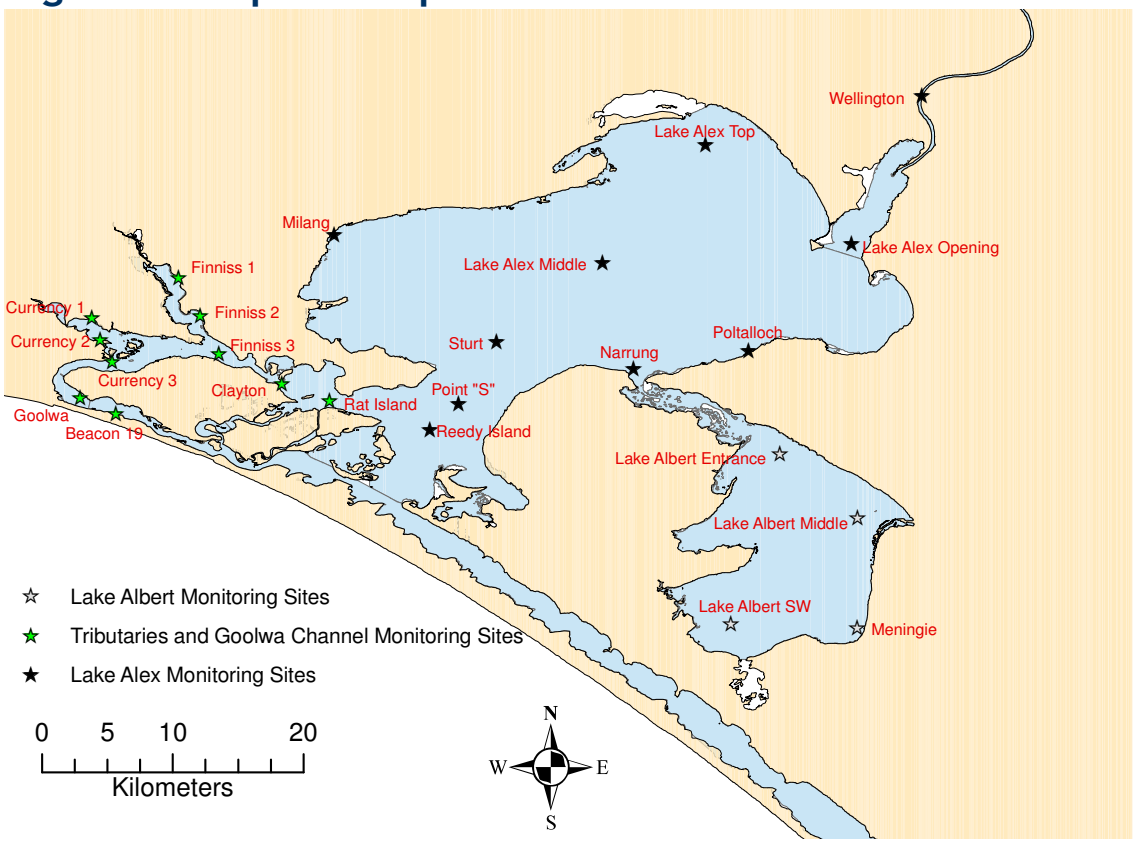
## Observations at a glance

- pH and alkalinity levels are stable and within guideline and management trigger levels (satisfactory) in Lakes Alexandrina and Albert
- Alkalinity and pH have declined within areas of Currency Creek and Finniss River and are being closely monitored
- Salinity levels have decreased due to winter rainfall

## Background

The Environment Protection Authority, South Australian Murray–Darling Basin Natural Resources Management Board, Department of Water, Land and Biodiversity Conservation, and Department for Environment and Heritage are monitoring to assess potential water quality impacts associated with water level decline and the exposure of acid sulfate soils (ASS) in the Lower Lakes. Fortnightly grab samples have been undertaken since August 2008 at 20 sites in Lake Alexandrina, Goolwa Channel, the Currency Creek and Finniss River tributaries, and 4 sites in Lake Albert (Figure 1).

## Figure 1 Map of sample sites



## Summary

A wide range of water quality parameters are being analysed for each of the sites. The key parameters at this time are alkalinity, salinity, pH and turbidity. Water quality results are shown below for selected sites and parameters in Lake Alexandrina (Figure 2), the Finniss and Currency tributary region (Figure 3) and Lake Albert (Figure 4). The full water quality dataset is available for download on the EPA website.

- **Alkalinity** is at high levels and stable for all sites in the main areas of Lakes Alexandrina and Albert, ranging between 150 and 250 milligrams per litre (mg/L) as calcium carbonate or $CaCO_3$ (Figures 2A and 4A). All values are above the state government trigger values for increased monitoring (100 mg/L) or management action (25 mg/L as $CaCO_3$).

  Zero alkalinity (no buffering capacity) is present at the Currency Creek site 2 despite limestone addition (Figure 3A). This is due to mobilisation of acidity from ASS following rainfall (Figure 5). A further in depth monitoring program is being undertaken in this region by DEH and EPA with the latest report from this additional sampling available on the web (http://www.epa.sa.gov.au/lower_lakes.html). Limestone additions have recently occurred in this region to mitigate acid sulfate soil impacts and preliminary results show improvement in some areas. Further rainfall has recently occurred in this region and ongoing monitoring is occurring (Figure 5). Levels of alkalinity in the Finniss and Clayton area have also declined recently which could be due to acid inputs from exposed ASS to the remnant water body (Figures 3A and 2A).

  Construction of regulator structures is now underway in this region which will help to contain areas of acidic water and prevent further acid generation. Further limestone dosing will be undertaken if required.

  ***Alkalinity is a measure of the buffering capacity of water, or the capacity of the water to neutralise acids.***

- **pH** levels are stable at approximately 8 – 8.5 for all sites within Lakes Alexandrina and Albert (Figures 2B, and 4B). This is within the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines (pH>6.5) for protection of aquatic ecosystems.

  pH levels have remained relatively stable at approximately 7.3 to 8.0 in the Finniss River, and have remained low in the Currency 1 and 2 sites to a pH of 6.8 and 4 respectively following the consumption of the alkalinity (Figure 3B). This is below the ANZECC guidelines (pH>6.5) indicating a high risk to aquatic ecosystems.

  ***pH is an indicator of acidity or alkalinity. Neutral water has a pH of 7, acidic solutions have lower values and alkaline solutions have higher values.***

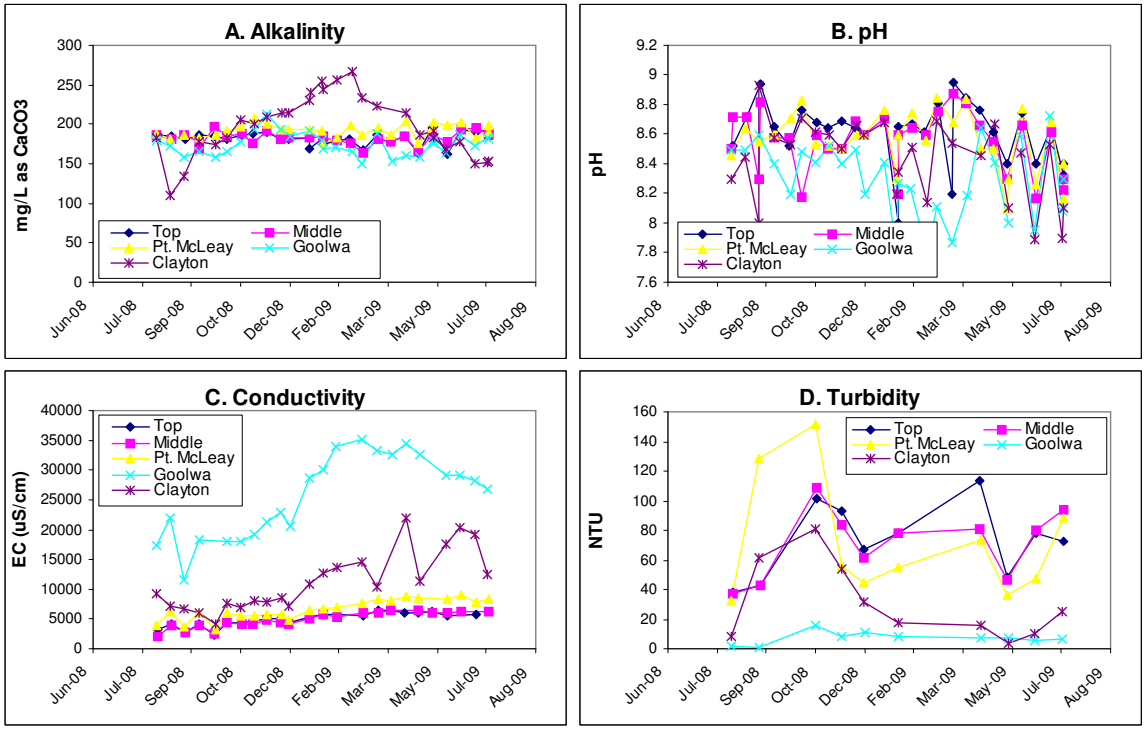
- **Salinity** levels (as measured by conductivity) have now slightly decreased due to lower evaporation rates and rainfall inputs at all sites (Figures 2C, 3C, 4C, rainfall in Figure 5). The lower Finniss-Currency tributary sites and the Goolwa Channel area still have high salinities (approximately half seawater in Goolwa channel).

  ***Salinity is a measure of the amount of dissolved salts in the water. Saline water conducts electricity more readily than freshwater so electrical conductivity (EC) is routinely used to measure salinity.***

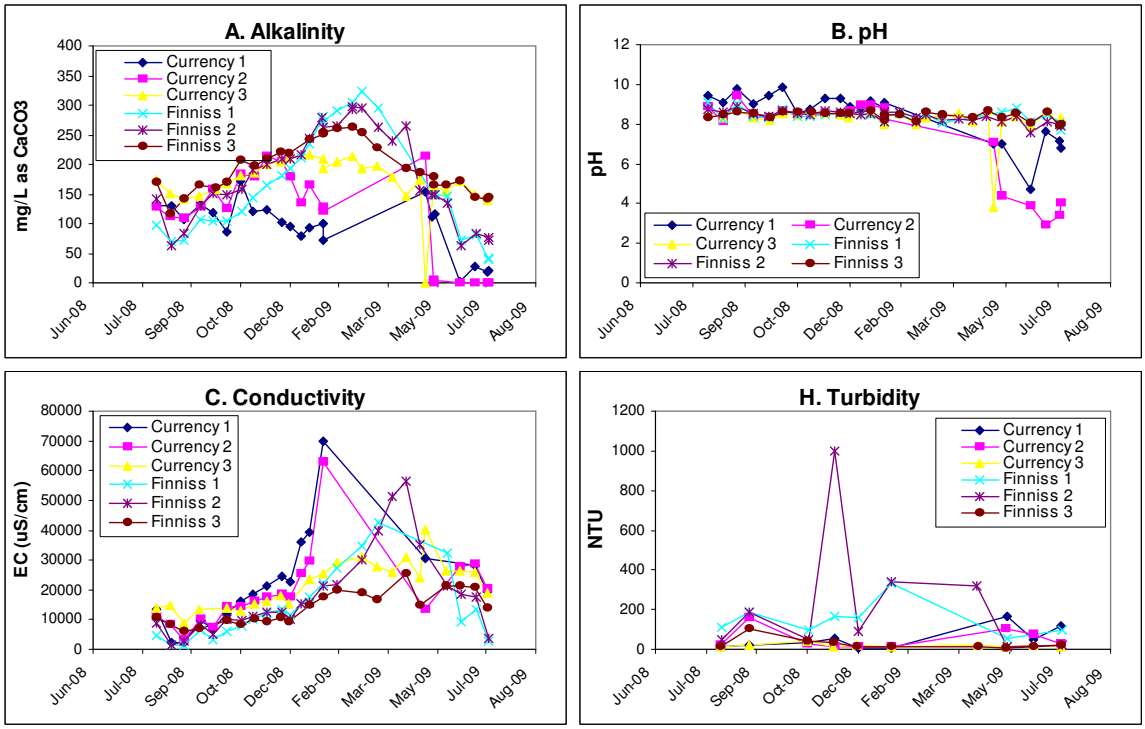
- **Turbidity** levels are quite variable and influenced by wind activity. As the water levels decline wind events will have a greater effect of the quantity of suspended material within the water (Figure 2D, 3D and 4D). The sites with high salinities generally have lower turbidity as salt causes suspended particles to aggregate and settle out of the water column.

  ***Turbidity is a measure of how much suspended material (e.g. phytoplankton, silt, clay) is in the water. The more suspended material, the greater is the water's turbidity and the lower its clarity.***

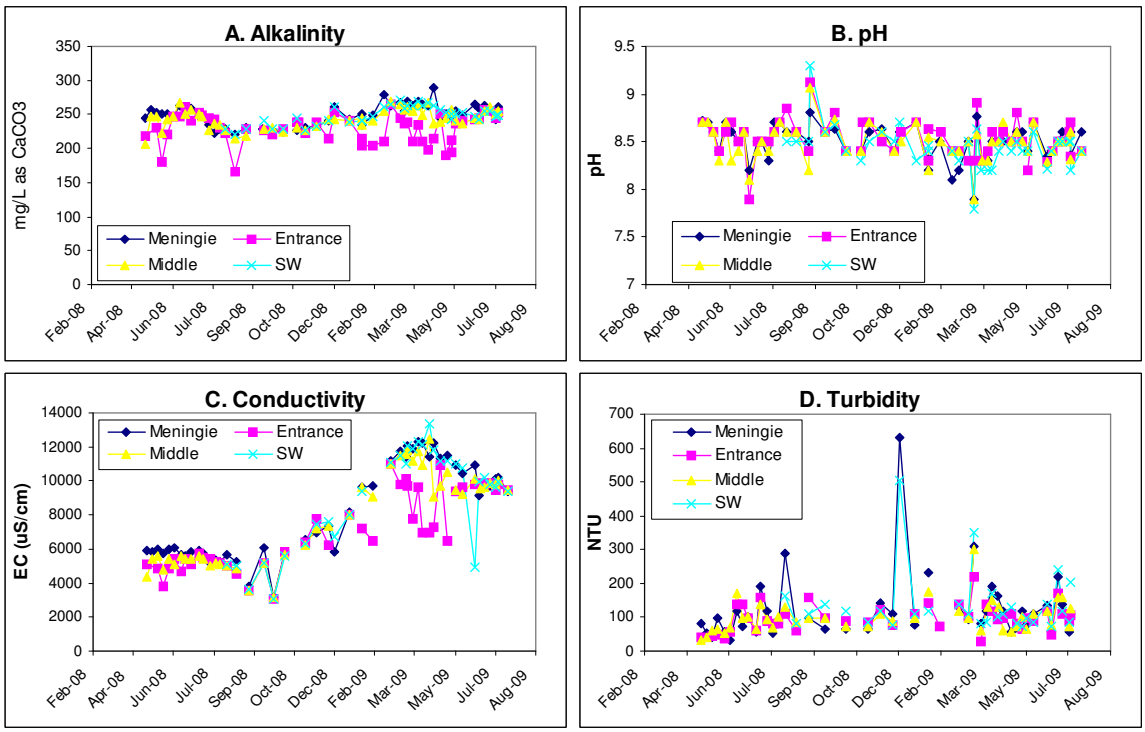
## Figure 2 Lake Alexandrina



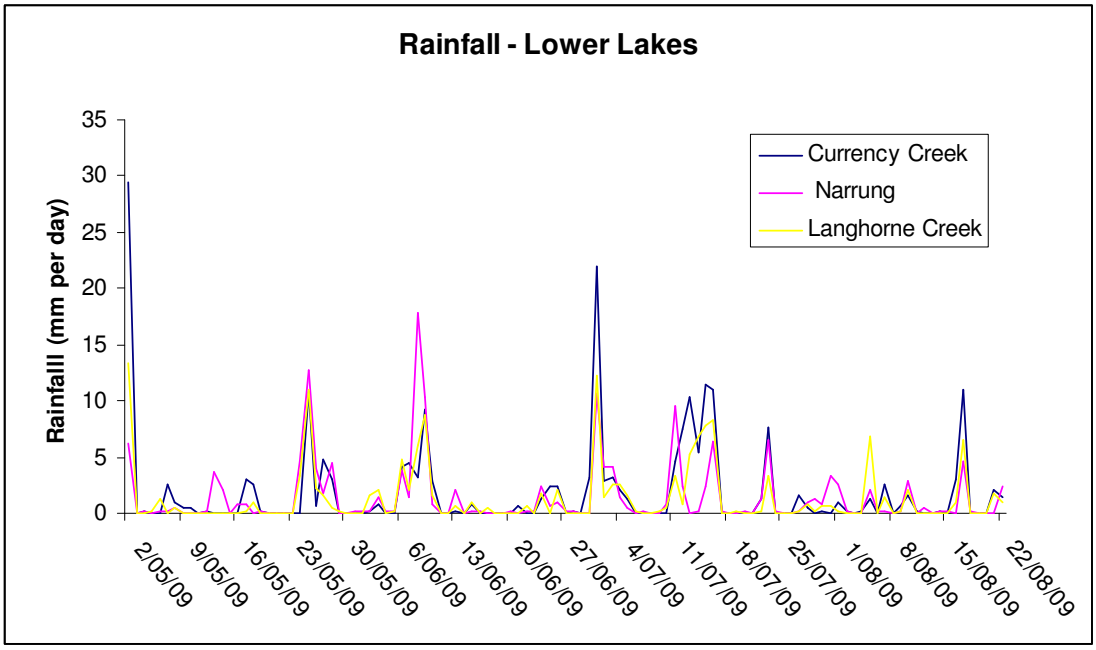
## Figure 3 Finniss River and Currency Creek tributary region




## Figure 4 Lake Albert



## Figure 5 Rainfall at Narrung, Langhorne Creek, Currency Creek




**Further information on water quality and quantity can be found on the following websites:**

- **River Murray Data** http://data.rivermurray.sa.gov.au/ (real-time data)
- **Environment Protection Authority** www.epa.sa.gov.au
- **Department of Water, Land and Biodiversity Conservation** www.dwlbc.sa.gov.au
- **South Australian Murray–Darling Basin Natural Resource Management Board** www.samdbnrm.sa.gov.au
- **Murray–Darling Basin Authority** www.mdba.gov.au
- **Waterwatch** www.waterwatch.org.au