

# LOWER LAKES WATER QUALITY REPORT

Report 7, September 2009

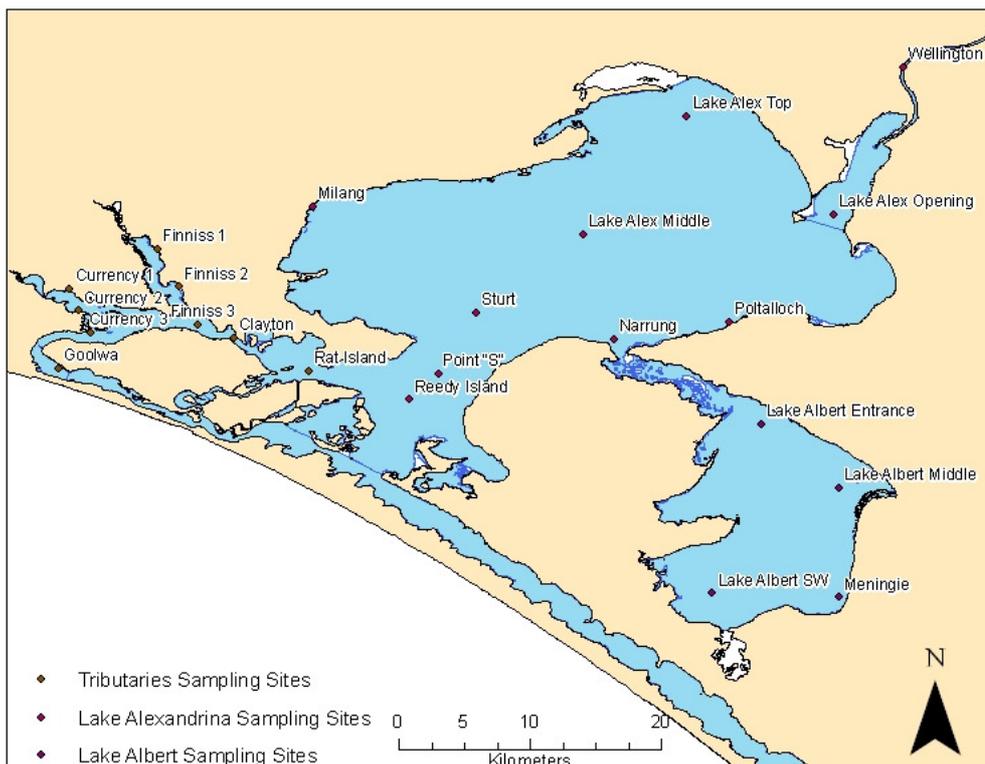
## Observations at a glance

- pH levels are within guideline levels (satisfactory) at all sites
- Alkalinity levels are stable within all areas of Lake Alexandrina and Albert. Alkalinity within Currency Creek has stabilised but remains at low levels
- 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 remains at high levels and above management trigger levels for all sites in the main areas of Lake Alexandrina and Albert (170 - 250 mg/L as CaCO<sub>3</sub>, Figures 2A, 4A). Low alkalinities were found recently at the Clayton site (west side of the regulator) which is likely due to the outflow of lower alkalinity water from the Finniss River (Figure 3A). The water level in the Goolwa Channel region has risen rapidly due to tributary flows and pumping from Lake Alexandrina. Alkalinity at all Currency Creek sites (Figure 3A) has returned somewhat since the application of limestone, and dilution from catchment flows and pumping. However, levels remain low at 25 mg/L (as CaCO<sub>3</sub>) indicating that the water body is still susceptible to further acidification. Levels of alkalinity in the Finniss area are relatively stable between 50 and 70 mg/L (Figure 3A). A further in depth monitoring program is being undertaken in this region (see the EPA's website: [Currency-Finniss water quality reports](#)).

***Alkalinity is a measure of the buffering capacity of water, or the capacity of the water to neutralise acids and resist pH change. Alkalinity within water bodies is consumed as acid is released from acid sulfate soils. Adding limestone contributes alkalinity to waters helping to neutralise any acid released from the sediments. Historically alkalinity levels within this region have been between 100 – 250 mg/L as CaCO<sub>3</sub>.***

- **pH** levels are stable at approximately, 8-8.5 for all sites in Lakes Alexandrina and Albert (Figures 2B, 4B) and this is well above the ANZECC guideline level of pH>6.5.

pH levels have remained relatively stable at approximately 7.8 to 8.4 in Finniss River, and have recovered and stabilised at all Currency Creek sites to a pH of between 7 to 8 (Figure 3B). This indicates the success of the limestone dosing and water level management program in neutralising the acidic conditions seen here in recent months. The pH decreased at the Clayton site which is consistent with the decrease in alkalinity noted above (Figure 3A).

***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 stabilised or are increasing (Lake Albert) at all sites (Figures 2C, 3C, 4C, rainfall in Figure 5). Salinities are expected to rise rapidly over the summer

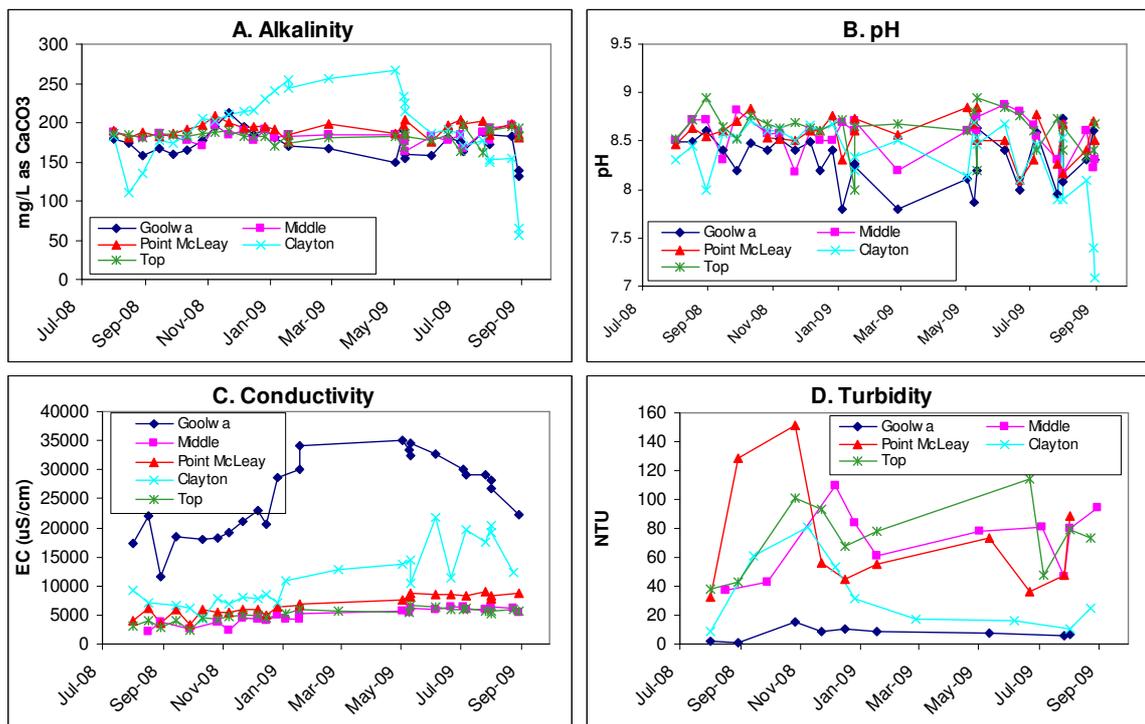
months. The Goolwa Channel and the lower Finniss-Currency tributary sites still have relatively high salinities (10,000-20,000EC) despite dilution from tributary flows and pumping from Lake Alexandrina (Figures 2C & 3C).

**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.**

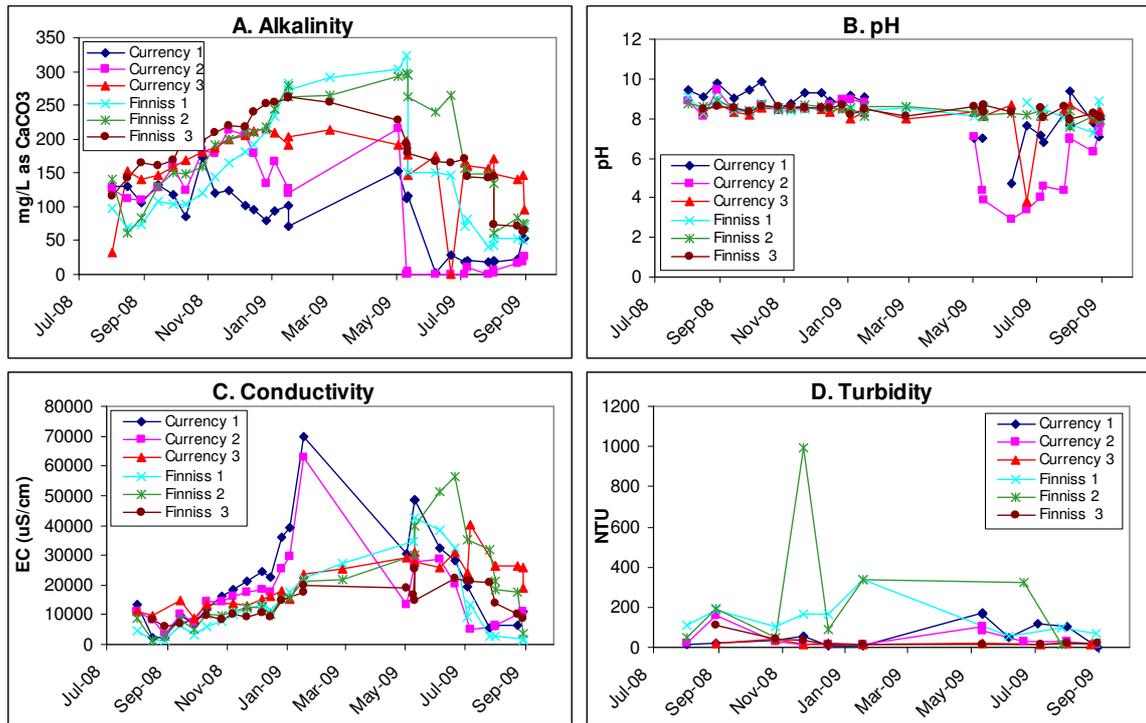
- **Turbidity** levels are quite variable and influenced by wind activity. As the water levels decline wind events will have a greater effect on the quantity of suspended material within the water (Figure 2D, 3D and 4D). The sites with high salinities (eg Goolwa) generally have lower turbidity as salt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

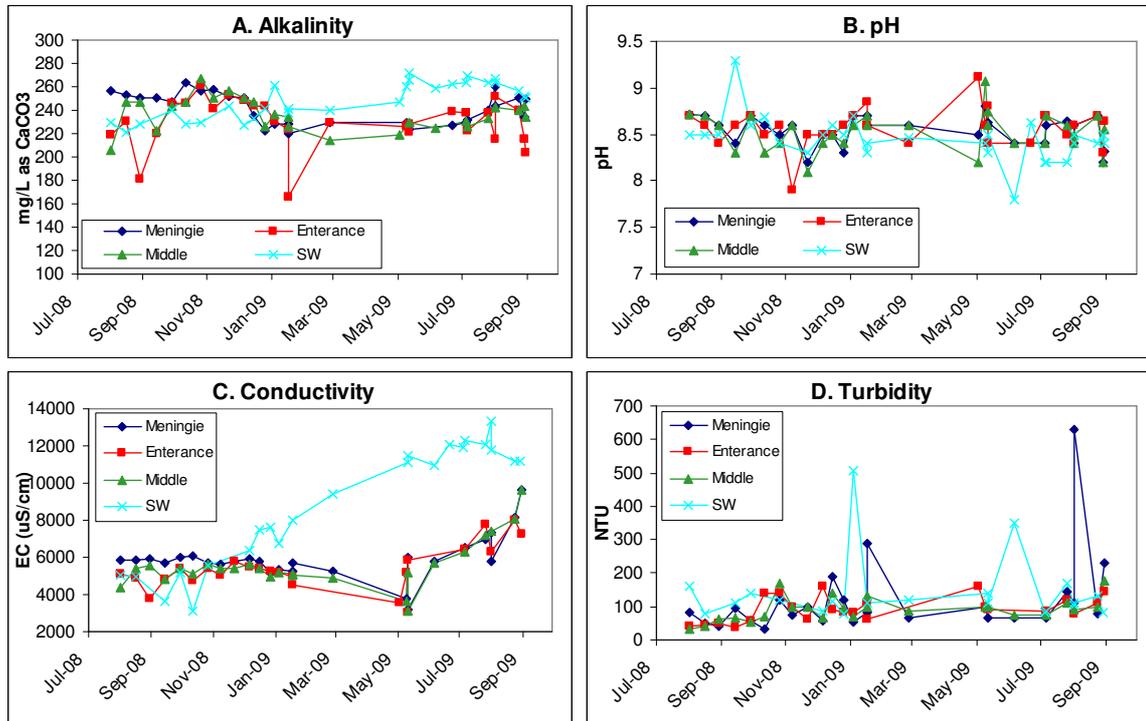
**Figure 2 Lake Alexandrina**



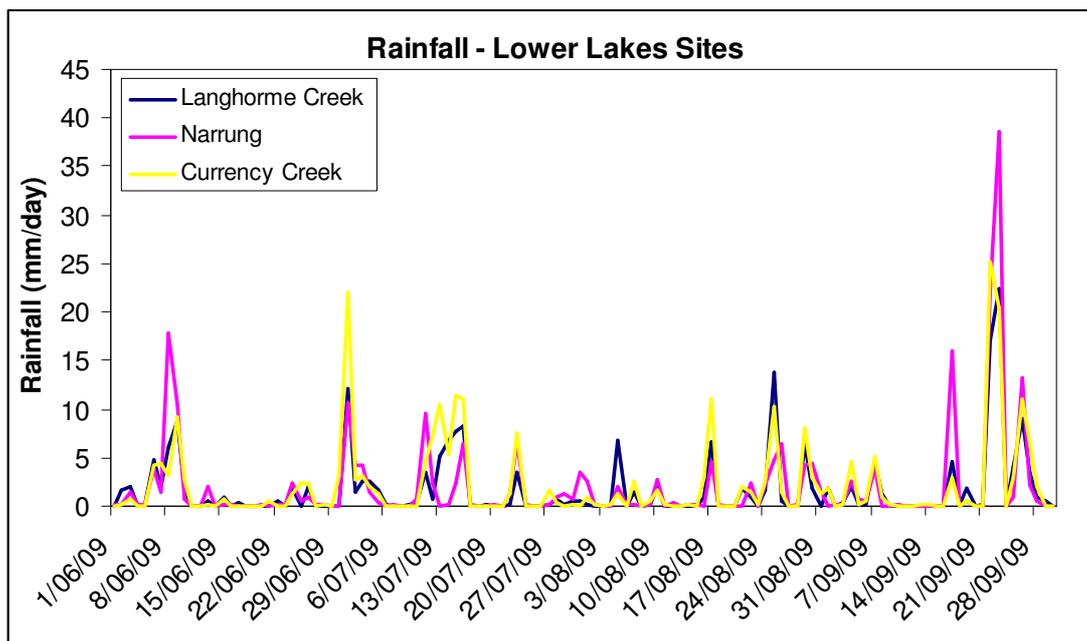
**Figure 3 Finnis River and Currency Creek tributary region**



**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](http://www.epa.sa.gov.au)
- Department of Water, Land and Biodiversity Conservation [www.dwlbc.sa.gov.au](http://www.dwlbc.sa.gov.au)
- South Australian Murray–Darling Basin Natural Resource Management Board [www.samdbnrm.sa.gov.au](http://www.samdbnrm.sa.gov.au)
- Murray–Darling Basin Authority [www.mdba.gov.au](http://www.mdba.gov.au)
- Waterwatch [www.waterwatch.org.au](http://www.waterwatch.org.au)