LOWER LAKES WATER QUALITY REPORT

Report 3, May 2009

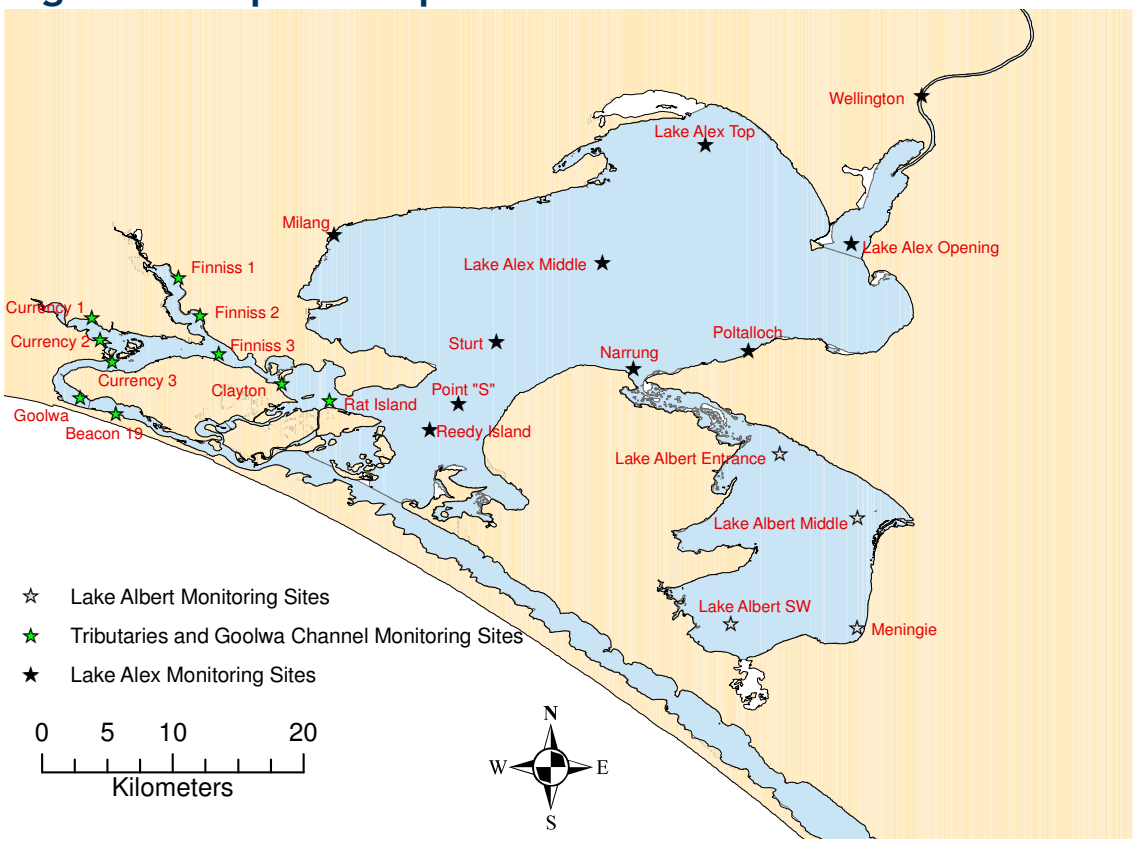
Observations at a glance

- pH and alkalinity levels are stable and within guideline and management trigger levels (satisfactory) in Lakes Alexandrina and Albert
- Alkalinity and pH have declined in pools of water within Currency Creek and are being closely monitored
- Salinity levels have stabilised due to decreased evaporation and 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 four 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 $CaCO_3$).

  Following recent rainfall events, sampling in previously dried areas of Currency Creek has resumed. Pools of standing water at Currency 2 have recorded alkalinity down to zero indicating that the system no longer contains any buffering capacity (Figure 3A). This is primarily due to mobilisation of acidity from oxidised acid sulfate soil sediments.

  Levels of alkalinity in the Finniss area have also declined recently which could in part be due to acid inputs from sediment to the remnant water body. However alkalinity continues to remain above management trigger levels and is being monitored closely (Figure 3A).

  A separate report for the Currency and Finniss region is available on the EPA website with results from more intensive monitoring. Limestone ($CaCO_3$) additions are also occurring in the Currency region to neutralise acidic pools.

  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 7.5 to 8.5 in the Finniss River, but have declined in the Currency 2 pool to 4.27 following the consumption of the alkalinity (Figure 3B). This is below the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines (pH>6.5) indicating a high risk to aquatic ecosystems. The limestone additions occurring to this area should result in the return of more neutral pH values.

pH is a measure of acidity or alkalinity. Pure water has a pH of 7, acidic solutions have lower values and alkaline solutions have higher values.

- **Salinity** levels (as measured by conductivity) are high compared to historical levels in the Lakes and Tributaries but have decreased recently due to lower evaporation rates and recent rainfall inputs. (Figures 2C, 3C and 4C).

  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

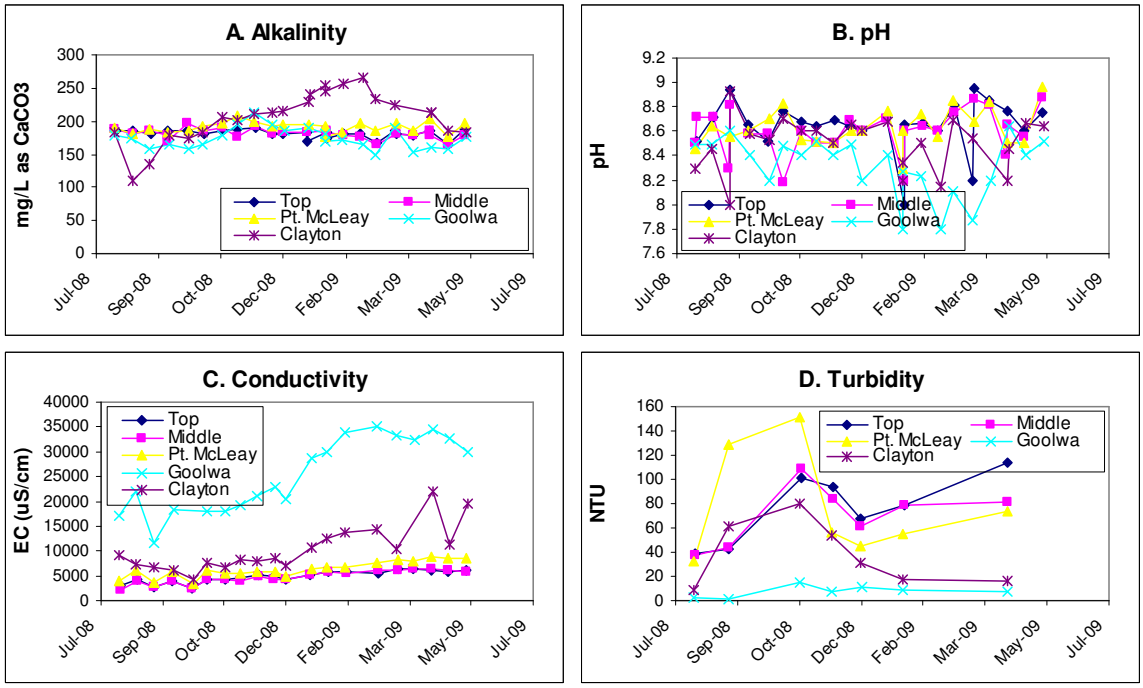


Figure 3 Finniss River and Currency Creek tributary region

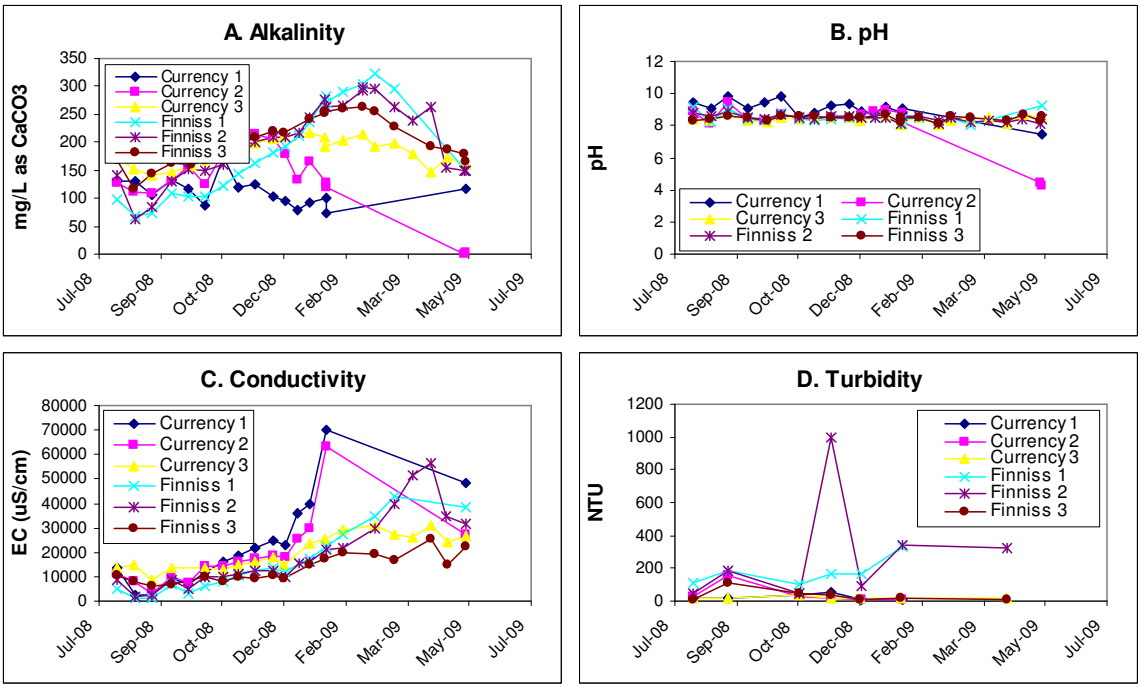
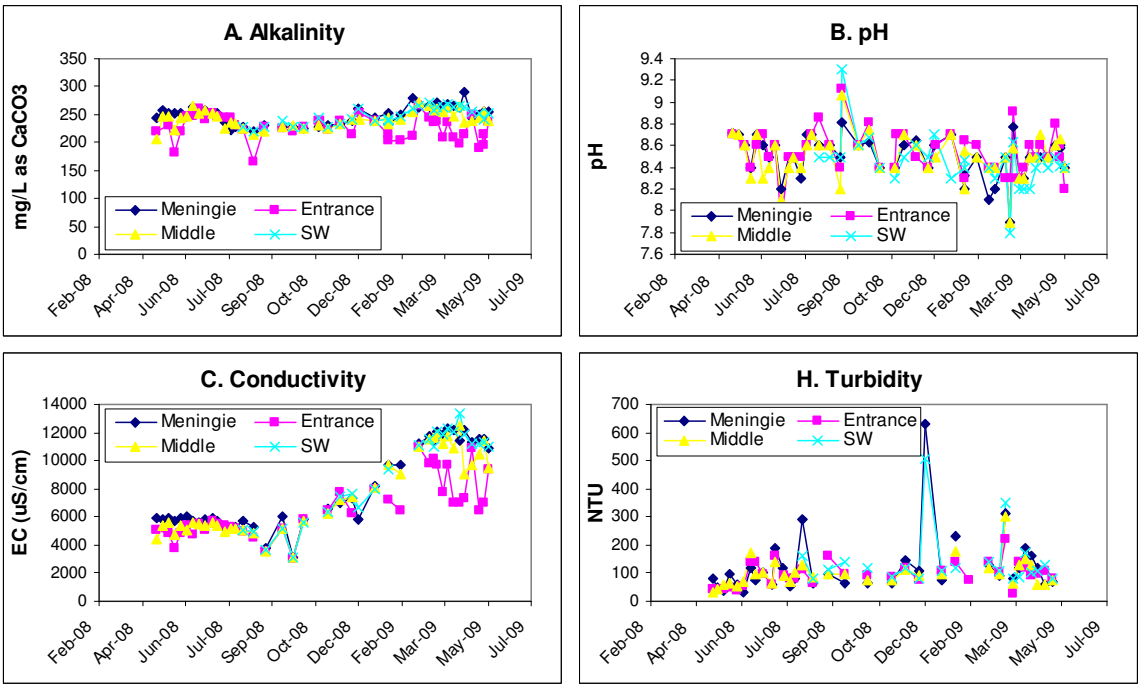


Figure 4 Lake Albert



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