LOWER LAKES WATER QUALITY REPORT

Report 11, January 2010

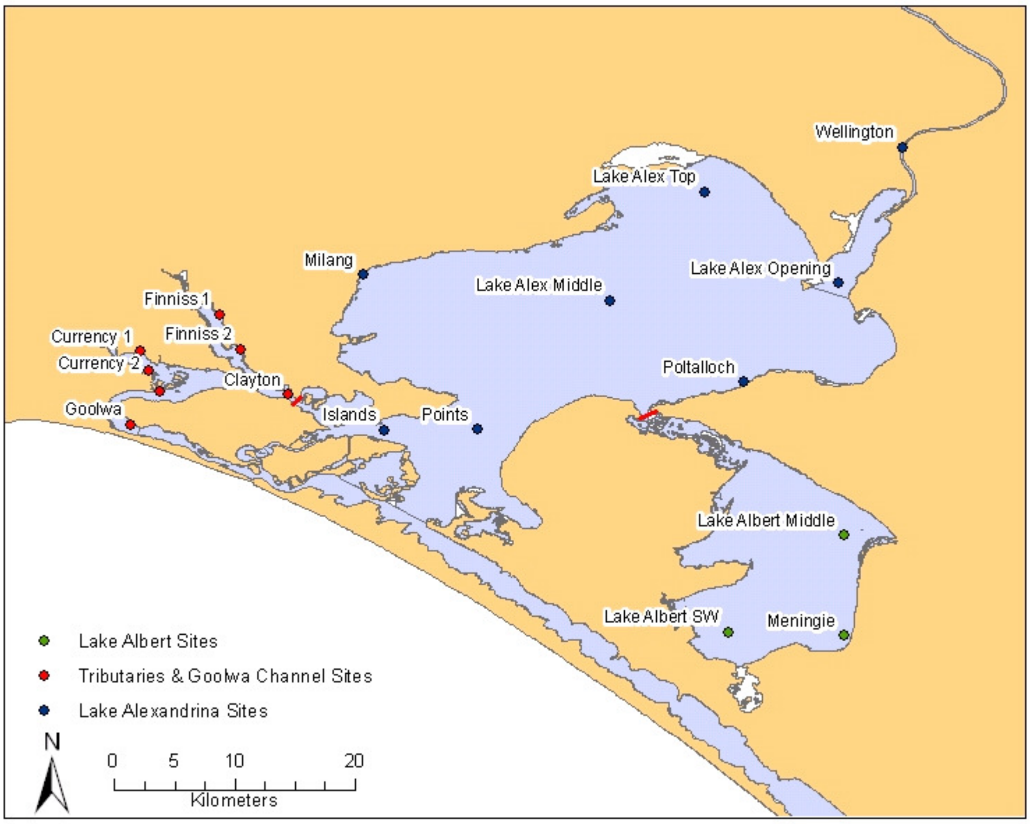
Observations at a glance

- pH levels are within ANZECC guideline values (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 increased due to evaporation exceeding precipitation and inflows.

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 18 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 stable and above management trigger levels for all sites in the main areas of Lake Alexandrina (160 - 250 mg/L as $CaCO_3$, Figure 2A).

  Lake Albert alkalinity remains high (above 200 mg/L as $CaCO_3$, Figure 4A) since pumping has started there has been a notable increase in alkalinity, specifically at the Lake Albert Entrance site.

  Alkalinity within the Currency Creek stabilised with the influx of water during the pumping over the regulator at Clayton (Figure 3A). However areas of the upper Currency still have low alkalinities between 65 and 175 mg/L as $CaCO_3$, see Figure 3A. Alkalinity within the Finniss River remains stable, however sites in the upper reaches continue to exhibit lower alkalinity and monitoring data suggests this is not due to dilution from tributary inflows. All tributary sites will require continued monitoring as water levels continue to draw down over the warmer months (see the latest specific water quality report for this region available on the EPA website[1]).

  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 $CaCO_3$.

- **pH** levels are relatively stable at approximately 8.6-8.9 for all sites in Lakes Alexandrina and Albert (Figures 2B, 4B) and this is within the ANZECC guideline level of pH 6.5-9.0.

  pH levels have remained stable at approximately 8.5 in Finniss River, and have recovered and stabilised (from earlier acidified conditions) at all Currency Creek sites to a pH above 8 (Figure 3B).

  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.

[1] See the EPA's Lower Lakes water quality website http://www.epa.sa.gov.au/environmental_info/water_quality/monitoring_programs_and_assessments/lower_lakes

- **Salinity** levels (as measured by electrical conductivity) continue to increase at most sites in the Lake Alexandrina, Currency Creek, Finniss river and the Goolwa Channel due to evaporation exceeding precipitation (Figures 2C, 3C rainfall in Figure 5). Salinity in Lake Albert has continued to increase rapidly during January (up to 17800 EC) due to the ongoing evaporation and concentration of the salts despite the pumping of water from Lake Alexandrina(Figure 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 on the quantity of suspended material within the water (Figure 2D, 3D and 4D). The sites behind the Clayton Regulator (e.g. Goolwa) generally have much lower turbidity (<30 NTU) (Figure 2D). This is likely due to lower concentrations of these constituents in tributaries flows, settling in the pool downstream of the regulator and salt induced coagulation and settling of clay colloids.

  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

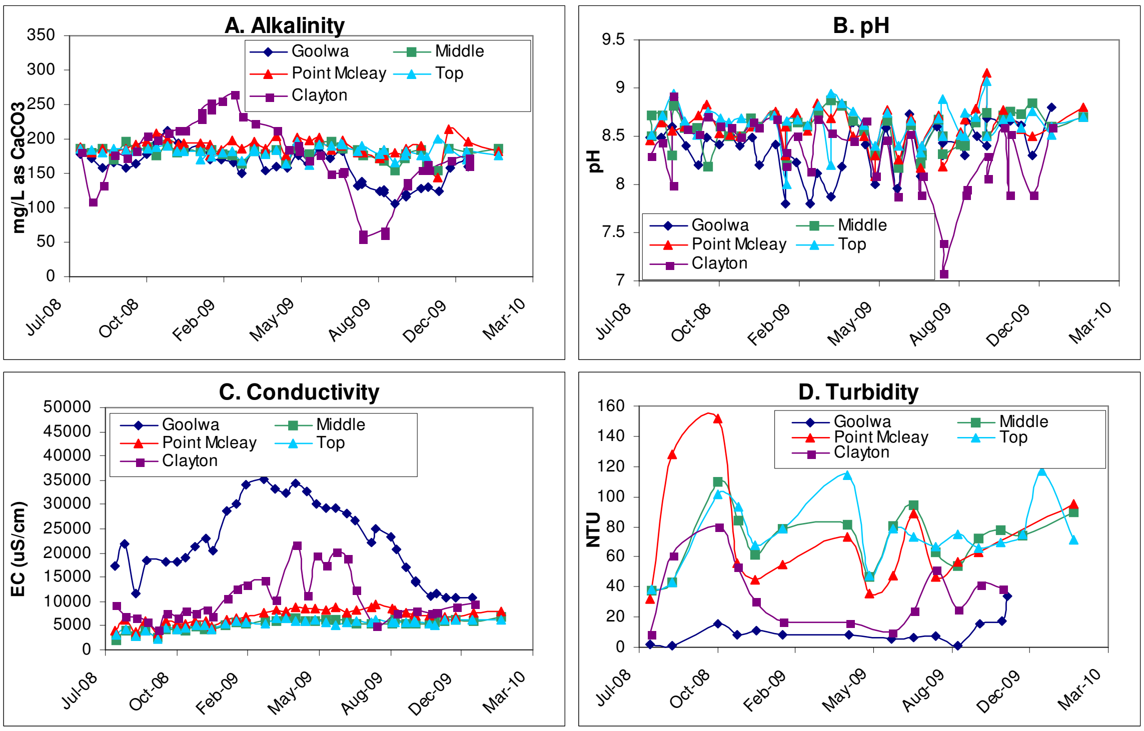


Figure 3 Finniss River and Currency Creek tributary region

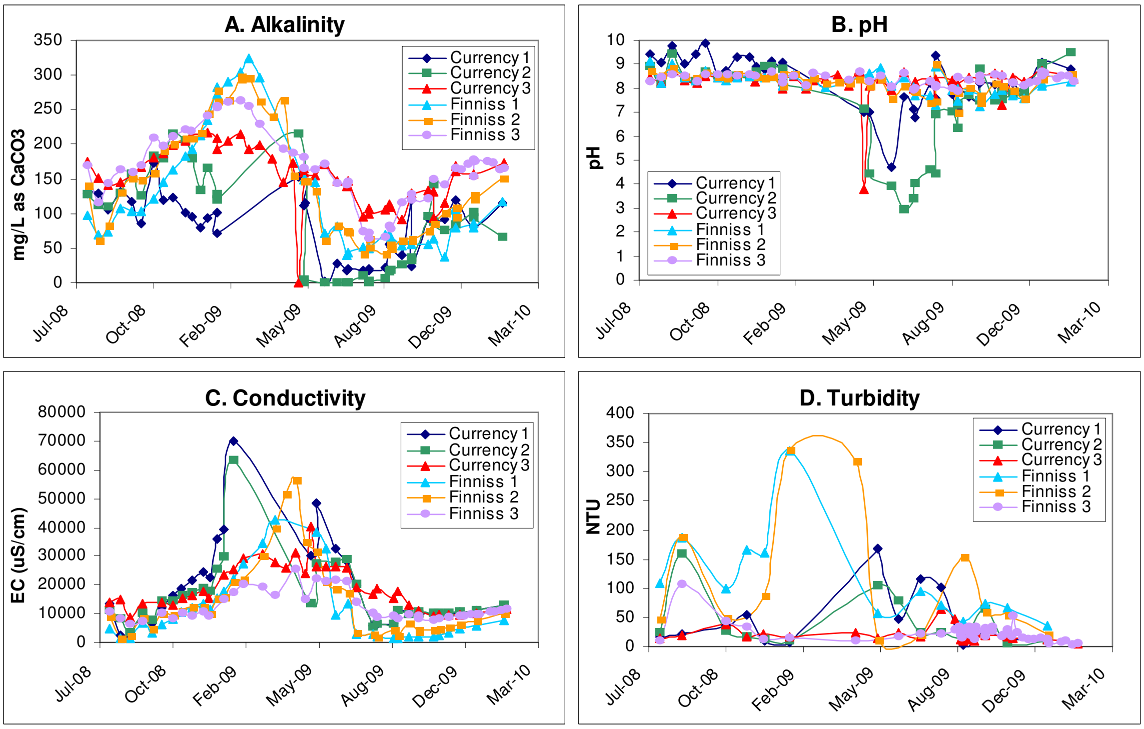


Figure 4 Lake Albert

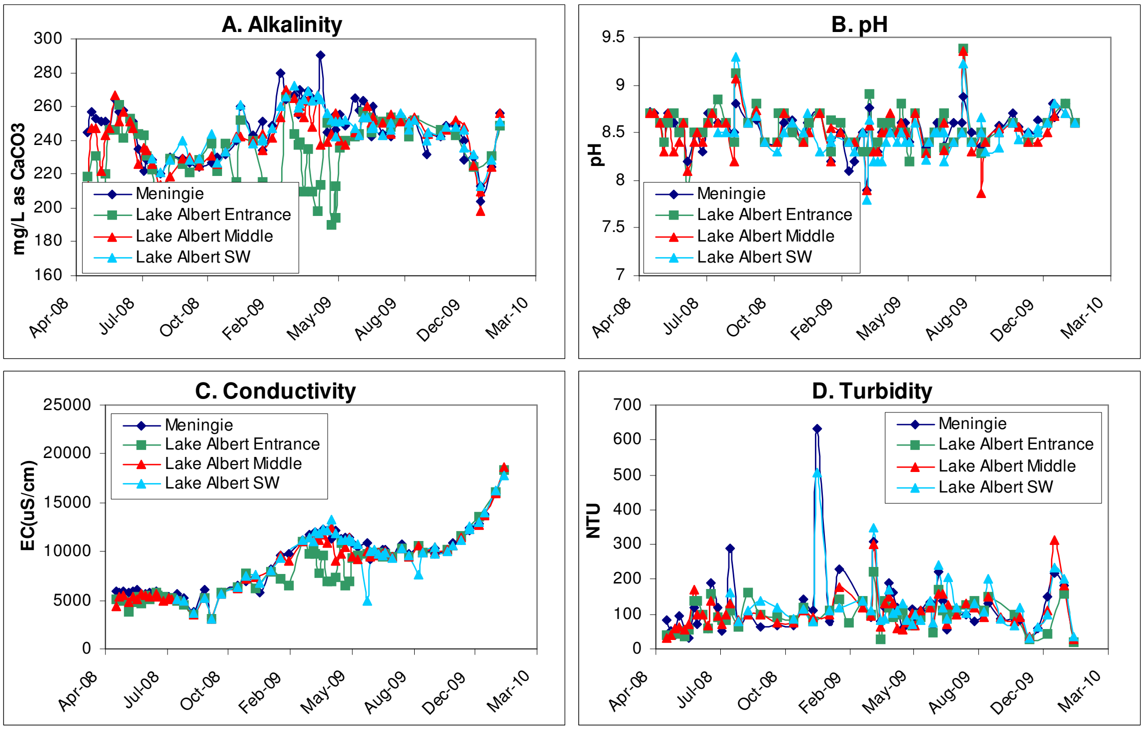
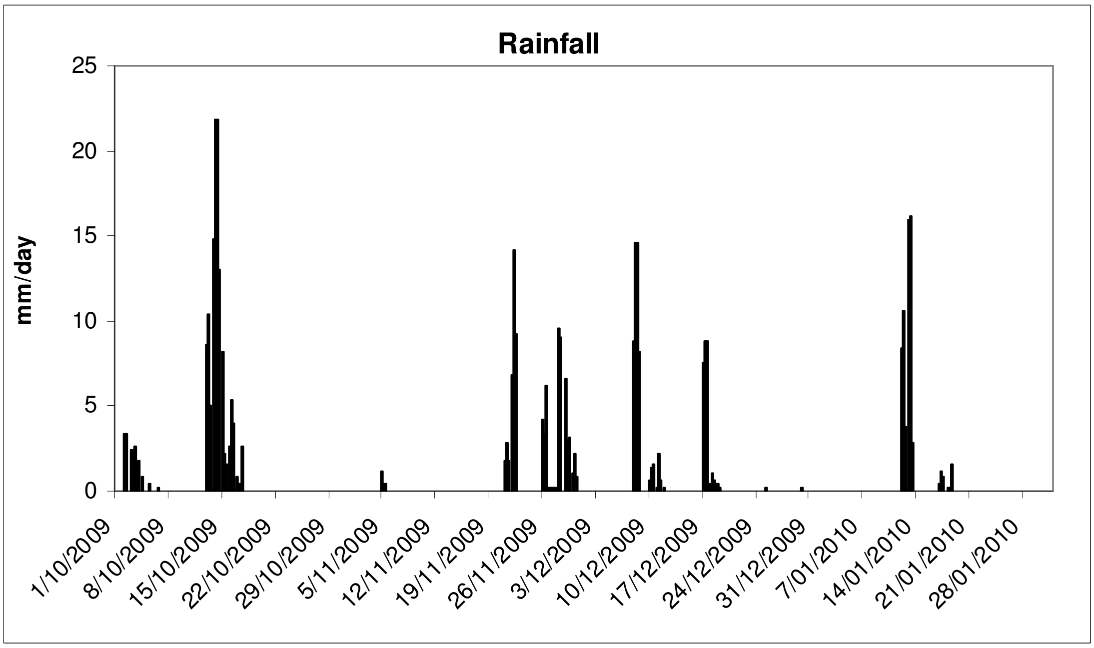


Figure 5 Rainfall at Narrung, Langhorne Creek, Currency Creek



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