LOWER LAKES WATER QUALITY REPORT

Report 13, March 2010

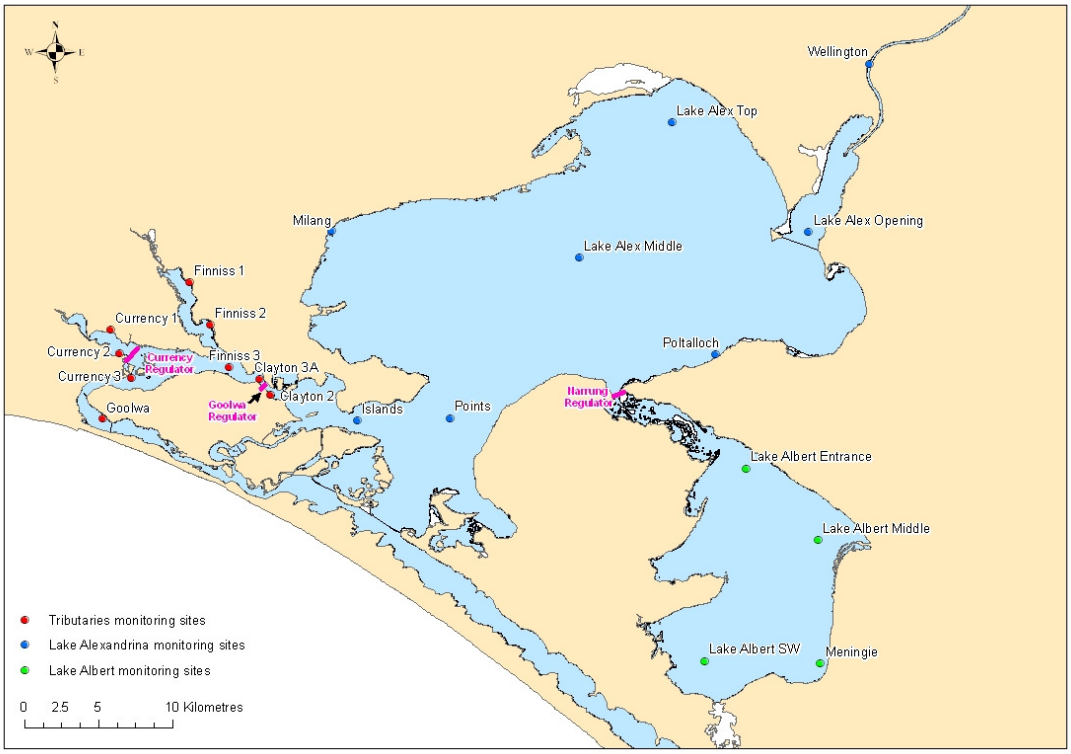
Observations at a glance

- pH levels are within ANZECC guideline values (satisfactory) at all sites
- Alkalinity levels are stable within all areas of Lake Alexandrina Alkalinity within Lake Albert remains high however a significant declining trend has been noted. 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, Department for Environment and Heritage, and Department of Water, Land and Biodiversity Conservation 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 stable and above management triggers levels for all sites in the main areas of Lake Alexandrina (Figure 2A).

  Lake Albert alkalinity remains high (270 - 310 mg/L as $CaCO_3$, Figure 4A) at most sites and has increased since pumping has resumed from Lake Alexandrina. Alkalinity has been decreasing over the last month at all sites. Alkalinity at the Lake Albert entrance site has been decreasing rapidly, presumably due to the increasing dilution from lower alkalinity water pumped from Lake Alexandrina.

  Areas of the upper Currency still have low alkalinities between 58 and 177 mg/L as $CaCO_3$ (see Figure 3A). Alkalinity within the Finniss River remains high (>150 mg/L as $CaCO_3$) and stable.

  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 and within ANZECC guideline levels (pH 6.5-9.5) at all sites (Figures 2B, 3B and 4B).

  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 electrical conductivity) have stabilised recently but remain very high in all lake areas (Figures 2C, 3C, 4C). There has been some localised rainfall (Figure 5) and increased River Murray inflows that have contributed, along with cooler autumn weather, to this stabilisation. Salinity is decreasing at the Lake Albert Entrance site due to pumping of lower salinity water from Lake Alexandrina (Figure 4C). Salinity at the Goolwa site has also still been increasing (Figure 2C), possibly due to leakage through the Goolwa barrage now that water levels have decreased below mean sea level in this region.

  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

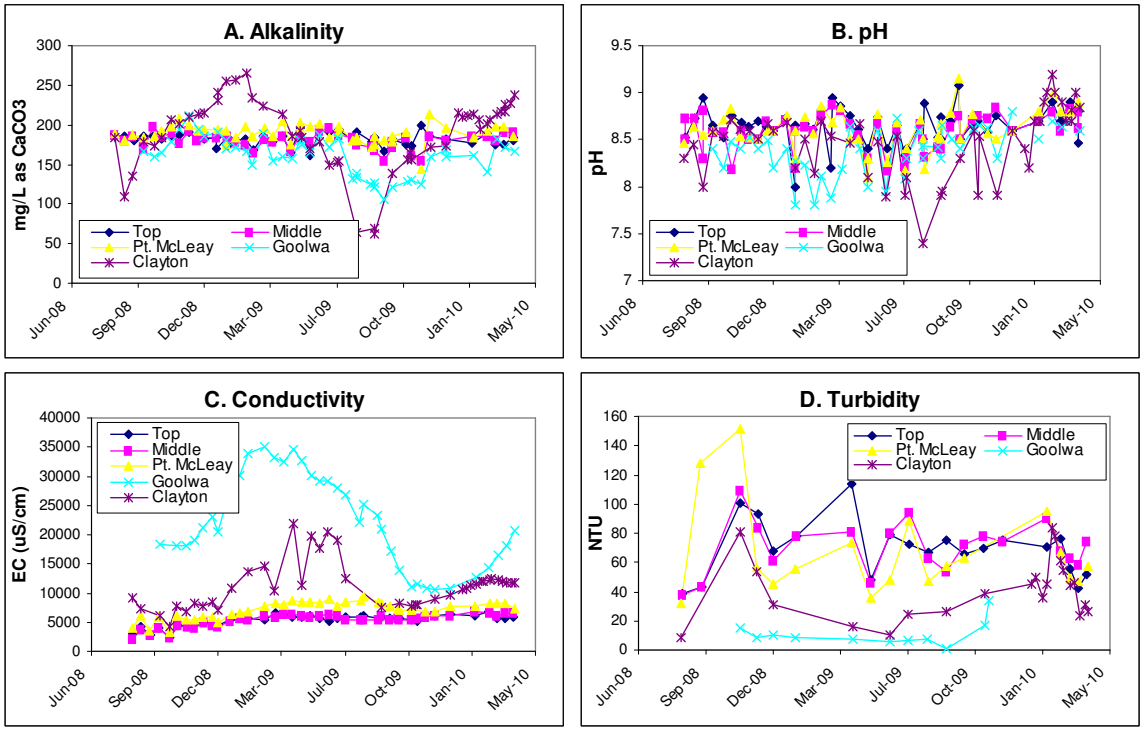


Figure 3 Finniss River and Currency Creek tributary region

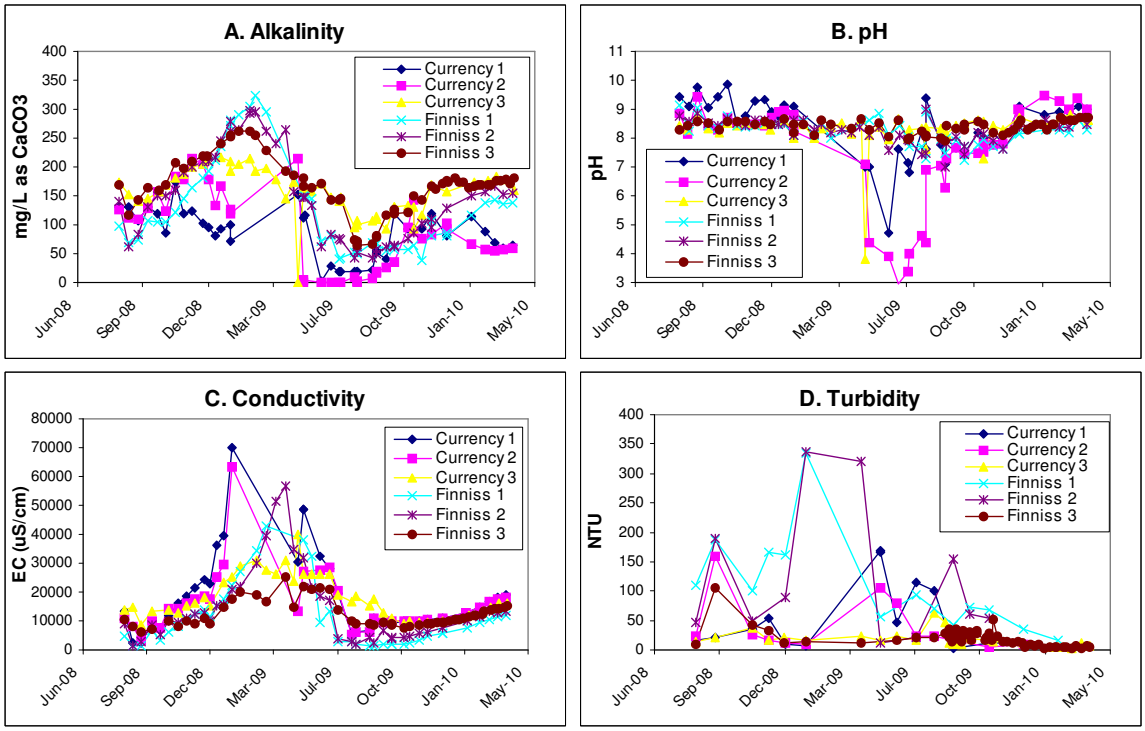


Figure 4 Lake Albert

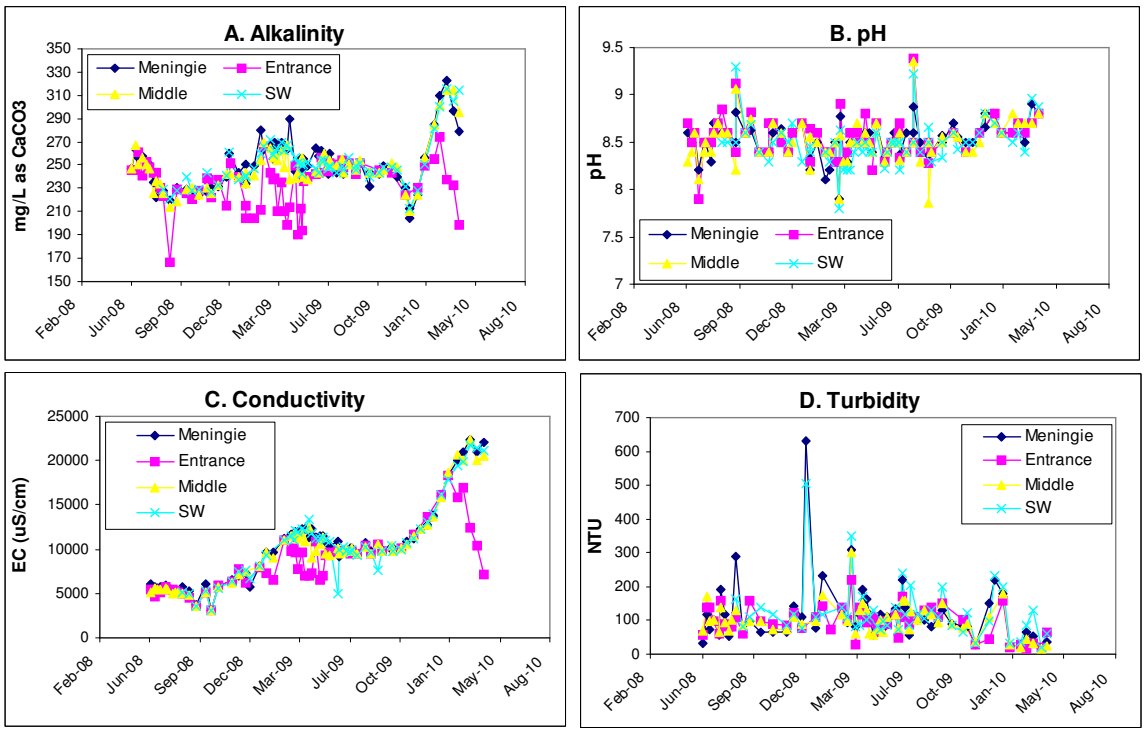
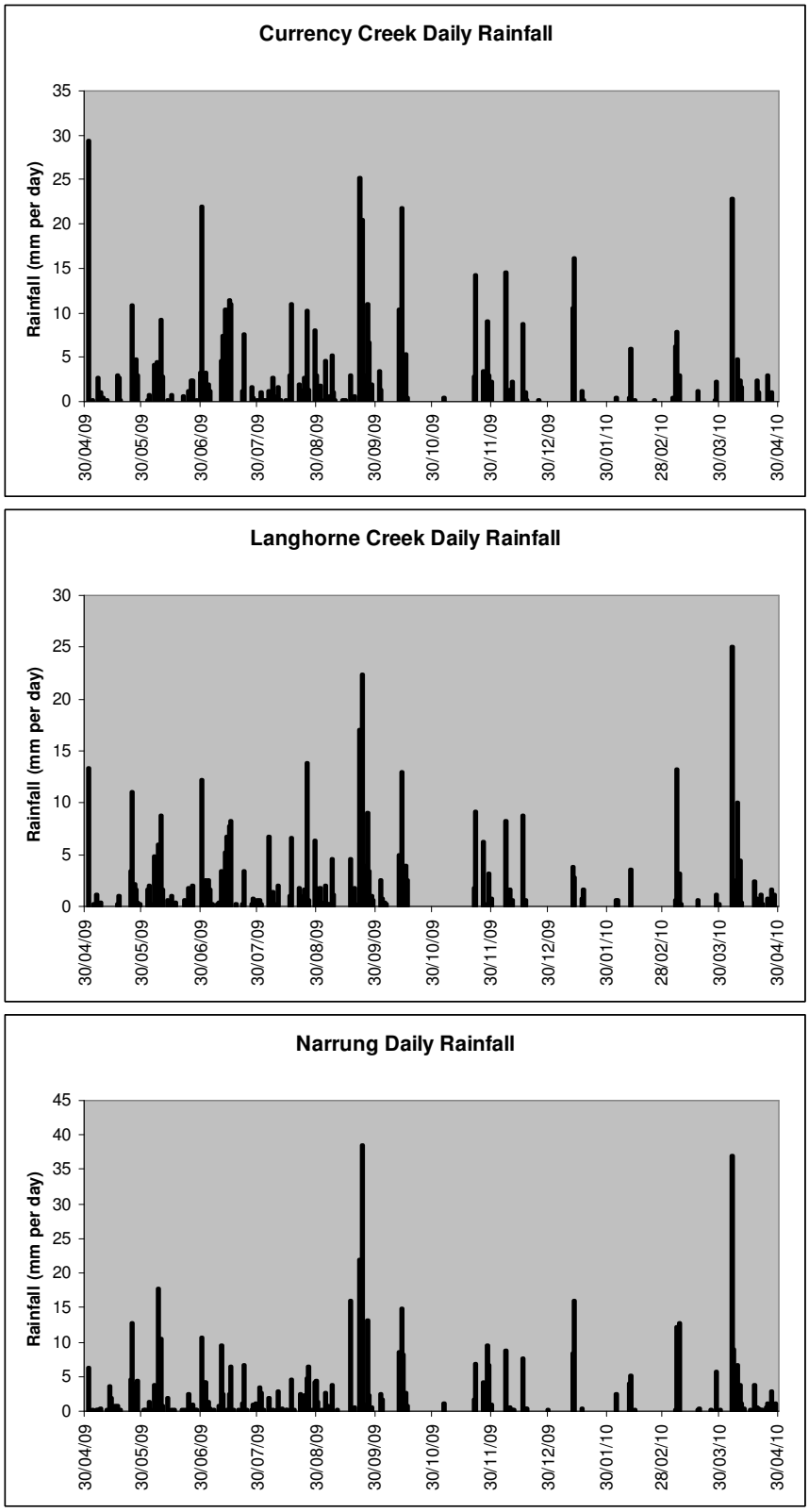


Figure 5 Rainfall at Narrung, Langhorne Creek, Currency Creek



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