Lower Lakes and Tributaries

Water Quality Report

Ambient and Event-based Monitoring

Report 25, March 2011

Government of South Australia
Department of Environment and Natural Resources

EPA South Australia

This project is part of the South Australian Government's Murray Futures program funded by the Australian Government's Water for the Future program.

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Observations at a Glance

- ***Water quality continues to improve across the Lower Lakes following substantial inflows of floodwater from the Murray-Darling Basin***
- ***Salinity remains stable and at low levels across Lake Alexandrina due to dilution from river inflows and export of salt through the barrages***
- ***Salinity levels still remain elevated in Lake Albert compared to historical values***
- ***pH and alkalinity continue to remain satisfactory at all sites in the main lake water bodies***
- ***Acidity has been recorded at a number sites despite neutral pH's including Hunters, Boggy and Currency Creeks, Finniss River and Narrung Narrows***

Background

The Environment Protection Authority (EPA), Department of Environment and Natural Resources (DENR), and the Department for Water (DFW) are co-ordinating a monitoring program to assess water quality in the Lower Lakes. Previous reports can be accessed from the EPA website[1].

Water Quality Parameters

A wide range of water quality parameters are monitored with key parameters reported herein being pH, alkalinity, salinity, sulfate:chloride ratio, turbidity, nutrients (total nitrogen and total phosphorus), chlorophyll *a* and metals (aluminium and iron). A brief description of these parameters and typical historical (pre-drought) levels are provided below:

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. The pH in the Lower Lakes region is typically between 8.3 and 8.5.

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 80 and 250 mg/L as $CaCO_3$.

Acidity is a measure of the presence of acid and soluble metals (positively charged) in a solution. Under normal stable conditions there should be no acidity present in waters sampled. Measured acidity is often a by product of oxidised acid sulfate soils and an indicator to there presence in sediment. .

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. As salinity increases, it may become toxic to native freshwater organisms. Prior to the 2007–2009 drought conditions, salinity was on average less than 700 µS/cm (EC) in Lake Alexandrina (at Milang) and less than 1600 EC in Lake Albert (at Meningie).

[1] See http://www.epa.sa.gov.au/environmental_info/water_quality/lower_lakes_water_quality_monitoring

***Sulfate:chloride** is used to give an indication of any sulfate inputs to the water body from acid sulfate soils. Chloride concentration is largely determined by evaporation and dilution. An increase in the ratio of sulfate:chloride indicates possible external sulfate inputs from acid sulfate soils. This ratio is usually about 0.06 (SO_4:Cl) in the Lower Lakes.*

***Turbidity** is a measure of the cloudiness or haziness in water caused by suspended solids (e.g. sediment, algae). Turbidity is expressed in Nephelometric Turbidity Units (NTU) and is measured using a relationship of light reflected from a given sample. Turbidity is very variable in the shallow Lower Lakes and influenced primarily by wind events. Prior to the 2007–2009 drought conditions, turbidity was on average about 60 NTU in Lake Alexandrina (at Milang).*

***Nutrients - total nitrogen (TN) and total phosphorus (TP)** are the total amount of nitrogen and phosphorus present in the water body. Nitrogen can be present in different forms (e.g. organic nitrogen in plant material, ammonia, nitrate and nitrite). Phosphorus can also be present in different forms (e.g. organic phosphorus, phosphate). High concentrations of phosphorus and nitrogen can result in excessive growth of aquatic plants such as phytoplankton, cyanobacteria, macrophytes and filamentous algae. Prior to the 2007–2009 drought conditions, TN was on average about 1.2 mg/L in Lake Alexandrina (at Milang) and 1.6 mg/L in Lake Albert (at Meningie) with TP on average about 0.15 mg/L in Lake Alexandrina (at Milang) and in Lake Albert (at Meningie).*

***Chlorophyll a** is the main photosynthetic pigment in green algae. The concentration of chlorophyll a gives an indication of the volume of aquatic plants present in the water column. Levels in excess of 15 µg/L are considered very high ("hyper-eutrophic") and nuisance algae and plant growth can occur. Prior to the 2007–2009 drought conditions, chlorophyll a was on average about 24 µg/L in Lake Alexandrina (at Milang) and 35 µg/L in Lake Albert (at Meningie).*

***Metals** such as iron and aluminium are measured primarily to determine interactions between sediments and the lake water body. During water level declines (i.e. due to evaporation and low inflows during droughts) metal concentrations are expected to increase. Similarly during large wind events total metal levels may also increase as they form part of the suspended solids composition. During floodwater inflows the concentration of metals may be diluted. Additional to this, if exposed acid sulfate sediments acidify and the pH is reduced, metals that were previously bound up within sediment are released. If these exposed sediments are rewet, any subsequent increase in metal concentrations in the water body may indicate acid sulfate soil impacts.*

***Dissolved Oxygen** is a measure of the quantity of oxygen present in water. Oxygen is essential for almost all forms of life Aquatic animals, plants and most bacteria need it for respiration as well as for some chemical reactions. The concentration of dissolved oxygen is an important indicator of the health of the aquatic ecosystem. Persistently low dissolved oxygen (<6 mg/L)will harm most aquatic life.*

Ambient Water Quality Monitoring

Ambient water quality sampling is undertaken fortnightly at 16 sites in Lake Alexandrina (including Wellington, the Goolwa Channel, Currency Creek and Finniss River tributary regions), and Lake Albert (Figure 1).

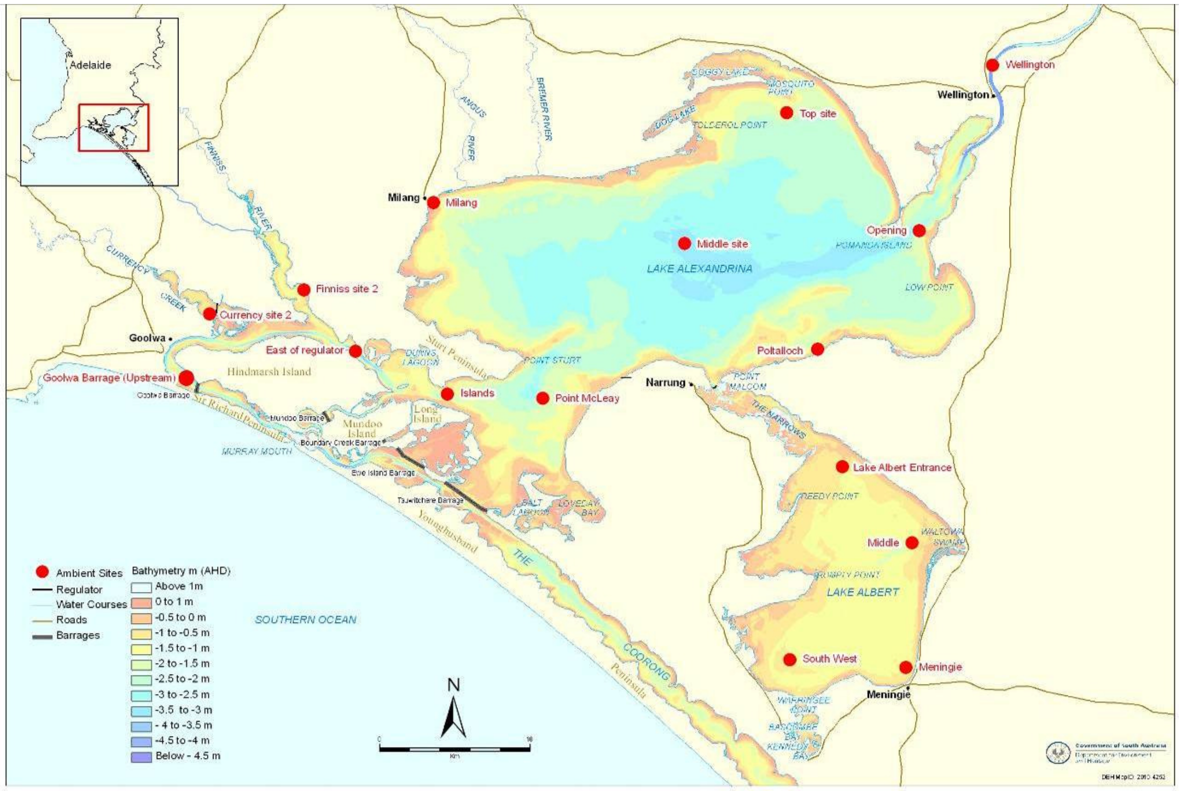


Figure 1 –Lower Lakes and tributaries ambient monitoring sites

Lake Alexandrina

Ambient water quality monitoring results are discussed below for selected sites and parameters in Lake Alexandrina. The five sites selected for reporting have been chosen as they are representative of the water body, incorporating water entering from the river (Wellington) and a transect across Lake Alexandrina from the northern corner (Top) through the centre (Middle) to the southern edge of the lake (Point McLeay) before it enters the Goolwa Channel. The site on the western margin (Poltalloch) provides an indication of the water quality near the entrance to Lake Albert. Figure 2 shows the recent water levels in Lake Alexandrina.

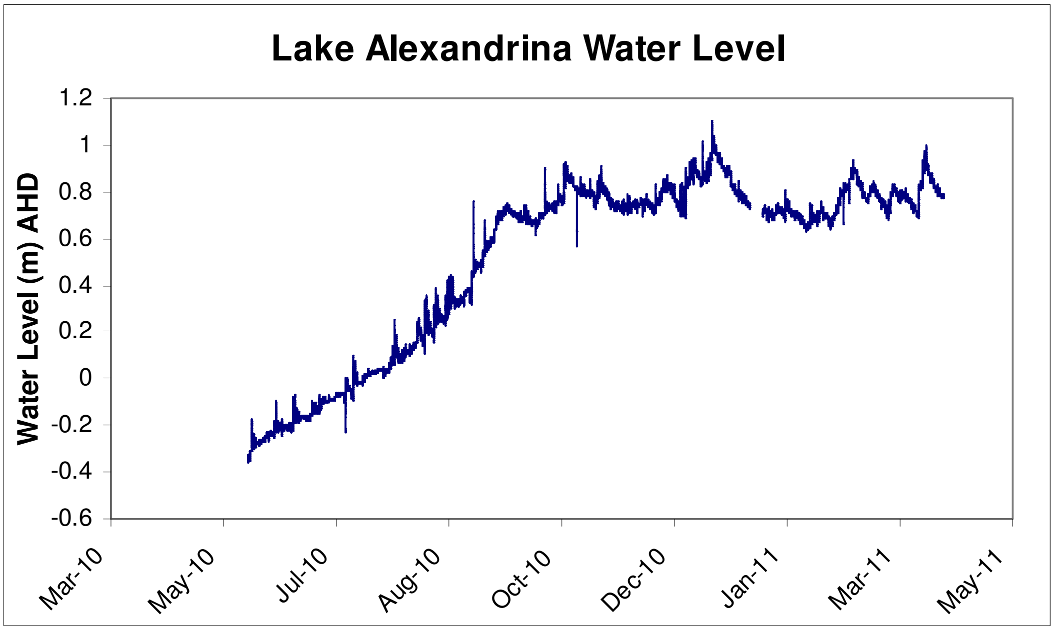


Figure 2 – Water level in Lake Alexandrina (DFW 2011)

pH

- pH levels in Lake Alexandrina (Figure 3) have stabilised and continue to remain within ANZECC guideline levels (pH 6.5-9.0). The pH within the river channel at Wellington still remains lower than Lake Alexandrina, however has shown a slight increase in values during the month of March.

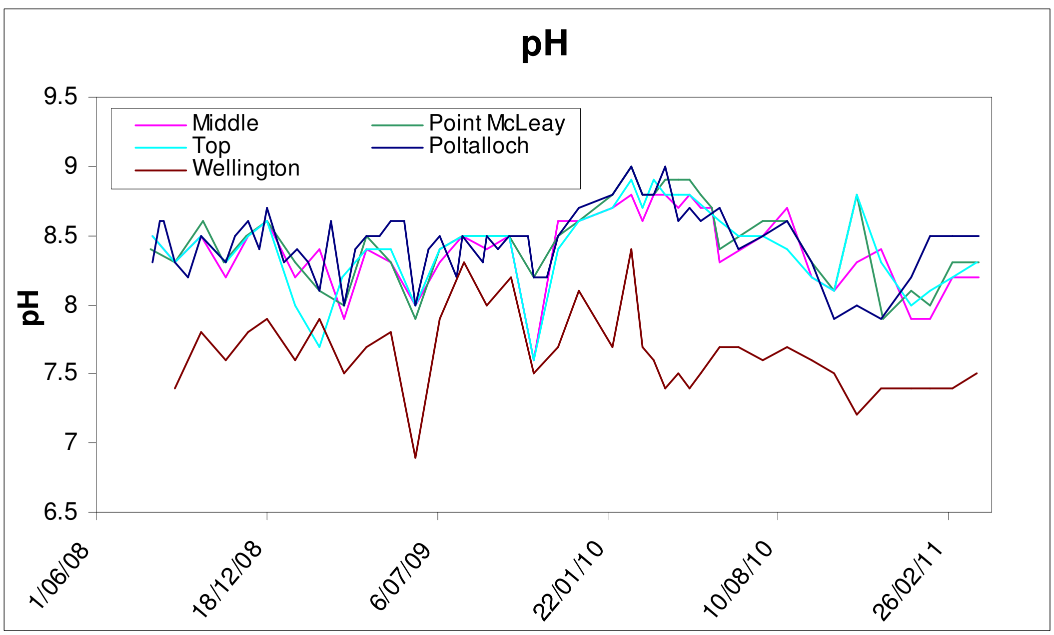


Figure 3 – pH at the Lake Alexandrina ambient monitoring sites

Alkalinity

- Alkalinity levels within Lake Alexandrina still remain relatively stable and uniform for all sites (80 – 90 mg/L) (Figure 4). The persisting spatial uniformity in the data indicates that River Murray flood inflows are the dominating influence on lake water quality. After the initial dilution and reduction in alkalinity across the lake from the flood events, alkalinity across Lake Alexandrina is trending upwards. This is due to an increase in alkalinity in the in-flowing floodwaters as represented by the increasing alkalinity seen at the Wellington site.

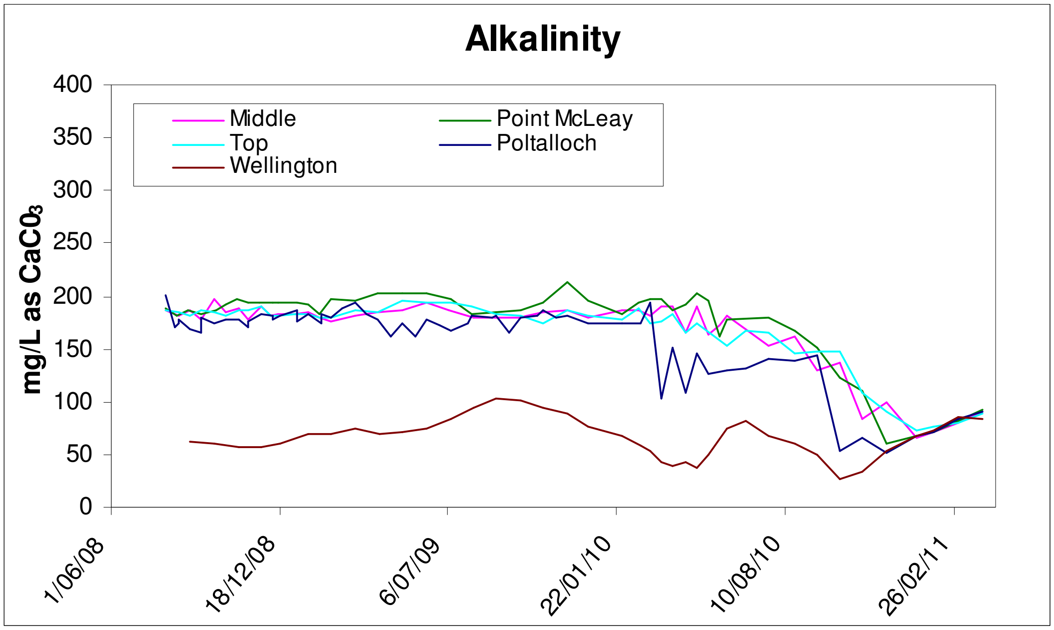


Figure 4 – Alkalinity at the Lake Alexandrina ambient monitoring sites

Sulfate:chloride ratio

- The sulfate:chloride ratio has increased slightly at the majority of sites in Lake Alexandrina after a period of decline due to flood water inflows over the summer months (Figure 5).

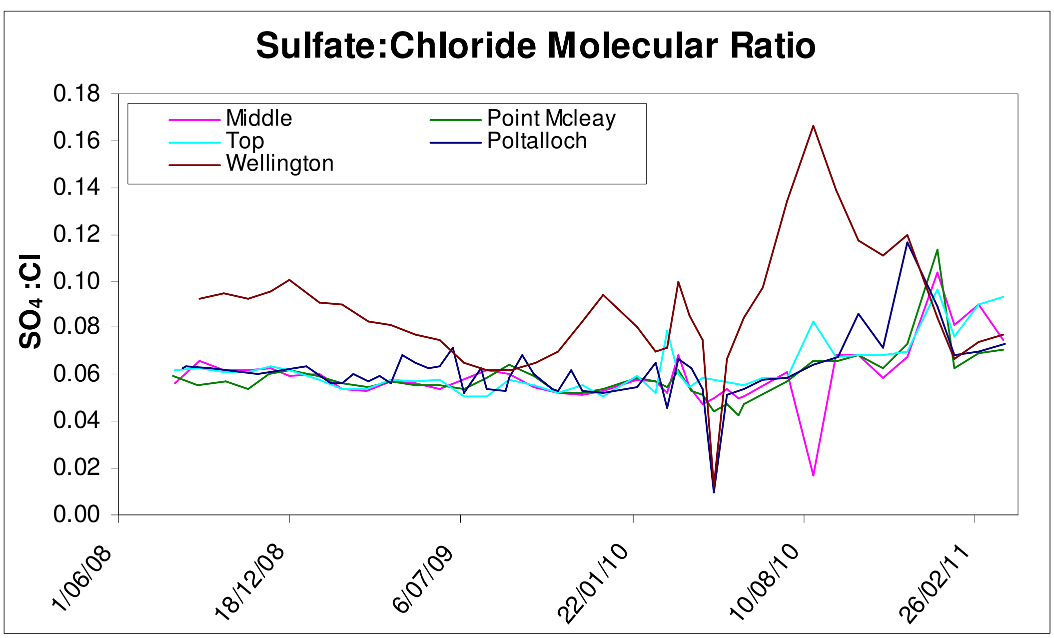


Figure 5 – Sulfate:chloride ratio at the Lake Alexandrina ambient monitoring sites

Salinity (EC)

- Salinity (as measured by electrical conductivity) levels have stabilised at consistent and low levels right across Lake Alexandrina (Figure 6). The high Murray-Darling Basin inflows and export of accumulated salt through the barrages have driven the reduction and subsequent stabilisation of salinity within the lake.

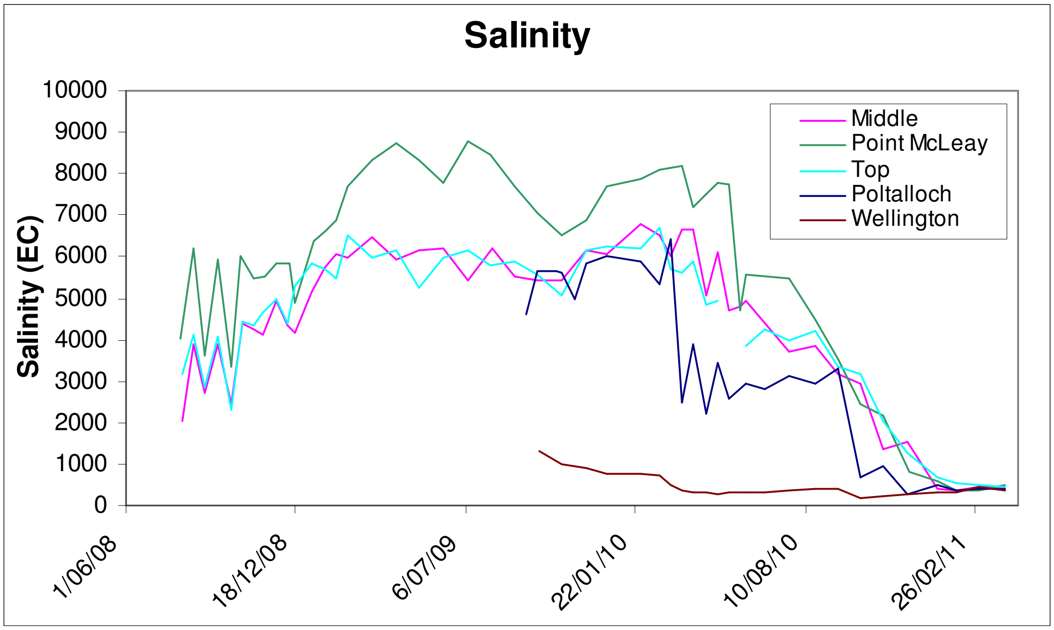


Figure 6 – Salinity at the Lake Alexandrina ambient monitoring sites

Turbidity

- Turbidity within Lake Alexandrina remains variable across most sites (Figure 7). Declines in turbidity levels across the 'Middle', 'Top' and 'Wellington' sites have continued during March, however the sites 'Point McLeay' and 'Poltalloch' have shown a slight increase over the last month. The flood water turbidity (Wellington site) and wind events, causing resuspension and redistribution of sediment, are likely responsible for the high variability in turbidity.

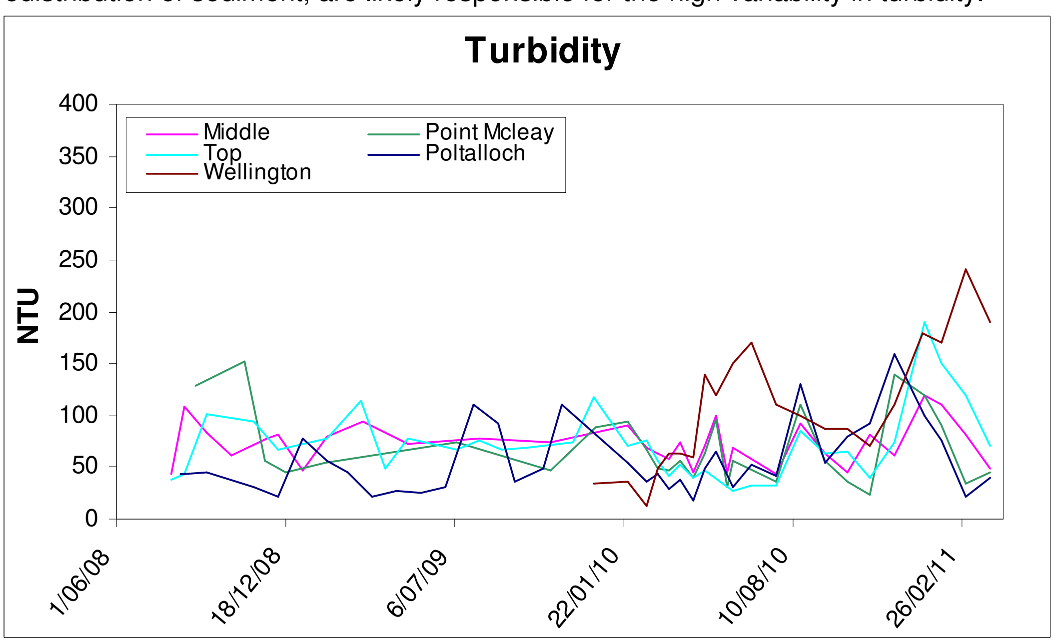


Figure 7 – Turbidity at the Lake Alexandrina ambient monitoring sites

Nutrients (total nitrogen and phosphorus)

- Total nitrogen and phosphorus levels within Lake Alexandrina continue to show very little variation through March (Figures 8 and 9). As expected, nutrient levels and trends are similar to that of the River Murray (Wellington site) as high floodwater inflows continue to mix with the existing lake water. Total phosphorus levels increased in the river inflows near the end of 2010, likely due to runoff of soil and fertiliser off the wider Murray-Darling Basin catchment. These levels have decreased slightly, and now range between 0.15-0.20 mg/L, however still remain above ANZECC guidelines, as does nitrogen, for freshwater ecosystems (<1mg/L TN, <0.025 mg/L TP).

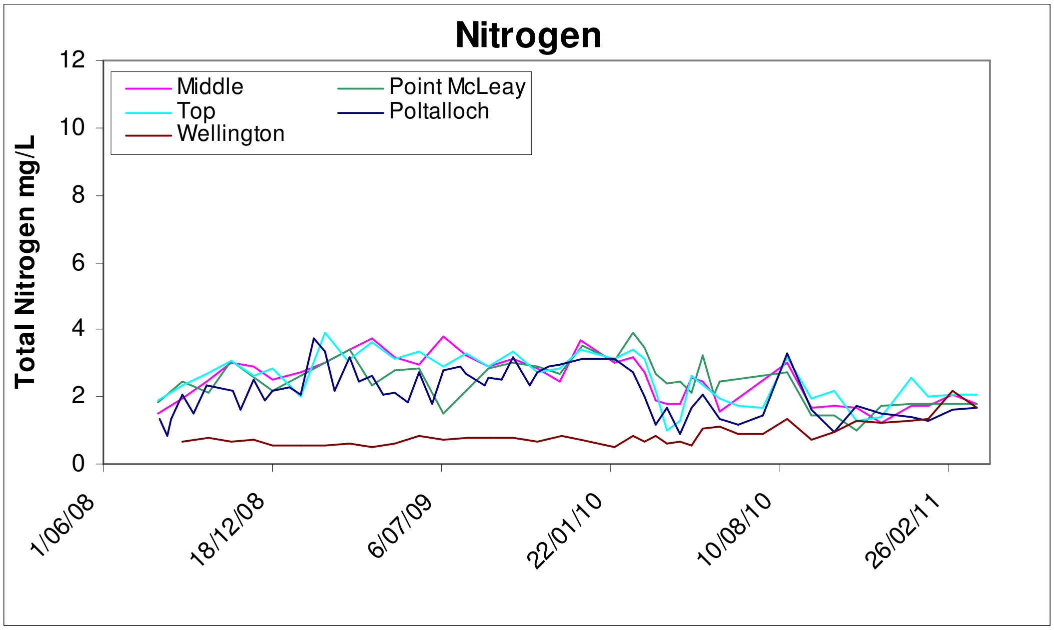


Figure 8 – Total nitrogen at the Lake Alexandrina ambient monitoring sites

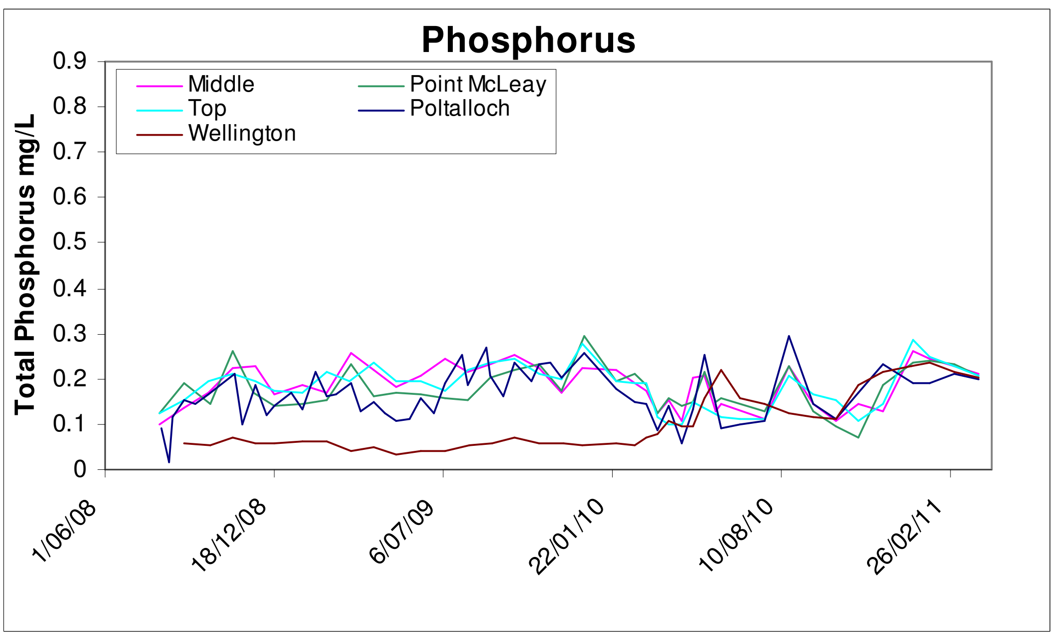


Figure 9 – Total phosphorus at the Lake Alexandrina ambient monitoring sites

Chlorophyll a (algae)

- Chlorophyll *a* has seen an increase across most Lake Alexandrina sites during March (Figure 10). The recent decreases seen in turbidity at several sites would have resulted in increased light penetration which may have caused an increase in photosynthesis and Chlorophyll *a* levels. Although Chlorophyll *a* levels in Lake Alexandrina remain high (hyper-eutrophic in ANZECC guidelines >15 µg/L), no potentially toxic blue-green algal blooms are present.

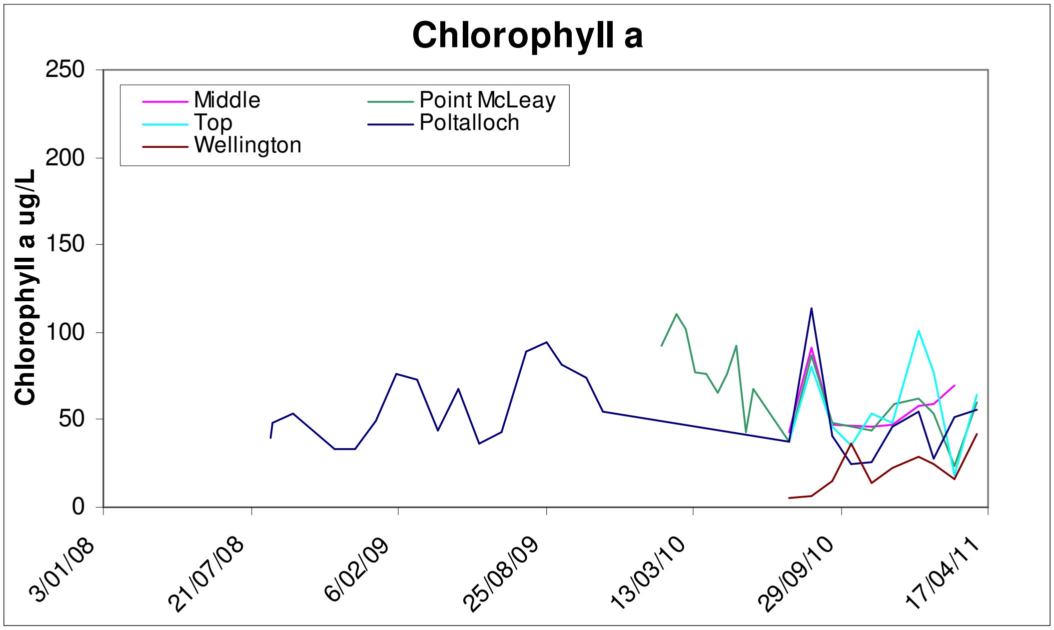


Figure 10 – Chlorophyll *a* at the Lake Alexandrina ambient monitoring sites

Metals

- Total aluminium and total iron levels within Lake Alexandrina remain stable across all sites (Figure 11 and 12). At present, lake metal concentrations appear to be more related to variable floodwater concentrations rather than lake geochemical processes.

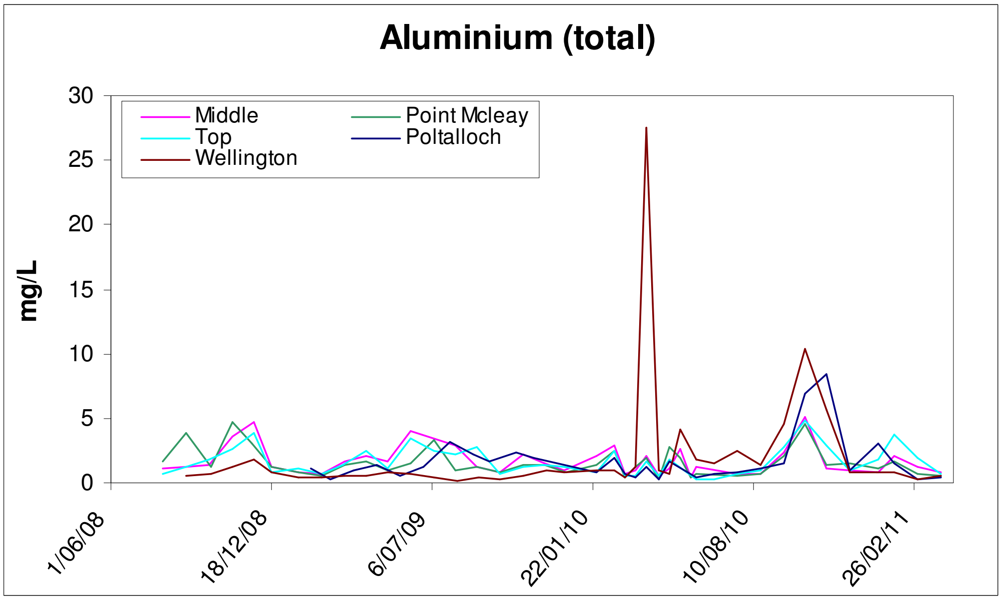


Figure 11 – Total aluminium at the Lake Alexandrina ambient monitoring sites

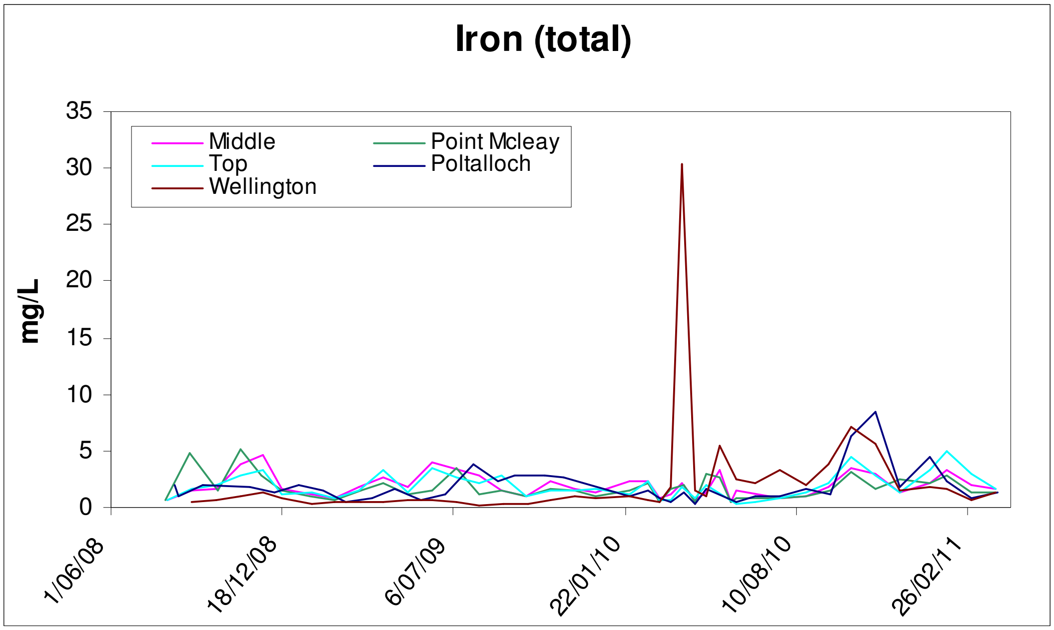


Figure 12 – Total iron at the Lake Alexandrina ambient monitoring sites

Dissolved Oxygen

- Dissolved oxygen levels in Lake Alexandrina remain relatively stable at most sites, however there has been a slight decrease in March (Figure 13). Lower dissolved oxygen levels continue to be observed at the Wellington site as a result of the black water flowing down stream as receding flood waters consumes oxygen from the decaying organic matter. This event has had a small impact on the dissolved oxygen concentrations within Lake Alexandrina, however due to the size and fetch of the lake the dissolved oxygen concentrations seem to recover very quickly and remain above guideline values (>6 mg/L).

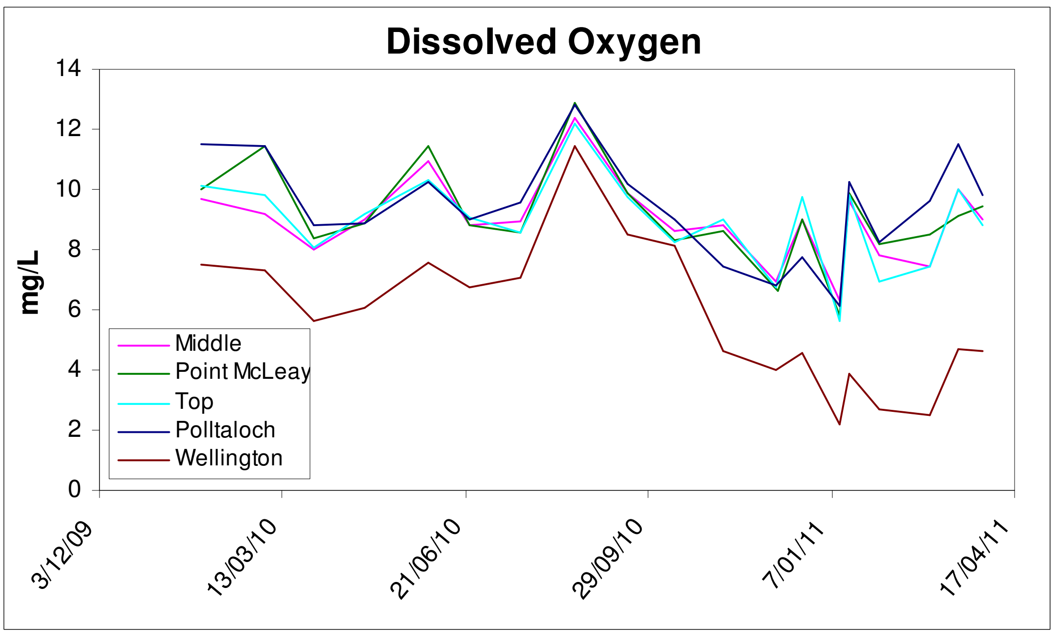


Figure 13 – Dissolved Oxygen at the Lake Alexandrina ambient monitoring sites

Lake Albert Water Quality

Ambient water quality monitoring results are discussed below for selected sites and parameters in Lake Albert. In mid September (starting 19/9/10), the Narrung bund was partially breached and monitoring data after this reflects changes due to inflows from Lake Alexandrina. Figure 14 shows the water level as measured in Lake Albert from March 2010. The figure clearly shows the rapid rise in water levels following removal of the regulator and the more recent managed water level fluctuation to pulse water and export salt from Lake Albert.

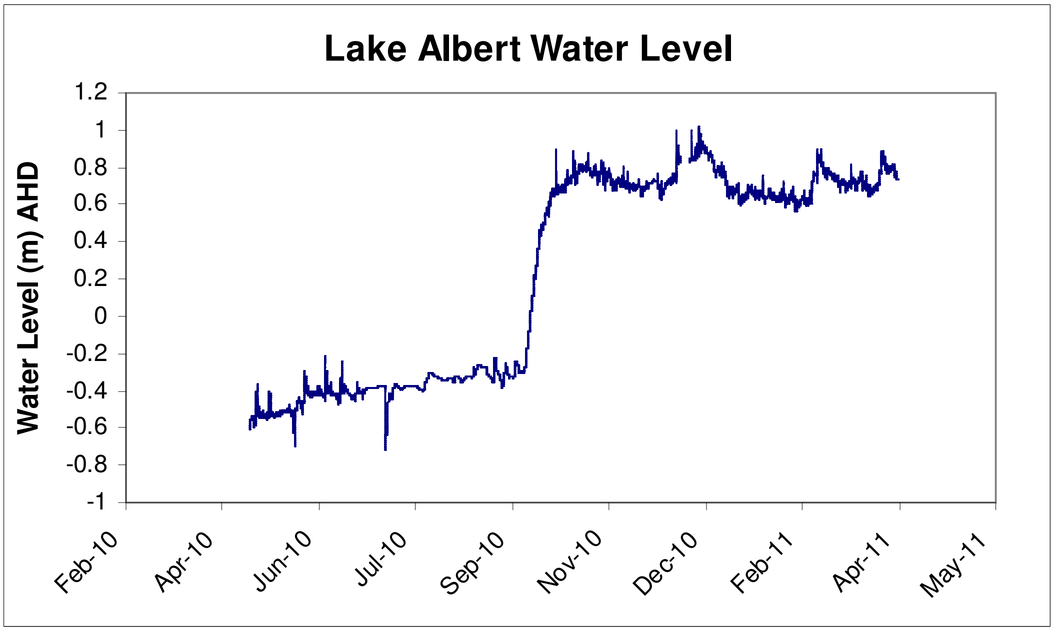


Figure 14 – Water Level in Lake Albert

pH

- pH levels in Lake Albert remain stable (Figure 15) and within ANZECC guideline levels (pH 6.5-9.0). The recent increase of the pH at 'Opening' is most likely the result of mixing patterns between Lake Albert and the Lake Alexandrina waters entering or exiting through the Narrung Narrows.

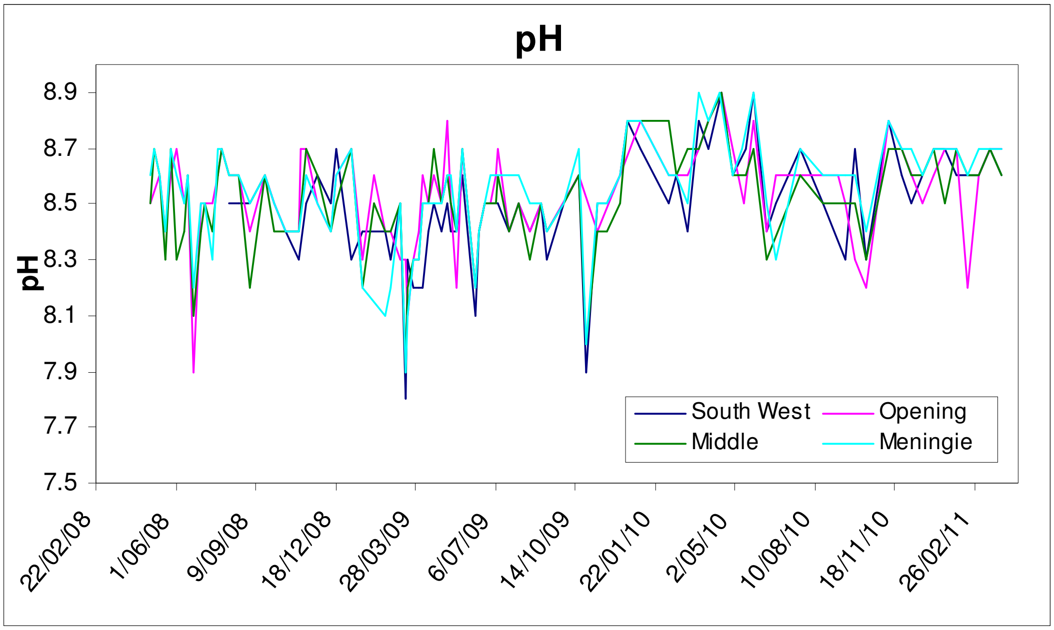


Figure 15 – pH at the Lake Albert ambient monitoring sites

Alkalinity

- Alkalinity within Lake Albert remains stable across most sites with the exception of Opening which continues to show significant variability in levels (Figure 16). The Opening site is the most influenced by inflow of lower alkalinity water from Lake Alexandrina and thus experiences more variability in concentrations.

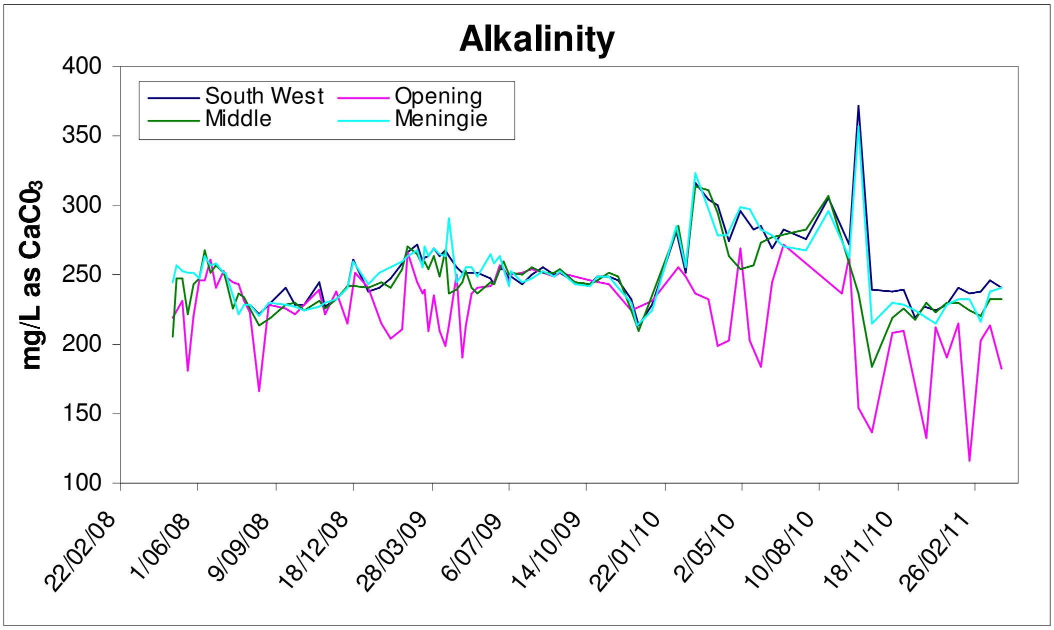


Figure 16 – Alkalinity at the Lake Albert ambient monitoring sites

Sulfate:chloride ratio

- The sulfate:chloride ratio has remained stable across all Lake Albert sites during March (Figure 17). This indicates that the system is not experiencing any sulfate inputs which would indicate the presence of acid sulfate soils and water movement through acidic soil profiles.

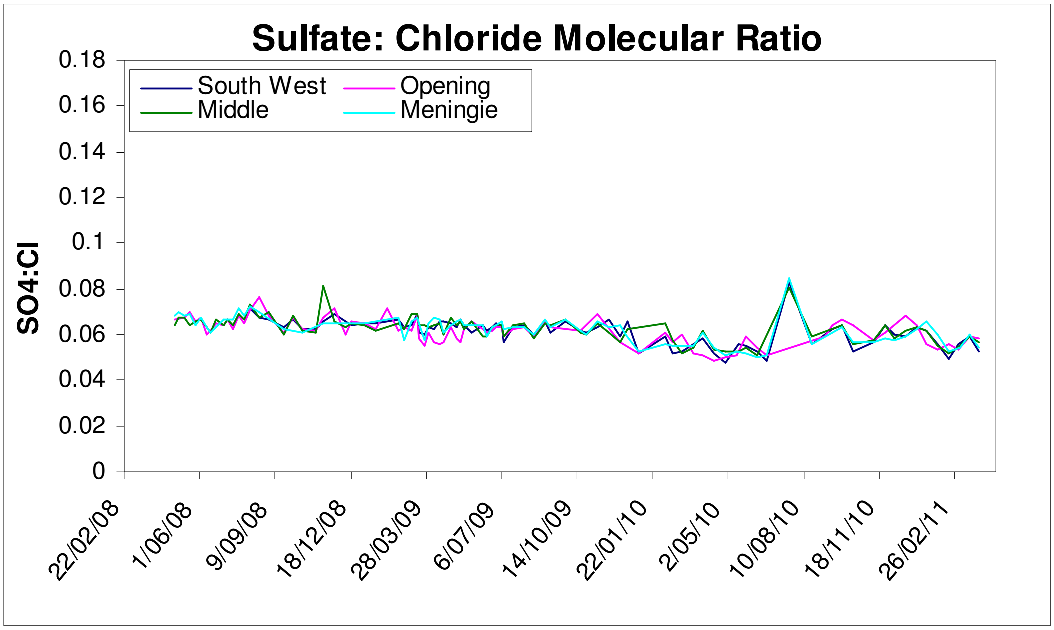


Figure 17 – Sulfate:chloride ratio at the Lake Albert ambient monitoring sites

Salinity (EC)

- Salinity levels are relatively stable across most sites but still remain high (between 2900 and 7000 µS/cm) compared to pre-drought levels (Figure 18). The Opening site continues to show the most variability in salinity levels as it is influenced by inflows from Lake Alexandrina primarily driven by wind direction and water level manipulations, as seen in Figure 14. Further inflows and mixing of water from Lake Alexandrina are expected to reduce salinities across Lake Albert, however it is unlikely salinities will return to pre drought levels (<1600 µS/cm) for some time due to the limited water exchange between the two lakes.

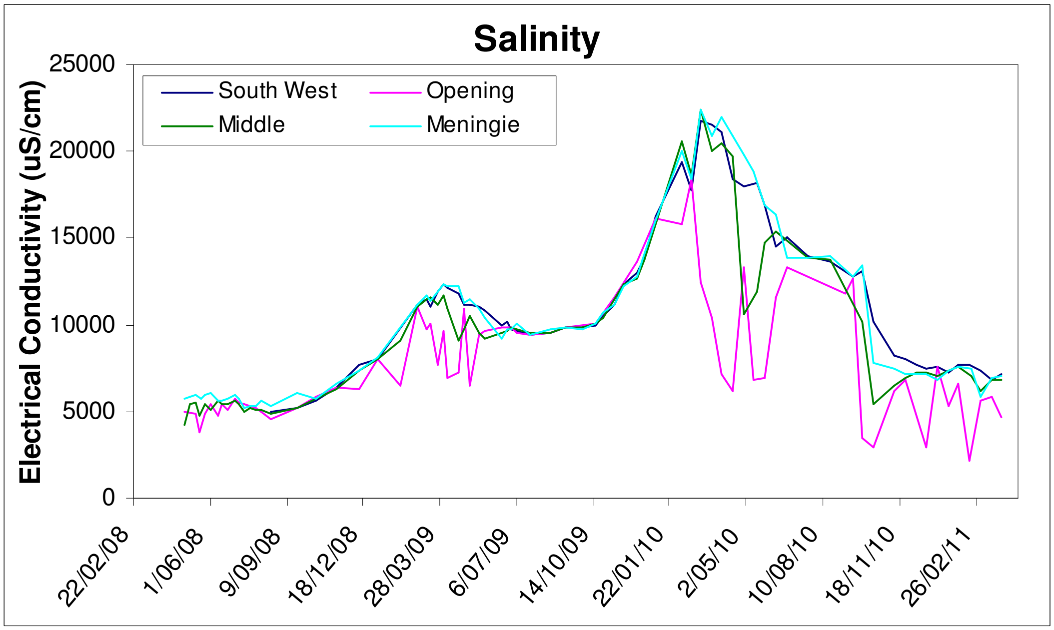


Figure 18 – Salinity at the Lake Albert ambient monitoring sites

Turbidity

- Turbidity in Lake Albert is continuing to increase at all sites over the last three months (January – March 2011) other than the South West site (Figure 19). This could be due to inflow of some higher turbidity water from Lake Alexandrina, but turbidity within Lake Albert is also highly dependent on wind direction and strength at the time of sampling.

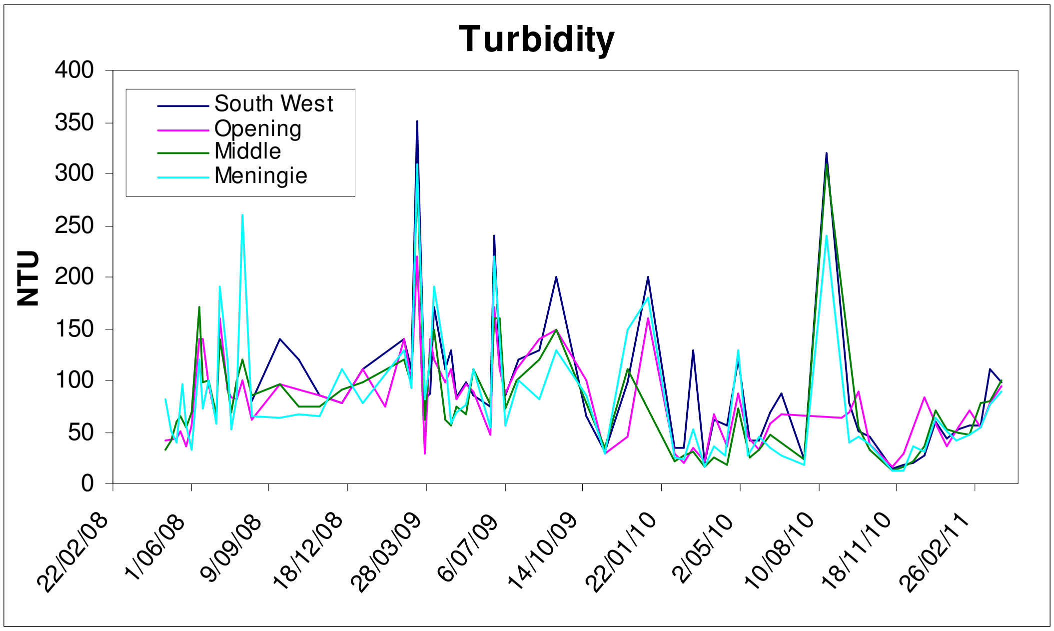


Figure 19 – Turbidity at the Lake Albert ambient monitoring sites

Nutrients (total nitrogen and phosphorus)

- Total nitrogen and phosphorus levels have remained stable across most Lake Albert sites during March following increases over February (Figure 20 and 21). Nutrient levels are comparable to historic data, however continue to be in excess of the ANZECC guidelines for freshwater ecosystems (<1mg/L TN, <0.025 mg/L TP).

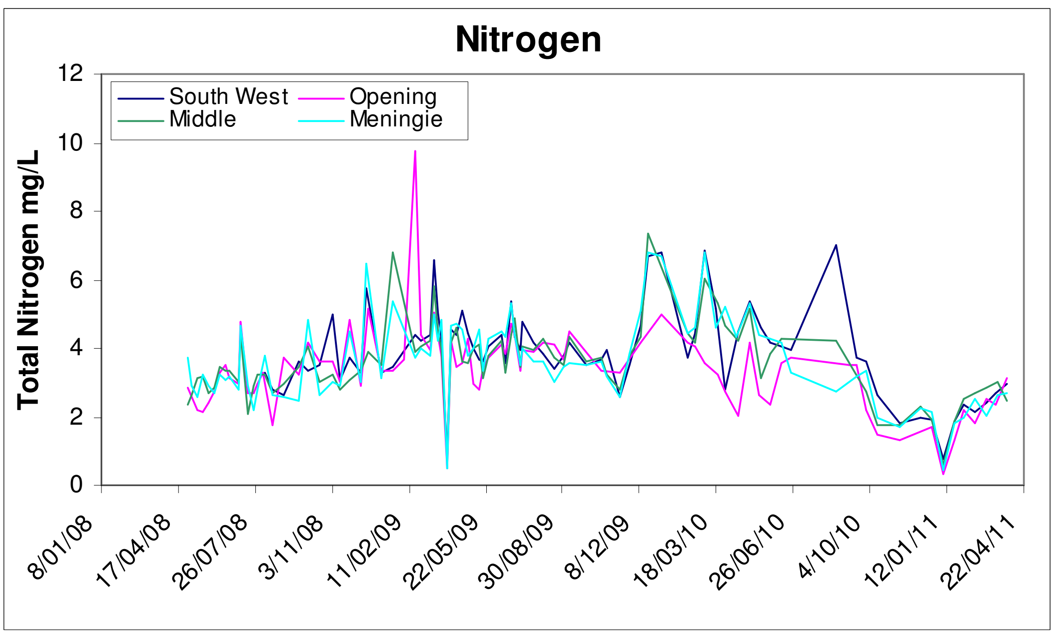


Figure 20 – Total Nitrogen at the Lake Albert ambient monitoring sites

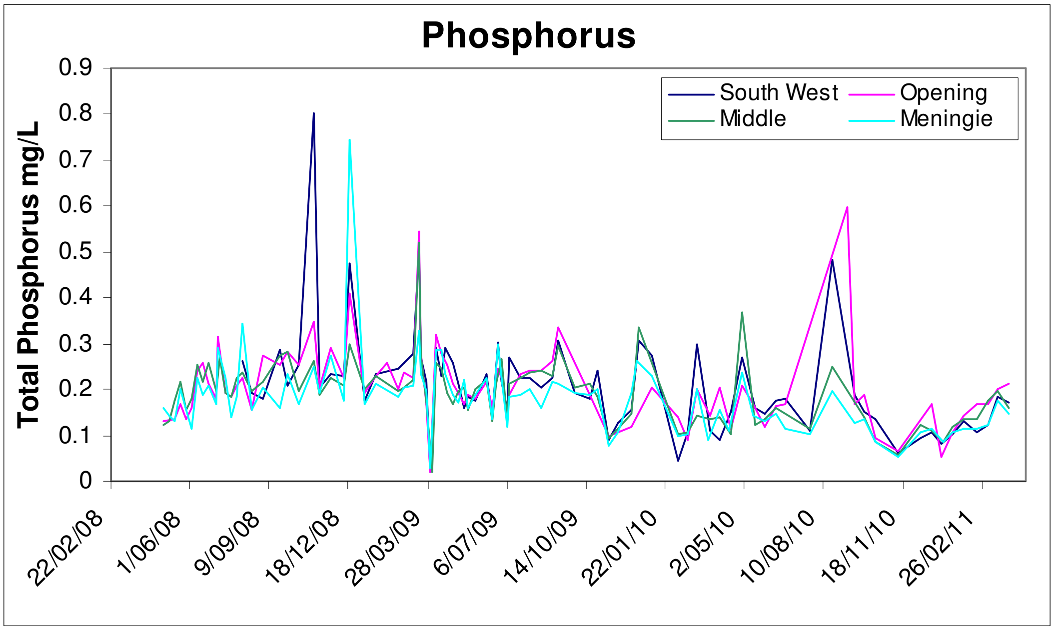


Figure 21 – Total phosphorus at the Lake Albert ambient monitoring sites

Chlorophyll a (algae)

- Chlorophyll *a* levels remained relatively stable in March (Figure 22). These levels do however, continue to be in excess of ANZECC guidelines (>15 µg/L considered hyper-eutrophic) and indicate a nutrient enriched system. Some blue-green algal species has been identified however these are only in small concentrations and not a significant risk at present.

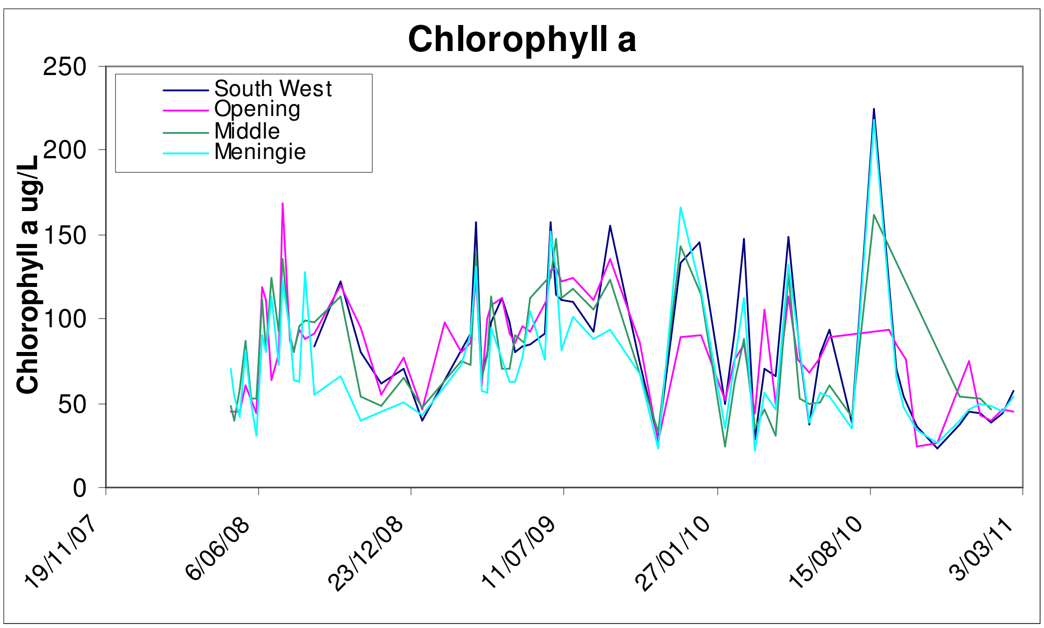


Figure 22 – Chlorophyll *a* at the Lake Albert ambient monitoring sites

Metals

- Total aluminium and iron concentrations within Lake Albert (Figures 23 and 24) remain stable at low levels. This is to be expected whilst water levels remain high and re-suspension of sediment (containing metals) and lower flux from exposed acidic sediments is less common than during the 2008–2009 drought period.

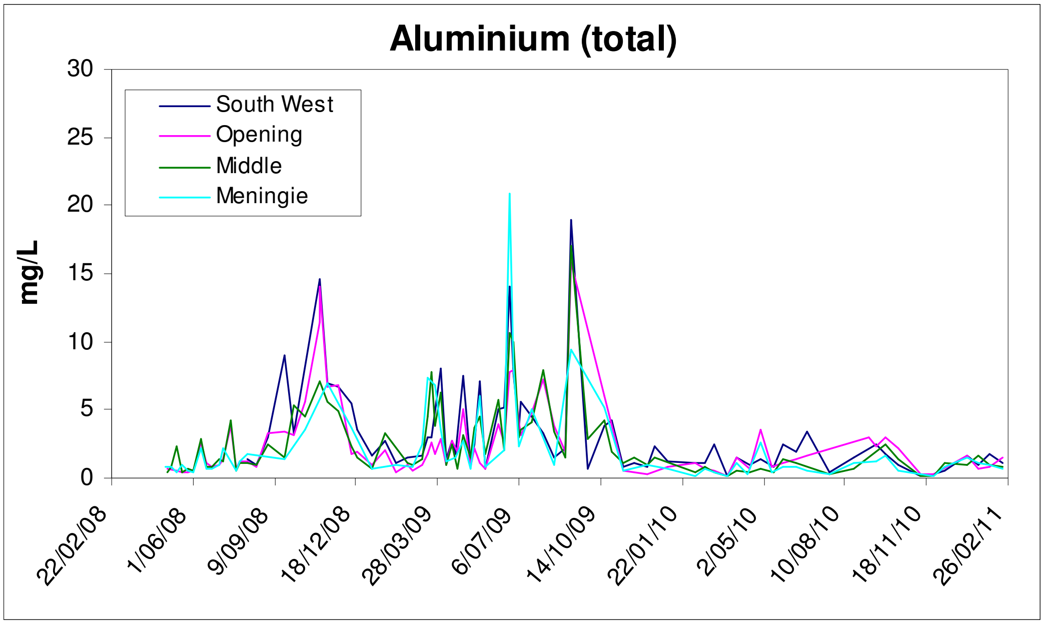


Figure 23 – Total aluminium at the Lake Albert ambient monitoring sites

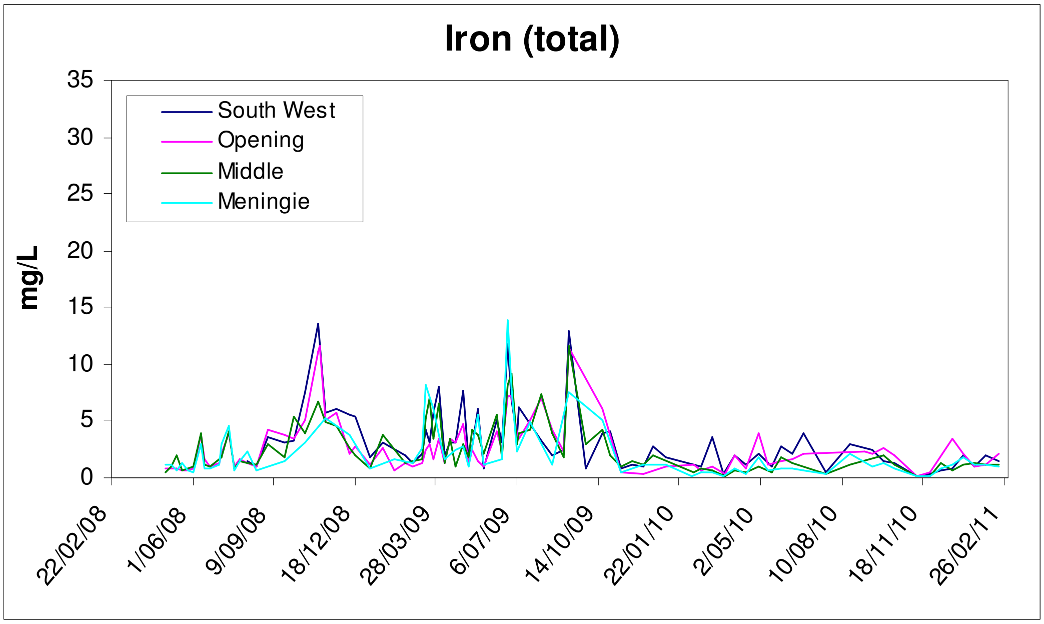


Figure 24 – Total iron at the Lake Albert ambient monitoring sites

Dissolved Oxygen

- Dissolved Oxygen levels in Lake Albert have recovered since the decline observed in February 2011, however have slightly decreased in March at all sites but are above guideline values (>6 mg/L) (Figure 25).

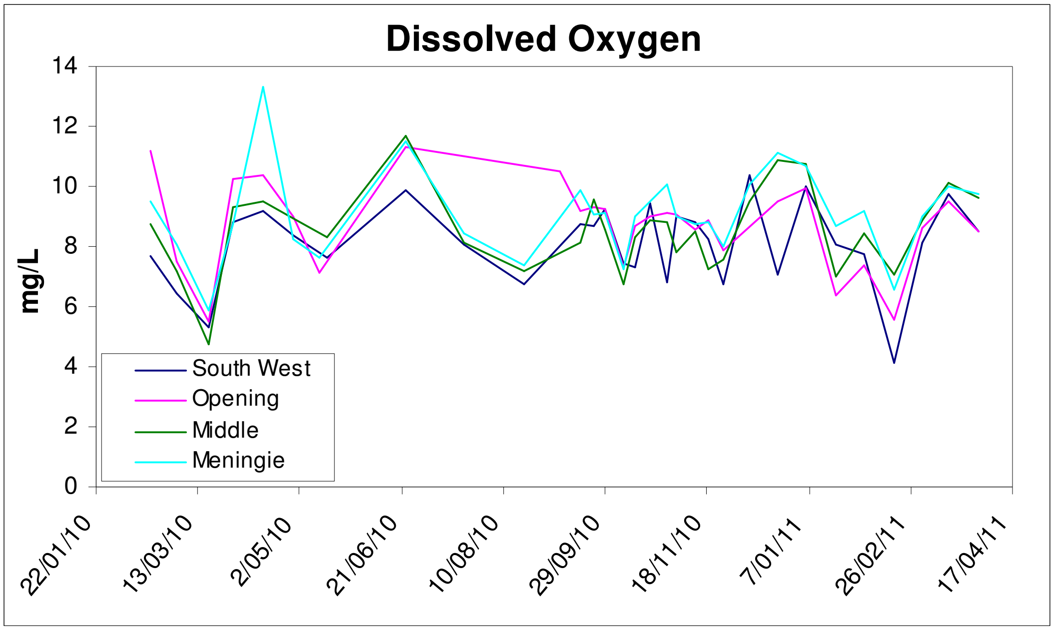


Figure 25 – Dissolved Oxygen at the Lake Albert ambient monitoring sites

Goolwa Channel and Tributaries Water Quality

Ambient and event-based water quality monitoring results are discussed for selected sites and parameters in the Goolwa Channel and Tributaries region (see Figures 1 and 26 for site locations). Due to the nature of the monitoring program both the ambient and event-based sites have been included in this section to compare data collected over the month. In late September (starting 26/9/10), the Goolwa regulator near Clayton was partially breached so monitoring data after this will reflect changes due to inflows from Lake Alexandrina. The water level in this region is shown in Figure 27.

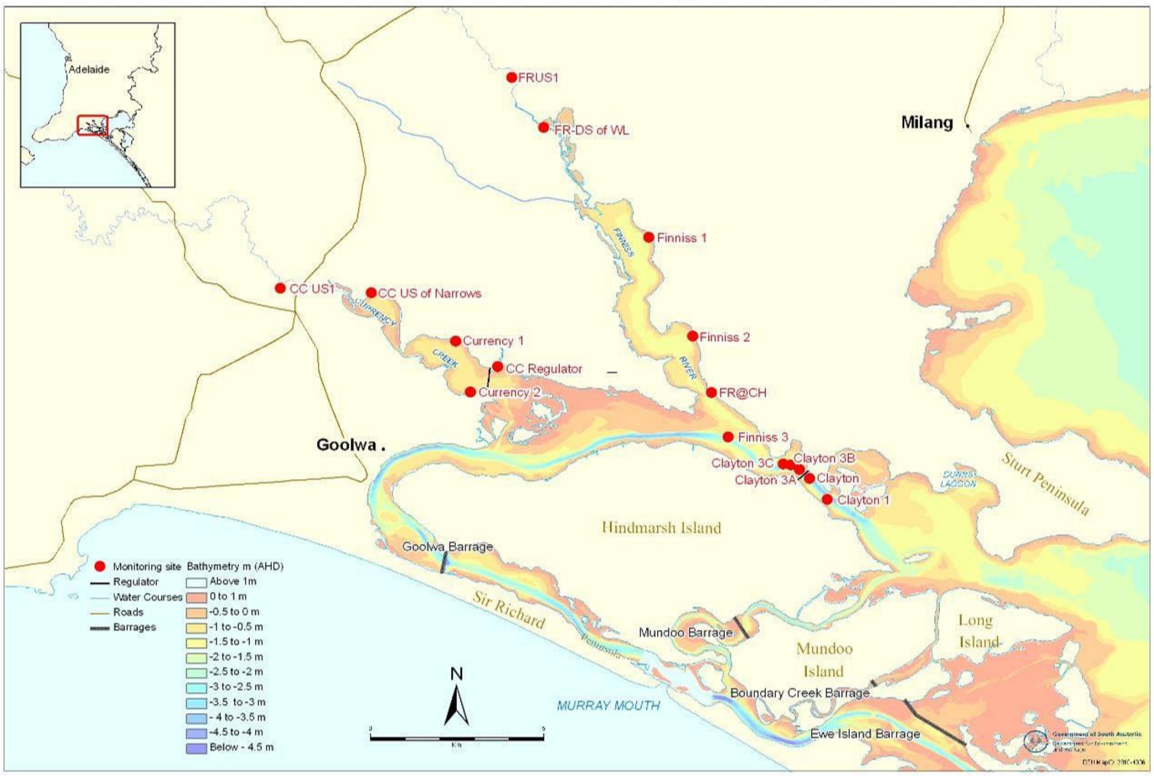


Figure 26 – Goolwa Channel and Tributaries ambient and event-based monitoring sites

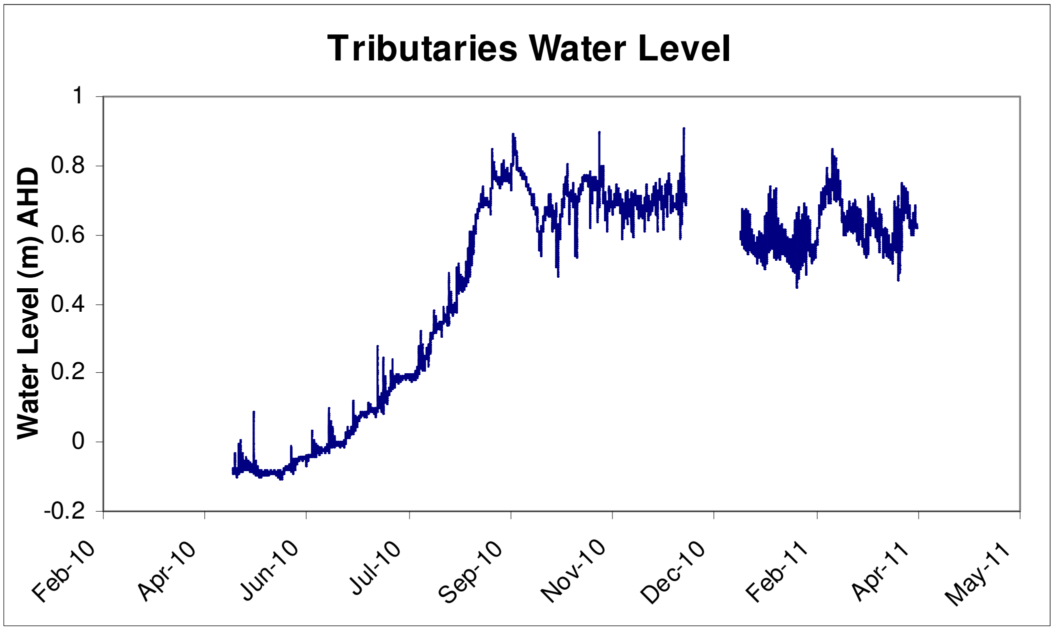


Figure 27 – Water level in the Goolwa Channel and Tributaries (DFW 2011).

pH

- pH levels at all sites have largely remained stable and within ANZECC guideline levels (pH 6.5-9.0) at most sites in the Goolwa Channel and Tributaries region (Figure 28).

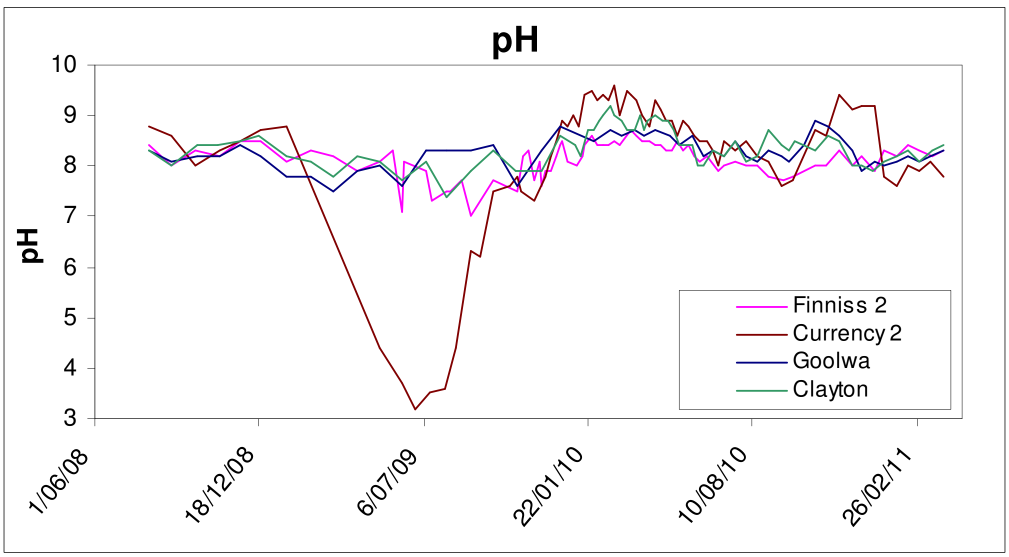


Figure 28 – pH at the Goolwa Channel and Tributaries monitoring sites

Alkalinity/Acidity

- Alkalinity levels at all of the Goolwa Channel and Tributaries sites are stable (Figure 29). The Alkalinity at Currency 2 has recently decreased possibly to acid sulfate soil water flux. Laboratory results have indicated there are low levels of acidity at the Currency Creek 2 site in March. This is likely due to diffusion of acidity from the underlying acid sulfate soils sediments that were exposed during 2007-2009 drought. Alkalinity and near neutral pH conditions are present in conjunction with the acidity. This will continue to be monitored closely over the coming months.

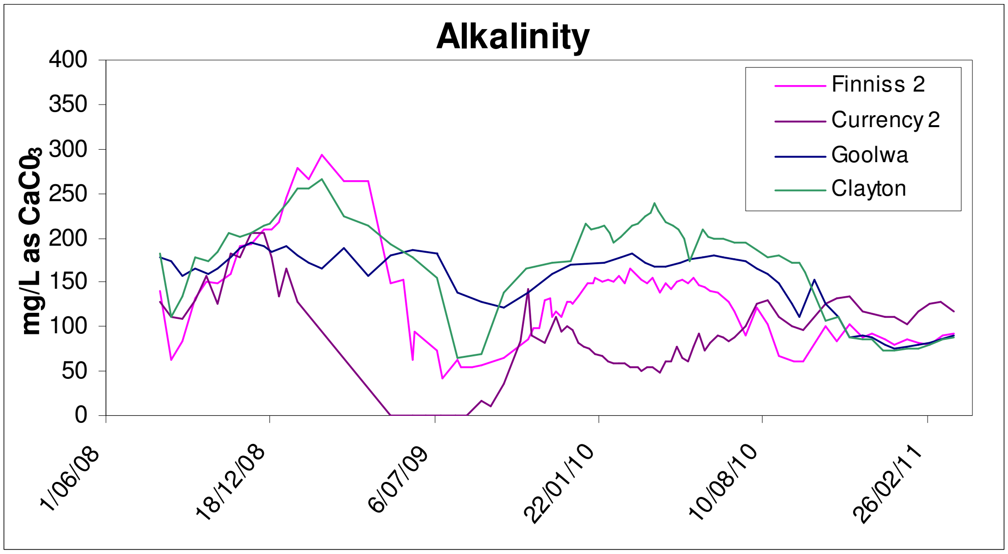


Figure 29 – Alkalinity at the Goolwa Channel and Tributaries monitoring sites

Sulfate:chloride ratio

- The sulfate: chloride ratio remains relatively uniform and stable at all sites in February (Figure 30). Trends do not indicate any widespread acid sulfate soil inputs.

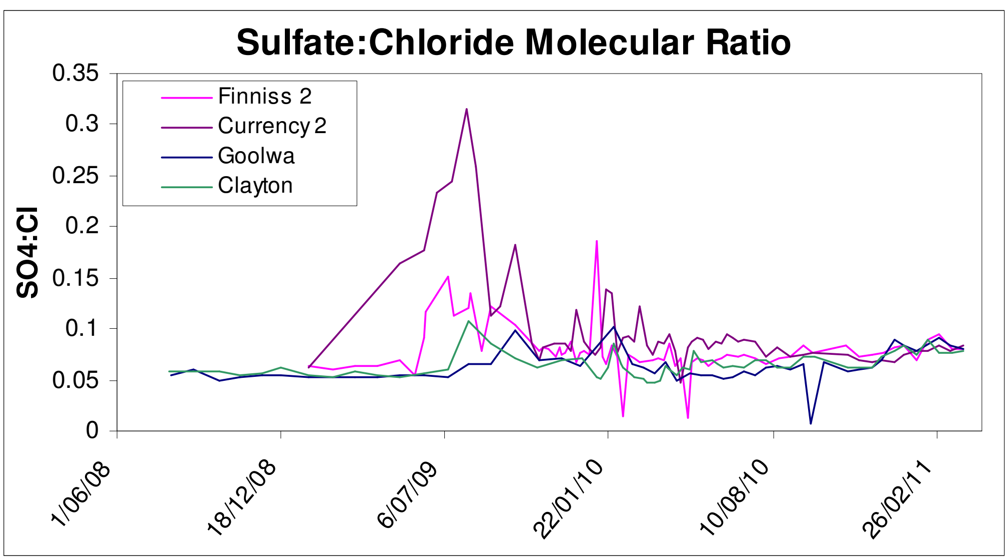


Figure 30 – Sulfate:chloride molecular ratio at the Goolwa Channel and Tributaries monitoring sites

Salinity (EC)

- Salinity levels remain low and stable for all sites in the tributaries and Goolwa Channel. Currency 2 salinity has fallen in March yet still remains higher then the other sites (Figure 31). This site is located on the north western side of the submerged Currency Creek regulator which is likely restricting mixing with the lower salinity flood waters and thus slowing the rate of salinity decline for Currency 2. At present declines in salinity at the Currency 2 site are tied to region wide water level fluctuations that are currently being manipulated to flush salinity from Lake Albert (see Figure 27).

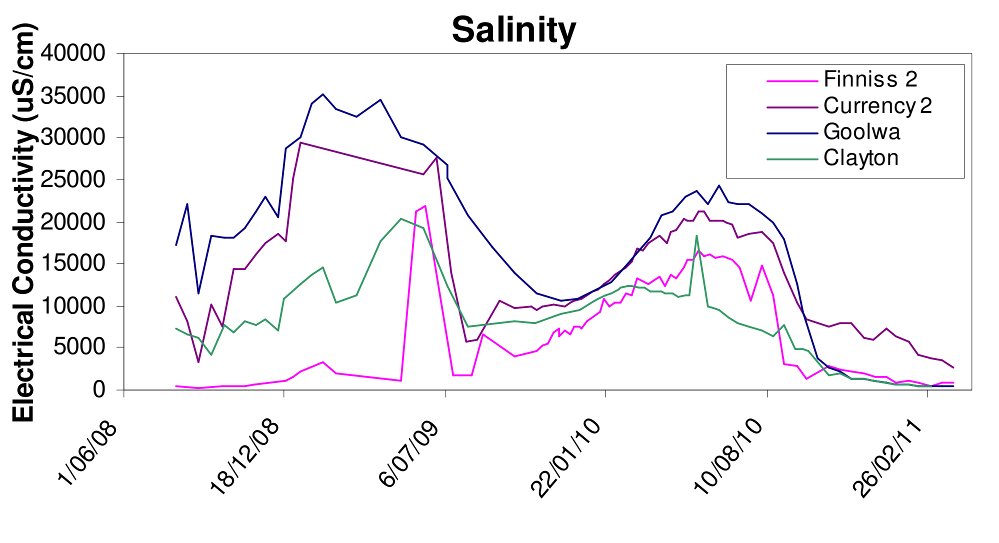


Figure 31 – Salinity at the Goolwa Channel and Tributaries monitoring sites

Turbidity

- Turbidity levels in the Goolwa Channel and Tributaries sites have decreased at all sites in March (Figure 32). This is consistent with the turbidity observed within Lake Alexandrina (Figure 6). The lower turbidity at the Currency 2 site is likely due to the presence of the Currency regulator restricting mixing with the more turbid flood waters, however, as observed for alkalinity and salinity, some recent mixing is occurring.

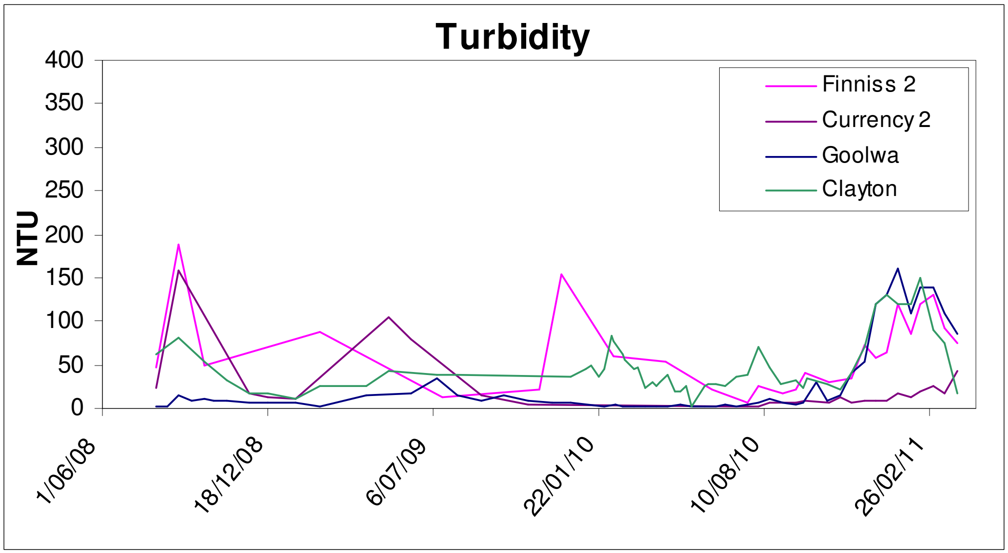


Figure 32 – Turbidity at the Goolwa Channel and Tributaries monitoring sites

Nutrients (total nitrogen and phosphorus)

- Nitrogen levels have remained relatively stable in the Goolwa Channel and Tributaries during March with only a slight increase across all sites (Figures 33 and 34). Phosphorous levels continue to increase at most sites with a slight decrease at Finniss 2. Currency 2 total phosphorus levels remain lower than the other sites. Nutrient trends in this region appear currently driven by water inflow composition and mixing processes in Lake Alexandrina (cf. Figures 7 and 8). Nutrient levels continue to remain above ANZECC guidelines for freshwater ecosystems (<1mg/L TN, <0.025 mg/L TP).

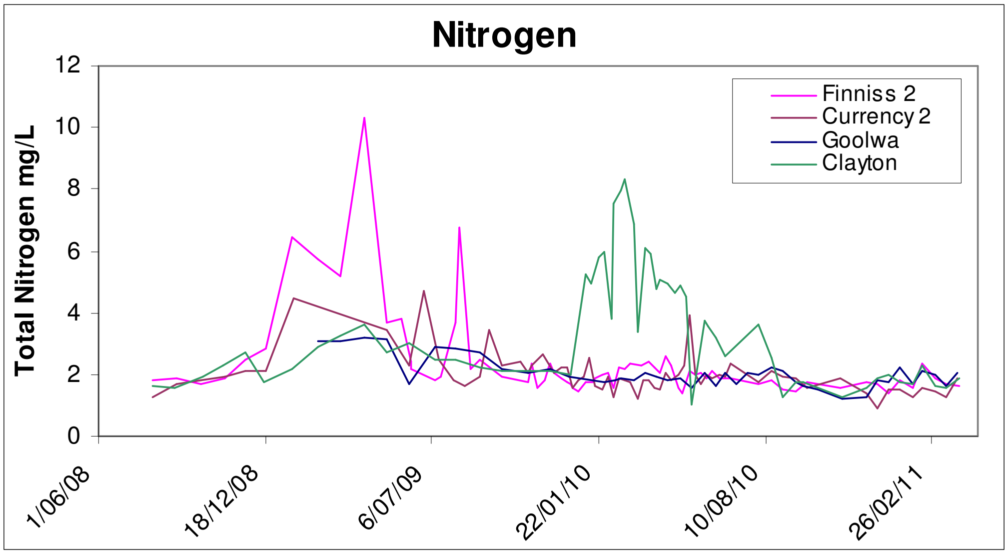


Figure 33 – Total Nitrogen at the Goolwa Channel and Tributaries monitoring sites

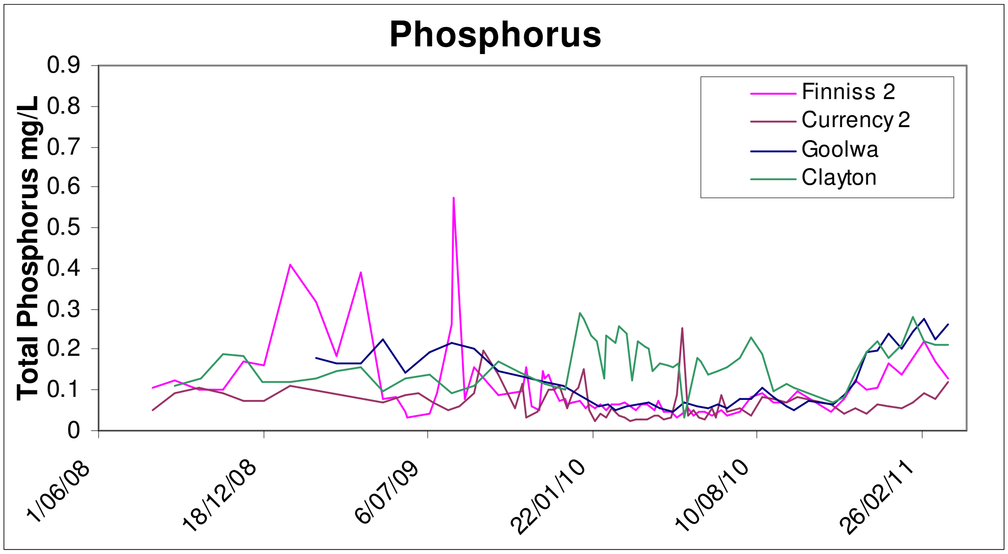


Figure 34 – Total phosphorus at the Goolwa Channel and Tributaries monitoring sites

Chlorophyll (algae)

- Chlorophyll *a* remains variable within the Goolwa Channel and the Tributaries (Figure 35). Increases in Chlorophyll *a* have occurred at the Clayton and Goolwa sites, the reason for this could be related to the recent decreases in turbidity in the region increasing light availability for algal growth (Figure 32).

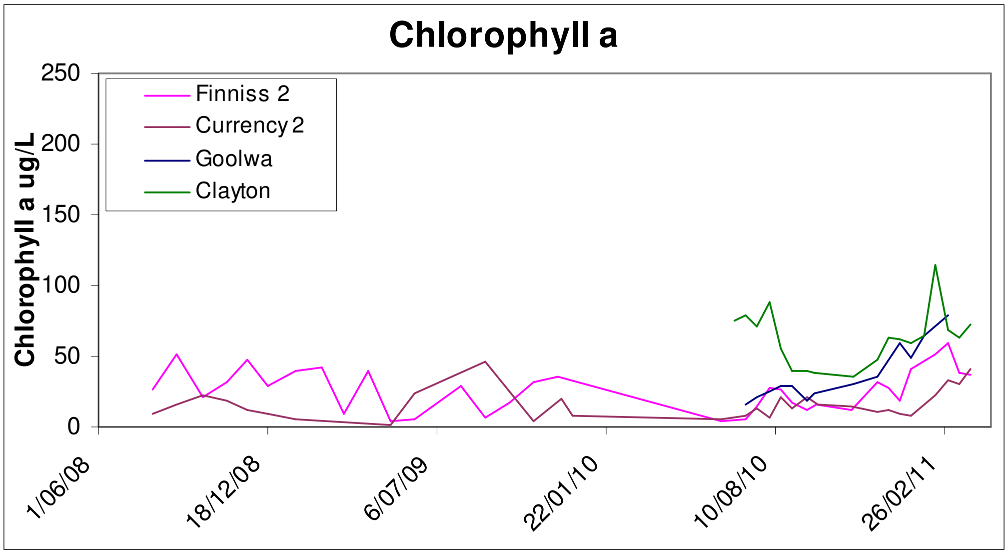


Figure 35 – Chlorophyll *a* at the Goolwa Channel and Tributaries monitoring sites

Metals

- Total aluminium and iron concentrations within the Goolwa Channel and Tributaries have remained stable at all sites since the increases recorded in January and remain relatively low compared to the 2008–2009 drought period (Figures 36 and 37). Currency 2 still has lower metals concentrations in comparison with the other sites tested, which could be due to the presence of the submerged Currency Creek regulator reducing mixing. Metal concentrations at other sites are consistent with inflowing flood water and Lake Alexandrina composition.

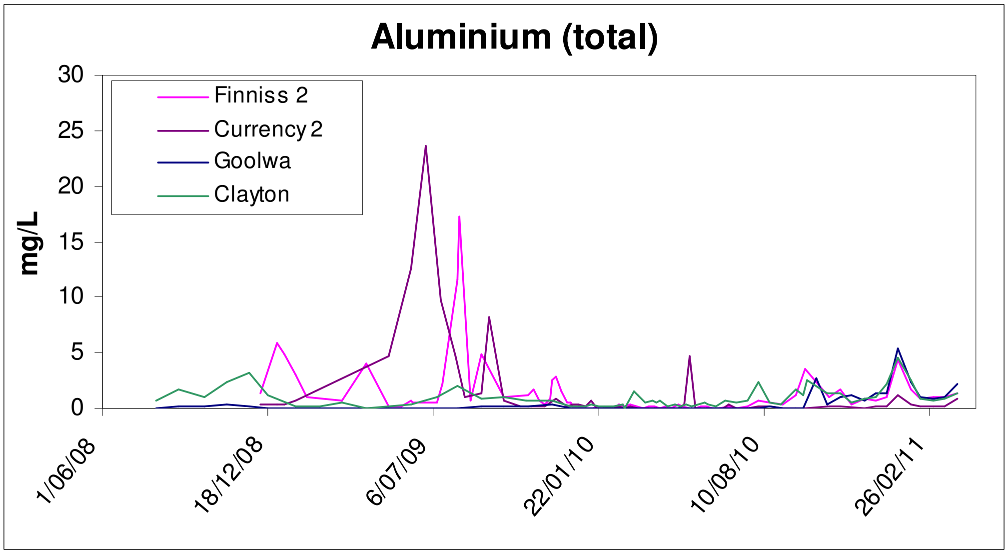


Figure 36 – Total aluminium at the Goolwa Channel and Tributaries monitoring sites

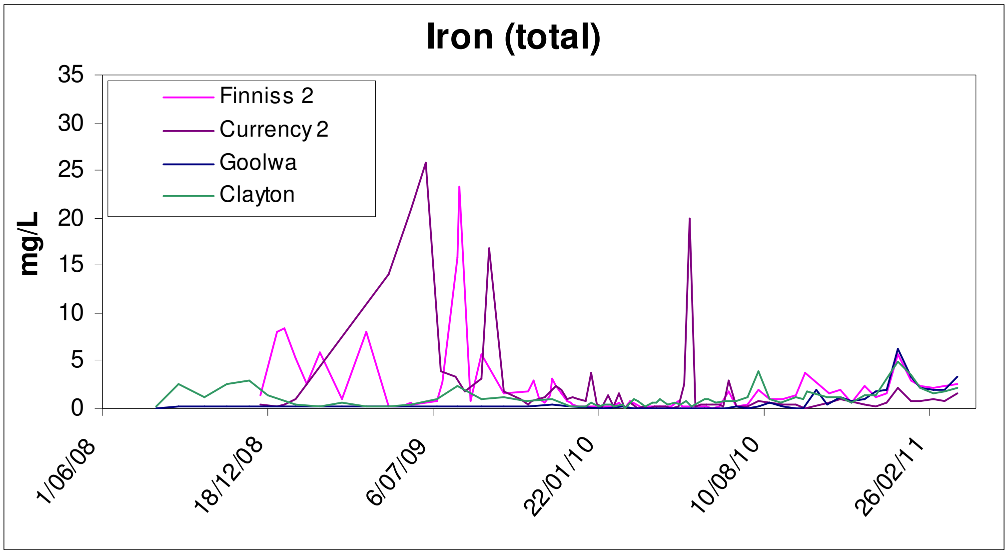


Figure 37 – Total iron at the Goolwa Channel and Tributaries monitoring sites

Dissolved Oxygen

- Dissolved oxygen levels in the tributaries have increased recently (Figure 38) and remain above guideline values (>6 mg/L) (Figure 38). The levels in this region are lower than in Lake Alexandrina (Figure 13) which might be influenced by some localised enrichment in organic material or oxygen consumption as a legacy from previous acid sulfate soil issues in the region (e.g. monosulfidic black ooze formation).

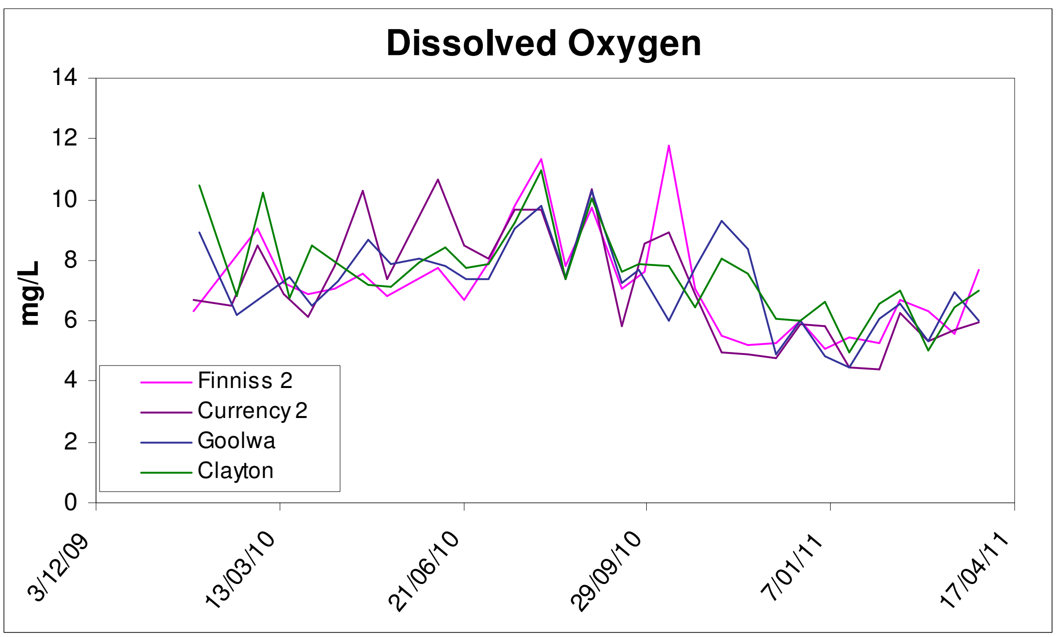


Figure 38 – Dissolved Oxygen at the Goolwa Channel and Tributaries monitoring sites

Event-based monitoring

Event-based water quality sampling is undertaken in regions that have experienced acidification or were at risk of acidification (Figure 39). The selection of sites was based upon previous acid sulfate soil risk assessments, in accordance with available data on the distribution of sulfidic and sulfuric materials and research and modelling into potential acidity fluxes. High risk locations were initially screened to identify the presence and extent of any acidity, and the frequency of further monitoring was determined from these results. Previously this information has been used to determine the need for management actions, such as limestone dosing which occurred in Currency Creek, Finniss River in 2009 and Boggy Lake, Lake Alexandrina in 2010. Limestone dosing reduces the acidity hazard and mitigates further metal release.

Event-based sampling is also presently undertaken in the Narrung Narrows to better understand the water exchange between the two lakes and near the Tauwitchere and other barrages to better understand salt and other constituent export from the lakes during high flows (see Figure 39 for sites).

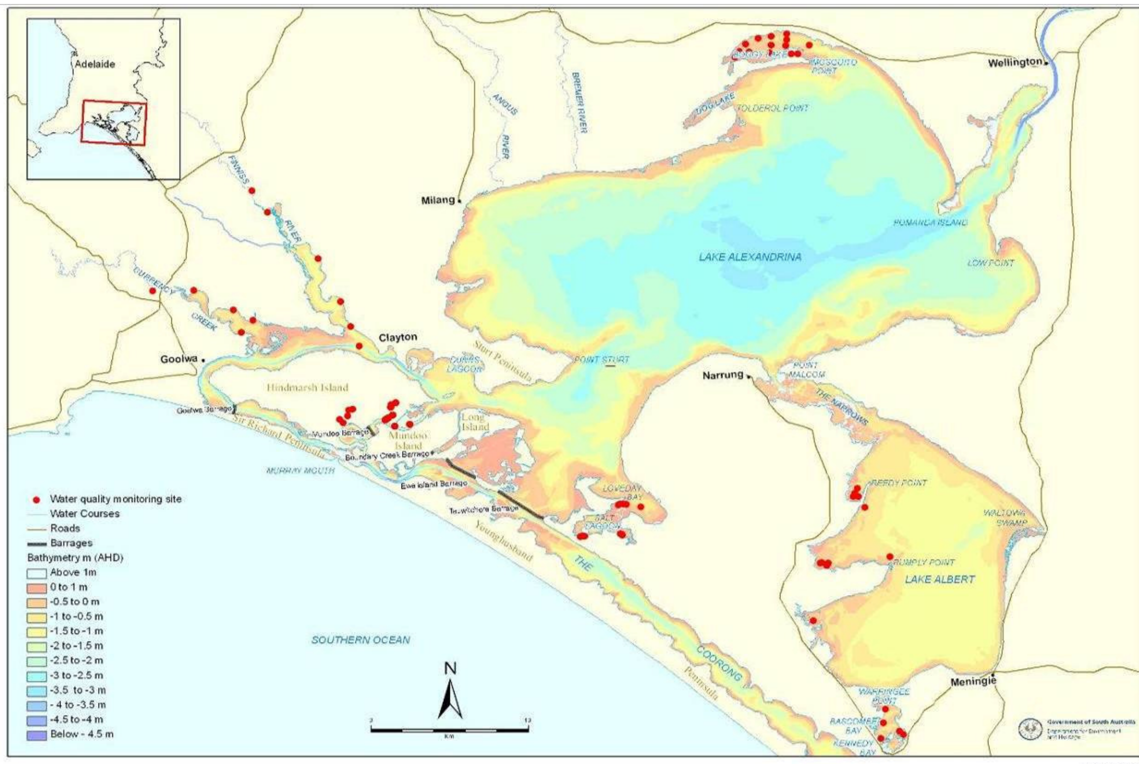
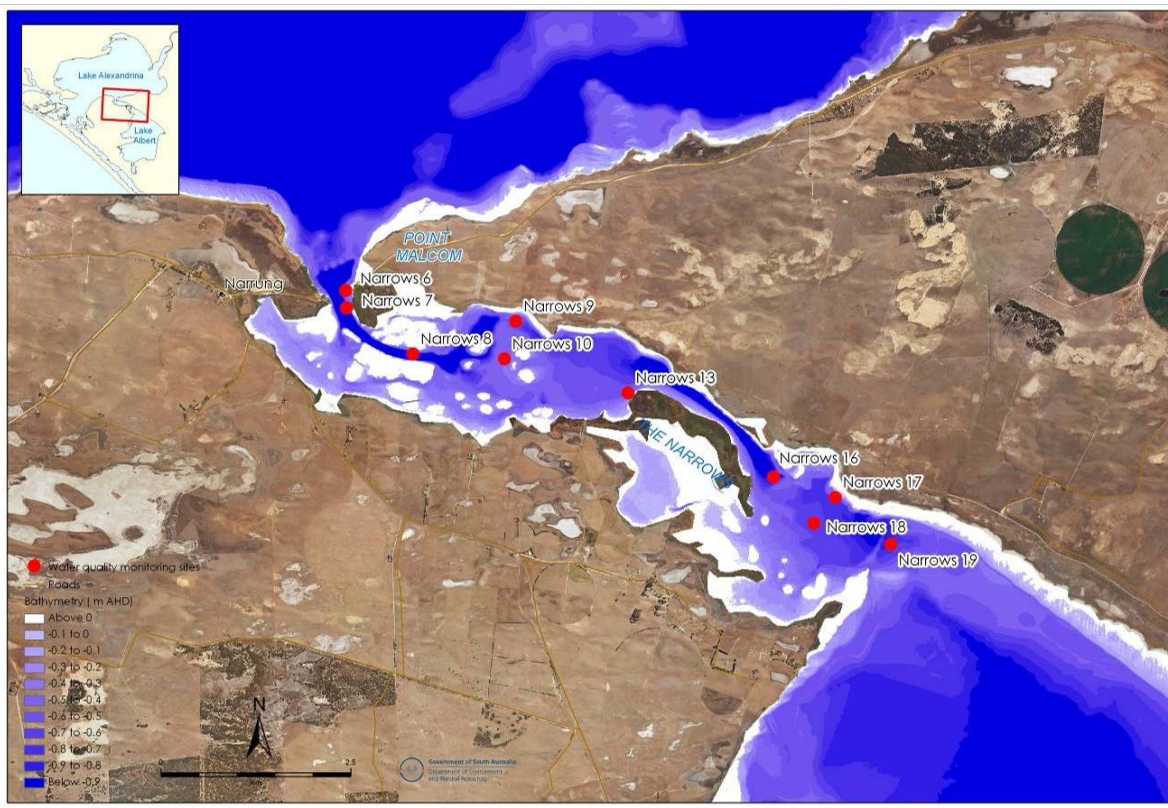


Figure 39 – Event-based water quality monitoring sites

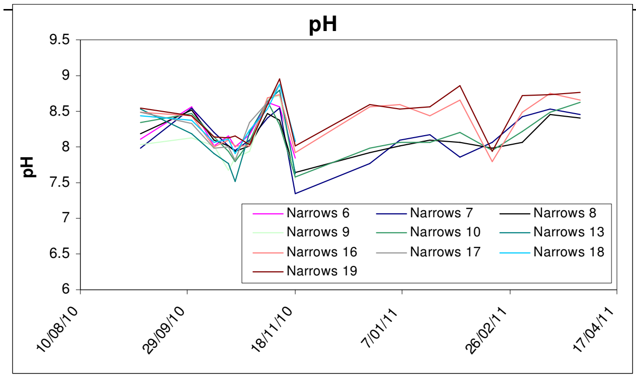
Narrung Narrows

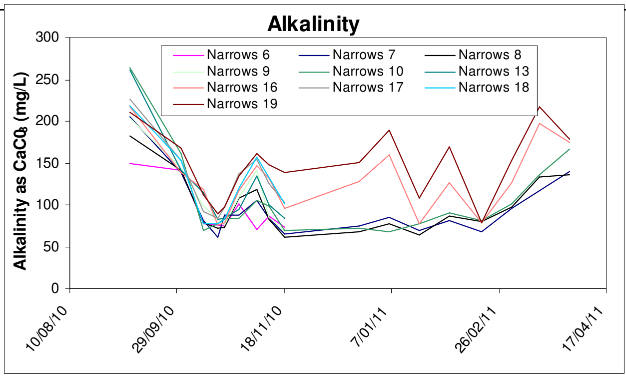
Figure 40 shows the various sample sites for the Narrung Narrows separating Lake Alexandrina from Lake Albert. Sites within the Narrung Narrows have been monitored since the Narrung bund was breached in September 2010. pH levels at all locations have stabilised during March while alkalinity and salinity levels appear to be influenced by water movements through the narrows (Figure 41). Recently there have been observations of acidity 2.7 mg/L at the Narrung Narrows 16) site, although the levels are quite low it indicates that there may be ASS impacts within the channel. However the site still maintains acceptable pH and alkalinity levels. This area will continue to be monitored closely over the coming months. The variability of the Narrows water quality results is likely a result of the varying wind directions and interactions with flood waters pushing water with lower salinity and alkalinity from Lake Alexandrina into the narrows. Water level manipulations in Lake Alexandrina are also influencing these trends.

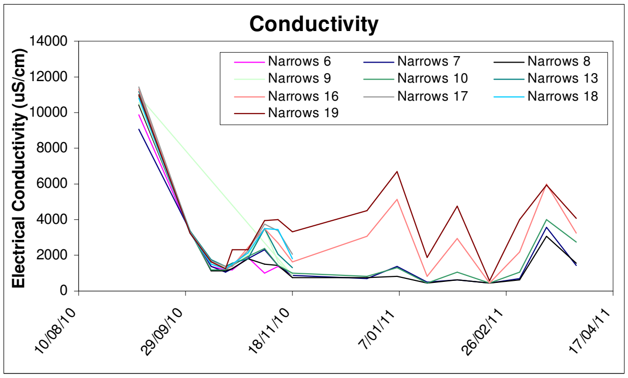


DEH MapID: 2011-4616

Figure 40 – Narrung Narrows monitoring sites


pH
pH
Narrows 6
Narrows 7
Narrows 8
Narrows 9
Narrows 10
Narrows 13
Narrows 16
Narrows 17
Narrows 18
Narrows 19
10/08/10
29/09/10
18/11/10
7/01/11
26/02/11
17/04/11


Alkalinity
Alkalinity as CaCO3 (mg/L)
Narrows 6
Narrows 7
Narrows 8
Narrows 9
Narrows 10
Narrows 13
Narrows 16
Narrows 17
Narrows 18
Narrows 19
10/08/10
29/09/10
18/11/10
7/01/11
26/02/11
17/04/11


Conductivity
Electrical Conductivity (uS/cm)
Narrows 6
Narrows 7
Narrows 8
Narrows 9
Narrows 10
Narrows 13
Narrows 16
Narrows 17
Narrows 18
Narrows 19
10/08/10
29/09/10
18/11/10
7/01/11
26/02/11
17/04/11

Boggy Lake

Figure 42 shows a map of sampling locations in Boggy Lake with water quality results from selected sites shown in Figure 43. Limestone dosing and improved water levels from flow into Lake Alexandrina since September 2010 have enabled the pH and alkalinity within Boggy Lake to recover and stabilise to within satisfactory guideline levels and trigger values (Figure 43). pH levels continue to remain stable but alkalinity levels have continued to gradually decline across all sites during March, which could be attributed to ongoing mixing with flood waters in Lake Alexandrina, as also apparent in the salinity results.

Figure 42 – Boggy Lake sample sites

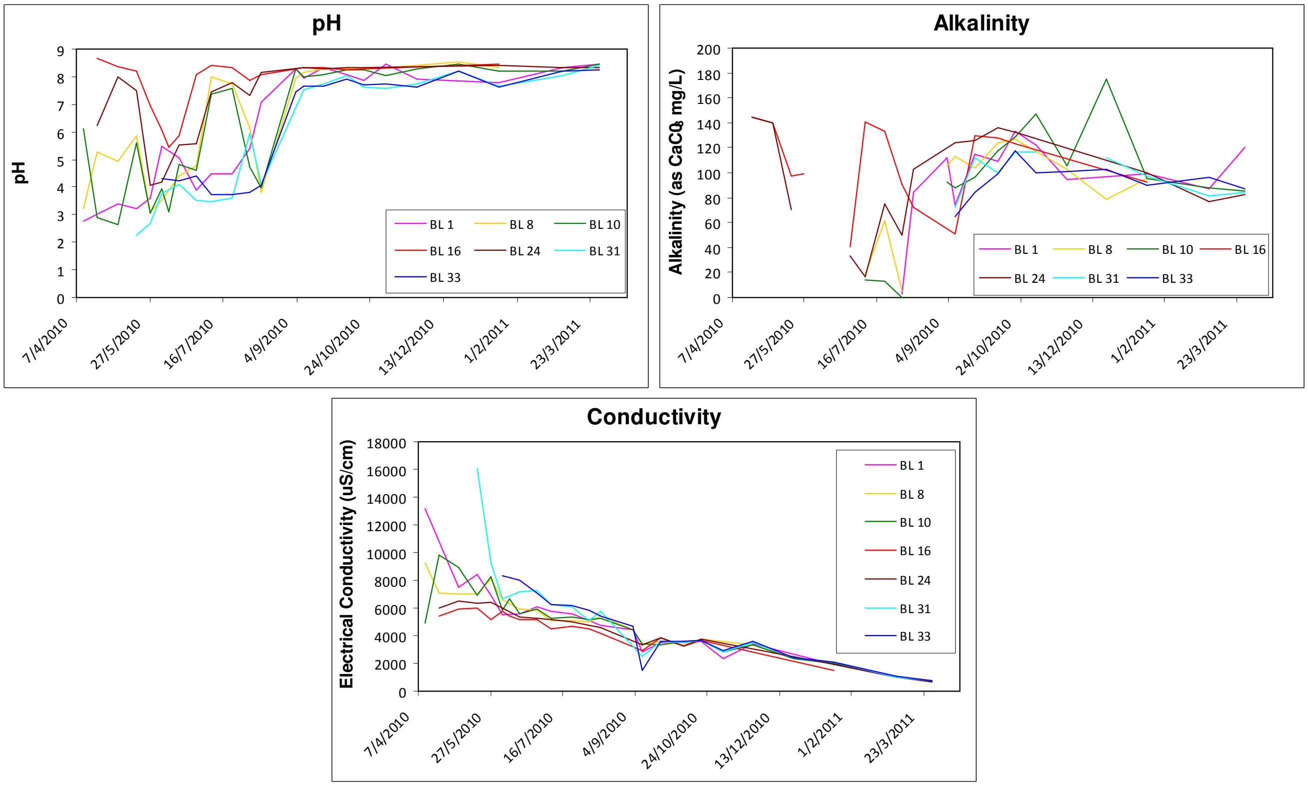
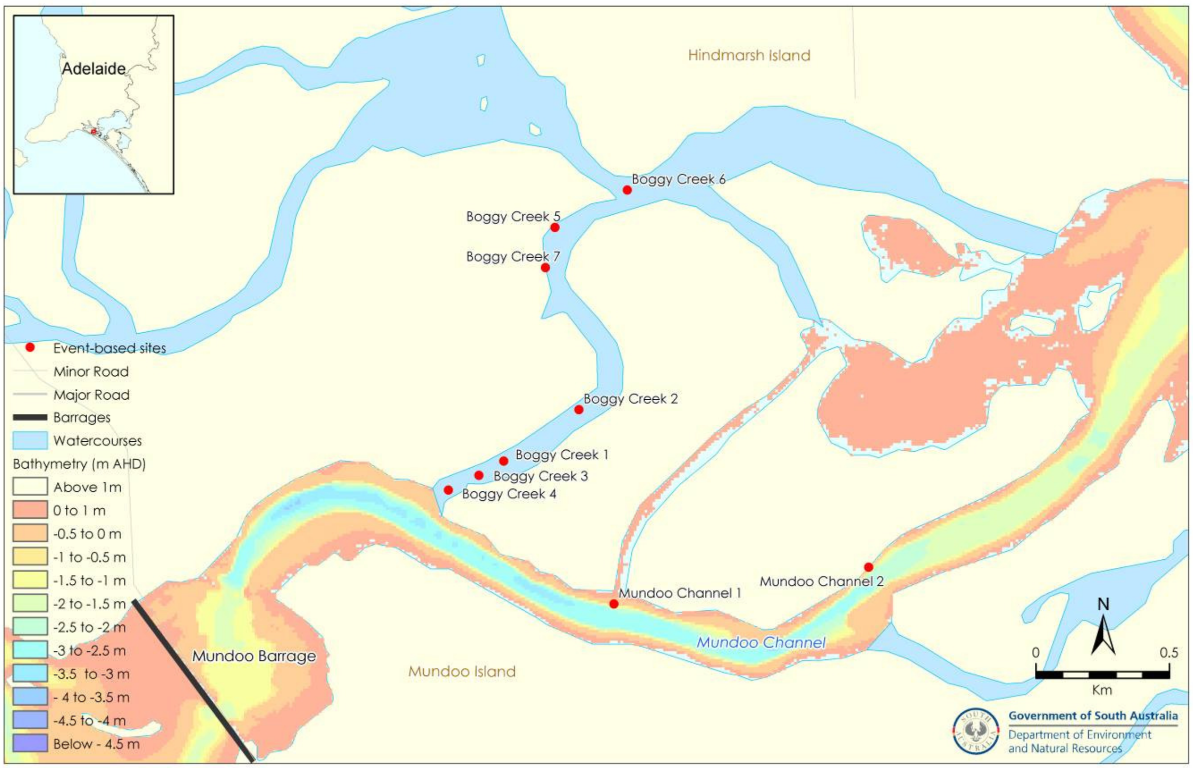


Figure 43 – Boggy Lake water quality results

Boggy Creek and Hunters Creek

Figure 45 - 46 and 47 - 48 show the Boggy Creek and Hunters Creek sampling sites and water quality results respectively. pH levels within Boggy Creek remain stable since flows returned to the area in December 2010 (Figure 45), and have remained relatively stable throughout March. This trend is consistent with the declining salinity, as a result of increased inflow from the Mundoo Channel into Boggy Creek, due to increased floodwaters within Lake Alexandrina. Alkalinity dropped slightly in February but remains with in ANZECC guidelines. Despite the increased flow and higher water levels there remains acidity present within Boggy creek, this is likely due to fluxes from sediments containing acid sulfate soils and will continue to be monitored closely as flows decrease over coming months

The pH levels within Hunters Creek have remained relatively stable since October 2010 (Figure 47). Salinity has remained consistently stable at low levels over the same period. Alkalinity within Hunters Creek has stabilised at all sites during March and remains within ANZECC guidelines. There have been some observations of low levels of acidity at Hunter’s Creek see Figure 47. This is likely due to diffusion of soluble Fe and Mn from the underlying acid sulfate soils (metal data not shown).



DEH MapID: 2011-4846

Figure 44 – Boggy Creek sample sites

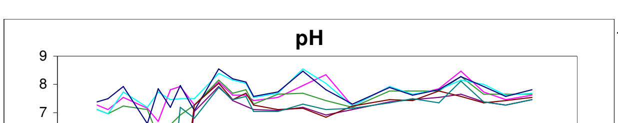


Figure 45 – Boggy Creek water quality results

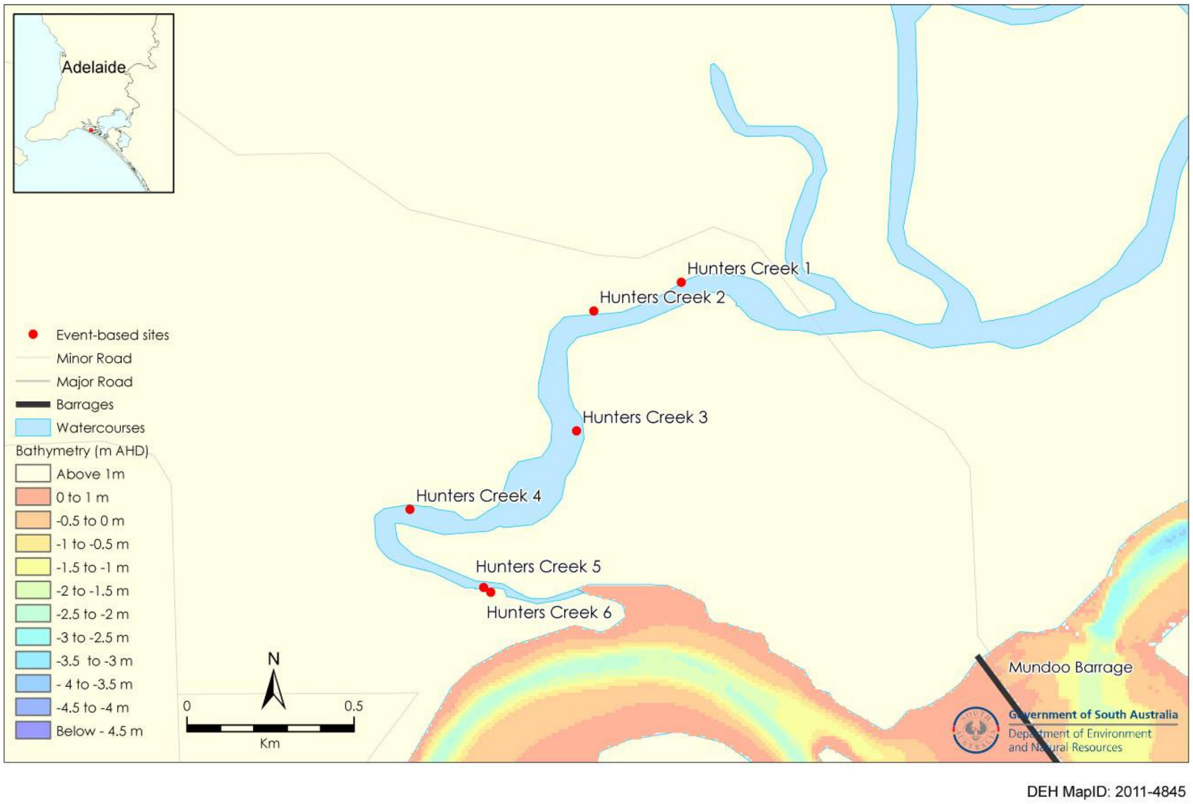


Figure 46 – Hunters Creek sample sites

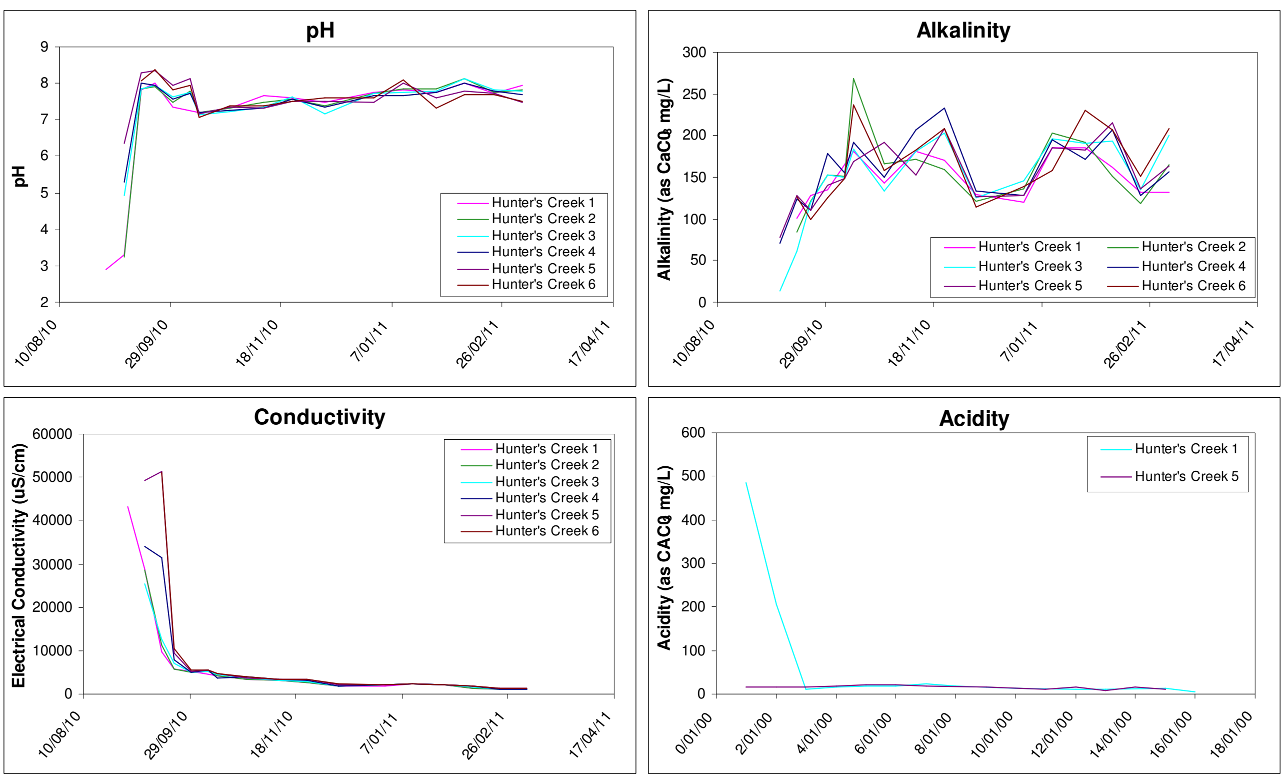


Figure 47 – Hunters Creek water quality results

Further Information

Further information on water quality and quantity, and acid sulfate soils, can be found on the following websites:

- Department of Environment and Natural Resources www.environment.sa.gov.au/cllmm/
- River Murray Data http://data.rivermurray.sa.gov.au/ (real-time data)
- Environment Protection Authority www.epa.sa.gov.au or for specific Lower Lakes data see http://www.epa.sa.gov.au/environmental_info/water_quality/lower_lakes_water_quality_monitoring
- Department for Water www.waterforgood.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
- CSIRO acid sulfate soils www.clw.csiro.au/acidsulfatesoils/murray.html