

North Central Waterwatch

Saltwatch Week 18 - 24 May 2015



A regional Salinity Snapshot report

Acknowledgement of Country

The North Central Catchment Management Authority acknowledges Aboriginal Traditional Owners within the region, their rich culture and spiritual connection to Country. We also recognise and acknowledge the contribution and interest of Aboriginal people and organisations in land and natural resource management.

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A copy of the draft is also available on www.nccma.vic.gov.au
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Saltwatch Week is an annual Salinity Snapshot event hosted by Waterwatch Victoria. The aim of the program is to facilitate an event across the state during a week in May where people collect a sample of water and test the salt content.

This year more than 100 sites were tested for salinity across Victoria. Testing indicated the results were mostly inside the Good range. Only six sites recorded as Very High levels and all were in the north central region.

What is salinity?

Salinity refers to the movement and concentration of salt through the landscape.

Salt is a natural component of our soils and water tables. In a healthy catchment, salinity rarely becomes a problem, but high levels of salt negatively impact on the health of waterways, vegetation and agricultural production.

Why monitor salinity?

Plants and animals need low levels of salt to help them grow, but all organisms have set tolerance levels. Salinity levels can affect the diversity of flora and fauna found within a waterway. It can also affect many areas of everyday life in rural and urban areas. Monitoring salinity allows us to understand the impacts of salinity and observe changes and trends in salinity over time. If salinity trends worsen over time we can attempt to intervene with changed land and water management practices.

What causes salinity to change?

Salinity occurs when deep-rooted vegetation is removed from the landscape, allowing larger volumes of rainfall to reach the water table. This rain collects salt particles from the soil profile as it seeps down, adding saline water to the water table. As groundwater rises it carries large amounts of salt that were previously stored underground. Higher rainfall and irrigation can exacerbate the problem, causing salt to rise to the surface and enter our waterways.

What are the environmental impacts?

High levels of salinity can severely limit the growth and diversity of vegetation, reduce the capacity and productivity of land, degrade habitats, decrease fauna health and diversity, affect water quality, reduce the value of water and contribute to erosion and damage infrastructure.

Managing salinity levels:

Planting deep-rooted native trees in high recharge areas (where rainfall is entering groundwater) can help to lower the water table. Improved land-management practices, efficient watering, monitoring salinity levels in the ground — and from surface water — can all also manage salinity effectively.

General water quality guidelines

The table below includes general guidelines as they relate to salinity values within the north central region. These guidelines help to identify where data sits in terms of general water-quality standards.

This should be used as a broad guide only to give initial grounding where data currently sits

North Central Waterwatch developed the guidelines and are based on the State Environment Protection Policies Waters of Victoria (SEPP WoV), Environmental Protection Authority, Victoria, the Australian and New Zealand Environment Conservation Council (ANZECC) Water Quality Guidelines (1992) and historical water quality data in the north central region.

The acceptable level of salinity in freshwater, for healthy aquatic ecosystems is <500 $\mu\text{S}/\text{cm}$. Levels higher than 2500 $\mu\text{S}/\text{cm}$ are considered Poor to Degraded.

Salinity	Excellent	Good	Poor – degraded
Upper/Lower Catchment	<500 $\mu\text{S}/\text{cm}$	500-2500 $\mu\text{S}/\text{cm}$	> 2500 $\mu\text{S}/\text{cm}$

Salinity in the north central region

A range of people in the north central region were asked to register their interest in capturing a snapshot of salinity from their local waterways. More than 30 people took up the offer, including Waterwatch community volunteers, landholders, Landcare group members and primary school students.

The majority of sites recorded measurements between 900 $\mu\text{S}/\text{cm}$ and 1800 $\mu\text{S}/\text{cm}$, falling well within the expected range for a healthy ecosystem. Four sites on the Avoca River were recorded as Poor, with salinity levels between 9,000 $\mu\text{S}/\text{cm}$ and 25,000 $\mu\text{S}/\text{cm}$. A further four sites on the Avon-Richardson catchment reported as Degraded with extremely high salinity levels.

FYI: seawater has a conductivity of around 54,000 $\mu\text{S}/\text{cm}$



Students using an Electrical Conductivity (EC) Meter to measure salinity levels in a water sample.

Salinity around the region

Campaspe Catchment

In the Campaspe catchment, four salinity samples were taken in total during Saltwatch Week, two sites on Five Mile Creek and two sites on the Campaspe River. All sample sites were located in the upper catchment and the results ranged from excellent - good. In general the range for salinity in upper catchments is generally good, due to higher rainfall and lower groundwater inflows.

Loddon Catchment

In the Loddon catchment, 15 salinity samples were taken from the upper reaches to lowland floodplains. Salinity samples were reported as good - fair throughout the catchment. After receiving a flush from the 2010 floods and since maintaining an environmental watering regime in the river, we have seen salinity levels stabilise into a good range in the lower catchment.

In the Avoca and Avon Richardson catchment, nine sites were tested for salinity, eight of these sites were well above the accepted range and are considered degraded. Groundwater inflows combined with recent low flows in these waterways are likely to be leading to salt concentration and the elevated salinity levels observed during Saltwatch week.

To view the data

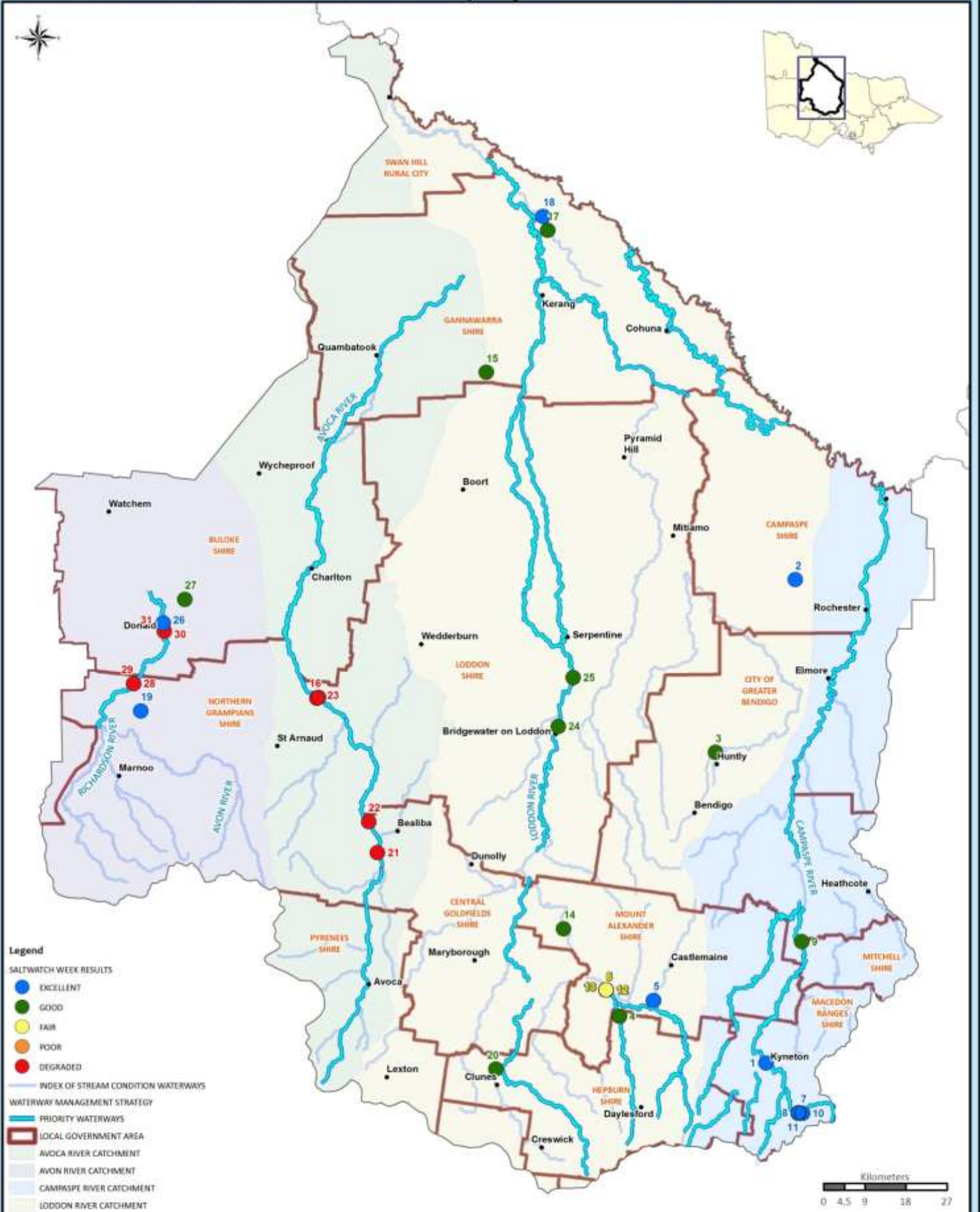
If you would like to view the state-wide salinity snapshots results go to:

<http://www.vic.waterwatch.org.au/monitoring-and-data/1010/>

To view results from the north central region, check out the map below. It highlights monitoring points for sites registered in the Saltwatch Week's Salinity Snapshot and are colour coded to represent whether they fall within the Excellent, Good or Degraded range.

If you have any questions, please contact your Regional Waterwatch Coordinator, Cass Davis, on (03) 5440 1863 or cass.davis@nccma.vic.gov.au.

North Central Waterwatch - Saltwatch Week May 2015



Legend

- SALTWATCH WEEK RESULTS**
- EXCELLENT
 - GOOD
 - FAIR
 - POOR
 - DEGRADED
- INDEX OF STREAM CONDITION WATERWAYS**
- PRIORITY WATERWAYS
- WATERWAY MANAGEMENT STRATEGY**
- LOCAL GOVERNMENT AREA
 - AVON RIVER CATCHMENT
 - AVON RIVER CATCHMENT
 - CAMPASPE RIVER CATCHMENT
 - LODDON RIVER CATCHMENT

- | | | |
|---|--|---|
| 1 Peter - Campaspe River, Kyneton | 14 Loddon River | 23 NC_AVC380 Avoca River between Coonooer and Low water bridge |
| 2 Gordon - Main Western Channel, Lockington Kotta Road, Lockington | 15 Lake Meran, Boort | 24 NC_LOD505 Loddon at end of Avondal lane - lawson property |
| 3 Brian, North Side Bendigo Creek, Millwood Road | 16 Avoca River, at Low Water Bridge | 25 NC_LOD525 Loddon, Salisbury West, Penny Lane |
| 4 CRD 900: Jim Crow Creek at Garsed Road crossing | 17 Wendy - Barr Creek @ Capels Crossing | 26 NC_LCP000 Foletti's Caravan Park |
| 5 CMB 600: Campbell's Creek at Max's gate | 18 Wendy - Loddon River @ House | 27 NC_LJ1000 Lake Jill Jill, Jeffcott Road |
| 6 LOD 250: Loddon River at Newstead spillway | 19 Fiona - Walkers Lake, south side | 28 NC_RNR330 Gutheries Bridge |
| 7 Five Mile Creek Reserve | 20 Prue - Creswick Creek (Mt. Cameron Rd Bridge) | 29 NC_RNR520 Waste Water Treatment Plan Road, Donald South Road |
| 8 Five Mile Creek @ Children's Playground | 21 Nola - Avoca River (Archdale Rd Bridge) | 30 NC_RNR580 Bullocks Head [Donald Township] |
| 9 NC_CAM355 5th side of Bridge, Heathcote-Redesdale Road near Knight Road | 22 Nola - Avoca River (Bealiba/Emu) | 31 NC_RNR600 Apex Park [Donald Township] |
| 10 NC_FMC380 Five Mile Creek Reserve | | |
| 11 NC_FMC450 Five Mile Creek @ Children's Playground | | |

Case Study: Salinity in the lower Avon-Richardson catchment

By Waterwatch volunteer Rob Loats

The lower Richardson River Waterwatch-monitored sites have recorded hyper-salinity levels in pools of water in summer over the past 20 years.

Why this occurs has always been a mystery to most, but the answer is simple. There is a saline underground water aquifer being fed from the upper catchment and running northward towards Lake Buloke. Importantly, it potentially becomes shallower as it moves from south to north, thus often infiltrating the lower Richardson River water pools.

The hydrology of this aquifer is impacted by varying weather conditions. In prolonged dry periods and drought conditions, the water level recedes. In very wet conditions or floods water seeps into the aquifer, builds up pressure and can infiltrate into the lower Richardson River.

With the recent record-breaking floods following the millennium drought, the aquifer's saline ground water infiltrated the lower Richardson River.

A very small but steady stream of highly saline water was observed slowly flowing at the Guthrie's Bridge, Reseigh's Ford and Donald South Road monitored sites.

The township of Donald is next to the Richardson River and below the aforementioned sites. Pooled water at Bullocks Head and Apex Park in the town were all impacted by saline ground water intrusion.



Unfortunately, these sites are also subject to runoff of degraded urban storm water, which further impacted water quality.

Interestingly, this year I have observed some of these monitored pools turning pink, then brown and yellow (most likely algae blooms) and emitting an offensive odour.

The Richardson River next to Donald has very little fall prior to finally terminating in the Buloke Lakes. This can lead to silt dropout and can impact on the

deeper refuge locations fauna potentially rely on. Little Lake Buloke is also heavily impacted by salinity and I have monitored salinity readings over 150,000 ECs there.