30 Years of North Central WaterWatch

A River Health Report and Citizen Science Success Story

Foreword

I am proud to present 30 Years of North Central WaterWatch – A River Health Report and Citizen Science Success Story. This report details the remarkable journey undertaken by the North Central Catchment Management Authority's (CMA) WaterWatch program to capture water quality data over the past three decades.

We have embraced the power of citizen science, inviting volunteers from within our communities to join hands with us in gathering scientific data. This collaborative approach, which combines professional expertise with the enthusiastic participation of local community members, means we have captured a compelling story of waterway health over time. By integrating citizen science into our projects, we have witnessed the remarkable capacity of our communities to engage, connect, and nurture their environment.

This report stands as a testament to the dedication, innovation, and collective effort of our team, partners, and most of all, the passionate and dedicated citizen scientists who are pivotal in testing waterway samples near their local patch. The data collected goes a long way in helping us shape activities that contribute to the enhancement and protection of our precious waterways in the North Central CMA region.

Our commitment to sustainable catchment management is unwavering, and the pages that follow unveil past and present endeavours to track water quality and foster overall catchment health.

I am thankful for the steadfast dedication of our team, the unwavering support of our partners, and the invaluable contribution of our volunteers and citizen scientists. The report is both a testament to the progress we have achieved and an inspiration for future citizen science led initiatives.

Brad Drust
Chief Executive Officer – North Central CMA

Barapa Barapa woman Laura Kirby. Photo: Bill Conroy

Acknowledgement of Country

The North Central Catchment Management Authority (CMA) acknowledges Aboriginal Traditional Owners within the region, their rich culture and spiritual connection to Country. We also recognize and acknowledge the contribution and interest of Aboriginal people and organisations in land and natural resource management, and pay respects to Elders past, present and emerging.

Introduction

As one of Australia's longest running citizen science programs, North Central WaterWatch are proud of the outstanding success of the program, of which would not have been possible without the tremendous efforts of participating volunteers. Their unwavering dedication is testament to the care and passion of people in our region for our waterways and environment. Without their assistance, we would not be able to keep track of the health of our precious waterways across our large region.

The North Central CMA region covers 13% of Victoria and comprises four river catchments: the Avoca, Avon-Richardson, Loddon, and Campaspe. More broadly, the catchment forms part of the Murray-Darling Basin.

The renewed North Central Regional Catchment Strategy 2021-27 identifies priorities for regional investment to protect and enhance waterways, wetlands and biodiversity assets including improving or maintaining water quality.

In recent years, the North Central CMA has been integrating citizen science into catchment management projects. Citizen science programs involve volunteers collecting scientific data to understand change over time that also supports monitoring programs and guides current and future efforts. This approach is proven to engage, connect and empower community within their local environment and to improve their appreciation of nature.

Whether active work is being undertaken in an area or not, WaterWatch volunteers provide significant data that complements our understanding of waterway health, changes over time and identifying waterway health concerns.

Learning about waterbugs with John Gooderham

Assessing waterbug samples

Interpreting results

The results in this report are a summary of water quality data collected by North Central WaterWatch citizen scientists over the past 30 years, from 1993 to 2023. The North Central CMA catchment is broken down into sub-catchments, Campaspe; Loddon; Avoca and Avon-Richardson, which is then broken down into program areas. The results for each program area are separated by decades to interpret changes over time, and finally interpreted using the Water Quality Indicator Levels. These are found by aggregating the data for a particular decade and finding the 75th percentiles for each indicator. For pH, the 25th percentile is also used, as both the lower and higher ends of the pH scale are used to determine the acidity or alkalinity respectively. Each indicator has four ranges, with 'good' being the most ideal for ecological health, and 'very poor' being the least ideal.

The North Central CMA catchment covers two surface water geographic regions: the Murray and Western Plains to the north and the Central Foothills and Coastal Plains to the south along the Great Dividing Range. These are used to determine the baseline ranges that would constitute an ecologically sound waterway. Some program areas span both regions, so data has been interpreted for both.

Water quality colour code

Sites have been colour coded and interpreted as follows:

Good
Water quality is acceptable and has minimal impacts on aquatic ecosystem health.

Moderate
Water quality and aquatic ecosystem health are moderately impacted.

Poor
Water quality and aquatic ecosystem health are largely impacted.

Very Poor
Water Quality and aquatic ecosystems are severely impacted.

Indicator definitions:

Electrical conductivity (EC) – measures salinity using an EC meter. The higher the number (measured in µS/cm), the more dissolved salts present within the waterway. A limited amount of salinity is important for the metabolic processes of aquatic organisms, but high concentrations may be toxic.

pH – measures acidity or alkalinity, and is measured with either a pH meter, or pH strips. The pH scale ranges from 0, indicating high acidity, to 14, indicating high alkalinity, with 7 being neutral. High or low pH can have significant ecological consequences, such as limiting the prevalence of pollution-sensitive species. Changes in pH is usually caused by geological factors, such as acidic or basic minerals entering waterways through scaling and erosion. It can also be an indication of a pollution event.

Turbidity – measures the clarity of a waterway and is determined using a turbidity tube. Turbid water can be due to a variety of organic and inorganic sources, such as turned-up sediment or coloured algal blooms. Generally, high turbidity in a body of water negatively affects availability of sunlight to aquatic vegetation and can clog gills of fish and invertebrates.

Reactive phosphorus – measures the amount of phosphorus, which is an indication of the nutrient load of the waterway of the nutrients or organic load. Phosphorous is a naturally occurring nutrient and is essential for all life. However high levels of phosphorous can lead to excessive algae growth and reduced oxygen levels.

Representative sites

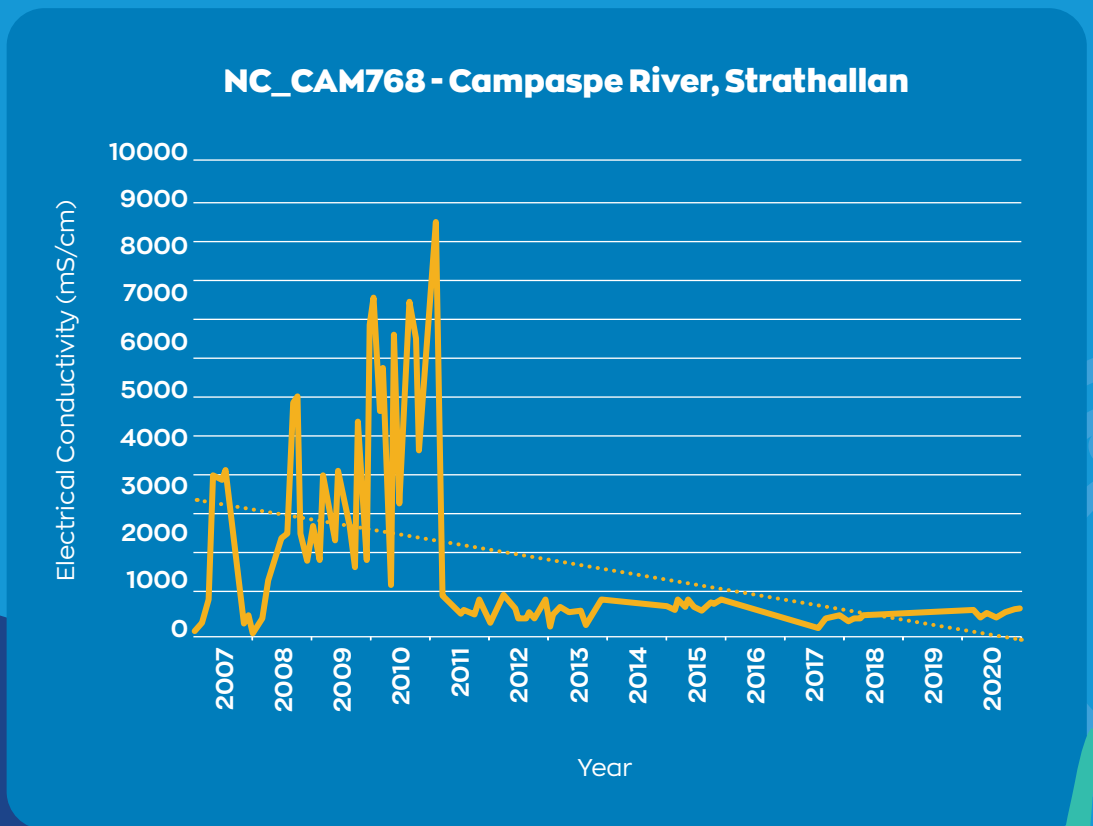
It can be challenging to ascertain the overall health of each catchment area by aggregating records for each site. This can be due to a multitude of reasons, such as varying influences on water quality and geographical location; some sites are within a forest catchment while others area naturally occurring saline lakes. As a result, this report has analysed and visualised singular sites with a high consistency of recordings over the decades, which are representative of the fluctuations in water quality in a region overall.

In addition, for each catchment, a representative site has been selected to describe a specific parameter in more detail and have been visualised with a line graph and without the use of the Water Quality Indicator Levels. This is a simple demonstration of the detail that can be reflected upon with such a long range of data.

Campaspe Representative Site – Electrical Conductivity

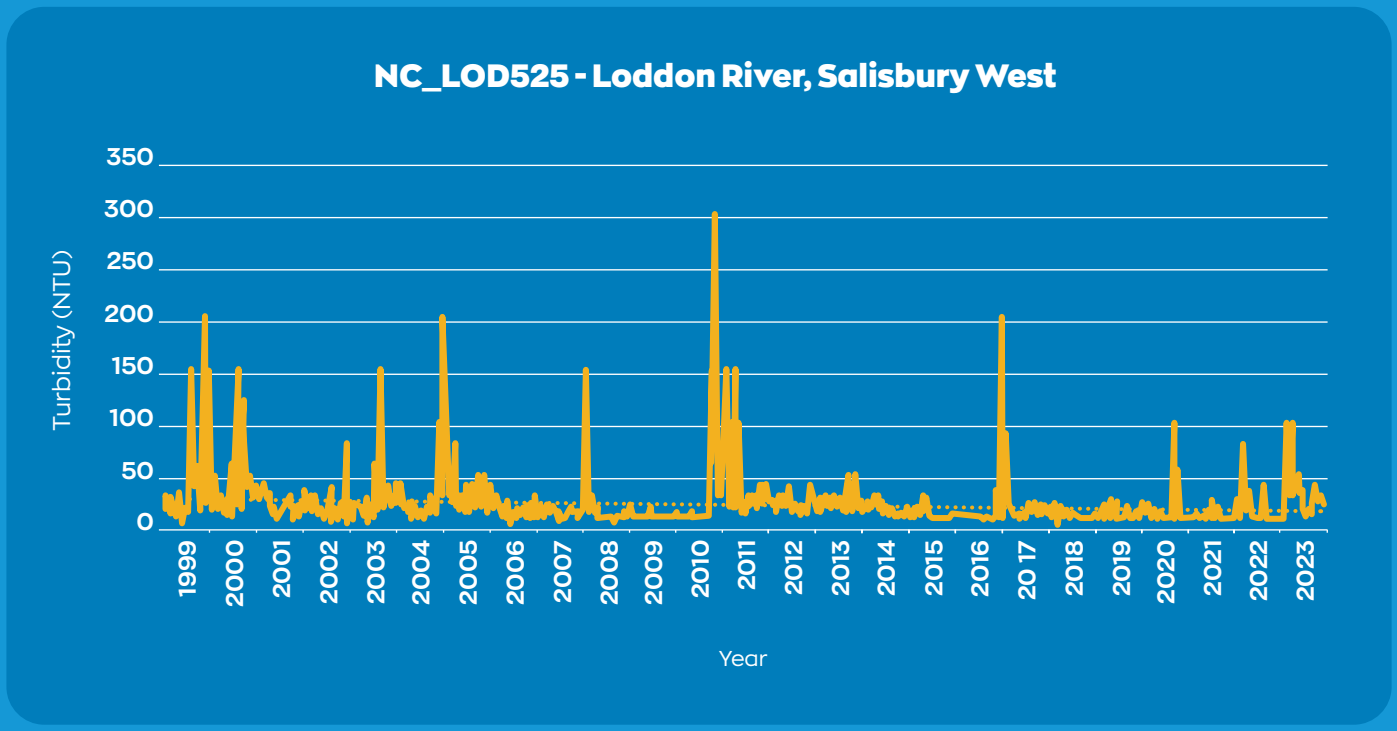
At this site on the Campaspe River, electrical conductivity has decreased. Prior to 2011, electrical conductivity was generally high with low flows likely seeing a condensing of salts in pools.

Following the major flood event of 2010/11, a sharp decline was recorded, perhaps indicating a dilution of salts and flush of pools during the event.



Loddon Representative Site – Turbidity

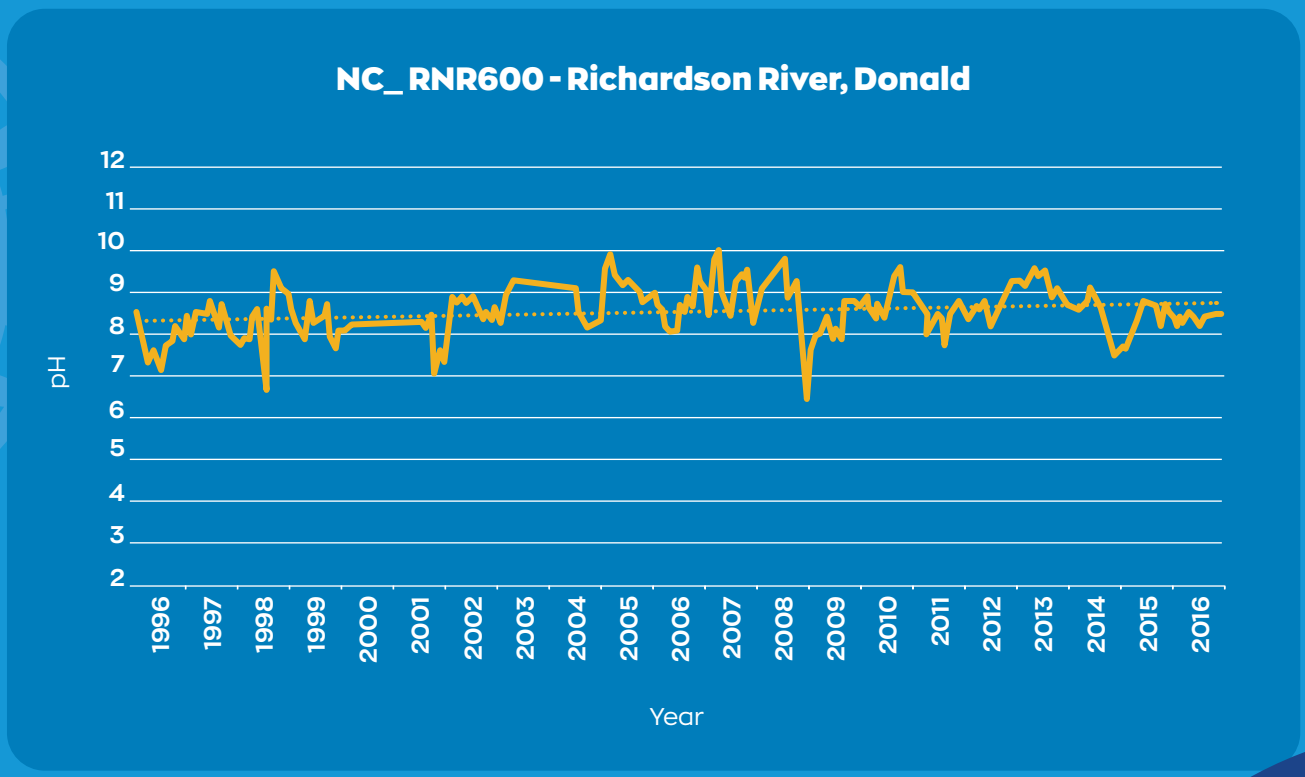
This site shows a typical representation of the peaks and troughs of turbidity, usually driven by seasonal rainfall. Typically, turbidity will increase during and after a rain event and then gradually decrease again and suspended solids fall out of the water column.



Avon-Richardson Representative Site – pH

The Richardson River typically has a slightly elevated (alkaline) pH level, most likely influenced by rock types and groundwater intrusions.

Across the 20-year recording period, pH has been recorded up to 10 and as low as 6.5 at times, but averages at around 8.5.

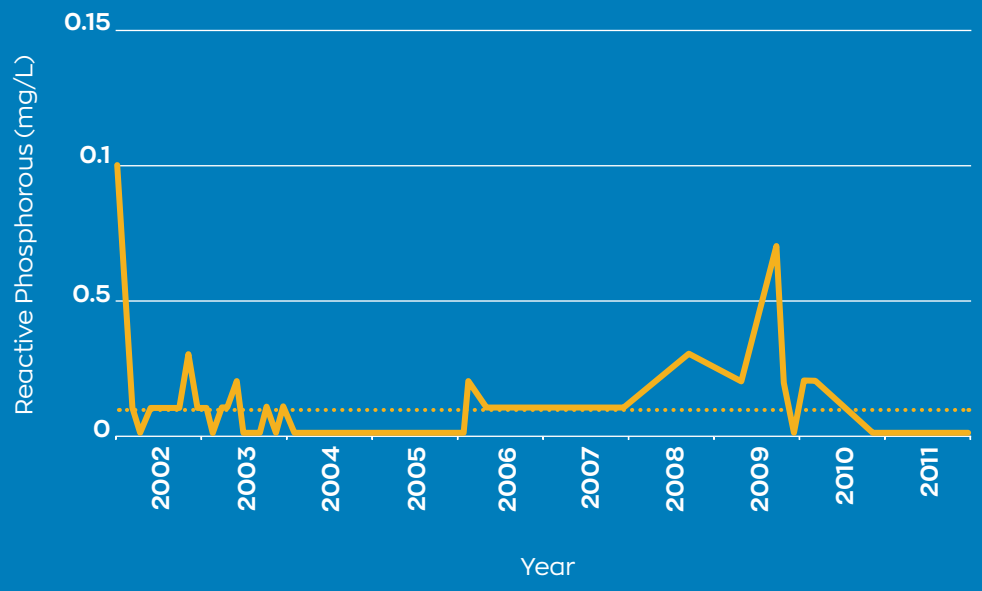


Avoca Representative Site – Reactive Phosphorous

The Avoca River has relatively low reactive phosphorous, with occasional peaks above the moderate- good levels (anything over 0.05 is classes as poor, and over 0.10 is very poor.

The Avoca River is not considered a highly nutrient-rich waterway. The peaks may be attributed to decaying organic matter, or super phosphate runoff following heavy rain.

NC_AVO385 & NC_AVO400 Combined - Avoca River, Coonooer Bridge



Water quality indicator levels

Central Foothills, Campaspe, Loddon, and Avoca sub-segment water quality indicator levels.

Indicator	Units	Percentile	Good	Moderate	Poor	Very Poor
pH upper	pH	75th	≤8.0	>8.0 ≤8.5	>8.5 ≤9.0	>9.0
pH lower	pH	25th	≥7.0	<7.0 ≥6.0	<6.0 ≥5.0	<5.0
Electrical Conductivity (EC)	µS/cm	75th	≤1,500	>1,500 ≤2,000	>2,000 ≤3,000	>3,000
Reactive Phosphorus	mg/L	75th	<0.025	>0.025 ≤0.055	>0.055 ≤0.110	>0.110
Turbidity	NTU	75th	≤20	>20 ≤30	>30 ≤40	>40

Murray plains, Campaspe, Loddon, and Avoca sub-segment water quality indicator levels.

Indicator	Units	Percentile	Good	Moderate	Poor	Very Poor
pH upper	pH	75th	≤8.2	>8.2 ≤8.5	>8.5 ≤9.0	>9.0
pH lower	pH	25th	≥7.0	<7.0 ≥6.0	<6.0 ≥5.0	<5.0
Electrical Conductivity (EC)	µS/cm	75th	≤1,500	>1,500 ≤2,000	>2,000 ≤4,000	>4,000
Reactive Phosphorus	mg/L	75th	≤0.045	>0.045 ≤0.050	>0.05 ≤0.100	>0.100
Turbidity	NTU	75th	≤20	>20 ≤50	>50 ≤100	>100

Reference: Metzeling, L & Tiller, D. Proposed WaterWatch Indicator Levels for NCCMA Regions (Feb 2022).

North Central CMA Region

North Central CMA Region – WaterWatch Sites 2022-2023

Programs areas

1. Upper Campaspe
2. Lower Campaspe
3. Coliban
4. Upper Loddon
5. Western Loddon
6. Loddon East
7. Mid Loddon
8. Gunbower
9. Upper Avoca
10. Lower Avoca
11. Avon Richardson

Murray and Western Plains

Cleared Hills and Coastal Plains

Kerang
Cohuna
Gunbower
8
Quambatook
10
Lower Avoca
Wycheproof
Watchem
Boort
Pyramid Hill
Mitiamo
Loddon East
6
Charlton
Donald
Avon Richardson
11
Wedderburn
Serpentine
Mid Loddon
7
Rochester
Elmore
Bridgewater on Loddon
St Arnaud
Marnoo
Upper Avoca
9
Bealiba
Bendigo
Huntly
Lower Campaspe
2
Dunolly
Heathcote
Castlemaine
Maryborough
Avoca
5
Western Loddon
Upper Loddon
4
Coliban
3
Upper Campaspe
1
Kyneton
Lexton
Clunes
Creswick

Legend

- WaterWatch Active Sites
- Locations
- Priority Waterways
- Waterways
- ERS Segments

What can be done?

Over decades surface water quality across the North Central CMA region has peaked and troughed which can be expected due to natural variations.

There are many and varied ways the community can get involved to protect our waterways and improve water quality; from collecting litter through to advocating for policy change, there is something for everyone to contribute.

Land clearing, stock access and erosion can contribute to sparce riparian vegetation which can also be the easiest remediation exercise with the most effective results. Improved land management practices such as fencing, revegetation and installing off-stream stock watering can vastly improve water quality and habitat availability. This practice also contributes to cooler water temperatures by shading and will also help to filter out excessive nutrient inputs.

Improved management of stormwater, sewage and industrial waste are vital strategies to control nutrients and elevated phosphorus levels, while planting deep-rooted native vegetation in high recharge areas (where rainfall is entering groundwater) can help lower the water table and decrease salinity.

Getting involved in local volunteering is also a wonderful way to contribute and a great place to start. By learning, better understanding and connecting with waterways, citizen scientists can make a huge impact, especially when advocating and sharing more broadly with their local communities, helping to raise awareness of the importance of waterway health.

PLANTING DEEP ROOTED NATIVE VEGETATION

FENCING WATERWAYS FROM STOCK

CELEBRATE OUR WATERWAYS

ADVOCATE AND HELP RAISE AWARENESS

KEEP URBAN STORMWATER CLEAN

BECOME A CITIZEN SCIENTIST

PLANT RIPARIAN VEGETATION AS A 'BUFFER' FOR NUTRIENTS

Campaspe revegetation

Campaspe Catchment

Legend

- WaterWatch Active Sites
- Locations
- Priority Waterways
- Waterways
- ERS Segments

Lower Campaspe Program Area

The lower Campaspe catchment has improved since monitoring began and is currently in good condition.

Water quality of the Lower Campaspe program area has gradually improved through the decades with improvements recorded across most indicators. The exceptions are reactive phos and turbidity which do not yet meet the requirements of a healthy ecosystem. Moderate turbidity and phos levels may recorded in the last decade may be attributed to seasonal rainfall, which disturbs sediment and introduces organic pollutants from stormwater runoff. Higher phosphorus levels may also be due to land use practices, although accounting for natural variations, it appears this value is somewhat trending downward.

8 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.9	8.3	1,600	0.15	43
Quality Level **(Murray)**	Moderate	Moderate	Moderate	Very Poor	Moderate

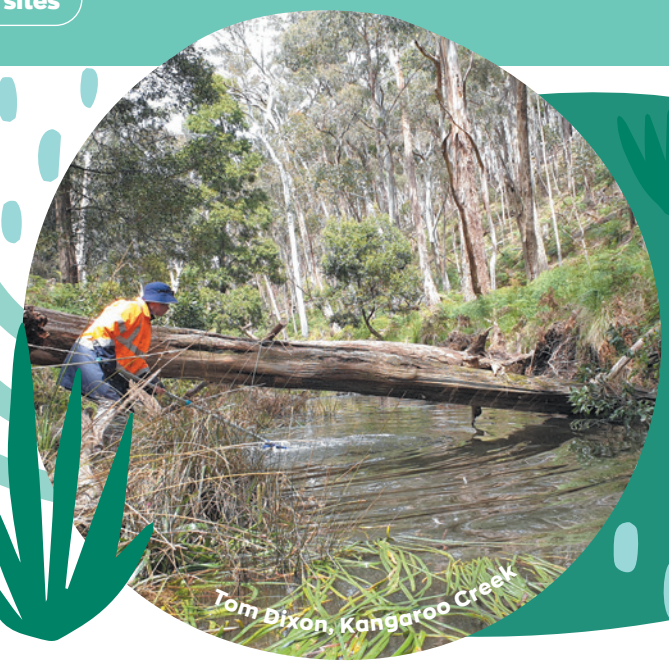
1,008 visits to 46 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.5	1,605	0.03	40
Quality Level	Good	Moderate	Moderate	Good	Moderate

950 visits to 30 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.4	736	0.05	30
Quality Level	Good	Good	Good	Moderate	Moderate

360 visits to 15 sites



Tom Dixon, Kangaroo Creek

Upper Campaspe Program Area

The upper Campaspe catchment is in moderate to good condition.

The monitored sites of the upper Campaspe catchment are located within the central foothills region. pH has been steadily improving since 1994 and has become more neutral as time goes on. Electrical conductivity, reactive phosphorus and turbidity have all improved since monitoring began. While reactive phosphorous decreased from 1994-2003, it has not improved since. High phosphorus levels may be due to nutrient enrichment from fertiliser runoff, faecal matter from livestock having access to riparian zones or lack of vegetated buffers in adjacent agricultural areas. Similarly, runoff from townships can contribute to high phosphorus concentrations, such as through organic pollutants or household and industrial pollutants from adjoining towns and tributaries.

10 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.1	6.3	1,975	0.25	17
Quality Level **(Central Foothills)**	Moderate	Good	Moderate	Very Poor	Good

196 visits to 26 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.5	7.2	996	0.07	20
Quality Level	Moderate	Good	Good	Poor	Good

482 visits to 16 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.9	7.3	482	0.07	16
Quality Level	Moderate	Good	Good	Poor	Good

332 visits to 18 sites

Coliban Program Area

The Coliban catchment is in very good condition.

Monitoring of the Coliban catchment in the new millennium indicated good to moderate water quality and this has continued to improve over time. The only exception is has been phosphorus, which was moderate for the period of 2004-2013. This has since improved likely due to better management, but may also in part because of natural variation. The catchment is currently being actively improved through *A Healthy Coliban Catchment*, a partnership project between North Central CMA, Coliban Water and DJAARA. Consistent monitoring and ongoing good land management will ensure this area maintains optimal water quality.

No data is available for this Program Area between the years 1994-2003.

7 Active volunteers

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.6	801	0.03	15
Quality Level	Good	Good	Good	Moderate	Good

350 visits to 9 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.5	329	0.02	12
Quality Level	Good	Good	Good	Good	Good

294 visits to 13 sites

Waterbug monitoring Coliban River

Loddon Catchment

The Native Fish Recovery Plan aims to restore native fish populations and waterway health in the central Murray system in Northern Victoria. Since 2016, the Project's citizen science program, RiverScan, has been tracking change and helping to inform the project about waterway health across the lower Loddon, Gunbower Creek, Box-Pyramid Creek and the Little Murray River.

Legend

- WaterWatch Active Sites
- Locations
- Priority Waterways
- Waterways
- ERS Segments

Upper Loddon Program Area

The Upper Loddon catchment is in good-to-moderate condition.

The Upper Loddon area initially had a poor to moderate water quality, with the exception of turbidity being good. This has improved over the years, although in the most recent decade, phosphorus has risen significantly. EC and pH are classed as good but are close to the moderate level.

Parts of Forest Creek and Campbells Creek have notably higher phosphorus concentrations compared to other sites within this program area.

8 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	8.1	2,090	0.05	10
Quality Level **(Cleared)**	Good	Moderate	Poor	Moderate	Good

509 visits to 14 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.8	1,693	0.03	10
Quality Level	Good	Good	Moderate	Moderate	Good

774 visits to 23 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.2	7.8	1,472	0.07	13
Quality Level	Good	Good	Good	Poor	Good

865 visits to 20 sites

Western Loddon/Loddon Western Tributaries Program Area

The Western Loddon/Loddon Western catchment tributaries are in great condition.

Although the western Loddon program lower rates of monitoring in 1994-2003 and again in 2014-2023, trends are consistent between each decade. While there have been fluctuations, such as a moderate acidity and moderate to poor turbidity in previous decades, the program area currently meets each ecologically healthy level in each indicator.

This has had consistently high-water quality and regular monitoring between 2004-2013.

Since 2021, the Tullaroop Catchment Restoration Project has been working together with the community to improve riparian habitat. Citizen Science data has helped to inform the project about waterway condition and will help to track change over time.

6 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.7	1,400	0.02	32
Quality Level **(Murray)**	Good	Good	Good	Good	Moderate

128 visits to 3 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6	7.5	1,038	0.03	60
Quality Level	Moderate	Good	Good	Good	Poor

704 visits to 13 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	8	378	0.02	10
Quality Level	Good	Good	Good	Good	Good

254 visits to 9 sites

Loddon East/Lower Loddon Program Area

The Loddon East/Lower Loddon catchment is in mostly good condition.

The lower Loddon is one of the most recorded rivers in this area. Since the first recording period, each indicator has fluctuated but in most recent years has displayed generally good results, aside from high turbidity

10 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.5	7.5	1,700	0.06	70
Quality Level **(Murray)**	Moderate	Good	Moderate	Poor	Poor

635 visits to 15 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.2	8	2,513	0.02	25
Quality Level	Good	Good	Poor	Good	Moderate

975 visits to 21 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.2	7.9	778	0.03	72
Quality Level	Good	Good	Good	Good	Poor

1,051 visits to 19 sites

Mid Loddon/Loddon Eastern Tributaries Program Area

The Mid Loddon/Loddon Eastern catchment tributaries are in moderate condition.

Although the mid-Loddon sub-region has historically had very poor to poor quality, it is steadily improving.

Historically, the catchment had poor to moderate water quality. This is likely due to the high concentration of Bendigo Creek monitoring locations, which majorly influence the trends of water quality in this sub-region. It has improved in recent years, likely due to improved catchment management practices.

This sub-region has consistently struggled with high turbidity due to urbanisation and stormwater runoff. Historic gold mining within the catchment has also likely contributed, with the goldfields of the era well known to have deposited masses of sediment which continues to be disturbed.

14 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.1	8.2	2,300	0.33	70
Quality Level **(Murray)**	Good	Good	Poor	Very Poor	Poor
Quality Level **(Cleared)**	Good	Moderate	Poor	Very Poor	Very Poor

1,025 visits to 47 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.5	7.7	1,436	0.11	30
Quality Level **(Murray)**	Moderate	Good	Good	Very Poor	Moderate
Quality Level **(Cleared)**	Moderate	Good	Good	Poor	Moderate

1,156 visits to 39 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.1	7.7	2,528	0.08	30
Quality Level **(Murray)**	Good	Good	Poor	Poor	Moderate
Quality Level **(Cleared)**	Good	Good	Poor	Moderate	Moderate

1,065 visits to 33 sites

Gunbower Program Area

The Gunbower catchment area is in moderate condition.

Within the Gunbower monitoring has decreased since the first reporting period. Recently, robust monitoring program was established in Black Swamp, Gunbower Creek and Reedy Lagoon, so trends are being recorded and future reports will this.

Phosphorous and turbidity have slightly improved in recent years, while pH and EC have generally remained steady.

1 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	8	200	0.16	43
Quality Level **(Murray)**	Good	Good	Good	Very Poor	Very Poor

143 visits to 9 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.5	7.3	82	0.02	30
Quality Level	Moderate	Good	Good	Good	Moderate

156 visits to 4 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.6	182	0.05	41
Quality Level	Good	Good	Good	Poor	Moderate

39 visits to 7 sites

Gunbower Forest, Reedy Lagoon

Avoca Catchment

John and Jan, Avoca catchment

Legend

- WaterWatch Active Sites
- Locations
- Priority Waterways
- Waterways
- ERS Segments

Upper Avoca Program Area

This program area variable condition across the reporting period, with a disproportionate level in the 2004-2013 reporting period as opposed to the initial and most recent reporting periods. This means the statistical viability of the first and last decades are far lower than the 2004-2013 one.

In the reporting period 2014-2023, the most consistently recorded site (AVO385, John & Jan Dods) influences this waterway the most – particularly notable is the EC value, which reflects a site that may be close to a groundwater discharge point, given the extreme salinity.

The 2004-2013 decade most accurately represents the health of the program area – although a dated one. Generally, it is in poor ecological health. The exception is phosphorus, which lies in the 'good' category, but otherwise is very poor or moderate. EC has consistently been very poor in the Upper Avoca.

3 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	8	8,070	0.01	16
Quality Level **(Murray)**	Good	Good	Very Poor	Good	Good

76 visits to 7 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	6.5	7.5	5,660	0.02	80
Quality Level	Moderate	Good	Very Poor	Good	Very Poor

1,350 visits to 46 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.3	7.7	17023	0.08	16
Quality Level	Good	Good	Very Poor	Poor	Good

53 visits to 2 sites

Lower Avoca Program Area

The lower Avoca is not currently monitored and has not been regularly monitored since 2013. Historical monitoring indicated a moderately healthy condition, with a declining EC however we are unable to establish or comment on current condition.

0 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.2	8	1,604	0.01	41
Quality Level **(Murray)**	Good	Good	Moderate	Good	Moderate

52 visits to 2 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7	7.9	4,624	0.02	40
Quality Level	Good	Good	Very Poor	Good	Moderate

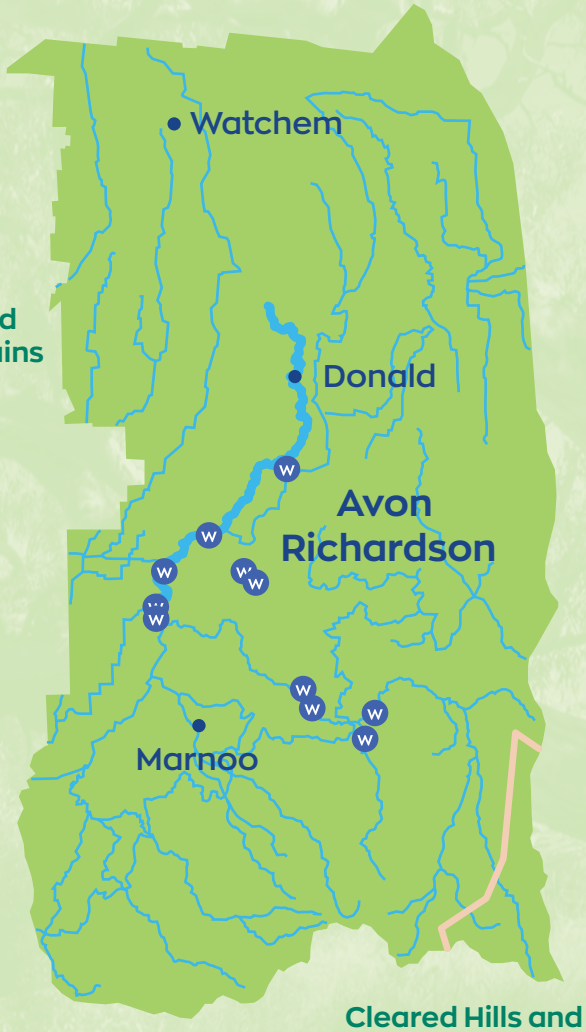
250 visits to 11 sites

Britt Gregory 2006

Waterbug sampling Image: Bill Conroy

Avon-Richardson Catchment

Rob accepting his 25 years of years of service award



Legend

- WaterWatch Active Sites
- Locations
- Priority Waterways
- Waterways
- ERS Segments

Avon-Richardson Program Area

The Avon-Richardson catchment area is in poor condition.

A volunteer has moved away from the district, so monitoring is now less regular than in the previous decade. Despite this, trends generally remain the same. Notably, EC steadily declined over the decades and remains alarmingly high with the Richardson River being the main contributor to the high salinity. High turbidity and pH were noted at all sites across each reporting period.

3 Active volunteers

1994-2003	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	8	8.8	10,300	0.06	48
Quality Level **(Murray)**	Good	Poor	Very Poor	Poor	Moderate

915 visits to 24 sites

2004-2013	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.8	8.8	19,330	0	51
Quality Level	Good	Poor	Very Poor	Good	Poor

2,394 visits to 40 sites

2014-2023	pH (lower)	pH (upper)	EC (µS/cm)	PO4 (Mg/L)	Turbidity (NTU)
Water Quality Indicators	7.8	8.7	26,600	0.06	60
Quality Level	Good	Poor	Very Poor	Poor	Poor

817 visits to 26 sites

Joint Working Group discussion

Acknowledgements

North Central Catchment Management Authority would like to acknowledge each of our WaterWatch volunteers past and present, for their tireless efforts in monitoring the health of the North Central CMA region's waterways this past three decades.

Cass Davis monitoring waterbugs

Mel and Jan 2007

Want to get involved?

If you're interested in becoming a WaterWatch volunteer, contact your local WaterWatch Coordinator at the North Central CMA

Email: citizenscience@nccma.vic.gov.au

Ph.: (03) 5448 7124

Office: 628-634 Midland Hwy, Huntly Victoria 3551

Post: PO Box 18, Huntly VIC 3551

The Victorian Government is supporting community partnerships through WaterWatch and other citizen science initiatives to address local waterway priorities. These priorities are being addressed as part of the Victorian Government's Water for Victoria initiative to improve catchment and waterway health across regional Victoria.

WaterWatch Victoria

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North Central CMA