A Healthy Coliban Catchment

Citizen Science Project
River Health Snapshot Report 2022

WaterWatch Victoria

A Healthy Coliban Catchment

North Central WaterWatch supports people to actively care for their environment by participating in Citizen Science programs that monitor and report on the health of the region's land, water, and biodiversity resources.

North Central CMA, Coliban Water, and Dja Dja Wurrung Traditional Owners continue to implement A Healthy Coliban Catchment, a 20-year plan to improve the health of the upper sections of the Coliban River and its tributaries. The aim of this project is to protect the Coliban River as a source of quality drinking water and by doing so, improve habitat connectivity, boost sustainable land use practices, and work with the community to further build cultural and recreational values.

In addition to providing drinking water for more than 130,000 people in towns such as Bendigo, Kyneton, and Castlemaine, the Upper Coliban catchment is a place of great historic, environmental, social, and economic value. The region also has a high cultural significance, with Traditional Owners having sourced native plants, medicines, and food here for thousands of years.

Under the plan, efforts include 300 kilometers of fencing to control stock access to waterways, allowing for protection of riparian areas and the natural revegetation of riverbanks. Other works include the removal of invasive willows and woody weeds, and planting of native vegetation.

Project partners are working with local governments, landholders, and community groups on a range of voluntary actions. North Central WaterWatch currently supports eight volunteers and Djandak staff to regularly monitor the health of Upper Coliban Catchment. Data collected by these citizen science activities provide an important baseline by which to monitor changes in water quality over the life of the plan.

A Healthy Coliban Catchment project achievements to date:

- 8km of fencing
- 34 ha of revegetation
- 310 people engaged
- 60 ha of weeds controlled
- 15 off-stream watering points

Trentham Falls Image Mark Reid

Summary of 2022 Results

Water Quality Indicators

EC (µS/cm)	pH (lower)	pH (upper)	Turbidity (NTU)	PO4 (Mg/L)
103	7	7.3	10	0.01
Good	Good	Good	Good	Good

Waterbug Indicators

Richness	EPT	Signal
13	3	3.2

Given that the Upper Coliban catchment is an important source of potable water, it is assuring that all water quality parameters tested by WaterWatch volunteers during 2022 were all well within the Good category.

Overall, water quality has remained optimal despite recent extreme wind (June 2021) and rainfall (October 2022) events impacting on the project area. On-ground works were severely impacted by flooding caused by heavy rainfall during this time.

A noteworthy outlier in otherwise excellent water quality results for the Coliban catchment is a moderate pH result at a few sites. In both cases, although classed as Moderate, pH was just below what would be considered Good. This is likely due to the buffering ability of headwater streams, typically resulting in a slightly lower pH than what would be expected lower in the catchment, and is no particular concern.

Macroinvertebrate surveys were conducted at two sites during December 2022. Given the surveys were undertaken shortly after heavy Spring rainfall, it is unsurprising that these results are poor. No doubt this has disturbed the sites, causing invertebrates to shift location, and delaying repopulation.

Pesticide Watch

North Central citizen science programs have been supporting a study into the presence of pesticides in Australian waterways led by Deakin University. A pilot study for Pesticide Watch was conducted at one location in the Coliban catchment during Spring 2022. Pesticide residues were detected at the site where the a pilot samples was taken. Pesticide Watch is being rolled-out across Australia throughout 2023 with River Detectives school, Malmsbury Primary School, participating. Findings are due later in 2023 and are expected to give an indication of which kinds of pesticides are present in the catchment, as well as noting the legal status of their use.

Healthy Coliban Citizen Science Project – 2022 Activities

- 10 sites monitored monthly by eight WaterWatch volunteers.
- Water quality monitored at two sites by Djandak.
- Two schools registered for the River Detectives education program.
- One online Healthy Coliban Project Prattle with River Detectives teachers from Malmsbury and Trentham primary schools, April 27.
- One incursion with 23 Grade 5 and 6 students from Trentham Primary School, May 25.
- One macroinvertebrate training workshop held with 12 participants from the Healthy Coliban Community Reference Group, December 8.
- Refresher WaterWatch training with one volunteer at their monitoring site, July 2022
- One site tested as part of Pesticide Watch pilot study.

Kangaroo Creek, Spring Hill Road

Site Code: KAN360 **Monitor:** David Tiller

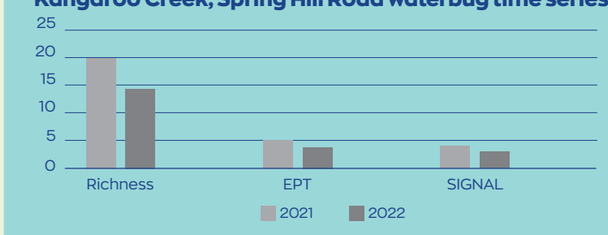
The site is currently the most upstream monitoring location of Kangaroo Creek, in a heavily forested area. It is particularly useful as a control for the upper Coliban catchment, acting as a baseline for what would be expected from a waterway in its natural condition. Each water quality indicator measured during 2022 was in the optimal range for this region and, due to regular frequency of testing, there is a high degree of confidence the results are accurate.

Dissolved oxygen (DO) was also recorded here during 2022. DO levels during the warmer months were particularly low, bringing the overall result for the year into the Very Poor category (31 percent saturation). The tannins observed in the creek during those months indicated the decomposition of leaf litter washed in from the forest floor was depleting dissolved oxygen, however DO levels recovered back to optimal conditions in autumn. Seasonal fluctuations are to be expected and are not of concern.

Waterbug results were Poor to Moderate during the sampling period and all indicators were lower compared to 2021 results. As the waterbug survey was conducted less than two months after heavy rainfall it is likely many macroinvertebrates were displaced, despite the large amount of instream habitat. While some caddis fly larvae were observed during sampling, a low SIGNAL score was recorded.

Water Quality Indicators					Waterbug Indicators		
EC	pH (lower)	pH (upper)	Turbity	PO4 (Mg/L)	Richness	EPT	Signal
362	7.2	7.3	9	0.018	14	4	3

Kangaroo Creek, Spring Hill Road waterbug time series



Coliban River, Trentham Falls Road

Site Code: COL090 **Monitor:** Mark Reid

The most upstream monitoring site of those on the Coliban River, water quality results here are like those in the rest of the catchment in that they are well within the Good range, with somewhat negligible acidity. This site has a healthy amount of riverside vegetation, including several shrubs, trees, and grasses, which provide habitat and stabilise the soil. Instream vegetation acts in a similar way, helping to filter any potential pollutants and suspended solids in the waterway.

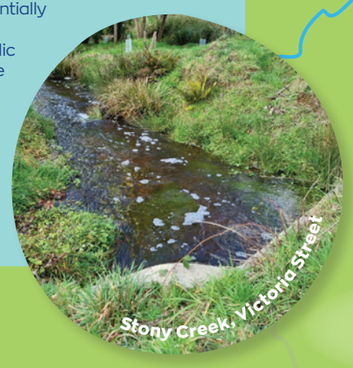
Water Quality Indicators				
EC	pH (lower)	pH (upper)	Turbity	PO4 (Mg/L)
86	6.9	7.3	12	0

Stony Creek, Victoria Street

Site Code: STO940 **Monitor:** Mark Reid

This site is near the top of the Coliban catchment, towards the end of Stony Creek, immediately downstream of the Trentham township. Despite being so close to town, nearly each water quality indicator is within an optimal range. The slight acidity may be because of sediment containing acidic minerals (such as carbonates) entering the stream at certain times during the reporting period. The monitor noted that a scum had temporarily formed underneath the culvert upstream of the testing location in December 2022, identifying it as potentially resulting from iron oxide seepage, which would further confirm the lowered pH being due to acidic minerals. Monthly water quality testing at this site began in August 2022.

Water Quality Indicators				
EC	pH (lower)	pH (upper)	Turbity	PO4 (Mg/L)
82	6.5	6.9	10	0



River Detectives:
Trentham District Primary School
Site Code: TRE010_RD

Malmsbury Primary School

Site Code: COL420_RD

River Detectives:

Coliban River, Reservoir Road

Site Code: COL380 **Monitors:** Djandak

This site was heavily impacted by the October 2022 rainfall and subsequent flooding and recently completed revegetation efforts were washed away. Although there was insufficient data recorded during 2022 for analysis, Djandak is committed to resume monitoring this site in 2023.

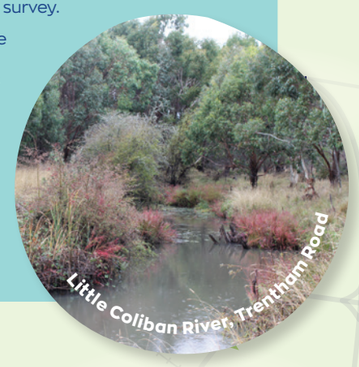
Little Coliban River, Trentham Road

Site Code: LIT950

This monitoring site is close to where the Little Coliban River empties into the Upper Coliban Reservoir and is characterised by a decent amount of both instream and riparian vegetation. While the site it is not currently monitored for water quality, a waterbug survey was conducted to determine overall waterway health at this location. Flooding has severely limited both the quality and quantity of invertebrate populations recorded during the December survey.

A water sample from this site was part of the pilot study for Pesticide Watch and tested positive for three herbicides, one of which is no longer registered with the APVMA and one which is banned.

Waterbug Indicators		
Richness	EPT	Signal
11	2	3.4



Stony Creek, Trentham Golf Course

Site Code: STO950 **Monitor:** Mark Reid

This monitoring site on Stony Creek is slightly further downstream of the Victoria Street site, next to the Trentham Golf Course. At this point, the creek has returned to a naturalised state after flowing through Trentham. Large fallen trees and undulations resulting from the 2021 windstorm as well as proximity to the road have made access to this site unsafe. As a result, monitoring at this site ceased in mid-2022. Water quality data collected from January through to July are all within the optimal range for the region, likely due to the density of instream vegetation upstream of this site.

Water Quality Indicators				
EC	pH (lower)	pH (upper)	Turbity	PO4 (Mg/L)
98	7.3	7.4	9	0

Tarilta
Metcalfe East
Sidonia
Greenhill
Edgecombe
Malmsbury
Malmsbury Reservoir
Drummond
Kangaroo Creek
Lauriston
Shepherds Hut Creek
Lauriston Reservoir
Pipers Creek
Porcupine Ridge
Denver
Spring Hill
Upper Coliban Reservoir
Tylden
Wheatsheaf
Coliban River
Little Coliban River
Woodend
Musk
Fern Hill
Stony Creek
North Blackwood
Barrys Reef
Macedon

Interpreting results

The results in this report are based on Citizen Science data collected as part of A Healthy Coliban Catchment during 2022. Water quality data was collected by WaterWatch monitors year-round and macroinvertebrate surveys were completed in early summer.

Water quality parameters in this report have been analysed using new indicator levels for the North Central CMA region developed in 2022 by Leon Metzeling and David Tiller. These indicators advance upon the State Environment Protection Policy (SEPP) guidelines, used in previous snapshot reports, to determine the ecological health of a waterway. This project lies within the Central Foothills – Campaspe, Loddon, and Avoca sub-segment of the surface water geographic region of the new Environmental Reference Standard (formerly Cleared Hills Bioregion).

Four water quality parameters were monitored by WaterWatch volunteers and Djandak staff: pH, electrical conductivity, reactive phosphorus, and turbidity. Site data was analysed for monitoring sites where there were five or more data entries and water quality results are the 75th percentile of all data entries at each site during 2022. For pH, the 25th percentile was also analysed to give an indication of the range of pH and diversion from neutral. The 25th percentile denotes the lower end of the range and the 75th percentile the upper end of the range of pH results during the 2022 calendar year.

Macroinvertebrate data was analysed at six sites in the project areas using Agreed Level Taxonomy (ALT) indexes for reference values of freshwater streams.

Samples were taken and analysed from one site in the project area in December 2022 for the presence of pesticides as part of the pilot Pesticide Watch study. Results from the initial study are included in this report. Unless exempt from the registration requirement through the Australian Pesticides and Veterinary Medicines Authority (APVMA), unregistered chemical products are illegal and can be dangerous.

Water Quality Colour Coding

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.

Water quality indicator levels

Central Foothills - Campaspe, Loddon, and Avoca sub-segment

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

Waterbugs Colour Coding

Sites have been colour coded and interpreted as follows:

	Percentile of index values	ALT Richness	ALT EPT	ALT SIGNAL
Meets or exceeds ALT objectives for a healthy ecosystem Key processes and/or water quality may be slightly impacted, however, most habitats are intact.	30th	≥21	≥6	≥4.2
Close to meeting ALT objectives for a healthy ecosystem Many key processes are not functional; water quality and/or habitat are moderately impacted.	5th – 30th	>16 to <21	>3 to <6	>3.5 to <4.2
Does not meet ALT objectives for a healthy ecosystem Most key processes are not functional and water quality and/or habitat is severely impacted.	5th	≤16	≤3	≤3.5

Glossary

ALT Agreed Level Taxonomy, is the current methodology implemented in Citizen Scientist macroinvertebrate surveying, to aid in the assessment of river and wetland health. The method involves identifying the features and movements of living organisms and means invertebrates can be returned to their waterway after data is collected.

Richness Refers to each unique genus identified using the ALT method. Generally, higher diversity of invertebrates reflects a healthier ecology.

EPT Ephemeroptera, Plecoptera and Trichoptera, refers to three orders of highly sensitive invertebrates, respectively; mayflies, stoneflies, and caddisflies (identified in their aquatic larval stages) found within Victorian waterways, with a particularly low sensitivity to pollution. Identification of a high count and richness of these invertebrates typically represents a healthy, unpolluted waterway.

SIGNAL Stream Invertebrate Grade Number – Average Level, is a simple index which determines each macroinvertebrate's tolerance of pollution. An abundance of macroinvertebrates with both high and low SIGNAL scores is indicative of a healthy waterway ecosystem.

Want to get involved?

If you're passionate about your local environment, then we need your help!

We're calling on the local community to help keep a watchful eye on the health of our priority waterways.

If you'd like to get involved and become a volunteer citizen scientist, please register your interest with one of our Citizen Science project officers at:

Email: citizenscienceteam@nccma.vic.gov.au

Ph.: (03) 5448 7124

Office: 628-634 Midland Hwy, Huntly Victoria 3551

Acknowledgement of Country

The North Central Catchment Management Authority acknowledges Traditional Owners and Aboriginal and Torres Strait Islander peoples within the region, including their rich culture and enduring spiritual connection to Country. We also recognise and acknowledge the contributions and interests of Aboriginal peoples and organisations in land and natural resource management.

Acknowledgements

North Central CMA would like to acknowledge the outstanding contributions made by WaterWatch volunteers, Traditional Owners and project staff involved in A Healthy Coliban Catchment.

A Healthy Coliban Catchment is a partnership between North Central CMA, Coliban Water and Dja Dja Wurrung and jointly funded by Coliban Water and the Victorian Government.

Joint Working Group discussion

This project is jointly funded by Coliban Water and the Victorian Government to deliver catchment stewardship to improve the holistic management of land, water, and biodiversity in and across the upper Coliban catchment. A Healthy Coliban Catchment is one of 11 Our Catchments, Our Communities regional on-ground projects funded from the Victorian Government's $248 million investment in waterway and catchment health over 2021-2024 and contributes to deliver Action 3.3 of Water for Victoria - invest in integrated catchment management.

VICTORIA State Government | Energy, Environment and Climate Action

North Central CMA

WaterWatch Victoria

Coliban WATER

Dja Dja Wurrung Enterprises Pty Ltd TRADING AS DJANDAK

River Detectives