Caring for the Campaspe

Citizen Science Project
River Health Snapshot Report 2021

WATERWATCH
North Central
Communities Caring for Catchments

The Campaspe River extends 250km from the Great Dividing Range near Woodend to Echuca on the Murray River. The river is valued for the social, economic and cultural benefit it provides for adjacent communities however, over the past two centuries, has been impacted by human settlement, gold mining, agriculture, and the demand for water supply.

The North Central Catchment Management Authority's (CMA) Caring for the Campaspe project has been working with the community to improve the condition of riparian land along the Campaspe River since 2012. This project has been funded through the Victorian government's Environmental Contribution levy to the tune of $7.6M over the past decade and has supported the protection and enhancement of river frontages. The North Central CMA has worked with landholders, Traditional Owners, and public land managers to deliver on-ground works that include weed control, riparian fencing, controlling stock access to the river bank and revegetation activities along the river's length in both towns and farming areas.

Since 2012, the Caring for the Campaspe project has achieved:

- Almost 100km of riparian fencing installed
- 66 off-stream watering troughs installed
- Over 400ha of weeds controlled including the removal of willow, gorse and blackberry
- Nearly 300ha of riparian land revegetated with native plants
- Working with 160 landholders
- Engaged with over 3,700 people at events to promote awareness and improved riparian management practices

This project would not be possible without the support of Landcare, angling and community groups. The project has also sought to work more closely with the three Traditional Owner groups along the river: Dja Dja Wurrung, Taungurung and Yorta Yorta. Their involvement has been through project planning, on-ground delivery of works, community engagement and monitoring activities.

The North Central CMA has enabled 11 schools to participate in the River Detectives program along the river's length. Schools monitor the condition of their local waterway each month and learn about water science. North Central Waterwatch has supported ten committed volunteers to actively care for their environment by monitoring water quality at 13 target sites along the Campaspe River and its tributaries. The Taungurung Land and Waters Council (TLaWC) joined the Waterwatch program in 2021 and are routinely monitoring four sites along the Campaspe River, Mount Pleasant Creek, and Forest Creek.

This report summarises the data collected by our valued citizen scientists and Traditional Owners for the Caring for Campaspe project during 2021.

It is worth noting that restrictions due to the COVID-19 pandemic saw limited opportunities for water quality monitors to collect data during the reporting period. Limited data has influenced the availability of information which can be included in this report.

RiverTour 2022

Interpreting results

The results in this report are based on the analysis of water quality data collected throughout 2021 and macroinvertebrate data collected in spring 2021. This report provides a baseline assessment of the current condition of the Campaspe River and its tributaries using available citizen science data.

The Victorian Government has a set of guidelines that provides limits to acceptable water quality levels and macroinvertebrate indices for healthy ecosystems. These levels are based on biological characteristics assigned to parts of the catchment which is determined by its position in the region. In this program, waterways are within both the Cleared Hills and Murray Plains bioregions.

Four water quality parameters were monitored by Waterwatch volunteers and TLaWC during 2021; 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 2021. The exception to this was the four sites monitored by TLaWC which each had only four data entries, between September and December 2021, when they commenced monitoring. Given the valuable contribution TLaWC have made to the Caring for the Campaspe project during 2021, these results have been included in this report. These sites are indicated by *.

Macroinvertebrate data was analysed at nine sites in the project areas using Agreed Level Taxonomy (ALT) indexes for reference values of freshwater streams: ALT SIGNAL index, EPT index and Taxa Richness.

Average Results

Bioregion	Water Quality Indicators				Waterbug Indicators		
	pH	EC	Phos	Turbidity	Richness	EPT	Signal
Cleared Hills	7.4	668	0.03	18.6	11.6	3.6	3.7
Murray Plains	7.2	791	0.06	23.8	10	3	4.1

Waterbugs Colour Coding

Sites are colour coded and interpreted as follows:

- **Meets or exceeds ALT objectives for a healthy ecosystem** (>30th percentile of index values for reference sites). Key ecosystem processes and/or water quality may be slightly impacted however most habitats are intact.
- **Close to meeting ALT objectives for a healthy ecosystem** (5th—30th percentile of index values for reference sites). Many key ecosystem processes are not functional; water quality and/or habitat are moderately impacted.
- **Does not meet ALT objectives for a healthy ecosystem** (<5th percentile of index values for reference sites). Most key ecosystem processes are not functional and water quality and/or habitat is severely impacted.

Water Quality Colour Coding

Sites are 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.

Symbols

- **Richness** is the number of different types of macroinvertebrates at a site; sites with higher taxa richness are generally in better ecological condition.
- **EPT** is the number of different types of stoneflies, mayflies and caddisflies at a site; low diversity of these sensitive macroinvertebrates may indicate ecological disturbance at a site.
- **SIGNAL** indicates the pollution tolerance of the macroinvertebrate community at a site. Each type of macroinvertebrate is assigned a value between one (tolerant) and 10 (sensitive) based on pollution tolerance or intolerance. The ALT Signal Index is the average of these values.

A site in good ecological condition, based on the ALT objectives, meets the following targets:

Richness	EPT	SIGNAL
16	4	3.8

Water Quality Indicator Levels

Water quality indicator levels for the Cleared Hills bioregions:

SEPP (WoV) segment	River health category	Reactive Phosphorus (mg/L)	pH (lower)	pH (lower)	Electrical conductivity (µS/cm)	Turbidity (NTU)
Cleared Hills	Good	≤0.03	≥6.3	≤8.5	≤700	≤15
	Moderate	>0.03 ≤0.1	<6.3 ≥5.5	>8.5≤9.0	>700 ≤1500	>15 ≤25
	Poor	>0.1	<5	>9.0	>1500	>25
Murray Plains	Good	≤0.06	≥6.3	≤8.5	≤2000	≤40
	Moderate	>0.06 ≤0.1	<6.3 ≥5.5	>8.5≤9.0	>2000 ≤3000	>40 ≤50
	Poor	>0.1	<5	>9.0	>300	>50

Cleared Hills Bioregion

Marsh Court

Site Code: NC_CAM060
Monitor: Alan Denehey

This monitoring site is close to the headwaters of the Campaspe River on the northern slopes of the Great Dividing Range. The site itself is just downstream from the Campaspe Reservoir and is flanked by forest to the west and grazing farmland to the east. Ashbourne Landcare and Macedon Ranges Shire undertake weed control and revegetation within this Reserve. The ALT SIGNAL score for macroinvertebrates at this location was 4.3, indicating a healthy abundance of pollution-sensitive bugs, attributed to relatively intact flanking habitats. Taxa richness was unexpectantly poor. Although no water quality data was collected from this site, it could be expected that water quality would be good given its location and surrounding land-use.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
N/A	N/A	N/A	N/A	14	4	4.3

Kyneton Botanic Gardens

Site Code: NC_CAM100
Monitor: Malcolm & Karen Shepherd-Clark

This site is the most urbanised of the monitoring sites on the Campaspe River and is impacted by stormwater runoff and expanding residential development in the Kyneton township. The Caring for the Campaspe project, together with the Campaspe River and Land Management Group and Macedon Ranges Shire, has undertaken significant willow control and revegetation of native species at this site. Although the native bank vegetation is re-establishing, instream vegetation is currently providing minimal shade and poor habitat diversity. These impacts are likely to have resulted in the poor taxa richness and EPT scores recorded for waterbugs at this location.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
N/A	N/A	N/A	N/A	7	0	3.9

Campaspe River Crossing (Hodges Bridge)

Site Code: NC_CAM200
Monitor: Malcolm & Karen Shepherd-Clark

Prior to the Caring for the Campaspe project in the early 2000s, the North Central CMA undertook significant willow removal and revegetation at this site, and it now has an excellent diversity of native riparian vegetation.

However, this site recorded the poorest results for macroinvertebrates of any monitoring site on the Campaspe in 2021, with all indicators failing to meet ALT objectives. This suggests that most ecological processes are not functional at the time the sampling was undertaken in November 2021.

No water quality data was collected by citizen scientists at this site during the reporting period however it is available from Coliban Water for this section of the Campaspe River, downstream of the Coliban Water Reclamation Plant release point. For the 12 months prior to June 2021, mean monthly water quality parameters are within those of the EPA Licence Limit for pH, total phosphorus, ammonia, dissolved oxygen and electrical conductivity.

It is unclear why the macroinvertebrate results are so poor for this location during the sampling period.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
N/A	N/A	N/A	N/A	7	1	3.1

Campaspe River Bridge at Barfold

Site Code: NC_CAM260

Monitor: Kerry Connoley

This monitoring site is approximately 13km downstream of the previous site with the Campaspe River, downstream of Turpins Falls. EPT scores for waterbugs have improved from poor to moderate between the two sites, however taxa richness and SIGNAL scores remain poor.

On-ground works in this section have included the control of woody weeds and fencing to exclude stock access. This section of the river is known to dry out over summer into pools and is frequently covered in an aquatic plant called Azolla. It is anticipated that as the riparian zone recovers from the removal of woody weeds and native vegetation cover establishes, shade and natural habitat will increase and the diversity and prevalence of sensitive waterbugs will improve over time.

No water quality data was available during the reporting period.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
N/A	N/A	N/A	N/A	13	5	2.9

Mosquito Creek, just north of Henry Lane Road Reserve

Site Code: NC_MOS995

Monitor: Jo and Bill Morrissey

Mosquito Creek enters the Campaspe River about 250m downstream of this monitoring site and is characterised by a narrow riparian zone. The average pH for this site is within a healthy range, however turbidity is poor, and concentrations of reactive phosphorus and salt are quite high and also rate poorly. Mosquito Creek is not a priority waterway for investment according to the North Central Waterway Strategy and it is possible that the surrounding agricultural land uses have impacted on water quality at this location.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.2	2090	0.15	30	N/A	N/A	N/A

Campaspe River, end Backhaus Road

Site Code: NC_CAM515

Monitor: Jo and Bill Morrissey

Water quality parameters collected over nine separate site visits between March and December 2021 are all good and all within healthy ranges.

The Caring for the Campaspe project has worked with landholders through this area to exclude stock access, control weeds and revegetate the river bank with native plants.

No water bug data was sampled at this location during 2021.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.3	597	0.02	11	N/A	N/A	N/A

Campaspe River Reserve, Axedale (near O'Keefe trail footbridge)

Site Code: NC_CAM519

Monitor: Brian and Shelley Truscott

Water quality indicators collected over 10 separate site visits between March and December 2021 are good and all within healthy ranges.

This site recorded the best SIGNAL score for the Campaspe River in the Cleared Hills bioregion during 2021 with a score of 4.4 indicating that there is a healthy abundance of sensitive waterbugs present in the sample. Taxa richness and EPT scores for macroinvertebrates are close to meeting the objectives of a healthy ecosystem for this location.

This monitoring site is within the Campaspe River Reserve at Axedale and characterised by a range of instream vegetation and habitats, including riffles, rocks and fallen logs which has no doubt contributed to the sensitivity and abundance of macroinvertebrates present. The Caring for the Campaspe project has undertaken willow control and native revegetation through the Axedale River Reserve with the Longlea and District Landcare Group, Axedale Primary School and City of Greater Bendigo since 2013.

This site is located downstream of Lake Eppalock where water is released from deep within the reservoir and is typically very cold (cold water pollution). This does not appear to have affected the macroinvertebrate population but may affect the health of other cold-blooded species such as fish, frogs and turtles. Water temperatures rise downstream from this location.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.6	616	0.02	9	16	5	4.4

Axe Creek at O'Briens Lane

Site Code: NC_AXE700

Monitor: Ian and Jane Logan

Though no water quality data was recorded during 2021, the site was highly turbid at the time of collecting waterbugs. This appeared to be a result of land-clearing and development nearby and would have impacted on the poor abundance and sensitivity of waterbugs sampled. Anecdotally, the creek was clear during sampling for the Great Australian Platypus Search just a month earlier.

Axe Creek enters the Campaspe River north of the Axedale township, opposite the Campaspe River Streamside Reserve.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
N/A	N/A	N/A	N/A	7	5	.3

Campaspe River, Barnadown Streamside Reserve

Site Code: NC_CAM546*

Monitor: Taungurung Land and Waters Council

Within the Cleared hills bioregion of the Campaspe, this site recorded the highest scores for macroinvertebrate richness and EPT. All waterbug indicators for the site were moderate, indicating that the site is close to meeting ALT objectives for a healthy ecosystem however some key processes may not be functional. The riparian zone has been fenced during the Caring for the Campaspe project limiting livestock access to the waterway in this section and water quality is good across all parameters.

This site is located just upstream of the confluence of Forest Creek with the Campaspe River.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.4	661	0.02	14	17	5	3.8

Forest Creek, Barnadown-Myola Road crossing

Site Code: NC_FOR995*

Monitor: Taungurung Land and Waters Council

Forest Creek is a main tributary to the Campaspe River with the confluence being approximately 900m downstream of this monitoring site. By monitoring water quality at this site, we can gain an insight into the quality of the water flowing into the Campaspe River.

EC, pH and reactive phosphorus are all within the good range for water quality at this location. A poor turbidity result of 160 NTU greatly exceeds the range of >50 NTU that would be considered good. Given there have been no incentives offered for fencing along Forest Creek, livestock access to the waterway may have caused erosion and impacted on water clarity. Prolonged turbidity can reduce the amount of the dissolved oxygen available and raise water temperature. It can also affect vision, spawning and breathing of fish and aquatic macroinvertebrates. This will be something to watch at this site during 2022.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.6	215	0.02	160	N/A	N/A	N/A

Murray Plains Bioregion

Mount Pleasant Creek, River Road, Runnymede

Site Code: NC_MOU990*
Monitor: Taungurung Land and Waters Council

Mount Pleasant Creek is a major tributary of the Campaspe River, entering the river less than 2km upstream of this monitoring site. Notes taken by Taungurung Land and Water during four site visits over spring 2021 indicate that the water is stained brown and smelly. There is no continuous flow in the creek and by December, the creek bed is dry. The high nutrient concentrations recorded during this period is likely due to the decay of organic matter by microorganisms in the pools as water levels recede. This process may also add oxygen stress to the system.

No macroinvertebrate data was collected from this site during 2021.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.45	117	0.185	70	N/A	N/A	N/A

Campaspe River - Elmore Highway Park

Site Code: NC_CAM575*
Monitor: Taungurung Land and Waters Council

This site recorded the best SIGNAL score of any site in the Caring for the Campaspe project area. A SIGNAL score of 4.6 suggests that most ecological processes and habitats are functioning at this site however there may be some disturbance. Although taxa richness at this site is the greatest sampled in the Murray Plains bioregion, a score of 12 does not yet meet the ALT objectives of a healthy system.

Water quality is within optimal levels for this bioregion across all tested parameters. This site is well shaded and waterbugs were able to be collected from a range of instream habitats. The Caring for the Campaspe project has fenced significant sections of the river from the impacts of stock access through the Elmore area.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7.5	571	0.01	13.25	12	4	4.6

Campaspe River, Roadside Park, Strathallan

Site Code: NC_CAM765
Monitor: Paul Poort

Water quality is again optimal across all parameters tested at this site throughout 2021. Waterbug results, however, are not so good with taxa richness and EPT recording poor results and a moderate SIGNAL score achieved. Farmland surrounds the Campaspe River Reserve at this location and water from the Goulburn River has entered the waterway, via the Waranga Western Main Channel just north of Rochester.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbidity	Richness	EPT	Signal
7	633	0.02	24.75	8	2	3.6

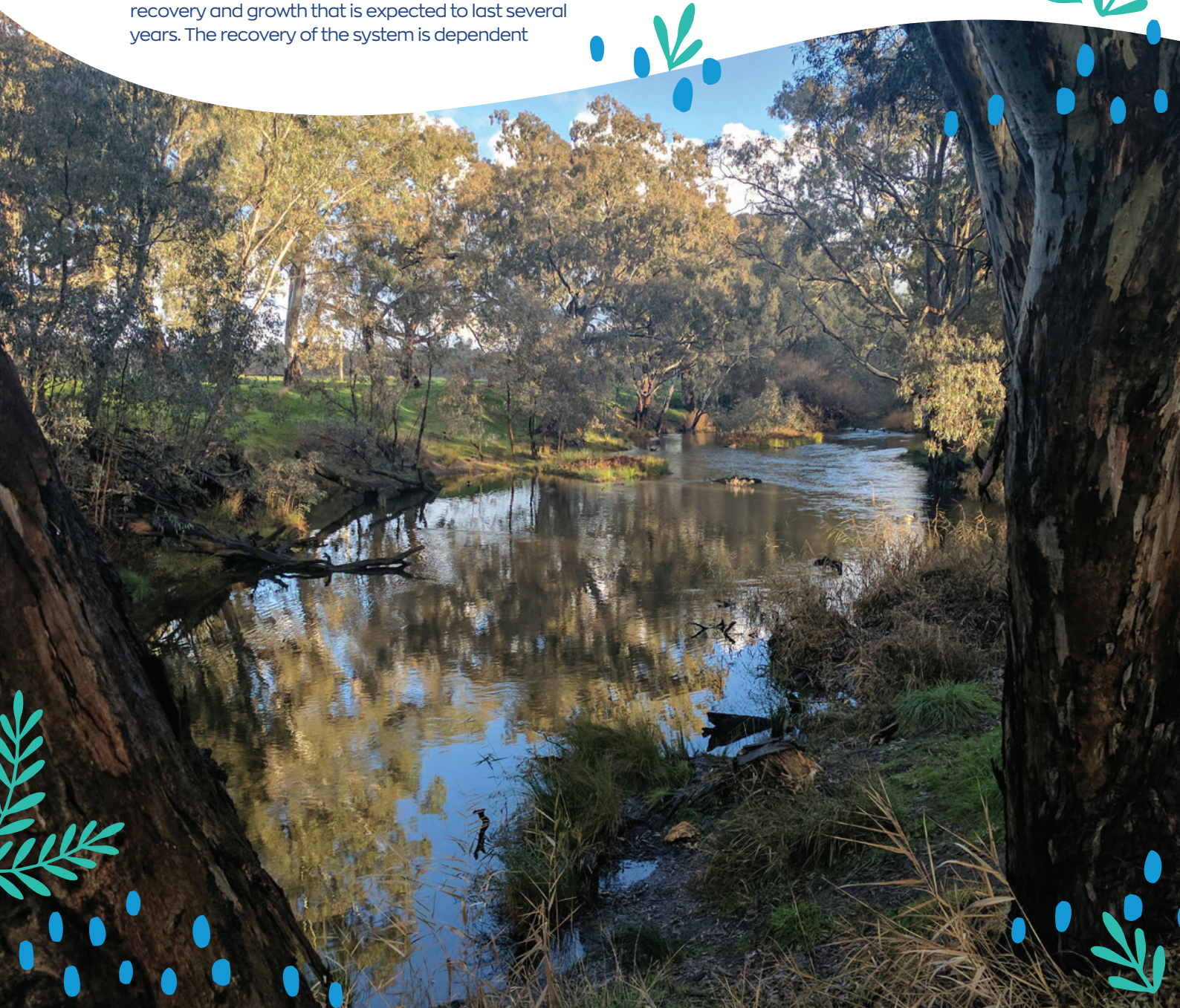
The Victorian Government has been supporting community partnerships through Waterwatch and other citizen science initiatives to address local waterway priorities. These priorities are part of the Victorian Government's *Water for Victoria* investment to improve catchment and waterway health across regional Victoria.

Overall Summary of results

Water quality data is consistently good along the length of the Campaspe River and its tributaries for sites where there are records. The exception being tributaries where incentives for on-ground works have not been offered. Despite the good water quality results, macroinvertebrate scores rate poorly and may suggest that key ecological processes are absent.

Following the extensive on-ground works that have occurred over the duration of the Caring for the Campaspe project, the river will enter a phase of recovery and growth that is expected to last several years. The recovery of the system is dependent on many things such as ongoing maintenance by landholders. Over time, it is expected that the condition of riparian land along the river will improve with ongoing woody weed control and native vegetation growth in the absence of livestock, creating valuable habitat for native fish and platypus.

The ongoing collection and interpretation of Waterwatch and citizen science data will be an important tool for monitoring the recovery and improvement of the Campaspe River over time.



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 waterways in the Campaspe catchment.

If you live in the project area (see map) and would like to become a volunteer citizen scientist, please register your interest with our Citizen Science project officer at citizenscienceteam@nccma.vic.gov.au or (03) 5448 7124.

Acknowledgement

North Central Waterwatch would like to acknowledge the contribution and support of those staff members from the North Central CMA and Taungurung Land and Waters Council involved in the Caring for the Campaspe project.

We also acknowledge the tireless effort from our dedicated citizen scientists. If it weren't for their contribution and the huge amount of data required, this report and its valuable contribution to the project and the benefit to the catchment would not be possible.

Acknowledgement of Country

The North Central Catchment Management Authority (CMA) acknowledges Dja Dja Wurrung, Taungurung and Yorta Yorta as the Traditional Owners of the project area and 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.

The Victorian Government is supporting community partnerships over the next four years 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 investment to improve catchment and waterway health across regional Victoria.

North Central CMA

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WATERWATCH North Central Communities Caring for Catchments

Dja Dja Wurrung Clans Aboriginal Corporation

Taungurung Land & Waters Council