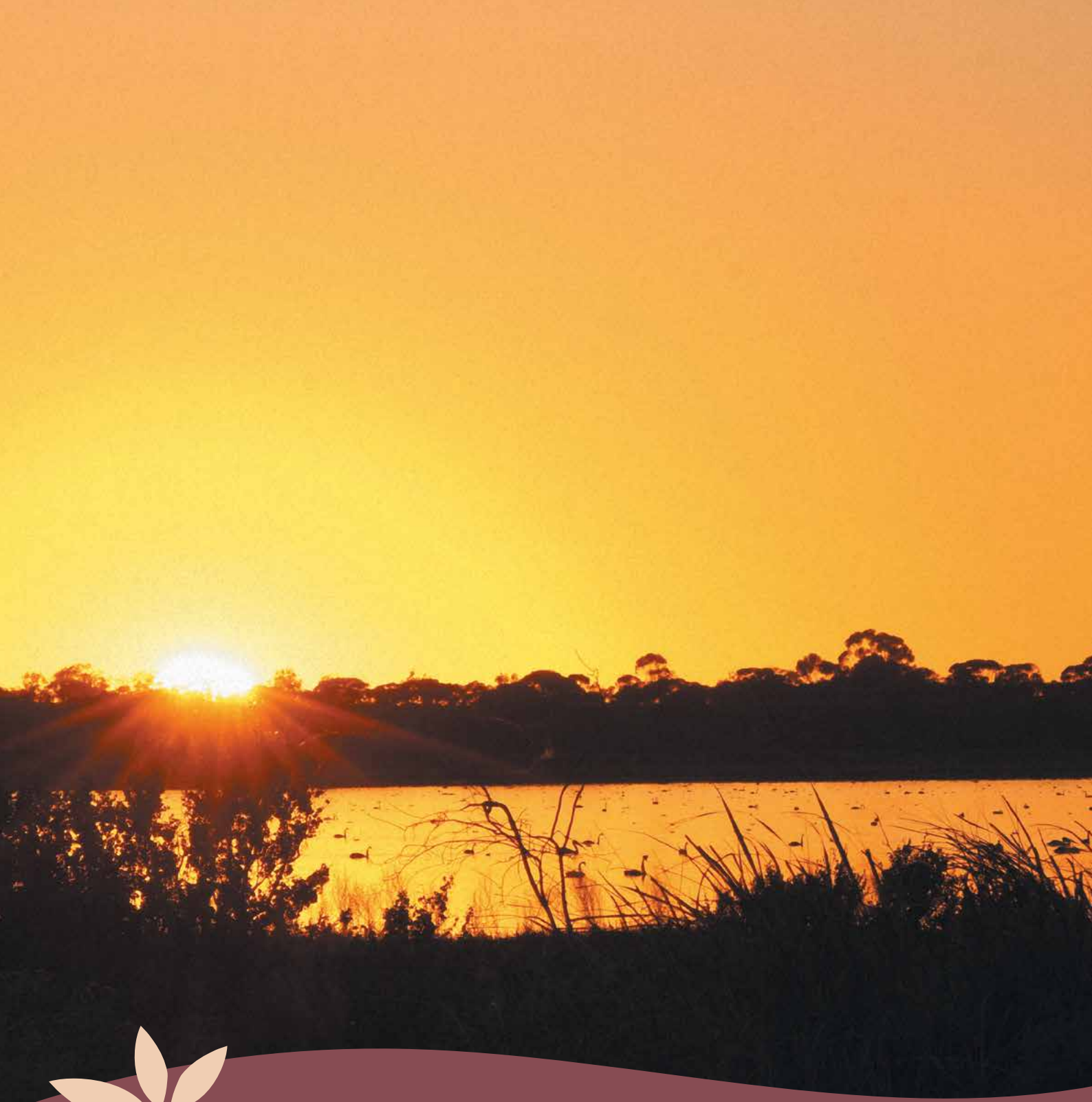


Kerang Wetlands Ramsar Site

Citizen Science Project
Snapshot Report 2023-24

WaterWatch
Victoria

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.

The North Central CMA region is home to the Kerang Wetlands, an extensive system of more than 100 wetlands. Twenty-three of these lakes, marshes, and swamps are recognised as internationally significant through their listing under the Ramsar Convention on Wetlands. Wetlands are one of the most threatened habitats in the world; the Convention exists as a framework for international cooperation for their conservation and wise use. The Kerang Wetlands are vital nesting and feeding grounds for waterbirds and other wetland dependant species.

The Kerang Wetlands also hold great significance to the Barapa Barapa and Wamba Wemba Traditional Custodians. With many thousands of years of knowledge handed down through the generations, North Central WaterWatch sees First Nations people as best placed to monitor the health of these wetlands. We are providing employment opportunities for Traditional Custodians to spend more time on Country while monitoring the health of these important wetlands.

The information gathered and partnerships formed have helped the North Central CMA to manage the site through the Kerang Wetlands Ramsar Site monitoring and management project 2021-24.

Environmental DNA Survey 2023

Environmental DNA (eDNA) is a non-invasive monitoring method used for detecting the presence or absence of specified fauna species. DNA fragments are inevitably shed in the aquatic environment; collecting and analysing water samples can offer a glimpse into which species are living in, or visiting, a waterway.

During 2023, several North Central CMA projects partnered to create an extensive eDNA monitoring program undertaken in the region. This complemented traditional sampling methods, commonly involving the use of nets or traps. The advantage of this method is that DNA can remain in the location long after an individual has moved on, and with movement of water, even if a species has not been present at an exact collection site.

Here we report on the results of eDNA surveys, with samples collected by Traditional Owners and North Central CMA staff during April and November 2023 and analysed by La Trobe University and EnviroDNA.

Across the seven sites surveyed on Kerang Ramsar wetlands, five notable species were detected as follows:

Notable detections:

Racecourse Lake - Unspecked hardyhead, golden perch, purple-spotted gudgeon, Murray cod.

Lake Tutchewop - Murray cod

First Reedy Lake - Murray cod, golden perch

Lake Cullen - golden perch

Hird Swamp - magpie goose

Middle Reedy Lake and Johnson Swamp were also surveyed but had no notable detections.

Wetland Condition Monitoring

Ecology Australia was procured to undertake an Index of Wetland Condition assessment at each of the 23 sites which comprise the Kerang Wetlands Ramsar Site.

In March and May 2024, a partial Index of Wetland Condition assessment was undertaken by Ecology Australia at each of the 23 wetlands which comprise the Kerang Wetlands Ramsar Site. The surveys aimed to capture vegetation responses to management and environmental conditions. The project included:

- Mapping of flora species listed under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) or the *Flora and Fauna Guarantee Act* (FFG Act)
- Mapping of evidence of sighting of high-threat pest plant and animal species
- Mapping of significant faunal habitat values (e.g. waterbird breeding rookeries)
- Compilation of a comprehensive vascular flora species list for each site
- Recording of other significant features including those associated with the hydrological management of the site

Threatened species found during the surveys include:

- 29 threatened flora species recorded
- Six critically endangered, 16 endangered and one vulnerable under the FFG Act
- The first ever recording of the critically endangered pale myoporum (*Myoporum brevipes*) within the Kerang Wetlands Ramsar Site. The species was recorded at Racecourse Lake

The data collected will assist with planning future natural resource management activities within the Kerang Wetlands Ramsar Site including pest plan and animal control, fencing and revegetation activities.

Curlew sandpiper and migratory shorebird monitoring

The curlew sandpiper is a migratory shorebird that breeds in Siberia before travelling to Australia to avoid the harsh Siberian winter and can be found within the Kerang Ramsar Wetlands Site from late winter/ autumn. The curlew sandpiper was once a relatively common visitor to Australia's shores, however population numbers have declined dramatically over the past few decades (BirdLife Australia).

Between October 2023 and May 2024, on ground curlew sandpiper and shorebird surveys were conducted by Wetland Revival Trust at 16 of the 23 wetlands that make up the Kerang Wetlands Ramsar Site. The survey program aims to identify and document the presence of the critically endangered Curlew sandpiper.

The surveys recorded:

- 16 shorebird species were observed at 12 of the 23 wetlands surveyed
- 2,327 individual shorebirds
- 5 curlew sandpipers were recorded
- Lake Tutchewop supported the highest diversity of shorebirds counted during a single survey, with seven species in total.
- Fosters Swamp and the Kerang Water Treatment Plant had the highest individual count of shorebirds, with 954 individuals recorded
- The most abundant shorebird species were red-necked avocets, with a total of 1167 (580 of which were recorded at Fosters Swamp and the Kerang Water Treatment Plant)

Curlew sandpiper eDNA monitoring was also undertaken.

- In March 2024, 25 water samples were collected from 18 sites
- All 25 samples were analysed for curlew sandpiper DNA
- Curlew sandpiper DNA was not detected at any of the 18 sites

Colonial nesting waterbird monitoring

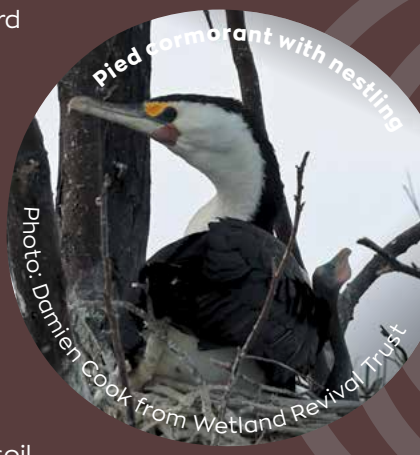
The Kerang wetlands support a high diversity of waterbirds including colonial-nesting waterbirds that breed at the site. Colonial-nesting birds include species such as the great egret (*Ardea modesta*), Australian white ibis (*Threskiornis molucca*) and great cormorant (*Phalacrocorax carbo*).

The presence and breeding success of these birds can tell us a lot about a wetland, in particular the wetlands' ability to support high energy intensive activities such as breeding. Wetland Revival Trust recently undertook colonial nesting waterbird breeding surveys at the wetlands that make up the Kerang Wetlands Ramsar Site. The aim of the surveys was to document breeding events of colonial nesting birds and the diversity and abundance of wetlands birds between September 2023 and May 2024. The surveys found:

- 60,048 individual wetland birds recorded between 19 – 22 March
- 71 species of birds
- 2,719 colonial nesting bird nests
- The species with the largest number of nests was the straw-necked ibis with a total of 2,030 (30 at Reedy Lake and 2000 at Middle Reedy Lake)

All species successfully fledged chicks over the 2023-24 breeding season, with 7,576 juveniles recorded.

The relatively high abundance of successful colonial waterbird breeding over the 2023-24 breeding season can largely be attributed to the large amounts of water across the landscape. These conditions created optimal conditions for nesting, with an abundance of food available for breeding birds to feed to their offspring.



Revegetation

Making the most of optimal soil conditions as the water recedes in some wetlands, the North Central CMA and Parks Victoria completed several revegetation programs at the Ramsar site. The aim of the program is to plant a variety of trees, shrubs and aquatic herb species, creating much needed habitat for native fauna.

- In Third Reedy Lake over a 1,000 tangled lignum (*Duma florulenta*) and river red gum (*Eucalyptus camaldulensis*) planted by Wetland Revival Trust & Traditional Owners
- The Ramsar project is working with Goulburn Murray Water (GMW) to restore the wetland through revegetation, weed control and pest animal control.
- At the Koorangie (Avoca) Marshes (First and Second Marsh) the project and partners have planted thousands of river red gum (*Eucalyptus camaldulensis*)

Benjeroop

TUT001

Lake Tutchewop

Lake William

Lake Kelly

Mystic Park

Kangaroo Lake

The Marshes

Lake Charm

Lake Charm

Stevenson Swamp

Lake Cullen

CUL001

REE003

Reedy Lake

REE002

Racecourse Lake

RACECOURSE LAKE

Fairley

Bael Bael

Wandella

Dingwall

Myall

Murray River

Murrabit River

Loddon River

Westby

Kerang East

Cullen

Johnson Swamp

PYR25

JOH001

Mead

PYR18

HIR001

Hird Swamp

Ganawarra

Lake Tutchewop

Site Code: TUT001

Lake Tutchewop is a naturally saline wetland, but since 1968 has also been a used as a saline groundwater salt disposal basin. While the electrical conductivity levels are considered very poor under the water quality indicator levels, the site still plays a crucial habitat role, including for several threatened species. Even though salinity levels are very high, Lake Tutchewop is one of the more important wetlands for waterbird abundance within the Ramsar site. Up to a certain point, saline conditions can lead to increases in waterbird abundance (Kellogg, Brown & Root Pty Ltd, 2011). During the 2023/24 shorebird surveys, Lake Tutchewop supported the highest diversity of shorebirds counted during a single survey; seven species.

Turbidity, lower pH and dissolved oxygen were rated good, reactive phosphorous moderate and upper pH rated poor.

Water Quality Indicators

pH (lower)	pH (upper)	Reactive Phosphate (Mg/L)	Electrical Conductivity (µS/cm)	Dissolved Oxygen % Saturation	Turbity (NTU)
7.8	8.6	0.05	11,485	146	20

Freckled Duck, First Marsh

Middle Reedy Lake, Pratt Road

Site Code: REE003

Middle Reedy Lake is a permanent freshwater lake, regulated for irrigation purposes and to support colonial waterbird breeding, including the well-known ibis rookery.

Of all sites monitored for the Kerang Wetlands Ramsar Site, Middle Reedy Lake has the best overall water quality. Reactive phosphorous, electrical conductivity, lower pH and dissolved oxygen all rated good, while upper pH and turbidity rated poor.

Water Quality Indicators

pH (lower)	pH (upper)	Reactive Phosphate (Mg/L)	Electrical Conductivity (µS/cm)	Dissolved Oxygen % Saturation	Turbity (NTU)
7.2	8.6	0.04	831	86	100

First Reedy Lake, Apex Park

Site Code: REE002

First Reedy Lake is a permanent freshwater lake, regulated for irrigation purposes.

Based on the water quality indicator levels, Pyramid Creek had good electrical conductivity, dissolved oxygen and lower pH, moderate upper pH and reactive phosphorous and poor turbidity.

Water Quality Indicators

pH (lower)	pH (upper)	Reactive Phosphate (Mg/L)	Electrical Conductivity (µS/cm)	Dissolved Oxygen % Saturation	Turbity (NTU)
7.4	8.0	0.05	442	112	60

Barapa Barapa woman Joan Singh water testing at Johnson Swamp

Johnson Swamp

Site Code: JOH001

Johnson Swamp is a permanent freshwater marsh, supporting large numbers of waterbirds. Being largely disconnected from natural water sources, Johnson Swamp receives environmental water from time to time.

During the reporting period, Johnson Swamp had good electrical conductivity, dissolved oxygen and lower pH, moderate upper pH and poor reactive phosphorous and turbid.

Water Quality Indicators

pH (lower)	pH (upper)	Reactive Phosphate (Mg/L)	Electrical Conductivity (µS/cm)	Dissolved Oxygen % Saturation	Turbity (NTU)
7.0	7.7	0.07	1,025	108	80

Water quality monitoring Johnson Swamp

Pyramid Creek, Hird Swamp

Site Code: PYR018

Although not officially a part of the Kerang wetlands Ramsar site, this site has been monitored as part of the citizen science program due to its proximity and connectedness to the wetlands.

Based on the water quality indicator levels, Pyramid Creek had good electrical conductivity, dissolved oxygen and lower pH, moderate upper pH and poor reactive phosphorous and turbid.

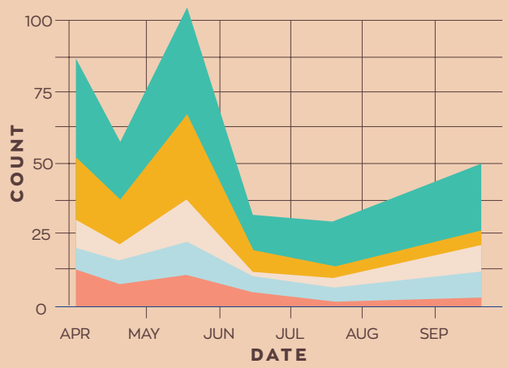
Water Quality Indicators

pH (lower)	pH (upper)	Reactive Phosphate (Mg/L)	Electrical Conductivity (µS/cm)	Dissolved Oxygen % Saturation	Turbity (NTU)
7.1	8.2	0.06	747	105	80

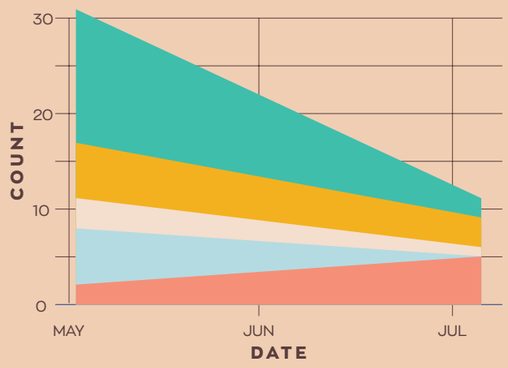
Pesticide Watch

Pesticide Watch is a citizen science program delivered by Deakin University that aims to improve understanding of how pesticide residues impact our waterways. The program launched in 2023 and partnered with North Central WaterWatch to collect samples at 19 sites across the region. In the Kerang Wetlands Ramsar project area, Lake Cullen (CUL001), Lake Tutchewop (TUT001) and First Reedy Lake (REE002) were sampled for pesticides between April and August. The graph bellow summarises the abundance of pesticides detected from water samples over this period. The full report can be accessed here: . The full report can be accessed here: https://www.nccma.vic.gov.au/media/documents/Pesticide_Watch_2023_Summary.pdf

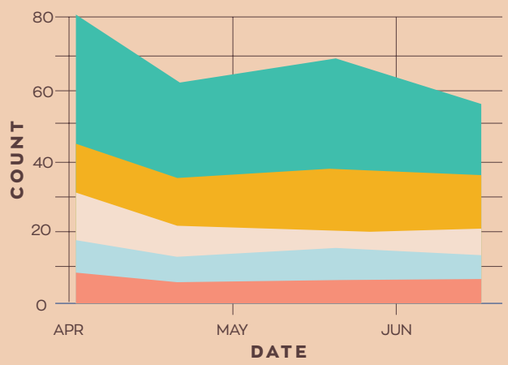
Pesticide Detections Over Time (CUL001)



Pesticide Detections Over Time (TUT001)



Pesticide Detections Over Time (REE002)



Interpreting results

Water quality parameters in this report have been analysed using indicator levels developed for the North Central CMA region 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 Murray Plains, Campaspe, Loddon, and Avoca sub-segment of the surface water geographic region of the new Environmental Reference Standard (formerly the Murray Plains Bioregion).

WaterWatch volunteers and Traditional Owners monitored five water-quality parameters: pH, electrical conductivity, reactive phosphorus, dissolved oxygen, 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 2023. 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 2023 calendar year.

Water Quality Monitoring

Two sites in the Gunbower Forest Ramsar area were regularly monitored throughout the year, at both Barapa Swamp and Green Swamp. Barapa Barapa First Nations people were engaged to undertake this work on Country; training and ongoing support was provided and two-way knowledge sharing has been an important aspect of the program.

Water quality testing includes temperature, electrical conductivity (an indication of salinity), dissolved oxygen, pH, turbidity and reactive phosphorous (as an indicator of nutrient load).

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

Murray plains, Campaspe, Loddon and Avoca sub-segment

Indicator	Electrical conductivity (EC)	pH lower (25th percentile)	pH upper (75th percentile)	Turbidity	Reactive Phosphorus	Dissolved oxygen
Units	(µS/cm)	pH	pH	NTU	(mg/L)	% Saturation
Good	≤1,500	≥7.0	≤8.2	≤20	<0.045	≥70
Moderate	>1,500 ≤2,000	<7.0 ≥6.0	>8.2 ≤8.5	>20 ≤50	>0.045 ≤0.050	<70 ≥60
Poor	>2,000 ≤4,000	<6.0 ≥5.0	>8.5 ≤9.0	>50 ≤100	>0.055 ≤0.100	<60 ≥40
Very Poor	>4,000	<5.0	>9.0	>100	>0.100	<40

River Detectives

River Detectives is an engaging education initiative that connects young people to nature by caring for their local waterway. Students learn about the importance of healthy waterways through water quality testing and the benefits to land, plants, animals, and people. Participating schools are provided with equipment, support, training and teaching resources.

Participating schools in the local area during 2023/24 include:

- St Joseph's Primary School Kerang
- Koondrook Primary School
- Murrabit Primary School
- Lake Boga Primary School
- Boort District P-12 College

Barapa Barapa woman Laura Kirby. Photo: Bill Conroy

We need your help!

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

We are looking for volunteers to help with monitoring our important Ramsar sites.

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 (CMA) 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.

We thank and acknowledge Barapa Barapa, Wamba Wemba, and Yorta Yorta Traditional Owners for their interest, involvement and contribution to the program.

References:

Kellogg, Brown & Root Pty Ltd (2011). *Ecological Character Description for the Kerang Wetlands Ramsar site*. Report to the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC).

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.

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