RiverScan

Citizen Science Project
River Health Snapshot Report 2021

WATERWATCH
North Central
Communities Caring for Catchments

North Central Waterwatch supports people to actively care for their environment and to participate in programs that monitor and report on the health of our region's land, water and biodiversity resources.

North Central Waterwatch and the Native Fish Recovery Plan (NFRP) deliver a citizen science program called RiverScan. The program engages the local community through regular water quality monitoring and community events.

Citizen scientists and Traditional Owners play an important role in monitoring changes in the ecological health of four key waterways: Little Murray River, Box-Pyramid Creek, Gunbower Creek and the Loddon River. The data collected helps North Central Waterwatch and the Native Fish Recovery project (NFRP) team make informed decisions about managing the environment to improve native fish habitat.

Laura Kirby performs a Welcome to Country in Gunbower

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.

Summary of Results

A total of 21 sites were monitored during 2021. Aggregated results from these sites have provided an average 'score' for waterway health of the four waterways represented.

Overall, results indicate the waterways are in moderate to poor health. The Little Murray had highly variable waterbug results, with an improvement in water quality since 2019.

The Box-Pyramid Creek also had variable waterbug results, with a decline in water quality compared to 2019 results. The Gunbower Creek had a slight improvement in waterbug results over this time however the system does not yet meet the ALT objectives of a healthy ecosystem.

Results for the Loddon River (together with the Twelve Mile Creek) indicate a decline in waterbug scores, but an improvement in water quality since 2019.

It is important to note that as the waterways are highly modified, any river health recovery is expected to take a long time. The NFRP is working to achieve this and to date has undertaken the following on-ground achievements.

Native Fish Recovery Project Cumulative Onground Achievements

CREATION OF DEEP POOLS
4

INSTALLATION OF INSTREAM HABITAT STRUCTURES
125

FENCING INSTALLED AND MAINTAINED
51KM

WEED CONTROL
283HA

FISHWAYS COHUNA AND KOONDROOK
2

REVEGETATION
111HA

CAPTIVE BREEDING PROGRAMS
2

AUSTRALIA'S FIRST SELF-CLEANING FISH SCREEN, COHUNA

THREATENED WETLAND SPECIALIST FISH RELEASED
2000+

SOUTHERN PURPLE-SPOTTED GUDGEON AND SOUTHERN PYGMY PERCH

Little Murray River

Site Code: NC_LMU300, NC_LMU600 and NC_LMU900

Monitor: Rob Loats and Bendigo Tafe Students

Three sites are regularly monitored on the Little Murray River. Results are combined to give a stream average. Results for 2021 indicate the EC was good, pH moderate, and turbidity poor. Reactive phosphorous testing was not sufficient to include in the results.

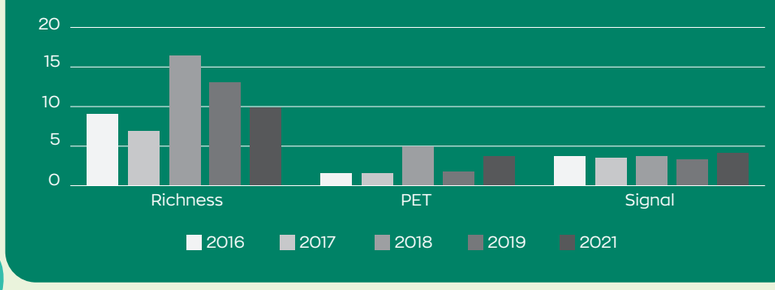
Waterbug testing in spring 2021 indicate that richness does not meet ALT objectives, EPT is close to meeting objectives, while the SIGNAL score meets the objectives for a healthy ecosystem.

Comparing results to previous years, there has been a decline in waterbug scores from 2018 to 2019 with a gradual improvement in 2021. When compared to the 2019 results, water quality results remain steady, except for an increase in turbidity.

The Little Murray River continues to benefit from improved flow conditions after the completion of the Swan Hill Modernisation Project in 2018. This included the construction of fishways at Fish Point Weir and Little Murray Weir; installation of instream woody habitat and stock exclusion fencing.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbity	Richness	EPT	Signal
8.5	127	N/A	88	10	4	4.3

Little Murray Waterbugs



Box-Pyramid Creek

Site Code: NC_PYR010, NC_PYR020, NC_PYR030, NC_PYR040 and NC_BOX001 , NC_BOX002

Citizen Scientists: Bendigo Tafe Students

Five sites on the Box-Pyramid Creek were monitored for waterbugs in 2021. Results per site varied greatly particularly richness, ranging from 5-15. EPT, while SIGNAL scores have declined since 2019.

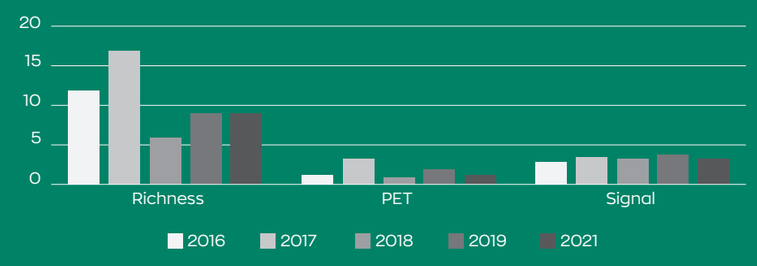
Overall, waterbug sampling results indicate the creek does not meet the ALT objectives for a healthy ecosystem and is in poor condition.

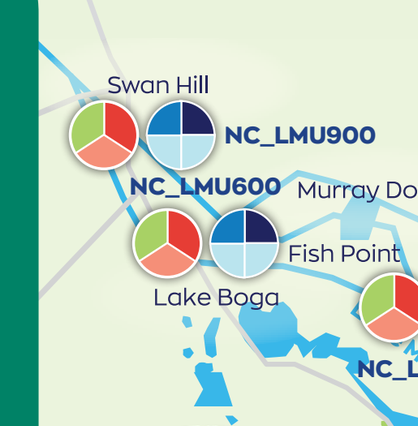
Insufficient water quality data was collected from the Box-Pyramid Creek during the reporting period.

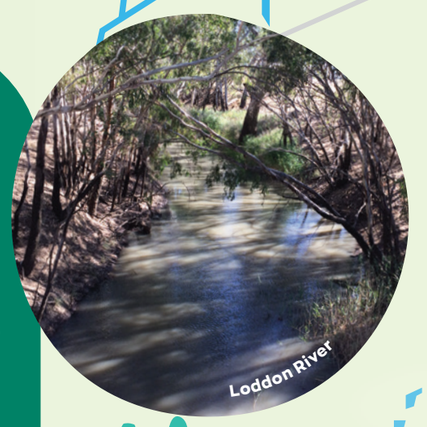
More than 7 km of stock exclusion fencing was installed along Box Creek in 2021 and five instream woody habitat structures.

Fish monitoring through the Victorian Environmental Flows Monitoring Assessment Program (VEFMAP) has revealed an increase in juvenile Murray cod in the past two years. Water for the environment delivered in Box-Pyramid Creek also provides a cue for large numbers of golden perch to move upstream from the lower Loddon River, via the Box Creek fish lock, and into into Ghow (Kow) Swamp, which has great nursery habitat and food resources for native fish.

Box-Pyramid Creek Waterbugs







Loddon River

Site Code: NC_LOD559, NC_LOD602, NC_LOD621, NC_LOD643, NC_LOD651, NC_LOD587, NC_LOD593, NC_TMC010

Citizen Scientists: Tony Brown, Brian Walton, Trevor Wilkinson, Bill Ricketts and Bendigo Tafe students

Five sites were monitored for water quality along the lower Loddon, and eight sites for waterbug monitoring. Compared to waterbug results from 2019, there has been a slight decline in richness and EPT while the SIGNAL score remains the same.

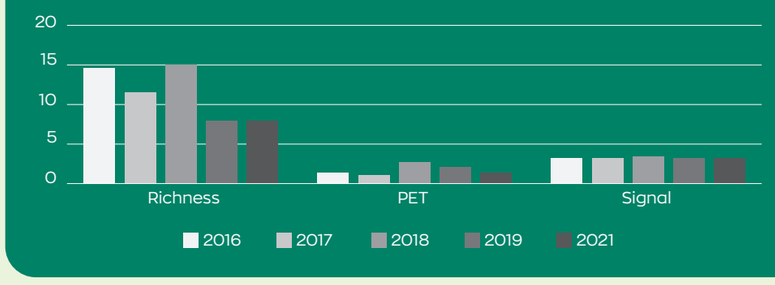
Water quality results are considered moderate to good while reactive phosphorous levels and turbidity have improved since 2019.

Over 110 ha of weed control and 60 ha of revegetation has been undertaken along the Loddon River upstream of Canary Island. An important flood runner that connects to the 12 Mile Creek has also been fenced and revegetated in preparation to release threatened southern pygmy perch at the site.

Continued riparian protection and delivery of water for the environment is expected to improve the health of the Loddon River in the long-term. As the Loddon River is highly modified it is anticipated that the health of its ecosystems will take a long time to recover.

Water Quality Indicators				Waterbug Indicators		
pH	EC	Phos	Turbity	Richness	EPT	Signal
7.7	497	0.03	100	7.9	1.4	3.2

Loddon River Waterbugs



Gunbower Creek

Site Code: NC_GUN130, NC_GUN115, NC_GUN110, NC_GUN105 and NC_ GUN148

Citizen Scientists: Bendigo Tafe Students

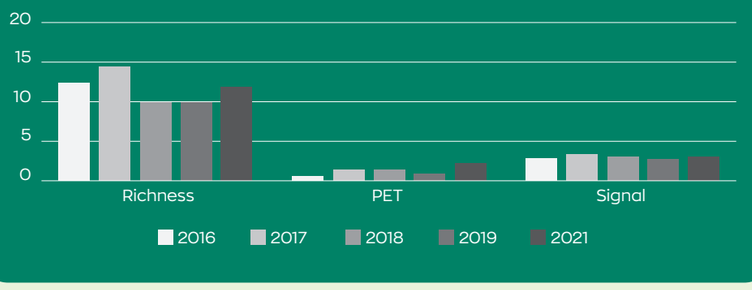
Although results for all three waterbug indices have improved since 2019, scores remain low and indicate Gunbower Creek is in poor health.

Insufficient water quality data was collected from the Gunbower Creek during the reporting period.

In addition to riparian works completed in the upper Gunbower Creek, two important fishways have been constructed at Koondrook and Cohuna, opening fish passage to the Murray River for the first time in more than a century.

Fishway trapping results from December 2021 at Koondrook fishway found large numbers of juvenile silver perch were passing through the low flow entrance, as well as bony bream and small-bodied species including Murray-Darling rainbowfish, Australian smelt, carp gudgeon and un-specked hardyhead.

Gunbower Creek Waterbugs



Interpreting results

The results in this report are based on the analysis of macroinvertebrate monitoring undertaken in spring 2021 and water quality monitoring undertaken throughout the year. Using citizen science data, this report provides an assessment of the current condition of four key waterways in the NFRP project area: Little Murray River, Box-Pyramid Creek, Gunbower Creek and the Loddon River.

The Victorian Government's guidelines provide 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 location in the region.

In this program, the catchments lie within the Murray Plains Bioregion characterised by low elevation and slow flowing streams associated with floodplains. Each site was assessed against these reference condition values and are calculated based on information known for the area, as if it was in the best available condition for that region.

Four water quality parameters were measured: pH, electrical conductivity (EC), reactive phosphorus (PO4) and turbidity. In 2021, water quality information was collected from five sites on the Loddon River and three sites on the Little Murray River.

Each site was assessed against three macroinvertebrate monitoring indices: taxa richness, EPT index and ALT SIGNAL index and results are calculated using Agreed Level Taxonomy (ALT) reference condition values.

Waterbugs Colour Coding

Sites have been colour coded and interpreted as follows:

- **Meets or exceeds ALT objectives for a healthy ecosystem** (>30th percentile of index values for reference sites). Key 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 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 processes are not functional and water quality and/or habitat is severely impacted.

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.

pH, Turbidity, Electrical conductivity, Reactive phosphorous

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)
Murray Plains	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

We need your help!

We are looking for volunteers to help with monthly water quality monitoring on the Gunbower Creek, Loddon River, and Box/Pyramid Creek. Please get in touch if you are keen to be involved: citizenscienceteam@nccma.vic.gov.au or (03) 5448 7124.

Acknowledgements

The RiverScan Project would like to acknowledge the tireless efforts of dedicated volunteer citizen scientists, who have contributed greatly to the program and this report.

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

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.


Southern pygmy perch


Koondrook fishway during construction

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