



Water sample collection, Little Murray River

North Central Waterwatch
River Health Snapshot Report
RiverScan Citizen Science Project 2018

Acknowledgement of Country

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



North Central Waterwatch and the Native Fish Recovery Plan (NFRP) teamed up again in 2018 to work with RiverScan volunteers to monitor waterway health to support the recovery of native fish populations in north central Victoria.

Citizen scientists play an important role in monitoring the health of four key waterways in the NFRP project area. Since 2016, a team of dedicated volunteers have been gathering data that tells a story about these waterways. In particular, the baseline data collected in 2016 informed our early implementation of the NFRP and, when compared to the 2017 data, allowed us to report on changes in ecological condition.

The program entered its third year in 2018 when community volunteers identified and assessed macroinvertebrates samples and water quality at 23 sites along the Loddon River, Gunbower River, Little Murray River and Box-Pyramid Creek. This data continues to help us understand changes in waterway health.

Ninety RiverScan citizen science volunteers are engaged through the Native Fish Recovery Plan and undertake monthly water quality testing across the four waterways focusing on pH levels, electrical conductivity, reactive phosphorus, turbidity, dissolved oxygen levels. Annual macroinvertebrate surveys are also undertaken.

The Victorian Government has been supporting community partnerships through Waterwatch and other citizen science initiatives to address local waterway priorities. These priorities have been addressed as part of the Victorian Government's \$222 million Water for Victoria investment to improve catchment and waterway health across regional Victoria.

Overall Summary of Results

Overall, the data from 2018 indicated improvements in ecological health at some locations, including the Loddon River and the Little Murray Rivers, although turbidity often exceeded the acceptable limits. There was an overall decline in the water quality in the Pyramid and Gunbower Creeks, compared to the 2017 report.

Through the NFRP project the North Central CMA will continue to deliver riparian and instream works to improve ecological condition of targeted waterways. These works complement the delivery of water for the environment for native fish outcomes.

The North Central CMA is committed to supporting citizen science programs that enable communities to take action regarding the health of the region's waterways and to share knowledge. Citizen scientists are the custodians of the environment and make a real difference to decisions being made about natural resource management.

North Central Waterwatch and the Native Fish Recovery Plan are working towards increasing native fish populations and ecological health of the region's waterways.

The Victorian Government is supporting community partnerships over the next four years through Waterwatch and other citizen science initiatives to address local waterway priorities. The priorities are being addressed as part of the Victorian Government's \$222 million investment over the next four years to improve catchment and waterway health across regional Victoria. This investment is a key component of Water for Victoria – the government's plan for management of our water resources now and into the future.

What's been achieved:

Over the past three years significant works have been delivered through the North Central CMA's Native Fish Recovery Plan.



CREATION OF
DEEP POOLS

4



INSTALLATION OF
INSTREAM FISH
HABITAT STRUCTURES

>100



WOODY WEEDS
REMOVED

33.6HA



NATIVE VEGETATION
PLANTED

4.8HA



FENCING INSTALLED
AND MAINTAINED

23.4KM



AUSTRALIA'S FIRST
SELF-CLEANING FISH
SCREEN, COHUNA

Little Murray River

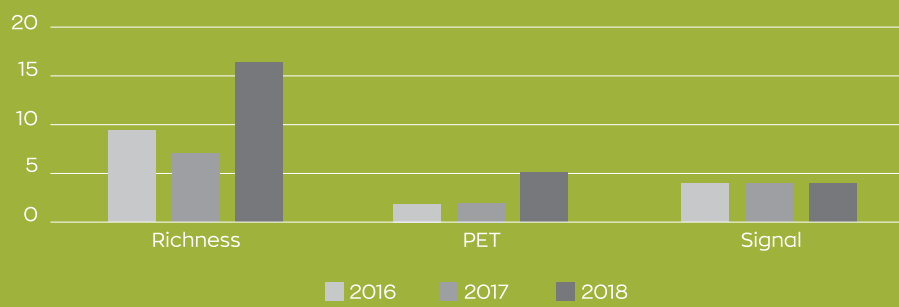
Site Code: NC_LMU300, NC_LMU600 and NC_LMU900
Monitor: Rob Loats and Bendigo Tafe Students

Data from 2018 indicated the Little Murray River was in good ecological condition. Objectives were reached in two of three ALT indices and there was an overall improvement from previous years. The taxon richness and PET indices more than doubled since the 2016 RiverScan survey. The increase could be attributed to improved flows and the addition of instream woody habitat. Furthermore, the water quality scores for the Little Murray River indicated the river had good quality water.

More than 50 instream woody habitat complexes were installed in the Little Murray River and the lower Loddon River. These complexes are designed to create habitat, resting points and feeding areas for Murray cod, golden and silver perch and threatened freshwater catfish. During 2018, the Swan Hill Modernisation Project for the Little Murray River was finalised resulting in the construction of two fishways, improved flows and fencing of livestock out of stream banks. These works are expected to deliver ongoing improvements to native fish populations and river health.

Waterbug Taxa Richness	ALT EPT	Signal Score	EC (µs/cm)	pH	Turbidity (NTU)	Phos (Mg/L)
16.5	5	3.8	247	8.2	43	0

Little Murray Waterbugs



Loddon River

Site Code: NC_LOD559, NC_LOD602, NC_LOD593, NC_LOD587, NC_LOD621, NC_TMC010, NC_LOD643, NC_LOD651 and NC_LOD901
Citizen Scientists: Brian Walton, Trevor Wilkinson and Bill Ricketts; Bendigo Tafe

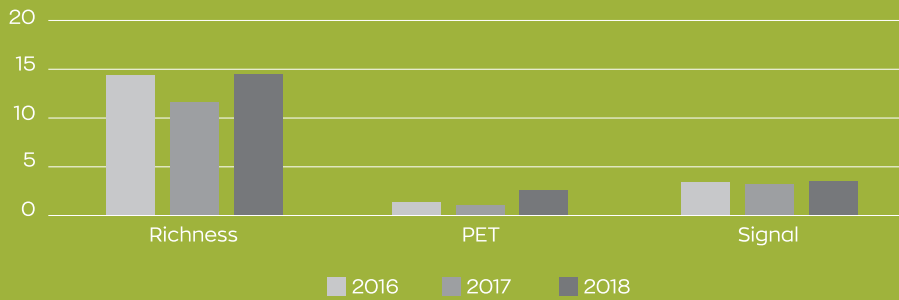
The Loddon River was in moderate condition. Although ALT signal scores remained relatively stable, taxa richness and PET indices increased markedly in 2018. Taxa richness and ALT signals indicate moderate condition, while the PET index was poor. The increase in ALT scores may be a result of improved instream habitat (e.g. aquatic vegetation) from the delivery of water for the environment, complemented by fencing and revegetation. In addition, the water quality scores for the Loddon River indicated good quality water. Loddon River indicated good water quality for all parameters except for turbidity. It is anticipated that ecosystem health recovery in the lower Loddon River will be slow due to the highly disturbed nature of this system; historic alteration of flows and siltation of instream habitats.

In 2018, a pilot project to increase deep pool habitat was undertaken with the removal of sediment from four pools along 12 Mile Creek to the depth of 1.8 m. The pools were designed to create refuge habitat for golden and silver perch and Murray-Darling rainbowfish. Eleven woody habitat structures were also installed in the pools to provide cover and feeding areas for native fish such as golden and silver perch.

Through the Swan Hill Modernisation Project, fishways were installed in Little Murray River at Little Murray Weir and Fish Point Weir. Migrating fish can now move 180 km from the Murray River through the Little Murray River, lower Loddon River, Pyramid Creek towards Kow Swamp's high-quality nursing habitat.

Waterbug Taxa Richness	ALT EPT	Signal Score	EC (µs/cm)	pH	Turbidity (NTU)	Phos (Mg/L)
14.8	2.8	3.4	0.03	7.8	310	91

Loddon River Waterbugs



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.



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 indicator levels

Water quality indicator levels for the Murray Plains Bioregions:

SEPP (WoV) segment	River health category	Reactive Phosphorus (mg/L)	pH (lower)	pH (upper)	Electrical conductivity (µs/cm)	Turbidity (NTU)
	Good	≤0.06	≥6.3	≤8.5	≤2000	≤40
Murray Plains	Moderate	>0.06 ≤0.1	<6.3 ≥5.5	>8.5 ≤9.0	>2000 ≤3000	>40 ≤50
	Poor	>0.1	<5	>9.0	>3000	>50

Interpreting results

The results in this report are based on the analysis of macroinvertebrate monitoring data collected in spring 2018. The report assesses the ecological condition of four main waterways in the NFRP project area: Loddon River; Box-Pyramid Creek; Gunbower Creek and Little Murray 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 are determined by its position in the region.

In this program, the catchments are within the Murray Plains Bioregion.

Four water quality parameters were measured at each site: pH, electrical conductivity, reactive phosphorus and turbidity. Three indices are calculated using macroinvertebrate data, assessed against Agreed Level Taxonomy (ALT) reference condition values.

Each site was assessed against these reference condition values and calculated using information known for the area.

In 2018, water quality data was collected for the first time as part of the project, four community volunteers collected data at five sites along the Loddon River and three sites along the Little Murray River.

Box-Pyramid Creek

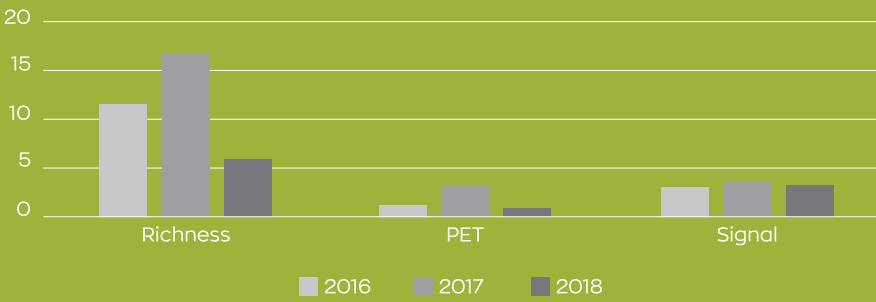
Site Code: NC_PYR010, NC_PYR020, NC_PYR030, NC_BOX002, NC_PYR040 and NC_BOX001
Citizen Scientists: Pyramid Hill College and Bendigo Tafe Students

In 2018 Box-Pyramid Creek was in poor condition. Taxa richness and PET scores were particularly low during 2018. The Box-Pyramid Creek system was experiencing a low flow and there was little instream habitat available for sampling. The bed of the creek was made up of a thick layer of silt.

A key objective for years two and three of the Native Fish Recovery Plan was to undertake works alongside instream woody habitat that had previously been installed in year one of the plan. The works included 6.3 km of riparian fencing, revegetation and 9.6 ha of woody weed control, to protect and improve habitat at seven woody habitat complexes. No water quality data was collected for the site during the reporting period.

Waterbug Taxa Richness	ALT EPT	Signal Score
6	0.8	3.2

Box-Pyramid Creek Waterbugs



Gunbower Creek

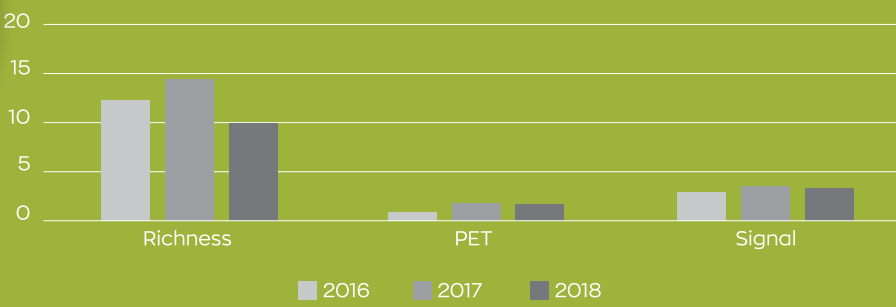
Site Code: NC_GUN130, NC_GUN115, NC_GUN110, NC_GUN105 and NC_GUN148
Citizen Scientists: Barham High School and Bendigo Tafe Students

Gunbower Creek was in poor ecological condition in 2018. As with Box-Pyramid Creek, there was a decline in ecological condition since 2016; the reason for the decline is unclear. Although Gunbower Creek saw a decrease in taxa richness since 2017, the PET index and ALT signal scores remained stable. Water quality data is unavailable.

The delivery of water for the environment continues to provide good conditions for Murray cod spawning and recruitment. In winter 2018, Australia's first self-cleaning irrigation channel screen was installed in the Cohuna Channel, preventing native fish from being lost to irrigation channel systems. Once fish move into irrigation channels, they are unable to return to natural waterways and are exposed to poor habitat and predation when channels are drawn down for maintenance during the 'irrigation off' season in winter.

Waterbug Taxa Richness	ALT EPT	Signal Score
10	1.5	3.2

Gunbower Creek Waterbugs



Symbols

- Taxa Richness** is the number of different types of macroinvertebrates at a site; sites with higher taxa richness are generally in better ecological condition.
- PET Index** 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.
- ALT Signal Index** 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:

TAXA richness	PET index	ALT signal
16	4	3.8

Pete's Story

By Cass Davis, Regional Waterwatch Coordinator

When Peter Rose joined the North Central CMA I was excited to have another Waterbug nerd on-board! I Peter works as a project officer on the Native Fish Recovery Plan project and we teamed up to develop a Citizen Science monitoring program for four key waterways the Loddon River, Gunbower Creek, Little Murray River and Box-Pyramid Creek. As a result, Peter and I have been working with volunteers for the past three years to monitor these waterways. I asked Pete what he loved about working with us.

"Since being involved with Waterwatch through RiverScan, the NFRP project now has a cost-effective way of assessing waterway health in response to Native Fish Recovery Plan management actions over time. It's extremely important to monitor the works we do and is something that otherwise would be difficult to achieve through fish monitoring using fish recovery plan funds alone."

I asked Peter what's been the impact Waterwatch has made to his project?

"Being involved with Waterwatch has brought another avenue of community, recreational fisher and educational engagement to the Native Fish Recovery Plan.

I feel that community members value being able to make real contributions to our project. Our project now has comprehensive river health data being collected, which will become invaluable over time to inform the success or otherwise of management actions, demonstrate the value of the works to the community and create opportunities for further investment into the plan.

There is already some evidence of improvement in river health, most likely related to flow management and instream habitat instillations, particularly in the Little Murray River. There is also evidence, through informal conversations, that volunteers enjoy being involved and keeping in touch with the project."

Finally, I asked Peter what he enjoyed most about the program?

"Being out in waterways and seeing the results of the management actions we are putting in place and watching volunteers discover the wonderful world of waterbugs!" – nerd!

Thanks for all your contributions to RiverScan Pete!



Acknowledgments

The River Scan Project would like to acknowledge the contribution and support from the following individuals during the development of this publication: North Central CMA staff members Cass Davis – Regional Waterwatch Coordinator; Peter Rose, Nicole Bullen, Tracey Harbridge – Native Fish Recovery Plan Project Officers; John Gooderham, The Waterbug Company; Terri Williams, lecturer, Bendigo TAFE and Bendigo TAFE students who have participated in the program and citizen science community volunteers; whose contribution, commitment and support have contributed greatly to the report.

How to get involved

Contact your local **Waterwatch Coordinator** at the **North Central Catchment Management Authority**

✉ Via post: **PO Box 18, Huntly VIC 3551**

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