



Rob Loois, woody habitat installed in the Little Murray



North Central Waterwatch
River Health Snapshot Report
**RiverScan Citizen Science
Project 2019**



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.



North Central Waterwatch Program supports people to actively care for their environment by participating in programs that monitor and report on the health of our regions land, water and biodiversity resources.

In 2016, North Central Waterwatch and the Native Fish Recovery Plan (NFRP) teamed-up to develop and implement a citizen science program called RiverScan. During the first year, RiverScan saw North Central Catchment Management Authority (CMA) staff and scientist work with twenty local community volunteers to monitor waterway health across four key waterways in the NFRP project area: Little Murray River, Box-Pyramid Creek, Gunbower Creek and the Loddon River. Since 2016, the RiverScan program has engaged over 240 community members through field days, trainings, workshops and meetings.

Through the RiverScan program, citizen scientists continue to play an important role in monitoring changes in the ecological health of waterways. The data collected helps North Central Waterwatch and the NFRP team make informed decisions about managing the environment to improve native fish habitat.

In 2019, monitoring included monthly water quality testing to understand pH levels, electrical conductivity, reactive phosphorus, turbidity, and dissolved oxygen. Annual waterbug surveys were also undertaken in spring 2019. The water quality data will give us a better understand of the ecological health of priority waterways as changes in water quality can influence macroinvertebrates communities. The North Central Waterwatch program is seeking expression of interest for community volunteers to monitor water quality, and continual contribute to monitoring the ecological health of the four key waterways.

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 \$222 million Water for Victoria investment to improve catchment and waterway health across regional Victoria.

Summary of Results

Overall, the on-ground works to improve the ecological health of four priority waterways has been successful. Since 2016, all four waterways have shown overall improvements in ALT objectives or remained constant.

Over the last 4-years, the North Central CMA has completed extensive work to improve the ecological health of the key waterways. Over the course of the project, revegetation sites have shown promising results, with some sites having survival rates at 80%. In most cases, works have exceeded the targets set for the four-year project.

The current focus of the project is on delivering further fencing to compliment river health works, particularly along the lower Loddon and Little Murray rivers. The project also aims to build on strengthening relationships between the community and North Central CMA.

Native Fish Recovery Plan Ongoing Achievements



CREATION OF
DEEP POOLS
4



INSTALLATION OF
INSTREAM HABITAT
STRUCTURES
>100



WOODY WEEDS
REMOVED
324HA



NATIVE VEGETATION
PLANTED
120HA



FENCING INSTALLED
AND MAINTAINED
57KM



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

Although there has been a minor decline in ecological health for Little Murray River in macroinvertebrate data meeting ALT objectives from 2018 to 2019, there has still been a significant improvement in ecological health since 2016. Two of the three indices show that Little Murray River is in moderate health. This includes richness and signal. Of the three sites monitored at Little Murray River, Herbie Lane has shown to be in moderate-good ecological health. The richness at Herbie Lane was the highest of all the sites monitored, and the PET and signal scores showed that the objectives were nearly reached. The sites monitored off Petal Island Road showed moderate health, however, the site off Little Murray Weir is depicted to be in poor ecological condition. In contrast, the water quality sampling shows that all three sites have high water quality for all four indices.

In 2019, ten instream woody habitat (IWH) structures were installed into Little Murray River. This work has added to the 60 IWH structures previously installed since 2016. In addition, two fishways were installed at Little Murray River at Little Murray Weir and Fish Point Weir, through the GMW Connections Swan Hill Modernisation Project, which means migrating fish can move 180 km from the Murray River through Little Murray River, lower Loddon River and Pyramid Creek to reach high quality nursing habitat at Kow Swamp. Complementary works have been completed, including over 11 km of fencing and 24 ha of woody weed removal.

Waterbug Taxa Richness	ALT EPT	Signal Score	EC (Us/cm)	pH	Turbidity (NTU)	Phos (Mg/L)
13	2	3.3	134	8.22	37	0.003

Little Murray Waterbugs



Box-Pyramid Creek

Site Code: NC_PYR010, NC_PYR020, NC_PYR030, NC_BOX002, NC_PYRO40 and NC_BOX001

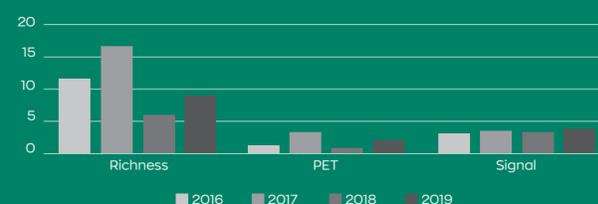
Citizen Scientists: Pyramid Hill College and Bendigo Tafe Students

Box-Pyramid Creek has the second most sample sites, and the largest disparity of results between sites. The richness ranges between 5-10, the PET scores range from 0-3 and the signal scores range from 3.2 to 4.8. However, overall the Box-Pyramid Creek has shown an improvement in two of the three indices since 2016. The highest water quality results were recorded in 2017 for all three indices. Both the McKenzie road and the Dobson road site had excellent signal scores. The other sites had moderate signal scores, except for the Kow Swamp site, which had a poor signal score. The overall results suggest that Box-Pyramid Creek is in poor-moderate condition.

Since 2016, seven IWH have been installed in Box-Pyramid Creek, and 2.2 km of streamside fencing to complement the IWH. In 2018, there was 9.6 ha of woody weed control combined with 6.3 ha of revegetation, and an additional 16 ha in 2019.

Waterbug Taxa Richness	ALT EPT	Signal Score
9	2	3.8

Box-Pyramid Creek Waterbugs



Loddon River

Site Code: NC_LOD602, NC_LOD593, NC_LOD587, NC_LOD559, NC_LOD621, NC_TMC_010, NC_LOD643, NC_LOD651, NC_LOD901

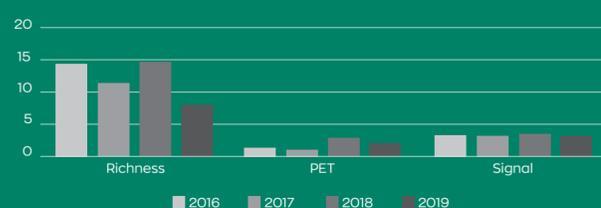
Citizen Scientists: Brian Walton, Trevor Wilkinson, Bill Ricketts, Tony Brown and Bendigo Tafe students

Overall, the results from the 2019 monitoring suggest that the Loddon River is in poor-moderate health. In 2019, there were eight monitoring sites along the Loddon River where macroinvertebrate data was collected. Since 2016, there has been a minor decline in richness, however, signal score has remained relatively constant and PET scores have improved. Major's Line had one of the highest signal scores of all the sites. Furthermore, there were four sites along the Loddon River where water quality data was collected. All four sites indicated good EC pH, and phosphate levels. All four sites indicated poor quality turbidity levels. Overall, indicating that the Loddon River is in moderate-good ecological health. Due to the Loddon River being highly modified, it is anticipated that the health of the ecosystems will take a long time to recover.

In 2017, IWH were installed below Kerang Weir, followed by a further 11 IWH in 2018. In addition, 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 for golden and silver perch, and Murray-Darling Rainbow fish. In 2019, approximately 1.9 km of fencing was completed, which contributed to a total of 13 km of fencing across the four years. This work was completed to protect important remnant patches of river red gum forests. Across Pyramid-Creek and the Lower Loddon River, 32 ha of native revegetation has been completed, focusing on sites that have had IWH installed.

Waterbug Taxa Richness	ALT EPT	Signal Score	EC (Us/cm)	pH	Turbidity (NTU)	Phos (Mg/L)
8	2	3.2	410	7.66	161	0.055

Loddon River Waterbugs



Gunbower Creek

Site Code: NC_GUN130, NC_GUN115, NC_GUN110, NC_GUN105 and NC_GUN148

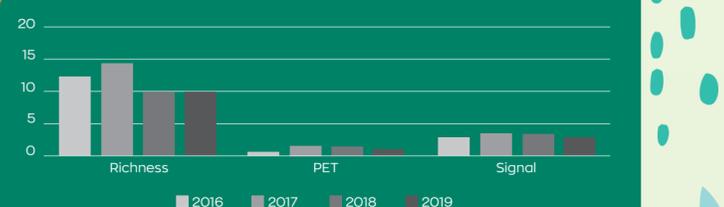
Citizen Scientists: Barham High School and Bendigo Tafe Students

The overall results from the 2019 Spring sampling suggest that Gunbower Creek is in poor-moderate health. The richness of the five sites varies significantly, between 7-14. The site with the highest richness was the Koondrook/Dry Swamp site. Shelby's Road had the highest PET score, and Darmoyle Road had the highest signal score. Since sampling in 2016, both the PET and signal scores have improved overall. There were no water quality samples taken at any of the Gunbower sites during the 2019 spring monitoring.

Gunbower is being adaptively managed through environmental watering to align with enhancing ecological assets, such as providing good conditions for Murray Cod migration and spawning. In addition, fish-screen infrastructure was installed along Gunbower Creek at Cohuna Weir to prevent the loss of native fish to irrigation channels and prevent the separation from the breeding population. Since 2016, there has been over 10 km of riparian fencing completed along Gunbower Creek, which will prevent livestock from accessing the banks and increase erosion and high turbidity.

Waterbug Taxa Richness	ALT EPT	Signal Score
10	1	2.8

Gunbower Creek 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.

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

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)
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	>3000	>50

Interpreting results

The results in this report are based on the analysis of macroinvertebrate monitoring undertaken in spring 2019 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 position in the region.

In this program, the catchments lie within the Murray Plains Bioregion, a region characterized 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 2019, 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 and results are calculated using Agreed Level Taxonomy (ALT) reference condition values.



“ We’ve been creating deep pools in the Loddon River to improve habitat for native fish. It’s shown to be beneficial; we are seeing a gradual improvement of ecological health and fish populations since 2016 ”

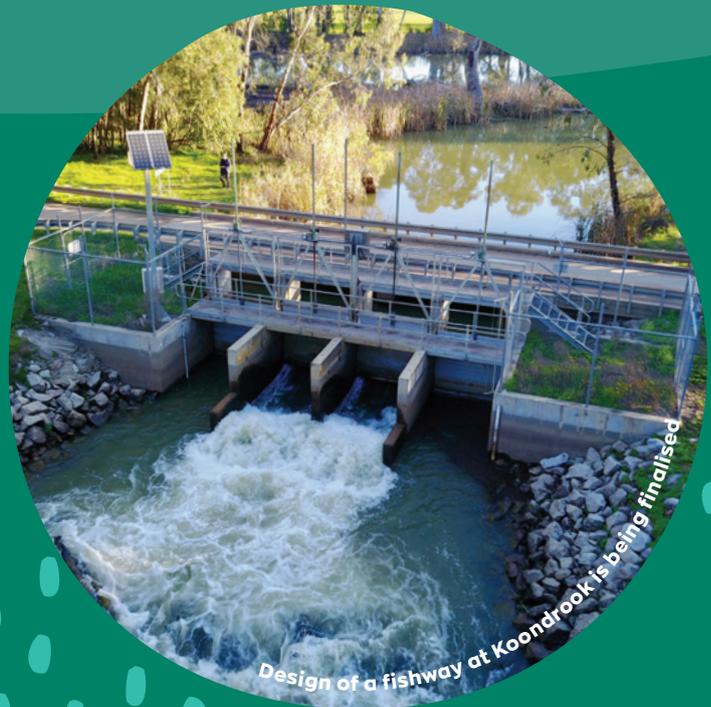
Peter Rose, Project Manager NRRFP



Acknowledgments

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We also acknowledge the tireless effort from our dedicated Citizen Scientists, 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**

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Or follow us on:   



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