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 $222 million Water for Victoria investment over the next four years to improve catchment and waterway health across regional Victoria.

The results

The results in this report indicate Birch's Creek is showing some improvements through increased diversity and a rise in pollution sensitive macroinvertebrate (waterbug) scores, however, there is still much to be done. The Birch's Creek Priority Waterways Project has one more year of funding to continue to deliver riparian works to improve ecological condition of the Creek.

Citizen scientists continue to play an important role in monitoring Birch's Creek. 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.

Acknowledgments

The Birch's Creek Priority Waterways Project along with Waterwatch 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, Peter Rose and Lang Dowdell; John Gooderham, The Waterbug Company; Michelle Mathews, Waterwatch Volunteer and Steph Carter, Waterwatch Volunteer and student at Bendigo TAFE.

Michelle and Lang

Birch's Creek @ Daylesford Clunes Road

How to get involved

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

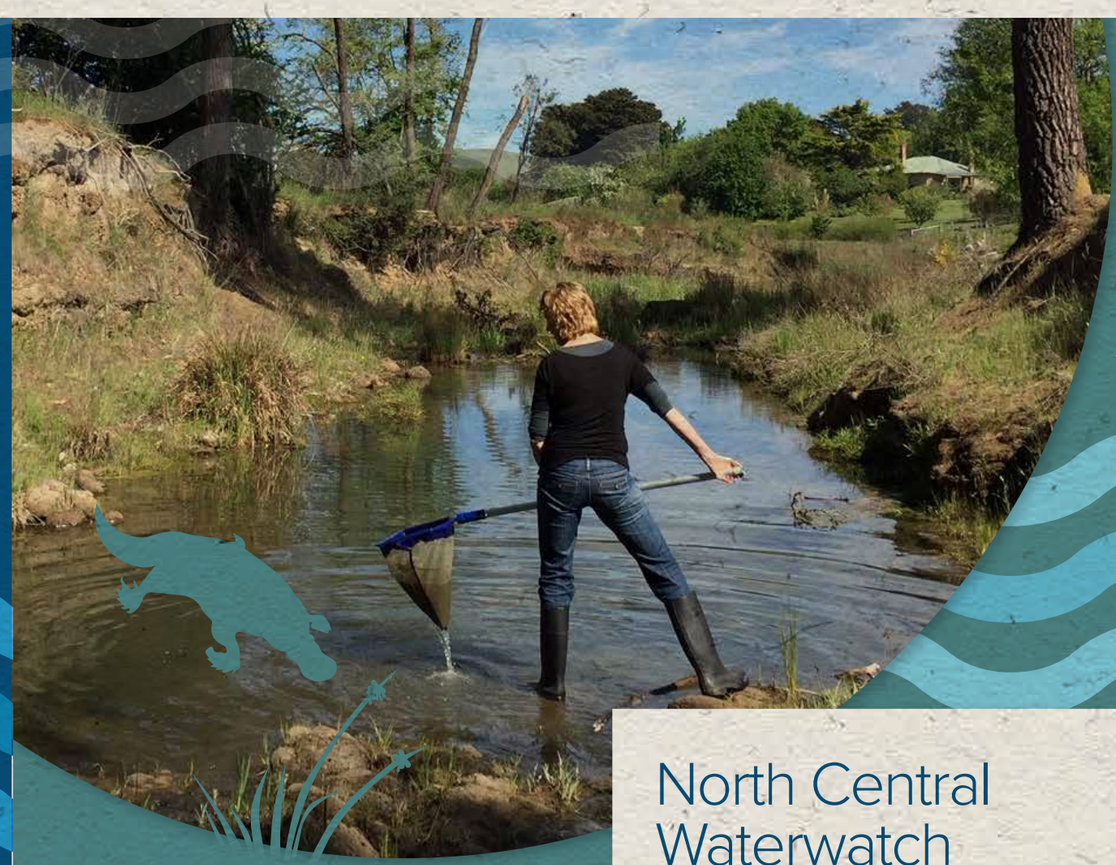
Via post: **PO Box 18, Huntly VIC 3551**

Phone: **03 5448 7124**

Main Office: **628–634 Midland Hwy Huntly Victoria 3551**

Email: **info@nccma.vic.gov.au**

Or follow us on:



Newlyn Reservoir 2018

North Central Waterwatch **Birch's Creek River Health Snapshot Report 2018**

North Central Waterwatch is continuing to partner with the Birch's Creek Priority Waterways project and citizen scientists to monitor the health Birch's Creek

In 2017, North Central Waterwatch and the Birch's Creek Priority Waterways project teamed up with citizen scientists to monitor four sites within the Birch's Creek project area to understand the health of the Creek.

In 2018, our committed citizen scientists undertook monthly water quality testing at two of the four sites, and in Spring helped us to collect, identify and assess macroinvertebrate samples from four sites.

During the past 12 months, our Birch's Creek Priority Waterways project continued to deliver activities to improve the condition of the creek.

Works to date include:
30 hectares of woody weed control
1.5 km of fences installed
26 hectares of native plant revegetation
4 off-stream watering troughs installed
24 people engaged through a Landcare field trip, and
33 people engaged at the Andersons Mill Festival

Citizen scientists will continue to play an important role in monitoring changes in the ecological health of Birch's Creek as a result of the environmental works undertaken through the Birch's Creek Priority Waterways project. This monitoring includes monthly water quality testing to understand pH levels, electrical conductivity, reactive phosphorus, turbidity, dissolved oxygen levels and annual macroinvertebrate surveys.

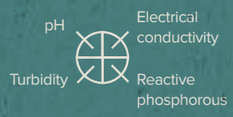
Acknowledgement of Country

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.

Water Quality Colour Coding

Sites have been colour coded and interpreted as follows:

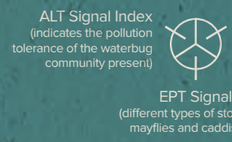
- **Good:** Water quality is acceptable and has minimal impacts on aquatic ecosystem health.
- **Moderate:** Water quality and aquatic ecosystem health are moderately impacted.
- **Poor:** Water quality and aquatic ecosystem health are largely impacted.



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.



Clunes

Birch's Creek @ Daylesford Clunes Road

Birch's Creek at Daylesford, Clunes Road, is generally in moderate ecological condition. Taxa Richness and ALT Signal Index scores indicate moderate condition, PET (Plecoptera, Ephemeroptera, Tricopte, the number of different types of sensitive waterbugs) has improved from moderate to good condition. Historically water quality results have been in moderate health. No water quality data was collected for this site during the reporting period.

Why? This site is surrounded by agricultural land and subsequently, salinity has a history of being reported as high. Macroinvertebrate communities are made up of sensitive species that appear to be thriving, this may be a result of the removal of willows and hawthorn, non-native plants that drop leaves into the water during autumn and as a result cause large fluctuation in water temperature, sunlight penetration, chemical composition and stream bed composition. The successful establishment of native riparian vegetation means the stream is no-longer impacted by these fluctuations and appears the system is making positive changes towards a more natural system.

Taxa richness	EPT Signal	ALT Signal Index	Electrical conductivity (µS/cm)	pH	Turbidity (NTU)	Reactive Phosphorus (mg/L)
20	7.0 ↑	4.0	ND	ND	ND	ND

Birch's Creek @ Daylesford Clunes Road

Birch's Creek @ Anderson's Mill

Birch's Creek @ Andersons Mill

The results for this site identified water quality is consistently in good condition since the removal of willows. We are seeing an improvement in pH levels. In some sections, submerged aquatic vegetation is returning and thriving. Macroinvertebrate communities are stable with ALT Signal and PET Index scores indicate moderate condition, while taxa richness was poor, reflecting no changes since 2017.

Why? It is anticipated that ecosystem health recovery in Birch's Creek will be slow. The results for this site reflect a recovering system impacted by willows, hawthorn, blackberry and other woody weeds that were removed in late 2017. Native plants such as blackwood and silver wattle were planted to protect stream-bank are thriving. Prior to these works, this section of Birch's Creek suffered from long periods of low sunlight and cool water temperatures. Now, with the site exposed to regular sunlight, aquatic vegetation is thriving creating a variety of instream habitats including vegetation, riffles and deep pools.

Taxa richness	EPT signal	ALT Signal Index	Electrical conductivity (µS/cm)	pH	Turbidity (NTU)	Reactive Phosphorus (mg/L)
14	4.0	3.8	358	8 ↑	9	0

Birch's Creek @ Newlyn Reservoir

Birch's Creek @ Newlyn Reservoir

The results for this site have identified macroinvertebrate communities are improving, the ALT Signal Index score meets the ecological objective, while PET has improved from poor to moderate. Taxa Richness is close to meeting the ALT objectives for a healthy ecosystem. There was no water quality data collected from this site during the reporting period.

Why? This section is immediately downstream of Newlyn Reservoir where willows have been removed in 2010 and 2016. Revegetation at this site include a variety of native riparian species. Results since 2016 show changes in water temperature, sunlight and stream bed composition have had an impact on macroinvertebrate communities. However, we are seeing a slight improvement and anticipate these results will continue to improve over time.

Taxa richness	EPT signal	ALT Signal Index	Electrical conductivity (µS/cm)	pH	Turbidity (NTU)	Reactive Phosphorus (mg/L)
16	6.0 ↑	4.3 ↑	ND	ND	ND	ND

Kingston

Newlyn North

Birch's Creek @ Werona-Kingston Road

The results for this site have identified water quality is consistently in good condition since the removal of willows. Macroinvertebrate communities are stable with no change in Taxa Richness and PET Index scores indicating it is close to meeting the ALT objectives. The ALT Signal Index score has decreased from moderate to poor and may be due the monitoring site being moved (for better accessibility) slightly upstream to a site where there has been no current works.

Why? This section of Birch's Creek has not had any woody-weed removal. It is overgrown with willow and blackberry. The pools in the stream are deep and full of large woody habitat. The site is frequently impacted by rubbish and there have been a number of dead sheep observed at the site. Although it borders agricultural land, water results are consistent.

Taxa richness	EPT signal	ALT Signal Index	Electrical conductivity (µS/cm)	pH	Turbidity (NTU)	Reactive Phosphorus (mg/L)
15	4.0	3.6 ↓	292	7.5	9	0.005

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 (upper)	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

Interpreting results

The results in this report are based on the analysis of macroinvertebrate monitoring data collected in spring 2018.

The report provides a baseline assessment of the current condition Birch's Creek using 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, the catchments lie within the Cleared Hills Bioregion.

Four water quality parameters were measured at each site during this time; pH, electrical conductivity, reactive phosphorus and turbidity. And 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 are calculated based on information known for the area, as if it was in the best available condition for that region