River Detectives Story of Change

RedGum Waldorf School of Central Victoria, North Central CMA region, 2025

River Detectives is a cross-curricular citizen-science program connecting teachers and young people with their local waterway. Students learn about the importance of catchment health and their role in caring for it through water-quality testing, macroinvertebrate sampling, and habitat surveys.

The program is available to schools and youth groups in five regions across Victoria.

Kyle Murphy is the site manager at the Muckleford school, formerly the Castlemaine Steiner School and Kindergarten. Established in 1988, the K-8 campus bridging Bassett's Creek and featuring a tributary was purchased in 1995 as 18 acres of flat grazing land in the Loddon River catchment.

The transformation of the land has been miraculous, thanks to designs from permaculture expert David Holmgren, sound bio-dynamic methods, and generous input from parents and friends.

About 160 students enjoy the school's Waldorf educational philosophy that developed out of Rudolf Steiner's work. Students engage in a strong academic program that builds deep understanding, critical thinking, and confidence. Art, music, hands-on projects, and practical work are central to the curriculum – helping children learn in ways that are meaningful and connected. Nature is an essential part of students' learning, grounding them in place and supporting their wellbeing.

RedGum (one of the three original trees on this site) reflects the school's pedagogy with its deep roots and broad horizons with students taught according to developmental stages, not ages or grade levels, to prepare them for the big things they will go on to do in the wider world.

Kyle loves his role as site manager. Starting out as a chef and retraining in Conservation and Land Management then going on to work in landscaping, he enjoys the dynamic role which may see him maintaining the buildings and grounds one day, attending to IT and OHS issues the next, while writing grants and supporting teachers with classroom projects in between.

The school has been involved in the River Detectives program for many years. Previous staff member Lisa Hall was the original driver of the program as a passionate advocate for embedding sustainability concepts across the school and making learning meaningful by using the natural elements on site and connecting with like-minded local groups and businesses.

Kyle explains: *"Having a waterway and wetlands area onsite and being in a bush setting, we place high value on the River Detectives program. We spend a lot of time in and around the waterways and use them in many aspects of learning."*

A tributary of Bassett's Creek runs through the site, and the school has developed Bush Food Island within the dam on the waterway. The treasured rehabilitation space and learning resource is used for all sorts of classes, including maths and literacy. Katherine Freeman, the school's Horticulture and Sustainability teacher, spends regular time at the island with students from all year levels, conducting water-quality monitoring and waterbug sampling.

Waterbug sampling at the dam around Bush Food Island

River Detectives citizen science also occurs at the school's wetland system. All water from the site is captured and enters a system of three linked effluent ponds. Nutrients are controlled with native cumbungi harvested annually. On the rare occasion overflow occurs, water terminates in another dam (commonly referred to as the Wetland's Dam) to provide a buffer and ensure the creek is not impacted.

Effluent ponds one and two

Effluent pond three

Wetland's Dam at the end of the pond system

The improving health of water from one pond to the next is regularly proven through water-quality testing, with decreasing turbidity and phosphorus levels in each successive water body.

When Kyle joined the staff, the River Detectives program was of particular interest. He has reaped the benefits of Lisa's foundational work and, together with other key staff and self-driven students, has taken it from strength to strength.

"I love aquatic ecosystems. I am really curious about how they work and what they can achieve. I enjoy trialing new initiatives and seeing how much the children love being involved."

The school has implemented some incredible projects in the past three years, demonstrating the infinite potential of the River Detectives program to serve as a springboard for knowledge-based local action.

This potential has been increased by natural integration with the ResourceSmart Schools (RSS) program. Staff member Terry Willis reinvigorated the school's long-term involvement several years ago, ensuring the school's wide variety of sustainability actions are documented on the RSS portal to tick off actions in each module. River Detectives has helped the school achieve actions in the water and biodiversity modules and they are due to receive their RSS five-star accreditation in 2026.

The students initiated the first initiative themselves while returning from the 2023 ResourceSmart Awards where the school won Campus infrastructure and Operations School of the Year.

"On the trip home, the small group of student representatives were so inspired by everything they'd experienced that day that they decided to form a club. A core group of enthusiastic students lead this, coming up with a name (Eco Club), recruiting other students by conducting interviews, and organising meetings with agendas circulated and minutes taken.

RedGum's 2023 ResourceSmart Schools award

Eco Club continues today with students from classes 4-8 willingly giving up their Tuesday breaks to be involved. The office bearers have their meeting at recess and all members get together at lunch time to work on practical projects.

"Terry provides support when needed but it's pretty self-directed. The club built a bird hide with recycled materials (named Bloom's Bird Hide in honour of Tavish Bloom, an original member). This has doubled as a clubhouse and helped the club start compiling a bird list that has grown from limited species on the barren site of 1995 to 130 birds today, including the migratory wetland species Latham's snipe.

Eco Club enjoying Bloom's Birdhide

Nestboxes ready for installation

"The club has made nestboxes and used some of their RSS award money to buy motion sensing cameras that have recorded sugar gliders and phascogales using their boxes."

Eco Club went on to win the Student Action Team of the Year (Primary) at the 2024 ResourceSmart Awards.

RedGum's 2024 ResourceSmart Schools award

To capitalise on this passion and momentum, Kyle successfully applied for a Junior Landcare grant to turn the wetlands into a duck refuge. The school has had biodiversity talks, incursions and visits from Dja Dja Wurrung elders to share stories and teach weaving techniques. They've installed wetland bird boxes to attract threatened duck species and have been busy adding aquatic vegetation that the ducks will feed on and use for nesting material. Again, their River Detectives monitoring will track the impact this vegetation makes on water quality and waterbug diversity.

Students learning from local indigenous artist and parent Arkeria Armstrong

Aquatic species to revegetate the wetlands

Using the broader River Detectives network, Kyle also contacted North Central CMA's fish ecologist Dr Peter Rose about the possibility of using their wetland system to stock native fish.

Peter has established a highly successful program using healthy local wetlands as surrogate sites to breed endangered, small-bodied, wetland-specialist fish such as the southern pygmy perch and southern purple-spotted gudgeon. Peter set traps and conducted surveys of the two dams on site, finding long-necked turtles and yabbies in both. Surprisingly, the dam at Bush Food Island had flat-headed gudgeon, lots of bugs, and no pest species. The Wetland's Dam did have a population of non-native gambusia, a small fish commonly known as mosquito fish. Suitability of the school's wetlands for fish relocation spurred further rehabilitation work.

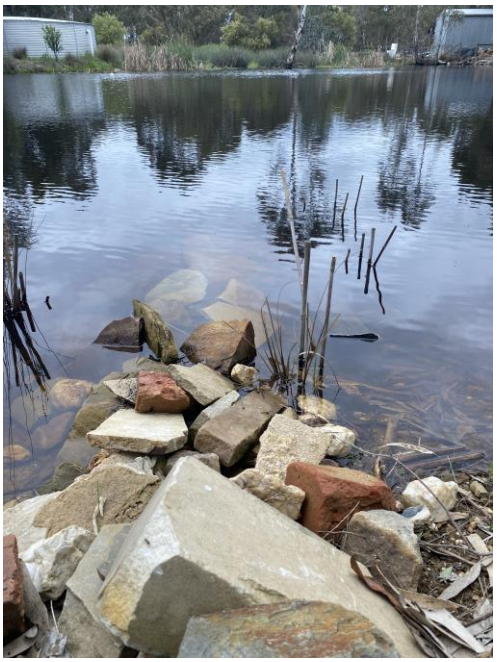
Getting ready to set the nets with Dr Peter Rose

Assessing the yabbies and long-necked turtles found

"To prepare for the fish, students added in-stream structure such as logs and sticks in 2025, then planted aquatic vegetation in an and around it all. They've added swathes of flat rocks from the bank right down into the water. Fish lay their eggs on flat surfaces so they will hopefully become egg platforms. Students are growing on native plants sourced from Newstead Natives to plant out onto floating vegetation pontoons that will add further habitat and food for aquatic life small and large and boost the wetlands' filtering capability," Kyle said.

Adding sticks and logs

Planting aquatic vegetation amongst the new structure



Rock swathes that will become egg platforms

Southern purple-spotted gudgeon were released in January 2026. This species, often referred to as zombie fish, were rediscovered in 2019 near Kerang after being declared extinct in Victoria in 1998.

Interestingly, the Wetland's Dam has been chosen despite, indeed due, to the presence of gambusia.
As another great example of networking, Dr Rose connected the school with Charles Sturt University. Gambusia pose a threat to native fish. Not as known predators but as competitors for food.

"Gambusia are prolific breeders, birthing thousands of live babies each year. The university is investigating which species of native fish might increase the stress levels of gambusia and control their numbers. Before the gudgeon are released, Charles Sturt Uni students carried out a baseline survey of fish, macroinvertebrates, microinvertebrates, and water quality. They will do follow-up surveys to see how both the exotic gambusia and threatened native Southern purple-spotted gudgeon are responding," Kyle said.

Southern purple-spotted gudgeon fingerlings ready for release

Charles Sturt University student Tom Dixon conducting a baseline survey (left) and Dr Peter Rose measuring dissolved oxygen levels (right).

Kyle has recently secured another grant from the Mount Alexander Shire Carbon Sequestration Project in an innovative move to prove that healthy wetlands can play a role in sequestering carbon.

"Water bodies are constantly off-gassing, especially when stagnant. The leaf litter breaks down in an anaerobic environment and releases methane and carbon. This can equate to the impact of a small fleet of cars on the road for a year. We have purchased three aerators for dam number two and one of the effluent ponds. We hope this will not only reduce gas emissions but assist the nitrate cycle so that bacteria can break down phosphorus and make it available for the plants. Improved plant health will increase carbon uptake, circle back to more nesting material for the ducks, provide better habitat for waterbugs at the bottom of the food chain, therefore helping all larger species thrive and so the spinoffs, that we will be able to track through River Detectives monitoring, go on."

Speaking of spinoffs, through Dr Rose, Kyle was introduced to Martino of RMIT who fronts a research project to measure the impact of wetland aeration. Funding is still being sought, but the hope is that two Pondi devices will be installed.

"Pondi devices are like upside-down buckets with solar panels on the top and filled with wiring and gadgets to measure the amount of gasses coming off the water. We'd like to place one on the dam with the aerator and the other on the dam without an aerator as the control. Our idea is to collect the data to prove the impact of aeration on carbon sequestration."

A Blue Carbon Lab Pondi device

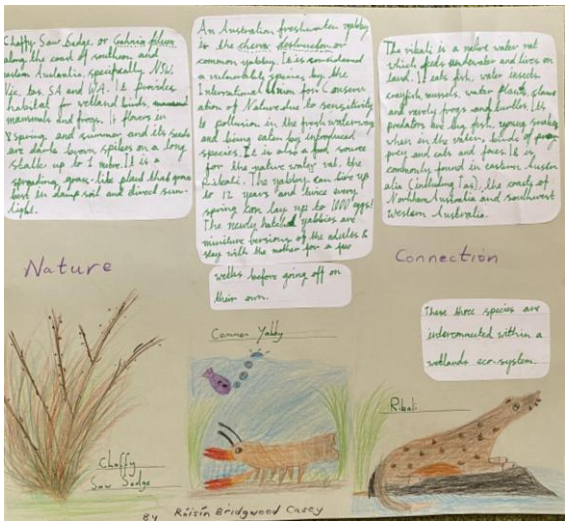
The River Detectives program has played a vital role in RedGum's journey, providing the foundation and keeping the momentum going.

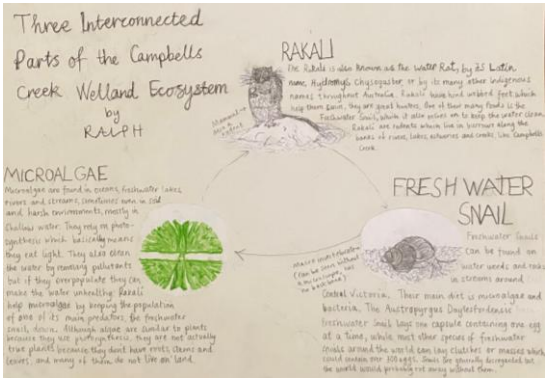
"The confidence staff get through River Detectives workshops and the incursions we can access are triggers for further investigations, with the ongoing monitoring tying everything together. We have been able to link with experts and other organisations for inspiration, learning, and help. Our wetland projects are great examples of real science backed by credible research for our students to feel proud of the difference they can make. What better story than the zombie fish to give children hope about the future," Kyle said.

Sampling waterbugs during school camp at Cockatoo Lagoon as a comparison to school wetlands' data.

The school has supplemented the water-quality kit provided by the River Detectives program with extra fundraised equipment, including waterbug sampling resources, so classes across all year levels can enjoy River Detectives whenever they like, either with Katherine during Horticulture and Sustainability sessions, with Kate who has started a Bush Kinder program, or by the kids themselves during their Eco Club time. River Detectives activities were even part of a recent canoe camp at Cockatoo Lagoon in the Gunbower Forest.

Students in class 5 concluded 2025 with a research project presenting information about three chosen flora or fauna species. They learnt about aquatic botany and taxonomy, integrating learning with the River Detectives program.





River DETECTIVES
connecting young people to nature

School budgets are limited and curriculums are crowded so in the beginning there was pressure for staff at the school to quantify the value a program such as River Detectives could provide. As the years have gone on and RedGum has maintained its commitment to the program, with inquiry projects naturally evolving, it has now turned into a huge part of the school.

"River Detectives is now embedded in our school and is making a difference. Eco Club has grown in popularity beyond the greenest of students to become more mainstream. We share stories of our River Detectives work on the school's facebook page and projects have made an undeniable change to the environmental health and physical appearance of the school. This not only looks good but is a highly valued learning tool."

Eco Club members construct bee hotel during their lunchtime (left) and the bee hotels in place beside one of the school wetlands (right).

"River Detectives forms the basis of ongoing investigations and has become the reason behind many of our restoration goals. In future we'd like to connect better with other River Detectives schools, neighbouring Landcare Groups and landholders and use our wetlands as flagship demonstration sites to educate about the benefits of enhancing dams for people health, stock health, biodiversity health and planet health. We'd love our students to lead tours with visitors.

"We'd also love to do more restoration work to Bassett Creek which is quite eroded and make it, along with our wetlands, an outdoor community education resource," Kyle said.

Students proving their capability to become wetland tour guides

The school hopes real-life nature-based learning will stay with students throughout their lives and make an impact, whether it be small or large. For Tavish Bloom, a foundational member of the Eco Club, it has made a big impact. In 2024, Tavish won the Victorian Woolworths Junior Landcare Award and was crowned the 2025 Junior Landcarer at the National Awards.

For more information about River Detectives:

Email riverdetectives@nccma.vic.gov.au or visit www.riverdetectives.net.au