River Detectives Story of Change

RedGum Waldorf School of Central Victoria, 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.

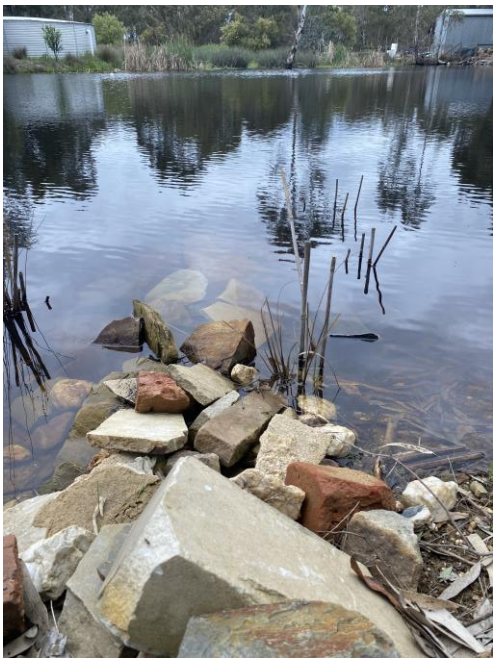
Getting ready to set the nets with Dr Peter Rose

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

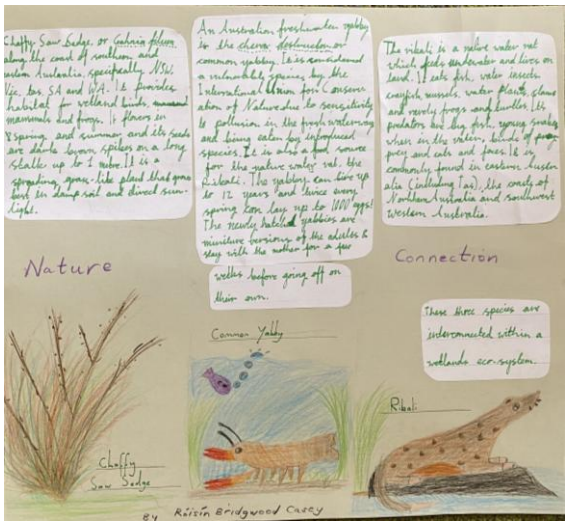
The River Detectives program has played a vital role in RedGum's journey, providing the foundation and keeping the momentum going.

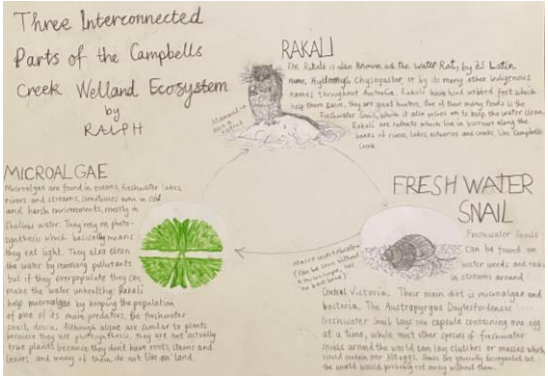
"The confidence staff get through River Detectives workshops and the incursions we can access are triggers for further investigations, with the ongoing monitoring tying everything together. We have been able to link with experts and other organisations for inspiration, learning, and help. Our wetland 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.





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

River Detectives Story of Change

Victory Christian College, 2024

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

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

Ro Rimmer is the senior sub-school (Years 9-12) Environmental Science educator at Victory Christian College, a large P-12 school of over 800 students in suburban Bendigo. It is an independent Christian school backing onto the Greater Bendigo National Park.

The school joined the River Detectives program in 2022 when it caught the attention of Ro who had worked as a Park Ranger beforehand. She has found it extremely rewarding to change careers but continue to utilise natural resource management skills, experience and networks through her teaching.

Ro has enjoyed the flexibility of both the environmental science curriculum and the River Detectives program. Add to this Ro's drive to make learning real and practical for students and you have a wonderful example of community-based environmental education that has made the most of natural and human assets in the local area.

Environmental Science students assist members of the Bendigo Field Naturalists Club to monitor next boxes that have been installed in the National Park behind the school, but Ro had dreams for more.

"I joined River Detectives in 2022 as I had to redesign the Environmental Science course for Year 9/10 students. Previously, Environmental Science was just a small unit in the Year 9 Science curriculum but the school had made a commitment to offer it as a VCE pathway subject for Year 9/10 students for the first time. I could see that the upcoming cohort was really into fishing so I modified the course to tailor it to their interests. River Detectives was a way to wrap additional learning around that passion."

The first term of the Year 9/10 Environmental Science course is Healthy Waterways so Ro starts with the 'hook' of taking the class fishing. She builds in a visit to the barramundi farm in Werribee and then uses River Detectives activities to explore water health concepts with water quality testing and macroinvertebrate sampling.

Water quality testing and macroinvertebrate sampling at Kennington Reservoir.

Fishing excursion

The school's adopted site is Kennington Reservoir, a water retention basin two kilometres from the school that was constructed in 1861 to provide a reliable water source for gold mining activities. Today it is a valuable piece of community public space, popular for bushwalking, fishing, picnicking and fitness activities. The surrounding reserve is known for its wildlife, indigenous vegetation and walking tracks.

The River Detectives program also plays a role in the VCE Environmental Science program with Year 11/12.

"One of the units is monitoring change over time so water quality testing has been a perfect fit for that – really practical and engaging. Another part of the course looks at biological indicators, so macroinvertebrate sampling brings that learning to life."

During 2024, the City of Greater Bendigo commenced dam wall repair work to address structural concerns and ensure the dam remained safe and accessible to the public in future.

While these engineering works required the reservoir to be slowly drained, thanks to funding from the Victorian Fisheries Authority, Council could take advantage of this rare opportunity to also improve environmental and recreational fishing conditions in the reservoir by:

- Deepening parts of the reservoir to create pools and channels
- Using removed timber and root mass to improve fish, frog and turtle habitat
- Planting aquatic vegetation to improve water quality, food and nesting resources
- Restocking the reservoir with a more diverse suite of fish species, including some native baitfish

This project aims to provide better wildlife habitat, better fishing opportunities, fewer algal blooms and improve the look and quality of Kennington Reservoir. Despite being challenged by the disruption initially, Ro seized the opportunity to get involved and use citizen-science activities to measure change throughout the process.

"I invited two City of Greater Bendigo staff; Mark Hall (Senior Biodiversity Officer) and Lu-Wei Spinks (Biodiversity Engagement Officer) to the school to talk to students about the project. They involved our students by asking them to prepare 110 trays packed with native aquatic species to create 'sods' that we are now caring for before they are placed in the shallows of the reservoir when works are complete and water is returned."

Council staff visit the classroom

Students prepare trays of aquatic plants

Ro uses an aquaponics garden in the environmental science course. Students grow plants during the first semester then they compare growth rates to plants grown traditionally in the vegetable garden. Having the aquatic plants to care for has seen the aquaponics garden continue throughout the year with the project extending to the Community Service classes and Duke of Edinburgh classes who are helping to weed and water the trays.

Another spinoff has been the delivery of 160 native fish fingerlings for the school to raise in their aquaponics tank. The fish are fed and tanks maintained by students and the fish will be stocked in Kennington Reservoir when dam wall works are complete.

"Monitoring had to cease during works as low water levels saw students getting well and truly bogged in the sticky mud but this River Detectives-related project has enabled students to monitor the health of this valued local waterway, take an important role in raising native plants and animals that will be returned to the enhanced reservoir, then continue to monitor change into the future."

Dam enhancement works provided another interesting opportunity for inquiry-based learning that Ro initiated. When water levels were dropped, she asked council if salvaged fish species could be provided to the school. Tench, Redfin and Carp species were secured and frozen immediately at Victory Christian College.

In fourth term, as Year 11 students studied Pollution and Food Security units, they investigated 'how scientific endeavours contribute to minimizing human impacts on Earth's systems'. North Central CMA River Detectives coordinator, Nicole Howie, delivered an incursion about micro-plastics; what they are, how they can enter streams through the urban stormwater system, their impacts on waterways, aquatic life and even humans and then looking at some innovative strategies to reduce impacts.

River Detectives staff explore concepts with a giant stormwater floor puzzle.

The following week, students dissected the frozen fish, analysing their stomach and digestive tracts for microplastics.

"Even with very simple technology, microplastics were found in one third of the fish. However, they were only found in the Tench species, with half of those dissected having microplastics present. We would love to conduct more dissections on the remaining fish as we hypothesise that it may be the bottom-feeding fish species (Tench and Carp) that will be more likely to contain microplastics."

Year 11 students dissect fish salvaged from Kennington Reservoir to search for microplastics.

As these students proceed into Year 12 Environmental Science studies in 2025, they will continue to be involved in the Kennington Reservoir project. They will produce a scientific poster to show their learnings and it is hoped they will see the fish restocked and be involved in planting out the sods of aquatic plants.

River Detectives has provided opportunities for outdoor learning which is vital when engaging students that choose Environmental Science who are naturally more 'outdoorsy'.

"Being able to teach the scientific skills whilst in the field and make it relevant to their learning has helped learning outcomes. If talking about turbidity for example, students can see the difference between a turbid and less turbid sample in the turbidity tube. This starts to make sense to them as they connect the relationship with aquatic plants that will have trouble photosynthesizing in turbid water.

Projects such as ours at Kennington Reservoir mean that concepts are not just theoretical. They are practical, important and useful to others beyond themselves. It's nice for students to feel as though they are giving back to the scientific community through their studies."

Ro concedes crowded curriculums and time constraints can make it difficult to get out and about but when the effort is made it is well worth it. Adding practical opportunities and experiences to course work and using real world applications has added so much value to the students' engagement, learning and passion to continue studying Environmental Science.

"Sometimes students come to class feeling frazzled or overwhelmed but then we go out on an excursion and they're smiling. I love the 'aha' moments that can occur in the field. I may have been trying to relay a concept in class or with a text book but then you take students out in the field and they get it. And then I hear the language I've been using coming through in student conversations.

Outdoor learning at Kennington Reservoir in action.

The River Detectives program really lends itself to secondary science. In the past there has been a low uptake of Environmental Science at VCE level at many schools. This is often because the subject is not offered to Year 9 and 10's and they are unable to get a taste of the subject. River Detectives, along with other like-minded programs, makes Environmental Science at year 9/10 level doable and practical.

2025 will be the first year that Environmental Science is offered right through from year 9-12 at Victory Christian College. This is an important change for the school and is directly related to the pathway program that introduced Environmental Science to Year 9 students back in 2022.

Always thinking, Ro has big plans for the future. She'd like to:

- Involve year 9/10 students in stormwater pit stencilling to raise community awareness.
- Have media students join excursions to document learnings at Kennington Reservoir.
- Grow awareness of the River Detectives program across the school to embed it in other areas.
- Develop an augmented reality sandbox with a model of the local catchment so students can see how water moves across the landscape from Victory Christian College.

For more information about River Detectives:

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

River Detectives Story of Change

Daylesford Dharma School, 2023

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

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

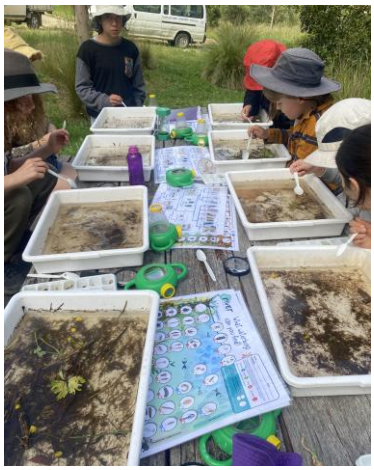
Tanya Wiggins is the Learning Manager at Daylesford Dharma School, a small primary school of 34 students near Daylesford in Central Victoria. The school is non-denominational, welcoming all students, but is unique in its Buddhist philosophical approach to teaching and learning with two key principles; interdependence and universal responsibility.

Creek bed developed within the school grounds.

The school aims to foster a strong understanding of how students are connected to the web of life and their responsibility of non-harm to that web. They have been involved in River Detectives since 2014. Tanya explains that when she heard about the program she could see the benefits straight away;

"We were going to Tipperary Springs regularly to learn about habitat, flora, fauna, and water bugs so I saw the program as a great opportunity for students to build that element of universal responsibility. Citizen-science gives them a great chance to contribute their observations while learning amazing skills which sit so beautifully within the Science and Humanities curriculum. It also allows students to explore the chemical science aspect which schools can find a little more difficult to cover."

The school's decade-long River Detectives journey revolves around their adopted site on Smiths Creek in Daylesford's Cornish Hill Reserve where Grade Three to Six students have been involved. Junior students look forward to being a senior student, with River Detectives a highly anticipated rite of passage.
Small class sizes and mini busses owned by the school means teachers can connect with their community regularly. On a whim, teachers can take their class to Smiths Creek and see first-hand what they are learning about. This means the learning is rich, meaningful, and can be continued back in the classroom.



Students enjoy a River Detectives excursion at Smiths Creek.

Cornish Hill Reserve, an 1850s goldmining zone, is being rehabilitated by the Friends of Cornish Hill. Former staff member Emily Wilden has developed a close relationship with the Friends of Cornish Hill Landcare Group and, in particular, group member Margie Thomas.

"The school has been involved in many initiatives and events with the Landcare Group over the years from Kids Teaching Kids events to cultural and environmental school field days with neighbouring schools. Parents are invited to come along and see the children's learning in action with families visiting the reserve on weekends and holidays to see how the site is healing and changing."

Dharma students teaching their peers.

At the Dharma School, immersion in subject matter leads to interests that children have autonomy to follow.

"*After a Landcare field day about frogs, the children kept talking about frogs, so staff harnessed this interest. Students from P-6 looked at frog distribution maps, identified the frogs of Cornish Hill, researched them, and created signs that were placed throughout the reserve."*

In 2022, teacher Mandy DeLacy and students refurbished the signs.

"If we're interacting with a space then we have responsibilities to that space to ensure it is looked after. River Detectives has created a real care of Cornish Hill by students."

Frog signs made by Daylesford Dharma School students

Students are currently propagating plants for revegetation in 2024 that will involve designing and making signage from recycled timber.

Daylesford Dharma School is committed to nature-based, environmental learning but Tanya explains the key impact of River Detectives;

"River Detectives keeps the momentum up. There is so much curriculum to consider in schools, but River Detectives keeps environmental learning front and centre in staff and children's minds throughout the year and over the years. Bush School has been another spinoff. We run Bush School at three sites; Cornish Hill, Tipperary Springs, and Merin Merin Swamp near Clunes. Students spend the bulk of their learning day on a Monday during terms two and three at one of the three sites focusing on experiential learning."

Tanya shares other benefits the program has had on students, staff, and the school community;

"For students, River Detectives is powerful as a multi-generational program. Older students mentor younger students and students relate skills with the science and biology they engage in at high school.

For staff, the River Detectives program gives us confidence to really think about how we want learning to look and the equipment, training, and support to make it happen. It has given our environmental curriculum form.

When we do lots of excursions around the community, there can at times be questions about whether this is time well spent for educational outcomes. The River Detectives program has helped us communicate the wonderful science learning that is happening when we visit environmental sites. The learning then flows back into our literacy and numeracy programs with the application of meaningful data we have collected,"

In 2023, Daylesford Dharma School received a Regional Recognition Award by the North Central CMA highlighting the contribution they've made to the goals of the Regional Catchment Strategy.

Proud recipients of the award for their commitment to River Detectives, their partnership with Landcare and on-ground achievements at both Cornish Hill and at their school site

From a curriculum development perspective, Tanya's highlight is the power of ongoing data collection that provides meaningful information across the seasons and years for use by students;

River Detectives has been embedded into many other curriculum areas. Rather than using arbitrary data, water quality results have been used in graphing activities in Maths."

Tanya is confident the school will be involved in the River Detectives program for years to come with Junior Landcare grant funding enabling another exciting project for 2024. Colleague, Rachel Taylor explains;

"For this project, aligned with our Compassionate Citizenship program, we plan to build nature observation boxes with the local Men's Shed and place them along tracks in the Cornish Hill Reserve. They will house journals and observational tools for people to record what they notice over different times of the year.

"The hope is these installations create greater community connection to the reserve and more awareness of the biodiversity in the waterway. Ultimately, the project will see the students use the data they gather from the observation boxes, and knowledge they glean from the excursions, to run another Kids Teaching Kids Day. Stepping up into the role of community educators, our students will run workshops about biodiversity."

For more information about River Detectives:

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

Photos provided by Nicole Howie and Tanya Wiggins

River Detectives Story of Change

Bridgewater Primary School, 2022

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

Since 2016, the program has been available to school and youth groups in five regions across Victoria.

In the North Central CMA region Chris Guinane is a teacher at Bridgewater Primary School, a small school of seven students half an hour west of Bendigo, set within a farming community on the Loddon River where the River Detectives program has been implemented over many years. Recently it has become the focal part of an innovative outdoor classroom program.

When Chris arrived at the school two years ago student numbers were dwindling. Chris and the principal at the time, Julie Ladd, realised there were local children living in close proximity to the school travelling straight past to attend other schools in nearby towns. School staff were keen to understand why.

Chris explains that they canvassed the entire Bridgewater community in 2021 to gauge perceptions and came up with a plan;

"*A common theme was the need for the school to be visible in the community. We needed a way to re-engage with the community and offer a point of difference to schools attracting our local children. Given our location and proximity to the river we thought we could experiment with an outdoor learning model and make that the new 'DNA' of our school. Our goal was to create passionate students learning about their own backyard - to create a culture of sustainability and produce students who are environmentally literate so they might become custodians in their future personal or work lives and make valuable contributions to society.*"

With Chris's outdoor education background, Julie's drive and the unwavering support of parents who could sense the excitement their kids felt at the prospect of learning outdoors, the outdoor classroom program was born. The school's involvement in River Detectives provided the foundation and it was up to the staff, students, families and community to shape the program.

Chris outlines how the program has evolved;

"We started implementing the outdoor classroom late 2021. Every second Wednesday we take all the students, along with a trolley loaded with everything we need, down to the Loddon River. For the first session we do our river science. We visit various positions along the river each fortnight gathering a broad spectrum of data, collecting a waterbug sample and doing a habitat survey. Students analyse the results and discuss what they mean. The students are at a point now where they have done it so often and feel so confident they could run the session themselves. They're still as excited about it now as the first time they did it which is a delight to see.

For the rest of the day we integrate our regular curriculum – literacy and numeracy – into the outdoors. The River Detective program support us with great resources and the Outdoors Victoria's outdoor learning toolkits provide hands on ideas and resources linked to the Victorian Curriculum. They are adaptable to cater for our ranges of ages, abilities and learning needs.

In literacy, students use their writer's notebooks to complete visual literacy tasks where they record and describe the things they can see, hear, smell, feel around them. In numeracy students work with waterbug data."

On alternate Wednesdays learning is completed outdoors on school grounds utilising the great facilities, gardens, chooks and avoiding technology as much as possible.

"The students lead work in the vegie garden seasonally; planning what will be planted next, calling suppliers, purchasing, planting and weeding. We use this produce in our kitchen to cook on Wednesday afternoons, having lunch together using produce we've grown. The kids cook and clean. We also have a waste management system with scraps being shared between the chooks, compost and worm farm.

Students identify the native plants on our grounds, care for them and observe what fauna is using them. These experiences form the basis for inquiry projects on flora and fauna around the school. We've just started sinking our teeth into learning about pollinators and plan to make a bee hotel. This has been a real eye opener for us all and is changing perspectives about the insects we encounter and creating more respect."

Bridgewater relies on the Loddon River for tourism, sport, recreation and farming. Sharing their outdoor learning with the wider community in an important goal of the program;

"We have a public Bridgewater Primary School facebook page with nearly 200 followers and regularly post photos and summaries of what we are doing. We also share to the broader Bridgewater on Loddon community facebook page. In future we'd like to share our data with the community to upskill others about what our river is telling us and what the possible threats and opportunities are.

We hope that by sharing our journey it will attract the attention of others, even experts in entomology for example that may wish to collaborate with our school. We figure that the further we can cast our net, the more chance we'll have of garnering support from people who wish to contribute and deliver incursions / masterclasses or upskill staff so that we can run a program that will produce the best outcome for our students."

The outdoor classroom program has been a tremendous success so far with very positive outcomes for all involved. It was a significant drawcard for new principal, Linda Kingsley;

"The program really brings down those ideas of climate change and global warming to something really tangible for students. Their changing environment is literally on their doorstep and they feel less powerless with these issues. Students can feel overwhelmed by the daily news but our students are thinking more of the good news story and how they can contribute."

For Chris, Wednesdays are his favourite day of the week;

"I spring out of bed on Wednesdays. Rain, hail or shine I know that everything we do on those Wednesdays will be highly engaging, super positive and will make an impact on our students and community. On these days we know the students are ready to learn with no anxiety and it's a treat to be a part of."

Chris and Linda are confident the program enhances learning outcomes for students. Senior students are demonstrating increased vocabulary and fluency in their information writing. Staff are witnessing their students being healthy, happy, active and connected to their local environment;

"The health of our river and the ecosystem is crucial to the wellbeing and daily lives of the people we care about here. The kids initially saw the program as a bit of fun but increasingly they're gaining a very clear picture of how things in their local environment are connected. They are understanding the importance of learning and passing that learning on to others. Students really care about what they're doing, taking pride in the program and the service we're providing to the community and environment."

Students play a large role in suggesting ideas for the program and this is reflected in their enthusiasm, effort and learning;

"I enjoy going down to the river doing learning. We do lots of waterbug testing to see if the water is ok." (Marley)

"We're lucky. Not many other schools get to do this. We are outside instead of being inside and we are learning about the environment. You can learn anything outside – even Maths !" (Isaac)

"When tourists come along the river path they are interested in what we're doing. We do a little session with them and show them the waterbugs we have collected." (Rylea)

"Every school should have an outdoor classroom because it is fun and we learn a lot." (Emily and Amaya)

Parents are learning a lot as conversations happen around the dinner table and the school is getting wonderful feedback from the wider community we interact with whilst at the river as Chris proudly explains;

"There was one occasion when a group of tourists stopped as they were walking past and I stepped back to encourage the kids to lead the conversation. The students were really insightful talking about the outdoor classroom. As it turned out the group were all ex-teachers and principals and were blown away by what they saw and heard. They loved seeing the engagement, the passion and how well the kids could articulate the purpose of what they were doing."

Chris and Linda agree they are excited by the way the program could evolve in future. They are determined to find innovative directions to take the program and undertake deeper investigations. In future they'd like to provide PD to other schools looking to begin their own outdoor learning programs. Schools can struggle to know where to begin but Chris's advice is to jump in and do it.

"We were lucky to have two principals who have given us the autonomy to have a crack. For other schools who are feeling averse to the risk or thinking of reasons why they shouldn't do it, just give it a go. The rewards will soon be clear in the way students engage so wholeheartedly with a program like this."

For more information: Email riverdetectives@nccma.vic.gov.au

or visit www.riverdetectives.net.au