

River Detectives Story of Change

Victory Christian College, North Central CMA region, 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."

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."



Outdoor learning at Kennington Reservoir in action.

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

Covenant College, Corangamite CMA region, 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.

Covenant College is a Christian school that caters for students from three year old kindergarten to VCE. They welcome families from diverse cultural and denominational backgrounds, drawing students from Geelong and the surrounding region.

The school has been involved in the River Detectives program since 2020, integrating it into the broader sustainability curriculum that has been successfully delivered by the college in partnership with Batesford Fyansford Stonehaven (BFS) Landcare for over a decade. Their story is a fine example of the way curriculum and learning outcomes can be enhanced through strong collaborative partnerships with community groups.

Now in its fourth year, Covenant College involve their Year 9 students in River Detectives as part of the College's Community Service Program. Students are immersed in the local environment and community action by working closely with BFS Landcare to improve the health of the Moorabool River. This collaboration allows students to make tangible contributions to their local environment while learning valuable skills.

In the past, a huge variety of activities, projects and events have been held including weekly walks, talks and on-ground work in the Moorabool River Reserve. Focusing on the river in the vicinity of Dog Rocks Fauna and Flora Reserve, the students have increased their awareness of the condition of the Moorabool River and the importance of healthy waterways to the environment; and learned about threats to the river system, threatened species and habitat.

Regular water quality monitoring, an integral feature of the River Detectives program, has added a new citizen-science component to the learning of both the students and Landcare members.



Corangamite CMA staff member Deirdre Murphy with Covenant College Year 9 students

The students regularly visit the Dog Rocks Fauna and Flora Reserve with volunteer members of the local landcare group as well as staff from the Corangamite Catchment Management Authority. During these excursions, they collect crucial water quality data, which supports the broader ongoing monitoring of the Moorabool River's condition and its changes over time.

The data collection involves measuring various parameters such as pH, electrical conductivity, air and water temperature, phosphorus levels, and turbidity. Additionally, students perform macro-invertebrate surveys—analysing water bugs to assess biological health indicators of the river.

Vice president of BFS Landcare, David Cliff, explains the value of utilising the River Detectives program in their work with the school.

“As a Landcare group we welcome the opportunity to work with the River Detectives program which we understand to be a worthwhile initiative.

Our hope is to introduce students to the important concept of being responsibly engaged in care for our local waterway environments, with weeding and planting in land reserves. It’s also a great way to be involved ourselves as a Landcare group in monitoring the health of our local waterways.”

By alternating between physical-chemical testing and biological assessments, students gain a comprehensive understanding of the river's health. This dual approach provides insights into both the physical conditions and the ecological state of the waterway, fostering a deeper connection to their local environment.

BFS Landcare secretary, Felicity Spear, enjoys the relationship they share with the school.

“BFS Landcare works with school groups to raise awareness of the value of caring for and protecting the natural environment and its waterways, including our local Moorabool River and its surrounding riparian zone.

With assistance from the Corangamite CMA and local volunteers our school groups from Covenant College regularly monitor water quality and bug biodiversity contributing this data to the bigger picture of river health in the region.

We regard this activity as a valued part of our program, with students having an opportunity to be actively involved in the experience of ‘hands on’ analysis, while developing a greater understanding of the impact of their findings.”



Covenant College students complete water quality testing and macroinvertebrate sampling to assess the health of Moorabool River.



BFS Landcare members with Covenant College Year 9 students

The River Detectives program not only teaches students about water science but also emphasises the importance of environmental stewardship.

It offers a hands-on, engaging way for young people to explore the interconnections between water, land, plants, animals, and their communities.

Through this experiential learning, students develop a greater appreciation for their local waterways and their roles in sustaining them.

For more information about River Detectives:

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

River Detectives Story Of Change

Minyip Kindergarten and Rupanyup Kindergarten,
Wimmera CMA region, 2024



River Detectives is a cross-curricular citizen-science program connecting teachers and young people with their local waterways. 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. Some aspects of the program are suitable for preschool-aged children, with sessions provided to early childhood services when capacity allows.

Christiana Henke is the Early Childhood teacher at two services in the Wimmera CMA region; Rupanyup Kindergarten and Minyip Kindergarten. Both are small services in a grain and livestock farming area. Rupanyup Kindergarten has six children enrolled, aged three, four, and five. Minyip Kindergarten has nine children. Both services are a fundamental part of the small communities of which they belong. They are blessed with nearby reserves and bushland, dams and wetlands. Both programs currently operate from the Minyip building due to the redevelopment of Rupanyup Kinder's playground.

Wimmera CMA River Detectives coordinator Jeanie Clark contacted Christiana in 2024 with an offer of including water experiences in their program. Christiana enjoyed prior experience with the WaterWatch program and knew of the similarities to River Detectives, with possibilities to study living things and access local wetlands for water creatures.



Jeanie suggested waterbug incursions for Term Four, also serving as professional development for Christiana. This topic fitted in with their current learning about nature, in particular insects. The children were very interested in bugs; their number of legs, special features, their habitats and eating habits (with all the gory details of course). They were also learning about the characteristics of different shapes.

Christiana explains, *"The timing for Term Four was very convenient as the children of both services had an intense interest in bugs/insects and this had been a focus of the program at both services for some time. As the wetlands are*

some distance away from the service, it wasn't feasible for us to visit them in person. The River Detectives program provided us with a very accessible and convenient solution."

Jeanie collected water samples from three different in-stream habitats of the Minyip Wetlands and shared them during incursions with the six Rupanyup Kindergarten children on October 18 and with the eight Minyip Kindergarten children on October 22.

Jeanie introduced sessions by showing the children a photo of where she collected the water to familiarise children with the site. She talked about the shapes of the creatures likely to be found to tie this into their recent learning.





Rupanyup Kinder children fishing for waterbugs.

Three trays were set up with water and bug samples from the three different in-stream habitats. The children observed the myriad of life swimming around in the trays then 'fished' for waterbugs using scoops.

Jeanie put the bugs into small petri dishes with lids. Magnifiers were placed on top of the dishes so the children could get a close look at the bugs' bodies. They were challenged to match bugs with the identification photos provided and work out what their names were.

The children were extremely excited and maintained their engagement for an extended period of time.

Each tray varied in water clarity, plant material, and health. Children discovered the channel and deeper water catchment were very active with bugs, but the dam was less active. They learnt that the dam provided less food and camouflage for the bugs to hide from predators.

Christiana received lots of fantastic feedback from children and families.

"Children from both services asked when the water bugs and Jeanie would be back again."

One Rupanyup Kindergarten family regaled how their child recounted all the aspects of waterbugs all weekend and wanted to call grandparents each time they recalled a new detail!

It had a very positive impact on the children, spreading awareness to them and their families of the local environment and the people within their community who are sources of knowledge."

Christiana acknowledges activities such as these develop an awareness of the world and each child's place in it – appreciating all creatures large and small. Children become more aware of their impact on other living things and develop empathy. They begin to realise that although a creature may be very small or hard to see, it is still a creation and requires care and respect.

Christiana enjoyed witnessing the development of interest in the children.

"Children remarked they wanted to see the water bugs in their natural environment. They were also concerned for the bugs' welfare, ensuring they had enough water in viewing dishes to breathe. I assured them Jeanie would return them to their natural environment once the session had concluded. The children closely watched how carefully the bugs were transported."



Rupanyup Kinder children study the features of each bug to identify them.



Minyip Kinder children compare bug shapes.

Educators produced photo pages about the incursions and shared them with the community through the local Community News Sheet and via Yarriambiack Shire Council's website.

Moving forward, Christiana would like to see the services work with the River Detectives program again, ideally over several sessions with an excursion to the Minyip Wetlands with children.

“This was a fantastic starting point to gauge interest and showed the extent of engagement the children achieved.

We are looking into installing a water sensory area to appreciate the habitat and ecosystem that water provides.

We would also like to build upon our current sustainability practices with gardening; composting; limiting water and electricity usage; reducing, reusing and recycling.”

These incursions demonstrated it's never too early to start environmental literacy and, in fact, it's often our youngest citizens who have the greatest capacity to wonder at the way nature works. The future is bright if the respect, curiosity, and care that these children showed stays with them as they grow into tomorrow's environmental champions.



Minyip Kinder children (left) and Rupanyup Kinder children (right) were proud to receive a waterbug lifecycle poster to remember the incursion by and share with their families.

For more information about River Detectives:

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

River Detectives Story of Change

Wandiligong Primary School, North East CMA region, 2024



**NORTH EAST
CATCHMENT
MANAGEMENT
AUTHORITY**

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.

Alex Shaw is a passionate sustainability educator at Wandiligong Primary School, a vibrant and energetic small school of 42 students south of Bright in north-east Victoria. Founded in 1870 during the gold boom, it is set in the picturesque Wandiligong Valley.

Being a small school is considered a strong asset, not a liability. Wandiligong PS believes small schools are great preparation for life, with an ability to provide a full and diverse curriculum in a caring, nurturing environment where students are adaptive, creative, confident, and have highly developed social skills.

Teachers at Wandiligong PS strive to link learning in the classroom with the lived experience of children and they draw on their bountiful local resources to engage and stimulate students. The school joined the River Detectives program in 2023 as an opportunity to extend learning beyond the classroom walls and make it active, stimulating and fun.



Natural school grounds support environmental learning.



The school had fantastic sustainability initiatives in place but wanted some help to do more.

“As a school we had been running a program each Friday called Sustainable Wandil. During these sessions students work in two multi-age groups to do a range of different activities that promote sustainability. We have done litter pickups, planted native trees in the Diggings Reserve, we grow and cook our own produce, we audit our school rubbish and recycling and collect data on local animals. We have collected river samples before with our old outdated WaterWatch kit, but no current staff had any training.”



In February 2023, students used the old equipment to look for insects in the water of Morses Creek.

To participate in the River Detectives program, the school adopted a site on Morses Creek in the town's Alpine Park Public Reserve, within walking distance from the school.

In their first year of participation, students from all year levels enjoyed visiting the local waterway and having some time in an environment outside of school.



Taking and analysing water samples at Morses Creek.

A tree planting day was held on the banks of Morses Creek in August 2023. Students planted 82 native trees, adding to the 200 trees planted in the previous three years and helping them get closer to their goal of planting 1000 trees over the next 10 years with support from the Diggings Reserve committee and the Alpine Shire Council.



Revegetation work along Morses Creek add to River Detectives learning.

Through this work, students develop a deep understanding of the environmental benefits of tree planting.

"They recognise these trees play a crucial role in preventing erosion along the creek, creating habitat for native animals and ensuring a beautiful natural environment for generations to come."



In September 2023, then North East CMA River Detectives coordinator Anna Hall visited the school on-site at Morses Creek. All students from Prep to Year Six engaged in citizen-science activities to learn the skills needed to monitor Morses Creek. They learnt the steps involved in both water quality testing and macroinvertebrate sampling.



Waterbug sampling on Morses Creek.



Collecting a sample for water quality testing.

“We particularly enjoyed learning about waterbugs. The incursion was really good and helped me a lot as a first-time teacher of this program.”

In 2024, the school continued its involvement, planting a further 300 plants along the banks of Morses Creek.



Planting trees along Morses Creek in 2024.

North East River Detectives coordinator Blair Yates visited the school in July. Inclement weather meant the session couldn't be run at Morses Creek but fortunately the school is blessed with expansive, heritage-listed school grounds. With a focus on surveying habitat quality, students talked about the animals they could see and hear and learn about how they benefit the local area.

Blair recalls, *"The kids shared some stories of their own encounters with animals. The school backs onto a hill with heavy vegetation so we saw a good number of critters and we even saw some kangaroos and deer tracks. At the end of the session Alex approached me to request another session and showed interest in having a session with Traditional Owners"*

In October Blair was able to visit again with Aunty Val of the Duduroa Dhargal Aboriginal Corporation (DDAC).



Blair and Aunty Val speak with students.

Aunty Val shared traditional stories and students created paintings using canvases and stencils. Blair ran a session at Morses Creek to share knowledge about its catchment; the creek's source, where it collects water from, the creek's tributaries, and where it flows.

This was a valuable way for students to understand their place within the catchment and the broader context of Morses Creek as an important waterway both upstream and downstream of Wandiligong.

Blair discussed the volume of water that flows through Morses Creek and answered students' questions.



Aunty Val introduces the art activity then students get busy creating their canvasses.



The school was keen to enhance the habitat of the school grounds with native revegetation. Blair was able to support the school with grant opportunities and a list of native plants known to be indigenous to the area. Using indigenous natives is best practice to restore habitat with species that would have been in a location prior to European occupation. These are the plants that will grow best being perfectly suited to the soil, rainfall, and conditions of the area and will provide the habitat needed for the area's native animals. Aunty Val offered the support of Duduroa Dhargal Aboriginal Corporation.

The River Detectives program is proud to deliver waterway-related teaching and learning resources but to also play a role in supporting schools to achieve their broader environmental goals.

Wandiligong Primary School is very excited to continue their involvement in the River Detectives program. The school is extremely appreciative it is able to access free incursions considering its remote location.

In a recent program evaluation, Alex commented, *“The students loved the program in 2024. It is such a beneficial program.”*

Alex particularly appreciates the benefits that school incursions bring.

“When Blair comes in with his science background it provides us all with deeper knowledge and he brings new ideas. Blair’s input keeps the kids curious. They have been inspired by him, commenting that they’d like to follow his footsteps and do work like his in the future.”

Blair is always flexible and keen to be involved with any sustainability work our school is involved in. Having his help to make connections with Aunty Val and the Duduroa Dhargal Aboriginal Corporation has been invaluable.”



The school has big plans for the future. An outdoor learning area was constructed in 2023 and there is a master plan for their Sustainable Wandi program.

When this space is finished it will be the home of the school’s sustainability focused learning program and will support recycling systems, waste reduction, vegetable gardens and its conservation efforts.

The beginnings of the Wandiligong Primary School outdoor learning area.

In 2025 the school wants to focus on habitat creation. It has identified a lack of butterflies on the school grounds, so students will plant host plants. They will be working with the local Men’s Shed to make native bee hotels and they are very keen to do more macroinvertebrate sampling with Blair to identify the creatures that rely on the habitat of Morses Creek.

For more information about River Detectives:

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