

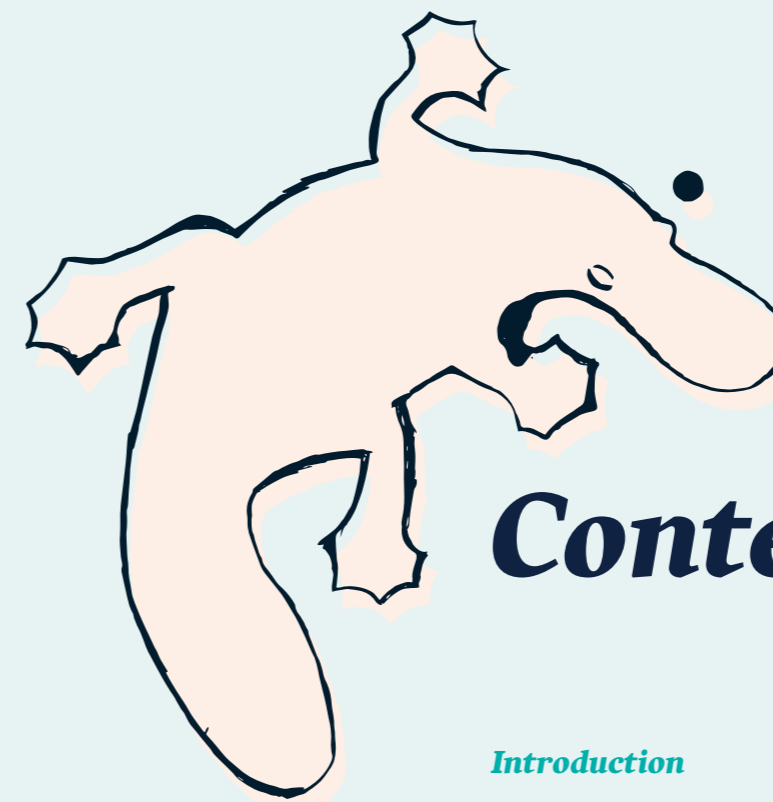


Waterwatch & EstuaryWatch
**Citizen science in
Victoria's waterways**

Annual Achievements Report
2020-2021



Environment,
Land, Water
and Planning



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Front cover: Shaya monitoring the Barwon estuary. Credit: CCMA.

Introduction



“Citizen science involves public participation and collaboration in scientific research with the aim to increase scientific knowledge.”

The Royal Society of Victoria.

The Waterwatch and EstuaryWatch programs have a long history of community-based environmental monitoring and citizen science in Victoria. Citizen scientists assess aquatic habitats, capture photo-point observations and monitor water quality, frogs, platypus, fish, macroinvertebrates, waterbirds and litter. These initiatives play an important role in informing waterway management choices, as well as developing community engagement and environmental stewardship and advocacy. Authorities in charge of catchment management play a significant role in assisting the programs.

The EstuaryWatch and Waterwatch Annual Achievements Report 2020-2021 describes how citizen science data has informed waterway management decisions, and how community awareness, engagement and knowledge of waterways has strengthened over the year. This publication highlights the ability Waterwatch and EstuaryWatch has to connect communities to their local environment, build capacity of communities and demonstrate stories of change. We thank the thousands of dedicated Waterwatch and EstuaryWatch volunteers who visit local waterways to monitor water quality and collect valuable environmental information.

Funding for these programs in regional Victoria is part of the Victorian Government’s \$248 million investment over four years to improve the health of waterways and catchments. Funding for these programs in the Greater Melbourne region is through Melbourne Water and other local partners.

These long-standing citizen science programs, and dedicated participants, have endured many challenges over the years, from drought to bushfire, and most recently, a global pandemic. As the Coronavirus (COVID-19) swept through Victoria, we were all challenged to go about our daily lives while doing our best to protect our health and the health of those in our communities. In line with government restrictions and guidance, Waterwatch and EstuaryWatch events were postponed, cancelled, or where possible where modified and continued in a limited capacity during COVID-19.

There was a shift in the ways in which people engaged with environmental volunteering which saw citizen scientists

embrace technology and collect data using app’s, connect with fellow volunteers and waterway experts in online forums, build capacity through webinars, take time to explore historical datasets and waterway information.

Our volunteers and program managers have demonstrated great strength, creativity and adaptability to rise above the challenges and to continue to connect with nature and contribute to citizen science through COVID-19. The patience, resilience and respect that volunteers have shown during this time is admirable, and greatly appreciated. Your contribution to citizen science is invaluable.

Citizen scientists involved in the 2020-2021 programs contributed a total of 83,227 hours to care for our waterways, equivalent to 11,097 volunteer days. This contribution provides an economic value of the 2020-2021 volunteer effort of \$3,473,895.



Aboriginal Acknowledgment

EstuaryWatch and Waterwatch proudly acknowledge Victoria’s Aboriginal community and their rich culture and pays respect to their Elders past, present and emerging. We acknowledge Aboriginal people as Australia’s first peoples and as the Traditional Owners and custodians of the land and water on which we rely. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life and how this enriches us. We embrace the spirit of reconciliation, working towards the equality of outcomes and ensuring an equal voice.

Waterwatch water quality sampling.
Credit: Waterwatch Victoria.



EstuaryWatch & Waterwatch

The Statewide EstuaryWatch and Waterwatch Program is achieving the vision of engaging, activating and empowering communities to care for and improve the health of Victoria's waterways.

The program supports Catchment Management Authorities (CMAs) and Melbourne Water in developing and delivering diverse opportunities for volunteer citizen scientists to connect and learn about Victoria's rivers, wetlands and estuaries, and contribute to waterway stewardship.

Victoria's Waterwatch and EstuaryWatch programs, having successfully built on community monitoring and engagement for 28 and 14 years, respectively, leverage the community goodwill instilled in these and other citizen science programs. Every CMA in regional Victoria delivers waterway health monitoring to their region through volunteer citizen science initiatives. There are also highly active programs in the Port Phillip and Westernport region, led by Melbourne Water and other local partners. Citizen scientists assess aquatic habitats, capture photo-point observations and monitor water quality, frogs, platypus, fish, macroinvertebrates, waterbirds and litter.

Through the EstuaryWatch and Waterwatch programs, citizen scientists are supported and encouraged to become actively involved in local waterway monitoring and on-ground activities. Every year thousands of dedicated volunteers head out to their local waterways to monitor water quality and collect valuable environmental information.

*Waterwatch Training at Tahbilk.
Credit: Waterwatch Victoria.*

To ensure the integrity of the community data collected, every great citizen science program requires stringent quality control. As a result, prepared 'mystery' samples with known values are essential for testing the collection methods and testing equipment of both the Waterwatch and EstuaryWatch monitoring programs.

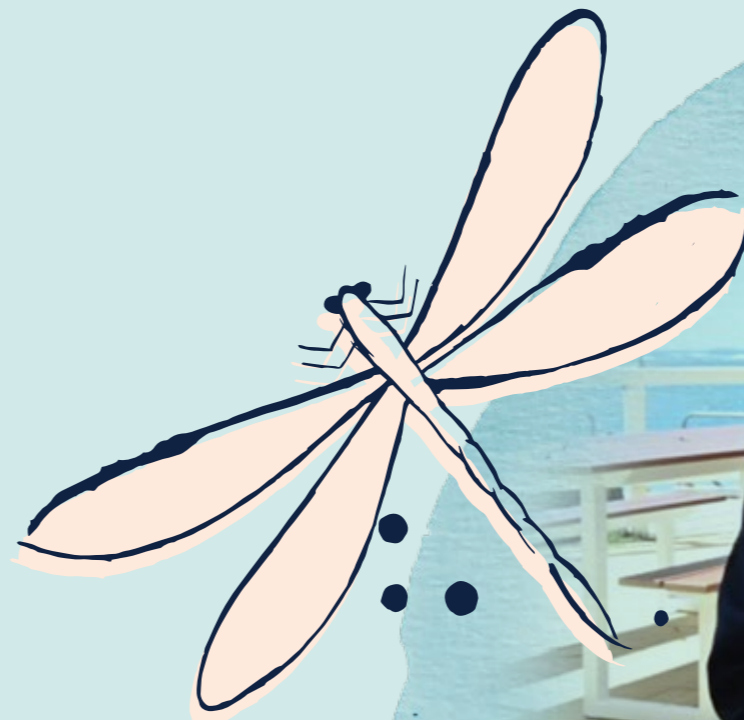
Waterwatch training was held in the Goulburn Broken region in early 2020 with new regional coordinators to help them build on their skills and expertise and to share this knowledge with the volunteer network. This event was led by Instream Solutions and generously hosted by Tahbilk Estate, who have been actively Waterwatch monitoring the Tahbilk lagoon for over 13 years and generously shared their time and environmental insights on the local area, as well as participating in the training.

Regional EstuaryWatch and Waterwatch coordinators gathered in the Corangamite region for a refresh and test event to ensure their skills and equipment are up to date and ready for statewide Quality Assurance/Quality Control (QAQC) testing events with volunteers, a critical step in ensuring the accuracy and reliability of citizen science data collected.

Because each volunteer's time and effort are valuable, and the scientific data they collect informs waterway management decisions, all water monitoring results must be accurate and reliable. Thank you to all of the dedicated Waterwatch and EstuaryWatch citizen scientists and coordinators who made time for this important event. Your dedication is greatly appreciated and contributes to a strong citizen science program!



*Waterwatch training at Barwon Heads.
Credit: Waterwatch Victoria.*



Where and what we are monitoring



Type of Monitoring Sites

- Birds
- Waterbugs
- Water Quality
- Litter
- Fish
- Platypus
- Frog

To find out more, visit [Waterwatch Victoria](#) or [EstuaryWatch Victoria](#).

109 Active Groups

702 Active Sites

2,477 Active Volunteers

7,737 Event Participants



Hopkins & Merri EstuaryWatch
Volunteers using new equipment.

Stories from across the state

Delivery Partners

CMAs, water corporations, local government and other delivery partners play a crucial role in successfully facilitating on-ground citizen science programs across Victoria. There continues to be strong community support for getting involved in caring for our waterways and catchments across the State, through citizen science activities. By working in partnership with individuals and community-based natural resource management groups, we can achieve better, more lasting change.

- **Corangamite CMA**
- **East Gippsland CMA**
- **Glenelg Hopkins CMA**
- **Goulburn Broken CMA**
- **Mallee CMA**
- **Manningham Council**
- **Melbourne Water**
- **Merri Creek Management Committee**
- **North Central CMA**
- **North East CMA**
- **Petaurus Education Group**
- **Rural City of Wangaratta**
- **West Gippsland CMA**
- **Wimmera CMA**





Corangamite



27 Active Groups 
99 Active Sites 
107 Active Volunteers 
1086 Event Participants 

Barwon Estuary Monitoring Program Phase 2 (BEMP2)

The community around the mouth of the Barwon River is passionate about its estuary. They are the driving force behind a unique citizen science program, BEMP2. It's focused on the Barwon River estuary at Barwon Heads and Ocean Grove in southwest Victoria.

Recreational users of the Barwon River estuary were concerned about public health risks in the estuary. They wanted to determine if there was bacterial contamination from various pollution sources and whether any such risks increase after rainfall events.

Volunteers participating in a training session at Barwon Heads. Credit: CCMA

Pollution may derive from stormwater, illegal sewer connections, poorly functioning septic systems, and faeces from dogs, waterfowl or other animals. To determine the existence, understand the causes and measure the potential impacts of such pollution, both regular and event-based monitoring is required.

Citizen scientist volunteers monitored water quality indicators and kept the community informed about public health impacts in a 2018/19 pilot. The 2021 program has more extensive direction and support for monitoring activities through meetings with stakeholders and the community. Existing EstuaryWatchers and new members have stepped up to take part. Teams of trained volunteers are collecting water quality data from nine sites around the estuary every week.

These data include measurements of turbidity (clarity of the water), pH, ammonia and general observations of the appearance and odour of the water. The presence/levels of enterococci, a bacterium indicating faecal contamination, is measured at a commercial laboratory.

The volunteers are monitoring water quality under typical conditions and after peak rainfall events. The accumulated data will improve our understanding of how water quality changes throughout the year, and any risks to humans.

At a Beach Study day, citizen scientists investigated how the estuary was used and identified other pollution inputs through Sanitary Survey methods. Novel source tracking techniques will be used to understand the relative abundance of different sources of bacteria.

EstuaryWatch members who regularly monitor the Barwon estuary were keen to join the BEMP2 program. Credit: CCMA.



Working for Victoria team improves Waterwatch habitat surveys

DELWP's Bellarine-based Working for Victoria team took time out from their important on-ground works to bring new eyes to the Waterwatch habitat survey.

The current Waterwatch habitat survey asks participants to rate the quality of five important habitat components, informed by the field guide:

- **Bank vegetation**
- **Verge vegetation**
- **In-stream cover**
- **Bank erosion and stability, and**
- **Riffles, pools and bends**

The Field Guide provides ratings with a brief description that helps participants match what they see on site. The main quality control challenge is to ensure consistent evaluation, as environmental features can be perceived in many ways.

Working with the Corangamite CMA Citizen Science program, the Working for Victoria team brought considerable enthusiasm and knowledge to the task. They explored whether the data quality of habitat surveys could be improved by adding site photos, field observations and a species list using the iNaturalist app in conjunction with the existing habitat rating system. The team visited Waterwatch locations throughout Geelong and the Bellarine region to conduct habitat surveys and assess if there is an improvement in the survey procedure. This work will lead to future training opportunities for volunteer monitors and improved data credibility in habitat surveys.

Improvements to the quality standard of the Waterwatch habitat survey method provides assurance of data credibility to users such as CMAs, natural resource agencies, education institutes and community groups.



The team worked in a COVID-safe manner with physical distancing, but masks were not required outdoors at this time. Credit: CCMA



East Gippsland



2
Active
Groups



15
Active
Sites



2
Active
Volunteers



1
Event
Participant



Understanding Gippsland Lakes Pelican populations

At 92 locations across the Gippsland Lakes, community members converge annually for the Great Pelican Count. This massive event is but one element of the broad community involvement in understanding the Gippsland Lakes pelican populations.

There are only two permanent Australian Pelican breeding sites, or rookeries, remaining in Victoria. One of these is in the region of the Gippsland Lakes. The BirdLife Australia Gippsland Lakes Pelican Project seeks to track and understand the movement, population changes, health and lifecycles of the pelicans. Since 2018, Birdlife Australia has banded adult and juvenile pelicans.

Individual birds can be recognised by unique colour band combinations which enable tracking and a better understanding of the pelicans' movement patterns across the Gippsland Lakes and interstate. Birds banded in Gippsland have been observed as far as Northern New South Wales and into Queensland, 1600km from the Gippsland Lakes.

The community have been actively involved in surveys, presentations, banding activities, band sightings and events such as the Count. The Gippsland Lakes Great Pelican Count commenced in 2018 and has become an annual citizen science event. Community members unite to count Pelicans, at the same time, on the same day across 92 allocated locations across the Gippsland Lakes and fringing wetlands. The event has become a highlight of the Gippsland Lakes calendar, engaging the community in citizen science in a shared celebration of an icon of the Lakes and collecting important population data.



Family bird monitoring at Gippsland Lakes. Credit: EGCSMA.



Bird monitoring as part of the Gippsland Lakes Pelican Project. Credit: EGCSMA.



Glenelg Hopkins



2
Active
Groups



14
Active
Sites



12
Active
Volunteers



Dartmoor School River Visit

Dartmoor Primary School children traded the classroom for the banks of the Glenelg River in mid-March to learn about relationships between Glenelg River flows, water quality, species in the river and river health.

Close encounters with native fish species and the Glenelg Spiny crayfish (*Euastacus bispinosus*), captured during electrofishing and fyke net demonstrations, were met with great excitement. Glenelg Hopkins CMA shared stories about caring for our waterways and the wonderful native species they support.

The students were told the amazing life stories of species found in the river, like the critically endangered Glenelg freshwater mussel (*Hyridella glenelgensis*). Although adult mussels are sedentary, the babies (*Glochidia* sp.) can travel long distances. After the mussel mothers brood them in their gills for eight weeks, they release the babies to hitch a ride on the gills or fins of fish! This is how mussels are able to move around river systems. They then grow to resemble adult mussels, leaving the fish behind to settle on the river bottom where they burrow and filter feed, helping to keep our rivers clean.

Thanks to the electrofishing on the day, the students were also able to hold fish and learn about the importance of keeping waterways healthy for native species. The appearance of a Glenelg Spiny crayfish sparked much discussion about the difference between river crayfish, yabbies and marine crayfish found in our oceans.

Glenelg Hopkins CMA is delivering a project through the Australian Government's Wildlife and Habitat Bushfire Recovery program, which funded the electrofishing and netting component of the day to help educate children about the Glenelg Freshwater Mussel.



Hands-on learning and action for Dartmoor Primary School students. Credit: GHGMA.

Hopkins & Merri EstuaryWatch 2020/21

Hopkins EstuaryWatch volunteer Ash Zanker epitomised the passion, flexibility and resilience of Hopkins and Merri EstuaryWatch volunteers in this difficult pandemic year.

The data collected continue to track the ever-important seasonal changes in water quality which occur in our region's estuaries; add to a long-term data set and are incorporated into the Glenelg Hopkins CMA's Estuary Entrance Management Support System. This was particularly important following the October floods which saw the second-highest flow rates recorded on the Merri system in recent monitoring records, along with the ever-challenging 'autumn break' period.

Unfortunately, at the end of June, we farewelled our long-term Coordinator, Debbie Dalziel, from the EstuaryWatch role. Debbie has been an extremely passionate and engaging coordinator for several years and we sincerely thank her for her efforts and advocacy for EstuaryWatch and Citizen Science in the Glenelg Hopkins region.

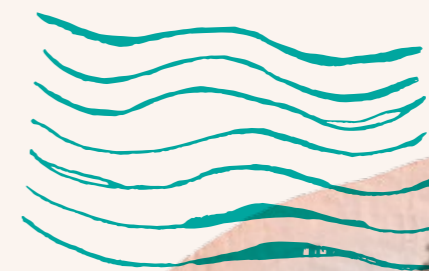
Ash also mentioned, "Deb's been wonderful, always checking if we're ok, needing anything, keeping us informed, popping along when she could, and organising some great sessions to be involved with. I wish her all the best, as I'm sure the others do".

Looking ahead, some fantastic opportunities are on the horizon for our EstuaryWatch program, particularly on the lower Hopkins and Merri systems, where a CMA led large-scale river restoration program is in development.

This includes a range of riparian and instream rehabilitation works, along with community education and engagement activities that will be available for our volunteers and community members to be involved in!

"We had to postpone a few times at late notice due to COVID restrictions, but that's how life is for everyone at the moment," Ash said. "I just really enjoy doing it (that's why I'm still doing it), catching up with the Hopkins crew, getting out amongst our beautiful nature, and getting the data for the CMA. We hope it helps out, and the estuary is so dynamic/interesting!"

**Ash Zanker
Hopkins EstuaryWatch**



Hopkins and Merri EstuaryWatch volunteers. Credit: GHGMA.



Goulburn Broken



1
Active
Group



58
Active
Sites



67
Active
Volunteers



A Committed Group makes monitoring simple

The area of Strathbogie supports some of the Goulburn Broken's most dedicated volunteers. The Creightons Creek Waterwatch group is a great example of a community coming together to collect water quality data across a wide area.

With monthly measurements of air and water temperature, electroconductivity, turbidity and pH, the group is collecting a robust long term data set for Creighton Creek and its tributaries that would not be possible without their support. Each month samples are collected from nine different sites, with volunteers dropping their sample to a collection point where one volunteer, John Neilson, collects and tests each water sample and enters it into the database.

This collaborative approach to data collection has many benefits including shared use of monitoring equipment – enabling resources to be spread further around the catchment – and saw the involvement of more volunteers than what would normally be possible. The most notable advantage is that the volunteers have created a connected network around the area that allows for observation and conversation to happen in a swift manner.

It's so great to see a local group working together to make light work!

Waterwatch and a spot of birdwatching!

One of the best things about being a Citizen Scientist is getting out into the field and observing everything around you. Many of our volunteers not only collect water quality data but will also take the time to record platypus observations, check for visiting birds in the area and look out for other changes and features of the waterways that they monitor.

Val LaMay, one of the Goulburn Broken region's longest serving Waterwatch volunteers, is also a mad keen birdwatcher! You won't see her without her binoculars in hand checking out all the birds around her.



Valerie La May, Goulburn Broken Waterwatch volunteer, bird watching at Winton Wetlands. Credit: GBCMA.

"The main thing I love about Waterwatch is that it's an excuse for me to go down to the Goulburn River. It's a fairly natural environment and there are usually not many people around. Some birdo purists insist that you can't combine other activities with birdwatching. I disagree. When I am outside, I am never not birdwatching!

"Down at the Goulburn River where I test the water, some birds are so used to people that they are fairly tame. The Superb Fairywrens are my favourites and they nearly always come up to have a look at what I am doing, or to glean insects off my car. In Summer, there is the added joy of seeing the warm weather migrants, such as the Dollarbird. Their favourite perch is just next to my sampling spot.

"While I am at the River, I am keeping a list of the birds I see and hear. The majority of birds are identified by their call. Well, you can't mistake the Kookaburra's call! Waterwatch with added serenade, what more could you wish for?"

The Goulburn Broken CMA loves to get people out into nature and feeling like they're part of the solution when it comes to waterway health and managing our rivers into the future.

"Supporting our volunteers to get outside and observe the world around them is so rewarding. I love catching up with all my volunteers and hearing the stories they have from their time down on the waterway."

"It's such a great way for people to feel connected to the environment"

**Kirsten Roszak
River Health Officer, Goulburn
Broken CMA.**

Superb Fairy Wren (*Malurus cyaneus*).

Creighton's Creek Waterwatch Group annual meeting. Credit: GBCMA.



Mallee



41
Active
Sites



35
Active
Volunteers



Tempy Primary School Students Become Malleefowl Ambassadors

The endangered Malleefowl are in sharp decline, but don't despair: Tempy Primary School students are on the case!

The Malleefowl is a large ground-dwelling bird, listed as Endangered in the Mallee. Its sharp decline is due to agricultural land clearing, altered fire regimes, predators and more recently, a long-term trend of declining rainfall. Birds are generally found in greater numbers in areas with more fertile soils with thicker habitats and an abundance of food plants – so maintaining healthy waterways is important.

Supported by the MalleeFowl Recovery Group and Mallee CMA, Tempy Primary School students are learning more about the unusual characteristics of this unique bird; its lifecycle and the importance of minimising threats to ensure its long-term survival.

Mallee woodlands near the school contain two active Malleefowl nests. Mallee Tours guided the students through a visit to learn about the birds' diet, identify the tracks and scat of other native birds and animals and learn about seed collection and propagation. They contributed to revegetation work on a 6000-acre property, utilising local seeds in plantings.

"It was important to involve the students in something that was local to them and for them to be able to see and understand something that they would normally only see from a distance", said Kaitlyn Pappin, Tempy PS classroom teacher.

Parks Victoria and Mallee CMA staff hosted the students on another outing, teaching them about Malleefowl habitat fragmentation and landscape linkages.

Kelly Mott from Parks Victoria discussing Malleefowl habitat with Tempy Primary School students. Photo: Mallee CMA

The field trips built on classroom work supported by The Malleefowl Education Kit, which supported learning across a range of curriculum areas: Science, Geography, Aboriginal and Torres Strait Islander histories and cultures, Art and Technology. The students' participation in analysing, storing and processing data provides the opportunity to contribute to real scientific research, with the resulting data being used for public information.

The Tempy Primary School students presented the findings of their Citizen Science project to the Victorian Malleefowl Recovery Group in May. As Kaitlyn Pappin said of her students: "They are now the experts, which is really important for the future of the species."

"It was really good how the topic tied in different areas of the curriculum, this is now a feature of our production which is being held in November."

Kaitlyn Pappin
Classroom Teacher
Tempy Primary School



Tempy Primary School students undertake some classroom learning before going out on site. Photo: Tempy Primary School. Credit: MCMA.

Red Cliff Scouts have turned to Citizen Science to support Mallee CMA in an important monitoring role.

The Hattah Lakes form a system of interconnected wetlands intermittently filled by creeks connected to the Murray River.

They are an important refuge for birds, animals and vegetation, including the Black Box (*Eucalyptus largiflorens*), which is a dominant floodplain tree at the Hattah-Kulkyne National Park and Ramsar site. The significant cultural and social values of the landscape continue to connect Traditional Owners and community members with this amazing part of the country.

Changes in flooding regimes in the lakes system have reduced Black Box condition and regeneration. Despite environmental water delivery to mitigate this since 2014, many Black Box populations remain in poor health with limited regeneration.

A key knowledge gap is understanding factors influencing seed germination, seedling survival, juvenile growth rates and time to maturity. A field trial to better understand the Black Box life cycle at Hattah Lakes is investigating the effectiveness of different management treatment options (natural regeneration, direct seeding, tube stock planting and browsing control) in support of improved regeneration outcomes.

Measuring the growth of the Black Box. Credit: MCMA.

And this is where the Scouts come in: since June of this year, Red Cliffs Scout Group has assisted Mallee CMA to monitor and measure the initial outcomes of the trial, which was established on a site with very little natural regeneration. One month after establishment, the Scouts observed no germination of seed from either natural regeneration or direct seeding treatments; 93 per cent of tube stock planted without tree guards were browsed and 20 per cent of those were dead. Tube stock with tree guards and existing natural regeneration seedlings were all unbrowsed and alive.

The Scouts' recorded observations provide evidence that browsing (by either native herbivores or rabbits) is having a high impact on Black Box seedling survival at Hattah Lakes. Ongoing monitoring of the surviving seedlings by our keen Citizen Scientists will contribute to a better understanding of longer-term impacts of browsing, seedling growth rates and time to maturity.



Red Cliffs Scout group at Hattah-Kulkyne National Park. Credit: MCMA.



Mallee CMA staff member Stephanie Robinson explaining the Black Box Trial. Credit: MCMA.



Melbourne Water



65
Active
Groups



308
Active
Sites



2147
Active
Volunteers



6292
Event
Participants



Waterway CSIs hit Melbourne's rivers in eDNA blitz

Citizen scientists across Melbourne signed up in droves to take part in a Melbourne Water eDNA monitoring blitz.

Dubbed Waterway CSI, the blitz involved volunteers at 70 sites taking water samples to be tested for environmental DNA, to help track the health and numbers of fish and animals in rivers and creeks across the city.

This is a simple and non-invasive way to capture the DNA of many species. A single scoop of H₂O in a test tube fitted with a special filter is sent to the EnviroDNA lab for DNA meta barcoding. Results can show different types of animals within a specific waterway. Melbourne Water has been using this approach to successfully monitor the biodiversity of Melbourne's creeks and rivers.

Waterway CSI Project Manager, Melbourne Water's Dr Teresa Mackintosh says to have so many people keen to be involved was heartening.

Melbourne Water Waterway CSI volunteer collecting an eDNA sample. Credit: Melbourne Water.

"Everyone taking part gets a sample kit containing a test tube fitted with an eDNA filter, a lunchbox and ice block to keep the water sample cold.

"Samples are mailed back express post to the lab within 48 hours of being taken. Every one of these test tubes of water is packed with animal DNA. This will provide us with important information on the biodiversity and habitat health within many of our much-loved waterways."

Western suburbs resident Liam Coombs leapt at the chance to take part in the Waterway CSI at his beloved Maribyrnong River.

"This is a simple and effective way that I can play a small role in helping those tasked with caring for our waterways and associated species to know how our environment is tracking.

"This data could potentially provide new information and result in targeted environmental management of a particular site," Mr Coombs said.

More than 150 CSI Waterway volunteers sampled over two weeks between lockdowns - from Werribee to the Mornington Peninsula.

Participants will be given details of the species found at their sample site. The information will also add to Melbourne Water's data repository.

Maribyrnong River. Credit: Melbourne Water.



That's a wrap - huge rubbish haul for community litter action project

40,000 pieces of litter!

That's the estimated haul from the efforts of residents, schools and environmental groups involved in Melbourne Water's Litter Action Project, which has wrapped up after nearly four years.

The Litter Action Program encouraged and supported volunteer community groups to monitor litter in or around their local waterways. The data collected by Citizen Scientists was added to the Australian Marine Debris Database and was used to create Source Reduction Action Plans to help stop litter at the source.

At Blackburn Lake, Citizen Science volunteers conducted monthly audits to identify common litter items and confirm the source of the litter. Armed with their data, they created a source reduction

action plan, which aimed to minimise litter items from entering the stormwater system in the first place.

Ms Cabuang said most people don't realise that more than 90% of litter in Port Phillip Bay comes from rubbish dropped on suburban streets, because when it rains, litter gets washed into stormwater drains and ends up in our waterways. The economic contribution of thousands of volunteer hours of rubbish collection equates to almost \$237,500.

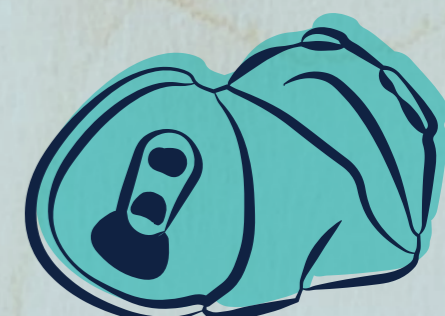
"Litter is a problem for all of us and Litter Action members are raising awareness through action that rubbish is everyone's responsibility. We know waterways are important for human connection - our rivers and creeks provide places for us to exercise, relax, socialise with family and friends and connect with nature." Ms Cabuang said.

"The tireless efforts of Litter Action citizen science volunteers over the past few years and their determination to make a difference on the ground have made a big social and economic impact to our waterways and community."

Yvonne Cabuang
Melbourne Water Team Leader
Education & Capacity Building



Melbourne Water Litter Action report.



North Central



6
Active
Groups



81
Active
Sites



61
Active
Volunteers



23
Event
Participants



Citizen Scientists Caring for the Campaspe

An annual River Health Snapshot is one of the regular outcomes to be delivered by Waterwatch citizen scientists in partnership with the Caring for the Campaspe project.

The condition of riparian land is critical to the health of waterways and since 2012, the project has worked with the community to improve it along the river's 250 km length.

Caring for the Campaspe has supported over 150 private landholders through incentives and advice to promote the protection of their river frontages from adjoining land uses. From Ashbourne to Echuca, the project delivers riparian fencing, off-stream watering, weed control and revegetation activities with interested landholders and public land managers in both rural and urban areas.

Now North Central CMA has entered into a new partnership with Waterwatch to complement this work. Established in March 2021, a new citizen science project is working with the community to increase skills and knowledge in land, water and biodiversity values. Volunteers, supported as valued citizen scientists and custodians of their adopted water quality monitoring sites, are now monitoring 13 targeted sites along the Campaspe River and major tributaries. In addition, 11 schools located along the Campaspe River corridor are participating as River Detectives, which is also funded as part of the partnership project.

The data collected by the community is a key focus of the monitoring program. It will be interpreted and used to provide an annual River Health Snapshot Report which will track the improvements in ecological condition over time and be fed back to both the North Central CMA project team and the community.

*The Campaspe River, Axedale.
Credit: NCCMA.*

Citizen scientists are playing an important role in helping natural resource managers make more informed decisions about the management of waterways. The local community is dispersed but joined by the river and its tributaries. By tracking the health of the river, and dedicating themselves to monitoring a particular site, community members become attuned to potential changes in sensitive aquatic environments, more connected to the waterways and to each other.



*Longest serving North Central waterwatch volunteer Rob Loats sampling the Campaspe river
Credit: NCCMA.*

“We haven’t lived here long; we hope by getting involved in Waterwatch we can learn more about our local river and how to help care for it.”

**North Central
Waterwatch Volunteer**

Southern Pygmy Perch go to School

Students at St Francis of the Fields Primary School near Bendigo are trialling an exciting element of a new breeding program for the threatened Southern Pygmy Perch.

The program is the result of a partnership between North Central CMA, the Australian and New Guinea Fishes Association (ANGFA), Native Fish Australia and the City of Greater Bendigo.

The partnership was formed to establish a breeding program with a view to reintroduce the Southern Pygmy Perch (Murray-Darling Basin lineage) back into the landscape. This little-known species was once common in north central Victoria. Over the last 40 years or so, numbers have drastically declined due to altered flows, lack of seasonal flooding to wetlands, habitat loss and predation and competition with pest fish species like carp and redfin.

Raelene Gooch and student at St Francis of the Fields Primary School with the tank funded by Strathfieldsaye and Districts Community Enterprise. Credit: NCCMA.

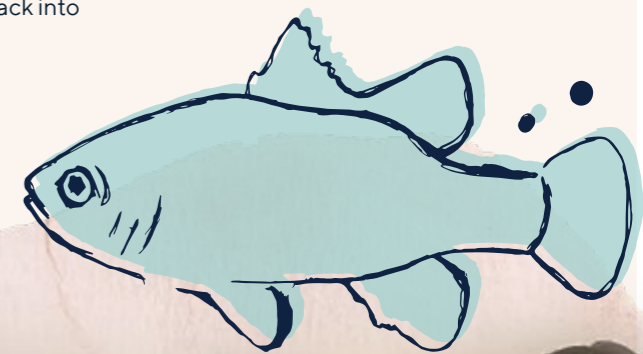
The idea of bringing fish to the classroom grew out of discussion about education and the need to raise awareness of this and other small-bodied fish species. What better way to engage children than to give them their own fish to raise? At St Francis of the Fields Primary School, students care for their ‘pygs’, as they are affectionately known; grow them to maturity and ultimately release them.

The school ‘fish in tanks project’ is a trial; but if it is successful, the group hopes to set up tanks in more schools across the region. St Francis of the Fields Primary School has an active sustainability program and is involved in the River Detectives program. As local caretakers, they regularly test the water quality of Sheepwash Creek – it is consistently excellent. They also know the creek has some permanent pools along its length, so the aim is to one day allow the students to release their fish back into Sheepwash Creek.

In the lead up to their special delivery, students participated in a virtual learning session with Peter Rose, Project Manager of the Native Fish Recovery Program at the North Central CMA, to learn all about the species and how they could help with recovery of the species.

“Our students have enjoyed watching how the pygs have settled into their new home and look forward to the day they are big enough to release into the wild.”

Raelene Gooch
Sustainability Teachers, St Francis of the Fields Primary School
Strathfieldsaye



North East



2
Active
Groups



56
Active
Sites



21
Active
Volunteers



331
Event
Participants



Jeffe and Carrie's Bundara river paradise

Jeffe Aronson lives on the Bundara River in the foothills of Anglers Rest.

His Waterwatch site is part of the Upper Murray Catchment, northwest of Omeo, in the foothills of the Victorian Alps. Jeffe worked as a River Guide – mostly in the Grand Canyon – for nearly half a century.

The extremely rugged landscape and beautiful flowing rapid was the reason Carrie and Jeffe picked this property. The calming qualities of life next to a river make them feel lucky: "All you have to do is walk outside and BAM! (you're relaxed)". Jeffe feels passionate and privileged to be able to monitor the Bundara River, right on his doorstep. His focus is on the river and everything around it.

In 2003, Jeffe and Carrie's house survived a bushfire that destroyed the surrounding environment. Jeffe has worked hard to ensure that his property

recovered from the bushfire, including working with Parks Victoria to map and eradicate patches of Broom, a weed of significance. This has resulted in the reappearance of native orchids such as Spider and Donkey. Jeffe monitors the health of the river and notes the wildlife present, with particular emphasis on a Grey Shrike Thrush that has come down the hill for the last four winters. A platypus has been spotted at the Waterwatch site too.

Jeffe has monitored this Waterwatch site for the last two years, quickly becoming knowledgeable and experienced in water quality testing.

With the help of Lisa Lee, the Landcare Facilitator in the Victorian High Country, Jeffe developed his own video: How to survey water health with freshwater macroinvertebrates. This has been available to be shared amongst North East volunteers and River Detective schools at a time when online education is a priority and such resources are much sought after.

"I love where I live because it is a unique riparian zone for Australia, where four perennial rivers meet."

Jeffe Aronson
Waterwatch Volunteer



Jeffe Aronson, holding his 2021 National Volunteer Week certificate. Credit: Maddy Shaw, North East CMA.

Bundara River. Credit: North East CMA.



River Detectives Resilience

In recovery mode from the 2019-20 bushfires, compounded by COVID-19 pressures, it has been a hard year for the North East – but the efforts of Waterwatch volunteers and the ten schools registered as River Detectives in the region garnered particular praise from North East CMA.

One of those schools, St Patricks Wangaratta, undertook the River Detectives program this last year with great enthusiasm. Teacher Katie Pallot worked with her students to test the local Ovens River, analyse results and report. Students were thorough in their investigation, testing pH and turbidity, undertaking an invertebrate survey, and surveying weed and erosion levels.

Concerns were raised by findings that included the presence of weeds and erosion, but students noted positive

results of healthy pH readings over four weeks and the presence of sensitive bugs during their freshwater invertebrate survey. Upon completion of the analysis, students formally sent the results to the Rural City of Wangaratta Council.

They also proposed amelioration works: to combat issues of erosion and invasive weed species takeover, students suggested weed removal and replacement with native plants. Natural Resource Managers from Council attended the school to talk to students about environmental protection – and they committed to planting.

St Patricks School captured students' engagement with River Detectives for the year in a video (<https://youtu.be/pIFEDzvNWIO>) in which students introduce the program and the importance of protecting the local environment. They speak about key activities of the program, key results of water quality tests and freshwater macroinvertebrate surveys and what they mean for the health of a river.

Hands-on activities bring out new skills and interests that many students may not have the chance to participate in otherwise. Students valued and enjoyed collecting the waterbugs themselves. Such rewarding experiences influence students on a deeper level to appreciate and protect their environment.

"It's a fun way to help the environment and learn about everything around you."

St Patrick's student

River Detective Professional Learning in Tawonga Credit: North East CMA.



Students front and centre for the River Detectives video opening scene. Credit: Katie Pallot, River Detectives, St Patricks Wangaratta.



West Gippsland



3

Active Groups



20

Active Sites



20

Active Volunteers



Reflecting on forty years of Wetland Rehabilitation

Jenny Davies, a beef farmer from Jack River near Yarram, has been a Waterwatch volunteer since 2008.

On their 340-acre property since 1976, Jenny and her husband Rob have dedicated themselves to revegetating and fencing remnant vegetation to protect a freshwater wetland system central to their farm. A stretch of the Albert River also runs through the property. During a flood, a significant volume of water flows out of the Albert and through their wetland system. The wetlands slow down the flow, allowing sediment to settle out before the water emerges back out into the river in a cleaner state.

Jenny sees the water quality testing she completes as a Waterwatch volunteer as a way to give back to the environmental cause. "Even though the water monitoring has not directly impacted our farming operation, it has kept the importance of the river in the forefront of my thinking;

Rob and Jenny Davis, enjoying the efforts of their wetland rehabilitation labours. Credit: Gerard Callinan.

and I am constantly reminded that it would be an achievement of our vision to have the willows removed and the banks revegetated."

She is also mindful of Albert River's connection with the Ramsar-listed Corner Inlet. Its seagrass beds are important for fish nurseries, carbon capture and oxygen production.

"The catchment flows into the Albert River, which we're on, and into Corner Inlet which carries sediment down the river from land use upstream and so that's been shown to be detrimental to the growth of seagrass in Corner Inlet... it cannot live, effectively, so that is a big threat."

Jenny's water quality testing contributes to maintaining the ecological character of this precious habitat. While she has not noticed any large-scale patterns to the water quality readings herself, she hopes the data she collects may be a useful information source for others. "The more observations which can be made means more data and perhaps specific points of degradation can be isolated."

After twelve years, Jenny is still passionate about Waterwatch. She would love to inspire others to become involved in testing other sections of the river and hopes to continue for at least another five years.



Jenny showing Tash, a student intern, how she performs her water quality monitoring along Albert River. Credit: Jem Stirling.

"I hope that the data may be used to show people how the life of the river is influenced by human behaviour and its consequent ripple effect downstream; high sediment levels affecting the seagrass in Corner Inlet."

Jenny Davis
Dedicated Waterwatch Volunteer

Waterwatch Volunteering inspired Higher Education

Stephen Broady had some time on his hands, so searched the internet for volunteering opportunities, and a Waterwatcher was born.

He started by testing water quality at Foster Creek, Kongwak in 2010. In 2013 he began testing further upstream near his home in Korumburra. Testing locally helps Stephen feel a sense of stewardship for his local waterway. As he says, "You do feel – ownership sounds too strong – but you do feel a local connection to it".

He is a passionate and consistent volunteer. To Stephen's recollection, he's missed just five sessions in twelve years of monitoring, and he is very proud of his long, comprehensive data set. Despite being required to test only eleven months of the year, he strives for twelve since he gets so much enjoyment and knowledge from the experience.

"If there's anything I can do to further the knowledge of this river," said Stephen, "whether it's for the EPA or for the CMA, I'm happy to do it." His routine is to complete testing near the end of each month, so he does not forget.



Stephen with his testing set up in the back of the car, ready to check water parameters. Credit: WGCMA.

Volunteering for Waterwatch sparked a love of learning in Stephen that has changed the course of his life. "It ended up putting me on the educational path; because I did this for a couple of years and I just thought this is alright... so I started on my Certificate III in Conservation Land Management then my Diploma then a Bachelor after that".

His studies help Stephen better understand his water quality data. "Through my hydrogeology classes I can understand EC a lot better as an indicator of groundwater contribution into the system – I found that really amazing". Stephen is currently in the last semester of his degree and intends to continue his volunteering after entering the workforce.

During recent EPA and South Gippsland Water investigations into contaminated wastewater released by a water treatment plant, West Gippsland CMA provided summaries of Stephen's data set to help establish a baseline of conditions in the creek.

Stephen safely collecting his water sample in Foster Creek. Credit: WGCMA.

"It's not well understood by the public, but water quality monitoring can be very costly and time-consuming. To have a dedicated volunteer like Stephen who has created a usable baseline dataset was fantastic. His understanding of the waterway assisted the CMA in assessing what impact the incident could have on Foster Creek and the broader Powlett River catchment. It was pure gold," says Jem Stirling, Waterways Project Officer of the WGCMA. The stream has now diluted the waste and returned to good health.

"It ended up putting me on the educational path because I did this for a couple of years and I just thought – this is alright!"

Stephen Broady
Dedicated Waterwatch Volunteer



Wimmera



1
Active
Groups



10
Active
Sites



5
Active
Volunteers



0
Event
Participants



There are 17 students at Jeparit Primary School, which has a long-standing connection to the Wimmera River – first engaging with Waterwatch in 1996.

Their regional Waterwatch coordinator Jeanie Clark works closely with them, and in 2018, with new teacher Heidi Lees, the Jeparit Primary kids became River Detectives, too.

The Wimmera River flows through the farming area of Jeparit before terminating at Lake Hindmarsh just north of town, which is Victoria's largest freshwater lake and the first of a series of terminal lakes.

"I saw the training advertised and thought it was a great opportunity considering the Wimmera River flows through our school's backyard," said Heidi. "Our school had just started a kayaking program in 2018 and I felt that

Jeparit Primary School River Detectives. Credit: WCMA.

the two programs would complement each other so that students could appreciate the river more, learn about what they are paddling on and how to look after it. I also really love hands-on learning. I prefer my students to use real data that they collect themselves rather than pretend data so they can actually see a purpose for their learning when studying data/graphing."

River Detectives is the core program that engages Jeparit PS students in sustainability education. Students collect monthly samples from the river, test it, record the data and upload it to the website as part of their Science and Geography classes. They do macroinvertebrate sampling in March and October, supported by the Waterwatch coordinator, to develop a broader appreciation of what lives in the river, what should live in the river, why it's important the river is kept healthy and what role the waterbugs play in the food chain.

More broadly, as described by Heidi: "With support from [Waterwatch coordinator] Jeanie we have learnt about the effects of flood, drought, and humans on the Wimmera River over time, especially their impact on salinity levels and turbidity. We notice that salinity levels are generally quite high. We learn about the fauna that visit our site through observations of tracks, scats, nests and other clues. We know that dogs, ants, wombat, possum, and rabbits have visited our site."



Replace JPS with Jeparit Primary School. Credit: WCMA.

In 2020–21, students' engagement with the river as River Detectives, as citizen scientists, as students and as locals caring for their environment led to an extraordinary project. Heidi described what happened:

"In 2020 during Science, the students mentioned that they'd noticed erosion on the riverbanks when conducting monthly testing. We applied for a Junior Landcare Grant to tackle the problem. The students wrote letters to people to ask if they could interview them about how what we could do to look after the river better and prevent erosion. They wrote to GWM Water, Landcare, Jeanie and local farmers during remote learning in 2020 then interviewed guests online using the Webex platform.

"Between lockdowns we invited an ecologist to walk along the river with students to identify native plants growing on the banks and look into the possibility of revegetation. In November we visited a local native nursery to propagate plants indigenous to the area.

"Next, we enjoyed a visit from Barengi Gadjin traditional owners to spend time at the river identifying culturally significant sites. The students saw middens and learnt about what daily traditional life would have been like along the river. They taught students about their culture, traditional tools and what appropriate revegetation might look like.

Parks Victoria supported us to identify revegetation sites protected from people/cars and with the best chance of success.

In May 2021, planting took place and Barengi Gadjin members joined the planting day.

"To educate the broader community and raise awareness of our project we put up a display in the main street to explain what we were doing and why."

Future plans include installation of bollards to protect future revegetation and signage outlining the project

Waterwatch coordinator Jeanie with JPS River Detectives. Credit: WCMA.

activities and goals, acknowledging project partners, promoting local user groups and sharing their thoughts about why the river holds value for them and why we need to look after it. Jeparit PS hopes the sign will communicate the way local groups are working together and reinforce the message that For people to use boats on the river, the river needs water. To have fish in the river, the water needs to be healthy. We need to look after each other so we can all enjoy the benefits of the river."

Jeparit PS was nominated for a 2021 Victorian Landcare Award for their innovative and collaborative project.

"Jeanie inspires the teachers she trains. We rely on her so much. Her role as coordinator is so valuable... She takes away my stress and we love to see her out in schools doing hands on activities with students and staff."

Heidi Lees
Classroom teacher, Jeparit PS.





Waterwatch Victoria

www.vic.waterwatch.org.au

EstuaryWatch

www.estuarywatch.org.au

River Detectives

www.riverdetectives.net.au

National Waterbug Blitz!

www.waterbugblitz.org.au

Saltwatch

http://www.vic.waterwatch.org.au/salt_data_portal.php

Fluker Post Project

www.flukerpost.com

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Waterwatch Victoria 

EstuaryWatch Victoria 



Environment,
Land, Water
and Planning