Murray-Darling Basin Spring 2023

Biodiversity Findings Report

Ewing's tree frog (Litoria ewingii), native species detected in survey

Thank you

Thank you to our generous volunteer citizen scientists and partnerships for joining The Great Australian Wildlife Search. Your support and participation led to remarkable results, gathering critical biodiversity data across the Murray-Darling Basin region.

Powered by innovative environmental DNA (eDNA) technology, this initiative enables important biodiversity research and conservation to help map, recover and replenish ecosystems and native species. The Murray–Darling Basin Authority (MDBA) is utilising this data with an enhanced understanding of the types of wildlife in the river system, and will use this data to help manage them for future generations.

The Great Australian Wildlife Search is being delivered by Odonata Foundation with support of the Basin Condition Monitoring Program – an Australian Government commitment to develop and deliver new monitoring and reporting of economic, social, cultural and environmental conditions in the Basin.

Delivered by:

ODONATA FOUNDATION

In partnership with:

Murray–Darling Basin Authority

EnviroDNA

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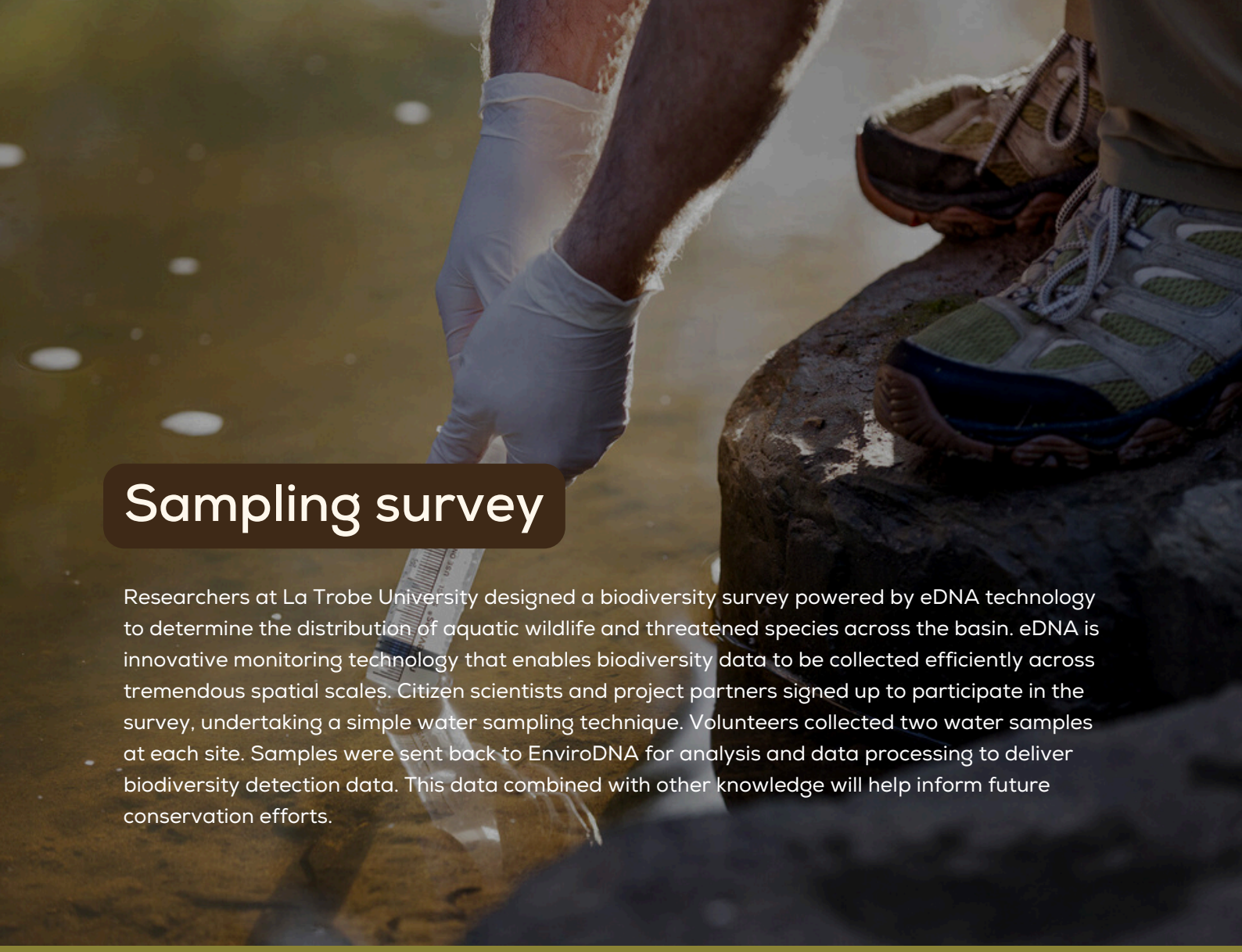


Sampling survey

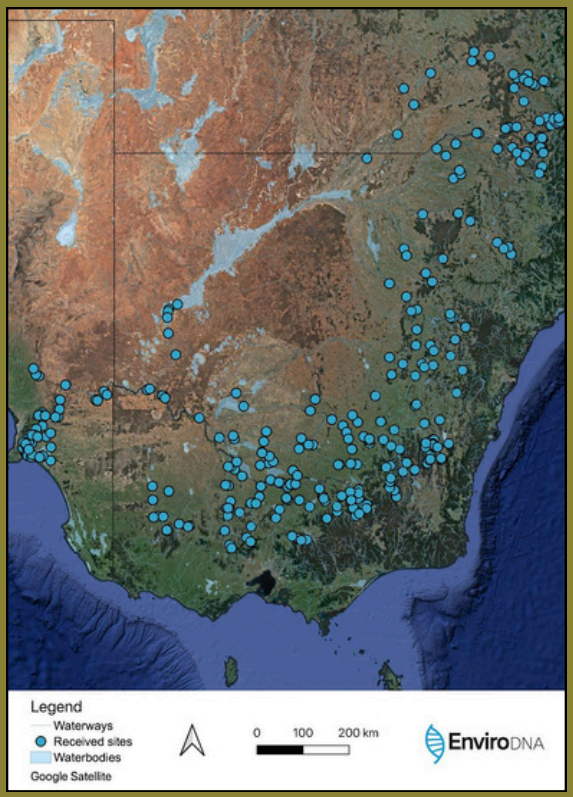
Researchers at La Trobe University designed a biodiversity survey powered by eDNA technology to determine the distribution of aquatic wildlife and threatened species across the basin. eDNA is innovative monitoring technology that enables biodiversity data to be collected efficiently across tremendous spatial scales. Citizen scientists and project partners signed up to participate in the survey, undertaking a simple water sampling technique. Volunteers collected two water samples at each site. Samples were sent back to EnviroDNA for analysis and data processing to deliver biodiversity detection data. This data combined with other knowledge will help inform future conservation efforts.

What is environmental DNA?

Environmental DNA, or eDNA, refers to the DNA that all creatures shed into their surrounding environment via skin cells, hair, scales, mucus and more. Analysing eDNA from environmental samples such as water, provides exceptional insights into the species, biodiversity and ecosystems that are present in the sampling region.

"The sampling was easy to do, I just had to follow some simple instructions. And I got to explore more of my local area which was great!"

- Spring 2023 Wildlife Search, Citizen scientist



Biodiversity Snapshot

324
Sampling locations

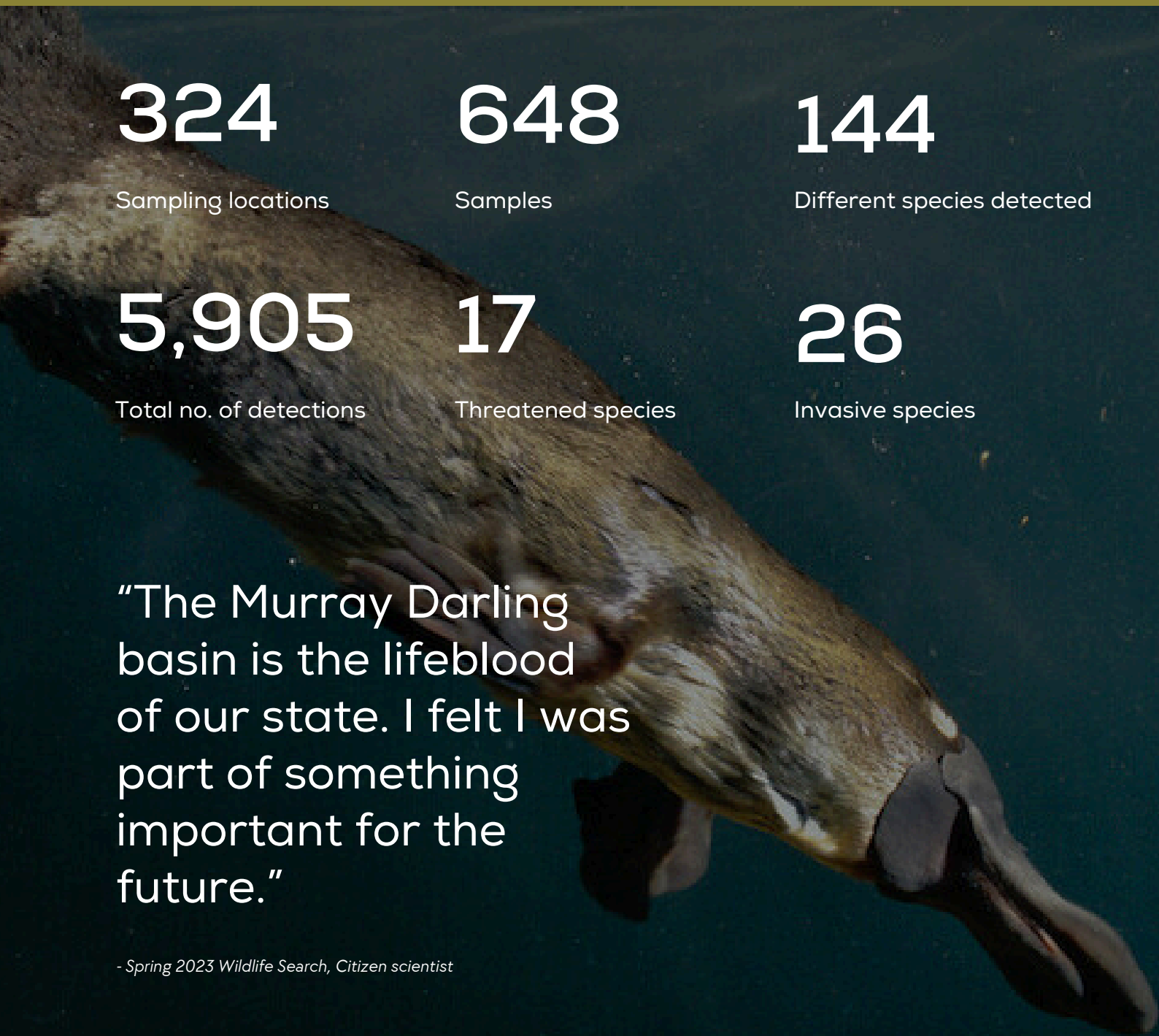
648
Samples

144
Different species detected

5,905
Total no. of detections

17
Threatened species

26
Invasive species



"The Murray Darling basin is the lifeblood of our state. I felt I was part of something important for the future."

- Spring 2023 Wildlife Search, Citizen scientist

Image: Dave Watts, Kape Images

Biodiversity Snapshot

Fish

41 fish species detected from 648 water samples, with 30 native fish, 11 invasive fish and 6 EPBC listed threatened species (Silver perch, Flathead galaxias, Trout cod, Murray cod, Macquarie perch, Southern pygmy perch).

Amphibians

20 amphibian species detected from 648 water samples, all of which were native to the MDB. We did not detect any EPBC listed species, although we did detect the Tusked frog, which is threatened in Queensland.

Birds

43 bird species detected from 648 water samples, with 40 native species and 3 introduced species. One EPBC listed bird species (brown treecreeper) was detected, and one Vic FFG listed species (Lewin's rail).

Mammals

32 mammal species detected from 648 water samples, with 20 native species, 12 invasive species and 4 EPBC listed species (Broad-toothed rat, Greater glider, Koala, Grey-headed flying fox). There was also 2 species detected that are listed under the Vic FFG Act (platypus & dingo).

Reptiles

Only 8 reptile species were detected from 648 water samples, of which one was a turtle (eastern long-necked turtle) and the other 7 were skinks.

Native Fish

Threatened species detections

Silver perch

EPBC listed as critically endangered, detected at 24 sites, hard species normally to detect.

Flathead galaxias

EPBC listed as critically endangered, detected at 1 site in a new waterway in Vic.

Macquarie Perch

EPBC listed as endangered, detected at 12 sites across Vic and NSW.

Trout cod

EPBC listed as endangered, detected at 14 sites across Vic and NSW (new locations).

Murray cod

EPBC listed as vulnerable, detected at 135 sites across SA, Vic, NSW and QLD.

Southern pygmy-perch

EPBC listed as vulnerable, detected at 18 sites with new detections in some Vic waterways.

Other commonly detected fish

Australian smelt

This is a common native species found throughout the MDB and was detected at 153 (47%) sites.

Mountain galaxias

Relatively common small native species found throughout the MDB and detected at 100 (31%) sites (with detections in SA, Vic, NSW & QLD.

Golden perch

Medium-sized freshwater species found mostly in the MDB, detected at 132 (41%) sites across the MDB from the eDNA samples.

Other native species

Threatened species detections

Grey-headed flying fox

EPBC listed as vulnerable, detected at 6 sites (5 in NSW, 1 in Vic).

Platypus

Listed in Vic (FFG Act) as vulnerable, thought to be declining across Australia, detected at 52 sites across the basin;

Koala

EPBC listed as endangered (NSW, QLD & ACT populations). Detected at 4 sites, 1 in QLD, 1 in NSW & 2 in Vic.

Broad-toothed rat

Recently EPBC listed as endangered, detected at 1 site in NSW.

Greater glider

EPBC listed as endangered, detected at 1 site in Victoria in the King River.

Tusked frog

Listed as vulnerable in QLD, narrow distribution and thought to be declining, detected at 2 sites in QLD west of the Gold Coast.

Other commonly detected species

Common brushtail possum

This terrestrial species was detected at 152 (47%) sites across the MDB.

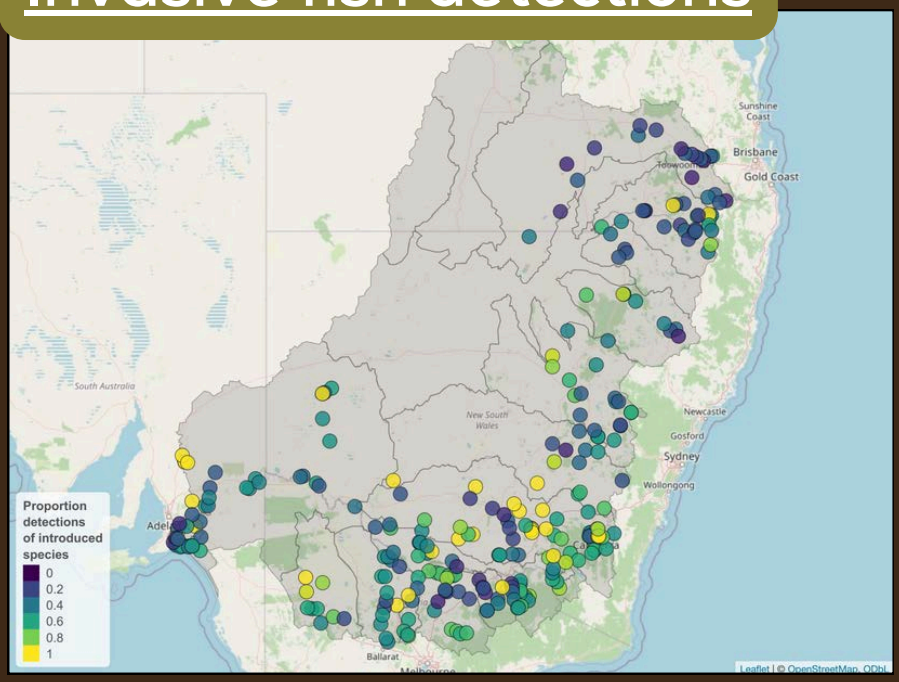
Australian wood duck

This semi-aquatic species was detected at 158 (49%) sites across the MDB.

Little pied cormorant

This native waterbird was detected at 67 (21%) sites across the MDB.

Invasive fish detections



In total 11 invasive fish species were detected in the basin. Amongst these species, Gambusia, Goldfish, Carp and Trout were the most abundant invasive fish species detected across sites in the MDB. Trout are widespread and dangerous feral fish that have a deleterious impact on all native fish, crayfish and frogs, made worse by intentional stocking into threatened species habitats Unfortunately, oriental weatherloach and roach were detected in new waterways, which may indicate they are spreading. In positive news, we did not detect Tilapia at any site.

Commonly detected invasive fish

Gambusia

Introduced to Australia to control mosquitoes, but quickly became a major invasive species causing declines of small freshwater species, detected at 138 sites across the MDB.

Goldfish

Highly invasive and widespread throughout the MDB, responsible for environmental degradation impacting native fish species, detected at 235 (73%) sites, the most of any species detected in these eDNA surveys.

Carp

Aquarium species closely related to carp that have spread throughout the basin, detected at 164 sites across the MDB.

Trout

Brown (pictured) and rainbow trout were detected across the basin at 62 (19%) sites and appear to be spreading.

Access the data explorer

Access the comprehensive biodiversity data online using the custom built data explorer application.

Scan the QR code to enter the application. Use the filters on the side menu to explore the data more closely and filter the results based on Assay, Class, Threat Status and Species.

If you choose to filter the data on species of interest, the results indicated in blue on the map will show where that species was detected. You will also have the option to overlay the data with corresponding ALA and VBA observations for that species for additional groundtruthing.

Clicking on the blue dot at any time displays the species detected in each sample at that site based on the filters.

SCAN ME

Frequently Asked Questions

Why is my sample not present in the results?

A small percentage of samples submitted to EnviroDNA had issues that meant they unfortunately could not be used in the dataset, i.e., the samples were incorrectly labelled or stored, sample DNA degraded in the post or was contaminated, sample was incorrectly handled and did not produce reliable data or their was very little DNA detected and therefore the sample failed the quality control process.

What do these results show and what do they not show?

These results show where the DNA of a particular species was detected at a site. The numbers represent the sequence reads detected of that species DNA, which can (but not always) relate to the amount of DNA present in a sample for that species.

I have seen a particular species at a site that is not shown in the data for that site?

The sample collected at a site is a snapshot in time of species that were present at the location recently (e.g., within the last 14 days). Multiple samples through time is the best way to increase detection of species, particularly if they are not aquatic species or only occasionally found at the site.

What impacts the detectability of species in eDNA samples?

Detectability will depend on a variety of things including DNA degradation, waterway flow rates, species abundance, how recently a species was at the site, and how long it stayed at the location etc. Detectability will often be much lower for terrestrial species than aquatic or semi-aquatic species.

Why were no samples taken in some areas of the MDB?

While we aimed to sample across every basin within the MDB, there were several basins that were not sampled, and some basins that were sparsely sampled. We plan to try and target these sites for sampling in spring 2024.

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We acknowledge the Indigenous people of Australia as the Traditional Custodians of the lands where we conduct eDNA water sampling and pay our respects to Elders past, present and emerging.

Contact us

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Spring 2023 eDNA sampling season was delivered by:

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For full list of funding partners, please visit:
wildlifesearch.org.au/program-partners