AUSTRALIAN Wildlife

SUMMER Vol: 1/2017

$10 (non-members)

Photo: Doug Gimesy

Celebrating a new century of wildlife preservation in Australia

Journal of the Wildlife Preservation Society of Australia Limited

(Founded 1909)

Footprints in water

in search of the elusive platypus

Story and photos by Doug Gimesy

A cold morning

It’s 5 a.m. on a crisp autumn morning, and the sky is clear. Stars sparkle brightly in the night sky and dawn is still over an hour away.

As we leave the warmth of our four-wheel drive and start walking, our headlamps illuminate the ground in front of us through the mist of our breath. It’s quiet, really quiet, and all we hear is the rustle of our waders, the sound of our footsteps and the burble of running water in the distance. We arrive at the river’s edge to inspect the two fyke nets and with excited anticipation I ask Josh Griffiths – one of Australia’s platypus experts and Senior Wildlife Ecologist at CESAR (an independent environmental research consultancy, and the team behind platypusSPOT) – “What do you think?” “Hmm, not sure. There’s movement in one net, but it could be a fish, rakali or just the flow of the river.”

As Josh wades into the water to lift up the end of the downstream net, he turns to me with a grin and asks, “Is your camera turned on?” I jump into the cold water, camera in one hand, low light LED in the other and take a few quick shots as he reaches into the net and carefully removes a large male platypus by the tail, careful to avoid the poisonous spurs. After putting him securely in a cotton bag, we make our way back to the car, where he is gently placed on a pad on the van’s rear tray. Jessica Pulvirenti, a student volunteer for this trip, brings out the field kit to help measure his weight, body length and bill length, and help take a small skin sample from the webbing on his feet. This will be used back in the lab to analyse the DNA of the platypus and help to better understand local and national genetic diversity and his familial relationships with other animals captured in this area. Josh also passes a microchip scanner over the neck to see whether the platypus captured today has ever been caught before. A beep goes off revealing the presence of a microchip, so we learn that this boy was first captured as a juvenile about a year ago in this creek.

This field trip was part of a Melbourne Water project that has been running for over 20 years, to determine how platypus populations are faring throughout the city and its fringes. Data from this study then helps the water authority to manage the waterways for platypus conservation, through efforts such as environmental flows, revegetation and weed management.

It’s not that easy

To determine whether just this one platypus was in this one stream has not been easy. We left Melbourne 17 hours earlier to arrive at about 1 p.m. and set up ten nets at five locations stretching over 10 kilometres of the waterway. That took about five hours. Once set up, the nets need to be checked every three hours until they are taken down at dawn the next morning, and then the trip back starts. By the time we arrive home, it’s been about 24 hours, with very little sleep.

Chatting to Josh as he packs up the nets, I ask, “Is it always this hard to capture one?” He tells me it varies. “There are some spots we can pretty much guarantee a capture, other places it can take one, two, three or four trips. And then, of course, there are some places where we have never caught anything. That doesn’t necessarily mean they aren’t there; it just means we didn’t catch any – that’s the challenge”.

Looking for similarities and differences. Student volunteer Jessica Pulvirenti measures the bill dimensions of a captured platypus as Josh Griffths helps holds this monotreme still. Such data is used to help compare morphological differences that may exist between populations.

Why so hard? How many are there? Numbers and prevalence

Speaking with Dr Tom Grant, a man who has spent the last 45 years studying platypus, he tells me, "These semi-aquatic egg-laying mammals are so elusive, so widely distributed but so difficult to study in the wild, that even after all this time, we still don't have a solid grasp of their abundance or distribution.

"As far as I am aware, there are no regional, state or national estimates of platypus numbers, and that's a problem. There are documented declines in numbers in some local areas and streams – leading to the prudent downgrading of the species to 'near threatened' – and the impact of predicted changes wrought by climate change are of concern, but we just don't know," he says. "If we want to ensure effective management and conservation plans are in place to protect this iconic species, we need to do what we can to not only understand the threats that face them, but how many there are and where they are."

Tahneal Hawke from the University of NSW, as part of her PhD, is looking at historical records of the platypus to better understand Australia's changing attitudes towards them as well as their changing distribution. She says: "Looking at newspaper articles can certainly give us some idea of where platypus used to be in some places. However, the accuracy of this approach is limited, as it relies on chance encounters and the sighting being newsworthy."

"For example, a newspaper report in the *Kerang New Times* dated August 1908 noted that 22 platypuses were caught in the Yarra River near Melbourne's Princess Bridge. However, I'm not sure that any have been seen in that part of the river for a very long time."

Setting up to capture. As part of Melbourne Water's monitoring program, researchers set up fyke nets in the afternoon to try to capture the elusive platypus. These are checked every three to four hours.

Similarly, during a flood in January 1933, *The Biz* reported that "A shoal of platypus – numbering 15 – were seen in the suburb of Casula (New South Wales)." However, Dr Tom Grant says that they are now very uncommon in the Georges River and no longer reported in this outer suburb of Sydney.

So what else can be done to help us get a better idea of platypus distribution and numbers? This is where the growth of citizen science and the development of new technology such as eDNA can help.

New technology to help citizen science

"Local knowledge is an invaluable source of information, and potentially important observations are often made by local residents and outdoor recreationists which can be overlooked in ecological studies. This is where smart phone apps like **platypusSPOT** can help," says Josh. "It offers wildlife enthusiasts an opportunity to contribute to a community-driven database on platypus distribution. While some have argued that the quality of data from citizen researchers can be unreliable, photographic evidence of observations entered on **platypusSPOT** helps minimise this issue as well as repeat sightings by different people creates self-verifying data. More importantly, this application allows data to be collected from a much larger pool of observers, over a wider geographic range and across longer time spans. It just isn't feasible for research scientists alone to collect data on this scale, especially for a species as elusive as the platypus."

Dr Gilad Bino at the Centre for Ecosystem Science at UNSW, who is part of the Platypus Conservation Initiative and is leading an analysis of numbers and distribution across Australia, added: "We need as much information on their distribution as we can get, and it is especially important if we can find out where platypuses no longer exist anymore as a result of human impacts."

eDNA

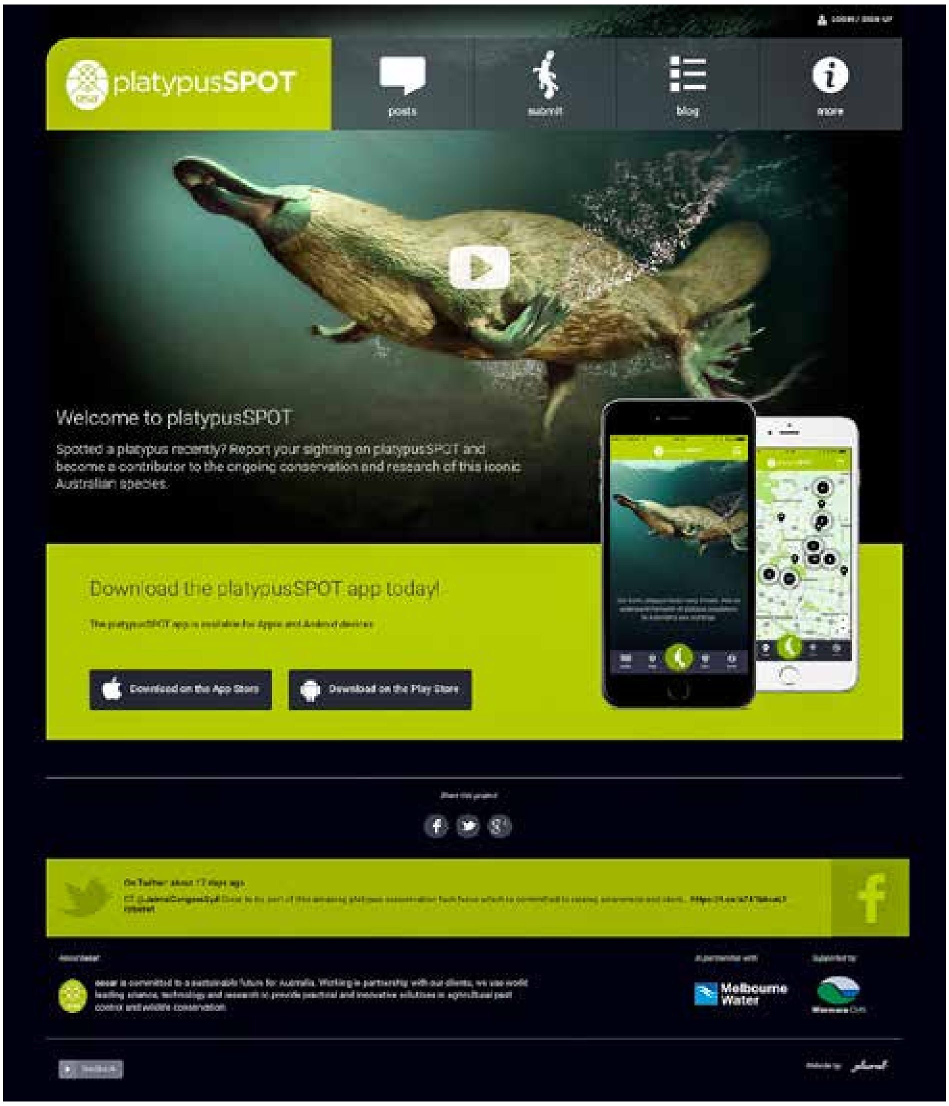
One of the most exciting new research tools is environmental DNA (eDNA). Anthony van Rooyen, a scientist at EnviroDNA, explains: "Animals are sloughing off DNA all the time, and even small fragments of DNA allow us to determine whether a particular species is in that sample. In terrestrial environments, however, the challenge is that you need to have taken the sample from where the animal has been standing, or at least very close. But the great thing about platypus is that their DNA gets washed downstream, so you can get an idea whether one has recently been upstream simply by taking a water sample. It's like CSI but in a river."

I ask Anthony how accurate it is, and he goes on to add, "Our studies show that it's much more sensitive than current netting methods, with about a 95 percent accuracy of determining the presence of platypus at a site. Of course it's much easier, quicker and cheaper than netting. You simply go to a spot in the river, take a water sample, send it to the lab, and that's it. No long nights out with nets, checking every few hours."

Skin sample collection for genetic testing. A small sample of skin between the toes is taken to look at population genetic health, to understand genetic diversity, population viability and familial relationships.

Sampling the waters for eDNA testing. The first part of looking for environmental DNA is collecting a water sample. Here, Lisa Kirkland, a member of the research team for EnviroDNA, draws up a sample of water in a syringe. This water is extracted, then filtered through a 0.22 micron filter on site, then sent to the lab for DNA extraction and analysis. This sample will then be refrigerated and transported to the laboratory for analysis.

Testing for platypus DNA. DNA from a river water sample is extracted in the laboratory so it can be analysed to look for any platypus DNA that may have been washed downstream.



Citizen science helps fill the gaps. As the platypus is generally so elusive, local sightings and recordings can be an invaluable source of information to help scientists better determine their national distribution. The evolution of smartphone apps like platypusSPOT allows for easy collection of data from many people.

Dr Tiana Preston from Melbourne Water is currently rolling out a plan to use citizen science and eDNA technology to more effectively monitor vulnerable platypus populations and assist with strategic education and infrastructure decision-making.

"The wonderful thing about combining citizen science and this technology is that by engaging residents in collecting the water samples, we empower the community to participate in waterway management, as well as raising awareness of platypus and the threats they face," She says. "It's also fast and affordable, multiple sites can be covered quickly, and it's about a tenth of the cost of live trapping. We are using the data collected by citizen scientists to guide waterway management works that will enhance platypus habitat."

Of course netting surveys will always be important. They enable the identification of individual platypuses, their sex, age and health, and the collection of genetic samples.

But now with eDNA, with such a large continent and national distribution still not being well understood, it's an exciting new tool that can better help us understand where platypuses still exist.

"My dream is that at some stage soon we can get funding to support the roll out of a national citizen science campaign, where thousands of people from all around Australia can sample their local waterways allowing eDNA technology to give us a better idea of their distribution," said Josh Griffith.

Will it give a definitive answer to where all the platypus may be found? No, but it will certainly give us a much better idea of distribution than we currently have, and that's important.

Note: A version of this article was originally published in *Australian Geographic.*

REFERENCES:

Newspaper reports:

Kerang New Times (Vic. : 1901 - 1918), Tuesday 25 August 1908, page 2

22 Platypus....Princes Bridge

Biz (Fairfield, NSW : 1928 - 1972), Friday 27 January 1933, page 4

A novel sight ...shoal of platypus...


Photo: Doug Gimesy