

Platypus News & Views



Newsletter of the Australian Platypus Conservancy (Issue 84 – May 2021)

IS THE PLATYPUS A TOOTHLESS NO-HOPER? (SOME NEW GENETIC EVIDENCE)

Results of a fascinating study comparing the platypus's genetic code with that of the short-beaked echidna have recently been published in the scientific journal *Nature*. One of the most striking new findings is that the platypus and echidna both lack four of the eight genes known to contribute to mammalian tooth development, suggesting that they have evolved from a common ancestor also missing these genes. Similarly, the platypus and echidna share a much reduced set of genes coding for digestive functions, again consistent with the two animals having descended from an ancestor that didn't much use its stomach for digestion.

The platypus and echidna are both famously toothless, though a juvenile platypus has a rudimentary set of premolars and molars which fall out around the time that it starts feeding on bottom-dwelling invertebrates such as larval caddisflies and mayflies. These teeth are replaced by grinding pads at the back of the bill that mash the platypus's prey into a fine paste requiring very little additional processing in the stomach before nutrients are absorbed in the intestines. Similarly, the echidna uses hard pads located on the roof of its mouth and at the base of its tongue to grind up its diet of ants and termites.

Teeth often survive as fossils, and provide one of the most commonly used tools for assessing mammalian evolutionary patterns. This has sometimes fuelled a perception that those animals unequipped with teeth are specialised life forms that will struggle to adapt to changing circumstances and so are inherently likely to become extinct. For example, a detailed review of platypus biology published in the *Journal of Mammalogy* in 2019 highlighted the platypus's lack of adult teeth as evidence of a functional decline that may reduce this species' environmental resilience.

Of course, a moment's thought reveals that vertebrate lineages can survive and evolve quite nicely in the absence of teeth, as illustrated by birds (which apparently became toothless about 65 million years ago) and turtles (which are believed to have been toothless for more than 200 million years). Like the platypus and echidna, birds and turtles are both descended from toothy ancestors that died out in the very distant past.

In the case of mammals, the baleen whales – toothless animals that feed by sieving small marine organisms through comb-like sheets of baleen – comprise 14 species believed to have evolved from a single common ancestor that existed about 24 million years ago. Today they range in size from around 6 metres to as much as 33 metres in length. Over time their foraging methods have also diversified, including skimmer-grazers that gather food by swimming with their mouth open to filter seawater, lunge-feeders that gulp vast quantities of water into an expandable throat region before forcing it through their baleen, and bottom-feeders that sift prey out of mouthfuls of shallow coastal sediment.

Given all of the above, there's no obvious reason why the platypus's lack of conventional teeth should necessarily either reduce its ability to survive or limit its long-term evolutionary potential. Instead, replacing teeth with continuously growing grinding pads is perhaps best viewed as being a clever adaptation – particularly useful in long-lived animals like the platypus and echidna - to avoid the risk that tooth enamel becomes unduly worn down by sand or fine gravel that accidentally enters the mouth.

LITTER'S UNACCEPTABLE IMPACT ON PLATYPUS

It's been known for some time that platypus can suffer horrific injuries and potentially die after becoming entangled in human rubbish (for example, see *PN&V* 76).

Because these animals mainly feed on bottom-dwelling invertebrates, they are often active in places where man-made debris tends to accumulate. A platypus also finds it very difficult to remove encircling loops or rings from its neck or body because its front feet - designed for efficient swimming – are hopeless at gripping or grabbing.

Instead, a platypus grooms using its hind feet, which cannot pull a loop forward past the animal's head. This is perfectly illustrated at right: the animal is using one of its back feet to tug or scratch at a narrow loop – possibly fishing line - encircling its neck. (Also note the shape of the front foot, held partly out of the water in the upper right hand corner of the photo.) Entangling loops therefore tend to move back along the platypus's body until they fit too snugly to move back any farther - and then start cutting into the skin.

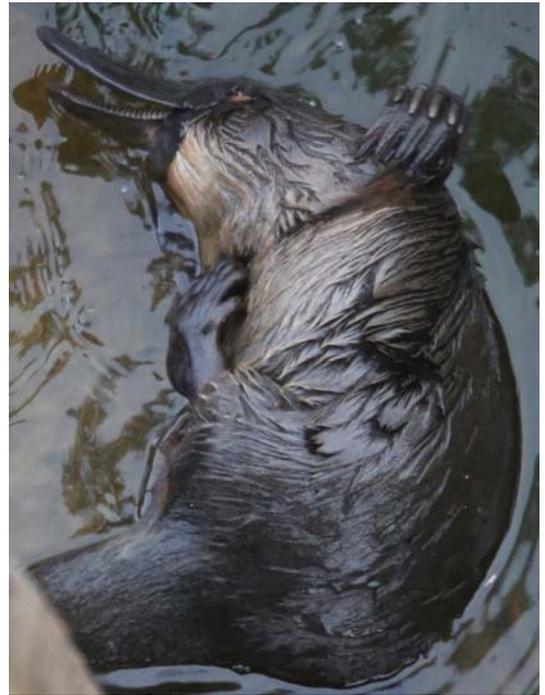


Photo credit: Ann Killeen

A research paper by APC biologists (published online by the journal *Australian Mammalogy* in April 2021) has confirmed the very widespread nature of this problem based on three decades of studies conducted in urban and rural habitats.

On average, 4% of the platypus encountered in live-trapping surveys in the greater Melbourne region – or one in every 25 animals - was found to be encircled by rubbish. Items measured 10 to 24 cm in circumference and comprised a depressingly broad range of products: lengths of fishing line, plastic cable-ties, a rubber home bottling seal, plastic bangle-type bracelets, elastic hair-ties, a hospital identification wrist-band, part of a six-pack-holder, engine gaskets, plastic sealing rings from food jars, a bicycle headlamp rim, a knotted piece of twine, and various synthetic loops or bands of unknown origin.

Though the average frequency of platypus litter entanglement was lower in rural creeks and rivers (0.5%), it also included a higher proportion of very harmful materials such as fishing line. Entanglement frequency was also found to vary with platypus size and age: significantly more first-year juveniles were entangled as compared to adults, and significantly more adult females were entangled as compared to adult males.

Pollution traps can be installed to intercept water-borne rubbish as it travels from stormwater drains to natural waterways. However, the traps must be cleaned regularly if they are to be effective, and are typically not designed to remove the relatively fine materials that entangle a platypus. Furthermore, many potentially harmful items enter waterways from sources other than stormwater, such as hair-ties lost while swimming or discarded fishing line.

As an alternative solution, you can do your bit to address this problem by adopting two simple habits as part of your daily routine:

- Pick up items of litter – especially any materials that could potentially encircle a platypus's bill, neck or body – whether or not they're found near water.
- Cut through ALL metal, rubber or plastic rings or loops of any size (just to be on the safe side) before disposing of them in a responsible manner.

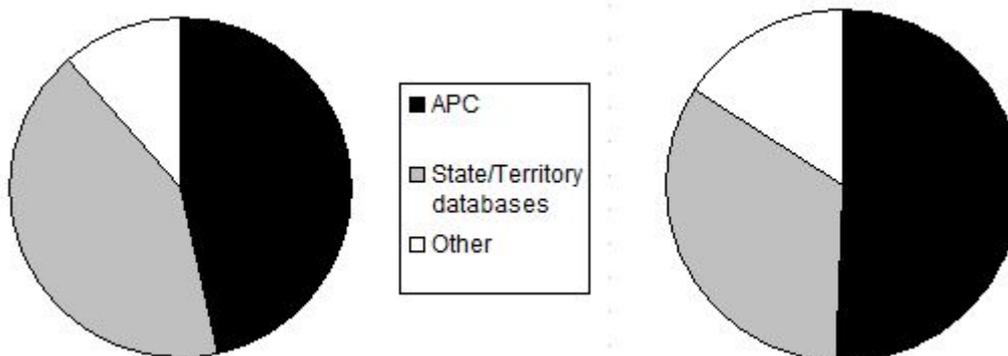
MAKING SIGHTINGS COUNT

Recent efforts to assess the platypus's national conservation status have highlighted the value of having a reliable set of platypus sightings records that can be used to help analyse population trends across the species' range.

Backed by considerable federal funding, the Atlas of Living Australia (ALA) was launched in 2010 with the worthy aim of consolidating reliable Australian flora and fauna records from available sources – including state and territory wildlife databases, museum records and “citizen science” sightings reported directly to ALA or via co-operating online platforms.

The Australian Platypus Conservancy began routinely recording the details of platypus sightings made by its own staff or other persons in 1994, and extended this program to include reports of rakali (aka Australian water-rats) in 2004. All of the APC's past records for both species have now been shared with ALA, with more recent reports uploaded on a regular quarterly basis. Around 21% of the approximately 13,500 platypus records currently held by ALA (dating back to the 1830s) have been contributed by the Conservancy. Likewise, the Conservancy has provided just over 27% of the nearly 8,000 rakali records held by ALA dating back to the 1840s.

As shown below, the Conservancy's contribution to national wildlife reporting has also grown through time, comprising 46.5% of platypus records (left pie chart) and 50.5% of rakali records (right pie chart) held by ALA for the period from 2010 to 2019. This partly reflects the success of APC initiatives specifically designed to boost the number of reported sightings, such as the community-based visual surveys for rakali carried out in Victoria in 2016/17 and the ACT in 2018/19 (supported by the Wottenhall Environment Trust) and the campaign to obtain platypus sightings in the Goulburn River catchment conducted in partnership with the Goulburn Broken CMA in 2018/19. These projects, featuring public information sessions and extensive media coverage, boosted sightings not only in the nominated time period but also in subsequent years. They thereby provide a model of how useful additional sightings records can be harvested cost-effectively for the national database.



Importantly, the Conservancy has always accepted that an essential aspect of recording platypus and rakali sightings for posterity is to identify reports that are likely to be in error. In some cases, details of an animal's appearance or behaviour may apparently differ from those of the species nominated in the report. Other records may be suspect due to a species having been seen at a location well outside its current known range. To resolve these discrepancies, a Conservancy biologist immediately contacts whoever made the report for more information – e.g. the distance to the animal, length of time it was observed, prevailing light conditions and whether it was seen by more than one observer – to provide a factual basis for assessing the sighting's merit.

Although visual records certainly have some limitations when used to characterise a species' distribution and status, they nonetheless are of real interest. We therefore encourage anyone lucky enough to see a platypus or rakali in the wild to report the details via the APC website (www.platypus.asn.au) so this information can be added to the national database.

NSW BANS OPERA HOUSE TRAPS

We're very pleased to report that New South Wales has banned recreational deployment of opera house traps and other enclosed yabby nets in all of its water bodies from 30 April 2021. Queensland has also recently announced the establishment of a Freshwater Fisheries Working Group which has been tasked in part to review the rules governing use of enclosed traps. We fervently hope that the remaining jurisdictions where opera house traps can be used – South Australia and the Northern Territory – will take similar action in the near future, especially as the commonwealth, state and territory Environment Ministers agreed in November 2019 to pursue a nationally consistent approach to address the “negative impacts that opera house yabby nets have on Australia’s native wildlife”.

ENTANGLED WILDLIFE AUSTRALIA

On page 2 we highlight the issue of platypus entanglement in litter. However, many other species are also at risk. Entangled Wildlife Australia has recently initiated a project to record sightings of wildlife entangled in materials such as barbed wire, fruit netting, abandoned fishing gear or miscellaneous rubbish. For more information, go to:

<https://biocollect.ala.org.au/acsa/project/index/23409a0b-6873-40a1-b291-f7eff3cbe837>

HOBART RIVULET PLATYPUS ARTWORK

In *PN&V* 83 we highlighted some of the great work that Pete Walsh is doing to help protect the Hobart Rivulet platypus population in Tasmania. Pete's efforts have inspired artist Mel Stanger to produce a beautifully detailed, limited-edition print portrait of one of the Rivulet's inhabitants. Each sale includes a donation towards conserving the Hobart Rivulet platypus population. For more details, go to: <https://www.thechangesmiths.com.au/.../platypus-art.../>



APC TALKS AND WEBINARS

APC community information sessions in June 2021 include the following:

- Friday 4 June: **Queanbeyan-Palerang Regional Council**, Platypus webinar (start 1 pm)
- Sunday 6 June: **Kergunyah Landcare Group**, Platypus talk at **Kergunyah** (start 2 pm)
- Wednesday 16 June: **YACTAC**, Platypus talk at **Morundah** (start 7 pm)
- Thursday 17 June: **Murrumbidgee Landcare**, Platypus talk at **Wagga Wagga** (start 6 pm)
- Saturday 19 June: **Threatened Species & Bushfire Recovery Forum** at **Bright** (12-4 pm)

If your organisation is interested in hosting a platypus or rakali conservation webinar, please contact the APC.

Australian Platypus Conservancy



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