

Ripples

Newsletter of the **AUSTRALIAN PLATYPUS CONSERVANCY**

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LOW FLOWS AND PLATYPUS: LESSONS FROM RUNNING CREEK

Drought clearly will have a devastating effect on platypus populations if waterways dry up completely. But what if flows simply decline to the point where water becomes stagnant? In theory, this too should be a problem for the animals—many of the small gilled organisms (such as mayfly and caddis larvae) which are important foods for the platypus can only survive in reasonably well-oxygenated water. So how well does the platypus cope when faced with inadequate flows in the real world?

New information relating to this issue was gained last summer along Running Creek, a small stream arising on the eucalypt-clad slopes of Kinglake National Park, north of Melbourne. In contrast, the lower reaches of the creek have been extensively cleared and are mainly used to graze beef cattle.

The APC has been monitoring the platypus along Running Creek since 1999, when a small breeding population was first confirmed to occupy the stream's middle reaches. The population's size and distribution have been tracked in conjunction with a comprehensive stream rehabilitation program undertaken by Melbourne Water. In co-operation with local landholders, stands of willows have been progressively removed from the creek margins, and the banks and channel stabilised with rocks where this has been needed to control erosion. The banks have been fenced to limit access by livestock, and substantial numbers of indigenous shrubs and trees planted.

To find out how platypus have responded to these activities, both radio-tracking and live-trapping studies were undertaken in 2003 — a period marked by severe drought, with flow along Running Creek dwindling to a trickle for most of the summer and effectively ceasing for two weeks in April. Interestingly, under drought conditions, radio-tagged platypus spent most of their time feeding in rehabilitated parts of the stream, with 96% of activity records associated with the two areas where habitat restoration works had been carried out in the summers of 2001 and 2002. By comparison, less than 20% of platypus activity records had been associated with the same two sections of the creek in the summer of 2000, when a similar radio-tracking study was undertaken in the months before habitat works were initiated.

Two factors in particular are believed to have contributed to the greatly increased usage of rehabilitated areas by platypus.

Firstly, the disappearance of densely fibrous willow root mats (which in many places had previously choked the channel) is predicted to have improved the efficiency of platypus foraging, by making it easier for invertebrates to be captured.

Secondly, the rehabilitated areas favoured by platypus typically contained at least 2-3 times more dissolved oxygen through summer and autumn as compared to other sites along the creek. In turn, this difference appeared to be due to a number of factors, including better flow capacity in the absence of encroaching willow roots; improved water aeration at the rocky riffles placed along

the channel to stop erosion; and reduced demand for dissolved oxygen after willow roots vanished.

Thus, the Running Creek results have helped to confirm that platypus discriminate in favour of habitats characterised by adequate levels of dissolved oxygen—and that conservation activities which improve this aspect of waterway health can provide a measurable positive benefit for the animals.

Did You Know That....

Platypus burrows are typically located in banks that rise at least one metre above the water and are also thickly covered by overhanging plants – thereby protecting the burrow from erosion and helping to ensure that a platypus can come and go without attracting the attention of predators (such as foxes or large owls).

STILL IN A TANGLE

The Australian Platypus Conservancy conducted its first live-trapping survey along Mount Emu Creek near Skipton (in western Victoria) in August 2003, as part of an ongoing program to investigate the platypus's status and distribution in rural areas.

One of the nine animals captured in the overnight session — a juvenile female — was found to have a red plastic ring caught firmly around her neck. Fortunately, APC researchers were able to remove the offending item, which appeared to be a safety-seal ring from a carton of cream. Otherwise, as this small animal continued to grow, she would almost certainly have suffered a slow and painful death from strangulation or infection.

This incident was a graphic reminder that the problem of litter entanglement is not confined to urban waterways, where APC surveys have revealed many sorry examples over time.

For example, five of the 67 platypus (or 7.5%) encountered in the Melbourne metropolitan area in the summer of 2002/03 had items of litter caught around them.

Three of the animals (all juveniles) carried rubber bands around their necks, which are unlikely to have caused them serious injury. However, the other two cases were more serious: a young male had a thick plastic band (of unknown origin) already cutting deeply into his neck, while an adult female was encumbered with a potentially lethal noose of nylon fishing-line.

The varieties of litter found on platypus this year can be added to a lengthy list of items that have previously been removed by APC staff, including a plastic cable-tie, a rubber canning jar seal, a gasket seal from a motor vehicle engine, other safety-seal rings, an elastic garment cuff, and a metal ring removed from “Lucky”, one of four platypus who can be adopted through the APC sponsorship scheme.

Despite such disturbing findings, some evidence suggests that the impact of litter on wildlife around Melbourne may be dropping. While the 7.5% entanglement rate recorded for suburban platypus in 2002/03 was higher than the previous year's figure of 5%, both values are below the figure of 10.5% reported in the first three years of Melbourne Water's Urban Platypus Program, from 1995-1998.

Measures such as the installation of litter traps in stormwater drains, better design of rubbish bins, community “Clean Up” days along waterways, and better public awareness of the problems arising from litter are probably all helping to reduce the amount of trash entering streams and rivers.

Clearly, though, more can and should continue to be done to reduce the hazard posed by litter to platypus (and other wildlife such as waterbirds and tortoises). People can make a genuine contribution by minimising the amount of rubbish they generate and helping to pick up litter from the environment. In addition, cutting through **all** plastic or metal rings or loops before recycling or disposing of them makes real sense—just in case these happen to end up where they don't belong.

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PLATYPUS AND THE DROUGHT

Exceptionally dry conditions have prevailed across much of eastern and southeastern Australia this summer, raising the question: How do platypus cope in times of drought?

A platypus will starve to death if its habitat dries up completely. Stagnant conditions caused by low water flow can be nearly as big a problem for the animals, reducing their food supply in the form of small freshwater creatures such as insects, shrimps and worms. While a platypus can let its body temperature drop and remain inactive in a burrow to avoid inhospitable conditions, this sort of behaviour has only been recorded in the colder months of the year, and only for fairly short periods (less than a week).

Drought also increases the risk that land-based predators such as foxes will be able to kill platypus when the latter are forced to spend more time feeding in shallow water (or, worse yet, have to trek across dry land to travel between pools).

The most extreme effects of drought are generally experienced in middle to late summer, at the same time that juvenile platypus first emerge from nesting (or nursery) burrows. The increased population size will necessarily result in greater competition for food—with young animals most likely to lose out due to their inexperience and lack of skill in foraging. Having recently weaned up to three offspring, breeding age females are often very thin in late summer, and so may also be particularly likely to die in drought-affected years.

Intuitively, one would expect that platypus are most likely to disappear during drought from habitats which were relatively unproductive even before the onset of dry weather.

For instance, a survey undertaken by the APC along the upper Maribyrnong River in February 2003 failed to find any platypus for the first time since surveys commenced along this waterway in 1996. However, the animals have always been fairly sparse in this section of waterway, with no adult females recorded to date—consistent with the hypothesis that the upper Maribyrnong comprises suboptimal platypus habitat even in years of reasonably high rainfall.

Faced with deteriorating habitat conditions, at least some platypus are predicted to become refugees and migrate to a different part of the catchment—particularly if the areas remain linked by water.

As one apparent example, the results of APC surveys along the Barwon River in early 2003 indicated that platypus had increased (as compared to the previous two years) in the middle reaches of the waterway, where large pools continued to provide feeding opportunities for the species. In contrast, platypus numbers had dropped farther upstream, where flows had declined more dramatically in response to drought.

In catchments where platypus populations have declined greatly or become severely fragmented, the species' ability to survive drought cycles may well be tested to the limit—particularly if water flows are markedly compromised by irrigation or other forms of water extraction. Establishing

environmental flow standards which both improve river health in years of good rainfall and ensure that adequate refuge areas remain for wildlife in times of drought is accordingly a key issue for conserving the platypus over the longer term.

PLATYPUS AND THE DROUGHT: HOW TO ASSIST A STRANDED ANIMAL

The APC has received a huge number of calls this summer from landowners in drought-affected regions concerned about the welfare of platypus apparently trapped in shrinking pools.

Sadly, there's no straightforward, easy answer to the question: "What's the best way to assist the animals' survival?"

Platypus can walk, and so in theory can leave an isolated pool and head off in search of a better place to live. However, their chance of success will necessarily depend on the distance to the nearest permanent water body—platypus can only feed in the water, and when walking across land are vulnerable to heat exhaustion as well as predators. While the animals have occasionally been found wandering several kilometres from the nearest waterway and lived to tell the tale, many platypus will undoubtedly end up dying if forced to travel a substantial distance on foot (say, more than a few hundred metres along a dry creek or river bed).

Persons who are worried that a platypus living in a small pool may be running out of food can try supplementing the animal's diet until normal flows resume.

While any amount of extra food may potentially be useful, platypus do need to eat a lot relative to their body size - based on studies undertaken in captivity, each animal needs to consume the equivalent of at least 15% of its body weight each day to thrive, with animals typically weighing in the order of 800-1400 grams (females) or 1200-2400 grams (males).

Accordingly, if people really intend to get serious about helping a platypus in this manner, they should plan to provide at least a couple of large handfuls of food a day. Platypus are carnivores, specifically adapted to finding live invertebrate prey in the water. In practice, given that it's not appropriate to damage natural habitats in search of platypus tucker, the best source of food is likely to be worms collected from large compost piles or a productive worm farm. Ideally, the worms could be tossed into the water near the animal when it becomes active (or at dusk). Even if it takes awhile for the platypus to grasp the concept that food is falling from the sky, the animal should find the worms if it's foraging in the immediate vicinity.

If a platypus is found a long way from water or in a remnant puddle, the best strategy is generally to take the animal immediately to the nearest stretch of suitable habitat so it can start to feed. The only exception will involve animals that are injured or otherwise clearly appear unwell, which ideally should first be taken to a veterinarian for professional assessment and treatment.

In either event, it's important to take great care when picking a platypus up, given that adult males are equipped with a sharp, poisonous spur on the ankle of each hind leg. The safest way to grab and hold a platypus is by firmly grasping the end half of the tail, which is beyond the reach of the spurs.

Once a platypus is in hand, it should be confined immediately in an appropriate container, such as a hessian sack or other reasonably roomy cloth bag (knotting the top firmly with twine or the equivalent to make sure the animal stays inside). A sturdy box with a lid may also be suitable, as long as the box is adequately ventilated as well as secure.

Because the body temperature of a platypus is normally a few degrees below that of a human, its feet and bill should feel cool at all times. It is also essential that a platypus not be allowed to overheat while being transported—for instance, by ensuring its holding container remains shaded, especially on warm days.

Did You Know That....

A female platypus incubates her clutch of one to three leathery-shelled eggs by clasping them between her belly and curled-up tail. The newly hatched juveniles measure less than two centimetres in length. Their emergence from the egg is assisted by the presence of a special bump (or caruncle) at the tip of the snout, an inward-curving egg tooth, and forelimbs armed with tiny claws.

PLATYPUS CARE EXTENDS ITS SEARCH

Since the *Platypus Care* program was launched in November 2002, the Australian Platypus Conservancy has been receiving a steady stream of platypus sightings reports from members of the general community. While most sightings relate to Victorian waterways, information has also been received from persons living in or visiting New South Wales, the ACT, Tasmania and Queensland.

Working primarily in partnership with the Victorian Catchment Management Authorities and Melbourne Water, *Platypus Care* will focus over the next few months on obtaining sightings (both recent and historical) through Landcare networks and community-based environmental programs such as Waterwatch.

Assistance will also be provided to a variety of initiatives that have arisen in Victoria in response to the *Platypus Care* program.

For example, a number of schools have decided to collect sightings reports from local landowners as a special environmental education exercise.

Similarly, some city councils have asked to help publicise the program both to assess the health of local waterways and improve community awareness of freshwater conservation issues.

Persons wishing to contribute information to *Platypus Care* can fill in the form below or pick up a standard reporting brochure from Victorian public libraries, CMA offices, or DSE Information Centres. Platypus sightings can also be registered on-line (or a copy of the reporting form can be downloaded and then filled in by hand) by visiting the *Platypus Care* website: www.platypus.asn.au

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PLATYPUS CARE—A NEW LOOK FOR PLATYPUS

For the past nine years, the APC has been using live-trapping surveys to find out more about the status of platypus populations in different areas and habitats. To date, netting has been undertaken in waterways located in eleven of Victoria's 29 drainage divisions, along with two rivers on Kangaroo Island.

From this work, two important generalisations have emerged. Firstly, while platypus are still doing well in some places, other populations are sparse or fragmented—or even seem to have disappeared. Secondly, live-trapping work is simply too difficult and time-consuming to ever provide, on its own, a comprehensive overview of how platypus are faring across extensive parts of their range.

As an alternative approach, the Conservancy has recently developed a new program—*Platypus Care*—to map where platypus occur based on community sightings of the animals. The idea behind *Platypus Care* is simple. Platypus are one of the most well-known and distinctive animals in eastern Australia, and many people—including anglers, canoeists, bushwalkers, picnickers, and landholders with stream or river frontage—see platypus on an occasional or regular basis.

Furthermore, pilot studies undertaken by the APC in several river catchments have shown that a remarkably good fit exists between where platypus are commonly seen and where they are captured in the course of live-trapping studies.

The records collected through *Platypus Care* will be used to help assess the status of platypus on a catchment-by-catchment basis and identify populations which are small or otherwise may be at risk. The *Platypus Care* database will also assist efforts to map catchment condition, develop effective plans for restoring waterway health, and monitor how the environmental values of streams and rivers improve as a by-product of conservation activities.

Providing feedback to communities about the status of platypus in their region should both promote interest in the natural environment and sharpen public awareness of the need to protect the animals and their habitats.

In the first instance, *Platypus Care* will mainly focus on collecting sightings from waterways in Victoria and adjoining parts of New South Wales. Accordingly, the program was launched in October 2002 at the Eltham Wiregrass Art Gallery (in Melbourne's eastern suburbs) by the Victorian Minister of Environment and Conservation, Sherryl Garbutt.

Platypus Care is being implemented in close co-operation with Catchment Management Authorities in Victoria and Melbourne Water. Funding to offset the costs of *Platypus Care* has been generously provided by all of the following:

State Government of Victoria
Corangamite Catchment Management Authority
Glenelg-Hopkins Catchment Management Authority
Goulburn Broken Catchment Management Authority
Melbourne Water
North Central Catchment Management Authority
North East Catchment Management Authority
West Gippsland Catchment Management Authority
Wimmera Catchment Management Authority

PLATYPUS CARE: THE INSIDE STORY

The success of *Platypus Care* clearly depends on the widespread participation of people willing to share their personal knowledge of platypus. To get the program off to a flying start, *The Weekly Times* newspaper agreed to publicise *Platypus Care* in mid-October. Together with background information about platypus biology and conservation, readers were provided with a special copy of a sightings report form.

Over the next twelve months, stories about how members of the community can assist platypus conservation by reporting sightings of the animals will also appear in local newspapers and a variety of newsletters and magazines, to reach as broad an audience as possible. Printed copies of the *Platypus Care* brochure and reporting form are now available for people to pick up from Catchment Management Authority offices, Information Centres managed by the Department of Natural Resources and Environment, and public libraries across Victoria. For those who would prefer to record the details of their platypus observations on-line, this option is also available by visiting the *Platypus Care* website: **www.platypus.asn.au**

The *Platypus Care* website is hosted by Vicnet and was designed and developed by John Kent (jekent@optushome.com). The website provides advice about how to go about looking for and identifying a platypus, and describes other species which may potentially be mistaken for a platypus, particularly in low light near dusk or dawn.

In the longer run, it is expected that this website will also be an ideal place to provide students and the wider community with a summary of what has been learned through *Platypus Care*, in the form of maps describing the current distribution of the animals across river catchments.

SPONSOR A PLATYPUS

In the course of an APC live-trapping survey undertaken in April 1999 as part of Melbourne Water's Urban Platypus Program, a juvenile male platypus was captured with a metal band (possibly scrap originating from a nearby light industrial area) tightly encircling his throat. Fortunately, Conservancy staff were able to cut through and remove this item. Otherwise, as the young animal grew bigger, the band would slowly but surely have strangled him.

Although officially identified by his Trovan microchip transponder tag as 01F022BF, the young male was nicknamed "Lucky" before being released back to the wild. Lucky has now been recaptured on several occasions, confirming that he is alive and well and occupies an area extending several kilometres upstream from where he was first captured along Diamond Creek. Most recently, in October 2002, Lucky was found to be a robust as well as fully mature animal, weighing a respectable 1820 grams as compared to only 1215 grams when he was first examined. Lucky is one of four animals that can be selected by people wanting to sponsor an individual platypus identified through the Conservancy's research and conservation programs.

For each sponsored platypus you will receive:

- A certificate bearing your name (or the name of a person you designate, if the sponsorship is intended as a gift), a scanned picture and description of the platypus, and information about the area in which he or she lives.
- A blank platypus greetings card.

The cost of sponsorship (Aus. \$) is as follows:

1 platypus only: \$10.00; 2 platypus: \$18.00; 3 platypus: \$25.00; All four: \$30.00.

Sponsorship application forms can be obtained from the APC website or by contacting the Conservancy directly.

PRIMARY PLATYPUS RESEARCHERS

Students from Darraweit Guim Primary School have recently been learning about the specialised craft of platypus research.

As part of the Victorian Government's Scientists and Engineers in Schools Project, biologists from the Australian Platypus Conservancy have been working with twenty-two students from Grades 4-6 to develop their understanding of how scientists go about studying nature.

By anyone's reckoning, the platypus is a difficult species to study in the wild. The animals are mainly active at night and spend nearly all of their time feeding underwater or resting underground in a burrow. They are not prone to congregate or vocalise, blend in well with their surroundings, and rarely leave any evidence of their activities in the form of tracks, scats or food scraps. Even the entrances to platypus burrows are typically very well hidden and hard for humans to detect.

However, it is precisely this degree of difficulty that makes the platypus an ideal subject for encouraging young students to think about the challenges involved in working as a field scientist and organising a research project.

Because the Conservancy is working with the Upper Maribyrnong Catchment Landcare group at Darraweit Guim to determine how best to conserve the platypus living in Deep Creek, the students also have had a special opportunity to see science being linked to practical environmental action in their own backyard.

The students have been involved in a number of research tasks, including helping to set nets for a platypus live-trapping survey and then watching Conservancy staff as they measured and assessed the condition of captured animals.

The results of the Darraweit Guim survey were interesting in that no fewer than thirteen of the fifteen individuals that were captured proved to be males.

This highly skewed sex ratio (which paralleled the findings of a previous survey undertaken in the area) suggests that some habitat problems may need to be addressed specifically to make the upper reaches of Deep Creek more productive of aquatic invertebrates (the basis of the platypus food supply) and hence more attractive to breeding females.

The students also received instruction and first-hand experience in the fine arts of observing platypus in the wild and describing the quality of habitat along the section of Deep Creek running behind the school.

School Principal Rob Rindzevicius said that the students will build on their lessons with Australian Platypus Conservancy researchers by developing a multi-disciplinary project entitled "Deep Creek Platypus: Now and Forever". They will generate a report on their local platypus population which will form the basis of a public presentation to the Darraweit Guim community. A group from the school also plans to present a paper on their platypus work at the 2003 student conference on river management issues in Mildura.

Did You Know That....

When juvenile platypus emerge from their nursery burrow for the first time in summer, they are fully furred, well co-ordinated, and nearly (80-90%) as long as adult animals. Accordingly, there is no special term in the English language for a young platypus—though Conservancy biologists sometimes refer to such individuals as "platypups".

AND THEN THERE WERE NONE?

The process by which a species or population goes extinct is most often blamed on chronic threats (such as progressive habitat loss or over-hunting). However, as populations shrink they also become less able to survive unlucky chance events, such as droughts or bushfires. Biologists have coined the term “minimum viable population” to describe the smallest number of animals that are expected to persist on their own, despite year-to-year variation in survival.

In practice, computer models suggest that an isolated platypus population will need to comprise at least 50-60 adults to ensure that the population has a reasonably high probability of surviving for 100 years or more. Smaller populations are progressively more likely to go extinct—or, put differently, less likely to survive adverse environmental pressures when combined with bad luck.

The results of recent platypus surveys along the Curdies River—undertaken on behalf of the Corangamite Catchment Management Authority—perhaps reflect a case in point.

The Curdies River is located in southwestern Victoria, about midway between the regional centres of Colac and Warrnambool. The catchment generally receives ample rainfall and supports many productive dairy farms. The down side is that pastures have often been established right to the edge of the river, with little or no cover provided by native vegetation on the banks. Comments by local residents also suggest that the amount of summer flow in the river and its tributary streams has declined in recent years, so that sections of streams which were once reliably perennial—providing year-round habitat for aquatic animals—now regularly cease flowing in dry seasons.

Importantly, the Curdies is also quite a small river, measuring just 2-6 metres wide in most places. Accordingly, it is likely that the entire Curdies catchment supported at most a few hundred platypus at the time of European settlement.

The APC set platypus survey nets in the Curdies system on two occasions in March 2002, providing replicated sampling of 31 kilometres of the river between Cobden and Timboon. Platypus were not encountered on either night.

The absence of animals at survey sites was mirrored by the pattern of platypus sightings reports—received through articles placed in the local newspapers and direct discussions with landowners along the river. In brief, only seven reports of sightings were obtained. Several persons born in the area stated that they had never seen a platypus nor heard of anyone else ever seeing one. The only reports of frequent sightings in any part of the catchment date back to the 1950's, with just two reports of platypus seen in the 1990's.

Based on the above, while it is possible that a few platypus survive in the Curdies system, it seems highly unlikely that enough individuals remain to comprise a viable population.

The restoration of platypus as an integral part of the Curdies ecosystem may well require that problems relating to river productivity and health be addressed across the catchment. Happily, the Corangamite CMA is currently developing a plan to achieve those ends in partnership with the local community. In this context, the reinstatement of platypus may best be viewed as both a worthy long-term goal and a biologically appropriate benchmark for catchment-wide improvement.

KNOWING ABOUT NETS

Platypus are air-breathing animals which can stay submerged for just a few minutes before drowning — especially when actively swimming. Accordingly, nearly any type of one-way net set to capture fish or other edible freshwater fauna (e.g. drum nets, “opera house” or other folding frame nets, or yabby pots) can potentially kill platypus if the animals live in the area.

A horrifying example of the slaughter that can be caused by misusing these nets was reported to the APC last summer by a landholder living in coastal Victoria. While walking with her children along a forest stream, she spied a derelict eel net set in the channel. After being retrieved from the water, the net was found to be full of bones—including a minimum of 17 confirmed platypus skulls!

While nothing can be known for certain about the circumstances surrounding the net’s history, it was not found in an area where nets of this type are allowed to be set legally. Furthermore, given that the stream holding the net was quite small, it is likely that the net had been abandoned for some time — perhaps the best part of a year or even longer — for so many animals to become trapped and die.

Because each platypus typically feeds along many kilometres of waterway, it is also likely that the net decimated platypus numbers over a very large area upstream and downstream. When flows increased in winter, platypus entering the net would have drowned. In summer, when the netting was partly exposed above the surface, they would have starved.

Even when nets are checked on a regular basis, fishermen report that two or more platypus may sometimes drown overnight in a single yabby pot. In turn, it is possible that platypus — whose natural diet includes yabbies — may go out of their way to enter traps holding a source of food.

To limit the potential for platypus (and other air-breathing animals, such as freshwater tortoises) to be killed accidentally by commercial fishermen, all of the states where platypus regularly occur place restrictions on such commercial operators. For instance, eel fishermen operating under licence in Victoria can only set their nets in a limited number of locations — chosen in part because they represent habitats where platypus are unlikely to be found, such as river estuaries.

To protect their own interests as well as non-target wildlife, it is important that recreational anglers also make sure that they understand and comply with state regulations designed to conserve natural populations. In Victoria, for example, yabby pots or other permitted folding frame mesh traps are only supposed to be set in dams or ponds on private land — as of September 2001 it is illegal to set such nets in streams and rivers.

More generally, it is vital that people be aware that fish and yabby nets alike may kill a range of other wildlife. From the viewpoint of air-breathing animals in particular, the only way to ensure that the traps are completely safe is to provide an air space at the top of the non-return chamber when setting a net in the water.

Did You Know That....

The platypus has scent glands located just beneath the skin of the upper shoulders. The glands of adult males are most active during the breeding season, when they secrete a pale yellow, slightly sticky fluid onto the skin—providing males with a strong and distinctively musky aroma at this time of year. By comparison, female scent glands are both smaller and less active year-round.

THE INTERNATIONAL PLATYPUS

The amazing platypus has long fascinated people around the world. The extraordinary hold which the species can have on the imagination is well illustrated by the case of Winston Churchill. At the height of World War II, the British Prime Minister asked that a consignment of live platypus be sent to London. Sadly, the male selected to make the journey to England died just four days from his destination when anti-submarine depth charges were detonated under the ship. The platypus was subsequently stuffed and mounted to become a prized display on Churchill's desk.

The worldwide interest in the platypus continues to this day. The Conservancy's website is flooded by international visitors seeking information on platypus biology and conservation. The species is a favourite topic of study in many overseas schools and colleges, with student projects sometimes leading to a class fund-raising drive to sponsor a platypus through the APC's program.

In fact over 60% of supporters of the platypus sponsorship scheme are from overseas. Most of these live in the United States, but people from Canada, the United Kingdom, Germany, France, Sweden and the Netherlands have also become involved. A similar story pertains to membership in Friends of the Platypus. Nearly 25% of those who support the work of the Conservancy by becoming Friends are from outside Australia. Americans are again best represented among overseas members, though many others have joined from a wide range of countries.

Relatively few overseas visitors participate in Conservancy fieldwork, particularly as the APC tries to accommodate numerous volunteers from Australian universities and local conservation groups. Nevertheless, enthusiastic participants have recently included persons hailing from the UK, USA, Netherlands, Denmark, Austria, Norway and Japan.

The APC's *Platypus Insights* program is also of great interest to overseas visitors. With no platypus found in foreign zoos, a trip to Australia provides the only way to see this remarkable mammal. Accordingly, an *Insights* tour, offering an exceptional opportunity to observe a platypus in the wild, is a popular experience for many tourists.

Clearly, although the platypus is a uniquely Australian animal, it also qualifies as a genuine "World Heritage Species".

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COUNTING ON CONDITION

To fuel its active lifestyle, a wild platypus must consume around 20-30% of its own body weight in food each day, mainly in the form of aquatic invertebrates.

In other words, an average-sized (1.5 kg) platypus needs to find and capture more than 2 kilograms of small freshwater organisms (worms, snails, larval mayflies and caddisflies, water bugs and diving beetles, peashell mussels, etc.) each week to stay healthy and happy.

So what typically happens when waterway productivity is reduced because of pollution or habitat degradation: do the platypus living along the waterway simply become skinnier, or do their numbers decline?

To help answer this question, APC biologists have for many years routinely assessed the physical condition of all platypus handled in the course of live-trapping surveys.

Each animal is weighed, and the amount of fat found in the tail (where a platypus stores up to 60% of its total body fat) is assessed by squeezing the tail edges gently. The results of this "squeeze test" are scored using a standard five-point scale developed by Tom Grant and Frank

Carrick in the 1970's: the tail of a very fat platypus (class 1) will be firm and difficult to bend inwards, while the tail of a starving animal (class 5) will be soft and limp, with the shape of the tail bones clearly outlined beneath the skin.

More than a thousand platypus have been examined by APC researchers since 1989, including animals associated with lakes and backwaters as well as streams and rivers, and national parks as well as heavily modified agricultural or urban landscapes. Interestingly, platypus fat reserves have proven to be remarkably consistent across waterways and habitat types, with the vast majority of animals (93%) belonging to tail fat classes 2 or 3.

Of the remainder, 5% were assessed as being in top condition (tail fat class 1), with roughly equal numbers of males and females assigned to this category. A disproportionately large number of juveniles was included among the 2% of all platypus rated as very thin (class 4) - presumably reflecting their lack of experience in foraging as compared to adults. Class 5 animals have not yet been encountered in the wild by the APC.

In turn, these findings suggest that platypus are remarkably good at matching population size to the amount of food available in their environment.

This finding is not completely unexpected, given that platypus are top order predators—as a group, predators tend to avoid over-crowding by means of social behaviours such as marking their home range boundaries with scent—backed up by aggression, if necessary.

From a practical point of view, this means that there is no reason to expect that platypus will ever outstrip the capacity of their local habitat to sustain them, or otherwise greatly overpopulate an area.

As well, it provides a scientific basis for choosing platypus population density as a useful indicator of the relative productivity of a stream or river—and a way to monitor how waterway health responds to conservation activities or other forms of habitat change along the banks or channel.

MACKENZIE RIVER UPDATE

The Mackenzie River arises on the slopes of the Mount Difficult Range in Grampians National Park and, in theory, joins the Wimmera River near the town of Horsham.

In practice, a large proportion of the Mackenzie's water is diverted for irrigation or urban use, with flow along the natural channel regularly ceasing in summer below the off-take channels located at the Laharum distribution heads.

In November 1997, the APC undertook a platypus survey along 25 kilometres of the Mackenzie, sampling sites within the national park as well as farther downstream on privately owned farmland. Just three platypus were encountered, including a male and a female recorded near the park boundary, and a second female captured on a grazing property not far from Wartook township (about 10 kilometres downstream of the park).

In November 2001, the APC again undertook platypus survey work along the Mackenzie, with funding provided by the Wimmera Catchment Management Authority. A number of CMA staff also worked with Conservancy biologists to set survey nets and check them after dark.

The results confirmed that platypus continue to reside along the Mackenzie, although at very low density—just one adult male was captured overnight at a site close to Wartook. Furthermore, this animal appeared to be unusually old, given his heavily scarred bill and tail and the fact that both of his spurs were broken off at the base—the first time that this has been observed by the APC. In recognition of the male's status as a venerable member of their community, local children who attended his release early the next morning decided to name him "Old Bill".

Based on the relatively small amount of survey information available, there is no scientifically valid way to determine if platypus population size changed along the Mackenzie from 1997 to 2001. However, it would not be surprising if the number of animals did decline over this period, given that only a very small environmental flow was allotted to the Mackenzie River channel downstream of Grampians National Park in the last three (exceptionally dry) summers.

A third platypus survey will be carried out along the Mackenzie later this year.

Meanwhile, the Mackenzie findings help to highlight that platypus conservation on private land can be critically important even when substantial parts of a river catchment are protected within a large and carefully managed park.

In the case of the Mackenzie, while the quality of the river environment in Grampians National Park appears to be very good, the total amount of platypus habitat reserved within the park is actually not that great when one considers that the home range of an adult female typically encompasses at least one kilometre of waterway, with males claiming even larger areas.

Furthermore, the ability of the Mackenzie's upper reaches to support platypus may be reduced by a series of spectacular waterfalls, which are likely to restrict the animals' movements.

Accordingly, the survival of platypus along the Mackenzie over the longer term is predicted to rely mainly on boosting the population's numbers through improved river management outside the national park, in the waterway's middle and lower reaches.

Did You Know That....

A platypus can reduce its use of oxygen underwater by lowering its heart rate dramatically—from an average resting rate of 140-150 beats per minute while on the water surface to sometimes fewer than 2 beats per minute while diving.

NEW PLATYPUS BOOK FOR SCHOOLS

"There Are Platypuses in Our Creek" is a new textbook for primary school students, produced by Barrie Publishing as part of its Year 4A Australian Series of non-fiction titles.

The authors are Alan Lane and Virginia King. Alan previously worked as a research scientist for the CSIRO and participated as an enthusiastic Earthwatch volunteer in a Conservancy platypus fieldwork expedition in 1999. Virginia's background includes many years of experience as a primary school teacher and as a writer, with more than 50 books for children and teachers published in Australia and overseas.

As well as presenting a range of factual information about platypus biology and ecology, the book features sections about research and platypus habitat requirements which are designed to stimulate the interest of young students in practical conservation activities.

Alan and Virginia have very generously decided to donate royalties from sales of the book to the Conservancy's research and conservation programs.

WOODY DEBRIS IS IMPORTANT TO PLATYPUS

Woody debris (including branches, sticks and logs) typically accumulates along a waterway as trees growing on the banks either shed their limbs or fall over.

In the past, a vast amount of woody debris was removed from Australian streams and rivers on the grounds that this material could contribute to erosion or flooding.

More recently, research has shown that the proportion of bank erosion actually due to snags is quite small. It has also been found that most pieces of woody debris have little or no effect on the extent of local flooding—particularly as compared to larger structures, such as bridge abutments.

At the same time, woody debris appears to be an extremely valuable resource in terms of contributing to the health and diversity of streams and rivers.

Along many waterways—particularly those lined with fine silt or sand—woody debris comprises the most abundant type of stable substrate in the water, providing a place where small aquatic animals can cling, perch, lurk, spawn and shelter from strong currents. While some aquatic invertebrates directly feed on dead wood, many others are nourished by grazing on the film of bacteria, fungi and algae which thrives on drowned timber. As well, the turbulence created as water flows over large logs both oxygenates the water and helps to maintain scour pools which are an essential habitat feature in their own right.

The importance of dead wood to native fish has been highlighted by a recent study which found that 94% of young Murray cod were encountered at sites featuring woody debris. Similarly, several studies undertaken by the APC have shown that a positive relationship exists between the amount of woody debris present in the water and platypus activity or abundance.

For example, in western Victoria's Wimmera River catchment, three waterways supporting reasonably large populations of platypus had on average 11 to 19 partly submerged logs or large branches (20 cm or more in diameter) present in each 50-metre section of channel. By comparison, in a neighbouring part of the catchment supporting few or no platypus, an average of only four emergent logs or large branches were present in each 50-metre stretch of channel.

Along Running Creek and the Little Yarra River near Melbourne, radio-tracking studies undertaken as part of the Melbourne Water Urban Platypus Program have revealed that around twice as much woody debris is present at sites where platypus regularly forage as compared to unused sections of the streams.

The positive association between platypus and woody debris presumably reflects the fact that platypus are top predators—mainly feeding on aquatic invertebrates such as worms and insects. Besides promoting the development of productive invertebrate communities, the presence of submerged wood may also improve platypus foraging efficiency by making it easier for these animals to find their prey underwater.

In short, to help conserve platypus (and a wide range of other freshwater species) it makes good sense to retain woody debris whenever possible as an important component of healthy aquatic habitats.

TAKING A DIVE

What is the best time of year to undertake visual surveys for platypus?

Research conducted at Toorourrong Reservoir (a relatively shallow impoundment, 1-2 metres deep, located north of Melbourne near the APC's research base in Kinglake National Park) suggests that the answer is at least partly related to the timing of the platypus breeding season.

Based on surveys undertaken in early morning, more than twice as many platypus were observed from June through September (when an average of 3.4 platypus were seen per survey session) as compared to October (when an average of only 1.6 animals were seen). Over the rest of the study, from November to January, an average of 2.8 platypus were spotted per survey session.

Platypus breed in the spring, with eggs typically recorded in October from Victoria. Given that about a month is believed to elapse between the time that platypus eggs are fertilised and the time they are laid in the nest, activity in this species appears to reach a peak in the period before and during the breeding season.

In the case of females, this is likely to reflect the fact that they are working hard to store fat which will be needed while raising young. In the case of males, breeding success presumably depends on moving around to monitor the reproductive status of prospective mates—while also doing their best to discourage other adult males from spending too much time in the vicinity.

By the same token, the relatively low number of platypus seen in October makes sense if a large proportion of females are involved at that time in incubating eggs and then caring for newly hatched juveniles in underground burrows.

Interestingly, platypus also spent more time on the water surface between consecutive feeding dives in the period from June through August (32% of activity time) than from September to January (25% of activity time). In terms of the animals' basic biology, this may again be related to the timing of breeding: increasing levels of male aggressiveness in late winter and early spring could well result in the population as a whole becoming more vigilant—devoting more time to watching other platypus and scanning their surroundings.

Along with the time of year, weather conditions have been found to affect the number of platypus observed at Toorourrong.

For example, the number of platypus recorded in a given survey session showed a significant positive correlation with the amount of cloud cover: the more overcast the sky, the more platypus were active during daylight hours.

As well, previous radio-tracking research has demonstrated that it is extremely difficult to see platypus feeding on windy days when the water surface is ruffled or choppy. (In consequence, visual surveys undertaken at Toorourrong are only carried out on calm, wind-free occasions.)

Based on the results summarised above, it clearly is important to take both season and weather into consideration when designing or interpreting observational surveys for platypus—particularly if there is any intention of comparing the results across waterways or through time.

To help community groups deal more effectively with these issues when endeavouring to set up a visual monitoring program for platypus, an article summarising the full findings of the APC study is currently being prepared for publication.

Did You Know That....

It is believed that platypus eggs need to be incubated for a period of about 10 days before they hatch. A mother platypus keeps her clutch of one to three eggs warm by grasping them between her curled-up tail and lower belly as she lies in an underground nest.

USING PLATYPUS TO PLAN

Since beginning its fieldwork programs in 1994, the Australian Platypus Conservancy has published research results in a wide range of scientific journals*. The APC is also strongly committed to sharing new findings about the platypus with management authorities and members of environmental organisations along with businesses and the wider community. To this end, the Conservancy continues to generate management reports, popular articles and special publications about platypus conservation needs.

In this context, the Australian Platypus Conservancy has been very pleased to work with Rio Tinto and the *Project Platypus* Landcare initiative to produce a new publication, "Using Science to Plan". The booklet was launched in July by Senator Nick Minchin, Minister for Industry, Science and Resources, at Parliament House in Canberra.

"Using Science to Plan" is based on work undertaken by the APC in partnership with *Rio Tinto Project Platypus* and Earthwatch in the upper catchment of the Wimmera River since 1997. The booklet describes how platypus research has contributed to Landcare in this region—both by providing landowners with detailed information on platypus habitat requirements and by using the animals' status to help monitor the effectiveness of habitat improvement projects.

Along with demonstrating the value of wildlife research to practical Landcare work, the publication also highlights the role of the platypus as a charismatic flagship for stimulating community-based environmental action.

"Using Science to Plan" is being distributed to Landcare and other environmental groups throughout Australia, as well as management agencies, educational institutions, public libraries and interested individuals. Copies of the booklet can be obtained by contacting Rio Tinto Australia, *Project Platypus* in Stawell, or the Australian Platypus Conservancy.

ISSUE 19 - June 2001

PLATYPUS IN THE BARWON

The Barwon River arises on the slopes of the Otways and Great Dividing Ranges in southern Victoria and flows through the city of Geelong before emptying into Bass Strait at Barwon Heads. Graziers began settling this catchment shortly after Europeans arrived in Victoria in 1835. Today, much of the basin continues to be devoted to the production of sheep, dairy and beef cattle, and a variety of grains and other crops.

Earlier this year, the APC undertook platypus surveys along four representative sections of the Barwon (each measuring 7.5-20 km in length), distributed between the town of Birregurra and the outskirts of Geelong. The work was commissioned by the Corangamite Catchment Management Authority, and aimed to provide information needed to develop a River Health Strategy for the area. To sample platypus effectively, nets were monitored carefully throughout the night at four to eight sites within each survey area. After being measured and micro-chipped (for permanent identification), animals were released back to the wild at the exact site where they had been captured.

The good news was that reasonable numbers of platypus were recorded in each of the four survey areas. Furthermore, a juvenile male was encountered in February at a site located near the outskirts of Greater Geelong, suggesting that breeding occurs successfully to at least the upstream edge of the city. On a less positive note, platypus were not captured at more than one-third of the sites where nets were set, with fewer animals apparently living both in the uppermost survey area (around Birregurra) and the lowermost area (between Fyansford and Gnarwarre) as compared to the river's middle reaches near Winchelsea and Inverleigh.

There is no way to know precisely how many platypus lived along the Barwon in the early 1800's. However, a number of factors are likely to have reduced the river's productivity in the past 150 years, including a decline in the numbers of native gum trees and shrubs growing on the banks, the proliferation of gorse and willows, increased rates of bank and channel erosion, inputs of salt and other pollutants from a variety of sources, and reduced summer flows.

In addition, there is good reason to believe that platypus populations along the Barwon River are being damaged by encounters with rubbish left along the waterway—three of the 32 animals captured in January and February had deep cuts or badly worn areas of fur around the neck or chest, evidently due to their protracted entanglement in loops of a tough material like nylon fishing line.

Fortunately, there is demonstrably strong community support for conserving platypus along the Barwon, with about a hundred local residents choosing to meet APC biologists at dawn after survey sessions in order to learn more about the animals and see a platypus being released back to the wild.

The Corangamite CMA is using the platypus survey results (along with several other useful measures of riverine health) to assess how well the Barwon is faring and decide which conservation actions will most effectively address environmental concerns and strengthen the river's habitat values. As importantly, the baseline platypus data generated by this year's survey program provides an objective benchmark to help monitor the changing health of the Barwon River in the future.

Did You Know That....

About half (30-60%) of a platypus's total body fat is stored in its tail. The fat helps to insulate the tail (which is thinly furred as compared to the rest of the body) when an animal is active in cold water.

Researchers can get a good idea of how fat a platypus is by examining the shape of the tail and gently squeezing its edges: the tail of a very fat animal will be rounded in cross-section and cannot be bent inwards, while a thin platypus will have a strap-like tail that can be folded along the midline.

FIRST PLATYPUS FOUND IN RUFFEY CREEK

Ruffey Creek is a highly urbanised waterway flowing through the eastern Melbourne suburbs of Doncaster and Lower Templestowe.

APC biologists were not particularly surprised to find that no platypus were recorded along Ruffey Creek in 1996, when surveys were first carried out as part of Melbourne Water's Urban Platypus Program. The scope of habitat change along the creek was underscored by the presence of a stolen car at one survey site, driven down the stream banks on the night before nets were set.

In May 2001, researchers again set nets along Ruffey Creek as part of the routine platypus population monitoring which takes place along Melbourne's waterways.

This time, they were delighted to encounter no fewer than three animals: one adult (or possibly subadult) female was captured about 50 metres above the point where Ruffey Creek joins the Yarra River, while two males (one adult and one juvenile) were recorded at a site located about 1.3 kilometres farther upstream. The adult male was travelling downstream when he entered the net, several hours after midnight—suggesting that he may have moved a kilometre or more before he was caught.

Ruffey Creek is the third waterway in the Melbourne metropolitan region (along with Diamond Creek and Mullum Mullum Creek) where platypus appear to have expanded their range in the last few years. Importantly, in all three cases platypus have been recorded for the first time in or near sections of creek where extensive channel stabilisation works—mainly undertaken to control erosion caused by storm water runoff from roofs and other hard surfaces—were implemented in the previous year by Melbourne Water. This pattern suggests that there is a causal link between stabilisation works and improved stream productivity, which in turn promotes increased usage by platypus.

It is not surprising that platypus are quite a sensitive indicator of changing conditions along a waterway, given that they depend on the presence of large populations of smaller aquatic organisms (such as insects, worms, snails, shrimps and yabbies) to serve as their dinner.

Because platypus are highly mobile animals—quite capable of moving several kilometres in a single night as they search for food or (in the case of adult males) mates—it also makes sense that they quickly occupy any vacant habitat that becomes available.

NEW PLATYPUS BOOK

Ann Moyal, member of *Friends of the Platypus* and a well-known historian of Australian science, has written a new book: "Platypus—the Extraordinary Story of How a Curious Creature Baffled the World".

It tells the fascinating story of how scientists gradually unravelled some of the mysteries surrounding this most enigmatic of animal species. Published by Allen & Unwin, the book is widely available from good bookshops.

THANKS TO VOLUNTEERS

Every type of job has its good points and bad points. Those aspiring to undertake platypus fieldwork can look forward to a lot of long nights, murky water, tangled nets, and slippery mud. On the other hand, there are few things more interesting than learning to see the world from the perspective of another species; theawns are beautiful; and it is very special to meet the huge range of people who care about Australia's wildlife in general and the platypus in particular.

More than a hundred such individuals have put their feelings into practice over the past nine months by helping out as volunteers with APC live-trapping surveys. A look at the rosters reveals that about half of these volunteers either belong to *Friends of the Platypus* or live in the district where the work was being undertaken. About a third were secondary students, tertiary students, or young people engaged in special environmental training programs.

As well, a large number of volunteers were drawn from the ranks of management agencies or local government, including Melbourne Water, VicRoads, and several Catchment Management Authorities and city councils.

Besides providing practical (and much appreciated) assistance with setting and checking nets, we hope that the experience of working on behalf of platypus conservation has given APC volunteers a better understanding of these very special animals.

SPONSOR A PLATYPUS

Since 1995, the *Friends of the Platypus* organisation has provided the main avenue for community support of the APC's work. Details of how to join the *Friends* can be found on the APC website. However, there has also been strong interest from people wishing to sponsor an individual platypus identified through the Conservancy's research and conservation programs. Accordingly, the APC has now established a platypus sponsorship scheme which initially involves four different animals:

Lucky was a small juvenile when found with a metal band stuck around his neck. Fortunately, APC researchers were able to cut through and remove this item, which would have eventually strangled him. Later surveys have confirmed him alive and well after his lucky escape.

Little Notch is a female platypus recognisable from the small notch in her upper bill, possibly caused by the sharp pincers of a freshwater crayfish. She is one of several animals who have been handled many times during ongoing research along Jack's Creek, near the APC's base at Toorourrong Reservoir Park.

Double Trouble was rescued as a juvenile from the jaws of a dog. Unfortunately, the rescuer then made a common mistake—placing the tiny animal in a tub of water for the night. When finally picked up by the APC, the young platypus was so cold and exhausted that she could barely move. However, with some expert care, she recovered completely and was eventually released back to the wild.

Magellan created a “world record” distance for platypus travel. APC surveys in the Wimmera found that this young animal had moved over 45 kilometres in search of a territory to call his own.

For each platypus sponsored you will receive:

- * A certificate bearing your name (or name of a person you designate, if intended as a gift), a scanned picture and description of the platypus, and information about the area in which it lives.
- * A blank platypus greetings card.

The cost of sponsorship (Aus. \$) is as follows:

1 platypus only: \$10.00	3 platypus: \$25.00
2 platypus: \$18.00	All four: \$30.00

Sponsorship application forms can be obtained from the APC website or by contacting the Conservancy directly.

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PLATYPUS ON THE MOVE

Knowing how far animals regularly travel - in the course of a day, a season, or their entire lives - is a basic prerequisite to understanding their environmental needs.

In a practical sense, information on platypus home range size and movements is required to interpret the meaning of platypus sightings reports, understand how habitat fragmentation can affect the animals' distribution and status in a catchment, predict how much time will be required

for platypus to occupy a rehabilitated waterway, and define the minimum amount of habitat needed to support a healthy, happy platypus population.

A platypus spends most of its life hidden from human view-either feeding below the water's surface or resting in a burrow. To map the animals' day-to-day movements, it is possible to fit them with special radio-transmitter tags and monitor their whereabouts using a wildlife tracking receiver. While this provides a very detailed picture of platypus activity patterns, the tiny size of the radio-tag battery means that a given tag can be tracked for no more than 12 weeks-only a small fraction of a platypus's potential life span.

Alternatively, information on the size of the area occupied by platypus over a period of many months or even years can be obtained by marking individuals with uniquely coded micro-chip transponders (the same type used to identify pet dogs and cats) and then later setting survey nets to locate the marked animals along a waterway.

The APC has recently reviewed the results of platypus mark-recapture studies undertaken by its staff over the last eleven years, with some interesting generalisations emerging.

In brief, 150 platypus have been captured on two or more occasions since 1989. While some animals were recorded at only a single trapping site, 16% were encountered at sites located 4 kilometres or more apart. Each male was encountered over a distance of 5.3 km on average, as compared to 0.9 km for each female. Nonetheless, female platypus certainly move substantial distances on occasion, with one adult female found to travel nearly 10 km along a Melbourne stream. The world record for long-distance movement by a platypus was achieved by a young male recorded nearly 48 km from the spot where he had first been marked (about 7 months earlier) along the Wimmera River in western Victoria.

The fact that platypus are so mobile has some important implications for their conservation.

On the positive side, platypus are expected to discover and potentially occupy rehabilitated sections of a stream or river quite quickly, as long as some animals already live within a reasonably short distance (perhaps 10 km or so) of the improved area of habitat.

On the other hand, if hazardous conditions develop along even a small section of waterway, platypus populations may be negatively affected over a very wide area - for example, if a vertical weir wall or other barrier forces the animals to leave the channel and walk around the obstacle, exposing them to an increased risk of being killed by predators.

In other words, platypus conservation is likely to be pursued most effectively when undertaken in accordance with the axiom which asks us all to think globally (or in this case, at least at the scale of a river catchment) while acting locally.

Did You Know

That observations in both captivity and the wild suggest that platypus may sometimes enter a state of torpor, in which their body temperature drops considerably and they remain inactive in a burrow for up to about six days.

Almost nothing is known about the environmental conditions or other factors responsible for triggering this behaviour, apart from the fact that it has only been observed in the colder months of the year (from late May to early September).

RECENT APC PLATYPUS SURVEY RESULTS: HOPKINS AND WIMMERA RIVERS

The Wimmera and Hopkins Rivers both mainly flow through agricultural landscapes devoted to the production of sheep, cattle and a wide variety of grains and other crops in western Victoria.

Platypus live-trapping surveys along the Wimmera River began in 1997, in co-operation with eleven Landcare groups working together in the upper catchment under the collective banner of Rio Tinto Project Platypus. Since that time, survey nets have been set at 141 sites distributed across approximately 150 kilometres of waterways, thereby sampling about one-third of the Wimmera and large sections of most of its reliably flowing tributary streams.

The most recent round of surveys along the Wimmera was undertaken in December 2000 to monitor the status of platypus in two key areas for the species - the Wimmera River between Elmhurst and Crowlands, and parts of Mount Cole Creek.

The good news is that the platypus population occupying the upper reaches of the Wimmera proper appears to be thriving, with a large proportion of the captured animals comprising breeding age females. On the other hand, it appears that platypus may have genuinely declined in the past 12 months along Mount Cole Creek, with no animals recorded in two areas where a total of 15 individuals have been marked since 1997 (and where at least five platypus have previously been captured in any given survey session).

The only factual evidence bearing on possible reasons for such a decline has been obtained with the help of a local landholder, who took the trouble to carry home the remains of a dead platypus found near the creek in June and promptly report her find to the APC.

A careful post-mortem examination revealed that the animal (a young male) had substantial fat reserves, indicating that he had not died from disease or malnutrition. The only visible injuries were to the top of the skull (which had been crushed at the back) and to the neck (which had been broken). The most obvious explanation was that the animal had died after being grabbed by the head and shaken forcefully by a predator. Based on the pattern of damage to the skull, the culprit was most likely to be a fox (or a similar-sized dog).

Terrestrial predators like the fox are most likely to be a problem to platypus survival along relatively shallow and narrow waterways (like Mount Cole Creek), particularly if water flows decline during dry weather and thereby further reduce opportunities for platypus to escape or hide effectively. In such cases, the best long-term strategy for helping platypus to cope with predators-or improve the likelihood that a depleted platypus population is replenished through natural migration into the area-may well involve encouraging an abundance of shrubs and smaller plants to grow along the channel. The vegetation should both limit easy access by predators and provide platypus (and other potential prey species) with protective cover.

In the case of the Hopkins River, platypus surveys were first undertaken near Mortlake in March 1999, in co-operation with the Central Hopkins Land Protection Association. A total of seven platypus, all adult males, were recorded at sites distributed along a 40 kilometre stretch of the main river.

APC researchers recently resurveyed the same section of the Hopkins, and were pleased to encounter a total of eight platypus, suggesting that the population is currently stable with respect to the overall number of animals residing in the area. As was also true in the first survey, more than half of the animals were rated as being in better than average condition in terms of their fat reserves. As well, three of the eight platypus were females, confirming that at least some sections of the survey area are likely to be providing breeding opportunities for the species.

PROTECTING PLATYPUS LEAFLET

Australian Platypus Conservancy studies of urban waterways have found that a large number of platypus become entangled in litter. On average, more than 10% of the animals examined during APC surveys have had at least one piece of litter caught around them.

In country areas, evidence has emerged of another problem for platypus caused by human activity. Many animals have been recorded with cuts or scars, usually to the head or bill. Such injuries appear to result from encounters with barbed wire or other fencing materials that cut into platypus as the animals swim underwater with their eyes closed.

To raise public awareness of these issues, the Conservancy has produced a leaflet entitled *Protecting Platypus*. Six case studies from the APC's records are used to graphically illustrate some of the horrific injuries suffered by platypus as a consequence of encountering items such as discarded fishing-line, dumped industrial and building waste materials, domestic rubbish and derelict fencing wire.

The new publication is being circulated widely to schools, libraries, community groups, councils and management agencies. Copies can be obtained by contacting the Australian Platypus Conservancy.

The *Protecting Platypus* leaflet has been sponsored by ITW Hi-Cone, which manufactures photodegradable plastic ring carriers. When exposed to sunlight, ultra violet rays cause the plastic in Hi-Cone rings to lose its tensile strength and become brittle so the material is eventually reduced to dust. In turn, this should significantly lower the risk of entanglement by platypus and other aquatic species where ring carriers have been thoughtlessly discarded.

NEW POSTER

The A PC has recently produced a new colour poster to highlight platypus conservation, with the help of a Parks Victoria Community Grant. The painting of two platypus diving in a swirl of bubbles is by leading wildlife artist, Pete Walton. Pete is a prominent member of the Wildlife Art Society of Australasia and is currently working on a leopard seal illustration for Australia Post for a proposed Antarctic Territories stamp issue.

The artwork has also been used to produce a new blank greetings card. The poster and card can be ordered from the APC website.

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PLATYPUS PREFER GUM TREES

Radio-tracking studies undertaken in 1998 by APC researchers in Melbourne's southeastern suburbs (funded as part of Melbourne Water's Urban Platypus program) indicated that platypus tend to avoid using stream segments dominated by willows, at least in summer.

These findings have now been confirmed by a study of how habitat attributes affect platypus feeding behaviour along Running Creek, a small stream located in the upper Diamond Creek catchment, northeast of the Melbourne city centre.

After monitoring the nocturnal movements of five radio-tagged platypus in late summer and early autumn, APC biologists determined that platypus activity was negatively related to the number of willows found on the banks. Conversely, platypus activity was positively related to the number of native trees (gum trees and wattles) growing along the channel.

Each 25-metre section of waterway in the part of Running Creek used by radio-tagged platypus supported on average 11 medium-to-large trees growing within 8 metres of the water, of which 82% were eucalypts or wattles and 8% were willows. By comparison, the same amount of bank in the area *not* used by platypus supported on average fewer than 5 medium-to-large trees, of which only 21% were native trees and 70% were willows.

Differences in water quality were also apparent when a site dominated by gum trees was compared with a site dominated by willows. Notably, only about one-quarter as much oxygen was dissolved on average in the water under willows as compared to that under eucalypts—a level low enough to stress many aquatic insects (which in turn comprise the main platypus food supply).

Similarly, research in Tasmania has found that streamside willows are associated with very low dissolved oxygen levels in summer, possibly due to high rates of bacterial growth within the dense root mats which typically invade the channel under these trees.

The very tough, fibrous nature of willow root mats are also likely to physically impede the efforts of any platypus interested in sampling invertebrates at sites where willows are abundant.

The significant negative relationship between platypus feeding activity and willows along Running Creek suggests that the size of the local platypus population may well increase if sizeable tracts of willow are progressively replaced by native vegetation.

Happily, as part of an ambitious catchment rehabilitation program for Diamond Creek and its tributaries, planning is now well underway for a series of stream improvement works to be undertaken along Running Creek.

The works—to be carried out by Melbourne Water in co-operation with local landowners and Landcare groups—will include removing willows, fencing stream banks to control access by livestock, and replanting the stream corridor with appropriate indigenous trees and understorey species.

Incorporating reliable information on platypus ecology into these and related work programs will help to ensure that they are as platypus-friendly as possible. As well, collecting benchmark ecological data *before* works are undertaken should make it possible to assess the actual contribution made by rehabilitation protocols to improving the health of aquatic wildlife habitats.

BARWON PLATYPUS STUDY

A Conservancy research program in the Wimmera River catchment has shown that platypus currently reside along a relatively small proportion of the waterways in this important wool-growing region. It seems highly likely that platypus numbers have also declined in other catchments where natural habitat conditions have been modified by agricultural practices.

The APC plans to continue its work in the Wimmera, in order to monitor the status and health of platypus in the region. However, it is essential that new studies also be commenced to examine how platypus are faring in other farming environments.

One such project, starting in spring 2000, will involve a series of surveys along the Barwon River, which flows from the Otway Ranges to Geelong in south-central Victoria. This waterway has been substantially modified since European settlement and its biodiversity values continue to be under enormous pressure from the combined impacts of rural and urban land use. In particular, salinity levels have risen dramatically as a result of man-made drainage schemes in the catchment.

Live-trapping surveys by the APC, undertaken in collaboration with the Corangamite Catchment Management Authority, will provide information on the abundance and distribution of platypus in the system. Reflecting the value of platypus as an indicator species, the research results will also make an important contribution to the Barwon River Health Strategy which is being formulated to address water and land management problems.

The surveys (using local volunteers) will be complemented by a local "Platypus Watch" campaign to encourage reports of sightings, as well as public talks by the APC to raise awareness of platypus conservation issues.

In addition to the Wimmera, the Hopkins catchment and now the Barwon, the status of the platypus in other farming areas will be investigated as further funding becomes available. As well, there is a need to determine how many platypus occur in relatively undisturbed habitats (e.g. national parks and forest reserves) to ascertain whether the species can be truly regarded as "safe" in such environments.

NATIONAL GEOGRAPHIC PLATYPUS

The April 2000 edition of *National Geographic* magazine carried an 11-page colour feature on platypus, the result of a successful collaboration between APC Conservation Biologist Melody Serena and American photographer David Doubilet.

Widely regarded as one of the world's best underwater photographers, Doubilet was faced with special challenges in getting shots of the platypus in its natural habitat. In comparison to the sharks, seals and other spectacular marine creatures which are the usual focus of David's art, the small and cryptic platypus comprised a much more elusive subject.

However, after working with an APC field team for several weeks on Kangaroo Island and around Melbourne, and lying on the bottom of a rocky creek bed for many hours in a wetsuit, some spectacular photographs of the platypus in its underwater world were obtained.

One image in particular, of a platypus twisting its way through swirling water, is an evocative reminder of the fact that this species can be traced through the fossil record to the time of the dinosaurs. The accompanying text has been designed to give the magazine's 40 million readers an overview of the unusual biological features and conservation status of this remarkable animal.

Dr Serena was the recipient of a National Geographic Society Research Grant.

RECENT PUBLICATIONS BY APC STAFF

The following articles have recently been published by APC staff and associates:

De-La-Warr, M. and Serena, M. (1999). Observations of platypus *Ornithorhynchus anatinus* mating behaviour. *The Victorian Naturalist* 116, 172-174.

Serena, M. (2000). Duck-billed platypus: Australia's urban oddity. *National Geographic*, vol. 197, no. 4, pp. 118-129.

Serena, M., Williams, G.A., Thomas, J.L. and Worley, M. (1999). Effect of a flood retarding basin culvert on movements by platypus *Ornithorhynchus anatinus*. *The Victorian Naturalist* 116, 54-57.

Williams, G. (1999). Our flagship for freshwater conservation. *Chain Reaction*, Winter 1999, pp. 18-19.

Williams, G. (2000). The urban platypus. *Greenhouse Living*, Winter 2000, pp. 10-13.

Williams, G. (2000). Unravelling the platypus mystery. *Wildlife Australia*, Winter 2000, pp. 2-5.

Worley, M. and Serena, M. (2000). Platypus need streamside vegetation. *Victorian Landcare and Catchment Management*, issue 16, pp. 12-13.

Worley, M. and Serena, M. (2000). Protecting the platypus. *Park Watch*, no. 201, pp. 5-6.

LIVING WITH PLATYPUS REPRINTED

The Conservancy's *Living With Platypus* booklet has recently been reprinted, following an enthusiastic response from Landcare and other community conservation groups, government management agencies, and schools.

The 40-page publication summarises much of what is currently known about the platypus and offers practical advice on measures that can be taken to assist platypus conservation in urban and rural waterways.

Copies of the booklet can be obtained from the Conservancy – see APC website for current cost.

Friends of the Platypus receive a free copy when they join the organisation or renew their membership.

Did You Know That....

Like most diving mammals, the platypus has blood that is rich in oxygen-carrying haemoglobin and red cells. The platypus can also reduce its need for oxygen underwater-by lowering its heart rate from more than 200 beats per minute to less than 10 beats per minute.

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CONSERVING THE PLATYPUS IN RURAL WATERWAYS

Describing a species' habitat requirements is one of the most challenging tasks faced by modern conservation biologists. Unfortunately, we cannot expect animals to provide us with a list of desirable features in their environment, nor can we read their minds. Alternatively, we *can* map the distribution of a species in a particular area and then find out whether habitat attributes vary consistently in relation to the animals' population density.

To assist platypus conservation in agricultural areas, APC staff recently completed a study of the species' habitat relationships along the Wimmera River in western Victoria. Following extensive live-trapping surveys, bank and channel characteristics were measured in an area known to support reasonable numbers of platypus (between Crowlands and Elmhurst) as well as a neighbouring area supporting few or no platypus (downstream of Crowlands).

Interestingly, several habitat features showed a very strong positive association with platypus, including the number of medium-to-large trees (mainly river red gums *Eucalyptus camaldulensis*) growing near the channel, the amount of leafy vegetation overhanging the bank, and the amount of dead wood (logs and large branches) lying in the water.

As well, some habitat features were negatively associated with platypus, including the presence of sandy or gravelly beaches along the edge of the channel - an indicator of high rates of erosion farther upstream in the catchment. In general, the habitat attributes that appear to be good for

platypus along the Wimmera are also known to be good for aquatic insects and other freshwater invertebrates such as yabbies. For example, large trees provide shade which helps to keep the water cool in summer, thereby maintaining reasonably high levels of dissolved oxygen. Organic materials such as dead leaves and branches provide places for invertebrates to feed and shelter from sources of disturbance, including strong flows. By controlling erosion along the banks, trees and smaller plants also limit inputs of mobile sediments which create poor living conditions for most aquatic organisms.

These relationships make sense given that the platypus is a top predator which mainly feeds on bottom-dwelling insects, worms, snails, yabbies and freshwater shrimp. Because platypus can only thrive as part of a productive aquatic community, it is not surprising that the animals are a valuable indicator of the biological integrity of freshwater systems.

The fact that so many of the habitat factors that are positively linked to platypus along the Wimmera relate to trees and other plants growing on the banks also highlights the key role played by good land management in stream and river health.

In short, even though we can't read their minds, the message provided by platypus couldn't be clearer. By working together in the Wimmera (and other country catchments) to ensure that stream and river margins are managed sustainably, farmers will contribute enormously both to waterway conservation and platypus survival.

HOW TO HELP A LOST PLATYPUS

Platypus breed only in late winter and spring, incubating a clutch of 1-3 eggs in an underground nest for a period of 10-11 days. The young first emerge from their natal burrow 3-4 months later, in the period from January to April. At this age they are well-furred and able to swim, but weigh only about half as much as adults. Like human infants, they also appear to be both curious and naive about the world. As a result, it is by no means uncommon for small juvenile platypus to end up in all sorts of inappropriate places - suburban gardens, ploughed grain fields, chlorinated public swimming pools, and the middle of paved city streets. As well, grown platypus are sometimes found wandering long distances from waterways when they are forced to leave an area because of population pressure or catastrophic changes to their habitat (for example, when a river dries up during a drought).

Confronted by a platypus in one's own backyard, perhaps a kilometre or more from the nearest stream, what's the best thing to do?

Firstly, although the platypus is not a naturally aggressive animal, caution is warranted whenever picking up an individual of unknown age and sex. This reflects the presence of sharp poisonous spurs on the heels of adult males. The spurs are about 1.5 centimetres long and curved like a dog's canine tooth, and while the poison is not considered to be life-threatening to humans, it can cause excruciating pain and spectacular swelling for the best part of a week. Hence, until it is established that a given platypus is definitely not equipped with such spurs, it is highly inadvisable to hold or carry the animal by supporting it from below. As a safe alternative, lift the platypus by gripping it firmly around the middle or end of its tail (but not the base of the tail, which a male can reach with his spurs).

Secondly, when selecting a container to temporarily hold a platypus, be aware that these animals are gifted escape artists. Though it may not look particularly agile, the average platypus is both very strong for its size and exceptionally good at squeezing through holes, gaps or cracks. As a temporary measure, the animals may be successfully confined for a short time in a sturdy cardboard box with a reasonably strong cover or lid.

If circumstances require that a platypus is held overnight before being released back to the wild or taken to a veterinarian, consider confining the animal within an old cotton pillow case, knotting a piece of twine tightly around the opening. Make sure that the animal has enough room inside to stretch out and move around a bit, and place the pillow case and its occupant in a box in a relatively cool (less than 30° C), quiet location where it won't be disturbed by curious pets or children. Because a platypus enters the water mainly to feed, it is generally wrong to force an animal to spend the night in a half-filled bath tub, unless a lot of food is provided in the form of live aquatic insects to replace the energy used while swimming! Even then, the animal will also need to be given a dry place to groom itself and rest.

Thirdly, if there is no reason to believe that a platypus found in an unusual place is injured, the animal should be returned to a suitable nearby section of waterway as soon as possible. Because platypus are wild animals with specialised living requirements, it is inappropriate (and illegal) to try to keep one as a pet for even a short period of time - the animal is highly unlikely to survive the experience.

Especially in drought years, a platypus may be forced to leave its territory as environmental conditions deteriorate. If the stream or river closest to where a platypus is found appears to be nearly dry, it would probably be best to release the animal along a different, reliably flowing waterway within the same river system - so the animal can potentially find its way home when conditions improve.

Did You Know That....

Based on research undertaken by Dr Tom Grant, the oldest platypus recorded to date in the wild lived to the age of 16 years. More studies are needed to determine how long individuals typically survive, though estimates of about 4-5 years for males and 6-8 years for females are not unreasonable.

IN TRAIN FOR PLATYPUS RESEARCH

The Australian Platypus Conservancy aims to be a model organisation for positive conservation action. To this end, the APC conducts highly cost-effective research, with low administrative overheads and maximum resources devoted to “hands-on” studies in the field. It also co-operates with a range of management agencies and environmental groups to ensure that research results are linked to practical measures for protecting and enhancing waterways. As well, the Conservancy runs a wide range of educational programs designed to raise community awareness of platypus conservation needs.

To expand our understanding of platypus ecological requirements, there is also a need to train more conservation biologists to tackle the challenges of studying platypus in the wild.

Along with providing places for community volunteers in fieldwork teams and work experience opportunities for tertiary students, the Conservancy has now initiated a number of formal training programs.

A second Mazda Foundation Traineeship is allowing a recent zoology graduate to spend six months involved in basic platypus research. In addition, an Internship (funded by the Ross Trust and others) is creating the opportunity for a more experienced researcher to take substantial responsibility for a major study, providing the background needed to play a leading role in APC (or other) conservation projects.

IS THE PLATYPUS AN ENDANGERED SPECIES?

The Australian federal government and state wildlife agencies in Queensland, New South Wales, Victoria and Tasmania all effectively classify the platypus as "common", implying that no direct conservation measures are warranted on behalf of the species.

In contrast, at the concluding session of the National Symposium on Platypus Biology held in November 1996, the following resolution was endorsed by a forum of Australia's leading platypus specialists:

"Although the status of the platypus is relatively secure in some areas, it is clear from the Symposium that the platypus is declining, and in some situations disappearing, from some areas of its current range, particularly in agricultural and urban landscapes.

The differing perceptions of government officials and scientists regarding the status of the platypus may partly reflect the fact that, until recently, most platypus live-trapping work has typically (and very understandably) tended to focus on waterways where the animals are expected to be at least reasonably abundant.

Over the past five years, the APC has been working hard to find out how many platypus survive in waterways that have been markedly altered by human activities. For example, a major Conservancy research program is studying the animals in the Wimmera River catchment, a major wool producing region of western Victoria. Landowners in this area report that platypus began noticeably disappearing in the 1970's, apparently in response to progressive deterioration in the quality of freshwater habitats.

The results of setting nets to survey platypus over about 150 kilometres of waterway have confirmed that the animals are absent or found at very low density through much of the catchment. At best, it appears that the entire Wimmera system (which drains nearly 10% of Victoria's total land area) currently supports no more than 200 platypus.

The Wimmera study has highlighted the tenuous position of the platypus in one agricultural catchment. Unfortunately, there is good reason to believe that this pattern of decline has been repeated in many other rural areas across the range of the species.

Similarly, while the positive outcome of surveys undertaken over the past five years around Melbourne is that platypus have been found in about half the city's waterways, the bad news is that the animals are gone from the other half. Moreover, there are far fewer animals living along most of Melbourne's streams as compared to when the city was founded about 160 years ago.

To protect platypus populations adequately throughout their range it makes sense to initiate appropriate conservation actions now, rather than waiting until this freshwater icon becomes locally endangered through neglect.

In this context, the following statement from the web site of Environment Australia, the leading federal wildlife conservation agency, is even more germane:

In recent years we have learned a lot about the Platypus. However, we need to know much more if we are to make sure that this remarkable creature survives.

NEW WETLAND WELCOMES THE PLATYPUS

The platypus will potentially use many different kinds of artificial water bodies: reservoirs, flood retention basins, ornamental ponds, recreational lakes and farm dams. However, manmade wetlands are rarely designed from the outset to be platypus-friendly. A recent project in Melbourne's eastern suburbs has set out to address this omission.

Olinda Creek, a tributary of the Yarra River, arises on the forested slopes of the Dandenong Ranges and flows about 20 kilometres through Melbourne's urban fringe before reaching the township of Lilydale. Surveys undertaken by the Australian Platypus Conservancy since 1996 have demonstrated that this waterway supports a sizeable platypus population, with 28 individuals (including 12 juveniles) marked to date. Most of these animals have been encountered in the relatively undisturbed upper reaches of the creek, with numbers declining downstream. Unless action is taken to improve the quality of freshwater habitats around Lilydale, there is a real risk that the platypus population in upper Olinda Creek will become isolated from the main Yarra population and cease to be viable over the longer term.

In early 1999, Melbourne Water carried out stream improvement works along a 700-metre section of Olinda Creek, at a site located about 2 kilometres upstream of Lilydale. The project aimed to reduce the risk of local flooding by removing willows and creating a system of flood retention ponds to divert and store surplus storm water. Given the desirability of creating additional platypus feeding habitat in this section of creek, the new wetlands system was also designed to encourage the animals to use the ponds even during times of low flow.

A secure route back and forth from the creek to the flood retention system was provided in the form of a special underground concrete pipe. Platypus are known to travel through pipes as long as the diameter is not too small nor the length too excessive. Accordingly, a large diameter pipe has been installed, with an open grate included about midway along its length so that a platypus can breathe even if the pipe is completely filled by water. As well, outflows from the new pond system terminate in relatively shallow rocky slopes rather than steep vertical drop structures, again improving platypus access.

The wetland ponds themselves have been specially contoured to provide sections of relatively steep but stable banks where platypus can build burrows. These areas are being densely planted to reduce potential disturbance by humans and predators such as foxes and wandering dogs and cats. Vegetation which overhangs the water's edge is being encouraged to help hide platypus burrow entrances. To provide additional protected space and extra edge habitat for platypus use, several small islands have been built in the ponds. In addition, some of the natural creek channel has been deepened and a series of shallow rock chutes or riffles constructed. These changes will both help to moderate post-storm flows and increase the diversity of freshwater habitats along Olinda Creek.

Conservancy researchers monitored platypus movements and use of burrows during the construction phase, so contractors could be alerted if an animal was found sleeping in the immediate vicinity of heavy equipment. By generating new information on the effects of construction on platypus behaviour, the radio-tracking work has also provided useful feedback on how best to implement future capital works programs affecting the stream zone.

In brief, platypus remained resident in the general vicinity of construction activities, gradually shifting their feeding patterns to accommodate the progress of the works. Only one burrow (unoccupied at the time) of the seven used by radio-tagged platypus in the works area was destroyed in the course of the project. By continuing to monitor the Olinda Creek platypus population, it will be possible to determine whether the number of animals living in the vicinity of the flood retention ponds increases as predicted, and if so, by how much. Meanwhile, this project has already demonstrated that new wetlands can easily be made both accessible and appropriate for use by platypus in the wild.

TRACKING DOWN TRYPS

Trypanosomes are tiny protozoan parasites found in the blood of all classes of vertebrates, including mammals, birds, reptiles, amphibians and fish.

In Australia, trypanosomes have been identified in native rodents, bats, bandicoots, wombats and kangaroos. A type of trypanosome, known to scientists as *Trypanosoma binneyi*, has also been described from the platypus.

Little is known about the life cycle or other biological characteristics of *T. binneyi*, apart from the fact that it has been recorded both in Tasmania and on the Australian mainland. While there is no evidence to suggest that a platypus is normally harmed by being infected with trypanosomes, it is possible that this situation may change if an animal is undernourished or becomes stressed, for example due to aggressive behavioural interactions during the breeding season.

As far as humans are concerned, the good news is that there is almost no possibility that people can become infected with platypus trypanosomes. In part, this reflects the fact that trypanosomes are spread from one individual to another by blood-sucking leeches, ticks or biting insects. Only one such species is commonly associated with the platypus, the platypus tick *Ixodes ornythorhynchi*, which fortunately does not regard human blood as being tasty (or even slightly edible).

To learn more about platypus trypanosomes, the Australian Platypus Conservancy has been undertaking a collaborative study since 1995 with Melbourne veterinarian Dr Ted Donelan and staff of the Central Veterinary Diagnostic Laboratory.

To determine if a platypus is infected by trypanosomes, a small sample of blood is collected after lightly anaesthetising the animal with isoflurane - a very safe compound which is also commonly used in hospitals to anaesthetise humans. A thin blood smear is prepared on a glass microscope slide and examined by an experienced veterinary pathologist for the presence of the parasites. Trypanosomes are recognised among blood cells as slender, crescent-shaped bodies with a wavy edge and short, whip-like tail.

Did You Know That....

Because platypus are predators near the top of the food chain and require large amounts of food to survive (up to about 30% of a given animal's body weight each day), it is believed that their numbers are most often limited by the availability of food in the form of aquatic invertebrates - shrimps, yabbies, horsehair worms, and insects such as diving beetles, mayflies and caddis flies.

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WHERE HAVE ALL THE YOUNG GIRLS (FEMALE PLATYPUS) GONE?

The Hopkins River basin drains nearly one million hectares of land in southwestern Victoria. More than 95% of this area has been cleared for cropping or grazing, with less than 4% of the catchment covered by indigenous vegetation. In consequence, the major water quality issue identified through most of the Hopkins basin is high salinity. As well, large stretches of waterways have been seriously degraded through bank and channel erosion.

In 1912, the naturalist J.A. Kershaw published a very detailed description of the platypus nesting (or nursery) burrows he found along the Hopkins River near the town of Mortlake¹.

...The nest-chamber is rounded in form, the bottom always being much lower than the floor of the burrow, which enters about its centre...The nest itself is composed of fine grass and gum-leaves, and completely fills the cavity. The bottom of the chamber is first covered with a thin layer of grass, followed by a thick layer of gum-leaves about four inches deep, which is continued up the sides, and - at least in one case - completely encircles the cavity, forming a compact circular nest, with the entrance in the side opposite the tunnel. It was noticeable that many of the leaves were green, and appeared to be quite fresh. The bottom of the chamber in every instance was wet, owing to surface soakage, and it is apparently with the object of avoiding this that the bottom of the chamber is excavated below the level of the burrow and so thickly lined with leaves...

To find out how the species is faring along the Hopkins today, the APC set platypus survey nets along 40 kilometres of the river's middle reaches in March of this year.

The study was conceived and undertaken in co-operation with the Central Hopkins Land Protection Association, with students from Mortlake Secondary College helping to set survey nets, and many local residents and a WIN-TV news crew meeting APC staff at dawn to see platypus being released back to the wild.

The good news is that platypus were captured across essentially the entire survey area, at 6 of the 8 trapping sites. As well, the animals all appeared to be healthy and reasonably well-fed based on the amount of fat apparent in their tails.

On a less positive note, the seven individuals encountered were all adult males - no females or juveniles were recorded.

Platypus sex ratios showing an excess of adult males have previously been reported in a number of waterways. While the factors serving to favour the presence of males have not yet been identified with certainty, one possibility is that males are more likely to be found in relatively degraded habitats than are females - because adult females demand high quality stretches of habitat to raise and wean their offspring. (Male platypus have no direct involvement in rearing juveniles.)

If true, this suggests that the development of a more balanced and productive platypus sex ratio will be both a desirable outcome and a natural indicator of improving riverine health along the Hopkins over the longer term.

¹ Kershaw, J.A. (1912). Notes on the breeding habits and young of the platypus, *Ornithorhynchus anatinus* Shaw. *Victorian Naturalist* **29**: 102-106.

Did You Know That....

According to Aboriginal legend, the first platypus was born after a young duck mated with a lonely and persuasive water-rat.

The duck's offspring inherited her broad bill and webbed feet along with the water-rat's four legs and handsome brown fur.

PLATYPUS BREEDING SUCCESS IN 1999

The birth of two platypus in captivity earlier this year captured much media attention. Happily, 1999 has also been an excellent year for platypus reproductive success along many natural waterways.

Along the Wimmera River in western Victoria, seven juveniles were recorded in the upper catchment between Elmhurst and Crowlands (near the Pyrenees Range) in April and May. By comparison, only three juveniles were captured over the same area in April and May of the previous year.

As well, the first juvenile to be encountered in the middle reaches of the Wimmera system (about 15 kilometres upstream of Glenorchy near the mouth of Seven Mile Creek) was recorded in 1999.

In the Yarra River and Dandenong Creek catchments near Melbourne, juveniles were encountered along six of the seven streams where the APC set nets in April and May to monitor platypus populations as part of the Melbourne Water Urban Platypus Program.

Breeding success was especially high along Mullum Mullum Creek in the city's eastern suburbs, where six young animals (three males and three females) were marked and released this year. By comparison, no more than two juveniles were encountered along this waterway in each of the four previous breeding seasons.

While much remains to be learned about the factors limiting platypus reproduction in the wild, the presence of large (or increasing) numbers of young platypus along a stream or river is clearly a positive sign as far as the environmental health of that waterway is concerned.

From the viewpoint of conservation, the presence of home-grown juveniles along streams and rivers is also of practical significance in helping to ensure that there are young platypus available to colonise new areas of habitat in the catchment - created as native trees and bushes are encouraged to grow along a waterway's banks, erosion is controlled, litter and other pollutants are eliminated, or adequate flows are restored along the channel.

LIVING WITH PLATYPUS BOOKLET

Since its foundation in 1994, the Australian Platypus Conservancy has been working hard to unlock some of the key scientific mysteries surrounding the species. With assistance from the Parks Victoria Community Grants Program, the Conservancy has recently produced *Living with Platypus* to make research findings more accessible to the general community.

Living with Platypus is an attractive 40 page booklet, designed with the assistance of fourth year students from The Works, the design consultancy at the Royal Melbourne Institute of Technology.

This publication summarises much of what is currently known about platypus biology and ecology and provides straightforward guidelines to assist platypus conservation. It is designed to be of interest and practical value to persons involved in waterway management at every level, including landowners, community volunteers, professional officers, consultants, and elected representatives - as well as concerned citizens and students of all ages.

Copies of *Living with Platypus* can be obtained from the APC – see website for current cost. Members of *Friends of the Platypus* will automatically receive a copy of the booklet when they join the organisation or renew their existing subscription.

Much of the information contained in *Living with Platypus* has also been included on the Australian Platypus Conservancy website to ensure that it is available to as wide an audience as possible.