

THE AUSTRALIAN WATER-RAT/RAKALI

AUSTRALIA'S NATIVE "OTTER"



1.1. Introduction

The rodents that Australians are most likely to come in contact with are recently introduced species that are officially classified as pests: house mice, black rats and brown rats. However, Australia also supports a diverse array of native rodents that have been a part of the local landscape for at least half a million years and in some cases much longer.

The largest of these is the Australian water-rat (also known as rakali), a very attractive animal weighing up to 1.3 kilograms – as big as a medium-sized platypus. The water-rat's ancestors are believed to have arrived in Australia around 5-10 million years, after swimming (or possibly rafting) from New Guinea.

The Australian water-rat is an aquatic predator which resembles a small otter in many ways:

- Muzzle is blunt and furnished with a dense set of whiskers (**below left. Photo: C. Hall**)
- Hind feet are broad, partly webbed and paddle-like (**below centre**)
- Tail is well-furred and thick to help serve as a rudder when swimming (**below right**)
- Body is elongated and streamlined
- Ears are small and can be folded flat against the head for a streamlined profile
- Fur is soft and lustrous, drying quickly and helping to keep the animal warm in the water



Even if platypus don't occur in your local creek, it may well support a population of these fascinating rodents, which are equally deserving of protection as native wildlife.

1.2. Naming

The scientific name of the species (*Hydromys chrysogaster*) translates as “golden-bellied water mouse”.

Early European settlers sometimes called this animal a “beaver rat”, even though it is actually much more like an otter than a beaver in its behaviour.

In 1995 the Australian federal government proposed changing the common name of the Australian water-rat to “rakali”, which is the term for this animal used by the traditional peoples of the lower Murray. Rakali is gradually gaining public acceptance as the common name for *Hydromys chrysogaster* but these animals are still also known as “water-rats”.

1.3. Distribution and status

Australian water-rats occupy a wide variety of natural and manmade freshwater habitats, including swamps, ponds, lakes, rivers, creeks and irrigation channels. They also inhabit brackish estuaries and sheltered ocean beaches. Water-rats are widely distributed on both the mainland and Tasmania and also occur on many offshore islands.



Distribution of *Hydromys chrysogaster* in Australia (source: Mammals of Australia)

Although very little is known about the current status of rakali in most parts of its range, capture rates in most areas tend to be quite low.

In part, this reflects the fact that water-rats are highly intelligent animals that are naturally wary of entering metal cage traps and also spend a large proportion of their time feeding in the water rather than on land. Water-rats are also very good at escaping from nylon mesh survey nets set in the water, using their sharp teeth to snip holes through the netting and escape.

In addition, rakali are relatively aggressive animals that do their best to defend a territory through scent-marking and aggressive behaviour towards other individuals. In turn, this will tend to ensure that relatively low numbers of adult water-rats occur in most habitats.

Anecdotal evidence also suggests that rakali numbers have declined in many places in southeastern Australia particularly since the mid-1990s, probably due to the combined impacts of drought and habitat degradation. More work is needed to map where water-rats occur and determine how the species' distribution may have changed in recent decades. In turn, this information will provide a factual basis for longer-term population monitoring.

1.4. Size and appearance

Adult water-rats measure up to 35 centimetres in length from their nose to rump, with a slightly shorter tail. Adult males typically weigh 0.8 kilograms (up to 1.3 kg) and adult females typically weigh 0.6 kilograms (up to 1.0 kg).

Depending on location, rakali can vary considerably in colour. The head and back may be nearly black (with golden-yellow belly fur) or some shade of brown or grey (with fawn- to cream-coloured belly fur). However, apart from occasional individuals that have lost the end of their tail through fighting, water-rats are characterised by a distinctive white tip to the tail across their entire geographic range.



The white tip to the tail is the most obvious identifying feature of the water-rat, whether the animal is in the water or on land (Photo: Carolyn Hall).

Rakali fur is moulted twice a year, being coarser and denser in winter. As in the case of platypus fur, it consists of a dense, fine layer of underfur covered by coarser guard hairs. Although water-rat fur is reasonably waterproof, it is much less effective than platypus fur at keeping its owner warm – water-rats are unable to maintain their body temperature in water temperatures below 25°C and consequently need to exit cold water at regular intervals in order to warm up in a burrow or other sheltered site.

1.5. Related species and subspecies

Hydromys chrysogaster has no close relatives in Australia, although several other species of *Hydromys* are found in the New Guinea region. By the same token, rakali is not closely related to either the European water vole (a.k.a. water-rat) or the American muskrat.

Several subspecies of *H. chrysogaster* have been proposed over time, generally based on variation in fur colour. Confirmation that valid subspecies occur will probably depend on the findings of future genetic studies.



Illustrations of the Australian water-rat in John Gould's early 19th century *Book of Australian Mammals* – four species of “Beaver rats” were recognised at that time.

L to R: Golden-bellied, Fulvous, White-bellied and Sooty.

1.6. Foraging behaviour and diet

Water-rats mainly consume aquatic prey (including fish, frogs, turtles, crayfish, crabs, large aquatic insects, mussels and clams), but the remains of terrestrial prey (such as mice and bats) have also been discovered in rakali faeces. It has been suggested that the proportion of foraging on land may increase in winter when water temperature declines.

Large rakali have occasionally been documented to kill reasonably large water birds, such as ducks and coots. They will also eat carrion and scavenge for human food scraps. Based on anecdotal reports, water-rats will travel several hundred metres across dry land to dine on delicacies, such as pet food left out regularly on a back porch.



Water-rats are excellent climbers (above left). In addition to sometimes scaling trees to look for prey such as birds and bats, they have been reported running along the roof rafters at Flinders Street Railway Station in central Melbourne.

A rakali snacks on bread provided for ducks on the banks of the Queanbeyan River in New South Wales (above right).

Rakali also appear to have the rare ability to be able to kill the introduced cane toads found in Australia's tropical north. By flipping the toads over before biting them, they avoid the poisonous parotid glands found on the back of the toad's neck.

After catching their prey, water-rats typically carry it in their mouth to a favourite feeding spot on a log or rock located at the water's edge or in the channel. Large piles of clam shells, crayfish claws or fish bones and scales can accumulate at such platforms — the remains of many water-rat meals.



A rakali at a typical feeding platform – in this case, a log in the middle of a weir pool.

1.7. Home range size and movements

Rakali are highly territorial, marking their home ranges with a strong scent reminiscent of the odour of cat urine. Apart from females raising dependent offspring, it is presumed that adult water-rats lead solitary lives.

Relatively little is known about home range size and movements in this species. An adult male radio-tracked along a small creek in Victoria was found to have a home range extending at least 3.9 kilometres, whereas three males living in Queensland had home ranges that extended at least 0.9-2.2 kilometres. An overland movement of at least 3 kilometres has also been recorded.

In places where populations are dense there is considerable fighting, as evidenced by a high frequency of bite marks on tails and hind feet. This suggests that juveniles have to disperse from their mother's home range fairly soon after becoming independent; however, nothing is known about this process.

1.8. Reproduction and life history

Water-rats can potentially breed throughout the year if conditions are favourable, but mating most typically occurs in late winter to early summer, with juveniles appearing from September to February. The gestation period is around five weeks long. Females generally first breed at the age of about a year and raise two or three litters of young in a good year. A female water-rat only has four nipples and typically raises just two to four babies in a given litter, suckling her young for about a month. After weaning, juveniles remain with their mother for a few more weeks before leaving home for good.

It is believed that rakali normally survive for a maximum of about 3-4 years in the wild.

1.9. Burrows and activity patterns

Water-rats occupy burrows located in creek and river banks, or shelter in large hollow logs lying near the water. Radio-tracking studies undertaken by Australian Platypus Conservancy staff have shown that platypus and rakali will use the same burrows, though probably not at the same time. On one occasion, an adult female platypus occupied a burrow a few weeks after it served as a nursery for a female water-rat with a litter of young. Such behaviour is not especially surprising given that platypus and rakali are about the same size and both are known to make use of many different burrows over time. It remains unknown whether the two species are equally likely to dig a new burrow in the first place.



This rakali is about to exit the water and enter a burrow.

1.10. Conservation issues

Rakali are subject to predation by many different species, including snakes, large predatory fish, birds of prey, and cats, dogs and foxes. However, there is no reason to believe that water-rats have ever vanished from any area solely due to predation. By the same token, there is no evidence that any diseases have an important impact on water-rat numbers.

Because rakali are warm-blooded carnivores which require a lot of food to fuel their energetic lifestyle, the main problem facing the species is most likely to be habitat degradation, if this in turn reduces the animals' aquatic food supply.

Given that water-rats have a fairly short natural lifespan (in most cases living no more than 3-4 years), local populations may decline in size and even disappear if females fail to reproduce successfully for several years in a row — for example, due to the combined effects of poor habitat quality and ongoing drought.

Rakali were once widely trapped for their fur and sometimes culled when they were perceived to be a nuisance in irrigation districts. However, they are now fully protected by law as native wildlife.



Unfortunately, many continue to drown in “opera house” traps and other enclosed nets designed to capture freshwater crayfish. Up to seven rakali have been recorded as killed in a single opera house trap. These nets are also known to kill large numbers of platypus and freshwater turtles. Opera house traps are now banned in most states and territories, including NSW, ACT and Victoria. Recreational anglers should use open-top pyramid traps, lift-style hoop nets or old-fashioned baited lines (without hooks) as wildlife-friendly alternative methods.

In theory, a rakali can chew a hole to escape from a submerged opera house trap. In actual fact, the animals usually drown before they can escape.

Australian water-rats can sometimes come into conflict with humans when they raid fish farms or chicken yards, kill free-ranging guinea pigs in gardens, steal bait from anglers, leave piles of food debris on the decks of moored yachts or on verandahs, or deposit chewed up cane-toads around the edge of swimming pools!

However, killing or relocating “problem” rakali is illegal and subject to substantial fines. In any case, such action is likely to be totally ineffective because dispersing juveniles are likely to recolonise the area in a relatively short space of time. A much more sustainable solution is to learn to live with rakali by rat-proofing problematic areas and not leaving food around that will attract them.

1.11. Co-existence of rakali and platypus

Platypus and water-rats both function as top predators in Australian freshwater systems and probably compete to some extent for food. However, the size of prey that can be consumed by an adult platypus is limited by the fact that its bill is equipped only with rough grinding pads to help process food. In contrast, a rakali has a formidable set of sharp incisors to help kill and dismember prey. Interestingly, the grinding surfaces of water-rat molars are quite smooth. Like the grinding pads of the platypus, this adaptation may be particularly effective at dealing with the hard, encased bodies of many aquatic invertebrates.



In practice, very little is known about the ecological and behavioural interactions between platypus and rakali. The two species are found living together in many places, so water-rats clearly do not automatically exclude platypus from freshwater environments (and vice versa).

However, there are also waterways where only one of the two species is commonly found. In general terms, rakali are much more likely to persist in badly degraded aquatic habitats than the platypus. This may reflect the fact that the water-rat is able to forage on land and also prey on introduced fish species.

It has been suggested that rakali may sometimes prey on young platypus but there appears to be no actual documented evidence to support this idea.

Somewhat surprisingly, there has been at least one documented record of a rakali being killed by a platypus – a female platypus appearing to use its back legs to hold a water-rat underwater until it drowned.

1.12. How to report water-rat sightings

Recent sightings of rakali (including details of when and where the animal was seen) can be reported to the Australian Platypus Conservancy (platypus.apc@westnet.com.au). The information will be transferred to the Atlas of Living Australia – the national fauna and flora data base - thereby contributing to an improved understanding of the species' distribution and status in the wild. Any finding of a dead water-rat should also be reported. Details of any unusual or interesting behaviour are also welcome.



Illustration: Peter Marsack

1.13 Reading list

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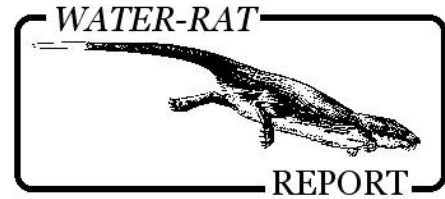
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Australian Platypus Conservancy



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RAKALI SIGHTING REPORT



1. Contact details for the person providing this report:

Name _____

Phone number or email address _____

Mailing address _____

_____ Postcode _____

2. Date or period of sighting(s) _____

3. Number of water-rats seen _____

4. Location of the sighting(s). To help us map this location quickly and accurately, please provide as many details as possible.

Name of waterway _____

Nearest town, village, suburb, etc. _____

Describe the location clearly in relation to named roads or other landmarks (for example, about 3 km upstream of Jones Road bridge and 1.5 km downstream of Back Creek) **OR** by providing a GPS or map grid reference:

5. Any additional comments about what you saw:

Please return your completed form to:

Australian Platypus Conservancy
PO Box 115, Campbells Creek VIC 3451
Email: platypus.apc@westnet.com.au