

**DISTRIBUTION AND STATUS OF THE
AUSTRALIAN WATER-RAT/RAKALI
(*Hydromys chrysogaster*)
IN THE GREATER ACT REGION**



A REPORT BY THE AUSTRALIAN PLATYPUS CONSERVANCY
TO THE WETTENHALL ENVIRONMENT TRUST

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Australian Platypus Conservancy



Wettenhall
ENVIRONMENT TRUST



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SUMMARY

The Australian water-rat or rakali* (*Hydromys chrysogaster*) is an exceptionally difficult species to survey using conventional live-trapping techniques. Consequently, relatively little is known about the current distribution and status of this very attractive native mammal in most parts of its range. This, in turn, has contributed to limited public awareness of rakali's occurrence and its important ecological role as a top aquatic predator.

This community-based survey, supported by the Wettenhall Environment Trust, has taken an important step in addressing the shortfall in knowledge about this species. New rakali reports contributed by this project represent a 526% increase on the pre-existing total of records for the Greater ACT region for the 2010-2019 period. The newly aggregated records and other relevant data were collated to allow a broad assessment of how water-rats are faring across the region – i.e. the ACT and neighbouring sections of NSW. This work also established a baseline for future sightings-based monitoring, and helped identify useful directions for further research.

The project also demonstrated that there is considerable potential for improving public support for water-rats as very desirable residents of waterways. Community interest in local rakali populations can potentially now be harnessed by relevant management agencies to highlight and help address environmental problems along waterways, particularly in areas where the more iconic platypus does not occur or is less common.



* In a commendable attempt to foster positive public attitudes towards Australia's native rodents, new names for these taxa were proposed by the Commonwealth environment department in the early 1990s. The designated common name for the Australian water-rat is the aboriginal word 'Rakali'. However, reflecting the fact that most published literature (both scientific and popular) still employs the name Water-rat rather than Rakali, this report utilises both names inter-changeably.

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INTRODUCTION

The platypus (*Ornithorhynchus anatinus*) is readily identified as one of Australia's most iconic animals but comparatively few people recognise our other native amphibious mammal, the Australian water-rat or rakali (*Hydromys chrysogaster*), despite the fact that it occurs close to human settlement in many places.

This lack of public awareness is related to the fact that the species is difficult to study in the wild: water-rats are very intelligent animals that are naturally wary of traps and (in contrast to the platypus) have sharp teeth that can be used to escape from nets. A number of studies carried out in Victoria in the 1980s and 1990s using cage traps recorded an overall CPUE (catch per unit effort) of only 6% from a combined total of 2449 trap-nights (range = 2-15%), despite the fact that trapping was generally conducted in areas where visual observations indicated that water-rats were relatively abundant (Smales 1984; Pamment 1986; Thomas *et al.* 1987; Gardner and Serena 1995; Seebeck 1999; Earthcare St Kilda 2004).

During the 19th and early 20th centuries the water-rat was hunted extensively for its fur. In the 1930s and 1940s, it was estimated that many thousands of animals were killed each year and the species virtually disappeared from many parts of its range, particularly in the Murray River system (Fleay 1990). Fortunately, demand for rakali pelts waned by the 1950s, and the species is now legally protected across Australia.

However, the water-rat's conservation needs have rarely been addressed in environmental management plans, probably reflecting both the lack of community awareness of the species and the limited availability of baseline scientific information. Likewise, this attractive native mammal has, as far as we are aware, never been adopted to serve as a flagship to generate community support for waterway rehabilitation programs.

Hydromys chrysogaster is currently not listed as threatened under any state or Commonwealth legislation and is considered to be a species of 'Least Concern' on the IUCN Red List of Threatened Species. However, this classification flows, in part, from the paucity of research into its true status in the wild. In fact, there are very good reasons why the species' status and its conservation requirements deserve further investigation.

Firstly, Australian rodents have suffered high rates of extinction and population decline (Lee 1995; Morris 2000) and rodents have experienced one of the highest rates of mammalian extinction globally (Ceballos and Brown 1995). *Hydromys* also falls within the critical weight range of native Australian mammals considered to be most susceptible to predation (Burbidge and McKenzie 1989; Johnson and Isaac 2009), particularly by introduced red foxes (*Vulpes vulpes*) and feral cats (*Felis catus*) (Abbott 2008).

Secondly, the Australian water-rat depends on aquatic habitats, making it highly vulnerable to human-related degradation of rivers, lakes and wetlands (Lunney 2008). The relatively short life span of rakali means that populations are at risk of declining precipitously if breeding fails to succeed for several years due to drought or excessive extraction of water resources. The predicted impacts of climate change are only likely to exacerbate such problems (Wilson *et al.* 2012).

BACKGROUND INFORMATION

The ancestors of *Hydromys chrysogaster* are believed to have arrived in Australia around 5-10 million years, after swimming or rafting from New Guinea. This attractive animal is the largest native rodent, weighing up to 1.3 kilograms – roughly the same as a medium-sized platypus.

The water-rat is an aquatic predator and possibly the most specialised of all Australia's rodents. In a number of respects it resembles a small otter:

- The muzzle is blunt and has a dense set of whiskers to help detect prey underwater (below left).
- The ears are small and can be tightly folded flat against the head to create a more stream-lined profile and keep water from entering the middle ear.
- The hind feet are broad, partly webbed and paddle-like (below centre).
- The tail is well-furred and thick, serving as a rudder when swimming (below right).
- The fur is soft, dense and lustrous, drying quickly to help keep the animal well-insulated and warm.



Hydromys chrysogaster is one of only a small number of semi-aquatic mammals occupying freshwater habitats in various parts of the world (Veron *et al.* 2008). The water-rat has no close relatives in Australia, although other species of *Hydromys* are known to occur in New Guinea and its associated islands. The Australian water-rat is not closely related to either the American muskrat (*Ondatra zibethicus*) or the European water vole (*Arvicola terrestris*) a.k.a 'Ratty' of *Wind in the Willows* fame,

Scientists in the 19th century originally classified water-rats as several separate species of 'beaver-rats' based on the considerable natural variation in fur colour. Eventually, by the late 1980s all these proposed taxa had been consolidated into the single species *Hydromys chrysogaster*. Recent genetic studies suggest there is a strong basis for subspecies delineation, with the populations in southwestern Western Australia, Barrow Island and Tasmania considered to be quite distinct from each other and those elsewhere (Bettink 2016).



**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.**

The Australian water-rat occupies diverse freshwater environments across most of mainland Australia and Tasmania. Its preferred habitat appears to consist of relatively slow-flowing water in rivers and creeks, backwaters and billabongs, or swamps and wetlands. Bank stability, the occurrence of low-growing vegetation on the banks and emergent in-stream vegetation have all been found to be associated positively with population density (Smart *et al.* 2011; Speldewinde *et al.* 2013).

Rakali are also known to utilise a wide variety of man-made water bodies or modified natural habitats such as irrigation channels, reservoirs, farm dams and fish farms (McNally 1960; Watts and Aslin 1981; Smales 1984; Williams and Serena 2017).

In addition to freshwater habitats, water-rats also occur in a range of saline environments, including estuaries, brackish coastal lagoons and even ocean beaches (Watts and Aslin 1981; Williams and Serena 2014, 2017). Accordingly, water-rats are unlikely to be directly limited by the amount of salinity in inland surface waters.

Water-rats are also known to travel long distances across dry land in search of food (McNally 1960; Harrison 1962). As a result, the animals can sometimes be observed in non-aquatic situations such as suburban backyards and city railway stations and will even occasionally enter domestic dwellings (Williams and Serena 2017).



The water-rat is a highly opportunistic predator and scavenger. Its diet primarily comprises fish and large invertebrates such as yabbies and mussels (Watts & Aslin 1981). Introduced fish species (especially goldfish, redfin perch and mosquitofish) were consumed in preference to native fish at a study site located near Griffin, New South Wales (Woollard *et al.* 1978). Frogs, turtles, bird eggs, mice and even fully grown water-birds are also eaten, along with edible domestic refuse, pet food and offal generated by

fishermen gutting their catch (Woollard *et al.* 1978; Smales 1984; Fleay 1990; APC unpub. data). In Queensland, the species appears to have developed the capacity to feed safely on the potentially toxic cane toad (APC unpub. data).

The water-rat is one of the few Australian rodents that is often diurnal, possibly partly reflecting the fact that its body temperature drops when water temperatures are $<25^{\circ}\text{C}$, declining very rapidly at temperatures $<15^{\circ}\text{C}$ (Fanning and Dawson 1980). To avoid becoming extremely hypothermic in cold water, water-rats return to burrows periodically to dry their fur and warm up (Gardner and Serena 1995). Despite this limitation, the species has been recorded at an elevation of at least 1500 metres in Mount Buffalo National Park (Menkhorst 1995) and in Kosciuszko National Park at 1900 metres (pers. comm. Dr Ken Green).

Little is known about social organisation in the wild, although Harris (1978) has suggested that adults are intrasexually aggressive, given that the home ranges of adults of the same sex appear to overlap less than those of other sex and age classes. In captivity, individuals form hierarchies in which only the dominant females usually reproduce successfully (Olsen 1982). In the wild, considerable fighting appears to occur in places where population density is relatively high, as evidenced by a high frequency of bite marks on tails and hind feet (APC unpub. data).

Water-rats mainly breed in spring and summer. In Victorian irrigation districts near Rochester and Echuca, pregnancies were recorded from early September to January, though most females (92%) were either pregnant or had already given birth by the end of October (McNally 1960). In theory, females are capable of producing up to three litters per year. However, the number of successful breeding events in any one year will almost certainly depend upon whether prevailing conditions are suitable, and the average number of litters produced annually in the wild remains unknown. It is likely that most juveniles disperse from their mother's home range fairly soon after becoming independent.

Litters can comprise up to seven young, though litters of three to five young appear to be most typical (McNally 1960; Olsen 1982). Gestation and lactation collectively require around 9 weeks to complete (Olsen 1982). Both males and females are reproductively senescent by the age of 3-4 years (Olsen 1982), implying that animals are unlikely to survive much longer than this in the wild.

Based on information gleaned from radio-tracking, water-rat home ranges typically comprise one or more kilometres of waterway (Harris 1978; Gardner and Serena 1995). Animals have been observed to range up to several kilometres in a given night, e.g. movements have been recorded of 3.1 km in less than 6 hours (Gardner and Serena 1995), and at least 3 and probably 4.5 km overnight (Vernes 1998).

The animals may use either burrows or hollow logs located near the edge of a waterway for resting and sleeping (McNally 1960; Harris 1978; Watts and Aslin 1981; Gardner and Serena 1995). The species has also been reported taking advantage of artificial features for shelter, both on land (e.g. in rock banks or drainage pipes) and a short distance offshore (e.g. in the exhaust pipes of moored boats and in rubber tyres mounted as boat fenders) (Williams and Serena 2014).



METHODS

In view of the practical difficulties involved in capturing water-rats in standard traps (see Introduction), the Australian Platypus Conservancy had previously identified systematic recording of water-rat sightings to be the most practical and cost-effective method for obtaining an overview of this species' status and distribution across the Greater ACT region. (For the purposes of this survey, this region was considered to be the Australian Capital Territory and neighbouring sections of NSW as defined by the Canberra Nature Map (www.canberra.naturemapr.org) and its associated programs: Atlas of Life Budawang Coast and Atlas of Life in the Coastal Wilderness

A database containing the details of water-rat sightings reported by members of the public and management agency staff has been maintained by the APC since 2000 and this was expanded in 2006 as the *Water-rat Report* program in order to provide an explicit community focus on *Hydromys chrysogaster*.

In 2013/14 the APC conducted a community-based survey of the *Hydromys* population in the Gippsland Lakes (Williams and Serena 2014). This regional pilot project established the methodology that was subsequently used to carry out a statewide survey in Victoria of the species' distribution and status, with support from the Norman Wettenhall Foundation (now WET), in 2016/17 (Williams and Serena 2017).

The main elements of the Victorian survey were essentially used and adapted in the Greater ACT study as follows:

1) Reliable sightings of water-rats (mainly submitted by community members and management agency staff) were recorded by the Australian Platypus Conservancy from 1 July 2018 to 30 June 2019 and added to the existing APC *Water-rat Report* database.

A community education program was conducted throughout the Greater ACT to help build awareness of the species and encourage past and present sightings to be reported.

New records were elicited in a number of ways, including:

- An information leaflet was circulated widely through the region (see Attachment B).
- Illustrated public talks about rakali ecology and conservation issues were presented at key locations (usually in conjunction with Field Naturalists Clubs, ACT Waterwatch, ACT Parks, Landcare networks or local environment groups) (see Attachment C).
- The need for additional water-rat records was highlighted in media features, including radio interviews and numerous articles in local newspapers, community newsletters and *Australian Geographic* magazine. (See Attachment D for copy of standard media release and Attachment E for selection of media coverage.)
- Similarly, the need for additional water-rat records was highlighted on the APC website, Facebook page and newsletter. (See Attachment F for newsletter articles.)

2) Records contained in the Canberra Nature Map (CNM) and Atlas of Living Australia (ALA) (www.ala.org.au) database for *Hydromys* in the Greater ACT were accessed so they could be considered alongside the larger body of reports collected by the APC (after discounting any records that had been duplicated).

3) All combined sightings records for the period 2010-2019 were then collectively analysed to provide an assessment of the distribution and status of water-rats by catchment. Selected earlier records were also utilised to assist the assessment process where relevant.

4) Records provided by ACT Waterwatch of *Hydromys* observed during the course of Platypus Group Watch surveys were also taken into consideration as part of the overall assessment of data. Supplementary reference was also made to occasional sightings of rakali noted by volunteers participating in the APC's *Platypus Count*/Australian Platypus Monitoring Network program.

Some inherent limitations with this methodology for data collection need to be recognised. In particular, the number of sightings reports received is clearly biased towards areas of high human settlement or activity as compared to rural or natural environments. To attempt to compensate for this, the eight 'catchment' units chosen for broad comparative analysis (see below) were designated on the basis of size of geographic area relative to the level of human occupation – i.e. in urban areas, relatively small river systems were nominated whereas in lightly settled areas whole catchments or amalgamations of river systems were utilised.

The units used as the basis for considering local status and distribution are as follows:

- Ginninderra catchment
- Molonglo catchment (+ Lake George)
- ACT Other catchments – Murrumbidgee River (main stem) ACT section, Tuggeranong, Cotter, Paddys and Gudgenby Rivers
- Upper Murrumbidgee catchment
- Snowy catchment
- Murrumbidgee (lower/NSW) catchment – including Yass River, Lake Burrinjuck, Goodradigbee River, Tumut River and Adelong Creek
- Budawang Coast atlas area – including Wollondilly, Shoalhaven catchments and Coastal Basins
- Coastal Wilderness atlas area – including Clyde, Deua/Moruya, Tuross, Bega/Bemboka/Brogo, Towamba and Wallaraugh Rivers



RESULTS

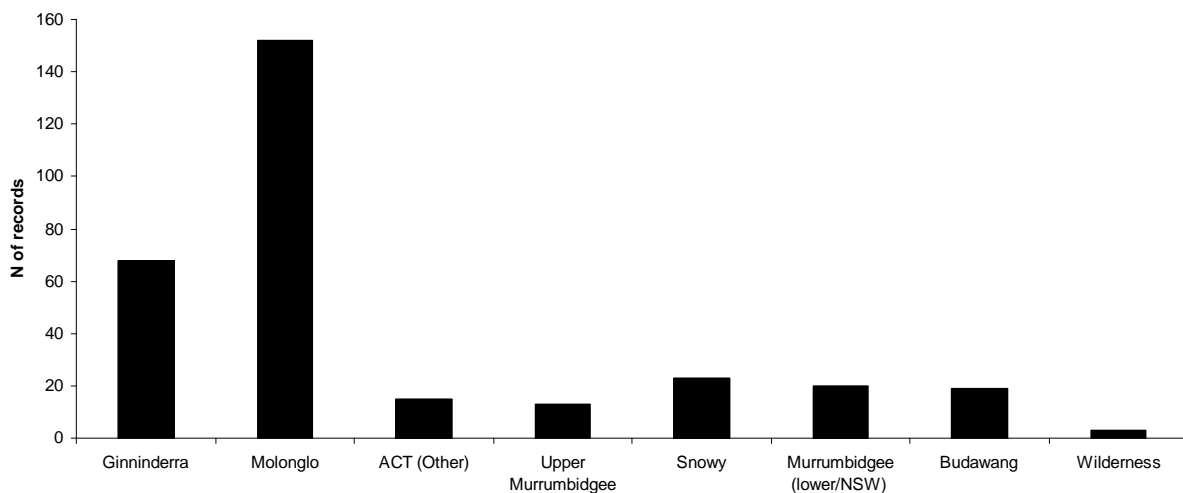
Prior to the commencement of this survey, 50 (non-duplicated) water-rat sighting reports for the period 2010 to mid-2018 were recorded in the CNM (27 entries) and ALA (23) databases. During the survey 263 new reports were obtained from across the Greater ACT region. Of these, 225 were collected directly by the APC (including 6 supplied by ACT Waterwatch from its database) and 36 and 2 were submitted directly to CNM and ALA respectively. In total, therefore, 313 reports pertaining to the period from 2010 to mid- 2019 contributed to assessing the species' distribution and status.

In addition, 33 new reports relating to the previous decade (2000-2009) were also received by the APC. Twenty records already existed for this period in the databases of CNM (5 records) and ALA (15). These 53 records in the consolidated total are also referred to in this report where relevant.

Distribution of water-rat sightings

Water-rats were sighted from 2010 to mid-2019 in all eight of the major 'catchment' units defined in this report (Fig. 1). The highest number of sightings was recorded in the Molonglo catchment (49% of the combined database), followed by the Ginninderra catchment (22%), Snowy catchment (7%), Murrumbidgee (lower/NSW) catchment and Budawang atlas area (each 6%). By comparison, few sightings originated in the Wilderness Coast atlas area (1%).

Fig. 1. Number of water-rat sightings originating in different Greater ACT catchments/atlas areas from 2010 to mid-2019.



Distribution of water-rat sightings among different river basins

Water-rats were reportedly seen since 2010 in all major drainages within the Greater ACT region with the following exceptions: the Numeralla and Bredbo Rivers within the Upper Murrumbidgee catchment, the McLaughlin/Bombala/Delegate Rivers system within the Snowy catchment, and the Clyde, Deua/Moruya, Towamba and Wallaraugh Rivers in the Coastal Wilderness atlas area (Table 1). There were also no records for Lake Burrinjuck in the Murrumbidgee (lower/NSW) catchment although two reports were received for the 2000-2009 period.

Table 1. Number of water-rat sightings originating in Greater ACT catchments from 2010 to mid-2019.

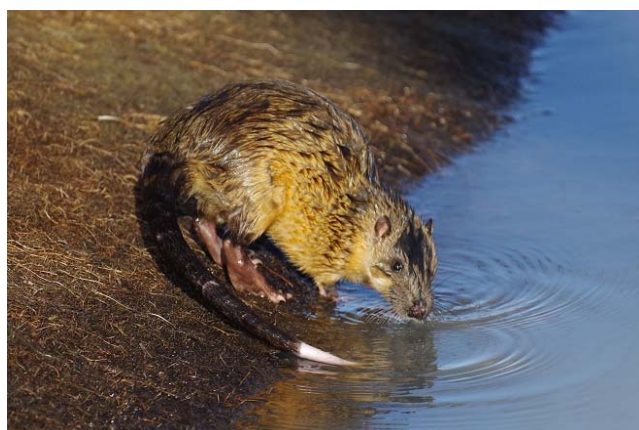
Catchment/Atlas region	Waterway	N. of reports
Ginninderra	Ginninderra Creek - upper	8
	Lake Ginninderra	48
	Ginninderra Creek - lower	12
Molonglo	Molonglo River - upper	9
	Queanbeyan River	24
	Jerrabomberra Ck & wetlands	20
	LBG East basin	18
	LBG Central basin	35
	LBG West basin	27
	Sullivans Ck	12
	LBG Scrivener basin	3
	Molonglo River – lower	2
	Lake George ⁺	2
Other ACT	Murrumbidgee River (main stem) ACT section	2
	Tuggeranong	2
	Cotter River	5
	Paddys River	2
	Gudgenby River	4
Murrumbidgee (Upper)	Murrumbidgee River (main stem)	9
	Numeralla/Bredbo Rivers	0
	Cooma Creek	4
Snowy	Snowy River (main stem, incl. upper tributaries)	3
	Eucumbene River/Lake Eucumbene	5
	Lake Jindabyne	7
	Mowambah River	1
	Thredbo River	7
	McLaughlin/Bombala/Delegate Rivers	0
Murrumbidgee (Lower/NSW section)	Murrumbidgee River (main stem)	1
	Yass River	8
	Adelong Creek	1
	Lake Burrinjuck	0*
	Goodradigbee River	3
	Tumut River	7
Budawang Coast	Wollondilly catchment	10
	Shoalhaven catchment	7
	Coastal basins	2
Wilderness Coast	Tuross River	2
	Bega/Bemboka/Brogo Rivers	1

+ Lake George included in Molonglo catchment for administrative convenience
2 records in 2000-2009 period

Presumably reflecting the large number of human observers concentrated in the Canberra/Queanbeyan urban area, the highest number of sightings records originated in Lake Ginninderra (48 records), followed by Lake Burley Griffin's Central basin (35), LBG West basin (27) and the Queanbeyan River (24). Outside of the ACT, the highest number of sightings for any river system was the Wollondilly River (10).

For a more detailed analysis of the distribution and status of water-rat sightings within each of the river systems listed in Table 1 and Fig. 1, see Appendix A.

Habitat usage



Water-rats reportedly made use of six broadly defined habitat types (Table 2). The animals were most commonly seen in natural and man-made lakes and reservoirs and wetlands (56% of records). This reflects the fact that Lake Burley Griffin, Lake Ginninderra and the Jerrabomberra wetlands were the source of so many sightings which, in turn, presumably is an outcome of the large number of human observers accessing these water bodies. Outside the ACT urban area, several records

came from two popular recreational destinations - Lake Jindabyne and Lake Eucumbene – but also from other lake habitats including Pejar Dam, Tantangara Reservoir, Tumut town pondage and a farm pond near Yass.

Rivers and creeks (40% of records) accounted for most other habitat usage. Only two records were from non-freshwater habitats – in the coastal basins along the Budawang Coast.

Finally, four sightings were made in miscellaneous landscapes lacking substantial nearby surface water, including one in the Australian National Botanic Gardens, two on suburban roads and one rakali in a house at Eurobodalla that had reportedly chewed its way in through a mud-brick wall.

Table 2. *Habitat types associated with water-rat sightings recorded in Greater ACT region from 2010 to mid-2019.*

Habitat type	N of records	% of records
Rivers	89	26
Creeks	45	14
Wetlands	21	7
Lakes	152	49
Irrigation channels	0	0
Other	4	1
Estuary/Coastal	2	1

It is interesting to note that one informal report received during this survey (pers. comm. Dr Ken Green) concerned several observations of water-rats at high elevations in Kosciusko National Park. In November 1998 a rakali was seen swimming in Betts Creek at 1740 metres. Then, in mid-June 2009 an animal was spotted at an even higher elevation – 1900 metres at Blue Lake, where ice is known to freeze to a depth of a metre or more. On this particular day some early ice had formed in the water but, unperturbed, the water-rat was seen to be both swimming in the water and walking over nearby ice and snow on land.

These observations appear to surpass the previously recognised 'mountaineering record' for the species of around 1500 metres, set at Lake Catani in Mount Buffalo National Park in Victoria (Menkhorst 1995).

Factors contributing to mortality



PHOTO: Two water rats were found drowned in Lake Burley Griffin this weekend. (Supplied: ACT Environment Directorate)

Rakali mortalities were described in 12 of the sightings records from 2010 to mid-2019, with the likely cause of death identified in 9 records. Of these, by far the commonest factor contributing to mortality was use of enclosed yabby traps or craypots (five incidents involving the deaths of 6 individual animals in total).

Predation was implicated in 3 mortalities. One involved an attack by a cat and another was the result of an attack by a German Shepherd and a fox terrier on a rakali that had entered a suburban backyard. A fox was probably responsible for the third incident.

One mortality was the result of road-kill – in this instance a water-rat was accidentally run over by a cyclist on a path running next to Lake Burley Griffin.

There was no evidence in this survey that any water-rats had been killed deliberately or inadvertently by snap-traps or poison baits used to target pest rats as has been previously reported (Williams and Serena 2017).

CONCLUSIONS

Scope of Study

This community-based survey has greatly increased the available pool of data describing where *Hydromys* are found in the ACT and the south-eastern corner of NSW.

At the start of the survey in mid-2018 only 50 rakali records from 2010 onwards were available on public databases for the Greater ACT region (i.e. ALA and CNM and its associated Budawang and Coastal Wilderness Atlases). The 263 new reports received during the survey for the 2010 to mid-2019 period contributed to a 526% increase on the previous total.

In addition, 33 new reports relating to the previous decade (2000-2009) were also collected by the APC, an increase of 165% on the 20 records which already existed for this period in the ALA and CNM databases.

As with most data collected via 'citizen science' programs, some inherent limitations need to be acknowledged. For obvious reasons, higher numbers of sightings reports tend to originate from urban areas and other places of high human activity as compared to predominantly rural or natural environments. To attempt to compensate for this in the broadest sense, the eight units chosen for comparative analysis (see Methods) were designated on the basis of size of geographic area relative to the level of human occupation. In urban areas, relatively small river systems (e.g. Ginninderra and Molonglo catchments) were nominated and were then further sub-divided for detailed assessment. At the other extreme, records for all six major river systems were amalgamated in the very lightly settled Coastal Wilderness area.

Likewise, the diverse range of sources contributing to the study meant that some qualitative differences in sightings details were lost in the analysis: for example, a single chance sighting by a visitor to a large recreational lake was considered for the purpose of this study to be equivalent to multiple observations made over time by landowners living close to a creek or irrigation channel.

Despite the limitations outlined above, the records accumulated in this study do provide the basis for a broad assessment of the distribution of *Hydromys chrysogaster* in the ACT and surrounding region. They also establish a baseline for future sightings-based monitoring, and suggest useful directions for future research on this poorly known species.

Distribution, habitat use and mortality factors

Our results indicate that water-rats are widely distributed across the Greater ACT region and appear genuinely abundant in the Molonglo River catchment (including Lake Burley Griffin) and the Ginninderra catchment (especially Lake Ginninderra), even allowing for the bias in 'over-reporting' of sightings from these areas of high human settlement.

No records were obtained for a number of significant water bodies, including the Numeralla and Bredbo Rivers (Upper Murrumbidgee catchment), the McLaughlin/Bombala/Delegate Rivers system (Snowy catchment), and the Clyde, Deua/Moruya, Towamba and Wallaraugh Rivers (Coastal Wilderness atlas area).

The lack of sightings in the Coastal Wilderness rivers is perhaps not surprising given the low level of human settlement in this south-east corner of NSW. However, the lack of sightings for these other water bodies is not so easily explained by 'under-reporting'. The Bredbo and Numeralla Rivers have comparatively high levels of human settlement and accessibility (particularly in their lower reaches) while a relatively high number of observers scan the McLaughlin/Bombala/Delegate system at Bombala's 'Platypus Country' viewing spots. Consequently, the absence of rakali reports suggests that the species is genuinely at low numbers in these waterways.

There are several other areas where the number of reports appears to be somewhat lower than expected based on a rough 'people/size of area' rule of thumb. Of special note, the Tuggeranong system (ACT Other catchments) had only two records for Lake Tuggeranong and none for the creek itself compared to the roughly-equivalent Ginninderra catchment in the ACT northern suburbs with 48 records for Lake Ginninderra and a further 20 for the creek. Given that one of the two records for Lake Tuggeranong entailed a water-rat found dead in an opera house trap it is possible that illegal netting may have had an impact on this population.

Similarly, the fact that there are only two records for the main channel of the Murrumbidgee River within the Australian Capital Territory section is also somewhat below expectations and appears to suggest a low-level water-rat population. Given the known use of illegal traps in this waterway, which has killed several platypus, it is possible that this problem has also had impact on rakali numbers. (See further comments on mortality factors, below.)

The study confirmed that water-rats make use of a wide range of habitats. Of particular note was the high usage of various types of lakes and similar water bodies, many of which were man-made or have been modified significantly from their natural state. The high level of usage presumably reflects the fact that lakes or the equivalent provide excellent foraging and breeding habitat for rakali and are also valuable refuges during periods of drought.

A number of modified urban lakes – especially Burley Griffin and Ginninderra – clearly constitute 'hot spots' for rakali sightings due to relatively high numbers of animals, easy public access and good viewing opportunities in relatively still water. This suggests that water-rat requirements should be routinely considered when designing new suburban development projects, with a view to encouraging healthy and productive populations.



Southern ACT Catchment Group Waterwatch co-ordinator Martin Lind with a dead rakali, commonly known as a water rat, caught in an Opera House-style net found in Lake Tuggeranong. Photo: Eric

Examination of mortality records indicates that death in various types of traps and nets is a widespread hazard for the species. Enclosed yabby traps, predominantly of the opera house design (see photo), were of particular concern, accounting for 55.5% of recorded mortalities. This was higher than the proportion (43%) reported in similar studies in Western Australia (Trocini *et al.* 2015) and 42.5% in Victoria (Williams and Serena 2017). This problem is likely to be addressed most effectively by appropriate changes to fishing regulations, along with vigorous community education and improved law enforcement.

At the present time it is understood that the ACT has committed to introducing a total ban on the use of enclosed yabby traps in late 2019/early 2020 when new fishing regulations will be introduced. NSW has also recently announced a move in that direction, possibly in early 2020.

The data obtained in this study are not sufficient to analyse any trends in rakali populations over the 2010-2019 period. However, see Appendix A for more information about the species' distribution in individual river basins.

RECOMMENDATIONS

1. The feedback received from the community about rakali in the course of this project was overwhelmingly positive. Typical of comments received were statements such as:

It's a great joy to see them here.

I loved watching one yesterday.

This suggests that water-rats could easily be promoted as a very desirable component of local aquatic ecosystems.

Relevant management agencies and local councils could and should harness this community interest both to assist rakali conservation and nurture community support for protecting aquatic habitats.

2. It is therefore recommended that government bodies in the ACT and NSW should formally recognise the conservation of *Hydromys chrysogaster* as a key objective in both natural and man-made aquatic environments. In particular, the needs of the species should be incorporated into environmental management programs (such as habitat improvement projects, environmental flow plans and water supply/irrigation system maintenance and upgrade activities) and planning schemes.

3. Agencies should also support the long-term conservation of this species by promoting public awareness of the existence of rakali in their regions. The following measures could be undertaken for modest cost:

- Install signage about the biology, status and distribution of rakali (and describes threats to the species such as litter and illegal and irresponsible fishing practices) at key locations around rivers, creeks and lakes.
- Develop a section on agency websites to describe what water-rats look like and where they can be seen in the area, and provide advice on "Living with rakali" e.g. how to deter water-rats from stealing eggs from chook pens, killing goldfish in ponds, leaving food debris on houseboats, etc.
- Insert references to rakali (together with images of the species) in relevant agency publications, stressing that the species is an interesting and highly desirable component of most aquatic ecosystems.
- Promote continued reporting of sightings (including mortality incidents) of water-rats to the CNM and/or APC (on behalf of ALA).

4. As detailed previously, further research is warranted to determine whether resident rakali populations are found in those waterways where no records were obtained in the current survey: Numeralla and Bredbo Rivers (Upper Murrumbidgee catchment), the McLaughlin/Bombala/Delegate Rivers system (Snowy catchment), and the Clyde, Deua/Moruya, Towamba and Wallaraugh Rivers (south-east NSW coast).

It would also be useful to increase the effort to encourage sightings reports in waterways where the available information suggests that relatively few animals occur (especially the Tuggeranong system and Murrumbidgee River).

This might be most efficiently addressed by utilising targeted techniques to elicit records, such as direct interviews with landholders owning river frontage and regional staff of management agencies.

The apparent survival of the species in Lake George, a small isolated drainage which sometimes becomes virtually dry, is of considerable interest and is deserving of more detailed research

5. The feasibility of developing monitoring programs in which volunteers collect data systematically over time should be investigated. This is likely to be most successfully used in the first instance to track populations in identified 'hot spots' – especially Lake Burley Griffin, Lake Ginninderra and Jerrabomberra wetlands (see above).

Such research would also be useful in helping to determine if water-rat spotting could be promoted as an eco-tourism attraction at such locations.

ATTACHMENTS

APPENDIX: Results – Supplementary Information: Summary of Records by Catchments/Atlas Regions

ATTACHMENT A. Maps

ATTACHMENT B. ACT water-rat survey – information leaflet/report form

ATTACHMENT C. ACT water-rat survey - public talks 2018/19

ATTACHMENT D. ACT water-rat survey – media information release

ATTACHMENT E. ACT water-rat survey – media coverage (selection)

ATTACHMENT F. ACT water-rat survey – APC Newsletter articles 2018/19



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Rakali Illustrations are by Peter Marsack (copyright APC and P. Marsack).

Australian Platypus Conservancy



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APPENDIX

RESULTS – SUPPLEMENTARY INFORMATION: SUMMARY OF RECORDS BY CATCHMENTS/ATLAS REGIONS

GINNINDERRA CATCHMENT

The Ginninderra Creek catchment had a total of 68 reports for the 2010-2019 period. The majority of these (48) were from Lake Ginninderra where the species appears to be relatively abundant in all parts of this water body.

Eight reports related to sightings upstream of Lake Ginninderra, including one in an artificial wetlands at Crace about 300 metres from the main channel of Ginninderra Creek.

In the section downstream of the lake, there were 12 records although interestingly there were no reports from the reach below Ginninderra Falls – i.e. closest to the confluence with the Murrumbidgee. However, one of the reports received during the survey noted seeing a water-rat in the lower Molonglo in the 1960s.

MOLONGLO CATCHMENT

The Molonglo system had the highest number of records (150 reports) for any sub-catchment in Greater ACT. This reflects the fact that this catchment offers sizeable areas of suitable habitat for water-rats (including Lake Burley Griffin (LBG) and the Jerrabomberra wetlands) and flows through the highly-populated central Canberra/Queanbeyan region, with large numbers of people potentially able to make sightings

The Molonglo River upstream of LBG had 9 records. One of these was from Carwoola in the section of river upstream of its confluence with the Queanbeyan River. Of the remainder, the majority (7) were in the reach near Duntroon – i.e. immediately upstream of LBG. Water-rats were also recorded at a high proportion (five out of 7) ACT Waterwatch ‘group watch’ surveys along this reach in the period 2014-2017, suggesting a reasonably abundant population.

A total of 24 reports were recorded for the Queanbeyan River for the period 2000-2019, including one upstream of Googong Dam. In addition, numerous other rakali sightings have been made by volunteers engaged in the APC’s *Platypus Count*/Australian Platypus Monitoring Network program. In general, the species appears to be relatively abundant and distributed along the length of the lower Queanbeyan River (i.e. downstream of Googong).

Water-rats also seem to be relatively abundant and distributed throughout Jerrabomberra Creek and its associated wetlands based on 20 reports recorded. This conclusion is supported by the fact that the species was observed during 11 out of 12 ‘group watch’ surveys organised by ACT Waterwatch at Jerrabomberra in the period 2014-2018.

Lake Burley Griffin (LBG) clearly also supports good numbers of rakali throughout most of its area. Eighteen reports were for the East basin with the vast majority (15) from the Kingston Foreshore area where the boat marina undoubtedly provides many good scavenging opportunities for this resourceful forager.

Central basin (i.e. between Kings Avenue bridge and Commonwealth Avenue bridge) provided 35 records, with the area near the Carillon being a 'hot-spot' for sightings – again probably reflecting the presence of nearby picnic facilities.

The West basin/lake (i.e. between Commonwealth Avenue bridge and Kurrajong Point) had a total of 27 reports, of which 15 were from the northern shores and 12 from the southern side. In addition, there were 12 records from Sullivans Creek, mainly in the ANU campus, although this total includes one report of a rakali spotted in a pond in the Australian National Botanic Gardens.

Only 3 records pertained to LBG's 'Scrivener basin' (i.e. the extreme western end of the lake between Kurrajong Point and the dam wall). This suggests that the species may be less abundant in the deeper waters of this part of LBG.

A small number of records – only two – were from the lower section of the Molonglo River (i.e. downstream of the Scrivener Dam wall), both dating from 2011. No water-rats were observed during any of the six 'group watch' surveys conducted by ACT Waterwatch along the lower Molonglo below Coppins Crossing in 2017-18. It appears that rakali are not very abundant along this waterway.

Lake George

Lake George is an isolated drainage basin (included here under the Molonglo catchment for simplicity). Two rakali reports – from 2013 and 2018 – were received for this water body. The survival of the species in this small system, which sometimes becomes virtually dry, is of considerable interest and is deserving of more detailed research

OTHER ACT CATCHMENTS

Murrumbidgee River (main stem)

Only two sightings reports were recorded for the main river channel of the Murrumbidgee within the Australian Capital Territory section – one near Point Hut Crossing in 2016 and one approximately two kilometres upstream of Uriarra Crossing in 2012. This is a surprisingly low figure given the relatively high number of records for most tributary sub-catchments in the ACT. No water-rats were recorded near Point Hut Crossing during three 'group watch' surveys conducted by ACT Waterwatch along Murrumbidgee in 2017-18. However, the species was observed in 3 of the five similar survey sessions held in 2015/16 at Tharwa.

Tuggeranong

Only two reports were received from Lake Tuggeranong – a surprisingly low total compared to the relatively high number (48) for Lake Ginninderra. Of these two records, one is from 2013 and the other is of a water-rat found dead in an opera house yabby trap in 2014. In addition, it is noted that no water-rats were recorded in three ACT Waterwatch 'group watch' sessions conducted by local students in 2012-13.

There are also no reports for Tuggeranong Creek itself. Accordingly, it appears that water-rats are at low abundance in the Tuggeranong system. The reason for this is not readily apparent and is worthy of more detailed investigation.

Cotter River

Five records are from the Cotter River for the 2010-2019 period, all relating to sightings in the lower section of the river (i.e. downstream of the dam wall). One sighting was recorded upstream of the dam in the previous decade (i.e. in 2007). There are no reports of sightings in the dam area itself.

Paddys River

There are only two records from the Paddys River system – one from Paddys River itself (2015) and one from the Gibraltar Creek tributary (2018). No records have been submitted for the Tidbinbilla River, another major tributary in this sub-catchment. However, occasional sightings of water-rats have been made in this river and its associated wetlands ponds at the Tidbinbilla Nature Reserve by volunteers engaged in the APC's *Platypus Count*/Australian Platypus Monitoring Network program. Accordingly, the species probably occurs throughout much of the Paddys River system but at low abundance.

Gudgenby River

Four records are for the Gudgenby River, relating to sightings in 2011, 2014, 2017 and 2018 respectively.

MURRUMBIDGEE (UPPER) CATCHMENT

There are only thirteen records for the entire Upper Murrumbidgee catchment (i.e. upstream of the ACT border) for the 2010-2019 period.

Nine reports were submitted from the main channel of the Murrumbidgee River itself. Five were from the Michelago to Murrumbucca reach. The other four were from the upper catchment including one report from Tantangara Reservoir and two records related to upper tributaries in the Kosciusko National Park.

It should also be noted that during 'group watch' surveys organised by ACT Waterwatch along the Murrumbidgee River at Scottsdale Bush Heritage Reserve (near Bredbo) from 2014 to 2018, water-rats were observed in 15 of the 20 sessions. In similar surveys along the Murrumbidgee near Mittagang Crossing, rakali were recorded during two of the four sessions conducted by ACTWW in 2015 and 2017. However, farther upstream at the Ashvale TSR near Adaminaby, there were nil sightings in two 'group watch' sessions held in spring 2018.

There are no records for the major tributaries of the Upper Murrumbidgee including the Numeralla and Bredbo Rivers. There were also nil sightings in four ACTWW 'group watch' surveys along the Numeralla River at Arnika Ford in 2015 and 2017.

All other sightings were in Cooma Creek (including one from Cooma Back Creek). Water-rats were also recorded during one of the 8 ACTWW 'group surveys' conducted along Cooma Creek in the period 2015-2018, with three individual animals observed on that particular occasion (August 2017).

SNOWY CATCHMENT

Snowy River (main stem)

There are only three records for the Snowy River itself for the period 2010-2019, two of which are from upper tributaries.

Eucumbene River

Of the five reports for the Eucumbene system, four are from Lake Eucumbene, including one report of a rakali killed in an opera house trap in 2016.

Lake Jindabyne

In total, there are 7 reports from Lake Jindabyne including one incident where an animal climbed onto a canoeist's paddle approximately 300 metres from shore.

Mowambah River

There is one report from 2016 from the Moonbah area; however, this report indicated that rakali were seen often at this location.

Thredbo River

There are seven reports from various locations along the Thredbo River over the 2010-2019 period. There is also a record from Lake Crackenback during the previous decade (reported as seen frequently between 2003 and 2008 with up to 4 individual animals observed on some occasions).

McLaughlin/Bombala/Delegate Rivers

There are no rakali records from this sub-catchment. Given the relatively high number of observers who scan the river at Bombala's 'Platypus Country' viewing spots, the absence of water-rat sighting reports suggests that the species is genuinely at low numbers in this system.

MURRUMBIDGEE (LOWER/NSW) CATCHMENT

Murrumbidgee River (main channel)

Within the Greater ACT region, only one record relates to the Murrumbidgee River channel downstream of the ACT border for the 2010-2019 period – a sighting at Gundagai in 2015.

Yass River

A total of 8 records pertains to the Yass River sub-catchment, with four in the main river channel and four in tributaries (including two for Murrumbatemen Creek).

Lake Burrinjuck

There are nil records for Lake Burrinjuck in the 2010-2019 period but in the previous decade sightings were reported in 2004 and 2007.

Goodradigbee River

Three records relate to the Goodradigbee sub-catchment with one in the river's main channel and two in tributaries.

Tumut River

There is a total of 7 records for Tumut sub-catchment, including five for the river's main stem, one in the Yarrongobilly River and one for Paddys River dam at Tumut.

Adelong Creek

One sighting reported from Wondalga in 2010.

BUDAWANG COAST ATLAS REGION

Wollondilly catchment

There are 10 records in total for the Wollondilly catchment. The majority (6) are for the Wollondilly River itself and its Mulwaree tributary, all close to their confluence in Goulburn. Other reports include two sightings from Pejar Dam and from as far downstream as Nowra Creek.

Shoalhaven catchment

Seven reports for the period 2010-2019 come from locations throughout the Shoalhaven catchment including two in the Shoalhaven River itself, two in the Mongarlowe River and the remainder in smaller tributaries.

It is interesting to note that Dr Tom Grant of University of NSW, who has conducted extensive platypus research in the Shoalhaven catchment over many decades, reports that *Hydromys* were common in 1970s but then disappeared (possibly as a result of deaths in traps such as opera house nets). However, from 2006 onwards signs of rakali occurrence (e.g. scats, tracks) became apparent and one was seen again 2009.

Coastal Basins

During the 2010-2019 there were rakali sightings from two Coastal Basins – Lake Conjola (2014) and St Georges Basin (2019). In the previous decade there were also sightings in two other basins – Burrill Lake (2009) and Lake Tabourie (2000).

WILDERNESS COAST ATLAS REGION

Clyde River

Nil records

Deua/Moruya River

Nil records

Tuross River

Two records, both from tributaries – Paddys Creek (2017) and Reedy Creek at Eurobodalla (2016) where a rakali reportedly caused damage to a house after chewing its way in through a mud-brick wall.

Bega/Bemboka/Brogo Rivers

One record only – from the Brogo River (2017)

Towamba River

Nil records

Wallaraugh River

Nil records

Australian Platypus Conservancy



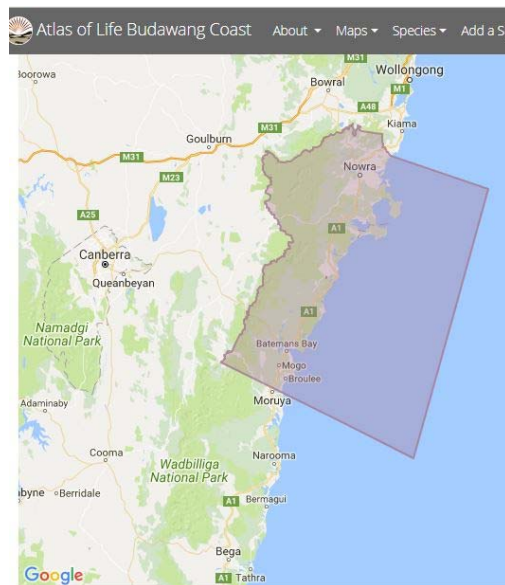
ATTACHMENT A

Maps of Greater ACT study area

Canberra Nature Map



Atlas of Life Budawang Coast



Atlas of Life Coastal Wilderness



ATTACHMENT B

ACT water-rat community survey – information leaflet/report form

Original = A4

WATCHING FOR WATER-RATS

Australian water-rats are active during the day as well as at night. They are most often observed swimming on the surface, especially in the evening or early morning.



However, the animals also frequently emerge from the water to eat (sitting up and holding their meal in their forepaws) or run along the river bank or shore searching for food. A feeding 'table' consisting of a pile of yabby claws or mussel shells on a rock or log (or boat deck) is often the best clue that the species is present.

Water-rats grow to about 50 to 70 centimetres in length (including their tail) and can weigh up to 1.3 kilograms. The colour of 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). In all cases, the tail has a conspicuous white tip.



PLEASE REPORT YOUR SIGHTINGS

Rakali is a difficult species to study. Little is known about its current status and distribution and conservation needs. The Australian Platypus Conservancy is working with various community groups and management agencies to find out how water-rat populations are faring across the ACT Region. You can make a vital contribution by reporting all sightings of rakali (including if you find a dead one).

If you have an accurate GPS location and a photo of the animal, please submit the report to the Canberra Nature Map website (canberra.naturemapr.org)

Otherwise, simply email the date and general location of any sighting to platypus.apcc@westnet.com.au (or report via the APC website www.platypus.asn.au or phone 03 5157 5568).

Sightings from the past are welcome (even if you can only provide an approximate date) as they help to establish how populations may have changed over time. Reports from outside the ACT Region are also welcome. All information is entered on a secure database and is only used for conservation purposes.

THE ACT REGION RAKALI SURVEY is generously supported by:



COMMUNITY PARTNERS
Field Naturalists Association of Canberra
National Parks Association ACT

LOOK FOR 'OTTERS' IN THE ACT REGION



Community Monitoring of the Australian Water-rat/Rakali in the ACT Region



OUR NATIVE 'OTTER'

Mention the word 'rat' and images of two introduced pests - the black rat and brown rat - spring to mind. In fact, the Australian water-rat (*Hydromys chrysogaster*) is a native species that was a natural part of our environment long before its Eurasian rodent cousins arrived on ships carrying the early colonists.

The water-rat (also known as rakali) is an extremely attractive animal which is found in most parts of the ACT Region. Its ecological role is much the same as that of otters living on other continents. The water-rat also has many otter-like features, including a thick coat of soft fur, a blunt and densely whiskered muzzle, partly webbed hind feet and a furry, tapering tail.



Water-rats are known to eat aquatic insects, yabbies, mussels, shrimps, and frogs (and even cane toads in northern Australia). Their formidable set of teeth can also be used to kill fish, tortoises and water birds, occasionally up to the size of small ducks.

LIVING WITH RAKALI

Although water-rats are fully protected by law, many continue to die in submerged opera house nets and similar enclosed traps set for yabbies and freshwater crayfish. Anglers are instead encouraged to use open lift-style nets or baited lines (without hooks) as inexpensive and effective methods for catching yabbies and crabs.

Australian water-rats occasionally come into conflict with humans when they raid fish farms, devour pet food left on suburban porches, steal bait from anglers, and leave piles of mussel shells on the decks of moored boats or the remains of cane toads around the edges of swimming pools.

Killing or relocating a 'problem' water-rat is both illegal and subject to hefty fines. In any case, such actions will almost certainly be ineffective given that dispersing juveniles are likely to occupy a vacant home range very quickly.

A better solution is to learn to live with water-rats by rat-proofing areas where you don't want the animals to go, and not leaving fish scraps or other food around that will attract them.

If you are experiencing problems with rakali, please let the Australian Platypus Conservancy know the details and we'll do our best to help. By sharing such information it should be possible to develop workable solutions to deal with unwanted behaviours.

RAKALI SIGHTINGS REPORT

Name:
Telephone:
Email:

When did you see water-rats?

How often have you seen water-rats?
 One time only
 Occasionally
 Often

Name of lake/creek/river/water body:

Name of nearest town/landmark:

If possible, provide a GPS latitude & longitude reading, map reference or description of location in relation to named roads or other public landmarks:

Please return your completed form to:
Australian Platypus Conservancy
P.O. Box 22, Wiseleigh VIC 3885
Email: platypus.apcc@westnet.com.au

ATTACHMENT C

ACT water-rat community survey - public talks 2018/19

<u>Date</u>	<u>Venue</u>	<u>Host</u>
<u>2018</u>		
April 10	Queanbeyan	Queanbeyan-Palerang Regional Council
July 29	Namadgi NP	ACT Parks Service
July 31	Wanniassa	ACT Waterwatch
August 1	Holt	ACT Waterwatch
August 2	Jerrabomberra	ACT Parks Service & ACT Waterwatch
August 2	ANU	Fields Nats Association of Canberra
August 3	Cooma	ACT Waterwatch (Cooma)
<u>2019</u>		
April 30	Yass	Goulburn-Yass Landcare Network
May 1	Goulburn	Goulburn-Yass Landcare Network
May 3	Mongarlowe	Upper Shoalhaven Landcare Network
May 4	Dalgety	Snowy River Alliance

ATTACHMENT D

ACT water-rat community survey – media information release

Australian Platypus Conservancy



MEDIA INFORMATION RELEASE

On the look-out for Canberra's 'otter'

What native mammal is about 50cm long, swims in rivers, creeks and lakes, and lives in burrows?

Most people would answer 'platypus' but equally correct would be the Australian water-rat (*Hydromys chrysogaster*), also known as rakali. Unfortunately the word 'rat' conjures up images of two introduced pests - the black rat and brown rat. It is often not appreciated that the Australian water-rat is a genuine native rodent that was a natural part of our environment long before the arrival of its unwelcome cousins. Rakali is an extremely attractive animal, with thick soft fur, dense whiskers, partly webbed hind feet, and furry, tapering tail. These physical features and its aquatic lifestyle give it a strong resemblance to a miniature otter.

Both platypus and water-rats function as top predators in freshwater systems, eating insects, yabbies, freshwater mussels and shrimps. The size of prey that can be consumed by a platypus is limited because its bill has only rough grinding pads. In contrast, rakali has formidable teeth which can be used to kill and eat fish and water-birds. Unlike platypus, water-rats often emerge from the water to search for food or to eat (holding their meal in their forepaws). A feeding 'table' – a pile of food fragments, such as yabbie claws or mussel shells, on a rock or log – often gives a clue that rakali is around.

Both species are mainly active at night but can sometimes be seen in the day, with rakali probably more likely to be spotted during daylight hours, especially in winter. Although similar in terms of size and colour, the two aquatic mammals can be distinguished by careful observation: the distinctive white tip to the tail of the water-rat being the best identifying feature.

Rakali is a difficult animal to study in the wild. Little reliable information exists about population trends, making it hard to assess its conservation status. The Australian Platypus Conservancy is currently conducting a survey of the species in the ACT region (with support from Wettenhall Environment Trust).

You can make a valuable contribution by reporting recent or past sightings to the APC website (www.platypus.asn.au). Please include details of how many animals were seen, date of the sighting (as accurately as possible) and name of water body where the sighting occurred (with latitude and longitude for the location, if possible, or enough detail that the site can otherwise be mapped).

Sightings from the ACT and surrounds are particularly needed, but reports from other parts of Australia are also welcome.

ATTACHMENT E

Media coverage (selection)

Radio interviews:

July 30 ABC Canberra – breakfast program

July 31 Radio 2XX – Landcare Hour program

SUNDAY CANBERRA TIMES AUGUST 19, 2018

Looking for Canberra's 'otter'

ASK
FUZZY
WITH
ROD TAYLOR





What native mammal is about 50cm long, swims in rivers, creeks and lakes, and lives in burrows?

A water rat braving the cold in Lake Ginninderra. Photo: Gary Schafer

Most people would answer "platypus" but equally correct would be the Australian water-rat (*Hydromys chrysogaster*), also known as rakali. Unfortunately the word "rat" conjures up images of two introduced pests – the black rat and brown rat. It is often not appreciated that the Australian water-rat is a genuine native rodent that was a natural part of our environment long before the arrival of its unwelcome cousins. Rakali is an extremely attractive animal, with thick soft fur, dense whiskers, partly webbed hind feet and furry, tapering tail. It has a strong resemblance to a miniature otter.

Both platypus and water rats function as top predators in freshwater systems, eating insects, yabbies, freshwater mussels and shrimps. The size of prey that can be consumed by a platypus is limited because its bill has only rough grinding pads. In contrast, rakali has formidable teeth which can be used to kill and eat fish and water-birds. Water-rats often emerge from the water to search for food or to eat (holding their meal in their forepaws). A feeding "table" – a pile of food fragments on a rock or log – often gives a clue that rakali is around.

Both species are mainly active at night but can sometimes be seen in the day, with rakali probably more likely to be spotted during daylight hours, especially in winter. Although similar in terms of size and colour, the two aquatic mammals can be distinguished by careful observation: the distinctive white tip to the tail of the water-rat being the best identifying feature.

Rakali is difficult to study. Little reliable information exists about population trends, making it hard to assess its conservation status.

The Australian Platypus Conservancy is conducting a survey of the species in the ACT region (with support from Wettenhall Environment Trust).

You help by reporting recent or past sightings to the APC website (www.platypus.asn.au). Please include details of how many animals seen, date of the sighting and name of water body where the sighting occurred (with latitude and longitude for the location, if possible, or enough detail that the site can otherwise be mapped).

Response: Geoff Williams, Australian Platypus Conservancy

The Fuzzy Logic Science Show is on at 11am on Sundays on 2XX 98.3FM.
Questions to AskFuzzy@Zoho.com
Twitter: @FuzzyLogicSci

Seeking 'otters' in the ACT

The Australian Platypus Conservancy's (APC) survey of Australian water-rats or rakali (pictured), an animal described as the Down Under version of the otter, will be launched on Thursday 2 August 7pm at the Slatyer Seminar room, ANU. The APC will conduct a community-based survey of the distribution of rakali in the ACT region during 2018/19 (with support from the Wettenhall Environment Trust). In addition to the launch, other rakali talks will be presented on Thursday 2 August 11am at the Jerrabomberra Wetlands, and Friday 3 August 6pm at the Cooma Ex-Services Club. Members of the community are encouraged to report all reliable sightings of water-rats - both from the past and present. Reporting forms will be available for completion at the talks. More info: call Geoff on 5157 5568 or email platypus.apc@wetten.net.com.au



Australian Geographic

Aussie 'otters'

Our biggest rat is a surprisingly endearing water creature with glossy fur and fabulous whiskers.

STORY BY GEOFF WILLIAMS

MENTON 'RAT' and Australians usually think of introduced black rats. But we have many native rodents that have been part of Australia's fauna for millennia (see AG 143). One of the largest is the water-rat, known also by the Aboriginal name rakali.

It's like a Down Under otter - an aquatic mammal well known in North America and Europe. Among the rakali's many appealing otter-like features are glossy fur and distinctive whiskers. It has a streamlined body and thick, tapering tail that acts as a rudder. Also like otters, rakalis are top-order aquatic environment predators, occupying the same ecological niche across Australia that's filled by otters in the Northern Hemisphere.

Rakalis feed mainly on prey from streams, creeks and dams - including fish, yabbies, mussels and aquatic insects. They also forage in muddy reed beds and on river- and creek-banks. In Queensland, rakalis have even learnt to eat cane toads by flipping these

noxious pests over to avoid ingesting the poison glands on their dorsal surface. Although mainly associated with fresh water, rakalis also inhabit brackish estuaries and even saltier bays and inlets, where they sometimes use moored boats as feeding platforms.

The rakali is difficult to study in the wild and hasn't traditionally attracted much research funding. Little is known about population trends, making it difficult to assess the species' local conservation status. Anecdotal evidence suggests habitat change has caused numbers to decline in some areas, such as irrigation districts where earthen channels have been lined with thick plastic sheeting to reduce seepage.

The rakali also continues to suffer direct human impacts. During the early 20th century, many thousands were killed annually for their pelts, with more than 50 needed to produce a single fur coat. Although now legally protected, water-rats still sometimes die after being trapped, poisoned or shot -

often deliberately because people don't recognise they are native rats rather than introduced sewer rats. Many animals also drown as bycatch in traps or nets set for fish or crustaceans. Studies carried out in Western Australia and Victoria found more than 40 per cent of reported rakali deaths involved animals drowning in nets known as opera house traps set for marron or yabbies.

The Australian Platypus Conservancy (APC) conducted a community-based survey in 2017 of rakali in Victoria to improve understanding of the species' status. This achieved a 74 per cent increase in modern Victorian data on the species. Interestingly, the animal appears to thrive in many artificial water bodies, suggesting opportunities to create new rakali habitat when urban lakes or wetlands are developed. Management authorities are also being encouraged to retain existing habitat when lakes or channels need to be modified.

The APC is conducting a similar survey in the ACT in 2018-19. It'll be launched with a public talk at the Australian National University's Slatyer Seminar Room on 2 August. All data collected will be shared with Canberra Nature Map and the Atlas of Living Australia to ensure it's publicly accessible. Other talks and rakali-spotting sessions will be held to build public awareness about rakalis and encourage people to watch for them and report sightings.

FOR MORE INFORMATION on the rakali, visit backyardbuddies.org.au/backyard-buddies/water-rat

Surveying rakali

THE AUSTRALIAN Platypus Conservancy (APC) is asking the public to help conserve the rakali by reporting sightings. It's found in aquatic habitats from rivers, creeks, lakes and ponds, to dams, wetlands, estuaries and coastal areas. Adults weigh up to 1.2kg and have a white tip on the tail. They're most active early morning and late afternoon, although they can be seen at any time of the day, particularly in winter.

Report recent or past sightings to the APC website platypus.asn.au/report-a-sighting Include details of how many animals were seen, the date and location, and give the name of the water body, latitude and longitude where possible.

ACT region sightings will be most useful, but reports from all regions are welcome.

PHOTO: GREGORY LLOYD BOWEN / CORBIS OUTLINE / GETTY IMAGES
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Understanding the water rat - Australia's "otter"



FREE PUBLIC TALK – 3 August, 6pm, Cooma Ex-Services Club

The platypus is widely recognised as a uniquely Australian animal. By

comparison, relatively few people know that the Australian water-rat (*Hydromys chrysogaster*) is a genuine native rodent that was a natural part of our environment long before its pest cousins - the black rat and brown rat - arrived with the early colonists.

The water-rat (also known as Rakali) is an extremely attractive mammal.

Its thick coat of soft fur, dense whiskers, blunt muzzle, partly webbed hind feet, and furry tail, all help create a resemblance to a miniature otter.

The Director of the Australian Platypus Conservancy, Geoff Williams, will be present a talk about rakali on this Friday 3 August at 6pm at the Cooma Ex-Services Club.

Geoff has been studying platypus and water-rats since 1994.

Before helping to establish the

Conservancy, Geoff was Director of Healesville Sanctuary and Assistant Director of Taronga Zoo.

Geoff will outline the biology and key conservation requirements of the Australian water-rat.

He will also include tips on how to go about spotting this fascinating native mammal in the wild with the aim of encouraging more people to look out for and report sightings of the species.

The Conservancy is conducting a survey of the status and distribution of the water-rat in the ACT region over 2018/19 (with support from the Wettenhall Environment Trust).

Members of the community are encouraged to contribute to this important 'citizen science' project by reporting all reliable sightings of rakali –

both from the past and present.

Reporting forms will be available for completion at the talk to record when and where the species was seen.

Details of any subsequent sightings over the next year can be reported directly to the APC (via email at platypus.apc@westnet.com.au or website at www.platypus.asn.au).

All reports will eventually be entered in the Atlas of Living Australia to help planning of future conservation action by management agencies and environmental groups to help water-rats in the local region.

The seminar is being hosted by Cooma Waterwatch as part of platypus month.

For further information about the water rat seminar please contact Antia on 0429 778 633 or coomawaterwatch@gmail.com

ATTACHMENT F

APC Newsletter articles

No.72 May 2018

APC EXTENDS RAKALI SURVEYS TO THE ACT

The Australian Platypus Conservancy is commencing a community-based survey of the water-rat or rakali in the ACT and neighbouring parts of NSW. This project will build on the success of a similar study by the APC to establish the status of this species in Victoria (see *PN&V* no. 70). The Norman Wettenhall Foundation is again helping to support the rakali survey; local partners include the Field Naturalists Association of Canberra and National Parks Association ACT. All new data will be shared with Canberra Nature Map and Atlas of Living Australia to ensure that it's publicly accessible. The ACT water-rat survey will be officially launched with a talk at ANU's Slatyer Seminar Room on Thursday 2 August. Other talks and rakali-spotting sessions will be held throughout the Greater Canberra region in 2018/19 to build awareness of this very special animal.

No.73 August 2018

WATER-RATS BREAKING THE ICE

The Australian water-rat (or rakali) is an adaptable species that is known to occupy a very wide range of aquatic habitats. A new record for how high it can occur in mountainous regions has been recently established as a result of some fascinating observations from Kosciuszko National Park. These have been shared with the APC by Dr Ken Green, who has worked for the past 40 years to document the plants and animals found at elevations above 1500 metres.

We believe that the previously recognised 'mountaineering record' for the species was around 1500 metres, set at Lake Catani in Mount Buffalo National Park in Victoria. However, Dr Green reports that in November 1998 he observed a water-rat swimming in Betts Creek at 1740 metres. Then, in mid-June 2009 he noted an animal at an even higher elevation – 1900 metres at Blue Lake, where ice is known to freeze to a depth of a metre or more. On this particular day some early ice had formed in the water but, unperturbed, the water-rat was seen to be both swimming in the water and walking over nearby ice and snow on land.

Dr Green's observations are among more than 100 new rakali records for the ACT and nearby areas that have been received since the APC launched its community-based survey for this species (funded by the Wettenhall Environment Trust) at ANU in early August. You can assist this project by reporting rakali sightings via the APC website (www.platypus.asn.au), or by emailing the details of when and where you saw a water-rat to platypus.apc@westnet.com.au.

No.74 November 2018

EARLY POLLING SUCCESS FOR CANBERRA RAKALI SURVEY

The APC's community-based rakali survey in the Greater ACT Region was launched at the Australian National University in August, with much appreciated support from the Field Naturalists Association of Canberra, National Parks Association and (especially) the Wettenhall Environment Trust. Since then, the number of new rakali sightings that have been reported greatly exceeds (by a factor of more than five) all previous official records for the ACT since 2000. Lake Burley Griffin and Lake Ginninderra have emerged as clear hot-spots for the species, with fewer reports received for Lake Tuggeranong and the Murrumbidgee River and its tributaries. The survey will continue until mid-2019, with more spotting and information sessions planned for April and May, so please continue to send all of your recent rakali sightings to platypus.apc@westnet.com.au.