

Quolls

Quolls are a spectacular example of a large carnivorous marsupial that has declined in numbers whenever it has encountered humans.

The Eastern quoll

Other common name is the eastern native cat.

The Eastern quoll is a solitary marsupial and historically was widely distributed throughout south-eastern Australia, from south-east South Australia, throughout Victoria and Tasmania to eastern New South Wales. This species experienced a dramatic decline and is now considered extinct throughout most of its former range. They are protected animals due to their decreasing numbers, and today the only known populations are in Tasmania.

The Eastern quoll is listed as an Endangered Species on Schedule 1 of the New South Wales Threatened Species Conservation Act, 1995 (TSC Act). This species is also listed as a Vulnerable Species on Schedule 1 of the Commonwealth Endangered Species Protection Act, 1992.

This slightly built species occurs in two colour phases (black or fawn), both with white-spots. It is distinguishable from the larger spotted-tailed quoll by the absence of spots on its tail. Individuals with either black or fawn coat colour occur in the same litter, independent of their sex or the colour of the parents. The quoll is about two feet (60 cm) long (including a long tail), and weighs roughly 2.9 pounds (1.3 kg). The female is slightly smaller than the male.



The Eastern quoll (Dasyurus viverrinus)

Ecology

The Eastern quoll is nocturnal, feeding at night and sheltering in dens by day. Insects and grubs, small terrestrial mammals and birds form much of an individual's diet. However, as an opportunistic carnivore, they may scavenge on carcasses of large animals. Grasses are often eaten and berries

also form part of the species' diet. Although the Eastern quoll is a solitary feeder, the home ranges of individuals overlap considerably. Males may travel over a kilometre in a night while females restrict their movements to a few hundred metres surrounding their dens. Despite overlaps in home ranges and apart from occasional instances of den sharing, adults generally avoid one another. Social interactions increase during the short breeding season when fights between males become more frequent.

The breeding period is from May to August with females producing up to thirty young after three weeks gestation. However, mortality is high and the first six young to attach themselves to the six teats of the female are the only survivors. Young are carried in the pouch for six to eight weeks, after which they are deposited in a den or carried on the mother's back. Weaning takes five months after which time the young become independent. Of the young that enter the den, mortality is low, so large numbers of juveniles enter the population around November. Juveniles disperse over summer, reducing the local population size. Home-ranges are relatively small, with females remaining within a few hundred metres from their den. Males travel larger distances, but are thought to restrict their movements to one kilometre from the den. Dens are made in hollow logs, underground burrows or amongst rock piles. Males may have numerous dens within their home-range. Although most males and females can breed for several years, most breeding adults consist of young of the previous season.



Mother and young quoll

Distribution

In New South Wales, Eastern quoll populations once occurred from the mid-north coast to the Victorian border. There have been recent unconfirmed sightings in the Wyong and Cessnock districts on the central coast and inland of Kempsey, however extensive surveys have not found any evidence of the species and its current distribution in New South Wales remains uncertain.



The Eastern quoll is extinct in South Australia and no animals have been caught elsewhere on the mainland in the past twenty years. In the 1980's there were claims of sightings in Victoria and New South Wales. Tasmania is the only remaining location of the Eastern quoll and that population is considered vulnerable due to a lack of knowledge about the disease which wiped out the mainland population around 1901.

Habitat

The Eastern quoll utilises a variety of habitats including dry sclerophyll forest, shrub, heathland and agricultural land. In Tasmania individuals occur most commonly where there are ecotones between cleared pastures and eucalypt forest, reflecting the availability of prey along forest edges. Riparian forests are also frequently used, particularly where a movement path is provided through cleared landscapes. The Eastern quoll requires hollow logs, rock piles and even haystacks in which to den.

Threats

- Loss and degradation of habitat through clearing of native vegetation and subsequent development
- Loss of large hollow logs suitable for den sites
- Competition for food and predation by foxes and cats
- Spread of epidemics, such as a parasitic protozoan, by cats to quolls
- Historically this species was persecuted by humans
- Road mortality
- Baiting of dingoes results in direct poisoning and changes the composition of predators, reduced dingo numbers favours foxes which compete with quolls.

Management

- Protection and maintenance of known or potential habitat, including the implementation of protection zones around recent records (particularly known or potential den sites)
- Appropriate pest control programs which are targeted towards reducing fox and feral cat numbers without affecting native species
- Alteration of prescribed fires and grazing regimes to ensure the enhancement and maintenance of known or potential habitats and the reduction of habitat fragmentation.

The spotted-tailed quoll

Other common name is the tiger cat.

The spotted-tailed quoll is the second largest of the world's surviving carnivorous marsupials (the largest being the Tasmanian devil). Spotted-tailed quolls vary from reddish brown to dark chocolate brown with white spots on the body and tail (unlike Eastern quolls which do not have spots on the tail). The species is considerably larger than the Eastern quoll, with males measuring up to 130 cm long and seven kg in weight. Females are significantly smaller than males. The eyes and ears of the spotted-tailed quoll are comparatively smaller than those of the Eastern quoll. Also the spotted-tailed quoll is physically strong in appearance, with a thick snout and wide gape.




Spotted-tailed quoll (Dasyurus maculatus)

Distribution and habitat

The spotted-tailed quoll is also found on the east coast of mainland Australia, but is rare. Two subspecies have been described - a smaller one (*D. m. gracilis*) is found in northern Queensland. *D. m. maculatus* occurs from southern Queensland to Tasmania. The spotted-tailed quoll is now threatened throughout its mainland range.

Behaviour and diet

Spotted-tail quolls are largely solitary and nocturnal, although the species does sometimes forage and bask during daylight hours. Spotted-tailed quolls spend a tenth of their time moving with agility above the forest floor on logs or in trees.



The spotted-tailed quoll is a capable hunter that, like the Eastern quoll, kills its prey by biting on or behind the head. Prey taken by the spotted-tailed quoll includes bandicoots, rabbits, rats, gliding possums, small or injured wallabies, reptiles and insects. Birds and eggs are also taken from time to time. Carrion is frequently eaten by spotted-tailed quolls and even tip scavenging and beachcombing occur. Large spotted-tailed quolls compete directly with Tasmanian devils for food - one female has even been seen to chase a Tasmanian devil away from a carcass!

Breeding

Breeding is similar to the Eastern quoll. Females breed only once a year unless they fail to find a mate or lose their litter early, at which time they will try to breed again. Breeding occurs in early winter with females giving birth to up to six young after a gestation period of 21 days. After about ten weeks the young are left in grass-lined dens located in burrows or hollow logs leaving the female free to hunt and forage. If the female needs to move to a different den she carries the young along on her back. Towards the end of November, when the young are 18 to 20 weeks old, they are weaned (stop suckling) and become independent of the female. Sexual maturity is reached at one year.



Two baby quolls playing outside their maternal den, captured by remote photography (photo by Brendan Cowled)

1080 and quolls

Sodium monofluoroacetate or 1080 poison is widely used in Australia to control vertebrate pest species, such as wild dogs, foxes, feral pigs and rabbits.

In July 2002 our Society wrote to the Director-General of New South Wales National Parks and Wildlife Service (NPWS) requesting input into the process of the Environmental Impact Assessment for aerial baiting of wild dogs in the Northern Directorate of NPWS. We were concerned that aerial baiting for wild dogs and foxes would have an impact on native species such as the tiger quoll and asked whether it was possible to demonstrate

to our Society that such aerial baiting would not impact on native species. We were specifically concerned about the specificity of 1080 poison and its impact on non-target native species, including the risk of secondary poisoning. Some land managers argued that individual tiger quolls may be poisoned but there is a net benefit to the quoll population from a reduction in the numbers of introduced predators such as foxes and wild dogs.

As a result of ongoing discussions with NPWS our Society offered financial support for research related to the question of impacts of baiting on quolls and awarded an ongoing research grant to Al Glen, a PhD student under Dr Chris Dickman at the University of Sydney. Al studied the interactions between foxes and spotted-tailed quolls and his project was closely linked to the objectives of the New South Wales Fox Threat Abatement Plan.

In September 2003 NPWS established the Aerial Baiting and Quolls Research Steering Committee to provide general oversight of the research and our Society's President, Patrick Medway, was invited to be a representative on the committee.

Quoll research

Al Glen is currently studying the effects of introduced predators on native quoll. There is an urgent need to learn more about the status and long term survival of our native quoll and this research work is part of a wider research program to protect the species from the impacts of foxes, feral cats and wild dogs.

The project entails volunteers joining scientists in a silent hunt for one of Australia's most elusive creatures - the endangered spotted-tailed quoll. Backed with our grant funds, volunteers and Sydney University scientists trace quolls in their natural habitat to research the species' ecology and to investigate the reasons for the decline of the species.

While there have been a small number of studies in the past, much is still unknown about this native marsupial carnivore, which belongs to the same family as the Tasmanian devil. It was once found across much of eastern Australia, but has declined dramatically in abundance and distribution. The destruction of habitat is likely to have caused much of the decline, however, competition from introduced species such as foxes, feral cats and wild dogs may also have contributed.



Al Glen weighing a captured quoll (photo by Bobby Tamayo)

Competition with foxes

Over a period of two years the survey will investigate diet, home range and habitat use of foxes and quolls living in close proximity. It will also look at the reproductive success and causes of mortality in quoll populations and finally population genetics of quolls. The study may provide evidence for the belief that foxes are partly responsible for the species' dramatic decline over the past decades. Foxes and wild dogs may impose both competitive and predatory pressure on quolls as they utilise similar prey and habitat and den in similar locations.

Paternity tests for quolls

Scientists and volunteers trap quolls and take DNA samples from young while they are still in the mother's pouch. These samples will help assess the genetic diversity within the population and enable paternity tests to determine whether some males are more successful at fathering offspring than others.



A female quoll just after being released from a trap

Radio tracking

Quolls, foxes and feral cats in the area are also being monitored by radio-tracking to see whether quolls are excluded from areas of preferred habitat by their introduced rivals. Predators may compete for space as well as for prey, and assessing the diets of quolls, foxes and wild dogs will help to determine the degree of overlap. Preliminary results show that small to medium-sized mammals such as rodents, bandicoots, rabbits and wallabies are important prey for all three species.

The future for one of Australia's most elusive creatures

Al Glen hopes that this research will lead to a more secure future for this unique species. A basic understanding of the quoll's ecology, and of the processes which have led to its decline, is essential to its conservation, and Al's survey is a first vital step in the right direction.

A blueprint for the future of quolls

Our Society recommends that all existing populations of quolls be located to determine the relevant threatening processes. In all cases, the primary aim to protect endangered wildlife should be to reduce habitat loss and control feral pests. We also should endeavour to reduce quoll deaths due to '1080'-type dingo baits. The education of people is essential to ensure quolls are protected on private land.

Recovery plans

A draft recovery plan for the spotted-tailed quoll has been prepared under the Federal Environment Protection and Biodiversity Conservation Act, and an Action Statement has been prepared in Victoria under the Flora and Fauna Guarantee Act. A recovery plan has not yet been prepared for this species in New South Wales.

Queensland

Clearing has removed over 70% of the forests and woodlands in the former range of the Southern tiger quoll in south-eastern Queensland.

Research

Queensland Department of Environment and Heritage research suggests adult Southern tiger quolls may have a 'territory' of up to 500 hectares. There are few areas where such territories exist without quolls encountering the effects of humans.

These effects include habitat loss and fragmentation, disease, competition with foxes and feral cats, poisoning by dingo baits and cane toads and death by shotguns.