

Do cats impact on wildlife?

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ABSTRACT

Cats can have beneficial impacts on wildlife by stabilising numbers of rabbits and exotic rodents. They can also have adverse impacts, directly through predation and indirectly through the transmission of diseases. In many cases it is incorrect to single out cats as the sole factor responsible for declining wildlife populations, but the adverse impacts of cats may operate in concert with other factors, such as droughts, to finally push species into local or complete extinction. However, there is enough evidence available to indicate that a reduction in the numbers of free-ranging cats in urban areas would lead to a desirable increase in biodiversity in Australian cities.

This statement, like any other to do with the management of complex ecosystems, needs to be viewed as a working hypothesis, requiring ongoing evaluation and subsequent modification as further information becomes available. Further information in this case could readily be collected by enlisting the aid of community groups to monitor the response of prey species to cat control programs.

INTRODUCTION

The question of whether cats impact adversely on wildlife in Australia has been with us for a long time. Even in the 1920's, a strongly affirmative answer was put forward by Wood-Jones (1924), who was greatly concerned by declines in many species of native mammal, some of which he attributed to predation by feral cats. Interest in the matter has increased markedly over the last few years and there have been several workshops and reviews addressing exactly this question (Potter 1991; Natrass 1993; Paton 1993; Carter 1994; among others). So what do we know from all this research? Do we have a problem with cats and wildlife in Australia and, if we have, what should we be doing about it?

BACKGROUND

The presumed ancestor of the domestic cat, *Felis catus*, is a hybrid between subspecies of the European/African wild cat, *Felis silvestris* (Serpell 1988). Descendants are now feral, or free-living, quite independently of humans, over virtually the entire Australian continent (Wilson et al. 1992) and many other parts of the world (Fitzgerald 1988). How long they have been in Australia is a matter of some debate. Aborigines in some areas of northern Australia regard them as native mammals (Burbidge et al. 1988; Reid et al. 1993) and it is almost certain that their arrival predated European settlement. Whatever the time of their arrival, they did not form part of the original Australian fauna.

Felis catus and *Felis silvestris* are predators, which eat other animals and in some parts of Britain *F. silvestris* is still regarded as vermin because of its predation on game birds such as grouse (Corbet and Southern 1977). In its feral or wild state, *Felis catus* preys on a huge variety of small animals (Fitzgerald 1988). The particular species do not seem to matter much but, given the choice, these animals will prey mainly on mammals, such as rabbits or rats, which make a substantial meal, with a few birds, lizards and invertebrates thrown in. It is more energy-efficient for predators to prey on animals as large as they can manage, and cats are real economic rationalists in this respect. In the absence of rabbits, cats will readily turn to other similar-sized animals, such as seabirds (Moors and Atkinson 1984; Fitzgerald 1988) or large fruit pigeons and flying-foxes (Tidemann et al. 1994). In the absence of prey of a preferred size they will scavenge whatever live or dead animal protein is available.

In many places where *Felis catus* has become feral, particularly islands, there is absolutely no doubt that it has had a negative impact on native species, in some cases resulting in their complete extinction (Fitzgerald 1988). Island ecosystems are usually less complicated than those on larger land masses, so ecological interactions are sometimes easier to interpret. The question of whether cats have a negative impact on wildlife in a large, extremely diverse land mass, such as Australia, is a more complicated matter. Like so many issues to do with ecosystems, the question bears on extremely complex interactions, some of which may only become evident over decades, or longer. Simplistic answers are rarely correct. Any answer should be regarded simply as a hypothesis, which needs to be tested. This is a most important point, for there is always a limit to the dollars or effort that can be diverted from the public coffers for wildlife conservation or feral animal control, because there are many other matters that also demand attention. Dollars or effort spent on cat control are dollars or effort which cannot be directed, for example, to fox or rabbit control, or conservation of koalas or platypuses.

It is, therefore, important that we view feral animals, including cats, in the wider context. Cats can have both beneficial and adverse impacts on wildlife. In some areas of Australia feral cats almost certainly have a beneficial effect by eating large numbers of rabbits (Catling 1988), which themselves have substantial impacts on ecosystems and agricultural productivity. In New Zealand (Fitzgerald 1990) and on Christmas Island (Tidemann et al. 1994) feral cats have a beneficial effect by stabilising the numbers of introduced rats, which can have a sometimes more serious impact as predators of wildlife (Atkinson 1985). One of the main reasons for human beings keeping cats used to be, and still is in rural areas, to control mouse and rat numbers. Urban cats in Australia still catch large numbers of exotic rodents (Reark Research, this conference), which may have a beneficial impact on urban wildlife. Cats are a preferred food of Aborigines in some areas and the sale of their furs generates a small export income for Australia (Ramsay 1994).

On the down side, there is a steadily growing list of evidence pointing to the adverse effects of cats on wildlife in Australia and elsewhere, both from the direct effects of predation and the indirect effects of spreading diseases, such as toxoplasmosis and sarcosporidiosis (Paton 1993). The term 'adverse impact' refers to a scale, with a local reduction in the numbers of individuals of a species at one end, and at the other, complete and final extinction. Extinction, the worst case scenario for a species, and for us, if we value biodiversity, usually only comes at the end of a long and often tortuous road, because extinctions are almost invariably due to more than one factor. What precedes extinction is endangerment, when the numbers of a species get to critically low levels. The difference between extinction and endangerment is slight, like the difference between being critically ill and dead. Any additional straws at this stage of a career of a species may finally break the camel's back.

Different ecological factors can act as the final straws in different circumstances. A particular species may finally become locally extinct in one place because of a bad drought. Another population of the same species may go into oblivion because of an extensive bushfire or the spread of a new disease. Or perhaps all of these factors may operate in concert. Australia is not the place it was in 1788. It now supports about 17 million human inhabitants, soon to be more, and massive changes have been imposed on the vegetation and the fauna. Exotic species, for example, now make up about 15 percent of Australia's plants (Humphries et al. 1991) and 10 percent of Australia's mammal fauna is exotic (Wilson et al. 1992). Many native species have already become extinct and many others are now teetering on the thin line between extinction and endangerment.

What worries most ecologists is the strong possibility that feral cats may be acting as final ecological straws. We know that they have in some circumstances and there is a good chance that they will in others. The fact that a particular native species successfully co-exists with cats in one place doesn't necessarily mean that it will in others. Natural events, like the drought we are currently experiencing, can tip the balance and may, in conjunction with other factors, send yet more species off into oblivion. I believe there is now little room for doubt that cats can and often do have adverse impacts on wildlife. The severity and time-frame of the impacts will almost certainly vary from place to place and the question of control of cats, in my view, must be addressed within this framework.

URBAN CATS

So, down to the urban cat, one of the main subjects of this conference. Urban cats prey on wildlife (Paton 1993) although we can expect that the extent to which they do this, and the consequent impact, will vary. Similarly, there is little doubt that urban animals feed into the feral pool, although the feral pool is undoubtedly self-sustaining anyway. Carter (1994), echoing the consensus of views at a recent workshop in Canberra, concluded that 'research into the link between domestic and feral cat populations is seen as a low priority because there is sufficient information to infer that there is considerable recruitment from domestic to feral populations'. Nobody has yet demonstrated extinctions of species because of cats in urban areas, but I don't believe any of us really wants to wait for such an event before we act.

We are often faced with the need to act before we have all the facts we might wish for, particularly when we are dealing with ecosystems. In the balance, it seems to me that it would be desirable to control urban cats from both an ethical viewpoint and an ecological one. I say this advisedly, returning to my earlier point that answers in wildlife management should be viewed as working hypotheses, which need to be evaluated as more information comes to hand. Instead of debating the issue further, I think we should use the unparalleled opportunity we have now to test some of the hypotheses that have been put forward about the impact of cats on wildlife. What happens to wildlife if free-roaming cats are eliminated from certain areas? Do the benefits warrant the inevitable costs?

Most science is based on experiments. With ecosystem management it is often very difficult to do clear experiments, firstly because of the scale of things and secondly because other factors, beyond the control of the experimenter, are often imposed on the experimental setup. If droughts or fires intervene, it may not be an easy matter to separate the effects of these from the one factor that was being looked at. Consequently many of the ecological experiments on effects of cats on wildlife have happened completely by accident. There are, for example, some islands which have the same native fauna, but some have feral cats and some don't. We now also have a few islands from which cats have been deliberately eradicated or controlled and we can see the effects on the wildlife.

What I propose we should be doing in Australian cities is carefully testing the effects on wildlife (and exotic rodents) of eliminating or greatly reducing the numbers of free-roaming cats. Several councils in Australia have now imposed cat control legislation and, no doubt, others will follow. We must seize this unparalleled opportunity to find out more about the impact of cats on wildlife and review our working hypothesis as we go. If our working hypothesis is correct, then a number of readily measurable things should happen if we remove cat predation from an area. We can list these as testable predictions:

1. there should be a reduction in the numbers of stray cats picked up by or handed in to refuges;
2. there should be a reduction in the numbers of wildlife injured by cats and handed in to refuges; and
3. there should be a rise in the numbers of mammals, birds and lizards, and perhaps we will see the reappearance of species.

There should also be a reduction in the numbers of animals feeding into the feral pool, although this would be far more difficult to measure. If community attitudes are seen as important in this context, and I certainly believe they are, then we should expect a change in these too. The experiment would need to run for several years, perhaps three at the outset, to cover the inevitable 'ecological noise' from events like droughts.

I have just finished analysing a data set recorded by members of a volunteer organisation which rehabilitates flying-foxes (among other things) in Sydney. These people have carefully kept records of accidental deaths and injuries to flying-foxes in the Sydney area since 1988. Upon analysing the data, I discovered a great many interesting things. Firstly, I discovered that the pattern of accidents across the Sydney metropolitan area gave a very detailed picture of the types of accidents that these animals experience. Cats, I should hasten to say, killed very few flying-foxes, probably only those which were debilitated in some way. A major cause of death (about 30 percent of 460 accidents) was electrocution on power lines. In some problem spots in both Sydney and Brisbane now, the power authorities have installed insulated cables. At a cost of course.

But the most useful information to come out of the analysis was a very detailed picture of how and where these animals forage. A lot of time and effort had already been expended by scientists, including myself, in trying to get this information, because it is vital for designing management plans. I was absolutely delighted to find the answer in these amateur-kept records, or 'stamp albums' as I rather disparagingly referred to them. I tell this story because I believe there is an important message in it. The message is that there are many people out 'there' who already collect a lot of information which has a bearing on ecological questions. Furthermore, they do it because they would like to see things improved and, with a little direction, they can help to answer some of the many questions to which we need answers. The real power of such an approach is the sheer size of the 'workforce'. A single ecologist, working on his own, with a limited budget, can do only so much.

There are already many volunteer groups which collect information on wildlife and there are many groups which care for stray cats. Sometimes the same people are involved in both activities. There are also many people who spend a great deal of their time looking at birds and some who look at other faunal groups. I believe that, with some coordination, these people could carry out what would amount to a huge ecological experiment on the impact of urban cats on wildlife. It would not cost the taxpayers much, except those who keep cats, and the volunteers. But then, they already do most of their work voluntarily. In conclusion, I'd like to reiterate the original question: Do cats impact on wildlife? Let's find out!

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Chris Tidemann is a wildlife ecologist who teaches and does research in wildlife management and conservation at the ANU in Canberra. He has studied ecosystems, particularly the role played by bats, in many parts off Australia and elsewhere. His interest in the impact of cats on native fauna, inspired when he was a child by the insightful writings of Frederick Wood-Jones, was renewed in 1988 by finding that feral cats ate large numbers of flying-foxes (as well as rats) on Christmas Island. In addition to studying bats and cats, he is also investigating the impact of exotic birds on ecosystems. He has a strong belief that wildlife conservation ultimately depends upon community support and that limited research dollars can be made to go a lot further through community involvement.

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