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Can Tassie devils control feral cats? The devil is in the detail

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DISCLOSURE STATEMENT

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Could devils help solve our feral cat crisis? The devil might be in the detail. Ross Huggett/Flickr, CC BY

Recently there have been discussions around **reintroducing Tasmanian devils** to parts of the Australian mainland. Some have even predicted that devils could help conserve biodiversity by **controlling the feral cats and foxes** that currently prey on a range of threatened species.

Some of these predicted benefits are said to be based on **"evidence from Tasmania"**. But how much evidence do we really have?

As part of a study investigating the cause of **decline of the eastern quoll**, we and our colleagues investigated interactions between devils, feral cats and quolls in Tasmania. Our findings published today in **PLOS ONE** suggest that there's no easy answer to the devil and cat conundrum.

A feral cat walks between feeding devils in a Tasmanian free range enclosure, but how much do we know about their interactions in the wild? Simon Plowright/Bicheno FRE, Natureworld

What's the link between cats and devils?

In Tasmania, it has been **suggested** that devils may control feral cats through competition and possibly predation. With devil populations currently being **decimated** by the spread of the fatal **Devil Facial Tumour Disease** (DFTD), it was predicted that devil declines would allow **feral cat numbers to increase**, threatening a range of small and medium-sized prey species.

In north east Tasmania (where DFTD was **first detected in 1996** and devils have been in decline the longest), government spotlight surveys detected an **increase in cat sightings** following devil decline.

This increase in cat sightings has often been interpreted as an increase in cat numbers, with suggestions that **eastern quoll declines may then be linked to an increase in cats**. While this interpretation might fit with predictions, our findings suggest that such conclusions may be premature.

Contrary to predictions, we found **no support** for the hypothesis that devils control cat numbers. Sites with more devils did not have fewer cats, and conversely, sites with fewer devils did not have more cats.

Further, we did not find higher cat numbers in north east Tasmania where devils had declined for 13-16 years.

So how do we explain the increase in cat sightings?

Scaredy cats

TAGS

Conservation, Mammals, Invasive species, Tasmania, Tasmanian Devil, Feral animals, Cats, Wildlife conservation, quolls

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Devils might not control the number of cats – but they may affect their behaviour.

The key for predators to co-exist is avoidance. By concentrating activity into **times** and **places** where large predators are less active, smaller predators such as cats reduce the risk of aggressive encounters with larger predators such as devils.

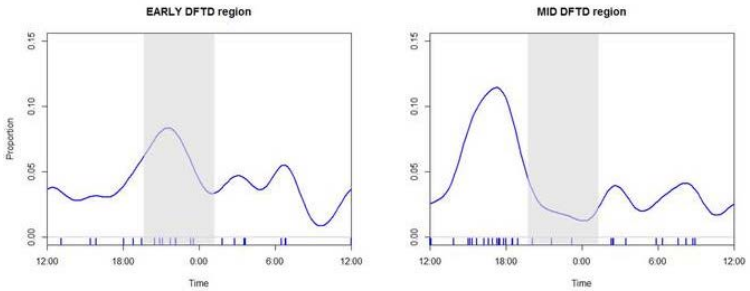
In our study, we found that cats and devils used the same areas, with cats observed at 92% of sites where devils were detected. While cats appeared to avoid individual cameras where devils were detected (a finding consistent with **other studies**), they were usually detected on cameras located only a few hundred metres away at the same site. This suggests that cats may avoid areas where devils are active, but only over short distances.

We also found evidence that cats and devils were active at different times. Cats were more active during the day, but in north east Tasmania where devils have been in decline the longest, cats were more active at night.

This suggests that cats may have previously hunted during the day to avoid nocturnally active devils. But with fewer devils to encounter following DFTD, it may now be safer for cats to shift their activity and hunt at night.

Even without an increase in cat numbers, this apparent shift in cat activity presents an emerging threat to a range of nocturnal prey species that may have rarely seen cats prior to DFTD.

If cats are now more active at night following devil decline, the increase in cat sightings in north east Tasmania may simply reflect a shift in cat activity times, with nocturnal cats now more detectable in spotlight surveys conducted at night.



Cat activity times (blue line) compared with spotlight survey times (grey shading). Cats were

more nocturnal in north east Tasmania (early DFTD region, where DFTD arrived 1996-1999) and would likely be more detectable in spotlight surveys than in the mid DFTD region (DFTD arrived 2000-2003). Bronwyn Fancourt

Are cats to blame for quoll declines?

Eastern quolls have declined by **more than 50%** over the 10 years to 2009 with no sign of recovery. Our research investigated whether this decline might have been linked with changes in cat populations following devil declines.

Contrary to predictions, we found no evidence that cats contributed to the recent quoll decline. But our findings suggest that cats might be preventing populations from recovering by killing young quolls.

Eastern quoll declines do not appear to be caused by any increase in feral cats. Bronwyn Fancourt

At a stable quoll site on Bruny Island, the number of quolls trapped predictably increased over summer as new young quolls emerged - an annual cycle that has been observed historically in stable quoll populations.

However, at our three study sites where quolls had declined, this summer population spike did not occur, suggesting that juveniles are not surviving to enter the population, possibly because cats are eating them.

We found that cat activity changed seasonally, with daytime activity in winter but more nocturnal activity in summer – the time of year when vulnerable juvenile quolls first emerge from their dens.

Unfortunately, this predation intensity may increase further should cats become more nocturnal following devil decline.

The outlook

We have only just begun to understand how devils, cats and

quolls interact in Tasmania. Extensive research is currently underway that will hopefully provide us with some much needed insights over coming years.

We provide a cautionary tale that highlights the need to consider alternative hypotheses to explain observed patterns, as the implications for species conservation could vary dramatically.

Bold decisions and novel approaches are required to stem the rising tide of **Australian mammal extinctions**. Proposals to reintroduce devils to the mainland are commendable and may potentially yield benefits for species conservation.

However, our findings from Tasmania suggest that the predicted benefits of such reintroductions may not be so predictable.

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13 comments sorted by Oldest Newest

John Newlands
tree changer

Cats are smarter and more agile than devils so I wouldn't expect them to fall prey. I think ultimately devils will need protection in enclosed areas with supplementary health checks and feeding. My neighbour has half a dozen cats and recently (last year) trapped and released a young devil. Perhaps it was scavenging for leftover cat food. If anything the devil was a benign casual acquaintance of the cats.

Living on the bush fringe I've noticed several species shifts ... fewer quolls but more bandicoots, fewer wallabies but more forest kangaroos, fewer copperhead snakes but more tiger snakes. I think devils are declining not only due to the facial tumour but harder times. As carrion feeders and only rarely takers of live prey they need scrub littered with wallabies that died from natural causes. Now spotlighting and roadkill are decimating the wallabies it's harder to get food. Weakness from disease makes it worse.

21 days ago • report

Peter Anderson-Stewart
Medical scientist

In reply to John Newlands

"My neighbour has half a dozen cats ..."

"Living on the bush fringe ..."

Disturbing ...

21 days ago • report

Sebastian Poeckes
Retired

In reply to Peter Anderson-Stewart

Just as cats appear to predate juvenile quolls, so I would have expected Devils to predate kittens. Maybe live prey aren't as important to devils as to cats, but I would have expected a devil to eat any nest of kittens it comes across. It's very interesting that this research demonstrates very limited interaction between cats and devils other than
some avoidance behavior on behalf of cats.

Reintroduction of
devils to the mainland may not be easy. There have been a number of isolated finds of devil carcasses across Victoria over a long period. In fact there appears to have been a small fairly long lived population in Central Victoria somewhere near Harcourt. However, despite the increasing use of movement triggered cameras around the bush, used by
wildlife organisationsand universities in animal surveys, there have been no recent sightings; at least as far as I am aware. Most of the Victorian cases were probably of isolated animals released with no chance of reproducing. However, larger releases such as that on Wilsons
Prom in the early 20th century have not resulted in the establishment of
any viable populations. If another attempt at mainland reintroduction is to be made, very significant actions may be needed to isolate the initial population from potential predators as is done with quolls and bandicoots.

21 days ago • report

John Newlands
tree changer

In reply to Sebastian Poeckes

Both cats and devils like to nest underneath largely unused buildings. A hay shed I can see out the window was blocked off underneath for this reason. I presume the mother of either species if present will fiercely repel any intruders. Sometimes a high pitched yapping noise could be heard which I presumed was the sound of devil
joeys.

21 days ago • report

David Obendorf

Veterinarian

In reply to John Newlands

John, you make a valid point when you say: "As carrion feeders [devils] and only rarely takers of live prey they need scrub littered with wallabies that died from natural causes."

Can I introduce some factual history into your important deduction. From about 1954 Tasmania commenced using Compound 1080 to kill what was deemed 'vermin' (rabbits, wallabies, pademelons & possums). Tasmanian devils, as the environmental hygienist, re-emerged from very low numbers as a result of this anthropogenically-produced carrion. Secondary poisoning with 080 for devil through poison carrion is not been shown to be lethal to devils. Just before the first Tasmanian RFA was signed in 1996-97 a report to government claimed that Tasmania has between 130 and 170,000 Tasmanian devils and this was considered an extraordinarily high density of devils. By that time 1080 was routinely used for both crop protection around commercial farms and in forestry regeneration coupes to mitigate against browsing native wildlife.

So John this one poison Compound 1080, in my opinion, was responsible from bring the devil back from low density (in the previous 90 years of strychnine usage on farms to control rabbits 1860-1950) to extraordinarily high numbers iby the mid-1990s. The transmissible fatal Schwann Cell sarcoma of devils [DFTD] was first detected in 1996 and the devil population - particularly in eastern Tasmania - have been serioulsly impacted by this cancer.

Carrion feeding from natural mortality events (in the early 1800s) that supported a stable lower density devil population was replaced by this anthropogenic cascade. I hope this makes sense and thank you for your interest in this matter John.

4 days ago • report

Edward Cannella

Zoologist at BIOSTAT Pty Ltd

A nice critical assessment of simplistic causality. This (IMO - good) research has reinforced quite a simple core belief - nothing in the world is simple. All ecologists should know that there is no such thing as a magic bullet and there is never a binary response to any issue in a dynamic system. Too many simplistic "solutions" to environmental issues are being pushed either through the ignorance of the media (and that includes academic, social and private media sources) and/or the ignorance of the researchers themselves (i.e., they are unable to look at the bigger picture in which their research may apply).

21 days ago • report

Ross McLeod
logged in via email @bigpond.com

In reply to Edward Cannella

Amen to that. Nature is in a constant of flux. Seeing similar knee jerk responses to weed control issues in peri urban areas that back on to a national park here. The biggest beneficiary will be Monsanto.

I don't think it would hurt to release the devils on the mainland. Not that I know much...it's just the vibe.

21 days ago • report

Ross McLeod
logged in via email @bigpond.com

In reply to Ross McLeod

oops...constant state of flux.

21 days ago • report

Mark Bachmann
Principal Ecologist at Nature Glenelg Trust

An interesting couple of lines from the article: "Contrary to predictions, we found no evidence that cats contributed to the recent quoll decline. But our findings suggest that cats might be preventing populations from recovering by killing young quolls."

As this suggests, a lack of evidence at this point in time doesn't equal lack of a probable influence - not all interactions in ecosystems are easily measured or identified - even if and when the end results of those invisible interactions are a series of cascading effects that can ultimately be quite dramatic. For instance, if cat behaviour is influenced an any way (as is suggested) by the presence of a healthy devil population in the landscape (through avoidance), then the landscape (from a potential prey item's perspective) is not uniform - even if cats appear to be "present" throughout it.

We have seen a version of this effect on the mainland, with the presence of relictual populations of Bush Stone-curlews in the parklands around the townships of Mundulla and Bordertown, in the South East of South Australia. In spite of curlews gradually declining over several decades and now being absent in potentially suitable habitat in the surrounding landscape, in a demise that (it is reasonably assumed) has been mostly driven by fox and cat predation, these townships have offered some form of "protective effect". Even though we can't prove it, and don't know exactly how the effect works, the only reasonable assumption that ecologists have agreed upon is that domestic dogs within these townships must be influencing fox and cat behaviour. While they are not absent, it has offered enough of a protective effect to still enable occasional recruitment at these sites. Curlews are still in great trouble in these towns (numbers are still declining), but their trend of decline has not mirrored that of the surrounding landscape. Finding novel ways of influencing predator behaviour would seem to be a more realistic target for those of us on the mainland because, to be blunt, eradication (outside of fenced exclosures) is an unrealistic goal.

In terms of the reintroduction

of devils to the mainland, we find ourselves at a point in time where we literally have nothing to lose. Devil conservation and recovery is a national priority in its own right – for a species that was present on the mainland until a mere few hundred years ago, the recovery of this species is not just a Tasmanian concern.

The fact that mainland reintroduction trials would enable us to test whether it is possible to have desirable effects on ecosystem function and critical weight range small mammal communities at the same time is a very attractive side benefit. If it does have a positive influence – no doubt we'll argue about exactly "how" this mechanism works – but that would be missing the point. After all do we want to argue over the science, or test and prove implementable measures that actually work to improve our ecosystems?

This form of applied research on the mainland, to complement Tasmanian studies (like the one mentioned in this article) would be a very positive step in the right direction.

20 days ago • report

Rob Brewster
logged in via email @rewildingaustralia.com.au

In reply to Mark Bachmann

A very good summary of the position we find ourselves in at this point in time, Mark. We certainly can't test the interaction of foxes and devils in Tasmania and we have very little to lose and everything to gain by testing translocations to mainland ecosystems.

20 days ago • report

David Obendorf
Veterinarian

In reply to Mark Bachmann

Mark, one of the last refuge free-ranging populations of eastern barred bandicoots in western Victoria occurred within the boundary of the town of Hamilton. The EBBs were finding effective refuge, food and breeding sites in a disused vehicle dump site and along the Grange Burn (town creek) where thickets of gorse remained. Peri-urban and urban refugia are sometimes extremely important to the survival of such small relict populations.

I was interested to read that Victorians actually releases of Tas devils on Wilson Prom in the early 20th century (Peter Anderson-Smith this thread) and a report of an historical devil population near Harcourt, central Victoria. It's being considered again in the 21st century in Victoria and NSW.

For the record there are currently no Tas devils on Bruny Island or the largest Bass Strait islands (Flinders, Cape Barren or King) but they were released onto a smaller island, Badger Island in the 1990s. The devils on Badger Island caused sufficient ecological impact to nesting birds that they were

removed. Recently devils were release on Maria Island NP off Tasmania's east coast.

In addition every so often someone relocates a dead devil from Tasmania onto the main road (simulating a roadkill) from the ferry terminal on Bruny Island - it creates quite an interest. Some people even hoax dead foxes as road kills or shot foxes in Tasmania. A single carnivore scat (2009) deemed by a DNA test to be a fox turd was discovered in the same vicinity of Bruny Island. Subsequent field surveys fail to find either devils or foxes (or their turds) on Bruny Island.

It pays to always work with high quality empricial data supported by corroboration (i.e. more than one fact of authenticity).

4 days ago • report

Daniel Hunter
PhD candidate at UNSW Australia

The photo shows devils in a captive environment that are well fed. Therefore, we would expect devils to show very little aggression towards a cat roaming around a feeding area. In a 'wild' situation, where devils are probably more hungry and defensive of their meal, I suspect cats would be less brazen.

17 days ago • report

Ian Rist
Managing Director

During the spreading of propaganda promoting the belief of fox imports and fox establishment in Tasmania all the so-called experts offered quite a few of their “legends in their own lunch boxes” theories on Devils and their suppression of foxes and feral cats.In a lifetime spent in the Tasmanian bush I have never known Tasmanian Devils to even eat dead feral cats let alone hunt them kill them and eat them.Goodness I gave them countless opportunities at the Blessington Game Farm, never did I see a single dead feral cat eaten, not one.Theories and practical experiences are two vastly different scenarios.Devils are basically opportunistic cowards and would not risk an encounter with a feral cat much less a female feral cat protecting kittens.Besides cats and kittens are very arboreal and wouldn’t be at all easy targets or Devils.Forget about Devils controlling foxes too, a fox vixen is a even more formidable adversary and it would be a very foolish Devil that went anywhere near a fox den.Dingoes are a different proposition, being able to handle both foxes and cats.

4 days ago • report