Where have all the mammals gone?



Ecologists at Arid Recovery continually study the ecosystem inside and outside the reserve to understand the impacts of invasive species. One way they do this is by trapping animals in the study area. Dr Nicki Munro explains [in this short video.](https://youtu.be/unTuoBm7Tcs)

1. *Notomys alexis*, commonly known as the spinifex hopping mouse, is endemic to the arid zones of central and western Australia. Ecologist Dr Nicki Munro collected data on a range of small native mammals inside and outside the fenced reserve. Below are the data Nicki collected for the spinifex hopping mouse. Put this data into a graph.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| Inside  | 0 | 0.2 | 0 | 2.3 | 12.6 | 14.8 | 16.8 | 50 |
| Outside | 0 | 0.5 | 0.2 | 2.3 | 3.7 | 1.9 | 3.9 | 3 |

1. Like all small native mammals, the spinifex hopping mouse does much better in the reserve where there are no foxes or cats. The fences at Arid Recovery have special one-way gates to allow small mammals to leave the reserve while not allowing rabbits or cats or foxes in. The hope is that the fenced reserve acts as a refuge for native mammals that then leave and breed outside the reserve. So far, however, all native animals that have left the reserve have died. Why is it that rabbit populations do well even in the presence of foxes, but native mammals do not?

Chance environmental events are major disruptions that sometimes occur in an ecosystem. These are things like fire, floods or drought. It’s important that ecologists predict what might happen in these scenarios. Watch [this video on ‘ecological modelling’](https://youtu.be/uwL81J0sdkc).

1. What would happen to the spinifex hopping mouse if a drought hit? Let’s assume that the population stays the same as 2005. This is the baseline data. Work through the scenario, putting the population estimate in the boxes for both inside and outside the reserve.

**Inside**

**Baseline data**

**Outside**

**Drought:** a severe drought has hit, causing the plants to reduce in number. With a reduction in food, small mammal numbers also drop to 10% of their baseline population.

**Inside**

**Outside**

**Loss of shelter:** Rabbits eat low-lying bushes resulting in a loss of cover and shelter for small mammals, as shown in this picture of a bush from Arid Recovery. This means they are more exposed and easier for cats and foxes to catch. Numbers reduce to 10% of the population in areas where rabbits are present.

**Outside**

**Inside**

1. What has happened to the populations inside and outside the reserve?

The spinifex hopping mouse is just one of many native small mammals that are generally impacted in similar ways by rabbits, foxes and cats. Like these native mammals, rabbits are also consumers. So does it matter if native mammals are mostly replaced by rabbits? [Let’s ask Dr Nicki Munro.](https://youtu.be/WhuidKNdv4w)

1. Ecologists need to consider the **interactions of different factors** to understand ecosystem dynamics. If you were an ecologist, using this modelling data, what would you recommend in a plan to help the arid zone?