Activity 3: addressing the ecological crisis

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| VCE key knowledge | * The distribution, density and size of a population of a particular species within an ecosystem and the impacts of factors including available resources, predation, competition, disease, chance environmental events, births, deaths and migration
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| VCE key science skills | * Organise, present and interpret data using schematic diagrams and flow charts, tables, bar charts, line graphs, ratios, percentages and calculations of mean
* Access secondary data, including data sourced through the internet that would otherwise be difficult to source as raw or primary data
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| Learning outcomes | * Describe how Ecologists work towards the conservation of species and ecosystems
* Explain how viruses are used to control rabbit numbers
* Compare a wide range of biotic and abiotic factors and explain how they influence the size and distribution of the population of a particular species
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| Duration | 30 minutes |

Students are introduced to the Arid Recovery program as one way that ecologists are trying to address the ecological crises. They learn that viruses have been intentionally released as a form of biocontrol and use data on rabbit numbers to draw a graph showing the dramatic decline in rabbit numbers. They consider how foxes may have responded to such a sudden decline in prey and learn that one native species may have become extinct due to prey switching, before there was a rapid decline in fox numbers.

Data used in this activity has been extracted from:

Read, J. and Bowen, Z. (2001) Population dynamics, diet and aspects of the biology of feral cats and foxes in arid South Australia. Wildlife Research, 28, 195-203

Students will need online access to explore the Arid Recovery website. There is also a short video embedded in the student worksheet (and the link is provided if student worksheets are printed). Students will need one sheet of graph paper each.

The key concepts that students should understand are: *prey numbers affect the size and density of a population; disease affects the size and density of a population.*

# Step 1

Begin by showing this short video section on Arid Recovery <https://www.youtube.com/watch?v=KbbtziC2wW4> from 31.52 to 34.24 on Arid Recovery. Students can complete the worksheet without watching this video if preferred.

# Step 2

**Student worksheet answers**

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| Addressing the crisis at Arid RecoveryGo to the Arid Recovery website at <http://www.aridrecovery.org.au/> and find the answers to the questions below. 1. Where is Arid Recovery located?

*On website: Conservation>AR reserve**In South Australia near Roxby Downs, in the arid zone*1. What is its main aim?

*On website: about us>about us**Restore the arid zone ecosystem*1. How does it achieve this aim?

*On website: various* *Built a fenced reserve and removed all non-native species from inside the reserve, then re-introduced native species*1. Click on ‘Conservation’ on the banner and read ‘untamed beauty’. Write one thing that surprises you.
2. Name 3 small mammals that have been reintroduced into the reserve (hint: see timeline)

*On website: about us>history>more information>timeline**Greater stick-nest rats; burrowing bettongs; greater bilbies; western barred bandicoots; numbats; dingoes*Arid Recovery took advantage of a key moment in the story of invasive species: the release of Rabbit Calicivirus Disease (RCD).Watch this short video from CSIRO in 1999 which explains the release of RCD. While you watch, think about what factors are mentioned that impact populations of rabbits. <https://www.youtube.com/watch?v=wXT2C_QWMBk>  1. Write two factors that impact on the density of a population that were mentioned in the video in relation to rabbits.

*Prey and disease*1. What was the major problem as rabbit populations crashed?

*Foxes preyed more heavily on native mammals as there were fewer rabbits*1. Using the data in the table below, draw a graph to show the decline in rabbit numbers

*Graph should like this the one here* [file:///C:/Users/Steve/Downloads/08\_Rabbit%20(1).pdf](file:///C%3A/Users/Steve/Downloads/08_Rabbit%20%281%29.pdf) *note that the dramatic decline in 1990 was the result of drought*1. Mark on the graph when Arid Recovery began

*1997*1. Add fox numbers from the table below to your graph. Because the scale of fox numbers is different from rabbits, you will need to add another axis to your graph on the other side.

*Ensure students have added another axis to the graph to show numbers of foxes. Note that when rabbit or fox numbers are zero, this is rounded and does not mean there are literally none.*1. What was the key factor that impacted the size and density of the population of foxes in the arid zone, shown on the graph?

*Prey population*1. What was the key factor that impacted the size and density of the rabbit population in the arid zone, shown on the graph?

*Disease* |