



**Local Land  
Services**  
Riverina

# PESTS IN IRRIGATION LANDSCAPES

## *STUDENT ACTIVITIES*



A resource about the common pests in irrigation landscapes of the NSW Riverina region and their impact on farming and local threatened species.

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# Life from the Murrumbidgee

Water is very important for life. Not just for us, but for the animals, plants, soil and air. In the Riverina region, water is used on farms for irrigating crops and pastures, in homes, by business and industry and by the native plants and animals.

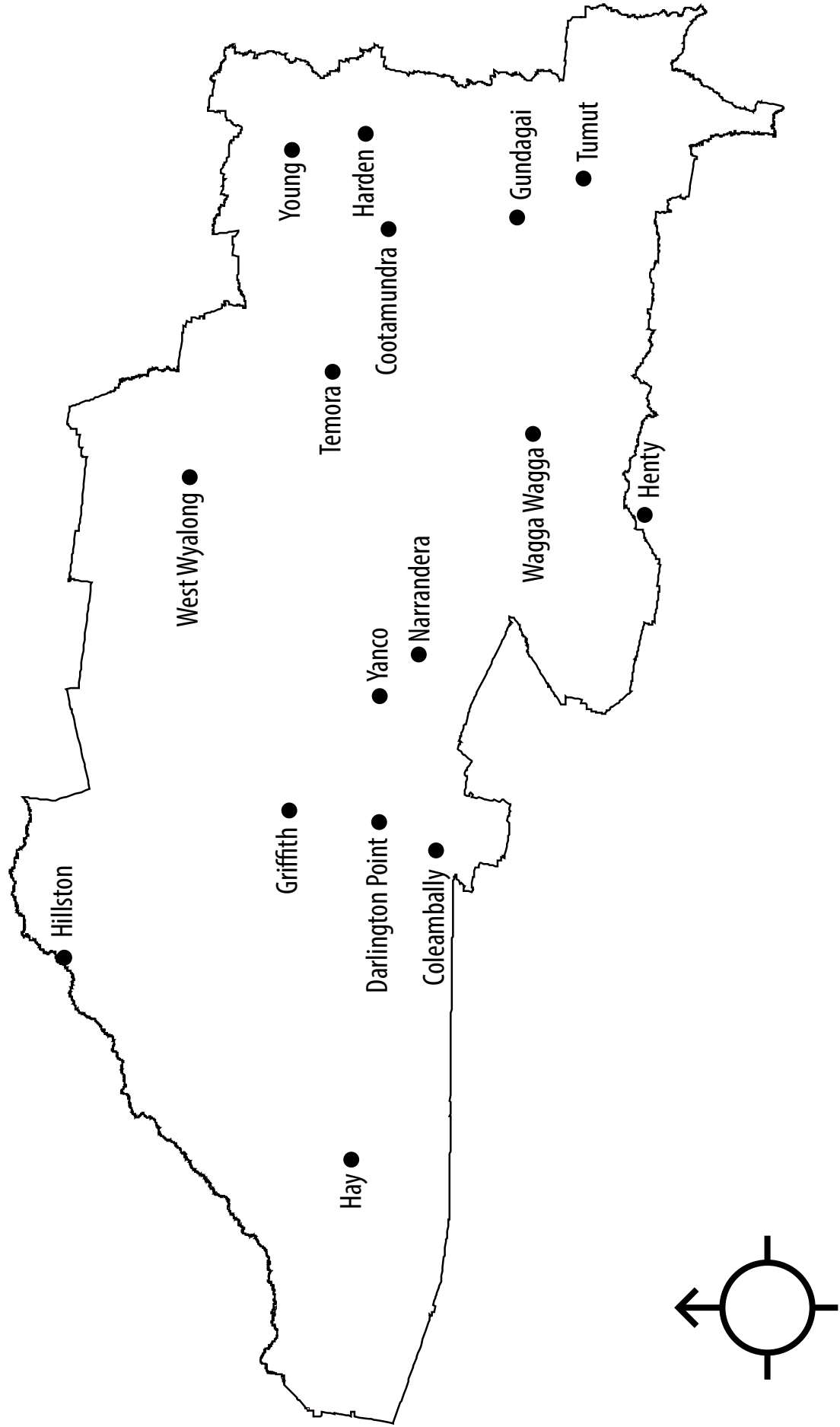
Watch the video ***Eb and Flo...A Long Way To Go*** <https://youtu.be/VGW44cCrICg> then answer the following questions.

1. Eb and Flo start their journey in the ..... mountains.  
They go to the ..... Irrigation Area, Griffith.
2. If Eb and Flo don't go to the Murrumbidgee Irrigation Area, where would they end up?  
.....
3. Name four uses for water from the irrigation channel that you can see in the video.  
.....  
.....
4. The video includes a quick look at the Water Cycle. Did you see it? Find out more about the water cycle in the Murray-Darling Basin at <http://bitly.com/wwcycle>

## ***Mapping exercise***

5. Using the map on the next page, complete the following tasks.
  - a. There is a blank compass on the bottom left of the map. Complete the compass by including the directions: North, South, East and West.
  - a. Use the resource book, or the internet, to identify the Coleambally Irrigation District and the Murrumbidgee (Griffith) Irrigation Area. Draw these on your map.
  - b. Using the resource guide, Google Maps or another map source as a guide, draw the Murrumbidgee River as it flows across the Riverina region. Show the direction of the water flow with arrows.
  - c. Find out where the water is diverted from the Murrumbidgee River and taken out to the irrigation areas. Draw those channels on the map and show the direction of the water flow with arrows.

# Riverina Local Land Services Region



# Threatened Species

The Australian bush has many plants and animals that have so few numbers they are considered a threatened species. When we talk about threatened species they can be put into a range of different categories depending on the severity of their situation.

1. Draw lines to match the types of threatened species classifications with their definition.

**Vulnerable**

A species numbers are so low that it is severely threatened.

**Endangered**

There are no more of a species left in their native habitats but there are some in captivity.

**Critically Endangered**

A species numbers have dropped significantly but it is not yet classed as endangered.

**Extinct in the Wild**

There are no more of a species left anywhere in the world.

**Extinct**

A species numbers are so low that it is very close to becoming extinct.

2. There are other words that we can associate with animals under threat. Go online, or to your library, and write down definitions for the following words.

**Conservation:** .....

**Common species:** .....

**Breed in captivity:** .....

**Sustainable:** .....

# Riverina species under threat

The Riverina region has a number of threatened species. Below is a list of some of these threatened plants and animals - including their threatened status in New South Wales. See if you can put them under their correct category (on the following page) containing the types of species.

If you are unsure about any of these species ask your teacher or research them in the library or on the internet.

Mammals = 4      Birds = 16      Amphibians = 2      Plants = 5      Communities = 3

Australasian Bittern	E	Koala	V
Australian Bustard	E	Lanky Buttons	E
Bilby	E	Little Pied Bat	V
Black-Necked Stork	E	Malleefowl	E
Brolga	V	Myall Woodland	E
Brown Treecreeper	V	Plains Wanderer	E
Bush Stone-curlew	E	Regent Honeyeater	E
Claypan Daisy	V	Sand-hill Spider Orchid	E
Diamond Firetail	V	Slender Darling Pea	V
Flame Robin	V	Sloane's Froglet	V
Freckled Duck	V	Southern Bell Frog	E
Glossy Black Cockatoo <sup>1</sup>	V	Spotted Harrier	V
Grey Falcon	E	Superb Parrot	V
Inland Forest Bat	V	Winged Peppergrass	E
Inland Grey Box Woodland	E	Yarran ( <i>Acacia melvillei</i> ) Shrubland	E

*E = Endangered*

*V = Vulnerable*

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<sup>1</sup> Although the Glossy Black Cockatoo species is listed as Vulnerable, the Riverina population is listed as Endangered.

# Riverina species under threat

## *Mammals*

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## *Plants*

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## *Birds*

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## *Communities*

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## *Amphibians*

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.....

# The Bunyip Bird

The Australasian Bittern is also called the Bunyip Bird for the noise they make out in the rice paddies. Colour in the image below to match the image of the Bittern in the resource book (or search for pictures online).



## Keeping watch

The Bittern is an Endangered bird and there are many people who are keeping watch on their numbers and helping to look after them. One of these people is Matt Herring, a wildlife ecologist. Read all about Matt and answer the following questions.

**Matt Herring – Wildlife Ecologist** <http://bitly.com/Mherring>

1. What is the website that Matt has? .....
2. What was the sound the students heard when Matt came to the school? .....
3. What is the word used to describe the Bittern's plumage? .....
- What does this word mean? .....
4. How big is the Australasian Bittern? .....
5. What do they eat? .....

Watch the video ***Bitterns Boom in Rice*** <https://vimeo.com/68458195> and see if you can find all the Bitterns in the bird watching session.

Read a Bittern poem in ***Blorey and the Birds of the Bidgee*** <http://bitly.com/bbbidgee>

# Pest Animals

A pest can be described many different ways.

FERAL  
INVASIVE  
INTRODUCED  
EXOTIC  
NON-INDIGENOUS  
ALIEN

The definition of a pest is ...

- **one that pesters or annoys**
- **an animal detrimental to humans or human interests**

Write down the names of as many pest animals in your area that you can think of.

How many pests could you name?

Check out the **PestSmart** website and write down some pests that you didn't think of below. [www.pestsmart.org.au](http://www.pestsmart.org.au)

# Counting the Cost

Feral animals impact crops, soils, livestock as well as our native wildlife and its habitat. Some landholders were recently asked to report sightings of feral animals on their farms over a period of two months. The following data was reported at these farms:

Feral Animals		Fred's Farm	Joe's Farm	Peter's Farm	Liz's Farm	Kim's Farm
Month 1	Foxes	5	6	4	1	8
	Feral Cats	7	0	2	3	5
	Rabbits	15	20	18	10	30
	TOTAL A					
Month 2	Foxes	8	5	7	2	12
	Feral Cats	10	2	8	4	5
	Rabbits	18	23	14	16	23
	TOTAL B					
TOTAL C (A+B)						

1. Fill in the monthly totals for each farm on the table (Total A & B).

2. Fill in the totals for each farm on the table (Total C).

3. One fox can kill one native animal per night. How many native animals were killed by foxes on each farm in Month 1 (30 days)?

4. Fred:  $5 \text{ foxes} \times 30 \text{ days} = 150 \text{ animals}$

Joe:

Peter:

Liz:

Kim:

5. Feral cats cause a lot of damage to wildlife in the Riverina region. How many cats were sighted across all farms in Month 2?

6. A pair of rabbits can produce up to 40 kittens per year. On Liz's Farm there are 10 rabbits containing 5 breeding pairs. How many kittens can these 5 pairs produce after 12 months? (HINT:  $40 \times 5$ )

7. Add up the total number of rabbits found across the farms in month 2.

8. If every 10 rabbits can eat as much pasture as 1 sheep, how many sheep worth of food are the rabbits eating across all the farms?

# Pest Detective - *Protecting our Wildlife*

## Scene of the crime

John and Felicity McClay are rice growers based in the Murrumbidgee Irrigation Area near Griffith, NSW. They are very proud farmers that realise the advantages of protecting the natural resources on their property. As well as managing their soil, water and air resources they have an interest in helping the native wildlife. In particular, Felicity loves that they have a number of breeding pairs of Australasian Bittern's that live in amongst their rice paddies. They have put a lot of work into managing their farm's waterways, preserving and rehabilitating vegetation, planting wildlife corridors and controlling feral animals to attract the Bitterns to their farm.

Unfortunately Felicity has noticed that some of their farm's Australasian Bitterns have disappeared. There seems to be something hunting them and they cannot figure out what. To save the rest of them they have decided to call you, the **Pest Detective**, to help them solve "The mystery of the disappearing Bitterns".

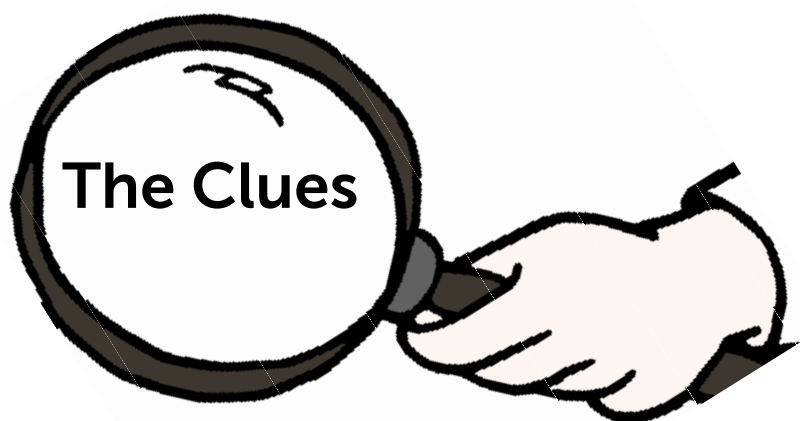
## The Victims

The McClay's have identified the victims as being an Australasian Bitterns. A good Pest Detective always learns as much as they can about the victim. Use the internet or your library to answer the following.

1. What type of creature is an Australasian Bittern?
2. What is the scientific name for the Australasian Bittern?
3. What is the conservation status of the Australasian Bittern in both NSW and Australia wide? (HINT: type "Australasian Bittern conservation status" into your search engine)
4. Describe the features of an Australasian Bittern. Examples can include size, colour, call and where it lives.

**NSW:**

**AUS:**



A number of clues have been found that may help you solve the puzzle of the missing Australasian Bitterns.

### Clue 1: Feathers tell a story

John discovered numerous feathers in the rice paddies where the birds were known to feed. What does this suggest about our missing Australasian Bitterns?

A good Pest Detective will always have an idea of what could have caused the damage. List any animals that you think could have been to blame.



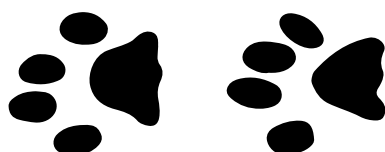
### Clue 2: Footprints in the mud

Felicity has searched the area where the feathers were discovered. She noticed there were three different types of animal footprints in the mud around the paddocks.

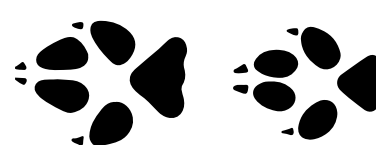
**A**



**B**



**C**



Use the Feral Animal Fact sheets from the resource book to identify the three animals that have been in the area.

**A**

**B**

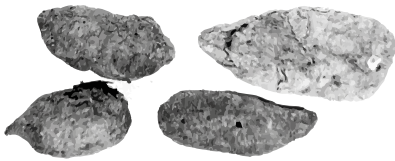
**C**

Were these animals on your list from Clue 1?

### Clue 3: Identifying the suspects

Now that you have limited your suspects down to three animals you cross check those animals against some scats (faeces or poo) that were found near the scene of the crime. Once again, use the Feral Animal Fact sheets from the resource book to identify the two animals that have been in the area.

**A**



**B**



**A**

**B**

### Clue 4: But which feral animal was it?

A number of animal hairs were found mixed in amongst the piles of feathers. They are very hard for you to identify as they are covered in dirt, blood and other materials. Luckily, as a good Pest Detective, you have your trusty microscope with you.

**Hair Sample**



You have taken a photo of the hair and now need to go to the FBI website to determine what animals they came from.

<http://bitly.com/fbi-hair> HINT: Check your hair against Figure 130 and Figure 138.

**IT'S DECISION TIME. WHO HAVE YOU IDENTIFIED AS THE GUILTY ANIMAL?**

### Solution

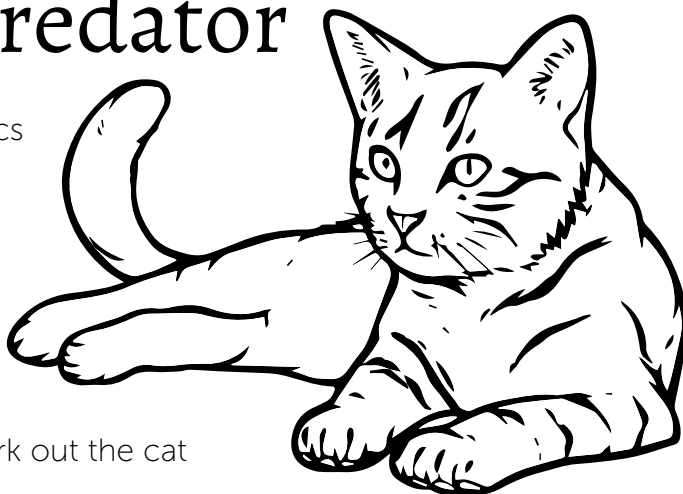
A good Pest Detective is also happy to give their customers advice on controlling pests. Use the Feral Animal Fact Sheets from the resource book to help you write down the best ways of controlling this feral animal for John and Felicity.

# The Purrrr-fect Predator

Adaptations identify features or characteristics that animals develop to help them survive. The flash cards below show some of the adaptations of cats that help them be the perfect predator. These adaptations make cats extremely deadly to our native wildlife.

Colour in these flash cards before cutting and folding them in half. With a partner, work out the cat adaptation and see how many you get right.

Can you think of other adaptations? Research "cat adaptations" on the Internet and create some new flash cards to share with your friends.



	<p><b>Soft Paws</b></p> <p>A cat can retract their claws so that they can walk silently when stalking prey.</p>
--	-----------------------------------------------------------------------------------------------------------------

<p><b>Claws</b></p> <p>Cats have sharp, strong claws that they use to climb objects and bring down prey.</p>	
--------------------------------------------------------------------------------------------------------------	--

	<p><b>Eyesight</b></p> <p>Cats have great vision, especially at night. Their pupils open wide in dim light to see their prey.</p>
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<p><b>Hearing</b></p> <p>The ears of a cat are large and can move to direct sound to the eardrum.</p>	
-------------------------------------------------------------------------------------------------------	--

	<p><b>Sharp Teeth</b></p> <p>Cats possess the teeth of a true carnivore, adapted for killing prey.</p>
--	--------------------------------------------------------------------------------------------------------

<p><b>Long Tails</b></p> <p>A cat's tail provides greater balance when climbing and walking on narrow surfaces.</p>	
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# Responsible Cat Owners

Feral cats are estimated to eat tens of millions of native animals each night in Australia. But what kinds of wildlife are they eating? Recent research has found that feral cats in Australia feast on 123 bird species, 157 reptiles, 58 marsupials, 27 rodents, 21 frogs and nine exotic medium- and large-sized mammals. They are a serious threat to wildlife around the world and have contributed to the extinction of numerous birds, mammals and reptiles. In Australia, cats have been implicated in the extinction of at least 20 mammal species. (SOURCE: Edith Cowan University, 3 February 2015)

The only difference between feral cats and domestic cats is that feral cats obtain all their food from the environment, while domestic cats depend on human support. However, even well fed domestic cats will prey on and kill native wildlife because of their natural hunting instincts.

Cats become feral because of irresponsible pet ownership. Problems occur when people let cats out at night to roam and stray, dump unwanted cats or kittens in the bush and do not act responsibly and have their domestic cat desexed.

Being a responsible cat owner means that you can enjoy the presence of your cat as well as the native wildlife that lives near your house and in your community. Here are some tips on how to be a responsible cat owner.

- Keep your cat confined to your property, especially at night. Cats can and do live happily indoors.
- Ensure your cat is easily identifiable with a collar and a name tag.
- Microchip your cat.
- Sterilise your cat.
- Vaccinate your cat.




Feathertail glider killed by a domestic cat, P. Coleman

**YOUR TASK:** Spread the word about the problem of feral cats and how easy it is to be a responsible cat owner. You can:

- Design a poster, flyer or postcard about how you can be a responsible cat owner. Include some of the facts listed above. Have a competition in your class and get the best one sent out with the school newsletter.
- Host a "Be a responsible cat owner" day at your school. You could invite someone from your local council, RSPCA or WIRES to talk about pet ownership and wildlife.
- Write a poem, create a song or create a music video about being a responsible cat owner and present it at a school assembly.

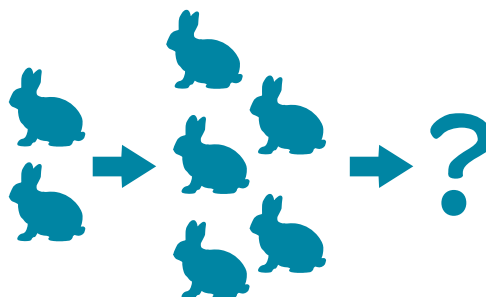
# Stop the Spread of Rabbits

Rabbits are one of Australia's most widespread pest animals. Hop online  and use the "Stop the Spread" activity to answer the following. <http://bitly.com/rabact>

1. What is the name for the following rabbits?

Male: ..... Female: ..... Baby: .....

2. A single pair of rabbits has a litter of 5 young. There is lots of food around and there are no predators, so all the young survive. After 4 months, those new young can have their own litters. There are now 3 breeding pairs and each have 5 kittens.



How many kittens are born? .....

According to the online activity, how many rabbits can there be after 18 months? .....

3. Rabbits can have a significant impact on our environment, especially on **pastures and crops**. According to the online activity, how many rabbits can eat as much as one sheep

.....

4. What are four main methods for controlling rabbits.

.....

.....

5. Rabbits can be mistaken for two other animals - one is another pest, while one is an Australian native animal. Name these two animals and describe a feature that makes them look similar and a feature that makes them look different to a rabbit.

Animal	Similarity	Difference

HINT: **GLOVEBOX Guide for Managing Rabbits**, pages 7-8 <http://bit.ly/1DqvwND>

# Alien Fish

Unfortunately there is a growing number of alien fish in our freshwater creeks, rivers and wetlands that are causing lots of problems to native fish. See if you can sort out which fish is native, and which is an alien. Once you've sorted the list, research three quick facts about each fish. For help finding fishy facts go to <http://bitly.com/dpi-fishes>

*Murray cod*

.....  
.....  
.....

*Golden perch*

.....  
.....  
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*Carp gudgeon*

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.....  
.....

*Redfin perch*

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.....  
.....

ALIEN

*Bony bream*

.....  
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*Eastern gambusia*

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NATIVE

*Carp*

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*Trout cod*

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*Goldfish*

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*Oriental weatherloach*

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# Super Weeds

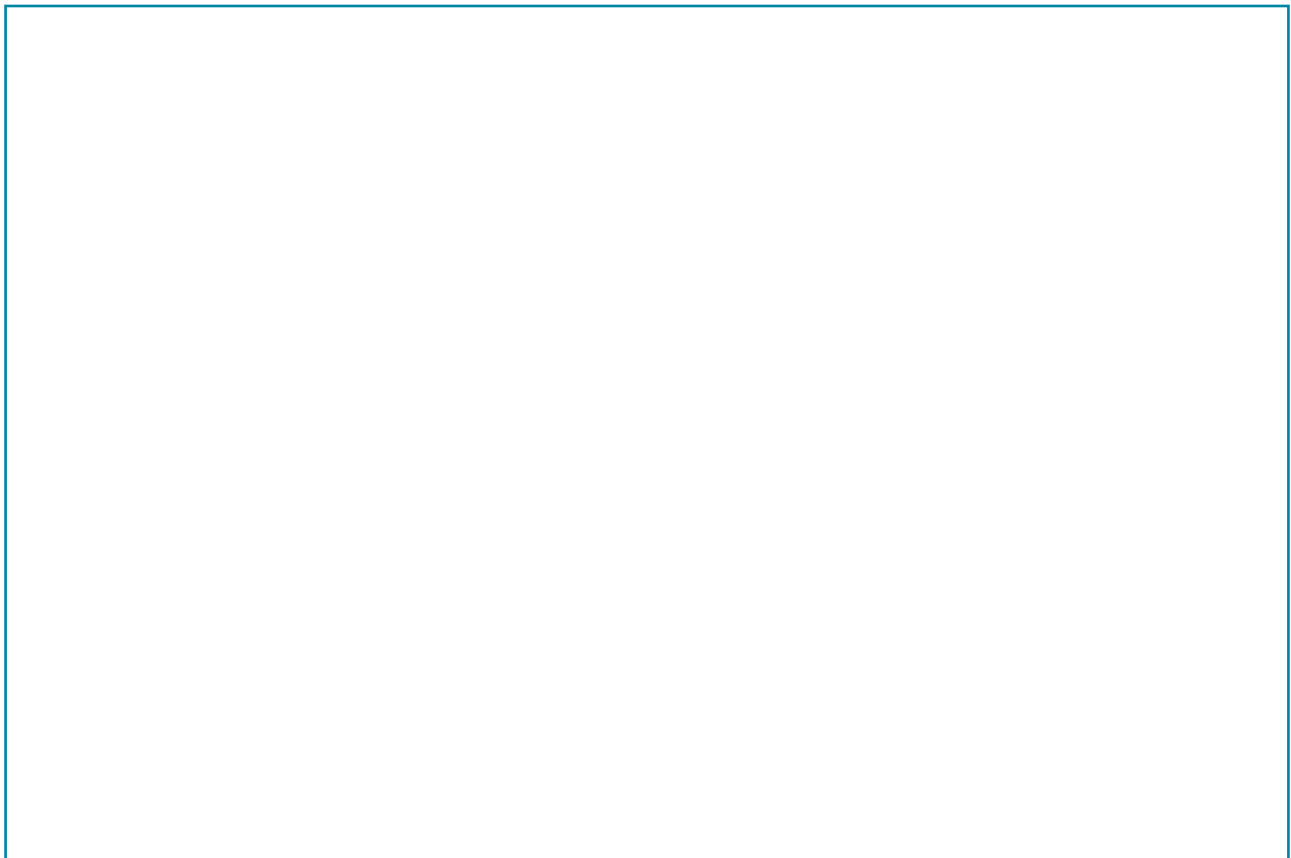
A weed is any plant that is growing where it is not wanted, often out-competing native species. Weeds are also known as invasive plants or pest plants. Many plants introduced into Australia in the last 200 years are now weeds.

Weeds typically grow fast and produce large numbers of fruit and seeds that are carried by water, wind or animals. They are often excellent at surviving in disturbed environments and are commonly the first species to establish in a cleared or disturbed area.

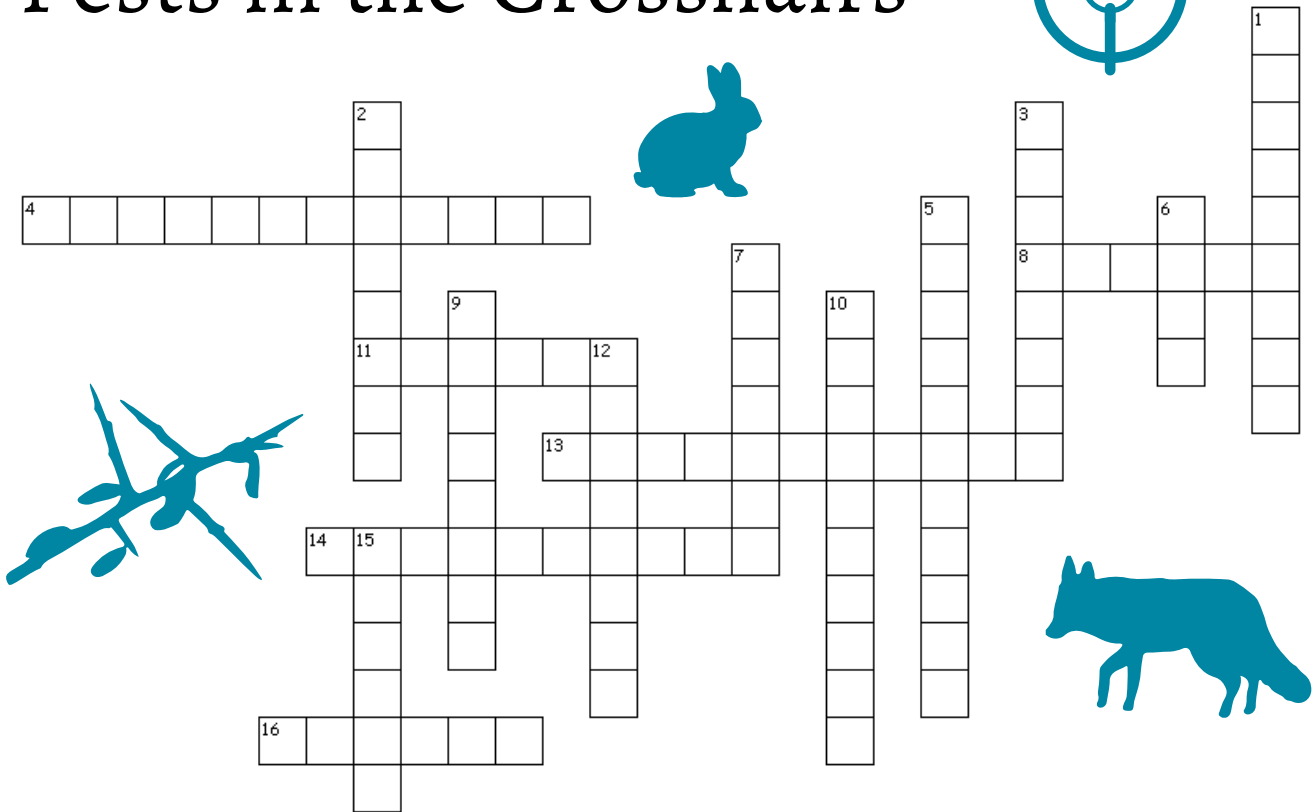
There are two key invasive weeds invading Riverina irrigation landscapes - African boxthorn and Alligator weed. Check out their weed spreading super powers below.

<i>African boxthorn</i>	<i>Alligator weed</i>
<ul style="list-style-type: none"><li>• Forms thickets</li><li>• Large thorns</li><li>• Bright, fleshy fruit eaten by animals</li><li>• Fruit contains lots of seeds</li><li>• Survives dry climate</li></ul>	<ul style="list-style-type: none"><li>• Creeping stems</li><li>• Forms thick, blanket-like cover</li><li>• Seeds spread by wind and water</li><li>• Can grow on land and in water</li><li>• Large underground root system</li></ul>

**YOUR TASK:** Find out what makes other weeds successful and create your own “super weed”. Draw your weed in the box below, name it and label its features that make it a “super weed”.



# Pests in the Crosshairs



## Across

- 4.** Scientists call the European red fox this name. (6,6)
- 8.** A species who is struggling to flourish is said to be under ..... (6)
- 11.** Animals that are pests in an area impacting on agriculture and native species are known as ..... (6)
- 13.** When feral animals compete with farm animals and native species for food. (11)
- 14.** This involves the artificial supply of water to aid in the growth of crops and pastures. (10)
- 16.** 1080 is a type of ..... that is often used to control feral animals. (6)

## Down

- 1.** When feral animals hunt and eat farm animals and native species. (9)

- 2.** A pest insect that is a huge problem for farmers growing fruit and vegetables. (5,3)
- 3.** A thick, hedge-like weed that has large thorns is the African ..... (8)
- 5.** Insects, birds or other animals that help farmers with pollination and pest control are called ..... (11)
- 6.** A plant that is growing in an area that it is not wanted is called a ..... (4)
- 7.** *Botaurus poiciloptilus* is also called the Australasian ..... (7)
- 9.** Setting a bait in a wire cage to catch animals is called ..... (8)
- 10.** Feral cats are called this by scientists. (5,5)
- 12.** This method of feral animal control uses guns. (8)
- 15.** The *Oryctolagus cuniculus* has another name. (6)

**WORD LIST:** irrigation, threat, bittern, ferals, *Vulpes vulpes*, predation, competition, poison, trapping, shooting, rabbit, *Felis catus*, weed, beneficials, boxthorn, fruit fly

## FOR MORE INFORMATION

Riverina Local Land Services .....	<a href="http://riverina.lls.nsw.gov.au">riverina.lls.nsw.gov.au</a>
Wirraminna Environmental Education Centre .....	<a href="http://wirraminna.org">wirraminna.org</a>
PestSmart .....	<a href="http://pestsmart.org.au">pestsmart.org.au</a>
PestTales .....	<a href="http://pestales.org.au">pestales.org.au</a>
Murrumbidgee Irrigation .....	<a href="http://mirrigation.com.au">mirrigation.com.au</a>
Coleambally Irrigation Co-operative Limited .....	<a href="http://www.colyirr.com.au">www.colyirr.com.au</a>



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