# Rabbit Management Guide

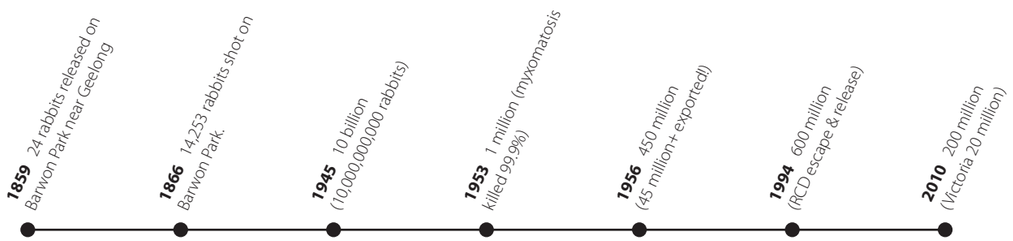
**A practical guide to rabbit management to assist land managers implement effective control**

Wild rabbits are Australia's most wide spread and destructive environmental and agricultural pest. Rabbits graze on native vegetation, crops and pastures. Rabbit grazing can prevent natural regeneration, compromise revegetation projects, reduce crop yields, and compete with livestock for feed thus reducing carrying capacity. Rabbit scratching and burrowing can be a major contributor to soil erosion

# FAST FACTS

| | |
|---|---|
| **Daily feed intake** | 150–500 g. Feeding for 3–6 hours.<br>Approx. 12 rabbits = 1 Dry Sheep Equivalent (DSE) |
| **Gestation period** | 28–30 days |
| **Age at weaning** | 21–25 days(fully independent) |
| **Maturity** | 3–4 months |
| **Litter size** | Average 4–6 per litter. Can average 28 kittens per year |
| **Adult weight** | Average is 1.6 kg. |
| **Breeding season** | Seasonal breeders (usually spring into summer or when green feed is available). Multiple cycles in breeding season. Females can be continuously pregnant for 6–8 months. |
| **Time from giving birth to re-mating** | 0.5–2 hours |
| **Life span** | 1.5–2 years in the wild |
| **Activity** | Above ground 6–14 hours. Dusk observations = 42–66% of rabbits above ground. |
| **Home range** | Larger for males than females. Varies with environment: 0.2 ha in temperate areas; up to 3.7 ha in semi-arid areas. |
| **Dispersal** | Rabbits less than 2 months old commonly disperse 1.5–20 km from home warren. |
| **Harbour** | The warren is the key to the rabbit's defence and its Achilles heel. Destroy the warren and you will destroy the rabbits' ability to breed, re-establish and rebound. |

# HISTORY




March 2009 – excessive grazing by rabbits and stock. In this particular location there was evidence of 190+ rabbits per spotlight km, with only cyclic rabbit baiting in use.
Photo: Tim

April 2012 – major rabbit management works complete. Stock excluded and rabbit numbers reduced to 0.5-1 rabbits per km using baiting, warren ripping & fumigation.
Photo: Tim



# WHY CONTROL RABBITS?

**Economic –** rabbits are prodigious eaters that will destroy pastures and crops. Rabbits are known to be very effective at spreading many weed species, further reducing productivity and creating a cost of weed control.

**Environmental –** more than 2 rabbits per hectare can prevent the regeneration of many native plant species, and they will ringbark many larger plants. Rabbits out-compete native fauna for habitat and food resources. Rabbits graze selectively, reducing species diversity.

**Social –** rabbits don't respect boundaries, so they are everyone's rabbits. This means that everyone has a problem and needs to participate in their control works. On the other hand saying "my neighbours aren't so I won't" is self-defeating and perpetuates a problem for land managers who are implementing control works.

**Legal –** The Catchment and Land Protection Act makes it an obligation for a landowner to control European Wild Rabbits. Failure to do so can result in significant fines.

*Characteristic angled secateur-like cuts of rabbit browsing*

*Cracked earth covered in rabbit dung*

## DO I HAVE A RABBIT PROBLEM?


More than 1 rabbit per hectare is a serious problem that is likely to increase. The grazing impact of 12 rabbits is equivalent to that of 1 dry sheep (SA Gov. 2012). The presence of rabbits can be readily measured through the frequency of warren entrances, scratching, browsing, dung and live rabbits observed. The guide 'Rabbits: A threat to conservation & natural resource management – How to rapidly assess a rabbit problem and take action' produced by Brian Cooke with input from Steve McPhee and Quentin Hart provides a very user friendly guide to assessing your rabbit problem.

*Characteristic bark stripping from rabbit browsing*

# PRIORITY IN CONTROLLING RABBITS

1. **Assess map & record the problem**
2. **Talk to your neighbours and work together.**
3. **Bait with 1080 or Pindone before the autumn break**
   a. Monitor the infestation
   b. Notify the neighbours & erect signage
   c. Free feed
   d. Bait (x 3 feeds for Pindone)
   e. Pick up carcases for 14 days
4. **Remove surface harbour – boxthorns, gorse, blackberries, rubbish heaps and under sheds. This drives more rabbits underground.**
5. **Destroy warrens – Ripping wherever possible, otherwise fumigate**
6. **Fumigate any warrens reopened after ripping or unable to be ripped.**
7. **Exclude rabbits from areas previously treated rabbit proof fencing and gateways, netting of buildings. Follow up is essential. Monitor & take action as required**

***Destroy the warren and you will destroy the rabbits' ability to breed, re-establish and rebound***

***Female rabbits can have pregnancies one straight after another for 6–8 months of the year.***

Photo: Steve McPhee

Many historic practices such as shooting, ferreting, trapping, long netting etc. have been shown not to have a significant lasting effect in a given area. These practices don't effectively impact the whole population, significantly impact a population's capacity to breed, or slow the rate of reinvasion.

| | jan | feb | mar | apr | may | jun | jul | aug | sep | oct | nov | dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Coordination** | | | | | | | | | | | | |
| **Assess infestation** | | | | | | | | | | | | |
| **Baiting** | | | | | | | | | | | | |
| **Surface harbour removal** | | | | | | | | | | | | |
| **Ripping** | | | | | | | | | | | | |
| **Fumigation** | | | | | | | | | | | | |
| **Maintenance** | | | | | | | | | | | | |

Likely windows of opportunity for rabbit control activities in an average year. Green shows the optimal window, Khaki shows allowance for variations of season and timing. Note that the optimal timing of baiting and subsequent activities will depend on the movement of the diseases through the population and timing of the autumn break in the weather which may vary year to year.



# CONTROL METHODS

**Coordination**
Rabbits are very mobile, so wherever possible neighbours should coordinate their efforts to create a more cost effective longer lasting outcome through reduced mutual reinvasion

**Baiting**
Rabbits are naturally timid animals with only around half their population venturing above ground at one time. As a result many methods such as trapping or shooting tend to have little impact on a population. Every rabbit needs to eat (a lot), so the use of poison baits can have particular effectiveness, especially when it is used to knock down the population before harbour destruction. Agricultural pest control contractors can be engaged if you are not able or inclined to conduct the control yourself, but you will still need to decide on the appropriate baiting option.

The two baiting option on the market are 1080 and Pindone.

- 1080 provides quick knockdown as it only needs 1 poison feed to be effective, but requires an Agricultural Chemical Users Permit (ACUP) with a 1080 endorsement for its purchase and use,
- Pindone requires poison feeds on 3 consecutive days to be effective and can have vitamin K1 applied as an antidote making it preferable near built up areas. There are greater potential risks to non-target native species (kangaroos, birds of prey,etc) and it must not be used in the presence of these animals (Farrelly et al 2005).

***Baits, signage & further advice are available from your local farm supplies outlet***

**When**
Best result can be achieved when applied after Rabbit Calicivirus Disease and Myxomatosis have affected a population during summer. Baiting at this time before the autumn break requires the least volume of bait and can help to remove immune animals from the population to enable the diseases to continue to be effective.

**Where**
Monitoring such as spotlighting will show where the rabbits are active, which is where the bait will need to be laid. Rabbits are attracted to freshly turned earth which is why bait laying trailers use a disk to turn a furrow into which the bait is laid. Many Landcare groups have bait laying trailers that they are happy to make available.

**Notification**
All adjoining landholders must be given written notice 72 hours before baiting commences. Notifications must specify the dates between which the baiting will occur and that dogs will need to be restrained. Warning signs must be displayed at all commonly used entry points to the land immediately before baiting and more than 4 weeks after. Approved signage is available with the supply of the baits. Livestock will need to be removed during baiting.

***The likelihood of reinvasion is greatly reduced if there is no significant warren within 3km of the given treatment site.***

**How**

- Lay 'free feed' (bait without poison) to get the rabbits used to the bait. This helps to determine the rate of uptake and therefore how much poisoned bait is needed and where. Several free feeds may be needed to ensure rabbits are readily eating the baits. Accurate baiting with efficient uptake helps minimise cost, off target impacts, and the time it takes for a rabbit to die. In areas where rabbit numbers are high, looping the bait trail within and around feeding areas and warrens maximises the opportunity for rabbits to come in to contact with the bait.
- Lay your poison baits during a period of fine weather and according to the label requirements; 1 poison feed for 1080 and 3 consecutive poison feeds for Pindone. To avoid off target impacts, bait stations may be used to keep wildlife at bay where product labels allow it. This can be made of a wire cage that sits over the bait and allows rabbits to access underneath but prevents kangaroos, stock etc from reaching the bait.
- All reasonable steps must be taken to recover the carcasses of poisoned animals during and for 14 days after the baiting program. Carcasses and unused baits must be buried to a depth of at least 50 centimetres or incinerated. This is to avoid secondary poisoning of carnivores such as domestic dogs.

*Bait laying trailer cutting a furrow and leaving oat baits dyed green*

***Always read and follow the directions of chemical labels and Safety Data Sheets for the product you are using***

## HARBOUR REMOVAL

Removal of species such as boxthorn, gorse, blackberry, briars, and even thistles or cacti decreases the survival of rabbits where their warrens have been destroyed. This helps to prevent reinvasion, and increases the effectiveness of fumigation and ripping by forcing rabbits to shelter in their burrows as treatment occurs.

Piles of cut material or standing dead plants can also act as harbour, so need to be burned or mulched. Good results can also be achieved with grooming attachments for bobcats or excavators that turn standing plants to mulch.

As with any weed removal, follow up is of paramount importance as germination of weed seed in the soil is highly likely following this type of work.

*A rabbit browsing line on boxthorns with a burrow entrance in the foreground*

## WARREN DESTRUCTION

As rabbits need burrows to breed and to survive predators, warren destruction should be given the highest priority as it will have the most lasting impact.

Mapping and marking of warrens ahead of time is advisable to facilitate ripping, follow-up and show change over time.

Ripping can be achieved using the biggest bulldozer, excavator or tractor/backhoe available. Wherever possible a second person should act as a spotter to guide the driver to ensure all entrances are destroyed.

The entire warren should be ripped to a depth greater than 60cm in one direction, then again at 90o to 'cross rip'. Cross ripping helps to prevent warrens reopening between rip lines. Ripped warrens should immediately be driven over several times to compact the soil, which also works to prevent reopening. All ripping should be conducted in the shortest timeframe possible to minimise local reinvasion. Entrances that reopen should be followed up with fumigation or re-ripped if the rate of reopening is high.

***There are at least 156 threatened species that may be adversely affected by competition and land degradation by rabbits***

Where ripping isn't appropriate contractors may be engaged to destroy warrens using explosives.

The disturbance of ripping is often followed by weed invasion especially as rabbits are known to transport weed seeds that will be sitting in the soil. It's a good idea to plan in rehabilitation work such as the sowing of pasture or native seeds, and follow up herbicide treatment.

*Bulldozer ripping a warren in steep terrain*

## FUMIGATION

Where ripping or explosion is not feasible, fumigation can decommission warrens that are inaccessible such as in steep terrain or under buildings. Fumigation is also useful to close any warrens that reopen after ripping. Aluminium Phosphide (Phostoxin) fumigant is toxic to humans, so the utmost caution must be exercised in its use. Personal protective equipment must be used including a full face respirator, gloves and overalls.

All the entrances of a warren need to be identified. This can be done using a smoker, which uses a small motor to blow smoke in one entrance of a warren to see where it emerges. These entrances should then be cut back with a shovel removing all grass and vegetation to ensure they can be effectively sealed.

The fumigant tablet is then wrapped in damp paper, placed in the burrow and the warren sealed with soil. A length of pipe with a narrower pipe inside it can act as an aid to place the fumigant tablet in the burrow, with the narrow pipe acting as a plunger to push the fumigant tablet out the end.

For more information always read product labels

*Tools for fumigation: a spade, a smoker, and a length of pipe to deliver the fumigant*

## TIPS FOR SPECIAL SITUATIONS

Cultural heritage/Remnant bush/Revegetation areas - bait & fumigate where ripping is inappropriate. Exclusion fencing for very high quality patches. High level of follow-up required.

Steep country - choose an appropriate contractor as it can be surprising what is possible

Warrens under large rocks - bait & fumigate

Warrens along water courses, - contact water authority & fumigate if appropriate

Highly erodible soils / Sodic soils - if ripping, follow with revegetation incorporating erosion controls such as jute mesh or mat and silt traps. Otherwise bait & fumigate

Organic farm – ripping & exclusion fencing

*Excavator working to its strength, using its reach to rip along a fence line without damaging it. Photo: Max Coster*

## FENCING

Fencing can be the most effective method of preventative control around areas of high quality vegetation, revegetation, or valuable crops and pasture. 30mm wire mesh netting should reach at minimum 900mm up the fence and 180mm from the fence on the ground as an apron to prevent rabbits digging under. In wet areas it can be sensible to use a separate replaceable apron

Netting also tends to be effective around the base of sheds and other structures or materials that can harbour rabbits when constructed to similar standards.

Any fence is only as good as its maintenance. It only takes one hole for the whole investment to be ineffective.

*Poorly constructed rabbit proof fencing failing.*

*Rabbit proof fencing with unsuccessful scratching*

# CASE STUDY

Ingliston

In 2009 Ingliston Park, a property of 781ha, had a rabbit density of 82 rabbits per km of spotlight survey.

In 2011 an integrated control program was rolled out across a mixture of arable flats and steep gorge country.

The program included:

- Mapping of 1200 warrens collected by GPS to identify baiting areas and facilitate ripping.
- Baiting done late Feb using 1080 oat bait along 76km of bait trail, reducing numbers from 82/km to 5/km (94%)
- Ripping done in early March by a CAT D7 bulldozer and in less accessible areas by a CAT 320c 20 tonne excavator.
- Fumigation using aluminium phosphide of inaccessible, missed and reopened warrens.

*Baiting trail winding its way across the Ingliston hills*

| | Area treated (ha) | $/ warren | $/Ha treated | $ / area treated |
|---|---|---|---|---|
| **Mapping** | 781 | $2 | $3 | $2,400 |
| **Ripping** | 274 | $33 | $158 | $43,292 |
| **Baiting** | 781 | $11 | $19 | $14,839 |
| **Fumigation** | 110 | $55 | $75 | $8,250 |
| **Total program** | 781 | | $88 | $68,781 |

By 2012 rabbit numbers were reduced to 0.5 – 1 rabbit per spotlight km.

# USEFUL RESOURCES

Moorabool Landcare Network
www.mln.org.au
For a list of current contractors refer to the Moorabool Landcare Network website

Moorabool Shire Council
Ph: 5366 7100
www.moorabool.vic.gov.au

Department of Environment & Primary Industries
Ph: 136 186
www.depi.vic.gov.au

Port Philip & Westernport Catchment Management Authority
Ph: 8781 7900
www.ppwcma.vic.gov.au
Email:
enquiries@ppwcma.vic.gov.au

Corangamite Catchment Management Authority
8781 7900
www.ccma.vic.gov.au


**Further reading:**
**Managing vertebrate pests:** Rabbits, Williams, C.K., Parer, I., Coman, B.J., Burley, J. and Braysher, M.L. (1995) Bureau of Resource Sciences/CSIRO Division of Wildlife and Ecology, Australian Government Publishing Service, Canberra.
**Monitoring techniques for vertebrate pests - Rabbits**, Mitchell, B. and Balough, S. (2007) NSW DPI Orange
**Options for Rabbit Control** Farmnote No 89/2001, Farrelly, G., et al., (2007)WA Department of Agriculture
**Rabbit Control & Management in the Western Catchment of Port Philp Bay**, Bloomfield, T (2013) PPWCMA Sunbury
**Rabbit Technical Note 2 'How Much Do Rabbits Eat?'**, (2012) Government of South Australia
**Rabbits: A threat to conservation & natural resource management** – How to rapidly assess a rabbit problem and take action, Cooke, B., McPhee, S., Hart,



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