



Rabbits and their impact

Tim Bloomfield (Attwood)

June 1999

LC0298

ISSN 1329-833X

The introduction and spread of the European rabbit into Australia has been well documented. This note describes the economic and environmental impacts, which have resulted from their release.

Common name

Rabbit, European wild rabbit.

Scientific name

Oryctolagus cuniculus.

Status

“Rabbits” are declared an established pest animal under the Catchment and Land Protection Act 1994.

A person may keep any kind of rabbit, other than the wild rabbit in Victoria. A maximum of 30 pet rabbits may be kept at one time. A permit is required for commercial farming of domestic rabbits.

A brief history of the European wild rabbit

“..... the rabbit menace in Australia today is so great that it would be almost impossible to exaggerate its possibilities.” (1935).

- 1859: 24 wild rabbits released at Barwon Park by Thomas Austin
- rabbits spread across Australia at about 130 km per year
- some farms were abandoned because of rabbits as early as 1881
- 1926: 10 billion rabbits in Australia
- 1944: 104,000,000 million rabbit skins/carcases exported from Australia
- 1952-1954: Myxomatosis killed 99.8% of rabbits
- Myxo virus attenuates/rabbit show resistance to the virus, rabbits breed up again, spreading into new areas and re-colonising old warren sites
- 1990: Australia’s rabbit population about 600 million
- rabbits cost agriculture and the environment millions of dollars each year

- 1996-1998: Rabbit Calicivirus Disease (RCD) rabbits reduced by >50% in arid areas
- 1996 –2003: Rabbit Buster, (a coordinated Landcare/NRE group integrated rabbit control program) rabbits reduced by 30% in Victoria (1999)
- RCD and integrated rabbit control used together in large-scale group campaigns has seen some areas aiming to become rabbit free.

The start of your rabbit problem

A single pair of rabbits can increase in 18 months to 184 individuals

Rabbits become sexually mature at three to four months, their gestation period is 28 to 30 days and mating can recur directly after giving birth. A female rabbit will dig a short burrow to breed in, if there is not one available or all are full. Individual females can produce up to five or six litters each year. On average each litter contains five kittens.

More and more rabbits

Sixty percent of young rabbits disperse from their *home* warren. A new generation disperses from the breeding warren seeking unripped burrows and safe above ground harbour after each breeding period. Rabbits are always colonising new areas.

Where warrens and harbour are not available on your land colonising rabbits may be taken by predators, or forced to move onto neighbouring properties

Rabbit impact

“Rabbits are the filter that all plants must pass to reach maturity”

Rabbits “*..are the pivotal species in many ecosystems.*”^{*1} as they have shown in western Europe and they are ‘*..next to man ... the prime architects of our landscape*’^{*2} on the effects of the rabbit in England”.

Farmers, in South Australia, were reported to have walked off the land because of rabbits as early as 1881, only 22 years after their introduction and only six years after they were declared pest animals in South Australia^{*3}.

In 1935 it was estimated that if the rabbit menace was eradicated -“ *the State of New South Wales alone could immediately carry another 12,000,000 sheep*”.^{*4}

Economic impact in Australia

The economic loss resultant from rabbits in terms of overall loss in productivity has never been accurately estimated partly because losses vary sharply in different climatic zones, seasons, and pasture types and with the degree of rabbit infestation. However, the real extent of earlier economic losses was clearly revealed by the enormous increase in wool and meat production, which followed myxomatosis, successfully introduced in early 1950's. *5

In 1952 this production increase was worth an additional \$68M and in 1953 just three years after myxomatosis had really begun to take its toll, the increase in Australia's wool clip attributed to myxomatosis was estimated at 30 million kilograms. By 1960 sheep numbers had risen from 88 million to over 152 million. The annual losses of potential output to the Australian Wool Industry from rabbits are estimated at \$95M. *6

Economic impact in Victoria

It is estimated that Victoria has at least 40 million rabbits, which are distributed across Victoria, throughout all climatic zones and most land types. The impact of rabbits on Victoria's economy is estimated in 1998 to be \$360 million dollars.

Rabbit affected areas

A survey in 1979 and repeated in 1990 showed that rabbits were a significant problem in approximately 25% of the State and occasionally a problem in another 27% of the state. *7

Many infestations now occur in areas where management is difficult and/or costly to implement. This includes much of the steep grazing country of central Victoria, the stony rises in western Victoria and some parts of the Mallee.

Grazing effect of rabbits

A rabbit grazes more closely than domestic stock. Grazing rabbits weaken perennial grasses during summer, even eliminating them from pastures. The pasture is then likely to be invaded by broadleaf weeds and annual grasses.

In only three years of high rabbit densities, the cover of subterranean clover has been shown to reduce from 75% to 20%. *8

Excessive grazing pressure by rabbits causes a loss of land through soil erosion. These erosion effects lead to off-site problems, such as reduced water quality in catchments, and then need expensive remedial measures.

Rabbits also affect revegetation and soil erosion reclamation projects by feeding on newly planted vegetation or burrowing. Rabbit effects are felt at farm level, in tree planting projects designed for stock protection and soil erosion or salinity control, or in forestry plantations.

Even low numbers of rabbits can have a devastating effect on tree-planting programs or intensive horticultural

operations. Rabbits also cause damage to grain crops and have significantly reduced crop yields in some areas.

Environmental damage

The impact of rabbits on the Australian environment has been disastrous. Rabbits have significantly altered the botanical composition of extensive areas of natural habitat.

"What is the difference between chainsaws, bulldozers, sheep and rabbits? Not much really. Though chainsaws and bulldozers are the preferred tools for clearing land, sheep and rabbits are just as effective. They eat tree seedlings so that when the adult trees die there are no young ones to replace them. The net effect is identical, only the time scale differs." *9

The effects of selective feeding

Rabbits selectively feed on certain species of plants at critical stages of development such as seeding and seedling establishment. This may result in the local extinction of particular native plant species as; *"rabbit populations of less than three per hectare can maintain the dominance of introduced herbage.."**10 and with the spaces created often being filled with noxious and/or unpalatable weed species.

Lots of rabbits, lots of damage?

Research in semi-arid sites has shown that *"even low(er) rabbit densities of 0.5 per hectare or 1 rabbit per 2 hectares can still severely damage some shrub species"**11. Other research workers have found what is not always evident to land managers on rabbit infested sites that is - *"there may be no safe rabbit density for some tree and shrub seedlings."**12

No native plants, no native animals?

Reduction in native vegetation can seriously disadvantage native fauna. In certain areas, rabbits are in direct competition with native wildlife for food and habitat requirements. Because of ecological changes associated with high rabbit numbers, rabbits have been blamed for a major role in the disappearance of the greater bilby *Macrotis lagotis*, and the pig-footed bandicoot, *Chaeropus ecaudatus*, and for putting many other species under stress. *13

Rabbits and 'roos

The effect of uncontrolled rabbits populations in combination with kangaroos *"in rangeland national parks have resulted in native flora and fauna being in little better condition with no more regeneration than surrounding properties."* *14

Rabbits, feral cats, and foxes

Rabbit populations may sustain numbers of predators like cats and foxes subsequently increasing pressure on native animals particularly those in the up to 5kg bracket.

"The settlement of Australia and the introduction of new pest species both prey species, rabbits, and predators species; foxes/ cats has changed the predator prey balance in Australian in two main ways. Firstly, new prey species

*can compete with native species for food and other resources, and they can alter the environment to the detriment of the native species. The introduction of rabbits, for example, has had a profound effect on the habitats used by similar sized bettongs and bandicoots in Australia. Secondly, the introduction of abundant new prey species can sustain predators (especially introduced predators that have had a significant period of co-evolution) at higher density than that which the natural prey could support. Thus predators such as cats and foxes, supported by an abundant prey like rabbits, can exert a strong influence on native prey species that are at low levels. This pressure coupled with clearing, fragmentation, and eradication of habitat can lead to local extinctions of native animals.”*15*

Economic benefits of rabbit management

The economic benefits of rabbit control have shown an increase of \$67.70 per hectare in absolute rabbit management to wool graziers in the Southern Tablelands. *16.

Effective rabbit management on a property near Colac has allowed an increase from 1.75 DSE (dry sheep equivalent) to 7.75 DSE over a five-year period.

A dairy farmer in the same Colac area has increased his milk production by 300% and doubled his fodder harvest over five years simply by tackling his rabbit problem.

Rabbits and carrying capacity

In a trial, in south-western Victoria, two areas each a hectare in size; one protected against rabbits, the other unprotected were studied over a two month period. In the first month the protected area supported 38 sheep each day compared to 12 on the unprotected. In the second month the protected area supported 45 sheep whereas the unprotected area could support only 7.

The cost of rabbit control

Approximately \$20M is spent annually by landholders on rabbit management on private lands; NRE spends approximately \$5.6M annually on rabbit management on public land.

Rabbit Buster

A state government initiative, the Rabbit Buster program committed \$20 million over 6 years (1996-2003).

Rabbit Buster funds go directly to Landcare and Rabbit Action Groups for onground rabbit control, specifically aimed at harbour destruction especially large scale ripping of warren systems over significantly large areas of catchments.

Rabbit Buster and other government-funded initiatives aim to link with the effects of Rabbit Calicivirus (RCD) to achieve a major long-term reduction in rabbit numbers.

Why is the rabbit still a problem?

Rabbit problems arise, in part, from landholders placing too much dependence on biological control methods and from the poor application of traditional control methods.

Cyclic control: wasted effort

Use of poisoning alone by land managers and NRE has resulted in cyclic pest control when populations are high with no integration of control. Rabbit populations have quickly rebounded from these poor control efforts.

Not beating the rabbit: leaving the weak link

Leaving warren/burrow systems and above ground surface harbour always ensures that control efforts and dollars expended on poisoning is wasted.

Long term control

Rabbit control agencies and community groups have identified that success in rabbit control comes from the use of two or more control measures used together (IRC). Destruction of warrens and removal of above ground surface harbour are essential in long term rabbit control.

Two or more rabbit control methods used together

Effective rabbit control encompasses a variety of techniques including poisoning, fumigation, harbour removal, warren destruction, and rabbit proof fencing, all of which is integrated into an long-term plan.

Targeted, large-scale rabbit control reduces rabbit numbers lowers farm-running costs, increases carrying capacity or crop yield, improves farm efficiency, raises land values and improves and protects our natural environment.

Aiming for rabbit free

Land managers must aim to have no rabbits, as history has shown that to tolerate even low numbers will result in a rapid return to lots and lots of rabbits over large areas.

Rabbit free!

The history of rabbit control shows that to achieve effective rabbit control your effort must be continuous and you need to be able to: -

- adopt and use integrated rabbit control
- kill rabbits at a faster rate than they can replace themselves at all densities
- ensure rabbit immigration into your control site is zero
- make all individuals in the population at risk from the control techniques chosen
- monitor rabbits at very low densities and take immediate action if the population increases
- maintain a social and political environment that supports the goal of aiming for rabbit free
- ensure the long term economic, environmental and social benefit of rabbit free is accepted and agreed to by all the major stakeholders

References

- *1 Williams K, Parer, Coman B, Burley J & Braysher M (1995), *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *2 Thomas and Worden (1956) quoted in Williams K, Parer, Coman B, Burley J & Braysher M (1995), *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *3 Williamson, Chapman & Hall (1996) *Biological Invasions*
- *4 Stead, D.G. (1935) *The Rabbit in Australia*
- *5 Reid, P.A., (1953) *Some economic aspects of myxomatosis*. Quart. Rev. Agric. Econ. 6:93
- *6 Sloane Cook and King Pty Ltd., (1988) "*The Economic Impact of Pasture Weeds, Pests & Diseases on the Australian Wool Industry*" Australian Wool Corporation.
- *7 Nolan, I.F., (1981) "A Survey of the Rabbit problem in Victoria". Department of Crown lands and Survey, Victoria. and Dowley, B.D. unpublished data. (1990)
- *8 Croft, J.D.(1995) in Williams K, Parer, Coman B, Burley J & Braysher M, *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *9 Pickard (1995), in Williams K, Parer, Coman B, Burley J & Braysher M, *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *10 Mallet, & Cooke, B. (1995), in Williams K, Parer, Coman B, Burley J & Braysher M, *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *11 Lange, & Graham(1995), in Williams K, Parer, Coman B, Burley J & Braysher M, *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *12 Williams K, Parer, Coman B, Burley J & Braysher M (1995), *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *13 Brunner, H., Stevens P, L., Backholer J. R. (1980) *Introduced Mammals in Victoria*. Proceedings of a Symposium Held at Rusden C.A.E. July 1980.
- *14 Greenwood et al, Bridgewater, and Potter(1995), in Williams K, Parer, Coman B, Burley J & Braysher M, *Managing Vertebrate Pests: Rabbits* Bureau of Resource Sciences and CSIRO
- *15 Richards, G. *The Cat Kit - a resource for schools*
- *16 Williams, C.K., (1991). *Efficacy, Cost and Benefit of Conventional Rabbit Control*. Australian Wool Corporation.

This publication may be of assistance to you but the State of Victoria and its officers do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.