

## **5. Plant and animal pest management**

### **5.1 Introduction**

Invasive plant and animal species are widely regarded as the single biggest threat to New Zealand's indigenous biodiversity (MfE 1997). These invasive species also threaten restoration projects such as that at the Kate Valley CMA as invasive weeds can out-compete and suppress plantings, while invasive animals browse plantings and seriously impact on key pollinators and dispersers in the surrounding forests. Incursions of domestic stock can have similar impacts to invasive animal herbivores. Because of the importance of invasive species, this section provides a detailed overview of how they will be managed as part of the Tiromoana Bush Restoration Project.

### **5.2 Domestic stock management**

Domestic stock will be removed from the Kate Valley CMA at the outset of the restoration project. This will involve upgrading existing fencing and installation of new fencing where required. Once adequate fencing is in place, all domestic animals will be mustered out of the area. All fences will be established or maintained to a sufficient standard to ensure that stock are not able to readily re-enter the area and all gates not required for management purposes will be removed to prevent accidental entries by stock. Those gates that are required for management purposes will be locked to ensure that they are not left open accidentally. Because of the importance of Remnants "A" and "B" as seed sources ("A") and as the nucleus for restoration ("B"), grazing will be excluded from these areas as soon as resource consents for the Kate Valley landfill have been granted.

Any subsequent incursions of stock will be quickly dealt with by removing the animals and repairing fencing as required. Annual inspections of all boundary fences will be undertaken to minimise the likelihood of such excursions and those involved in the management of adjacent areas will be informed of the desire to keep the Kate Valley CMA free of domestic stock.

In places where plantings associated with the Kate Valley Landscape Management Area adjoin the Kate Valley CMA, it should be possible to rationalise fencing to ensure that stock are excluded from both areas where required.

### **5.3 Animal pest management**

A number of introduced animal pests including brushtail possums, stoats, ferrets, rats, mice, red and fallow deer, goats, rabbits, hares, pigs, hedgehogs and vespid wasps are likely to be present or border upon the Kate Valley CMA. Domestic and feral dogs and cats may also come onto the site. The presence of both wild and domestic animals within the restoration area will impact upon the restoration work proposed at this site. This section outlines the objectives for animal pest management and the programme that will use to achieve these objectives. The objectives for animal pest management are to reduce the impact of herbivores on the restoration plantings, and the impact of herbivores and carnivores on indigenous plant and animal species within regenerating forests.

The approach to animal pest management recognises that different animal pests pose differing threats to restoration and indigenous biodiversity. A prioritisation system will therefore be used for management work based on likely threats of individual pest species. The priority ranking and objectives for control of each pest will be reviewed annually to allow for adaptive pest management.

The overall approach to animal pest control will meet accepted best practice standards (e.g., as defined by ECan or DOC) and the methods used will be kept under regular review through an adaptive management approach. All animal pest control programmes will meet the legislative conditions and requirements set by the relevant Acts and Regulations of Parliament including the Wild Animal Control Act 1977, the Resource Management Act 1991, the Health and Safety in Employment Act 1992, the Biosecurity Act 1993, the Hazardous Substances and New Organisms Act 1996, the Animal Welfare Act 1999, and the Pesticides (Vertebrate Pest Control) Regulations 1983. All pest control operators will be required to have appropriate pesticide licences where required. Details of the methods to be used for animal pest control will be developed with the contractors undertaking the work and will be based on current best practice guidelines. Some methods that might be appropriate are outlined in Appendix 2.

Introduced pests targeted for control are split into two management groups: High priority (possums, stoats, ferrets, weasels, rats, rabbits, hares, feral deer, feral goats, wasps); Low priority (feral cats, feral dogs, feral pigs, hedgehogs, mice). The priority ranking for each pest animal will be reviewed annually. Some pest species (e.g., possums, cats, rats and mice) can be encouraged into an area by the presence of rubbish, especially organic rubbish. Obviously the presence of a major landfill adjacent to the restoration area will act in this way. However, Transwaste Canterbury Ltd will establish a major ongoing animal pest control operation as part of landfill management.

Brush-tail possums: Brush-tail possums are present throughout the Kate Valley CMA. They are a direct threat to restoration plantings and general biodiversity values, in particular regenerating forest and birds. They also constitute a threat to neighbouring land holders in terms of production (damage to young pine trees and spread of bovine Tb) and biodiversity values on their land. Because of previous records of bovine Tb in cattle in the Kate Valley area, an ongoing possum control operation occurs on the property including the Kate Valley CMA and as a result possum numbers are very low. It is intended that this operation will continue for the foreseeable future. The effectiveness of possum control will be monitored through assessing biodiversity response (Section 9). Should monitoring indicate that the current level of possum control is insufficient to sustain biodiversity values then the current possum control operation will be reviewed. Should the decision be made to cease the bovine Tb based control operation, then a replacement operation will be implemented for the Kate Valley CMA.

Stoats, ferrets and weasels (mustelids): Mustelids are likely to be widely distributed through the Kate Valley CMA, although probably at low numbers. Numbers will also fluctuate considerably between years depending on food availability. Mustelids are a direct threat to biodiversity values within the area, especially native birds and larger invertebrates. They are also implicated in the transmission of bovine Tb. These species are known to have relatively large home ranges (e.g., 60-200 ha for stoats) and to move considerable distances while foraging or while dispersing as juveniles. Mustelid control will be undertaken throughout the Kate Valley CMA and the success of the control will be assessed through forest bird monitoring (Section 9.4).

Rats: Rats directly affect biodiversity through predation of fauna, but also impact upon plant regeneration processes through seed predation (and hence could impact on the restoration plantings by limiting subsequent regeneration). Further, they are a key food source for other predators (especially stoats), in effect buffering higher numbers of these predators. Rat control will be undertaken throughout the Kate Valley CMA and the success of the control will be assessed through forest regeneration and forest bird monitoring (Section 9).

Hares and rabbits: Hares and rabbits constitute a direct threat to restoration plantings. Unfortunately hares in particular are difficult to control, but these pests will be controlled as impacts dictate. Impacts will also be minimised through the use of appropriate retardant pastes on restoration plantings. Hare and rabbit impacts will be directly monitored as a part of restoration monitoring (Section 9.3).

Feral deer and goats: Feral deer (red and fallow) and goats are likely to be present within the general area, and to pass through the Kate Valley CMA from time to time. These species can cause damage to biodiversity values, and also pose a threat to restoration success. They are also known to be reservoirs for bovine Tb. Control will be opportunistic in nature, and will involve hunting when animals are known or thought to be present. Where appropriate, local hunters will be encouraged to undertake this control. The benefits of any control will be based on assessment of the number of animals killed versus the number seen, as well as through monitoring of forest regeneration (Section 9.2).

Vespid wasps: Wasps are present primarily in remnant "B" and constitute a threat to biodiversity values (in particular native birds and invertebrates) within this area through competition for food resources and predation. They also constitute a direct threat to health and safety of people working in the area. Control will involve the active seeking out and locating nests and treatment with a suitable poison each summer (December – April). Wasp numbers will be monitored qualitatively based on their perceived abundance.

Feral cats, feral dogs, feral pigs, hedgehogs and mice: These animals are either known to be present in the Kate Valley CMA, but difficult to control (mice and hedgehogs), or may occasionally be present in the general area (feral cats, dogs and pigs) and as such may spread into the Kate Valley CMA. Control will not be implemented directly for these species although it is expected that feral cats, hedgehogs, and mice will be caught as a consequence of other control programmes including those associated with the landfill. Should feral dogs or pigs be seen they will be actively hunted. Dogs will be prohibited from the Kate Valley CMA walking tracks (Section 7).

#### **5.4 Plant pest management**

Weed species present a very real threat to the success of any restoration programme as they can out-compete the planted species resulting in reduced growth rates and mortality. However, it needs to be acknowledged that for gorse at least, the eventual succession appears to be to indigenous forest. However, several other species of weed are a direct threat to restoration (both plantings and natural regeneration) and the highly modified nature of Kate Valley means that these species are already present in large numbers. The objective of weed management is therefore to maintain the Kate Valley CMA free of all priority weed species. Three groups of weed species are discussed here – woody weeds, pasture grasses and gorse.

All plant pest control will meet national and regional legislative requirements, especially any obligations imposed through the Regional Pest Management Strategy, and will follow best-practice guidelines. All staff involved in weed control work will be required to have appropriate licences for handling any chemicals involved. Details of the methods to be used for plant pest control will be developed with the contractors undertaking the work and will be based on current best practice guidelines. Some methods that might be appropriate are outlined in Appendix 2.

Woody weeds: These are weed species that are known to cause problems in similar environments and therefore pose a threat to biodiversity values, including restoration plantings, at this site. Woody weed species known to be present in the Kate Valley CMA (early 2004) include wilding conifers, European broom, hawthorn, willow, blackberry and old man's beard.

Three main approaches will be taken to prevent the establishment and spread of woody weed species in the Kate Valley CMA:

1. An initial programme of control to eliminate all woody weeds from the Kate Valley CMA will be undertaken during the first year of the restoration plan, with a follow-up operation in the second summer. The objective of this phase is to eliminate woody weed seed sources.
2. A regular surveillance programme will be undertaken to monitor the establishment of woody weed species and control will be implemented as required. To facilitate this, a field guide to all woody weed species will be produced during the first year.
3. The list of woody weeds will be reviewed annually as part of the overall restoration review (Section 10.4) and updated as necessary.

Pasture grasses and herbs: Pasture grasses are efficient competitors for water, as well as nutrients and light, and can restrict the growth of new plantings. However, there is little likelihood that any of the widespread grasses can be eliminated from the Kate Valley CMA, as many have very effective vegetative reproduction and spread by means of their rhizomes. Almost all species also reproduce effectively by seed (and have excellent dispersal mechanisms) and many maintain large numbers of seeds in persistent soil seed banks, so they regenerate readily by these sources. Herbaceous plants provide similar threats as grasses with some species having the potential to smother restoration plantings. Persistent soil seed banks and good dispersal mechanisms (especially by wind; e.g., thistles) again creates the potential for long-term re-infestation. Control of these species will therefore focus on removing them prior to the establishment of restoration plantings and restricting their re-establishment and growth after planting until plantings are tall enough to suppress them.

Gorse: While widely regarded as a plant pest, gorse offers considerable potential as a nurse species for restoration of indigenous forest. Gorse has been used successfully in this capacity at Hinewai Reserve on Banks Peninsula (Wilson 1994) and it is proposed that gorse will play a similar role in the Tiromoana Bush Restoration Project. Gorse will be used as a nurse plant because of the high costs associated with controlling gorse and of implementing an active planting programme covering >100 ha, and the known ability of gorse to invade rank grassland and provide a suitable environment for indigenous forest regeneration. However, gorse also presents a considerable fire risk and a key component of restoration management is to vigorously maintain a total-fire ban within the Kate Valley CMA. In addition gorse adjacent to boundary fences will be managed in a manner consistent with ECan boundary gorse control requirements.