

COSTS AND BENEFITS OF SERRATED TUSSOCK CONTROL

CASE STUDY 3: LOCAL GOVERNMENT

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Simon Purves from Brimbank City Council oversees a serrated tussock (*Nassella trichotoma*) control program for Sydenham Park, a 231 hectare site, in the outer north western suburbs of Melbourne. This area is known to have medium to dense infestations of serrated tussock throughout the landscape¹. Sydenham Park was no exception, so to preserve and enhance the biodiversity value of the site, Simon and his team trialled different methods for serrated tussock control. This was part of a four-year program designed to stop its spread and enable native grassland plant species to recover and thrive.

The Property

Sydenham Park is located 20km north-west of the Melbourne central business district near Melbourne's Tullamarine Airport. The 231 hectare site is bordered by the Maribyrnong River to the east, Jacksons Creek to the north, Organ Pipes National Park to the west and the Calder Freeway to the south. Sydenham Park includes the 43 hectare Keilor Park Golf Course. Deep Creek and Jackson Creek meet at the park to form the head of the Maribyrnong River. The site is mainly flat bordered by deep valleys towards the western and northern boundaries.

Sydenham Park was acquired by the Brimbank City Council 40 years ago. Conservation work started on the property in 1997.

The landscape is typical of the Western Plains, which is dominated by native grasses with sparse trees and shrubs. Significant environmental, geological and cultural values are present on-site which provides habitat for a range of flora and fauna. Kangaroos, wedge tailed eagles, platypus and echidnas have all been sighted in the area and growling grass frogs are often heard in the wetter areas. Common native grasses on the site include wallaby grass (*Rytidosperma spp.*), kangaroo grass (*Themeda triandra*) and spear grass (*Austrostipa spp.*).



Above: Simon Purves, Maribyrnong Valley Connection Project Officer, on-site at Sydenham Park

KEY SUCCESS FACTORS

- Working with surrounding property owners, stakeholders and agencies to undertake control and reduce pathways of spread into controlled areas.
- Hitting the weed hard in the first couple of years to bring it under control
- Long-term commitment to control with an on-going monitoring and control program.

¹ Agriculture Victoria, 2020, Victoria. Resources Online, Present distribution of serrated tussock (*Nassella trichotoma*) in Victoria

Incentive to Act

Under the *Catchment and Land Protection Act 1994*, serrated tussock is declared a regionally controlled weed in the area of Sydenham Park. Regionally controlled weeds are usually widespread and landowners are required to take all reasonable steps to prevent growth and spread on their land.

Controlling serrated tussock is one of many actions the Brimbank City Council takes to conserve biodiversity across their 390 hectares of conservation land throughout Brimbank.

Their focus on protecting, maintaining and enhancing biodiversity is reflected in their 2012-2022 Biodiversity Strategy, which includes a commitment to *continue active conservation land management actions of weed control, biomass reduction, pest animal control and planting/direct seeding on conservation assets*.

In January 2017, Simon and his team undertook an assessment of the site to determine the cover of serrated tussock. The assessment involved in a desktop review and mapping, followed by an on-site survey to ground-truth the results. This analysis found that serrated tussock cover on different parts of the site was:

- Large paddock 30%
- Direct seeding paddock 10%
- Escarpment 60%
- Gully 70%.

The assessment results also indicated that serrated tussock was expanding into previously unaffected areas. This prompted the team to reconsider where and how they were approaching serrated tussock control. This led to the trial approach, as described below.

The team also set control targets over the four-year program. The aim of the control program was to reduce serrated tussock strategically in high value areas and identify and control pathways of spread through the park. The biggest threat to the team's control methods are pathways of spread, this includes areas difficult to control such as escarpments, and seed spread by animals.

Approach to Control

TRIALS

Over 20 years the Council team had used both flupropanate and glyphosate at a range of different sites. Glyphosate is a broad spectrum herbicide, so care must be taken to avoid spraying native or pasture grasses. It is absorbed by the foliage and translocated to the growing points. Flupropanate is a selective herbicide that is slowly absorbed by the root system of the plants. Residue in the soil can suppress germination of seed. Given serrated tussock's movement and spread across the site, the team decided to undertake control trials to identify the best approach for Sydenham Park. Working with other agencies and the Victorian Serrated Tussock Working Party, the team established three 400m² (20m x 20m) test plots.

Firstly, a burn was conducted across the test areas. Following the burn, plot one was left to regenerate as a control, plot two had glyphosate applied to post-fire serrated tussock growth and plot three had flupropanate applied. To apply the herbicide, a boom spray was used where there were no rocks or areas that could damage the boom spray. Areas that were not suitable for a boom spray were spot sprayed using a knapsack or rig. Prior to spraying, the test plots were assessed and where there were high densities of native seedlings, spot spraying was undertaken to avoid spraying new native growth.

All plots were monitored to assess the different chemical treatments and to identify what successional weeds could be expected across similar sites with the treatments. Key findings from the trial include:

- Serrated tussock recovers quickly post fire and can outcompete native grasses if follow-up spraying is not conducted
- Reducing the biomass of serrated tussock gave native plant species more space to recruit
- Flupropanate showed the best results for serrated tussock control and is now used as the main herbicide treatment across Sydenham Park.

Image on page 3 (opposite): An area of the site where serrated tussock dominates, resulting in low biodiversity

ON-GOING CONTROL: STRATEGIC BURNING, SLASHING AND HERBICIDE USE

Once the trials were completed the approach was tailored to different areas of the property depending on the level of infestation and topography. Slashing was undertaken to reduce biomass on the east side of the property where the land is flat and less rocky. Flupropanate was then applied with a boom spray, except in areas with high value native plant species, where spraying was undertaken using a rig or backpack sprayer to avoid damaging native plants.

In rocky areas where it is unsuitable to use a slasher, burning was used to reduce biomass

and re-growth was sprayed. In May 2019 (post trial) Brimbank City Council, in partnership with other agencies, burned 16.5 hectares of serrated tussock in the gully on the west side of the property. Flupropanate was then applied using a rig or backpack sprayer.

The entire site has been monitored closely to understand whether serrated tussock has been effectively reduced, the response of native grasses, and what plant species are recruiting (both weed and native). Follow-up spraying has been conducted on serrated tussock re-growth with a rig or backpack sprayer.

Costs of the Control Program

The cost of controlling serrated tussock at Sydenham Park demonstrates the importance of early intervention and follow up. It is much more expensive to control serrated tussock when the cover is high, as was the case at Sydenham Park, than it is to spray scattered individual plants.

For the flat areas, initial control costs were \$410 per hectare, which includes preliminary slashing and spraying. Follow up control costs have reduced to around \$155 per hectare. Even though the cost per hectare has declined, it is still high compared to properties that maintain a low coverage of serrated tussock by continuous control.

ITEMS	YEAR 1	YEAR 2	YEAR 3	YEAR 4
SLASHING	\$160/ha	\$80/ha	\$80/ha	\$80/ha
SPRAYING	\$250/ha	\$150/ha	\$75/ha	\$75/ha
TOTAL	\$410/ha	\$230/ha	\$155/ha	\$155/ha

Table 1: Brimbank City Council's control costs in flat areas of Sydenham Park

In the escarpment areas, control costs are higher because of the lack of access for machinery. Slashing is not possible, so the area was burnt. Boom spraying was also not possible, so all spraying had to be done with a spray rig. In the escarpment areas, initial control costs were \$4,200 per hectare, which reduced to \$500 per hectare in year 2 and \$250 per hectare in subsequent years.

ITEMS	YEAR 1	YEAR 2	YEAR 3	YEAR 4
BURNING	\$3,000/ha	-	-	-
SPRAYING	\$1,200/ha	\$500/ha	\$250/ha	\$250/ha
TOTAL	\$4,200/ha	\$500/ha	\$250/ha	\$250/ha

Table 2: Brimbank City Council's control costs in escarpment areas of Sydenham Park



As demonstrated above the costs of controlling scattered infestations is far greater than preventing infestations from occurring. Compared to other scenarios, Brimbank City Council has had to spend more on control than those who have prevented infestations from occurring as shown in **Figure 1**.

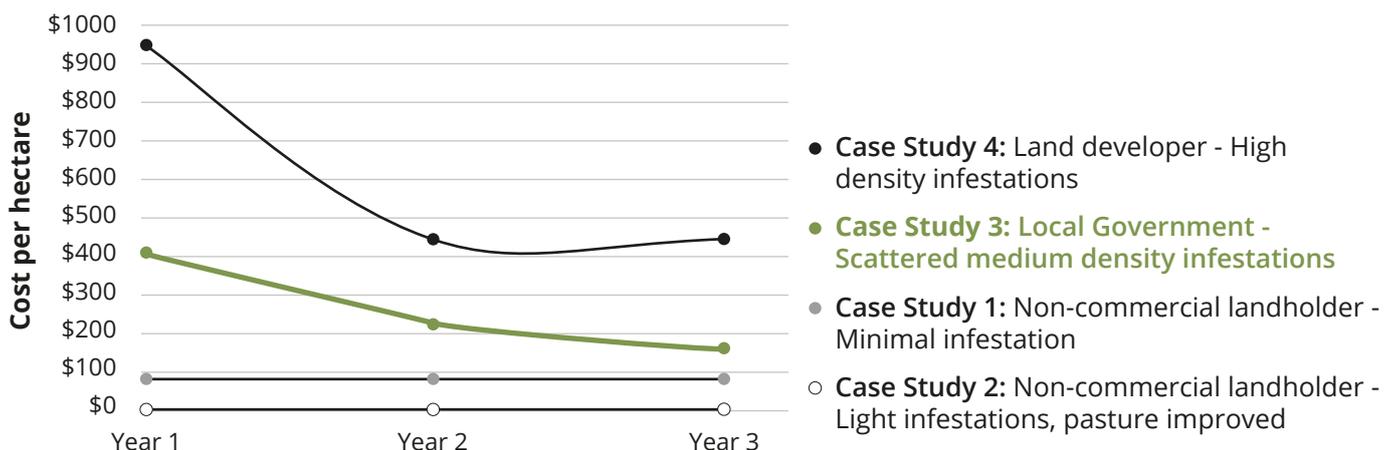


Figure 1: Cost comparison of four case studies – Brimbank City Council is case study 3

If serrated tussock is left to infest a property or landscape, the cost of controlling it will be at least five times higher than if it was prevented in the first instance

Benefits of Control

Now that the program is in its third year, Simon and his team are beginning to see the benefits of their work, particularly in the larger paddocks. The main benefit at this stage is limiting the spread of serrated tussock into high value assets such as remnant native vegetation and Organ Pipes National Park. Serrated tussock, if left un-controlled, outcompetes native grassland species resulting in a low diversity of plant species. Spraying, slashing and burning remove most of the serrated tussock plant, which creates space for native species to germinate and establish, increasing diversity in the landscape.

The smoke and heat from burning the landscape can also trigger germination of some native plant seed that is dormant in the soil. In some burnt areas on the site where follow-up spraying has been undertaken, the team have observed native daisies and ferns returning to areas previously covered in serrated tussock.

The program has also reduced the potential for serrated tussock seed spread to neighbouring properties, including the Tullamarine Airport, vineyards, graziers, Organ Pipes National Park and residential areas.

This project is supported with funding from Agriculture Victoria and the Australian Government’s Agricultural Competitiveness White Paper, the government’s plan for stronger farmers and a stronger economy.

BENEFITS OF CONTROLLING SERRATED TUSOCK

-  Reduced seed spread
-  Improved biodiversity



Australian Government
Department of Agriculture, Water and the Environment

