

A partnership approach to strengthening management of Madagascar ragwort

POSITION PAPER



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COMMERCIAL IN CONFIDENCE

About this paper

This paper was jointly commissioned by Northland Regional Council, DairyNZ, Beef + Lamb NZ and Pāmu Farms. This was driven by a shared commitment to take collaborative action on this invasive species given its serious risks to farm productivity.

The paper clarifies the rationale for strengthening action to better address the growing threat of Madagascar ragwort and identifies a joint position on the pathway forward.

It includes the following sections:

- **The case for action:** This section outlines the urgent need to address Madagascar ragwort, describing its rapid spread, impacts on farming and the economic implications.
- **The management programme options and assessment:** This section presents five strategic options for managing Madagascar ragwort, explaining how these options were developed and assessed.
- **The preferred management programme:** This section describes the preferred management approach. This is focused on empowering landowners, investing in research, implementing targeted regulation, and improving monitoring, all designed to slow the spread and minimise the impacts of Madagascar ragwort.
- **Delivering the preferred management programme:** This section explains how the preferred programme will be implemented through a partnership model, clarifying the roles and responsibilities of local government, industry bodies, central government, iwi/hapū, and landowners to ensure effective delivery and collaboration.
- **Costing the preferred management programme:** This section provides high level cost estimates for the five options, including the preferred programme.
- **Funding the preferred management programme:** This section discusses principles for how the preferred management programme could be resourced and funded.

An economic impact assessment is appended. This was also commissioned by NRC, DairyNZ, Pāmu Farms and Beef+Lamb to identify the economic implications of unmanaged spread of Madagascar ragwort in response to a request from the Primary Production Select Committee.

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Executive summary

This paper was jointly commissioned by Northland Regional Council (NRC), DairyNZ, Beef + Lamb NZ and Pāmu Farms. It describes the strong rationale for strengthening action to better address the growing threat of Madagascar ragwort and identifies a joint position, agreed between NRC and industry partners, on the preferred approach to managing this invasive pest.

There is a strong case for acting to address the growing spread of Madagascar ragwort to protect the productivity of beef and dairy farming

Madagascar ragwort is an invasive and toxic superweed that has established itself in the top half of Northland.

The invasive weed is already causing significant losses for beef and dairy farmers with up to 35% reductions in carcass weights and 65% losses in milk solids produced per hectare reported on affected properties. Its resilience to treatment, rapid spread, and the high costs of treatment make it uniquely challenging for individual landowners to manage. While Madagascar ragwort primarily impacts dairy and beef farming, it also impacts other types of farming, including land held by iwi/hapū.

Despite the potential collective benefits that coordinated action could yield, management efforts have been limited to date because of:

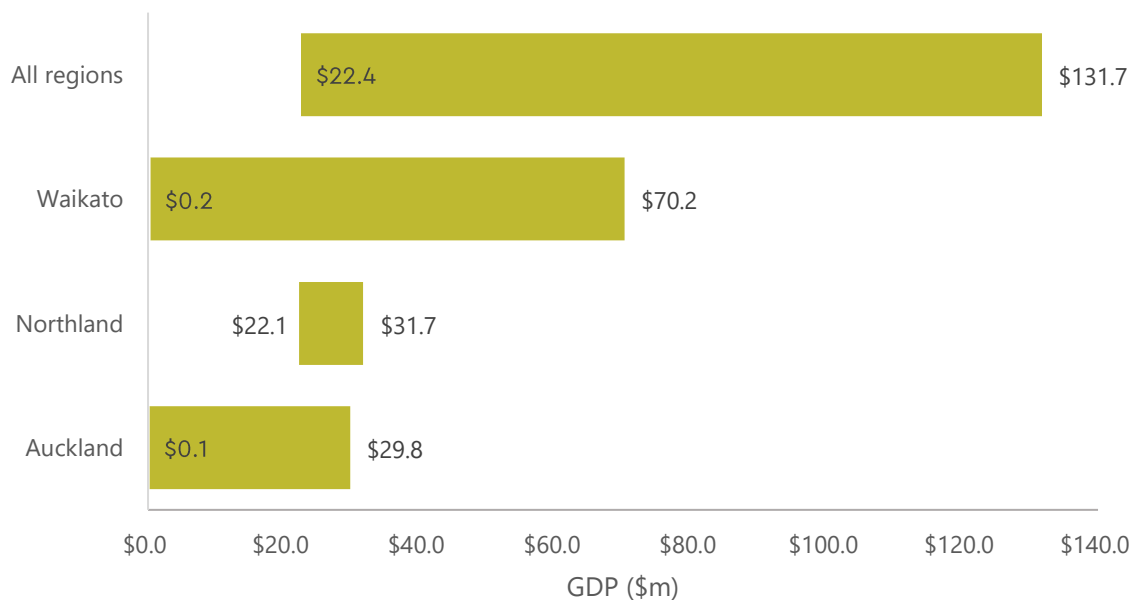
- Competing incentives among landowners to undertake treatments.
- Constrained resources and priorities across stakeholders, limiting collective support.
- Low sector-wide awareness, with inconsistent understanding of the threat across landowners resulting in inconsistent action.

There is a closing window to act. Climate and spread modelling show Madagascar ragwort could spread exponentially across the country, with a risk of long-distance dispersal through human mediated vectors of spread (e.g. where it can 'hitchhike' through the movement of hay, equipment and cattle). This places nearby regions with large farming activity like the Waikato and Manawatū-Whanganui at particular risk. Initial modelling shows that Madagascar ragwort could infest significant portions of Northland, Waikato, and Auckland by 2050 under high spread rate scenarios.

Without intervention, the annual GDP losses across Northland, Auckland, and Waikato could reach between \$22 million and \$132 million in 10 years (2035), escalating to between \$73 million and \$276 million in 30 years (2055). The impacts on GDP are illustrated in Figures 1 and 2 below. Production losses in 10 years could be between \$47 million and \$270 million with an associated fall in employment of between 222 and 1,204 jobs.

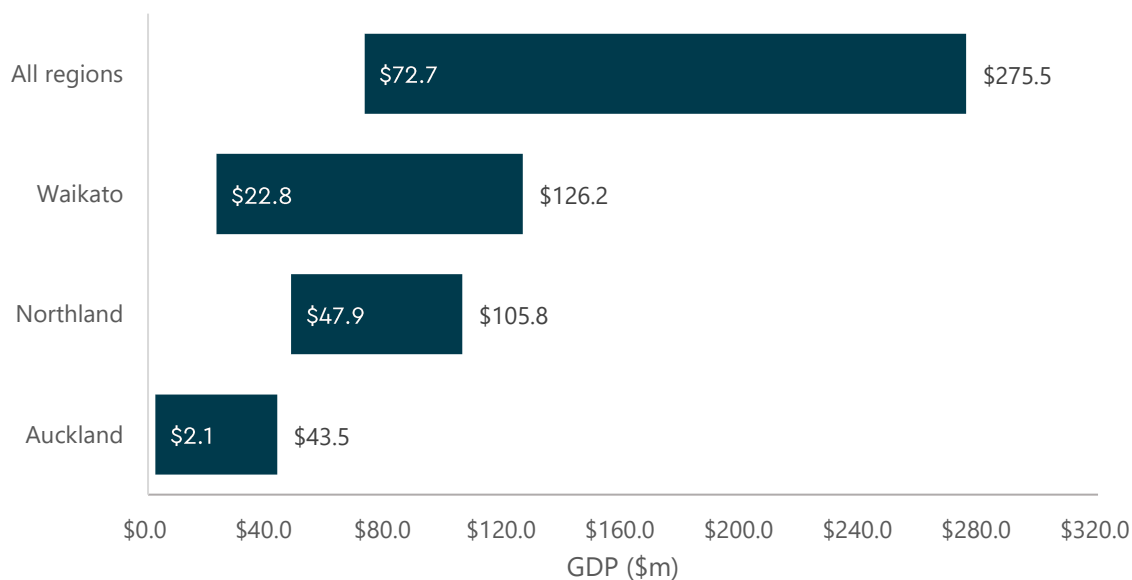
Based on these economic losses, total tax losses for the government could reach between \$11 million to \$64 million in 2035 and \$34 million to \$134 million in 2055.

Figure 1: Low and high GDP impacts in 2035 by region and total study area



Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

Figure 2: Low and high GDP impacts in 2055 by region and total study area



Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

Economic impacts of unmanaged spread in Northland, Auckland, and Waikato**\$22m to \$132m**

Estimated range of annual GDP losses across Northland, Auckland, and Waikato in 10 years (2035) under low and high spread scenarios (rounded).

\$73m to \$276m

Estimated range of annual GDP losses across Northland, Auckland, and Waikato in 30 years (2055) under low and high spread scenarios (rounded).

222 to 1,204 jobs

Estimated job losses in 10 years (2035) under low and high spread scenarios.

Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

There is a unique opportunity to act decisively while the spread of Madagascar ragwort remains contained to the top half of the Northland region to minimise these significant economic impacts. Intervening early in the invasion curve provides the best chance of success, but this window is closing as spread develops. Acting now is particularly important to reduce the risk of spread to neighbouring regions.

Strong local ambition exists for greater action. NRC, DairyNZ, Beef+Lamb NZ and Pāmu are seeking to leverage their collective resources, together with support from central government, to strengthen the management programme to prevent further spread and minimise the impacts of this invasive and toxic pest.

The preferred management programme

We developed five options for possible management programmes through this work, informed by feedback from landowners, industry representatives, other regional councils and scientists.

The preferred management programme focuses on empowering landowners and those at risk of spreading Madagascar ragwort. It involves:

- Providing targeted advice and support to landowners, farmers, contractors, and suppliers.
- Investing in research to improve our understanding and ability to manage Madagascar ragwort.
- Implementing cost-effective, simple regulation to support landowner-led management, including advocating for exclusion status in other regions.
- Improving the monitoring of spread through greater engagement with landowners.

The programme should be reviewed in three years to ensure it remains proportionate to the evolving scale of the problem.

The preferred management programme will be delivered through a partnership approach

Delivery will require genuine partnership between councils, industry bodies, landowners, iwi/hapū and central government:

- The role for local government will involve regional coordination, providing engagement support, contributing to research and managing regulation. Authorities in neighbouring regions will need to consider the relative merits of seeking exclusion of the pest from their regions.
- Beef+Lamb and DairyNZ will play a key support role to their members across the North Island who would stand to benefit from improved management of Madagascar ragwort and who also could potentially exacerbate its spread. The role of the industry bodies involves engaging with farmers to raise awareness, providing technical information and support, jointly support research, and co-ordinating efforts with NRC and MPI.
- The potential for cross-regional spread, market failure to effectively manage this spread, and economic impacts on this scale elevates this pest beyond just a local issue to one that requires central government support. MPI support is needed to complement the efforts of local government and the farming industry. MPI's role will include providing support through national awareness raising and campaigning, co-funding public good research, providing support for inter-regional activities and making it easier for local government to access specialist support and advice. Government also faces an imperative to manage Madagascar ragwort effectively on Crown land as a responsible regional citizen and role model for other landowners.

Landowners play the most critical role, given their responsibility for management and treatment on their land, with support from partners as described above.

The preferred approach is estimated to cost an additional \$10.4 million over the first four years which will need to be jointly resourced to be successful

The preferred approach is estimated to cost an additional \$10.4 million over four years, to be jointly resourced and funded by NRC, industry bodies, central government, and landowners, in line with biosecurity funding principles. Partners are intending to discuss relative funding shares and return to government in February 2026 with a proposed funding approach.

Table 1: Summary of costs of the preferred approach over the next 4 years (\$ million)

Activities	Cost
Regulation and enforcement	\$0.893
Coordination and collaboration	\$2.670
National support for management programme	\$2.186
Monitoring and surveillance	\$0.416
Research	\$1.430
Advocacy and education	\$2.783
Sub-total operating expenditure – excl. landowners	\$10.377

Landowners bare the greatest cost, with annual treatment costs facing Northland farmers over the next 4 years estimated to be between \$12.7 million and \$14.5 million annually on average.

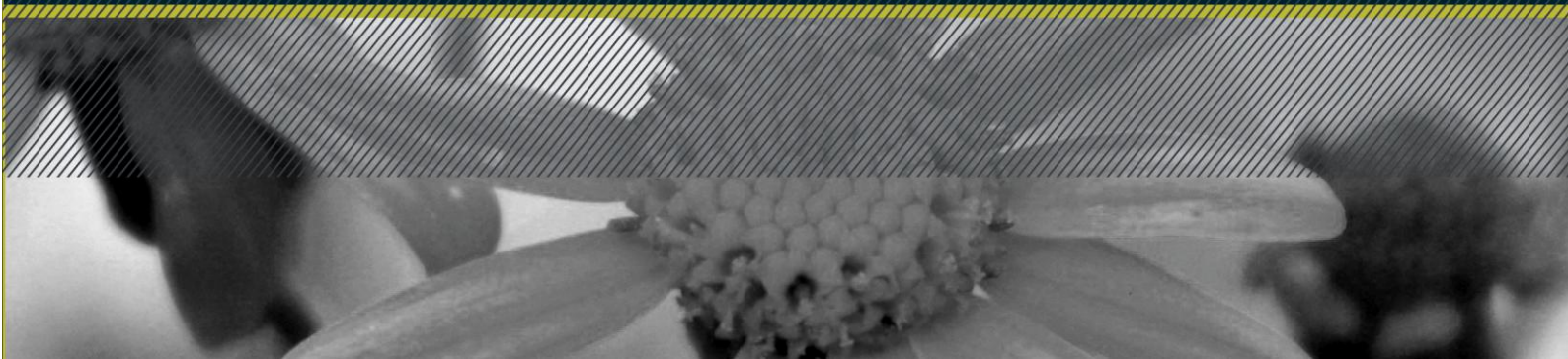
The next steps involve confirming commitments from stakeholders, establishing working arrangements, and moving to programme establishment

Indicative timeframes and milestones are:

- **December 2025** – Meeting with Minister for Biosecurity and senior MPI officials to confirm ambition and appetite for Crown support.
- **February 2026** – Confirming funding shares with NRC, industry bodies, neighbouring local government, and Crown.
- **April 2026** – Sign MOU on respective commitments, including funding, resourcing, and working arrangements.
- **May 2026** – Endorsements from local authorities.
- **June 2026** – Establish management programme, including governance, working arrangements, recruitment, and implementation.

SECTION ONE

The case for action



The case for action

This section sets out the case for action, providing the context, impact, problem, and imperative for action:

- **Context:** An aggressive and toxic superweed has established itself in Northland.
- **Impact:** Madagascar ragwort threatens beef and dairy farming across New Zealand.
- **Problem:** Competing incentives are limiting the ability to slow the spread within and across regions through effective and co-ordinated interventions despite the collective benefits an effective management programme would yield for New Zealand
- **Imperative for action:** There is a closing window for action and strong stakeholder ambition to minimise the impacts on farming and slow the spread of Madagascar ragwort in Northland and the top of the North Island.

Context: An aggressive and toxic superweed has established itself in Northland

Overview of the context

Madagascar ragwort:

- Is highly toxic and can be fatal to stock with no treatment available for affected animals.
- Is currently contained to the top half of Northland, but has begun to spread exponentially in recent years based on landowner reports.
- Spreads aggressively and establishes in pastures extremely rapidly given a single plant can produce 10,000 seeds within six weeks of germination and is capable of germinating all year round following any warm rain event, with seeds carried by wind and human mediated pathways.
- Its ability to spread via movement of hay, cattle and equipment means it can travel long distances, threatening nearby regions, in particular those with large primary industry production like the Waikato and Manawatū-Whanganui.

Madagascar ragwort is a toxic invasive superweed

Madagascar ragwort (*Senecio madagascariensis*) is a daisy weed that is highly toxic to cattle and horses. It has yellow flowers and grows rapidly to 20–60 cm tall, becoming woody and shrub like. It is an annual to short-lived perennial and grows in wide range of soils and climates. Germination

usually peaks in autumn but it can germinate year-round following any warm rain event. These seeds are then spread by the wind or can hitchhike on farm equipment, hay and stock.

These characteristics allow Madagascar ragwort to spread rapidly and exponentially across pasture.

Madagascar ragwort contains toxins (pyrrolizidine alkaloids) that poison livestock when ingested.¹ It is particularly toxic to cattle, deer, and horses as it causes liver cirrhosis (scarring of the liver), photosensitisation (inflammation of the skin), jaundice (where the skin and whites of the eyes turn yellow), weight loss, and neurological changes. Poisoned animals can take months to die.

Livestock generally learn to avoid the toxic weed once they learn its toxicity, but poisoning can still occur especially when plants are young and stock are unfamiliar with Madagascar ragwort, or when it is hidden in contaminated hay.² Stock can also be poisoned following control operations as the plant becomes more palatable, but remains toxic. Poisoning also becomes more likely if the infestation is severe or pasture is scarce.

Figure 3: Madagascar ragwort. Photo credit: Wendy Brown



¹ Agresearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design.

² Manaaki Whenua – Landcare Research. 2023. Feasibility of biological control of Madagascar ragwort, *Senecio madagascariensis* Poir.

Madagascar ragwort is currently contained to the top half of Northland but has begun to spread exponentially in recent years based on landowner reports

Madagascar ragwort's presence in New Zealand was first confirmed through DNA testing in 2022. Its actual arrival date in New Zealand is unknown given the lack of scientific testing and the similarity of Madagascar ragwort to the visually identical gravel groundsel (*Senecio skirrhodon*).

NRC findings of substantial infestations in 2009³ suggest it would have first arrived long before then. Landowner accounts suggest it has been present in the region for between 30–35 years, with there appearing to be a consensus around the 20-year mark.

Landowner reports suggest that the spread of Madagascar ragwort has accelerated over recent years. It has been suggested that this increased spread could have been driven by:

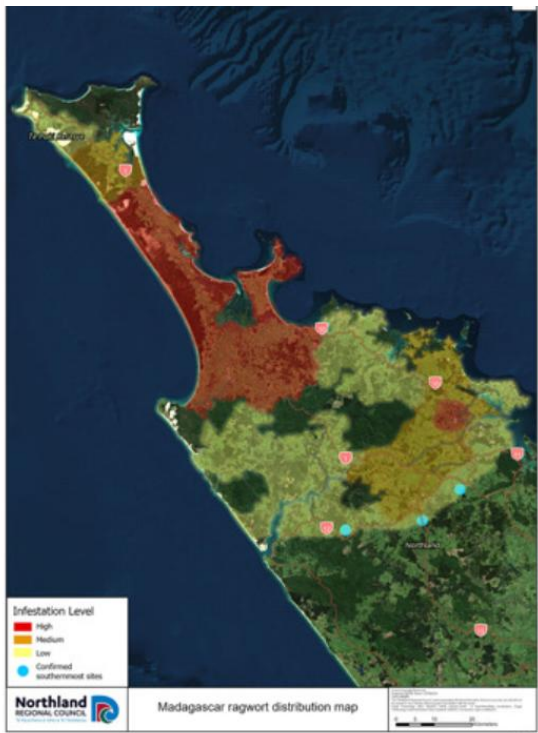
- Shifts from sheep to beef farming (with the removal of the grazing control by sheep and adjusted pasture management approaches supporting spread).
- Moves away from routine spraying programmes to protect legumes in pastures.
- Extreme weather with droughts and heavy rain increasing in severity and frequency due to climate change (Madagascar ragwort has a competitive advantage in drought or flood damaged soil).
- The exponential growth rate meaning initial spread is slow but spread rate increases as seed densities and coverage increase (see spread modelling below).

It has now spread across significant parts of Northland, including the Aupōuri and Karikari Peninsulas, Victoria Valley (south of Kaitaia), and areas around Broadwood, Doubtless Bay, Kapiro, Kerikeri, and Kaikohe (see map below).

Its close resemblance to the widespread gravel groundsel and other daisy weeds makes accurate detection challenging, particularly for landowners who are not aware of the pest. This enables Madagascar ragwort to spread unnoticed. This raises the possibility that there may be outliers in other parts of New Zealand.

³ Proposed Plant Pest Management Strategy and Proposed Animal Pest Management Strategy for Northland (2009)

Figure 4: Current spread mapping



Madagascar ragwort spreads aggressively

The high number of seeds produced, the rapid growth to maturity, ability to germinate year-round, and ability for seeds to spread via wind and human mediated pathways means spread is aggressive and exponential. This is reflected in landowner experiences.

“One year you might see three plants, the next year half the paddock is flowering” – Vicki Stevens.⁴

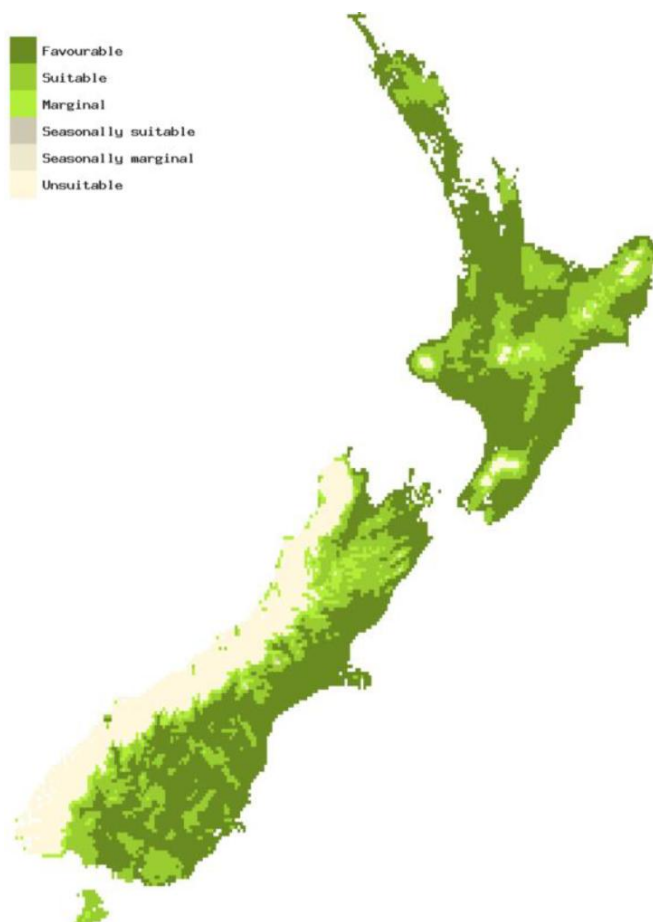
Based on the documented dispersal distances of a closely related species, it is likely that most seeds will typically fall within 100m of the parent plant,

however longer distance dispersal will still be a relatively common occurrence given the volume of seed produced. Landowner observations in Northland suggest that there is dispersal happening over distances of greater than 1km under certain wind and terrain conditions.⁵ This means it can gradually spread across regions by moving through paddocks and along roadsides to neighbouring properties.

⁴ AgResearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design.

⁵ Models of the wind dispersal of the related species South African ragwort (*Senecio inaequidens*) predicts 63.2% of seed falls in the first 10 metres, 99.8% of seed falls within the first 100 metres. AgResearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design.

Figure 5: Climex modelling of spread



Source: Agresearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design.

Climate modelling shows it could spread across the country

CLMEX modelling shows that large portions of New Zealand could support Madagascar ragwort growth.⁶ Madagascar ragwort can grow in a wide range of soil types and survives in most climates other than very cold, being somewhat limited by frost. This means it could establish itself across the North Island and the South Island.⁷ As temperatures across the country continue to warm, there is a high likelihood that the pest could spread into those areas currently deemed 'marginal'.

Its ability to hitchhike means it can travel long distances, threatening vulnerable North Island farming regions like the Waikato and Manawatū-Whanganui

Human mediated pathways are particularly dangerous as it enables Madagascar ragwort to jump long distances across regions and potentially as far as the South Island. The seed can hitchhike through the movement of hay, livestock, and equipment (e.g. tractors) between farms in the same or different regions.

⁶ Agresearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design. Agresearch notes "there is potential for the parameters used for this modelling to overestimate the range".

⁷ This modelling is from John Kean based on parameters from Wijayabandara K, Campbell S, Vitelli J, Shabbir A, Adkins S. 2022. Review of the Biology, Distribution, and Management of the Invasive Fireweed (*Senecio madagascariensis* Poir). *Plants*. 11(1):107. <https://doi.org/10.3390/plants11010107>

Figure 6: Distribution of cattle movements

The map in Figure 6 illustrates the movements of cattle and deer recorded in the National Animal Identification and Tracing (NAIT) programme in a single day (13 May 2021). In one week, there were 243,858 movements of 213,172 animals. This includes movements across the North and South Islands, with the Waikato being a particular hotspot.

Drought events in the central North Island increase risk of inter-regional spread as this can cause large scale movement of hay and feed from Northland down to regions like the Waikato. Hay is produced by cutting large areas and is then spread across large areas, increasing the risk of collecting seedlings of Madagascar ragwort and distributing it into an unknown location.

While currently known infestations are contained to the top half of Northland, as infestations become larger and more dense, the potential for faster and wider spread increases. In particular, the threat of human-mediated dispersal across regions increases. This risk is discussed further below.

Source: NAIT, provided by Ministry for Primary Industries

Impact: Madagascar ragwort threatens beef and dairy farming across New Zealand

Overview of the impacts

Its ability to quickly dominate pasture and its high toxicity to cattle makes Madagascar ragwort highly damaging to farming:

- It chokes beef and dairy farms by causing declines in the carcass weights and milk solids produced per hectare.
- It is very difficult and costly to manage once established, with the most effective treatments comprising use of chemical herbicides that also damage pastoral productivity.
- It impacts other types of farming and land use, including for rearing horses and deer.
- It impacts on the connection of iwi/hapū to the whenua.
- It brings a high economic cost due to the lost productivity, production impacts, costs of control and opportunity costs associated with control and surveillance activities.

Madagascar ragwort chokes beef and dairy farms by causing declines in carcass weights and milk solids produced per hectare

Madagascar ragwort chokes farm productivity

Madagascar ragwort competes with and replaces native pasture. Stock typically avoid areas of pasture where it has been established. As a result, it progressively reduces the amount of feed provided by a paddock. This reduces the effective size of productive farmland as it reduces the quantity of stock that can be supported productively per hectare for beef and dairy farming.

This means farms dealing with established infestations experience a real economic impact and production losses in the form of declining carcass weights and milk solids production. This leads to substantial revenue losses for farmers.

Table 2: Summary of selected farmer impacts

Farm example	Production losses	Infestation size	Per ha annual revenue losses (excluding treatment cost)
Rangiputa farm (Pāmu)	Carcas weight per ha has reduced approximately 35% from 268kg in FY18 to 175kg in FY24.	The infestation covers 1,200 to 1,400ha or around 39% of the farm.	Annual revenue loss of over \$500 per ha.
Dairy farmer near Kaitaia	Milk solids per ha has reduced approximately 65% in infected areas with 1400kgMS/ha declining to 910kgMS/ha.	The infestation covers 50ha or around 15% of the farm.	Annual revenue loss of \$1,354 per ha with a total annual loss of \$455,000 (at assumed payout of \$10kgMS)

These impacts are consistent with those seen in Australia, where pasture invasion by Madagascar ragwort has been estimated to impact up to 60% of pastoral land and reduce farm profitability by 15% to 50%.⁸ 35% of farmers in New South Wales consider it to be the worst weed they are dealing with.⁹ Impacts have potential to be greater in New Zealand given the importance of clover which is damaged by agrichemical treatment.

It is difficult and costly for landowners to manage

Madagascar ragwort is significantly more challenging and costly to manage than most other pasture weeds. This is because treatment requires a mix of carefully timed, repeated and ongoing interventions.

There are no silver bullet treatments

Treatments need to be applied carefully as some chemicals kill clover and impact soil quality, with other treatments making the infestation worse if applied incorrectly (for example, mulching or slashing can spread seed and cause weeds to become woody and more difficult to control). Landowners also need to manage the risk of spread by cleaning equipment, managing movement of stock and hay, and managing pasture (including stock grazing).

⁸ Sheppard A, Olckers T, McFadyen R, Morin L, Ramadan M, Sindel B 2013. Biological control of *Senecio madagascariensis* in Australia – a long-shot target driven by community support and political will.

⁹ Agresearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir.) and control trial design.

There are 4 types of treatment outlined in Table 3 below.

Table 3: Control methods

	Effectiveness	Considerations
Hand weeding	Hand weeding can be highly effective for very early infestations and/or low volumes	This becomes cost prohibitive on a large scale due to the labour-intensive nature of treatment. Must be repeated very frequently to prevent seeding. Risk of spreading seed if undertaken when seed present on the plant.
Mowing/ slashing/ mulching	Must be repeated very regularly to be effective, as cut plants will re-grow and flower	Manual control options carry significant risk of worsening the issue if done poorly. Seed can accumulate on machinery, and be spread to unaffected areas. Because the seed is so fine it is very difficult to decontaminate effectively. Pruned plants can become woody and more resistant to herbicides. Cut plant material remains toxic but becomes more palatable to stock, so farmers need to implement withholding periods to avoid stock deaths.
Chemical control	While there is no known single herbicide control method that will efficiently control all growth stages of Madagascar ragwort without significant impact on beneficial pasture species, a programme of ongoing and carefully timed application of certain chemicals has proven effective at reducing infestations to manageable levels. Initial trial work by farmers/operators has found the 2,4-D / dicamba/ Bonza® 'triple mix' can be used to manage larger infestations when timed around germination peaks. ¹⁰	Control programmes should be timed around germination peaks to target newly germinated seedling and juvenile plants while they are more susceptible and before they set seed. A number of the available agrichemical control methods impact on clover and other beneficial pasture species. Ease of chemical application depends on topography, with more hilly country requiring helicopter application that can be costly. Cut plant material remains toxic but becomes more palatable to stock, so farmers need to implement withholding periods to avoid stock deaths.
Biocontrol	While biocontrol has been an effective and sustainable tool for other pest weeds, a biocontrol agent for <i>Senecio madagascariensis</i> has not yet been identified despite significant research overseas. A feasibility study for biological control of Madagascar ragwort in New Zealand largely discounted the agents identified and tested	Further DNA research and survey work is required to identify potential new insects and pathogens for testing. ¹² In Hawaii, a moth (<i>Secusio extensa</i>) released in 2012 has shown only minimal damage to Madagascar ragwort. This species is not considered suitable for release in New Zealand

¹⁰ Further information on treatments effectiveness can be found on the NRC website.

¹² Manaaki Whenua – Landcare Research. 2023. Feasibility of biological control of Madagascar ragwort, *Senecio madagascariensis* Poir.

Effectiveness	Considerations
overseas to date as unsuitable for New Zealand. ¹¹ However, recent scientific developments since this research suggests potential new areas to survey for agents that may be more host specific to the genotype in New Zealand.	due to its impacts on other Asteraceae, including other <i>Senecio</i> species.

It imposes a major cost burden

Applying these interventions year-round imposes a substantial cost burden. Case studies show that treatment and management costs vary across farms depending on the size of the infestation, topography, and ability to use chemicals. Pāmu Farms spray costs are around \$100/ha, applied to large areas and multiple times a year. Another farmer, Ian Sizer, spent up to two hours a day hand-weeding, and estimated his cost at around \$70,000 a year.

These costs add up (as set out in Table 4 below). Instead of focusing on productive activities, farmers need to spend hours on hand-weeding, chemical application, and monitoring.

“The weed is not simply a biosecurity concern or a pasture management issue – it is becoming a daily burden that affects our time, income and mental wellbeing” – Dairy farmer impacted by Madagascar ragwort

The costs associated with treating established infestations have a significant negative impact on farm profitability and put farms of all sizes at risk of becoming economically unsustainable. This is not just an issue for smaller farms and landowners who may struggle to meet the costs of treatment. For large farms, a substantive level of effort and costs are involved in treating and preventing spread. It will also have greater impacts on organic farms that are unable to use pesticides and need to resort to hand-weeding.

¹¹ Manaaki Whenua – Landcare Research. 2023. Feasibility of biological control of Madagascar ragwort, *Senecio madagascariensis* Poir.

Table 4: Overview of costs to landowners

Costs to landowners of managing Madagascar ragwort	
Treatment costs	This requirement for repeated treatments makes it considerably more difficult and expensive to manage than most other pasture weeds. Annual spraying costs vary depending on chemicals used and rate of application. Pāmu Farms spray costs are \$100/ha. Labour costs of chemical application, and physical removal is highly labour intensive. The cost for manual pulling was around \$80 per hectare for Pāmu Farms but this cost will be highly variable depending on the method used, frequency, and intensity of the infestation. ¹³
Stock losses	Madagascar ragwort causes stock deaths. Pāmu Farms recently lost 2 Friesian bulls from toxicity.
Identification checks	Farmers need to undertake surveillance checks with time and labour costs.
Spread management	This includes cleaning equipment and limiting hay movement between farms and paddocks costing time and labour (decontaminating equipment very difficult in practice due to the fine seed).
Re-grassing	The pasture renovation process can be used to remove Madagascar ragwort seedlings and reduce seed banks but must be carefully managed carefully. Pasture renewal costs between \$600 to 1,300 per hectare. ¹⁴
Pasture impacts	Pasture can become less productive due to the loss of clover and other beneficial pasture species through agrichemical control.
Changes to stocking approaches	Sheep can be grazed to control Madagascar ragwort but are generally less profitable than beef or dairy. Average gross revenue per sheep stock unit is \$103, compared to \$125 for beef cattle (2024 values). ¹⁵
General management costs	Time and effort spent by farm managers on medium to larger scale farms who have to redirect management efforts.
Opportunity costs	Time and effort drawn away from other productive uses of resources.

¹³ Estimated using annual eradication spray and spray control costs from Pāmu 2024, Madagascar Ragwort – More than a Northland challenge

¹⁴ Chaos Springs. 2017. [The 7 best and most economical ways to renew your pasture naturally — Chaos Springs | Soil Dynamics](#); Catalyst Performance Agronomy. [Don't let poor cash flow drive poor decisions when it comes to Pasture renovation | Catalyst Performance Agronomy](#).

¹⁵ Beef and Lamb. [northern-north-island-class-9-all-classes.xlsx](#).

Figure 7: Pāmu's Rangiputa Farm in Northland



CASE STUDY: Pāmu's Rangiputa Farm in Northland

Madagascar ragwort has become one of the most pressing challenges for Pāmu's Rangiputa Farm. Over the past six years, its spread has accelerated dramatically. What began as scattered plants is now a dense infestation across 1,200 to 1,400 hectares of the 3,300-hectare property.

The impact has been severe. Production at Rangiputa has fallen by 35 percent, costing the business more than \$500 per hectare. Madagascar ragwort has been found on six of Pāmu's seven Northland farms.

Pāmu has invested heavily in control measures. A range of spray programmes have been trialled using products like Kamba, Bonza, and Sprinter. These efforts have been costly, covering 300ha twice yearly at \$100/ha, and largely ineffective.¹⁶ Spraying kills clovers and other desirable pasture species, yet Madagascar ragwort quickly re-establishes itself.

¹⁶ Note there has been conflicting feedback on effectiveness of control methods from different farmers. This may be due to variable factors across farms, like how spray is being undertaken, and density of seedbank at this site.

Hand-pulling has proven effective only in very low numbers or new incursion scenarios, but it requires extremely attentive staff and is not practical at scale. Applying stock pressure from adult sheep has helped control Madagascar ragwort in some areas of Rangiputa Farm. However, this approach comes with significant challenges. Current lamb and wool prices, combined with the lack of suitable sheep breeds for Northland's climate, mean that relying on sheep undermines the farm's profitability. Despite these efforts, the infestation continues to outpace control measures.

Pāmu Farms have seen the potentially drastic impacts on New Zealand farming and are advocating for a stronger and scaled up management programme to address this risk.

Madagascar ragwort also impacts other types of land use

While beef and dairy are the main concern, Madagascar ragwort also has the potential to impact other types of production and land use:

- **Beekeeping.** The toxin in Madagascar ragwort, Pyrrolizidine alkaloids can contaminate honey and bee collected pollen with potential for impacts on apiculture.¹⁷
- **Horticulture.** We have not explored the impacts for horticulture but the pest's ability to thrive in disturbed soil indicates risk for certain types of horticulture. Horticulture is also an industry that could exacerbate spread through the movement of equipment.
- **Deer.** It is poisonous for deer, with potential impacts on deer farms.
- **Wool and lamb.** While sheep can tolerate Madagascar ragwort, they can still be impacted at higher infestation levels with poisoning impacting milk and liver function.
- **Horses.** Horses are used across the north island for sport, recreation, farming, transport and tourism. There are approximately 1,204 horses in Northland and 10,945 in Waikato (including high value racehorses).¹⁸ Madagascar ragwort's high degree of toxicity makes it potentially fatal for horses who graze on it.

There is potential for greater spread to threaten New Zealand's ability to export commodities to countries where it has designated weed status. This includes some of our key trading partners including the United States, Australia and Japan.¹⁹

¹⁷ Agresearch. 2025. Review of current control methodologies of Madagascar ragwort (*Senecio madagascariensis* Poir) and control trial design.

¹⁸ [Horses \(include race horses\) in New Zealand farms - Figure.NZ](#)

¹⁹ Government of Canada. RMD-13-04: Consolidated Pest Risk Management Document for pest plants regulated by Canada, [RMD-13-04: Consolidated Pest Risk Management Document for pest plants regulated by Canada - inspection.canada.ca](#)

It impacts on the connection of iwi/hapū to the whenua

In addition to the significant connection of iwi/hapū to the environment, there are also large tracks of iwi/hapū owned and operated farms throughout Northland and the North Island. Many of these farms are smaller in scale and are primarily used to provide kai for the household. This makes them particularly vulnerable to the costs of control and production losses from dealing with Madagascar ragwort. Impacts include:

- **Burden of on-going management.** The need for expensive treatments can impose a burden on small farms that is prohibitive to viability.
- **Kai sovereignty.** This is the freedom and responsibility of tangata whenua to protect their ancestral food systems. Impacts of treatments on soil health and freshwater can impact this.
- **Taonga impacts.** While impacts have not been studied in detail, there is the potential for direct and indirect impacts on taonga species, including as a result from deteriorating soil health and water quality through increased herbicide use.
- **Kōrero tuku iho.** Impacts on cultural value of learning land management and development practices as more of the whenua is lost to infestation and kaitiaki have to redirect efforts towards reacting to the spread.

Problem: Competing incentives are limiting the ability to slow the spread within and across regions through effective and co-ordinated interventions

Overview of the problem

Despite the scale and immediacy of the threat and local ambition for action, our ability to slow the spread through effective interventions is limited by the following three root causes:

- Competing incentives are undermining management efforts.
- Shared benefits without shared contributions limits scale and effectiveness of the programme.
- Preventive measures are lacking due to low awareness.

Competing incentives contribute to different landowner responses to infestations

There are competing incentives to manage the spread across landowners depending on where Madagascar ragwort has established, the scale of infestation, the use and profitability of the land and the awareness landowners have around the pest and its impacts.

Beef and dairy farmers are generally commercially incentivised to manage spread. However, incentives can be mixed, especially for those that are not aware of its impacts.

Owners of non-productive land who are not directly impacted by Madagascar ragwort do not face a commercial imperative to treat it and address its spread. These other uses include forestry, sheep farming, collectively managed land, and government entities managing conservation parks and transport corridors.

These competing incentives mean that actions by farmers to prevent spread may not be reciprocated by other landowners in the region. The impact of this could be that:

- Madagascar ragwort increases in its spread to other parts of the region and potentially cross-regionally from untreated infestations allowed to grow.
- Owners of productive land feel a sense of helplessness given any efforts they make to treat infestations could be nullified by a lack of action by other landowners.
- Owners of land with infestations may struggle to keep on top of control where they have neighbours who allow infestations on their property to spread untreated.
- As Madagascar ragwort spreads further within the Northland region, its increased presence elevates the risk of incursions into other neighbouring regions.

These competing and mixed incentives highlight the need to consider appropriate regulatory tools and coordinated management to align incentives across all landholders, regardless of individual commercial impact, and to educate landowners in a way that enables meaningful action.

CASE STUDY 2: Rebecca, Northland dairy farmer²⁰

For Rebecca a dairy farmer in Northland, Madagascar ragwort has become a daily battle that affects her time, income, and wellbeing.

Rebecca started with manual control but as neighbouring infestations grew, that approach became impossible. Now, Rebecca spends hours every week on control, and the cost has soared to over \$470 per hectare when combining spraying and manual follow-up. Even then, chemical control only achieves about 50% success. Her runoff block has lost 80% of its productivity, and she has had to abandon her low-herbicide principles just to keep the business viable.

Time spent managing the pest is taking away from core farm work and other priorities. Activities that once provided balance and wellbeing like horse riding have had to be put aside.

Every time Rebecca leaves her farm, she sees unmanaged infestations on neighbouring land and roadsides, knowing thousands of seeds are blowing onto her property. That constant pressure is mentally exhausting.

²⁰ Name has been anonymised.

Rebecca has sought an improved management programme that shares responsibility across all landowners and provides practical support for control. This includes awareness campaigns, proactive monitoring, and government-backed funding for research and co-ordination.

Misalignment of short and long-term benefits and costs across regions and industry hinder efforts at co-ordination and prioritisation of resources

Local government and industry participants outside of Northland stand to benefit in the long run from efforts taken early to slow the spread. However, the immediate benefits of harm averted, and the costs associated with management and treatment fall primarily on Northland stakeholders. Without a co-ordinated approach that leverages the resources and information across regional and industry partners, it is unlikely the programme will be sufficient to control and prevent further spread outside the region. Other regions have a stake in ensuring an effective regional programme in Northland that can contain or at least slow the spread.

To date, the responsibility for managing Madagascar ragwort has largely fallen on affected landowners and NRC, who have worked hard to build momentum despite limited resources. While stakeholders have expressed support, they face competing priorities and limited resources, which makes it challenging for them to meaningfully contribute to the management programme.

Madagascar ragwort is categorised as a ‘Sustained Control’ species under the Northland Regional Pest and Marine Pathways Plan

The regulatory framework for managing Madagascar ragwort is provided by the Biosecurity Act. This framework allows for a bespoke management programme to be applied to a pest based on its characteristics and priority level.²¹

Responsibility for leading the Madagascar ragwort management programme currently sits at the regional level, with NRC assigning Madagascar ragwort ‘sustained control’ programme management status. Current management measures have included the good neighbour rule, raising awareness, and commissioning research.²² It is not yet being managed in neighbouring at-risk regions.²³

²¹ The different programme statuses include exclusion, eradication, progressive containment and sustained control.

²² NRC also has a rule that land occupiers within Northland must destroy all Madagascar ragwort in the operational areas of a quarry.

²³ Neighbouring councils in Bay of Plenty, Auckland, Waikato and Manawatu Whanganui do not have management programmes or rules relating to Madagascar ragwort.

Expanding the programme would enable more effective management by leveraging a broader set of tools, including enhanced education and information campaigns, targeted research, improved surveillance, and more robust regulatory measures.

Achieving this scale requires increased coordinated action and resource allocation among all stakeholders, including industry groups, iwi/hapū, central and local government, and the wider farming community. By sharing responsibility and resources, the management programme can be strengthened to provide for stronger control.

This would also result in the management burden being more fairly shared by those who benefit from efforts to slow the spread.

The rationale behind an increased role of government

There is a case for government to consider intervention in the management of this invasive weed because of market failure to address cross-boundary contagion risks.

Only coordinated public action can overcome misaligned incentives, enforce landscape-scale prevention strategies, and protect long-term public interests. The role for government (both central and local) relies on policy and regulatory interventions, sustained funding for cost-effective prevention over expensive reactive control, and coordination across regions.

This is discussed further in the 'Delivering the preferred management programme' section below.

Inconsistent levels of information and awareness across landowners make it challenging to mobilise action at a regional and cross-regional scale

While efforts to educate landowners across the region have intensified, there remains inconsistencies across Northland and in other regions around the information and awareness landowners have around Madagascar ragwort, its impacts, and how to manage it.

This applies both to impacted landowners and at-risk landowners who are not aware of the existence of the pest and how to detect and control it. This lack of awareness ultimately contributes to a lack of action at the scale required or at the earlier point in the infestation curve where prevention measures can be much more cost effective (as opposed to later on where the costs of dealing with established infestations are disproportionately higher).

There are several measures landowners can adopt to reduce the risk of spread onto, from, and around their land:

- **Pathways management.** This involves ensuring equipment is cleaned before movement and managing movement of stock and hay. Contractors are a key risk of this as they move between sites, including across regions with a joint responsibility with landowners. There is a particular risk that farmers purchase hay or stock from an infested area. This risk increases during drought where hay movements increase.
- **Vigilance and surveillance.** This is key to enable elimination before the infestation becomes out of control. The similarity of Madagascar ragwort to other wide-spread daisy species makes identification extremely difficult.
- **Maintaining pasture quality.** Madagascar ragwort thrives in disturbed soils, with the exposed soil allowing the seed to germinate. This means managing stocking rates and use of competitive pasture species can reduce risk of germination. This becomes difficult during drought or on low fertility soils.

This underscores a strong need to educate farmers in Northland and other regions at the top of the North Island about the threat of Madagascar ragwort and the measures available to prevent its spread. Achieving this will require a coordinated national campaign to ensure it has significant profile, consistent messaging and broad reach.

Imperative for action: There is a closing window for action to minimise the impacts on farming and slow the spread of Madagascar ragwort in Northland and the top of the North Island

Overview of the imperative for action

There are several drivers for action:

- There is a closing window of opportunity to avoid exponential spread to other parts of the country, with neighbouring agricultural regions at particular risk.
- Prevention is much more effective, easier, and cheaper than attempting eradication once it has established.
- Better managing the spread would alleviate impacts on farming and the economy.
- There is a strong stakeholder drive for action reflecting shared interest in managing the spread.
- There is an opportunity to strengthen the management programme to avoid and minimise the impacts of Madagascar ragwort.

There is a closing window of opportunity to avoid exponential spread to other parts of the country, with a need to address the particular risk to neighbouring agricultural regions

Madagascar ragwort remains largely contained to the top half of Northland, and there is a window of opportunity to slow its spread before it establishes itself further south or in other regions.

This window is rapidly closing. As infestations become more widely spread and dense, the seed load increases. This increases the risk of spread by both human-mediated and natural (e.g. wind) pathways, creating an exponential effect. This is illustrated by the exponential spread curve under a scenario with a high rate of human mediated dispersal as depicted in preliminary modelling (discussed below).

There is a particular need to reduce the risk of inter-regional spread. As addressed in the context section above, Madagascar ragwort can grow in climates across New Zealand down to the South Island. This makes it imperative to manage the highest risk vectors of spread between regions, namely the movement of hay, cattle and equipment.

Agricultural regions in the North Island are most at risk, but the potential for spread as far as the South Island remains. This is illustrated in the map of NAIT movements in Figure 6 that shows a high number of cattle movements across the North and South Islands, with the Waikato being a particular hotspot.

Should Madagascar ragwort establish in the expansive pastures of the Waikato or Manawatū-Whanganui, or closer proximity farms in Auckland, slowing the spread will become significantly more challenging. It will also become more harmful to national economic interests given the high reliance on farming in the Waikato and Manawatū-Whanganui.

These regions are most at risk given their immediate proximity to the existing infestation, favourable climates, large portions of land in pasture, and likelihood of receiving infested equipment, stock, or hay. There is a total of 3.7 million hectares of agricultural land that could be vulnerable to further spread, across Waikato, Manawatū-Whanganui, Northland, BOP, and Auckland.²⁴

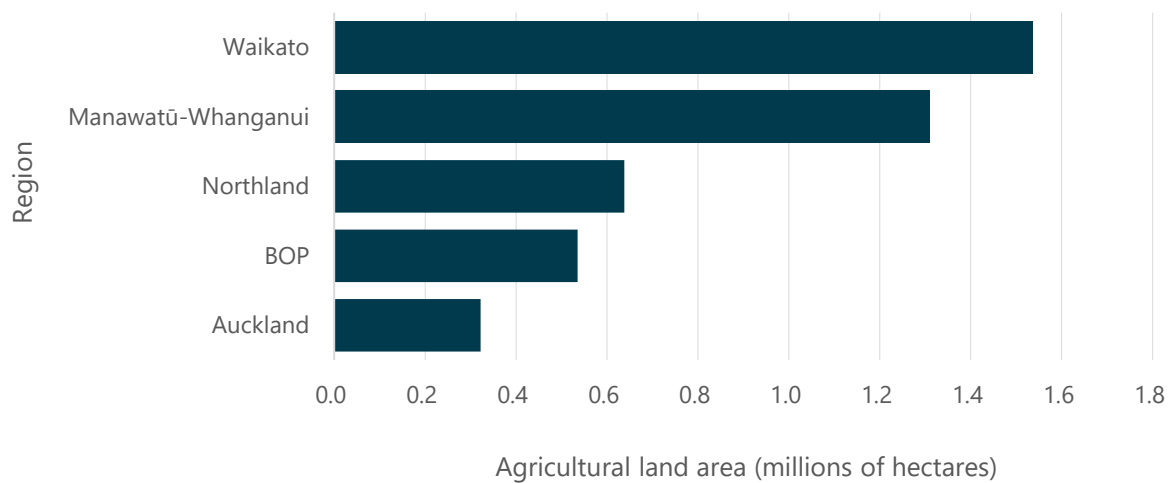
Cattle numbers within Northland and neighbouring regions:²⁵

2,768,456 dairy cattle

1,695,898 beef cattle

²⁴ Figure.NZ. 2022. [Total agricultural land area in New Zealand - Figure.NZ](#)

²⁵ Figures are for cattle in Northland, Bay of Plenty, Auckland Waikato and Manawatū-Whanganui in 2022. StatsNZ. [Livestock numbers: Data to 2023 | Stats NZ](#)

Figure 8: Agricultural land area by region in upper North Island

Source: Figure.NZ. 2022. Total agricultural land area in New Zealand. [Total agricultural land area in New Zealand - Figure.NZ](#)

Initial modelling shows that Madagascar ragwort could infest significant portions of Northland, Waikato, and Auckland by 2050 through human mediated dispersal

Landcare research has developed a preliminary model to chart the potential spread of Madagascar ragwort, estimating spread against two scenarios.

Modelling shows that while initial spread has been slow, without management, the anticipated spread could be exponential (consistent with the typical pest invasion curve). As seed banks increase, so does the likelihood of spread by wind and longer distance jumps through human mediated pathways (e.g. transfer of machinery and equipment, cattle and hay). The high seed count means even light infestations can result in around 1 million seeds per hectare.²⁶

The high spread scenarios illustrate the significant coverage that Madagascar ragwort could achieve by 2050. Under the high spread scenario, Northland experiences higher infestation rates until 2025, after which Auckland experiences a greater proportion of infested regional land. These results appear driven by the closer proximity of farms in Auckland and the fact Auckland continues to receive invasions from the Northland region in addition to within region spread.

This modelling is only preliminary and indicative with several key assumptions and limitations, including the assumption of zero mitigation activities. Further model refinement would support more accurate estimates, particularly to validate against current known sites of infestation, known human mediated pathways and how often hay, cattle and equipment is moved between regions.

²⁶ Queensland Government. 2025. Fireweed. [Fireweed](#)

Table 5: Initial estimates of the proportion of infested area by year, region and spread scenario

Time horizon	Region	Area infested – Low spread	Area infested – High spread
Ten years from now: 2035	Auckland	0.12%	55.93%
	Northland	15.72%	22.51%
	Waikato	0.05%	16.25%
Thirty years from now: 2055	Auckland	3.92%	81.67%
	Northland	34.00%	75.19%
	Waikato	5.26%	29.20%

Source: Landcare research

Prevention is much more effective, easier and cheaper than attempting control once it has established

The exponential nature of spread emphasises the importance of acting now. The initial management costs while the pest is contained to one region are small compared to the much larger costs of attempting to treat and manage the pest if it spreads more widely within Northland and/or establishes itself in other regions.

Acting now will also ensure a management programme has time to be established with immediate support available for landowners. Research can also be commissioned with a view to actionable outcomes before we reach a pest invasion 'tipping point'. A co-ordinated programme of early interventions will also ensure a sufficient lead time to enable behaviour change among landowners.

International examples emphasise the importance of preventing the spread through multiple interventions

Madagascar ragwort has infested parts of Australia and Hawaii. While these countries have different climates and contexts, they show the high potential for spread and the need to tailor management ambition to the degree of spread. These examples also show that a multi-intervention approach is needed, including a focus on preventing spread to at risk areas.

- **Australia** – Madagascar ragwort is widespread in New South Wales and Queensland. It is managed through an integrated approach using herbicides, pasture management, mixed grazing (sheep/goats), extension service, and ongoing biocontrol research.²⁷ Where Madagascar ragwort has reached the limit of its range, the aim is to reduce impact and density via best practice weed management. In areas which have the potential for ragwort, the aim is to raise awareness, support early surveillance, and increase identification skills and support.
- **Hawaii** – Complete eradication is considered impossible on Hawaii due to its widespread presence on the islands of Maui, Lanai, and Hawaii, and a few localised detections have been treated on O’ahu.²⁸ In 2013, it was estimated to have taken over more than 850,000 acres of pastureland.²⁹ Localised eradication is possible in small sites. Management involves physical removal (hand-pulling), chemical and biological control (using the fireweed moth), and strict monitoring of new infestations.

Better managing the spread would alleviate significant impacts on farming and the economy

MartinJenkins undertook an economic impact assessment of the potential costs of allowing Madagascar ragwort to spread without intervention. This assessment, appended to this paper, estimates the direct, indirect, and induced impacts resulting from the spread of Madagascar ragwort in Auckland, Northland, and the Waikato.

The assessment found significant economic impacts which increased over time are driven by the loss of production on farm, with flow on consequences for other producers in the supply chain and consumption impacts that would collectively reduce regional GDP and employment outcomes.

Without intervention, the annual GDP losses across Northland, Auckland, and Waikato could reach between \$22 million and \$132 million in 10 years (2035), escalating to between \$73 million and \$276 million in 30 years (2055). The impacts on GDP are illustrated in Figures 9 and 10 below. Production losses in 10 years could be between \$47 million and \$270 million with an associated fall in employment of between 222 and 1,204 jobs.

²⁷ Australian Weeds Committee (2012) *Weeds of National Significance Fireweed (Senecio madagascariensis) Strategic Plan*. Australian Weeds Committee, Canberra.

²⁸ Hawaii Government. 2025. Invasive Species Profiles. [Hawaii Invasive Species Council | Fireweed](#)

²⁹ Hawaii Government. 2013. [Department of Agriculture & Biosecurity | Biocontrol Moths Released on Maui to Fight Invasive Fireweed](#)

Notably, under a high spread scenario, the Waikato begins to experience disproportionately higher impacts due to its higher concentration of dairy farms. These impacts are illustrative of the scale of impacts for other regions that have a greater reliance on primary industry production such as the Manawatū-Whanganui which have not been included in the analysis.

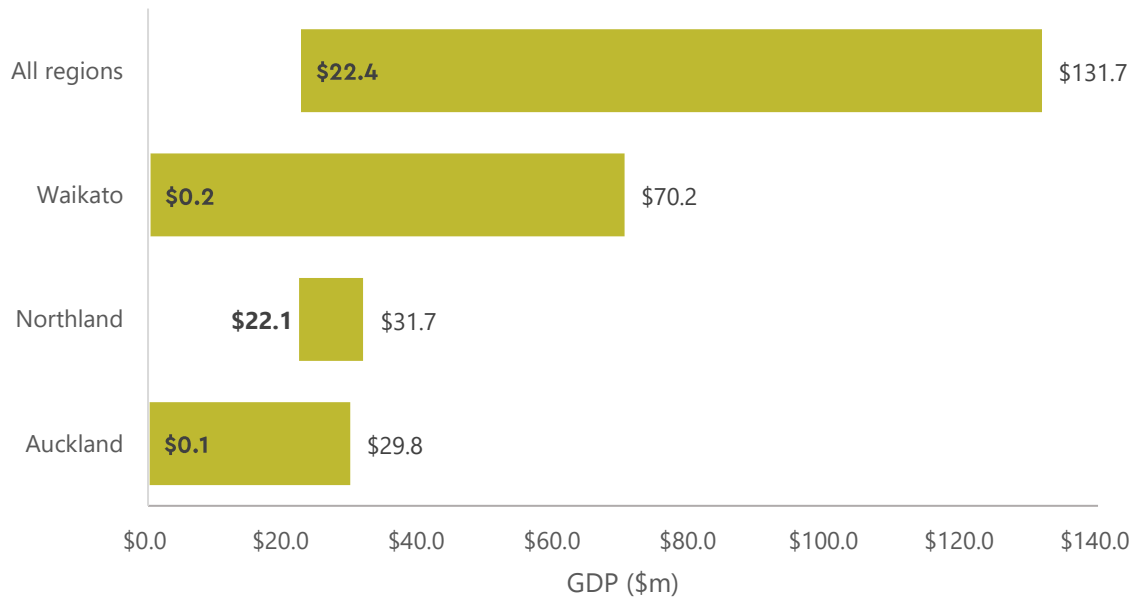
While these results are indicative and based on preliminary spread modelling, they demonstrate the order of magnitude of the economic impacts we could potentially be facing. In particular, the analysis reinforces the devastating harm that could occur from inter-regional spread, should this eventuate within the next decade. Given the increasing rate of spread we are witnessing in Northland, there are strong reasons not to underestimate the threat that Madagascar ragwort poses not just to Northland but to neighbouring regions.

Table 6: Losses in output, GDP and FTE due to spread of Madagascar ragwort in Northland, Auckland and Waikato

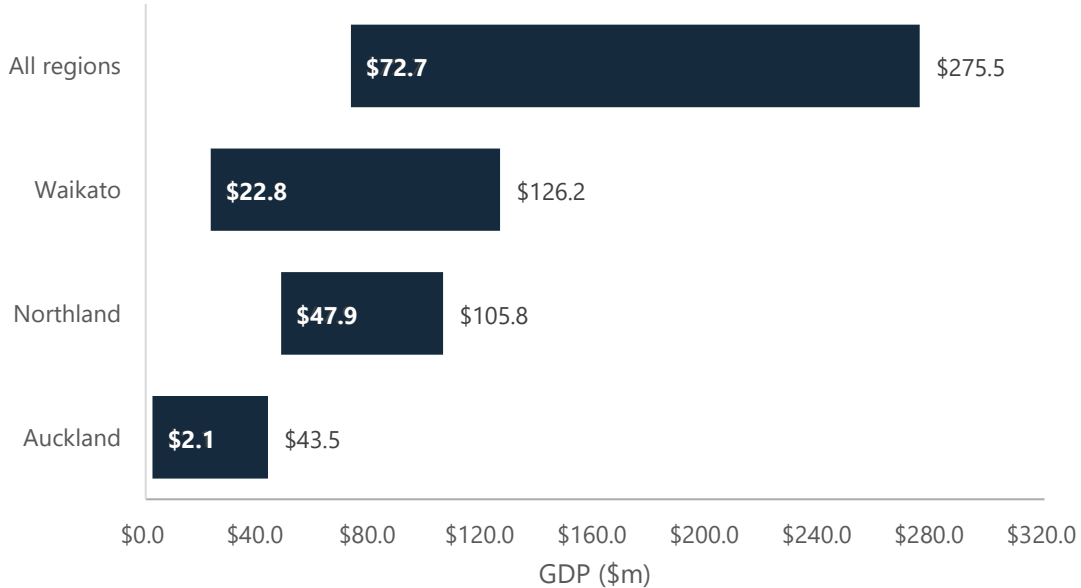
	2035		2055	
	Low spread	High spread	Low spread	High spread
Total output losses (\$m)	\$46.73	\$269.88	\$150.14	\$566.09
Total GDP losses (\$m)	\$22.41	\$131.72	\$72.70	\$275.54
Total employment losses (FTE)	222	1,204	689	2,550

Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

Note: These represent one-off nominal impacts in 2035 using static multipliers and revenue assumptions assuming no structural change or productive growth in the economy

Figure 9: Low and high GDP impacts in 2035 by region and total study area

Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

Figure 10: Low and high GDP impacts in 2055 by region and total study area

Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

These results are consistent with economic analysis undertaken on the avoided economic costs of better biosecurity management such as the examples outlined below.

Examples of the economic benefits of improved treatments

- An economic analysis of Chilean needle grass, which has similar characteristics, showed that the national benefits of preventing Chilean needle grass spread justified annual expenditures of between **NZ \$5.3 million and NZ \$34 million** depending on the rate of spread.³⁰
- Economic analysis of biocontrol for common ragwort highlights the large potential economic implications of discovering optimal treatment approaches.³¹ In that case, the premature rejection of an effective biocontrol agent in 1933 cost the dairy industry **\$8.6 billion** (NPV) from 1945 to 1999. The introduction of a biocontrol beetle in 1983 saved \$64 million of expenditure across New Zealand dairy farms in 2015.

Reduced taxation revenue for the government

Reduced activity in the sheep, beef, and dairy farming sectors would translate to lower taxation revenue for government if Madagascar ragwort spreads without adequate control. Lower business output means less taxable income, while job losses and lower wages reduce personal income tax contributions. Declines in indirect and induced spending further reduce GST collection. Together, these effects represent a material fiscal impact, highlighting the wider consequences of Madagascar ragwort beyond farm-level profitability.

Table 7 summarises the indicative tax losses that could occur if Madagascar ragwort spreads unmanaged by 2035 and 2055 under the low- and high-spread scenarios. The estimates show tax losses ranging from \$11.1 million to \$134 million. Across all scenarios, most tax losses (around 75%) result from reductions in taxable business income. GST losses account for about 18%, and personal income tax losses about 6%.

³⁰ Analysis shows the breakeven cost is NZ\$ 5.3 million and NZ\$ 34 million depending on the rate of spread. The breakeven cost is the point at which the benefits equal the costs. Bourdôt GW, Buddenhagen CE (2023) The cost of doing nothing about a sleeper weed—*Nassella neesiana* in New Zealand. PLoS ONE 18(12): e0295574. <https://doi.org/10.1371/journal.pone.0295574> The cost of doing nothing about a sleeper weed—*Nassella neesiana* in New Zealand | PLOS One

³¹ Fowler, S., Gourlay, A., & Hill, R. (2016). Biological control of ragwort in the New Zealand dairy sector: an ex-post economic analysis. *New Zealand Journal of Agricultural Research*, 59(3), 205–215. <https://doi.org/10.1080/00288233.2016.1170050> <https://www.tandfonline.com/doi/full/10.1080/00288233.2016.1170050#d1e853>

Table 7: Total tax losses by year and spread scenario

Year and spread scenario	Reductions in taxable business income	Income tax loss	GST loss	Total tax losses
2035-low spread	\$8.38	\$0.63	\$2.1	\$11.1
2035-high spread	\$47.98	\$3.72	\$12.1	\$63.8
2055-low spread	\$26.80	\$2.05	\$6.7	\$35.5
2055-high spread	\$100.78	\$7.78	\$25.3	\$133.9

Source: MartinJenkins estimates using land use, revenue, spread modelling and regional multiplier inputs from various sources

Notes

- 1 Reductions in taxable business income are estimated as the loss in direct output under that scenario multiplied by the 28% business tax rate. Full pass through of the loss of output on taxable business income is assumed.
- 2 Income tax losses are estimated by taking the number of indirect and induced jobs lost, multiplying by the median annual agricultural earnings (\$63,960),³² then applying a 20.8% tax rate.³³
- 3 GST losses are calculated at 15%.
- 4 All estimates assume no changes to policy or tax over time.

There is strong local ambition, but current efforts to manage Madagascar ragwort are limited in scale

The significant harm Madagascar ragwort can cause means there are a wide range of stakeholders who have an interest in managing its spread. The concern and desire for action is shared by impacted farmers (including Pāmu Farms), DairyNZ, Beef+Lamb, regional councils, scientists, MPI, iwi advisors, and agrichemical advisors. This was highlighted through recent workshops and engagements with stakeholders.³⁴

Since DNA identification in 2022, efforts to manage the invasive pest have been building momentum, as awareness grows and the spread increases. Stakeholders have seen and experienced the devastating impacts and can see a closing window of opportunity to prevent further spread.

³² LEED Median earning for the agricultural sector, 2024 Q3.

³³ [OECD Taxing Wages 2025: New Zealand](#)

³⁴ This report was informed by workshops and discussions with the following stakeholders (but does not necessarily reflect the particular views of each of these stakeholders): Landowners from impacted areas, NRC, Landcorp, Dairy NZ, Beef and Lamb, MPI, Horizons Regional Council, BOP Regional Council, Waikato Regional Council, Auckland Regional Council, Landcare, Farmlands and NuFarm.

Efforts to date have involved:

- **Impacted farmers undertaking treatments to stem the spread and pushing for greater co-ordination.** Affected farmers have been actively attempting to control Madagascar ragwort on their land, while seeking support from NRC, industry bodies and government to ensure their efforts are not wasted due to inaction in other parts of the region. This includes Ian Sizer's petition to Parliament, Pāmu's hosting of the Minister, and other impacted farmers raising concerns with industry groups, media, and government.
- **NRC progressing management and co-ordination with stakeholders.** The Minister for Biosecurity has clarified that while lead responsibility sits with NRC, it would require a collective effort with industry. NRC has progressed a range of initiatives including targeted regulation, working with landowners, industry and government, sharing information, and commissioning research. The success of any response will depend not just on the efforts of NRC but other partners in the region.
- **The Primary Production Select Committee hearing presentations from landowners and NRC with members across political parties acknowledging the scale of the risk.** Ian Sizer presented a petition in 2025 outlining the severe threat to New Zealand's pastures and livestock and urging government to address the invasion of Madagascar ragwort. This was followed by presentations from Pāmu and NRC. Committee members across the political spectrum expressed significant concern and were aligned on the need for further action.

Table 8: Timeline of activities

Date	Milestone
2022	Identification through DNA testing, along with growing awareness and appreciation of impacts by landowners battling with ragwort.
2023	Biocontrol feasibility study published (commissioned by NRC).
2025	Review of current control methodologies and control trial design published (commissioned by NRC).
2025	Northland Regional Pest and Marine Pathway Management Plan amended to substitute Madagascar ragwort for gravel groundsel, applying rules and formal management status to Madagascar ragwort.
2025	Minister Hoggard visit to infestation on Rangiputa Farm
2025	Ian Sizer's Petition to Primary Production Select Committee.
2025	MOU signed between NRC, Pāmu Farms, Beef+Lamb, and Dairy NZ to identify economic impacts and confirm a position (outlined in this paper).

Figure 11: Stakeholder workshop at Northland Regional Council on 21 November 2025



There is an opportunity to strengthen the management programme to minimise the impacts of Madagascar ragwort

The key outcome sought is addressing the spread and minimising the impacts of this pest on farming and New Zealand more broadly.

There is an opportunity to make progress toward this outcome by strengthening the management programme for Madagascar ragwort. This would involve scaling information and advocacy, research, monitoring and surveillance, and continued targeted use of regulation. Delivering a scaled programme can be achieved by greater collaboration and coordination of key stakeholders, and greater resourcing commitments.

Any future management programme needs to respond to the root causes of the problem and reflect the ambition of stakeholders.

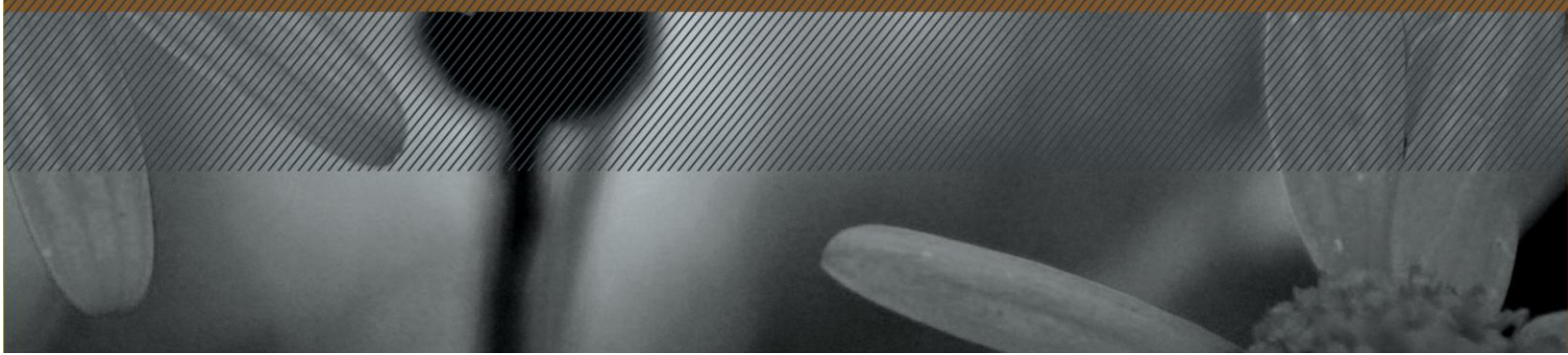
Programme objectives

Partners have agreed to the following objectives to underpin any management programme:

- Improving the management of existing infestations and slowing further spread of Madagascar ragwort, particularly by reducing risks of long-distance dispersal events.
- Improving the capability of the biosecurity system to manage Madagascar ragwort through clear leadership, greater awareness, amplified and consistent information, and improved understanding of spread, detection, and treatment.
- Providing value for money by being proportionate to the potential harm and economic costs, and making optimal use of scarce financial and human resources.
- Encouraging collective and co-ordinated action, with the management burden being shared fairly among landowners, farmers, industry bodies, iwi/hapū, and local and central government (recognising the shared interests in reducing the impacts of Madagascar ragwort).

SECTION TWO

The management programme options



The management programme options

This section explains the approach to developing options, the key questions considered and the options themselves.

Overview of the management programme options

We developed the following options:

- **Option 1:** Limited intervention.
- **Option 2:** Increase information and advocacy and invest in research incrementally.
- **Option 3:** Building greater knowledge and awareness and investing in research to empower landowners.
- **Option 4:** Strengthened regulation on reporting and control, with greater landowner support and research investment to enable compliance.
- **Option 5:** Strengthened regulation and enforcement including pathways management.

We have developed 5 options for managing Madagascar ragwort

Each of these options has different levels of ambition and strategy which translates to varying features and costs. Lower ambition means the programme is smaller scale with light touch and ad hoc interventions. Higher ambition means the programme is larger scale with stronger interventions.

Considering these options allows us to analyse the approach that best reflects stakeholder ambitions, responds to the problem, and achieves the objectives.

In developing the options, we considered the following focus questions:

- What programme management strategy would achieve the desired level of ambition?
- How can landowners be empowered through information, awareness, and education?
- How can research support our scientific understanding and overall management programme?
- What rules and regulatory approach is needed to mandate behaviours if this is required?
- What monitoring and surveillance is needed to understand spread?
- How can stakeholders work together to deliver the management programme?

We undertook the following two workshops with stakeholders, with the themes from those workshops and how these have informed the options described in Table 9 below.

- 21 November – to understand the key challenges and opportunities, choices available to partners in developing a management programme, priority actions for a management programme, and likely roles and responsibilities. Attendees included representatives from regional councils (NRC, Waikato, Auckland, Bay of Plenty, and Horizons), Beef and Lamb, Dairy NZ, Pāmu, Farmlands, NuFarm, Landcare, and AgResearch.
- 26 November – workshop with a selection of landowners in the region to understand implications of the key choices and potential options for a management programme.

These workshops focused on identifying views and preferences on the preferred management programme by analysing the key choices. The options and the preferred option were strongly informed by these discussions.

Table 9: Key choices, themes from stakeholder workshops and how these inform the options

Key choices	Themes from stakeholder workshop	How this informs the options
What programme management strategy would achieve the desired level of ambition?	• Strong ambition to improve current programme based on the problem, danger of further spread, and opportunity to act before it accelerates further and spreads inter-regionally. • Need to achieve best value for money within constrained budgets and competing priorities. • Need to focus on building landowner awareness and capability rather than punitive regulation. Need to maintain landowner goodwill.	Options 1–3 are focused on what could be done without strong regulation. All options (other than limited intervention) increase the scale of the programme. The options set shows what could achieve best value for money under varying levels of resourcing commitments.
How can landowners be empowered through information, awareness, and education?	• There is low awareness that needs to be addressed as soon as possible. • Messaging needs to come from those that farmers will listen to and leverage existing connections into the community. • Messaging needs to be clear and consistent with detailed information on management.	All options focus on information, awareness and education with coordination to amplify messages through farmer networks. Increasing scale of investment under each option.
How can research support our scientific understanding and overall management programme?	• Strong need for greater scientific understanding. • Biocontrol is vital but needs to be done in stages to ensure it is feasible. • Priorities need to be around refining existing control methodologies, reliable detection and mapping current spread. • Mixed views on the research priorities.	All options feature a degree of research investment, with increasing scale of investment under each option.

Key choices	Themes from stakeholder workshop	How this informs the options
What rules and regulatory approach is needed to mandate behaviours if this is required?	• Need to avoid punitive and complex regulations that may incur high levels of non-compliance and will lose goodwill with industry. • Too early to introduce regulation when farmers have not been given a chance to comply. • Some views that pathways management rules are needed to prevent inter-regional spread, with others highlighting the high costs and business impacts. • Complexity of pathways enforcement would require significant resource to develop and police regulation effectively	Stronger regulation is only introduced in options 4 and 5 which show graduated levels of regulation.
What monitoring and surveillance is needed to understand spread?	• Need to find a more reliable way of confirming identification. • Need to maintain goodwill to ensure voluntary declarations of spread for mapping. • Need to check for cross-regional spread.	Options 3 to 5 include a need for neighbouring councils to consider exclusion status meaning some surveillance activity is done.
How can stakeholders work together to deliver the management programme?	• Shared interests across stakeholders in the shared benefit of slowing spread, particularly government and the beef and dairy sectors. • Desire to work together and share burden. • Need for all stakeholders to leverage respective strengths, including farmer networks, practical knowledge, and scientific knowledge. • Need for clear leadership.	All options envisage a degree of collaboration and coordination, with this becoming more deliberate and important from options 1 to 5. All options include a role for government and the beef and dairy sectors.

We have focused on assessing sustained control or progressive containment programmes for Northland

Biosecurity management frameworks provide for a spectrum of desired outcomes, ranging from reducing the impact of pests, to containing their spread, to complete removal and prevention. These are defined further below.

Types of biosecurity management programmes

- **Exclusion:** to prevent the establishment of a pest that is present in Aotearoa New Zealand but not yet established in an area.
- **Eradication:** to reduce the infestation level of a pest to zero levels in an area in the short to medium term. Eradication plants are present in low numbers or have a limited distribution, and eradicating them appears to be feasible and cost-effective. These pests all have the potential to establish widely in the region.
- **Progressive containment:** to contain or reduce the geographic distribution of the subject, or an organism being spread by the subject, to an area over time. Progressive containment plants are present in the region at numbers or distributions that mean eradication is not possible in the short term, but populations can be contained or reduced over time.
- **Sustained control:** to provide for ongoing control of a pest, to reduce its impacts on values and spread to other properties.
- **Site-led:** to protect specific high-value sites (for example, key native ecosystems) from a pest, rather than managing the pest across the entire region.

Management strategies typically focus on prevention and incorporate mechanisms to support early detection and rapid response to new outbreaks. They also emphasise the need to combine regulatory interventions with sustained public education and enforcement.

Given Madagascar ragwort infestations are well-established in the top of Northland, both exclusion and eradication programmes are not judged to be feasible in Northland at this stage. Progressive containment in Northland would require significant investment and cost given the extent of current spread, wind dispersed nature, and costs of enforcement. Importantly, exclusion and localised eradication is still feasible in other regions where Madagascar ragwort has not yet established itself and therefore any incursions can be dealt with early and decisively.

Description of the options

The five options are described below. Each of these represent a point along a sliding scale of ambition from sustained control through to progressive containment.

Option 1: Limited intervention

Option features	
Ambition	Sustained control. Raise awareness among farmers on the need to control infestations and manage spread from neighbouring properties.
Strategy	Use current approaches to sharing information and regulation (good neighbour rule) to support occupiers with site-based management.
Regulation and enforcement	Good neighbour boundary rule (50m) – complaint activated (currently proposing moving to 100m in Plan changes).
Monitoring and surveillance	Response based surveillance in Northland.
Advocacy and education	Retain NRC information webpage and rely on networks to share information.
Research	Commissioned on an ad hoc basis.
Coordination and collaboration	Managed individually by stakeholders with informal use of relationships.
Additional costs	\$0.239 million over the next four years.

Option 2: Increase information and advocacy and invest in research incrementally

Option features	
Ambition	Sustained control. Raise awareness among farmers on the need to control infestations and manage spread from neighbouring properties.
Strategy	Increase effort on raising awareness through greater use of information sharing and education, supported by ad hoc research to improve scientific understanding.
Regulation and enforcement	Retain good neighbour rule (with proposed shift to 100m in plan changes).
Monitoring and surveillance	Response based surveillance in Northland.
Advocacy and education	Increased focus on raising awareness by leveraging stakeholder networks (MPI, industry bodies, iwi/hapū). Provide light-touch education and advice on how to manage the pest and reduce risk of spread.
Research	Commissioned on an ad hoc basis by individual parties through existing budgets.
Coordination and collaboration	Managed individually by stakeholders with informal working relationships between stakeholders for some collaboration and coordination on messaging.
Additional costs	\$2.712 million over the next four years.

Option 3: Building greater knowledge and awareness and investing in research to empower landowners

Option features	
Ambition	Greater sustained control. Empower farmers and other landowners to manage the pest and reduce risk of spread in the immediate term.
Strategy	Focus on advocacy and education as the primary lever for enabling behaviour change. Attempt to slow the spread while improving the quality of information on the pest, where it has spread, its biology, and investigating the potential for biocontrol, with the intention of revisiting the overall approach in 3 years. Deliver through greater more structured co-ordination across local government, industry, iwi/hapū, and government.
Regulation and enforcement	Retain good neighbour rule. Introduce a requirement for landowners to notify Northland Regional Council where Madagascar ragwort has established itself to build the understanding of where it has spread (no requirement to control). Support neighbouring councils to consider applying management status to the pest in their RPMPs.
Monitoring and surveillance	Increase in monitoring and surveillance resulting from greater support for landowners and the requirement to notify. Establishment of a national pest portal that could include information for landowners, and could have a reporting mechanism for potential locations and mapping of current spread (to be confirmed by scientific verification).
Advocacy and education	Undertake a structured and proactive approach to supporting landowners, farmers, contractors, and suppliers through provision of advice, information, and targeted technical support. This includes on the ground/in person advocacy with a particular focus on pathways management for contractors and fodder producers and other suppliers that may be key potential vectors for spread. This would include delivering the latest evidence and insight from other landowners' experience, research, and scientific study. This would also be supported and delivered through partners, including industry bodies, iwi/hapū, MPI, neighbouring councils, and the farming sector.
Research	Stakeholders identify and agree on research priorities with co-funding to enable this. MPI provides support for commissioning and managing research on behalf of local government and industry groups given the wider public benefit including outside of Northland.
Coordination and collaboration	Establish MOU and/or joint governance and working arrangements for collaboration and coordination of key messages, management approach, and frontline activities.
Additional costs	\$10.377 million over the next four years.

Option 4: Strengthened regulation on reporting and control, with greater landowner support and research investment to enable compliance

Option features	
Ambition	Progressive containment. Stronger regulatory approach backed by a well-resourced enforcement effort, proactive education, and support for landowners to comply and a funding boost to accelerate research.
Strategy	Combine strong capability building and advocacy with strengthened regulation to incentivise and support all land occupiers who are taking action to address the spread.
Regulation and enforcement	The option would strengthen regulation by exploring a: - Requirement to report and manage infestations in Northland in low incidence zones (applying thresholds based on the size of infestations for where the rule applies), with good neighbour boundary rule implemented in other zones. - Requirement on occupiers and feed suppliers to disclose infestations to purchasers of feed produced in infested areas. This scale of effort would need to be supported by neighbouring councils applying exclusion status and resourcing monitoring and control efforts, meaning any inter-regional spread would be addressed through immediate treatment and removal.
Monitoring and surveillance	Programme of targeted monitoring and surveillance based on regulatory reporting in Northland and in neighbouring regions (assuming exclusion status is applied).
Advocacy and education	Establish a programme approach to supporting landowners, farmers, contractors, and suppliers through provision of advice, information, and targeted technical support. This would work in tandem with regulatory requirements and incentives by providing the information, advice, access to tools, and technical knowledge for landowners to ensure compliance. It would work in the same way as it would in option 3 but with greater investment in resources and systems to be delivered at a large scale and frequency.
Research	Increase scale of research through a contestable fund, co-funded by council, industry, and MPI. Research is administered by subject matter experts with secretariat support from MPI, based on research priorities agreed by partners.
Coordination and collaboration	Establish an inter-regional management vehicle with representation from industry bodies and iwi/hapū to ensure the programme can be delivered with the scale and reach required for success. Focus on ensuring a shared direction with parties working interchangeably, sharing resources, and co-funding aspects of the programme.
Additional costs	\$17.279 million over the next four years.

Option 5: Strengthened regulation and enforcement including pathways management

Option features	
Ambition	Progressive containment. Same as option 4 but including the introduction of a regulatory pathways management approach to manage high risk vectors of spread, primarily the movement of contractors, hay, equipment, and cattle.
Strategy	Same as 4 but with a wider scope and associated education and enforcement effort given the introduction of pathways management regulation.
Regulation and enforcement	Same as option 4 but further strengthen regulatory approach by introducing pathways management rules to manage spread risk by focusing on the highest spread risk vectors. This scale of effort would need to be supported by neighbouring councils applying exclusion status and resourcing monitoring and control efforts, meaning any inter-regional spread would be addressed through immediate treatment and removal.
Monitoring and surveillance	Programme of targeted monitoring and surveillance based on regulatory reporting in Northland and based on boundary control in neighbouring regions (assuming exclusion status is applied).
Advocacy and education	Same as option 4.
Research	Same as option 4.
Coordination and collaboration	Same as option 4.
Additional costs	\$25.230 million over the next four years.

Assessing the options

This section explains how we assessed the options and how we landed on the preferred option.

Overview of options assessment

We assessed the options against the objectives, considering the problem and context.

Option 3: Building greater knowledge and awareness and investing in research to empower landowners is the preferred approach. This option seeks to meaningfully improve management of Madagascar ragwort by building greater knowledge and awareness and investing in research to empower landowners. This approach also best reflects the general stakeholder views expressed in the workshops, especially the preference to focus the balance of effort on building capability and buy-in rather than using punitive and potentially costly regulation at this stage.

Assessment framework

We assessed the options on how well they achieved the objectives. The assessment was informed by the context, problem definition and applied experience and judgment of stakeholders.

Assessment criteria

Objectives		Criteria used for assessment
Objective 1	Improving the management of existing infestations and slowing further spread of Madagascar ragwort, particularly by reducing risks of long-distance dispersal events.	- Does the programme encourage landowners and occupiers to deal with established infestations and/or the threat of incursions? - Does the programme address mixed incentives across different land use types? - Does the programme support partners to deal with the highest risk vectors of spread?
Objective 2	Improving the capability of the biosecurity system to manage Madagascar ragwort through clear leadership, greater awareness, amplified and consistent information, and improved understanding of spread, detection, and treatment.	- Does the programme improve scientific understanding? - Does the programme ensure landowners and occupiers have the information and knowledge to manage and prevent infestations?
Objective 3	Providing value for money by being proportionate to the potential harm and economic costs, and making optimal use of scarce financial and human resources.	Does the programme investment achieve best value for money?

		Are the regulatory impacts and programme costs proportionate to the problem?
Objective 4	Encouraging collective and co-ordinated action, with the management burden being shared fairly among landowners, farmers, iwi/hapū, and local and central government (recognising the shared interests in reducing the impacts of Madagascar ragwort).	- Does the programme provide for co-ordination and collaboration on activities and resources? - Is the management burden shared in a way that recognises the beneficiaries and exacerbators? - Does the programme involve a role for government (central and local) and the beef and dairy sector that reflects their respective interests and roles in improved management?

Assessment legend

Assessment	Score
Does not achieve objective	*
Marginally achieves objective	**
Substantively achieves parts of objective	***
Fully achieves and delivers on objective	****

Assessing the options

Limited intervention is not a tenable option

Option 1: Limited intervention		
Objectives	Assessment	Score
Objective 1 Improving the management of existing infestations and slowing further spread.	Existing measures do not have the scale to motivate or empower landowners to manage infestations and further spread. There are currently limits to scientific understanding, and awareness among farmers with an inability to reach or advise them within current approaches.	*
Objective 2 Improving the capability of the biosecurity system to manage Madagascar ragwort.	Capability remains low under this option given the limits on awareness and education. Scientific understanding will not improve without investment in research.	*

Objective 3 Providing value for money by being proportionate to the potential harm.	While costs are minimal, the lack of scale means the programme is not proportionate to the scale of the risk given the potential economic impact. This option achieves poor value for money in the long term as it shifts the burden of costs over time to primarily responding to and controlling large infestations with the likelihood that several landowners would be forced to retire land or shift to other land uses.	*
Objective 4 Encouraging collective and co-ordinated action, with the management burden being shared fairly.	Collaboration is informal and unstructured. There are no mechanisms to ensure equitable burden-sharing among landowners, local government, and other stakeholders. The approach does not foster collective action.	*

Option 2 will support and enable incremental improvements to management efforts

Option 2: Increase information and advocacy and invest in research incrementally		
Objectives	Assessment	Score
Objective 1 Improving the management of existing infestations and slowing further spread.	Targeted investment in education, advocacy, and research will better empower landowners, resulting in incremental improvements in management among those who are motivated to control the impacts of the invasive pest. The lack of wider education and advocacy and lack of collaboration will likely hinder improved management at scale.	**
Objective 2 Improving the capability of the biosecurity system to manage Madagascar ragwort.	Incremental efforts to educate and promote awareness, along with informal collaboration and co-ordination will support some marginal improvements over the status quo. However, without an at-scale and proactive approach this is unlikely to deliver the capability uplift required.	**
Objective 3 Providing value for money by being proportionate to the potential harm.	Investment is modest and incremental and, in the immediate term, likely proportionate to current impacts. While improvements are expected, as the pest continues to spread the absence of stronger incentives and structured collaboration would limit long-term cost-effectiveness.	**
Objective 4 Encouraging collective and co-ordinated action, with the management burden being shared fairly.	Coordination remains informal, relying on stakeholder goodwill and networks. There are no formal mechanisms for equitable burden-sharing, meaning collaboration will be patchy and inconsistent.	*

Option 3 is likely to meaningfully improve management by building greater knowledge and awareness and investing in research to empower landowners

Option 3: Building greater knowledge and awareness and investing in research to empower landowners		
Criteria	Assessment	Score
Objective 1 Improving the management of existing infestations and slowing further spread.	The stronger education, advocacy, and capability-building measures, along with research backed advice is likely to empower landowners to better manage existing infestations and slow further spread through pathways reduction. Greater co-ordination across regions and adoption of exclusion status in RPMPs, if agreed, would also support prevention outcomes.	***
Objective 2 Improving the capability of the biosecurity system to manage Madagascar ragwort.	The focus on empowering landowners, increasing scientific understanding and promoting greater co-ordination and collaboration between NRC, industry partners and, iwi/hapū is likely to improve the capability of the system.	****
Objective 3 Providing value for money by being proportionate to the potential harm.	This option provides excellent value for money as the scale of investment is proportional to the potential economic impact and harm. The use of education and advocacy in the short term provides a lower-cost approach to supporting landowners compared to regulation, which could be revisited if this approach does not deliver the progress needed.	****
Objective 4 Encouraging collective and co-ordinated action, with the management burden being shared fairly.	Coordination and collaboration improves through more formal mechanisms (MOU) and senior representation in shared governance supported by co-ordination of frontline activities. This helps to amplify messaging, leveraging collective resources to increase impact. It also provides roles for government (central and local) and farming industry that reflects their respective interests in improved management.	***

Option 4 requires landowner buy in, greater investment in research, and an uplift in enforcement for disclosure based regulation to be successful

Option 4: Strengthened regulation on reporting and control, with greater landowner support and research investment to enable compliance		
Criteria	Assessment	Score
Objective 1 Improving the management of existing infestations and slowing further spread.	Strengthening regulation without buy-in is unlikely to be effective, particularly given the potentially high compliance burden and business impacts. The provision of greater support will help to alleviate the concern from landowners but there could still be high levels of non-compliance as a result.	***
Objective 2 Improving the capability of the biosecurity system to manage Madagascar ragwort.	The dual approach of regulating and supporting landowners, combined with greater co-ordination and collaboration, and a funding boost to accelerate research funding should support a stronger system.	****

Objective 3 Providing value for money by being proportionate to the potential harm.	Strengthened regulation imposes high costs of compliance and control for landowners and higher enforcement costs for the regulator. These costs are somewhat proportionate to the potential impacts but are likely to be prohibitive for many small to medium scale landowners. In the long-term a strong regulatory response implemented at this point in time could lead to loss of business and trust and is unlikely to provide a strong value for money proposition.	**
Objective 4 Encouraging collective and co-ordinated action, with the management burden being shared fairly.	The option establishes formal governance mechanisms and co-funding arrangements, leveraging stakeholder resources to more evenly share the costs of the management response. It also provides roles for government (central and local) and farming industry that reflects their strengths and respective interests in improved management.	****

Option 5 is unlikely to have public support or represent a proportionate response and will require a significant uplift in funding and resourcing

Option 5: Strengthened regulation and enforcement including pathways management		
Criteria	Assessment	Score
Objective 1 Improving the management of existing infestations and slowing further spread.	This option, if implemented effectively, is the most likely to minimise spread through the combination of pest-based and pathways-based regulation. The addition of pathways rules provides the best chance of avoiding long distance dispersal events.	****
Objective 2 Improving the capability of the biosecurity system to manage Madagascar ragwort.	The increased scale of the programme will improve system capability, along with additional regulatory levers to address the risk of pathways spread.	***
Objective 3 Providing value for money by being proportionate to the potential harm.	The scale of the programme and additional regulation will involve high costs which may not be considered proportionate. Pathways management rules may also be complex and difficult to enforce depending on how they are framed. This may ultimately diminish its value for money proposition.	**
Objective 4 Encouraging collective and co-ordinated action, with the management burden being shared fairly.	The option establishes formal governance mechanisms and co-funding arrangements, leveraging stakeholder resources to more evenly share the costs of the management response. It also provides roles for government (central and local) and farming industry that reflects their respective interests in improved management.	****

Option 3 is the preferred management programme

Option 3 is preferred because it will build greater research-based knowledge and awareness to empower landowners, while creating the necessary scale and co-ordination to ensure control efforts address spread within Northland and across regions

Option 3 is preferred because it best meets the objectives and addresses the root of the problems compared to the other options. This approach also best reflects the general stakeholder views expressed in the workshops, especially the preference to focus the balance of effort on building capability and buy-in rather than using punitive and costly regulation at this stage.

Option 3 is preferred because it:

- **Makes a meaningful improvement in the management of existing infestations** and slows the spread through its focus on building the awareness and capability of landowners and leveraging cross-partner resources to deliver a scaled programme.
- **Reduces the risk of spread to neighbouring regions** through better management of existing infestations. The inter-regional scope of the new management approach (through involvement of neighbouring councils, cross regional industry bodies and central government) will also support better management of inter-regional spread risk by increasing the awareness of farmers, exacerbators and high-risk vectors of spread.
- **Builds the capability of the system** to better manage Madagascar ragwort by investing in research to improve scientific understanding. Given the long timeframes involved in researching and implementing science, investment now is critical for the system to address future spread.
- **Provides best value for money** by focusing investment on cost-effective capability building and minimising regulatory burden and costs. The increased scale of investment by a total of \$10.4m over the next 4 years (or \$2.6m per year on average), when considered alongside landowner costs, is proportionate to even the lowest anticipated figure for GDP loss (\$22.41 million across Auckland, Northland, and the Waikato in 2035 under a scenario with a low rate of spread across regions).
- **Shares the management burden fairly** and leverages the combined strengths of stakeholders through collaboration and coordination. Importantly, it provides for roles of both government (central and local) and the beef and dairy sectors (these roles are discussed further in the roles and responsibilities section).
 - It recognises NRC's role as regional pest management lead. It also reflects central government's role given the strong potential for inter-regional spread, the competing incentives that constrain management efforts, and the economy wide impacts (\$22.4 million to \$132 million by 2035, escalating to \$73 million to \$276 million by 2055 across Auckland, Northland, and the Waikato).
 - The farming sector plays a critical role through both on-farm management by farmers, and industry bodies leveraging influence and resources to drive the programme in the interests of their members.

Options 1 and 2 are not considered sufficient to achieve a meaningful difference or respond to the scale of the problem and impact. Options 4 and 5 could achieve a better management outcome by addressing competing incentives, but the associated costs and regulatory burden imposed are likely to be infeasible, disproportionate and would not provide best value for money at this stage.

The scale of the problem should be re-examined in 3 years to consider whether the management programme should be adapted

While option 3 is best suited to the current context, ambition, and scale of the problem, this should be reassessed over time. The context could significantly change in a way that warrants adjustments to the management programme due to:

- Research that identifies more effective and/or cheaper treatments (like biocontrol) or identifies a key spread risk.
- Spread rate increasing or inter-regional spread, this could be due to droughts/heavy rain, increasing frequency of human mediated dispersal or increasing seed densities.
- Stakeholder appetite changes. This may change if the problem increases, due to greater understanding of the impacts or a more favourable macro-economic context.
- Efforts at education and awareness raising prove less effective at prompting action across multiple land use types.

This makes it important to monitor the spread and context into the future and consider whether adjustments to the management programme are required. A review in 3 years could also consider whether progressive containment is warranted and feasible at that point. This is reflective of an adaptive management approach.

Adaptive management

The management programme will be underpinned by an adaptive management approach (namely, a structured approach to learning by doing) which reflects the following principles described by the Environment Court:³⁵

- clearly identify the different stages or phasing of delivery
- establish robust baseline monitoring to monitor outcomes
- identify clear and strong monitoring, reporting, and surveillance mechanisms to enable early detection and rapid response, and
- establish clear feedback loops for undertaking scientific research and tool development.

This is an approach increasingly common in biosecurity responses, particularly where the risks are unknown, but the possible consequences are significant.

This reinforces the need for the immediate term focus to be on:

- investment in science and innovation to support our understanding of how Madagascar ragwort behaves, how to reliably detect and treat it, including the potential for biocontrol methods
- ensuring farmers and landowners have a shared understanding of the threat of the pest and how to manage it
- increased monitoring, and
- slowing the spread as much as possible to provide us with time to deliver the above and garner more information to inform our next steps.

³⁵ Taken from the New Zealand Environment Guide produced by the Environment Foundation and the Environmental Defence Society. <https://www.environmentguide.org.nz/eez/purpose-and-principles/information-principles-and-adaptive-management/>

The preferred management programme

The preferred management programme

This section discusses the preferred management programme in more detail, including the intention and rationale behind each feature.

Overview of the preferred programme

The preferred management programme represents a step up in how Madagascar ragwort is managed.

The preferred approach is centred in a landowner and farmer-led approach to dealing with the potential spread and impacts of Madagascar ragwort with the right level of support from local government, industry bodies, and central government.

It has the ambition to slow the spread and improve management of existing infestations. It seeks to do this by empowering landowners through the provision of proactive one-to-one support for farmers and landowners, advocating with contractors and hay producers for improved pathways management, co-ordination of information and advocacy across local government and industry partners, and investing in research to improve our understanding of the pest, its spread, and how to control it.

The preferred option empowers landowners and those at risk of spreading Madagascar ragwort to better manage its spread and impacts

The preferred management programme represents a step up in how Madagascar ragwort is managed. It seeks to slow the spread of the invasive pest within Northland, and reduce the risk of spread to neighbouring regions by empowering landowners, farmers, contractors, and suppliers across all at-risk areas.

The approach focuses on addressing the spread and impact of Madagascar ragwort by:

- **Empowering landowners, farmers, contractors, and suppliers**, through:
 - proactive one-on-one support and advice on the threat of Madagascar ragwort, how to detect and treat it, and how to prevent its spread.
 - provision of information and advocacy to contractors and hay producers to ensure they are adopting appropriate pathways management to mitigate the risk of spread.

- extending engagement to farmers in at-risk areas, including Northland but also neighbouring at risk regions like Auckland and Waikato.
- **Investment in research** into its current spread, refinement of existing control and management methodologies, biology (in particular seed longevity), greater understanding of on-farm and on-land impacts, reliable detection methods, and the potential for biocontrol.
- **Targeted regulation** that is cost-effective and simple to comply with, namely:
 - maintaining the good neighbour rule with an expanded radius of 100m to better reflect the distance at which seeds can disperse
 - a requirement to report the presence of Madagascar ragwort in low incidence zones so that NRC can record where it is spreading and work with landowners in those areas to manage the impacts and remove the pest where possible.
- Ideally, the adoption of **exclusion status in RPMPs** for neighbouring regions to prevent establishment and spread in these regions and reinforce efforts in Northland.
- **Improved monitoring** of the areas Madagascar ragwort is spreading to through greater engagement with landowners.

Empowering landowners, farmers, contractors and suppliers

A key focus of the programme is improving awareness and better empowering landowners to treat and manage infestation risk. There will be several layers to this approach:

- The provision of proactive face-to-face support and advice on the threat of Madagascar ragwort, addressing knowledge gaps and providing consistent control and management advice for differing situations.
- Provision of information and advocacy to contractors and hay producers to ensure they are adopting appropriate pathways management to mitigate the risk of spread.
- A national information programme to raise awareness, including through alignment of messaging to ensure consistency in how the origins, threats, and impacts of Madagascar ragwort are reported and in the mitigations that are presented to affected landowners. This messaging will focus on landowners in Northland but also those in at-risk neighbouring regions, like Auckland and the Waikato.

There are three broad categories of audiences who the programme will need to focus on.

Table 10: Key audiences for education and advocacy

Audience	Needs
Landowners, farmers, and suppliers who are currently dealing with established infestations on their property	• awareness of what Madagascar ragwort is • understanding how to reliably detect it • understanding the impacts it can have on their property and surrounding areas / neighbours • understanding how to manage and treat it and reduce risk of spread • understanding what is happening at a regional and national level
Landowners, farmers and suppliers who do not currently have it but are at risk of invasion	• awareness of what Madagascar ragwort is • understanding how and where to scan for it • understanding preventive measures they can take • understanding the impacts it can have on their property and surrounding areas / neighbours • understanding how to manage and treat it if it does reach their property and ongoing management • understanding what is happening at a regional and national level
Those who are not directly impacted but could facilitate the spread (for example, contractors, feed producers, stock agents)	• awareness of what Madagascar ragwort is • understanding how and where to scan for it • understanding preventive measures they can take to minimise risk of spread, particularly proactive pathways management techniques • understanding the impacts it can have on their clients and consumers • understanding what is happening at a regional and national level

A co-ordinated effort is required among all parties who interact with landowners, farmers, contractors, and suppliers. This will be important for:

- **Consistent, useful, and scientifically informed messaging.** Achieving this requires strong alignment and close engagement with the scientists, agrichemical suppliers, and farmers to ensure the messaging is practical, useful, and science based.
- **Amplification of messaging.** This is essential to ensure it reaches the right audience and is delivered by trusted voices who resonate with farmers. Farmers themselves are key messengers, sharing stories and acting as champions within their communities. Leveraging local networks, social media, and established platforms such as the Dairy Women's Network, Farmers Weekly, and rural supply stores can significantly boost impact. Messaging should also be tailored to seasonal activities and aligned with relevant events to maximise engagement.
- **Sharing and leveraging existing resources.** This includes leveraging existing farmer engagements done by NRC, MPI, agrichemical suppliers, and industry bodies, and sharing engagement materials and information.

Commissioning research to improve management effectiveness

Research is a critical tool in the fight against Madagascar ragwort. It strengthens our knowledge base and supports innovation to develop more cost-effective tools and measures to deal with Madagascar ragwort. We have tested the potential priorities for research and where funding should be targeted to deliver the greatest value. An indicative prioritisation is presented in Table 11 below.

Research projects will need to be confirmed through further stakeholder engagement. This includes mana whenua engagement which is particularly important for biocontrol to ensure approaches are consistent with mātauranga and cultural values.

Table 11: Potential area of research focus

Priority level	Potential areas of research focus	How this would support the management programme
High	Biocontrol	Investigate potential biological agents to provide sustainable, long-term control options and reduce reliance on chemical treatments.
High	Identification & DNA Analysis	Develop a cost-effective DNA test to simplify and provide certainty and identification to ensuring correct treatment strategies and preventing misidentification.
High	Distribution Mapping	Provide accurate data on current infestations, enabling targeted control efforts and prioritisation of high-risk areas.
Medium	Distribution Modelling	Estimate future spread patterns under different scenarios, helping to plan proactive interventions and allocate resources effectively.
Medium	Species Biology	Improve understanding of growth cycles, reproduction, and dispersal mechanisms, informing timing and methods for control.
Medium	Control & Management	Evaluate effectiveness and feasibility of chemical, mechanical, and cultural control methods, supporting best-practice guidelines.
Medium / Low	Impact & Vulnerability	Assess economic, environmental, and cultural impacts, and identify vulnerable regions or sectors to guide risk-based management.

The potential for biocontrol

Biocontrol was of particular interest among stakeholders given its potential to significantly increase the cost-effectiveness of treatment and enable more targeted removal of Madagascar ragwort without impacting on native pasture. The introduction of an effective biocontrol beetle (the ragwort flea beetle) in 1983 for common ragwort in New Zealand was estimated to save dairy farmers \$64 million of expenditure in 2015.³⁶

The relative lack of success seen in biocontrol investigations for Madagascar ragwort in Australia had dampened expectations on the potential for biocontrol in New Zealand. However, recently published research on DNA markers has shown that New Zealand populations and most of Australia's populations of Madagascar ragwort are unlikely to have originated from the KwaZulu-Natal region of South Africa, where all candidate biocontrol agents studied in Australia were sourced.³⁷ Genetics research pointed to the Eastern Cape region of South Africa as the possible area of provenance of most of the Australasian invasive populations.

Further genetic work is needed to confirm this, however, if the Eastern Cape is the true native range, new, promising candidate agents well adapted to New Zealand's Madagascar ragwort may be available. This provides greater hope for a potential biocontrol agent to help tackle this invasive pest.

As with any scientific research, it is difficult to estimate the likelihood of breakthroughs. There is a need to weigh probability and scale of potential return against the costs. This risk can be managed through taking a staged and incremental investment approach, which has been factored into the cost estimates.

Targeted regulation that is cost-effective and simple to comply with, supporting landowner-led efforts to deal with Madagascar ragwort

A targeted approach to regulation reflects the need to focus on shifting behaviour by building capability and awareness. This seeks to maintain incentives on landowners to report the presence of Madagascar ragwort, and to maintain goodwill with landowners who are still coming to terms with the presence of Madagascar ragwort on their properties and the threat it poses. The approach involves expanding the good neighbour rule and introducing a new requirement to disclose the presence of the invasive pest in low incidence areas.

Maintaining the good neighbour rule with an expanded radius of 100m

NRC has applied a 'good neighbour' rule to Madagascar ragwort. This requires that land occupiers within Northland must destroy all Madagascar ragwort within 50m of an adjacent or nearby property, where the adjacent or nearby land occupier is taking reasonable measures to manage Madagascar ragwort on their property or its impacts on pastoral production or environmental values. This rule will be enforced on receipt of a complaint from a directly-affected land occupier.

³⁶ Fowler, S., Gourlay, A., & Hill, R. (2016). Biological control of ragwort in the New Zealand dairy sector: an ex-post economic analysis. *New Zealand Journal of Agricultural Research*, 59(3), 205–215. <https://doi.org/10.1080/00288233.2016.1170050><https://www.tandfonline.com/doi/full/10.1080/00288233.2016.1170050#d1e853>

³⁷ Schmidt-Lebuhn, A. N., Egli, D., Greay, A., & Gooden, B. (2025). Phylogenomics and genetic admixture of the invasive fireweed complex (*Senecio inaequidens*–*Senecio madagascariensis*) at a global scale. *Biological Invasions*, 27, 243. <https://doi.org/10.1007/s10530-025-03704-3>

The rule seeks to address mixed incentives for management across landowners. Some landowners simply accept the infestation as management costs are too high, or because it has lesser impacts on their farm (e.g. horticulture is less susceptible). This increases risk to neighbours and can make control efforts on neighbouring properties fruitless.

There is a risk that landowners avoid notifying council to preserve neighbourly relations, which are viewed as especially important in rural communities. This means many infestations go unmanaged. However, given the distribution of this weed and the labour-intensive enforcement mechanisms this represents a relatively low cost and low effort way of minimising direct impacts on neighbours.

As part of the Regional Pest Management Plan review that is currently underway, NRC is seeking to publicly consult on increasing the distance covered by the rule from 50m to 100m to better align with the distance at which seeds can disperse.

A requirement to report the presence of Madagascar ragwort in low incidence zones

This allows NRC to record where it is spreading and work with landowners in those areas to manage the impacts and remove the pest where possible. While the focus of the management programme remains on education and advocacy, this requirement to report will not be accompanied with the threat of regulatory action, as that could disincentivise reporting. Should stronger regulatory measures be considered in the future, these will need to consider how to support those landowners who had previously disclosed the presence of Madagascar ragwort to ensure they are not disproportionately or unfairly impacted by a change in regulatory approach.

Importance of applying exclusion status within other regions

The preferred management programme would ideally be supported by neighbouring local authorities applying exclusion status to Madagascar ragwort, with the accompanying resource to support monitoring and early removal where there are inter-regional incursions. Adoption of exclusion status would justify and reinforce efforts in Northland that reduce the risk of spread to neighbouring regions.

This is a decision for local government in neighbouring regions. Officers have committed to investigating this, including the potential costs and benefits of such an approach through the development of their RPMPs.

There is potential to re-examine whether stronger regulation would be appropriate after 3 to 4 years

While stronger regulation is not suitable within the current context, changes to this context over the next 3 to 4 years may warrant considering strengthening the regulatory approach. This is because there are likely to be a small proportion of landowners who may refuse to treat or manage infestations despite efforts to raise awareness. These unmanaged infestations could grow and increase the rate at which Madagascar ragwort spreads, undermining management efforts across the region.

The following rules were considered through the development of options. The costs and challenges illustrate the difficulty of managing Madagascar ragwort through stronger regulation.

Table 12: Summary of rules that can be applied and their relative merits

Potential rule	Benefits	Costs and challenges
Requirement to destroy This involves setting a rule that requires land occupiers to destroy infestations on their land. Thresholds can be applied to the land or infestation size or location to limit the scope of the rule.	This ensures all land occupiers are managing infestations to protect others.	Infestations can be costly to manage, with large infestations being unaffordable for some. Enforcement costs for the regulator can be high. Given the necessity for a programme of repeated treatment, enforcement would entail ongoing compliance checks for development and adherence to management plans. Equity would need to be considered for landowners who disclosed infestations on the basis of no requirement to destroy.
Pathways management This involves setting requirements to manage risk of spread through high risk vectors like the movement of hay, cattle, vehicles, and equipment. This can be done via a Controlled Area Notice, or through pathways management rules implemented regionally.	This can reduce risk of spread across larger distances, including across regions.	This can be costly and burdensome to comply with and enforce due to the high number of daily movements that could be a vector of spread. Restrictions or cleaning requirements will also have impacts on businesses. Regulations that are difficult and expensive to comply with (like time consuming cleaning of equipment) will likely have a low compliance rate.
Requirement to declare infestation This could involve requiring high risk exacerbators, like hay producers, to declare to the hay purchaser that the hay was made in a contaminated area.	This can allow landowners to better manage risk of spread onto their land.	This can have costly impacts on businesses and would require significant cost and resource to enforce.

There is also potential to consider mandatory or voluntary certification

Over time, there may be value in developing and implementing a certification regime to manage spread by high-risk pathways. Such a regime could either be voluntary (market-led) or mandatory (imposed through regulation). The value of the regime would be in bridging information gaps for landowners when purchasing goods and services from suppliers who carry a risk of spreading Madagascar ragwort. This can happen through supply of infected hay, movement of cattle and equipment, or contractors providing services from farm to farm.

Key design features that would need to be worked through include:

- Whether it would be introduced voluntarily or mandatorily:
 - voluntary introduction would involve supporting suppliers and contractors to develop processes and systems for managing risks and self-reporting this to their consumers
 - mandatory introduction would see regulation introduced requiring disclosure from suppliers and contractors
- Which vectors of spread it would apply to, which could include one or more of the following:
 - supply and distribution of hay
 - movement of cattle
 - movement of equipment
 - movement of contractors
- The thresholds for determining that risks have been managed appropriately (for example, what percentage of land would need to be under active management to be certified)
- How it would be funded, with options including use of public funding, establishing a public trust with iwi/hapū and/or community providers, industry-funding, or a combination
- What monitoring and enforcement would be undertaken to ensure the certification regime is functioning and accurate declarations are being made (including what penalties will be imposed on those that are making false declarations)
- What support might be required for suppliers and contractors to manage risks appropriately.

This has not been proposed as part of the preferred approach given it is unclear what appetite there will be for such a regime to be introduced now. Given there remains an inconsistent level of awareness and understanding, introducing a certification regime is likely to impose additional costs for suppliers and contractors that farmers may not be willing to bear at this moment in time.

There was consensus across stakeholders that the immediate focus needs to be on education and advocacy to ensure a shared level of understanding consistently across farmers and landowners. Once the risks are understood, there may be a greater appetite for a certification regime and a willingness to pay a slight premium for the assurance that goods and services purchased do not carry the risk of spreading Madagascar ragwort.

Figure 12: Madagascar ragwort seeds photo credit Wendy Brown



Monitoring the spread closely to inform the management programme

Monitoring the spread rate and frontier is critical to the management programme. This allows the targeting of interventions, ensures landowners are receiving correct information on risks, and allows for adaptations to the management programme if necessary.

There is already a degree of mapping done but it needs to be undertaken at a finer scale. Given the ability of the spread frontier to constantly move, and the potential for longer distance jump dispersals, surveillance needs to be ongoing. Improved surveillance will be supported by:

- The new requirement for landowners to notify NRC where Madagascar ragwort has established itself.
- Research in detection methods and spread modelling.
- Promotion of reliable apps (like iNaturalist) that can be used to declare findings of Madagascar ragwort, which can then be investigated.³⁸
- Closer engagement with landowners in at risk areas and maintaining landowner goodwill which will incentivise voluntary disclosures.
- Monitoring across regional boundaries by neighbouring local governments to identify incursions early and enable removal before large infestations can establish themselves.

Leveraging biosecurity management programmes for other similar pests

The mechanisms outlined for managing Madagascar ragwort such as machinery hygiene and certification programmes could also be applied to other pest plants affecting primary production. As we experience a higher number of invasive species and multiple possible pathways for spread within and between regions, there is likely to be value in considering the pathways that may pose the greatest risk to biosecurity and how these could be better managed.

³⁸ It is difficult to get accurate location and reportee information out of iNaturalist so may need alternate tool (location is often obscured for privacy reasons, with no contact info for reportees).

Delivering the preferred management programme

This section explains the roles and responsibilities for delivering the management programme and the management model.

A programme founded on genuine partnership

The preferred management programme will require the joint contributions of all partners to ensure its success. This will require clearly defined roles and responsibilities, playing to the relative strengths, capabilities, and interests of each partner.

The rationale for a partnership-based approach

No single party can deliver this programme. There is a strong rationale for a partnership approach leveraging the strengths of each partner. We have considered the relative roles and responsibilities for each partner in delivering the management programme. This is informed by the Biosecurity Act 1993 which provides for both beneficiaries and exacerbators to contribute to management. We have considered:

- Who benefits from a successful management programme
- Who are the likely exacerbators of harm through further spread
- How are responsibilities defined under legislation
- What are the resources and tools that each partner brings to a management programme
- How can relative strengths and collective resources be leveraged to optimise the programme.

NRC can play a regional coordination role but dealing with the potential scale of impacts requires genuine cross-partner and cross-regional collaboration

NRC has its role assigned as a regional pest management agency under the Biosecurity Act 1993. It holds the necessary regulatory powers, including the ability to make rules and enforce those. Given the current location of the infestation at the top of Northland, there is a key role for NRC in coordinating the programme. As will be discussed, it is important that NRC is well-supported given the potential for inter-regional spread and scale of potential impact which elevates this beyond a typical regional pest management programme.

Given the risk of inter-regional spread, and vulnerability of neighbouring regions, neighbouring local governments also have a key role in considering whether to include Madagascar ragwort within their management programmes by assigning it exclusion status.

Regional activities that NRC can lead and facilitate include:

- Proactive support for landowners to provide technical information and support, raising awareness of the threat of Madagascar ragwort, its impacts, and the options for treatment.
- Co-ordination and collaboration across regional partners, including at management levels and on frontline activities.
- Ensuring consistency of messages and information shared with landowners, including ensuring this takes account of the latest evidence and knowledge around Madagascar ragwort.
- Leading the development of cost-effective regulation that is simple to understand and achieve compliance.

The beef and dairy industries have a key role as both the direct beneficiary of management and as exacerbators of spread

The beef and dairy sectors are both the direct beneficiaries of management and exacerbators of spread. This means the industries have an equal stake in contributing to managing Madagascar ragwort under established biosecurity principles.

These farming sectors (farmers, contractors, agribusiness, manufacturers, and farming representative bodies) stand to benefit directly from the management of spread as it protects productivity, avoids economic harm, and defers substantial treatment costs. The farming sectors also exacerbate the spread as supply-side activities like the movement of hay or stock represent the highest risk vectors for carrying Madagascar ragwort within and between regions (noting unmanaged infestations from non-productive land will also equally exacerbate spread). Farmers also have the best opportunity to manage the infestations as land managers.

There is an important role for Dairy NZ and Beef+Lamb. While the issue is currently a local issue (and these bodies represent levy payers across the country) the potential for spread and impacts across regions as far as the South Island emphasises there is a collective sector interest in investing in better management.

The role for central government is premised on the need to address cross-regional market failures and to mitigate the potential harm to national interests and the economy

The potential for cross-regional spread, market failure to effectively manage this spread, and economic impacts on this scale elevates this pest beyond just a local issue to one that requires central government support. This support is needed to complement the efforts of local government and the farming industry.

Competing incentives on landowners and incomplete information on which landowners can make informed decisions are significant barriers to effective management of spread (these issues are

elaborated on in the problem section). These market failures mean the market will not effectively manage Madagascar ragwort spread within and between regions (concerning multiple councils), with the associated economic impact representing a significant risk to regional and national interests. The potential GDP impacts range from \$22 million to \$132 million by 2035, escalating to \$73 million to \$276 million by 2055 across Auckland, Northland, and the Waikato.

The case for public intervention to address suboptimal market incentives to effectively manage Madagascar ragwort

There are several misaligned incentives that are contributing to a lack of co-ordinated action at scale to address the spread of Madagascar ragwort. These include:

- Landowners who do not have infestations may choose not to invest time or money in prevention or control, relying on neighbouring landowners to be responsible for treatments and the associated financial burden of this. If their neighbours successfully control the pest, non-contributing landowners still benefit from reduced risk of spread to their own land without having shared the costs or effort required.
- Farmers and local government in regions not yet affected might avoid participating in collective action or funding, assuming that the problem is “someone else’s” and that they can benefit from the containment efforts of others.
- Industry participants (like contractors or feed suppliers) may not adopt best practices for preventing spread, relying on the vigilance of landowners and councils to keep the pest in check. They still benefit from a healthier, more productive farming environment.

The market alone will not solve the problem, because individuals have an incentive to avoid costs if they believe others will bear them. This leads to underinvestment in pest management and increases the risk of widespread infestations. There is also an asymmetry and lack of information, where farmers do not have awareness of the risks and therefore do not manage these risks.

Without some central government support behind the efforts of local government and industry partners, the management programme will struggle to achieve the scale and profile required for success. Support from government could take the form of co-funding for research, financial support to enable access to expertise to support the management programme, resource to enable co-ordination across regions, and in-kind provision of scientific, advisory, and communications support.

Only coordinated public action can overcome misaligned incentives, mobilise landscape-scale prevention strategies, and protect long-term public interests. Government (both central and local) holds these levers which include regulation, investment, and coordination.

Finally, but of equal importance, is the role the government can play as a responsible land manager of significant land holdings in Northland region. This land exacerbates the spread when infestations are not managed.

NRC can co-ordinate a management programme but will need the support of industry as an equal partner with a high degree of ownership from landowners

The management programme will need to be delivered through a genuine partnership between local government, industry bodies, landowners, iwi/hapū, and central government.

NRC can co-ordinate efforts at a regional level, working with partners through formal shared governance and working arrangements. This could be supported by a MOU that sets out roles, responsibilities, and key commitments including of time and funding.

This will involve:

- NRC assuming the role of programme co-ordinator with dedicated resourcing. Its role will involve facilitating aspects of the programme with significant support and resourcing from partners.
- Industry bodies (Beef + Lamb, Dairy NZ) partnering with NRC as partners with an equal stake in ensuring a positive biosecurity outcome, providing dedicated resourcing and co-funding for the management programme to ensure its success.
- Support from MPI to enable access to specialist and technical resource and drive co-ordination with neighbouring regions.
- Early and ongoing involvement of iwi/hapū, ensuring local mātauranga informs and underpins the management programme.
- Treatment and land management responsibility held by farmers and landowners (including leadership from government landowners), with wrap around support provided through the management programme. Impacted landowners are bearing the major burden of the management programme as evidenced by the estimated treatment costs that Northland farmers are estimated to incur, which are between \$12.7 million and \$14.5 million annually on average over the next 4 years

The imperative for the Crown to lead as a significant owner of land in Northland

Government is a significant owner of land in the Northland region with government land managers including DOC, NZTA, district councils, and Pāmu Farms.

These actions government takes, or fails to take, can have a large impact on the efforts of NRC and industry partners to mobilise landowners in the region.

It is incumbent on the Crown to ensure it manages its landholdings responsibly to ensure that infestations on road corridors, conservation land, or school grounds are dealt with proportionately. This has both an impact on the communities in which the Crown owns land and role modelling the approach required to slow the spread of Madagascar ragwort. It also mitigates the possibility of substantial economic loss.

Table 13: Overview of stakeholder roles

Stakeholder	Opportunity to support the programme
NRC	• Proactive support for landowners to provide technical information and support, raising awareness of the threat of Madagascar ragwort, its impacts, and the options for treatment. • Co-ordination and collaboration across regional partners, including at management levels and on frontline activities. • Ensuring consistency of messages and information shared with landowners, including ensuring this takes account of the latest evidence and knowledge around Madagascar ragwort. • Leading the development of cost-effective regulation that is simple to understand and achieve compliance.
Industry bodies	• Lead information, engagement, and awareness programme, through own channels, with a focus on promoting shared key messages and technical advice. • Engaging with farmers to inform the programme, including setting of research priorities and spread mapping. • Contributing to regional and cross-regional co-ordination, through dedicated resourcing at both governance (senior leadership) and working levels (policy, land advisors, comms advisers). • Co-funding research and supporting delivery of research trials.
MPI	• Contribute to information, engagement, and awareness programme, particularly through delivering messaging. • Provide support for commissioning, co-funding, and managing research on behalf of local government and industry groups given the wider public benefit including outside of Northland. • Support for surveillance and diagnostics. • Support and advocacy for RPMP development and cross-regional co-ordination. • Financial support to provide access for regionally led programmes to procure specialist and technical support. • Engage with government land managers to ensure infestations and spread risk is managed on Crown land.
Neighbouring local authorities	• Consider exclusion status as part of RPMP. • Support information and advocacy in own regions. • Co-ordination and sharing of intelligence through formal and informal channels and networks.
iwi/hapū	• Leverage networks to raise awareness. • Contribute mātauranga and incorporate management into kaitiaki activities.

Costing the preferred management programme

This section explains the costs of the options and costing assumptions.

The preferred approach is estimated to cost \$10.4 million over the first four years

A high-level overview of the costs across the five options is presented below.

The costs are indicated as additional to the status quo management programme which is already incurring costs that have primarily been borne by NRC.

Options 4 and 5 present the highest cost envelope given the significant regulatory focus and associated costs required to deliver the education, enforcement, and research activities to support compliance.

Table 14: Summary of costs of all 5 options over the next 4 years (\$ million)

Activities	Option 1: Limited intervention	Option 2: Increase information and advocacy and invest in research incrementally	Option 3 (preferred): Building greater knowledge and awareness and investing in research to empower landowners	Option 4: Strengthened regulation on reporting and control, with greater landowner support and research investment to enable compliance	Option 5: Strengthened regulation and enforcement including pathways management
Regulation and enforcement	\$0.000	\$0.000	\$0.893	\$2.536	\$5.712
Coordination and collaboration	\$0.000	\$0.277	\$2.670	\$3.594	\$3.594
National support for management programme	\$0.000	\$0.000	\$2.186	\$3.852	\$3.852

Activities	Option 1: Limited intervention	Option 2: Increase information and advocacy and invest in research incrementally	Option 3 (preferred): Building greater knowledge and awareness and investing in research to empower landowners	Option 4: Strengthened regulation on reporting and control, with greater landowner support and research investment to enable compliance	Option 5: Strengthened regulation and enforcement including pathways management
Monitoring and surveillance	\$0.000	\$0.000	\$0.416	\$0.832	\$0.832
Research	\$0.239	\$0.849	\$1.430	\$3.265	\$8.041
Advocacy and education	\$0.000	\$1.587	\$2.783	\$3.199	\$3.199
Sub-total operating expenditure – excl landowners	\$0.239	\$2.712	\$10.377	\$17.279	\$25.230

The preferred approach is estimated to approximately cost an additional \$10.4 million over the first four years. Key activities this will fund include:

- Advocacy and education for landowners through recruitment of advisers to proactively work with landowners and provide the necessary technical information and support that enables them to implement cost-effective controls.
- Regional co-ordination and collaboration, through establishing a partnership-based MOU with co-funding from NRC and industry partners, and supporting development of resources to support the response
- Research funding to deliver high priority research around reliable detection, surveillance and mapping, and investigating the feasibility of biocontrol.
- National support for the programme, including funding for specialist expertise, co-ordination resource for inter-regional activities (including establishment of a national pest portal with information for landowners and possible reporting mechanisms), and provision of support from Biosecurity comms, plant laboratories, and other national resources.

Key assumptions

Only those directly incurred additional financial costs have been included. There are a range of cost drivers, and we have tried to reflect these drivers as accurately as possible. Economic costs that do not incur a financial cost, such as the time that farmers spend pulling or spraying Madagascar ragwort, are not included.

The costs are indicated as additional to the status quo management programme which is already incurring costs (primarily borne by NRC).

Costs are high-level estimates, and are based on prior examples, salaries, and workloads.

The spread of Madagascar ragwort is a key driver of cost, affecting both landowners as well as compliance and enforcement costs. We have relied upon the Madagascar ragwort spread model developed by Norman Mason at Landcare Research to estimate demand for services.

Some costs are expected to increase with the spread of Madagascar ragwort, some are a fixed cost, and others are only expected to be incurred over a defined period. Finally, the investment made into some areas is a choice, such as research and education.

Specifically, cost categories include:

- Operating costs to local authorities associated with regulation and enforcement
- The operating cost to local authorities and industry to coordinate and collaborate
- The cost to local authorities of operating a reporting line
- Funding made available to educate the public
- Funding to provide for Madagascar ragwort research efforts, and
- The commercial spraying costs incurred by landowners to control Madagascar ragwort.

Further assumptions include:

- The 'low spread' scenario in Landcare's model has formed the basis for the base case estimates on the presumption that the preferred option helps to slow the spread.
- Madagascar ragwort's first year in NZ was 2005, making 2026 year 22 in the Landcare spread model.
- Only those areas that have been infested for 10 years or less are sprayed by landowners, with spraying occurring between once and twice per year per farm, averaging 1.5 times per year.
- Compliance and enforcement costs are based on officers requiring up to 4 days per infected farm.
- The average farm is 279 hectares.
- Each farm is assumed to be 50% infected before Madagascar ragwort spreads to another farm.
- 75% of infected farms are in the 'high-incidence' areas in the top half of the Northland region
- In Option 3, it is assumed that enforcement action will be taken against 20% of infected farms as a result of complaints.
- In Option 4, it is assumed that enforcement action will be taken against 30% of infected farms in the high-incidence area as a result of complaints. Complaints are expected to be higher owing to greater awareness of Madagascar ragwort.
- Enforcement officers monitor newly infected areas for 10 years from 2026.
- Costs have been inflated at an even 2.0% per year.
- All costs are operating expenditure, so there is no capital charge or depreciation expense.

Summary of landowner costs

Estimating landowner costs is extremely challenging given the multiple variables associated with implementing treatments including land and farm typologies, the scale of infestation, rate of spread, geology, topography, soil quality and disturbance, grazing management, and so on.

We have adopted highly simplified assumptions to provide an order of magnitude estimate of the potential costs involved. These assumptions include:

- Commercial spray costs, including application, cost \$117.64 per hectare per event.
- The spraying programme occurs over a ten-year period and is done on average one and a half times per year.
- Only infected areas are sprayed.

Only the costs for Northland farmers have been included, under the assumption that Madagascar ragwort is kept out of the adjoining regions through neighbouring local authorities adopting exclusion status for the pest under their RPMPs and the costs of removal are accounted for in the monitoring and surveillance costs assigned to those local authorities.

We have estimated the likely order of magnitude of treatment costs across the low and high spread scenarios over the next 4 years. We have also included a scenario where the investment in education and advocacy helps to slow the spread (at a conservative assumption of 10% per annum). These provide a highly indicative range for the potential control costs landowners might face. When compared to the potential economic impacts, the costs represent a reasonable investment to mitigate the risk of significant losses in production, GDP (value added), and employment.

Table 15: Landowner control costs over next 4 years (\$ million)

Treatment costs incurred by Northland farmers	Proportion of newly infected areas reduces by 10% annually (low spread)	Low spread	High spread
Total collective cost to Northland farmers over next 4 years	\$50.811	\$52.171	\$57.883
Average annual collective cost to Northland farmers	\$12.703	\$13.043	\$14.471
Economic impact assessment (for comparison)			
Impact on total output in all three regions in 2035		\$46.73	\$269.88
Impact on total GDP in 2035		\$22.41	\$131.72
Impact on total employment in 2035 (FTE)		207	1,113

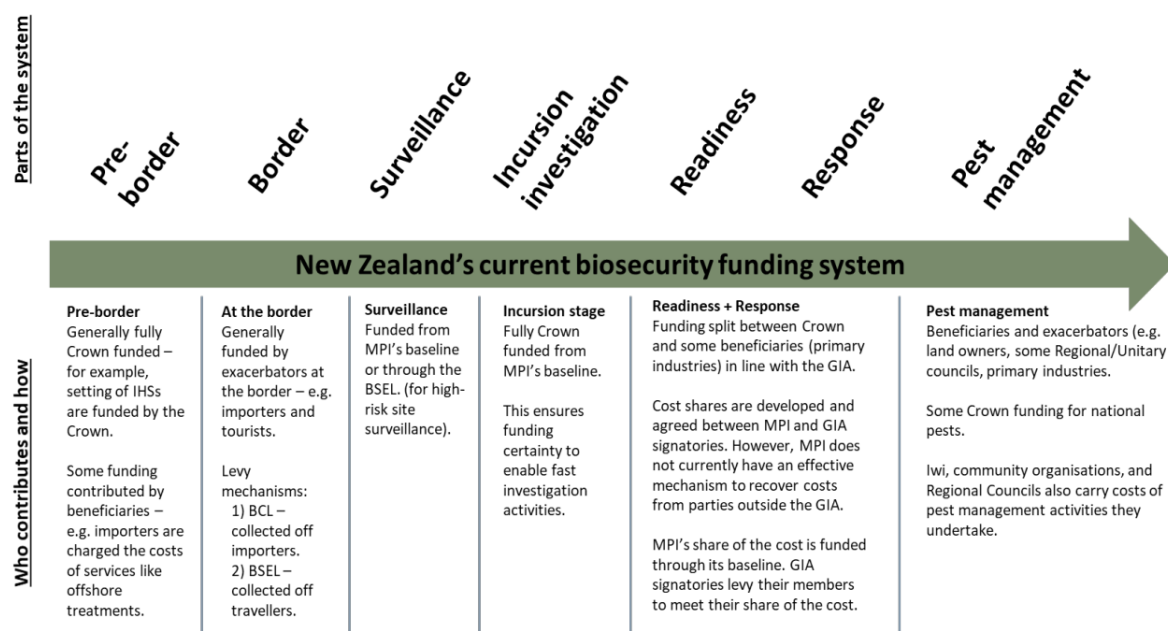
Funding and resourcing the preferred management programme

This section explains how the preferred management programme could be resourced and funded.

Pest management is funded by beneficiaries, exacerbators, councils and Crown

Biosecurity management is becoming increasingly costly as threats grow in complexity and scale and climate changes makes us more susceptible to an increasing number of invasive species that can establish themselves in our native ecosystems. The diagram below provides an overview of how the biosecurity system is funded and how costs are shared between the Crown, beneficiaries, and exacerbators.³⁹

Figure 13: Overview of how the biosecurity system is funded



Source: Ministry for Primary Industries, 2024

³⁹ Ministry for Primary Industries (2024). Regulatory impact statement, Biosecurity Act Amendment Bill, Paper 3: Funding and compensation.

Funding principles

The preferred management approach will require a multi-pronged funding approach that enables partners to share costs and make the most effective use of limited resources. This funding approach also recognises that there are multiple activities required to successfully manage Madagascar ragwort.

The funding strategy for the preferred approach should be guided by the following principles:

- **Additionality.** Additional funding should support additional investment, not substitute for or divert existing spending away from activities already focused on managing Madagascar ragwort.
- **Common but differentiated responsibility.** The wider community stands to benefit from the investment to improve how we manage Madagascar ragwort, in particular to protect the contribution that our primary industries make to the regional and national economies. This extends to sharing some of the costs of doing so, through contributions from local government (ratepayers) and Crown (taxpayers).
- **Distributional equity.** The costs of managing Madagascar ragwort fall on those directly impacted and dealing with it, however the benefits of preventing further spread are shared by a much wider group of regions, landowners, and suppliers. This warrants some degree of differentiation of costs borne by users who either benefit from and/or exacerbate harm.
- **Intergenerational equity.** The costs and benefits of resource use and protection should be distributed between present and future generations, to ensure future generations do not bear a disproportionately greater burden of costs and impacts. This means, ensuring that current generations bear a reasonable burden of costs and do not shift the burden of response and financial liability onto future generations to bear (at which point these may be too excessive and the infestation of Madagascar ragwort reaching endemic levels that render a management programme moot).

How features of the programme can be resourced and funded

An indication of the types of activities that each party could support is set out below based on these principles.

Funding contributions need not only be provided through cash provision as there may be other ways for partners to support the programme through provision of in-kind resourcing, secondments, partial FTE commitments (e.g. 0.25 FTE per year), and other forms of support in lieu of a financial contribution.

Table 16: Indicative view of funding sources

Activities	Crown (Vote appropriation)	Departmental budgets (property owning)	Local government (general or targeted rates)	Industry bodies	Landowners
National backbone support for programme	✓				
Regulation and enforcement			✓		
Co-ordination and collaboration			✓	✓	
Advocacy and education			✓	✓	
Research	✓		✓	✓	
Treatments		✓			✓

National backbone support

Crown funding for national backbone support is consistent with the aim of supporting activities that would slow the spread in Northland and minimises the risk of Madagascar ragwort spreading to neighbouring regions. It also helps to address the market failures described in this paper (misaligned incentives, lack of co-ordination) by incentivising and supporting greater efforts at local government-industry collaboration both within and across regions.

As described above, national support could be provided to support a range of activities. This includes commissioning and management of research, inclusion in national awareness campaigns, support for council/industry co-ordination, support for surveillance and diagnostics, and support for RPMP development.

This support could be provided through reallocation of existing staff resources to support the management programme or through funding for dedicated resources for the programme. The funding commitment can also be met through in-kind provision of support through existing channels (for example, national awareness campaigns, use of plant laboratories, and so on).

Funding for regulation and enforcement

Regulation and enforcement represent core BAU for local government and as such costs are proposed to be met through existing council revenues, either through reprioritisation of existing spend or through other revenue raising. This anticipates delivery of:

- Monitoring of complaints and reports.
- Compiling reports lodged under the good neighbour rule and requirement to report.

- Establishment and maintenance of reporting mechanisms.
- Communications and advice provided in relation to regulations.
- Future enforcement efforts deemed appropriate.

Funding for co-ordination and collaboration

Regional co-ordination and collaboration is proposed to be delivered by NRC in partnership with industry bodies. There are administrative costs to this, including:

- Establishing a partnership-based MOU with co-funding from NRC and industry partners.
- Standing up joint working and governance arrangements to support co-ordination and collaboration.
- Recruitment of dedicated and shared resourcing to implement the management programme.
- Provision of in-kind support from each partner.

Funding for these activities should be shared between NRC and industry partners given these activities are being delivered primarily for the benefit of industry with flow on benefits for the wider region. Arguably local authorities from other regions have a strong interest in supporting these activities as well but decisions around funding support will need to be made on a case-by-case basis by those authorities in line with their relative priorities and the status they assign to Madagascar ragwort in their RPMPs.

Funding for research

The preferred approach includes provision for funding in the first five years of the management programme for research into high priority projects which may include identification and DNA analysis, distribution mapping, and biocontrol (noting preferences for specific projects will need to be confirmed with stakeholders).

Funding for this research should come from a mixture of:

- Crown funding recognising there are public good benefits from research that will benefit other regions and the national interest given the potential economic impacts that would be averted.
- Local government funding where possible recognising the benefits to ratepayers and broader regional interests.
- Industry bodies that have members who stand to benefit directly.
- Philanthropists, although this should not be relied upon given the uncertainty of securing funding.

Iwi/hapū funding may be appropriate where the values of the research are aligned with those of the organisation or trust seeking to fund the research.

Funding for advocacy and education

A key part of the management programme is the provision of proactive support to landowners to raise awareness and educate them on the risks associated with Madagascar ragwort and how it can be managed. This includes:

- Frontline support with 'boots on the ground' in the form of dedicated advisers who can approach impacted landowners and provide support tailored to their circumstances and needs
- Advisers approaching contractors and hay producers to ensure they are adopting appropriate pathways management to mitigate the risk of spread
- Developing communications and messaging, including technical advice for landowners that is provided consistently
- Development and promotion of information campaigns to raise awareness.

Resourcing for these components can be achieved through:

- **Staffing commitments from stakeholders.** While councils, MPI, and industry bodies already have engagement functions, a deliberate allocation of staff time will be necessary.
- **Leveraging stakeholder engagement forums.** There is a need to commit to use of existing channels such as websites, on-farm visits, and communications programmes to maximise reach and efficiency.⁴⁰
- **Co-funding arrangements.** Some funding will be required for direct cost activities such as advertising, events, and additional programme management/administration/coordination support.

Funding and resource commitments should be shared between NRC and industry groups where these activities are undertaken in Northland initially.

As other regions begin to ramp up their own approach to advocacy and education, there will be opportunities to share resources, experiences, insights, and lessons to benefit those programmes, with the possibility of expanding the focus of the programme into one with a cross-regional remit and added funding commitments from other local government partners.

Funding for treatments

Treatments would be delivered and costs borne by landowners. We have not considered options around financial and other support for landowners, but these may include:

- Land advisory support from local government and industry bodies, including supporting development of farm biosecurity management plans.
- In kind provision of advice and support from advisory support teams at MPI, local government, and industry bodies.
- Financing support.
- Co-funding or seed funding to enable treatment activities.

⁴⁰ For example, an impacted farmer suggested NRC could incorporate messaging into annual pond inspections.

Next steps

The next steps involve confirming commitments from stakeholders, establishing working arrangements, and moving to programme establishment. Indicative timeframes and milestones are:

- **December 2025** – Meeting with Minister for Biosecurity and senior MPI officials to confirm ambition and appetite for Crown support.
- **February 2026** – Confirming funding shares with NRC, industry bodies, neighbouring local governments, and Crown.
- **April 2026** – Sign MOU on respective commitments, including funding, resourcing, and working arrangements.
- **May 2026** – Endorsements from NRC and neighbouring local government.
- **June 2026** – Establish management programme, including governance, working arrangements, recruitment, and implementation.

Figure 14: Madagascar ragwort on Pāmu Farms



Appendix: Economic impact assessment

