Future directions for pest management in Taranaki

Review of the *Pest Management Strategy for Taranaki: Animals* and the *Pest Management Strategy for Taranaki: Plants-*

Intervention logic model worksheets

Taranaki Regional Council

Private Bag 713

Stratford 4352

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1. Introduction

1.1 Purpose

The purpose of this document is to record the findings of an internal review carried out by Taranaki Regional Council (the Council) planning and operation staff of the Council's pest animal and plant programmes.

The findings of that review were a starting point for the development and design of future pest management programmes, which have been set out in a companion document *'Future directions for pest management in Taranaki; Review of the Pest Management Strategy for Taranaki: Animals, and the Pest Management Strategy for Taranaki: Plants'*. Together these documents are informing the review of the Council's pest management strategies.

1.2 Background

This document contains the worksheets completed in workshops held with Council staff to apply the intervention logic model process to current and potential future pest management programmes.

The intervention logic model is increasingly being used nationally and internationally as a planning tool to review and design programmes and to test the underlying rationale for public interventions. As part of the review of its pest management strategies, the Council has applied the intervention logic model.

The process involved a series of 14 workshops held throughout February and March 2012. At those workshops, staff evaluated what outcomes are sought in relation to individual pest animal or plant species, and then evaluated how that species could be managed in the future.

1.3 How the intervention logic model works

The intervention logic model describes a programme as a linear sequence of components – typically it involves consideration of inputs, activities, outputs and outcomes. Set out below is an explanation of the eight component parts to be documented.

- Scoping and planning

Scoping and planning involves documenting the current situation and developing a vision for a future programme. In terms of the current situation matters typically considered were the biological characteristic and distribution of the pests, the preferred habitat, the nature and scale of adverse and unintended impacts and the overall effectiveness of existing management programme.

- Inputs

Inputs are the resources that the Council intends to invest in the proposed programme to deliver on the proposed outcomes. Inputs are used to produce the outputs and outcomes of the programme. They typically include money, equipment, poisons.

- Activities

Activities are the suite of management actions that are required to be undertaken by the Council to achieve the outputs specified for a proposed programme. Activities range from advice and education, to regulation, and the undertaking of physical works. Activities can be measured in terms of numbers of traps set, number of meetings held with the community, etc.

❖ Outputs

Outputs are the tangible results of the activities in the proposed programme, goods and services produced such as possum or weed control. An output will usually be composed of a number of activities. The outputs of a programme are generally measured by some count or number, for example the residual trap catch of possum control operations, the number of reports produced, etc.

❖ Intermediate and long term outcomes

Outcomes are the desired states of the community, biological system, or production sector to be achieved by the programme.[1]

In the logic model, outcomes were split into intermediate outcomes (e.g. "…eradicate all known infestations of climbing spindleberry in the Taranaki region over 10 years), which fed into desired long term outcomes ("…threats to the extent and condition of indigenous remnant ecosystems are avoided due to reduced infestations of climbing spindleberry").

For the revised regional pest management plan, intermediate outcome statements are valuable as they allow a short-to-medium term assessment of the difference that outputs are making to programme outcomes. Intermediate outcome statements can readily be turned into the objective for that particular programme. The outcome statement needed to define what will change as result of the intervention, and by how much (or at the very least in what direction the change will occur). This then allows the means of measuring progress towards the desired outcome to be defined[2].

❖ Identify stakeholders

The logic model requires the Council to consider who are the stakeholders that should be consulted with or engaged with during the plan writing stage and, thereafter, during the implementation of the programme

❖ Assumptions

The link between a programme's activities and outputs and its desired outcome is based on a number of underlying premises – a set of ideas that forms the basis for delivering activities and outputs and achieving the desired outcome of a programme.

During the logic model workshops, all assumptions and expectations of how an activity or input would lead to an outcome were canvassed and documented. These were based on experience, and knowledge of the operational and policy staff participating in the workshops. Examples of assumptions made for some programmes might be there that the public good for eradication programmes exceeds the benefits accruing to individual landowners or, for widespread pests, the land owner might be best placed to carry out the control.

[1] Outcome statements were developed for each programme using the programmes vision.

[2] Progress towards intermediate outcomes can be measured using indicators. For example, an intermediate outcome like "Increased stock productivity over 5 years' might be measured by the indicator 'kgs of milk solids/ha'.

❖ Internal and external factors affecting outcomes

There are many factors over which operational staff have little or no control over, which may affect the programme outcomes. It is important to document these factors, as anticipated changes in any of these factors that may trigger programme adjustments. For example, political or economic support is important to consider when designing a programme as it will determine the amount of resources available.

Figure 1 below shows a logic model worksheet with the eight main components.

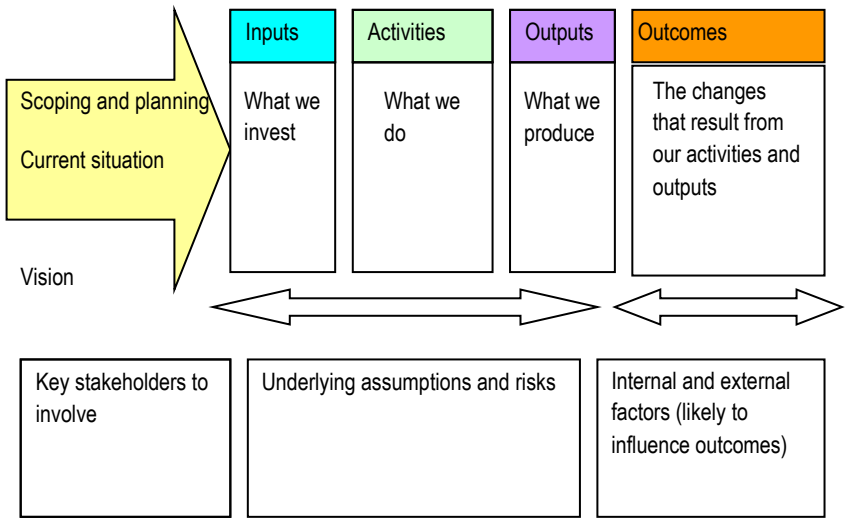

Figure 1 The Intervention Logic Model applied to pest management

2. Animal pest logic model worksheets

Set out overleaf are the worksheets that were developed for current pest animals during the intervention logic model workshops. The outcomes from this worksheets feed into the main body of this paper, where current programmes are assessed and future directions recommended.

Rooks (*Corvus frugilegus*)	**Inputs**	**Activities**	**Outputs**	**Outcomes**	
Current situation	**What we intend to invest**	**What we intend to do**	**What we intend to produce**	**Intermediate**	**Long term**
• **Eradication** pest in current RPMS (Section 5.1) • *Distribution:* 3 known rooks I in the Patea area, unsure if it still alive, 1 in Hawera and 1 in Brixton; Possibility of incursions from neighbouring regions, populations expand rapidly. • *Effects:* can become significant cropping, horticultural, and pastoral pest Vision Economic productivity is protected and sustained for future generations	40 hours/year including investigations into new incursions	Advice and education Public awareness campaign -media release - newsletter - meetings Surveillance Direct control at all sites of infestation Programme management, planning and monitoring	**Public awareness and engagement.** Contractor engagement, website hits, # of public enquiries, # of workshops, # of newspaper articles Rook control. # of control operations **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Prevent establishment of rooks in Taranaki. **Current objective:** to prevent the establishment of rook in the Taranaki region by eradicating all known (as at 1 May 2007) populations of rooks in the Taranaki region by 2017 and, as practicable, destroying any new populations of rooks that are identified over the duration of the Strategy.	Harm to economic activity is prevented due to absence of rooks.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game; • DOC • District Council's • Land Occupier • QEII • Iwi / Hapu • TRC internally • Councils of Neighbouring regions	• Is a problem in neighbouring regions, large control operations are underway • There is high potential for reinvasion (from neighbouring regions) • Congregate, rookeries can have up to 1000 birds. • Control techniques are available • TRC is best placed to carry out control • Most cost effective control is done early; they are cheap to control in low numbers, but expensive and difficult once established	• Political support • Community support • Economic support	There are three rooks known to be present in the Taranaki region, one of which has not been seen for approximately 12 months. There is potential for an incursion to occur from neighboring regions, where large control operations are underway. Should an incursion occur, Rooks have the potential to significantly affect cropping, horticultural industries and pastoral production. The Council proposes to prevent the establishment of rooks through an eradication programme, maintaining a capacity to respond to incursions should they occur. This will be done by: 1. Providing advice and information to landholders about the control of rooks including: a. handling enquiries; b. promoting public awareness through a programmed public awareness campaign; 2. Carrying out site led control of rooks at sites of infestation when required. 3. Planning, managing, and monitoring the eradication programme, and adapting the approach if required.

Argentine ants *Linepithema humile*	**Inputs**	**Activities**	**Outputs**	**Outcomes**	
Current situation	**What we intend to invest**	**What we intend to do**	**What we intend to produce**	**Intermediate**	**Long term**
• **Containment** pest in current RPMS (Section 6.1) • *Distribution:* 10 known areas of infestation with approx 2000 properties infested; mostly in urban, coastal areas, and increasing in range • *Effect:* Predominantly a threat to lifestyle/ amenity values/ significant nuisance, household pest; Also a threat to horticultural production; biodiversity, compete strongly with other insects. Vision Amenity values in urban areas are protected and maintained for future generations.	0.25 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Surveillance and enforcement Identification service Site led control in actively managed KNEs Programme management, planning and monitoring	**Public awareness and engagement.** Contractor engagement, # of website hits, # of public enquiries, # of workshops, newspaper articles **Argentine Ant control.** Number of control operations Number of KNE's actively managed under sustained control **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase capacity of public/contractors to carry out Argentine ant control over 10 years. No reduction of rare and distinctive fauna attributable to Argentine ants in actively managed KNEs over 10 years. **Current Objective:** To protect amenity, horticultural production, and biodiversity values by preventing the spread of Argentine ants from affected properties to neighbouring properties for the duration of this Strategy.	Minimise impacts of Argentine ants on amenity values in urban area Biodiversity increases across Taranaki due to reduced pressure from Argentine Ants

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game; • DOC • District Council's • Land Occupier • Queen Elizabeth II Trust • Biodiversity section; • Iwi / Hapu • TRC (internally) • Coastal communities	• Other regional councils are pulling back • Not yet a known KNE problem. • Effective though expensive control options • Compliance with land occupier rule would be unduly onerous. • Site led approach is the most cost effective option • Landowner best placed to decide if they should carry out control. • Distribution and abundance is increasing throughout coastal parts of Taranaki. • Public enquiries are decreasing Pathways problem: easily spread by humans	• Political support • Community support • Economic support	Currently in the Taranaki region, Argentine ants are a pest for their household nuisance value in coastal urban settlements. They are not yet a known problem in KNES, although coastal KNEs remain prone to invasion from nearby infestations. Effects on biodiversity are not well documented, but may include detrimental effects on native invertebrates and their potential to swarm over nesting native birds and chicks. Distribution and abundance is increasing throughout New Zealand. Eradication and sustained control programmes are not considered to be feasible or appropriate for the management of Argentine ants. It is therefore recommended that the Council adapt a site led and facilitation approach to their future management. As part of day to day pest control activities, the Council will endeavor to minimize the impact of Argentine ants on amenity values, and prevent impacts on biodiversity by: 1. Providing advice and information to landholders (particularly in affected and/or all coastal communities) about the control of argentine ants, including: a. handling enquiries; b. identifying infestations when requested; c. enabling liaison with bait suppliers/contractors; d. arranging newspaper articles to promote public awareness; e. requiring nurseries supplying riparian plants to have in place an appropriate detection / control programme; 2. Carrying out site led control of argentine ants in actively managed KNEs where required 3. Surveillance: mapping areas of infestation in collaboration with bait suppliers/ contractors 4. Planning, managing, and monitoring the programme and adapting the approach if necessary. The Council proposes to carry out these activities through a site led programme in the Regional Pest Management Plan. Around New Zealand, other regional councils have not succeeded in containing Argentine ant infestations. Land occupier rules are unduly onerous where there are private benefits to undertake control (eg. minimize nuisance impacts). The landowner is best placed to decide if they will carry out control. Public education campaigns have proved effective in the past in raising awareness and enabling access to bait suppliers. Site led control at significant sites will be carried out where required to protect native biodiversity.

Possums (Self Help Programme) *Trichosaurus vulpecula*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (Section 6.2 of RPMS) with compliance regime • 230,000ha covered by the self help programme • *Distribution:* 25% RTC pre-control; now 5-6% RTC; wide distribution across ring plain at low densities • *Effects:* eat pasture, trees, ($5/ha lost production, vector of disease,	6.7 FTE's facilitating only 8 FTE's in total including planning, liaison etc	Advice and education Site led control **Enforcement.** <10% RTC; NODs served Programme planning, management and monitoring	**Public education and engagement.** Farm visits, trained and motivated people. Possum control Effective adaptive management programme Maps/data strategies and plans	Maintain high stakeholder buy in & capacity to carry out control over 10 years. # of enforcement actions, surveys **Maintain remnant forest health over 10 years** % dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora & fauna) Maintained and increased stock productivity over 10 years. Kg (milkfats) $/ha?	Biodiversity increases across Taranaki due to reduced pressure from possums Harm to economic activity from possums and diseases is prevented or reduced. **Current objective:** To protect agricultural production values and indigenous biodiversity values, for the duration of the strategy by: Reducing infestations of brushtail possums to below a 10% residual trap catch on the ring plain through the implementation of the self help possum control programme; and, Promoting the voluntary control of possums throughout the region
Vision					
Economic productivity and indigenous biodiversity is protected and sustained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Regional community • TRC internally • farmers, • DOC • care groups • Fed Farmers • industry groups • lifestyle block owners • environmental groups • Iwi • Royal forest & bird	• Behaviour = attitude, skills and imperative • KNEs benefit from the programme • <10% RTC achieves XY • Programme only sustainable on intensively farmed land (ring plain) • Spending $8 to save $5 (TRC spending)	• Political support • Community support • Economic support • Cost benefit analysis wont stack up	Possums are a significant threat to biodiversity in New Zealand, in remnant forest, as well as compromising pastoral productivity and acting as a vector for diseases. The Self Help Possum Control Program has been an extremely effective method for controlling possums on the Taranaki ring plain, reducing from 25% RTC to 5-6% across the Dairying ring plain since the programme began in 1992. The value in the program is in empowering landholders to carry out their own control which is proving to be a highly effective method for controlling possums on the ring plain. The Council proposes to maintain low possum numbers through a sustained control Programme, by continuing to maintain landholders capacity to carry out control through the self help programme. This will be done by: 1. Providing advice and information to landholders about the control of possums including: a. handling enquiries; b. providing bait at cost for possum control c. promoting public awareness through farm visits, media releases and newsletters; 2. Carrying out site led control of possums in actively managed KNEs 3. Enforcement of strategy rules including good neighbour rule 4. Planning, managing, and monitoring the sustained control programme, and adapting the approach if required. It is anticipated that no new inputs will be required to ensure outcomes are achieved.

Possums (hill country/outside self help programme) *Trichosaurus vulpecula*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (Section 6.2 of RPMS) with compliance regime • *Distribution:* approx. 30% RTC in eastern hill country. • *Effects:* eat pasture, trees, forestry , ($5/ha lost production, vector of disease,		Advice and education Site led control Programme planning, management and monitoring	**Public education and engagement.** Farm visits, trained and motivated people. Possum control Effective adaptive management programme Maps/data strategies and plans	Maintain high stakeholder buy in & capacity to carry out control over 10 years. # of enforcement actions, surveys **Maintain remnant forest health over 10 years** % dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora & fauna) Maintained and increased stock productivity over 10 years. Kg (milkfats) $/ha?	Biodiversity increases across Taranaki due to reduced pressure from possums Harm to economic activity from possums and diseases is prevented or reduced. **Current objective:** To protect agricultural production values and indigenous biodiversity values, for the duration of the strategy by: Reducing infestations of brushtail possums to below a 10% residual trap catch on the ring plain through the implementation of the self help possum control programme; and, Promoting the voluntary control of possums throughout the region
Vision					
Economic productivity and indigenous biodiversity is protected and sustained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Regional community • ratepayers, • farmers • Department of Conservation • Community groups – Lake Rotokare, Taranaki Environment Trust, Paraninihi. • Federated Farmers • TRC internally • lifestyle block owners • Iwi • Royal forest & bird • Ministry of Primary Industries	• Behaviour = attitude, skills and imperative • KNEs benefit from the programme • <10% RTC achieves XY • Programme only sustainable on intensively farmed land (ring plain)	• Political support • Community support • Economic support • Cost benefit analysis wont stack up

Possums are a significant threat to biodiversity in New Zealand, in remnant forest, as well as compromising pastoral productivity and acting as a vector for diseases.

The Self Help Possum Control Program has been an extremely effective method for controlling possums on the Taranaki ring plain with the vast majority of the ring plain now encompassed by the self help programme. However it is unlikely to be cost effective to apply the programme to properties in the eastern hill country.

The Council proposes to maintain low possum numbers through a sustained control Programme, by continuing to maintain landholders capacity to carry out control, but at a less intensive rate than properties in the self help programme. This will be done by:

1. Providing advice and information to landholders about the control of possums including:
    d. handling enquiries;
    e. providing bait at cost for possum control
    f. promoting public awareness through farm visits, media releases and newsletters;
2. Carrying out site led control of possums in actively managed KNEs
3. Supporting community groups such as Lake Rotokare, Taranaki Environment Trust, Paraninihi to carry out possum control
4. Planning, managing, and monitoring the sustained control programme, and adapting the approach if required.

European rabbit *(Oryctolagus cuniculus)*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
• **Containment pest** (Section 6.3 of current RPMS) • *Distribution:* Widespread on 'rabbit prone land' (coastal sand country), Population can increase rapidly. Population currently being maintained below 3 on the Mclean Scale • *Effects:* Compete directly with stock for grazing (13 rabbits = 1 ewe), eat native vegetation in sand dunes and restoration plantings.	50hrs enquiries, 200hrs shooting, 20% relating to rabbits (rest hares)	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control - In actively managed KNE's Undertake annual monitoring of rabbits across rabbit prone land types Enforcement < 3 on Modified McLean scale Programme planning, management and monitoring	**Public awareness and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Rabbit control. **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Agricultural production is maintained over 10 years. kgs/milkfat, $/ha **Objective:** to protect agricultural production values by preventing the spread of European rabbits from affected properties to neighbouring properties for the duration of this Strategy	Harm to economic activity is reduced due to decreased pressure from rabbit browse. Biodiversity increases across Taranaki due to reduced pressure from rabbits
Vision					
Economic productivity is maintained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Department of Conservation • District Councils • Land Occupier • QEII • Farmers • Iwi • Taranaki Regional Council (internally) • Animal health board • Dune restoration trust	• Climate change may result in increased population • The land holder is best suited to carry out control • Riparian areas could be providing habitat for increased numbers of rabbits • Rabbits are subject to predation from other animals, removing predators may result in larger rabbit populations	• Effect of prey shifting? Removing predators may have negative effect • Political support • Community support • Economic support • Public perception of 'rabbit problem'	Rabbits are widespread on 'rabbit prone' land, the coastal sand country on the Taranaki ring plain. There are reducing number of complaints over the life of the Strategy which indicates that rabbits are becoming less of a problem. Rabbits compete directly with stock for grazing, with 13 rabbits consuming the same amount of grass at 1 ewe. They also graze on native sand dune vegetation and restoration plantings. The Council will protect the biodiversity values of places of regional significance from adverse effects of rabbits through a site-led programme by: 1. Providing advice and information to landholders about the control of rabbits including: a. handling enquiries; b. promoting public awareness through farm visits, media releases and newsletters; 2. Carrying out site led control of rabbits in actively managed KNE's 3. Planning, managing, and monitoring the sustained control programme, and adapting the approach if required.

Brown bull-headed catfish *(Ameiurus nebulosus),*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance pest** (section 7.1.1 of current RPMS). DOC is responsible for their management. TRC provide a support role. • *Distribution:* At release of 2007 strategy, no confirmed sightings had been reported in the region. • *Effects:* compete with native fish for territory and food, prey on insects/koura, small fish • *Spread:* Pathway problem – both deliberate and accidental. Is found in neighbouring regions Vision Indigenous biodiversity is protected and sustained for future generations	0.1 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control at sites of infestation Programme planning, management and monitoring	**Public education and engagement.** Petshops, signage, advertising	**Reduce spread of pest fish via pathways.** Slower increase in a number of known sites. **Current objective:** To promote public understanding of the pest characteristic of brown bull headed catfish, and to facilitate the control of catfish by DOC and others for the duration of this strategy.	Minimise impacts of pest fish on water quality and biodiversity in Taranaki waterways.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Department of Conservation • Ministry of Primary Industries • Fish & Game; • District Council's • Land Occupier • TRC (internally); • Iwi	• Patea and Waitara rivers are high risk if catfish becomes established. • DOC has a statutory obligation under freshwater regulations to control pest fish. • Lack of awareness in community about pest fish • Effective control techniques are available, but may not be suitable for large or fragile areas.	• Political support • Community support	Currently, Catfish are not found in the Taranaki region. If they were to be found in the region, they could potentially have a detrimental impact on native fish populations if not strictly controlled. The Department of Conservation is responsible for the management of pest fish under freshwater regulations. TRC plays a support role to ensure that a collaborative effort is applied to ensure that pest fish are effectively managed. The Council proposes to collectively manage all pest fish through a site-led programme, by: 1. Providing advice and information to landholders about the control of pest fish including: a. handling enquiries; b. maintaining information of its website; 2. Carrying out site led control of pest fish in conjunction with DOC where required 3. Planning, managing, and monitoring the site-led programme, and adapting the approach if required. It is anticipated that no new inputs will be required to ensure outcomes are achieved. The Council will continue to support DOC in their management of pest fish in the region.

Koi carp *(Cyprinus carpio),*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance pest** (section 7.1.2 of current RPMS). DOC is responsible for their management. TRC provide a support role. • *Distribution:* thought to be present in small numbers in the region. • *Effects:* significant threat- uproot plants, lower water quality, and eat insects/other fish. Noxious fish and unwanted organism • *Spread:* Pathway problem – both deliberate and accidental, found in neighbouring regions Vision Indigenous biodiversity is protected and sustained for future generations	0.1 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control in KNEs/ all areas of infestation? Programme planning, management and monitoring	**Public education and engagement.** Petshops, signage, advertising	**Reduce spread of pest fish via pathways.** Slower increase in a number of known sites. **Current objective:** To promote public understanding of the pest characteristic of koi carp, and to facilitate the control of koi carp by DOC and others for the duration of this strategy.	Minimise impacts of pest fish on waterquality and biodiversity in Taranaki waterways.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Ministry of Primary Industries • Fish & Game; • Department of Conservation • District Council's • Land Occupier • Iwi • TRC (internally)	• Patea and Waitara rivers are high risk if pest fish became established. • Department of Conservation has a statutory obligation under freshwater regulations • Lack of awareness in community • Effective control techniques are available (may not be suitable for large or fragile areas)	• Political support • Community support

Conclusion

Currently, known infestations of Koi Carp are in low numbers in the region. If they were to become established, they would have a significant impact on the health of our freshwater ecosystems if not strictly controlled. The Department of Conservation is responsible for the management of pest fish under freshwater regulations. TRC plays a support role to ensure that a collaborative effort is applied to ensure that pest fish are effectively managed.

The Council proposes to collectively manage all pest fish through a site led programme, by:

1. Providing advice and information to landholders about the control of pest fish including:
    a. handling enquiries;
    b. maintaining information of its website;
2. Carrying out site led control of pest fish in conjunction with DOC where required
3. Enforcing plan rules where required.
4. Planning, managing, and monitoring the site led programme, and adapting the approach if required.

It is anticipated that no new inputs will be required to ensure outcomes are achieved. The Council will continue to support DOC in their management of pest fish in the region.

Gambusia (Mosquitofish) *(Gambusia affinis)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance pest** (section 7.1.3 of current RPMS). • *Distribution:* Present in 3 sites in Waitara catchment • *Effects:* consume wide range of invertebrates, attack larger fish. • *Spread:* Pathway problem – both deliberate and accidental, eel fishing nets Vision Indigenous biodiversity is protected and sustained for future generations	0.1 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control Programme planning, management and monitoring	**Public education and engagement.** Petshops, signage, advertising	**Reduce spread of pest fish via pathways.** Slower increase in a number of known sites. **Current objective:** To promote public understanding of the pest characteristic of mosquito fish, and to facilitate the control of mosquito fish by DOC and others for the duration of this strategy.	Minimise impacts of pest fish on water quality and biodiversity in Taranaki waterways.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game; • Department of Conservation • District Council's • Land Occupier • IWI / Hapu • TRC (internally)	• Patea and Waitara rivers are high risk if pest fish were to become established • DOC has a statutory obligation under freshwater regulations, TRC play a supporting role • Lack of awareness in community about impacts of pest fish • Effective control techniques are available (may not be suitable for large or fragile areas)- • Piscicide used is Rotenene, toxic to other organisms in the freshwater environment	• Political support • Community support	Currently, gambusia are found in three localized sites in the Waitara catchment. If they were to become established, they could have a detrimental effect on our freshwater ecosystems by preying on invertebrates and other fish if not strictly controlled. The Department of Conservation is responsible for the management of pest fish under freshwater regulations. TRC plays a support role to ensure that a collaborative effort is applied to ensure that pest fish are effectively managed. The Council proposes to collectively manage all pest fish through a site-led programme, by: 1. Providing advice and information to landholders about the control of pest fish including: a. handling enquiries; b. maintaining information of its website; c. joint public awareness campaign (TRC/DOC) d. signage 2. Carrying out site led control of pest fish in conjunction with Department of Conservation where required 3. Enforcing plan rules where required. 4. Planning, managing, and monitoring the site-led programme, and adapting the approach if required. The Council will continue to support DOC in their management of pest fish in the region.

Rudd *(Scardinius erythrophthalmus)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance pest** (section 7.1.4 of current RPMS). DOC is responsible for their management. TRC provide a support role. • *Distribution:* Significant infestation in Lake Rotorangi, additional infestations found in Waitara river and Lake Rotomanu. • *Effects:* prey on native fish, affect water quality, game fish (trout) • *Spread:* Pathway problem – both deliberate and accidental Vision Indigenous biodiversity is protected and sustained for future generations	0.1 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control in KNEs Programme planning, management and monitoring	**Public education and engagement.** Petshops, signage, advertising	**Reduce spread of pest fish via pathways.** Slower increase in a number of known sites. **Current objective:** To promote public understanding of the pest characteristic of rudd, and to facilitate the control of rudd by DOC and others for the duration of this strategy.	Minimise impacts of pest fish on waterquality and biodiversity in Taranaki waterways.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Ministry of Primary Industries • Fish & Game; • Department of Conservation • District Council's • Land Occupier • Iwi / Hapu • TRC (internally)	• Patea and Waitara rivers are high risk • DOC has a statutory obligation under freshwater regulations • Lack of awareness in community • Effective control techniques are available (may not be suitable for large or fragile areas) • Noxious species under the Freshwater Fisheries Act.	• Political support • Community support

Conclusion

Currently, Rudd are found in very low numbers in the region. If they were to become established, they could have a detrimental effect on our freshwater ecosystems by preying on invertebrates and other fish if not strictly controlled. The Department of Conservation is responsible for the management of pest fish under freshwater regulations. TRC plays a support role to ensure that a collaborative effort is applied to ensure that pest fish are effectively managed.

The Council proposes to collectively manage all pest fish through a site-led programme, by:

1. Providing advice and information to landholders about the control of pest fish including:
    a. handling enquiries;
    b. maintaining information of its website;
2. Carrying out site led control of pest fish in conjunction with DOC where required
3. Enforcing plan rules where required.
4. Planning, managing, and monitoring the site-led programme, and adapting the approach if required.

It is anticipated that no new inputs will be required to ensure outcomes are achieved. The Council will continue to support DOC in their management of pest fish in the region.

Brown hares *(Lepus europaeus occidentalis)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance pest** (Section 7.2 of the current RPMS) • *Distribution:* Widespread throughout dairy land • *Effects:* Nip top out of newly planted seedlings, selective browsing (young riparian plants, coastal restorations at risk). Potential to damage horticulture/cropping.	50hrs enquiries, 200hrs shooting, 80% relating to hares (rest rabbits)	Advice and education Public awareness campaign -media releae - newsletter - meetings Site led control at riparian and restoration plantings Programme planning, management and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Hare control. Number of sites where hare control is undertaken, **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Success of restoration projects is maintained and increased over 10 years. Plant survival (%) monitored by LMOs Current objective: To promote public understanding of the 'pest' characteristic of brown hares, and to facilitate the voluntary control of brown hares, for the duration of this Strategy.	Biodiversity increases across Taranaki due to reduced pressure from hare browse on riparian and restoration plantings
Vision					
Indigenous biodiversity is protected and sustained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Ministry of Primary Industries • Fish & Game • Department of Conservation • District Council's • Land Occupier • Queen Elizabeth Trust • Biodiversity farmer • Iwi • TRC (internally) • Animal health board	• Restoration includes riparian, coastal, Key Native Ecosystem plantings • Riparian areas could be providing habitat causing increase in numbers • Hares have self regulating populations, rabbits can increase exponentially. • Climate change may result in increased pop. • More riparian plantings = increase in biodiversity • Whilst hare populations do not increase exponentially like rabbits, 1 hare can do a lot of damage • National rule already exists for compliance (WAC Act) • Subject to predations by other animals	• Community support • Political support

Conclusion

Hares are currently widespread throughout Taranaki dairy country. Browsing from hares can cause significant damage to new plantings, especially in riparian and restoration projects, where they nip out the top of newly planted seedlings.

As part of day to day pest control activities, the Council will endeavor to minimize the impact of hares, increase capacity to carry out control and prevent their impacts on biodiversity by:

1. Providing advice and information to landholders about facilitating the community control of hares including:
    a. handling enquiries;
    b. enabling liaison with contractors;
    c. promote public awareness;
2. Carrying out site led control of hares in at riparian and restoration plantings where required.

The Council proposes to carry out these activities in a site-led programme in the Regional Pest Management Plan.

Feral cat *(Felis catus)*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance Pest** (section 7.3 of the Current RPMS) • *Distribution:* Widespread in low numbers, however one cat can have a significant impact, large home range of up to 200 ha • *Effects:* Predate on birds - (ground nesting & arboreal), lizards, invertebrates; vector of diseases (TB + *Sarcocystis spp.*) • *Spread:* population continuously supplemented by pet cats that are released or stray.	1.5% of an FTE: enquiries 2% of an FTE: site led control	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control in actively managed KNEs Support of SPCA programme Programme planning, management and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. **Feral cat control.** Number of KNE's actively managed under sustained control, number of cats destroyed **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	No reduction of rare and distinctive species in KNE's over 10 years Presence / absence Number of native fauna species in KNE's increase over 10 years Presence / absence **Current objective:** to promote understanding of the pest characteristics of feral cats, and facilitate the voluntary control of feral cats, for the duration of this strategy.	Biodiversity increases across Taranaki due to reduced pressure from introduced predators
Vision					
Indigenous biodiversity is protected and sustained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Ministry of primary industries • Fish & Game • Department of Conservation • District Council's • Land Occupier • QEII • Farmers • Iwi • TRC- internally • Animal Health Board • SPCA	• A national rule already exists • TRC sets up control programme, maintenance carried out by landowner • Farmers benefit from vector control • Support AHBs survey (logistic support) • Not all KNEs require control • Farmers benefit from vector control	• Effect of prey shifting? More cats may have positive effect on reducing rabbits • Political support • Community support • Economic support

Conclusion

Feral cats are widespread but in low numbers, however just one cat can make a significant impact. Cats prey on birds, lizards and invertebrates, and may be a vector of diseases.

The Council will aim to minimize the impact of feral cats on biodiversity through a site led programme, by:

1. Providing advice and information to landholders about facilitating the community control of cats including:
    a. handling enquiries;
    b. supplying traps to landowners;
    c. promoting public awareness;
2. Carrying out site led control of feral cats at KNEs where required
3. Planning, managing, and monitoring the site led programme and adapting the approach if necessary.

Feral deer *(Cervus spp. and Odocoileus virginianus boreali)*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance (Section 7.4 of current strategy) • *Distribution:* high density in south Taranaki; 180,000ha of potential deer habitat • *Effects:* forest browse impacts (specifically red deer), serious when combined with other pests. Vector of diseases. Fallow deer impacts on agricultural production	0.5% FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control on actively managed KNES Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. **Deer control.** Number of KNE's actively managed under sustained control, number of deer controlled **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain remnant forest health over 10 years No reduction of rare and distinctive species in KNE's over 10 years Presence / absence **Current objective:** to promote public understanding of the 'pest' characteristics of deer, and facilitate the voluntary control of feral deer, for the duration of his strategy.	Biodiversity increases across Taranaki due to reduced pressure from ungulates
Vision					
Indigenous biodiversity is protected and sustained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game • Department of Conservation • District Councils • Land Occupier • QEII • farmer • Iwi / Hapu • TRC (internally) • Animal health board	• Site led control at KNEs • National rule exists under WAC Act • DOCs have reduced capacity in animal control • Control isn't working on DOC estate • Community acceptance of the problem • Red deer are a biodiversity risk, present in low numbers, fallow deer have larger populations, impact agricultural production. • Other species not present in the region, but there is possibility of invasion from other regions.	• Political support • Community support • Economic support	Currently, feral deer (especially fallow deer) are widespread in the Taranaki Region, with large populations in the Waitotara catchment. Feral deer can destroy the under-storey of vegetation which can result in severe deterioration of forested areas. The Council proposes to manage feral deer through a site-led programme, by: 1. Providing advice and information to landholders about the control of feral deer including: a. handling enquiries; b. maintaining information of its website; 2. Carrying out site led control of feral deer in actively managed KNEs where required 3. National rule exists under WAC act for their control 4. Planning, managing, and monitoring the programme, and adapting the approach if required. It is anticipated that no new inputs will be required to ensure outcomes are achieved. The Council will continue to support the efforts of DOC in their management of feral deer in the region.

Feral goats (*Capra hircus*)	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance (Section 7.5 of current RPMS) • *Distribution:* widespread (phase 3 of infestation model), especially eastern hill country areas. • *Effect:* Pest potential second only to that of possum. Destroy understory vegetation. May also impact on agricultural production.	5% FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control on actively managed KNES Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Goat control. Number of KNE's actively managed under sustained control, number of dead ungulates **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain remnant forest health over 10 years No reduction of rare and distinctive species in KNE's over 10 years Presence / absence **Current objective:** to promote public understanding of the 'pest' characteristics of feral goats, and facilitate the voluntary control of feral goats, for the duration of his strategy.	Biodiversity increases across Taranaki due to reduced pressure from goats
Vision					
Indigenous biodiversity is protected and sustained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors
• Ministry of Primary Industries • Fish & Game • Department of Conservation • District Councils • Land Occupier • QEII • farmers • Iwi / Hapu • TRC (internally)	• Site led control at KNEs • DOCs have reduced capacity in animal control • Control isn't working on DOC estate • Community acceptance of the problem	• Political support • Community support • Economic support

Conclusion

Currently, feral goats are widespread in the Taranaki Region, with large populations in the eastern hill country. Goats can destroy the under-storey of vegetation which can result in severe deterioration of forested areas, and may also impact on agricultural production.

The Council proposes to manage feral goats through a site-led programme, by:

1. Providing advice and information to landholders about the control of feral goats including:
    a. handling enquiries;
    b. maintaining information of its website;
2. Carrying out site led control of feral goats in actively managed KNEs where required
3. National rule exists under WAC act for their control
4. Planning, managing, and monitoring the programme, and adapting the approach if required.

It is anticipated that no new inputs will be required to ensure outcomes are achieved. The Council will continue to support the efforts of DOC in their management of feral goats in the region.

Pigs (Sus scrofa)	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance (section 7.6 in current strategy) • *Distribution:* widespread, particularly abundant throughout the eastern hill country. • *Effects:* primarily through eating understory vegetation, also responsible for pasture degradation when numbers build up	0.5% FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control on actively managed KNES Support Animal Health Board survey Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Pig control. Number of KNE's actively managed under sustained control, number of dead pigs **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain remnant forest health over 10 years No reduction of rare and distinctive species in KNE's over 10 years Presence / absence **Current objective:** to promote public understanding of the 'pest' characteristics of feral goats, and facilitate the voluntary control of feral goats, for the duration of his strategy.	Biodiversity increases across Taranaki due to reduced pressure from ungulates
Vision					
Indigenous biodiversity is protected and sustained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game • Department of Conservation • District Councils • Land Occupier • QEII • farmers • Iwi / Hapu • TRC (internally) • Animal health board	• Site led control at Key native ecosystems • DOC have reduced capacity in animal control therefore control ineffective • Community acceptance of the problem	• Political support • Community support • Economic support	Currently, Pigs are widespread in the Taranaki Region, with large populations in the eastern hill country. Pigs can destroy the under-storey of vegetation which can result in severe deterioration of forested areas, and may also impact on agricultural production. The Council proposes to manage feral pigs through a site-led programme, by: 1. Providing advice and information to landholders about the control of feral pigs including: a. handling enquiries; b. maintaining information of its website; 2. Carrying out site led control of feral pigs in actively managed KNEs where required 3. National rule exists under WAC act for their control 4. Planning, managing, and monitoring the programme, and adapting the approach if required. It is anticipated that no new inputs will be required to ensure outcomes are achieved.

Magpies *(Gymnorhina tibicen)*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance (Section 7.7 in the current RPMS) • *Distribution:* Widespread, increasing in numbers and range, preferred habitat- dairying. • *Effects:* Impacts- reduced nesting for native birds, harass birds, prey on indigenous invertebrates, geckos; nuisance value. • lots of public enquiries (probably second after ants) Vision Indigenous biodiversity is protected and sustained for future generations	0.05 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Facilitate direct control - cages Project management, monitoring and planning	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Magpie control. Number of control operations Number of KNE's actively managed under sustained control **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase capacity of public/contractors to carry out magpie control over 10 years. No reduction of rare and distinctive fauna attributable to magpies in actively managed KNEs over 10 years. **Current objective:** To gather information and promote public understanding of the 'pest' characteristics of magpies, and to facilitate the voluntary control of magpies, for the duration of the strategy.	Minimise impacts of magpies on amenity values in urban areas? Biodiversity increases across Taranaki due to reduced pressure from Magpies

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game; • Department of Conservation • District Council's • Land Occupier • QEII • Iwi / Hapu	• Biodiversity impacts of magpies not confirmed • Magpies are a problem that is here to stay • Most aggressive during breeding season (July to December) • Cage is the most effective control method (safer, catches more) • Not currently a problem in KNEs	• Political	Magpies are becoming increasingly widespread across Taranaki in rural dairying areas. Magpies are a problem mainly for their nuisance value, but may also affect biodiversity. Eradication and sustained control programmes are not considered to be feasible or appropriate for the management of magpies. It is therefore recommended that the Council adapt a site led and facilitation approach to their future management. As part of day to day pest control activities, the Council will endeavor to minimize the impact of magpies on amenity values, and prevent impacts on biodiversity by: 1. Providing advice and information to landholders about facilitating the community control of magpies including: a. handling enquiries; b. supplying traps to landowners; c. enabling liaison with contractors; d. promoting public awareness 2. Carrying out site led control of magpies in actively managed KNEs where required The Council proposes to carry out these activities through a site-led programme in the Regional Pest Management Strategy.

Mustelids – ferret, stoat, weasel *(Mustela furo, Mustela ermine, Mustela nivalis vulgaris)*	**Inputs** **What we invest**	**Activities** **What we do**	**Outputs** **What we produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance** (section 7.8 of current RPMS) • **Distribution:** Widely distributed at low densities in variety of habitats • **Effects:** Predate on birds - (ground nesting & arboreal) Biodiversity *lizards, invertebrates*; vector of diseases	1.5% of an FTE: enquiries 2% of an FTE: site led control	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control Programme management/planning Monitoring	**Public awareness and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Mustelid control. Number of KNE's actively managed under sustained control, number of dead mustelids. **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increased stakeholder buy in & capacity to carry out control over 10 years No of KNE's actively managed No of community projects No reduction of rare and distinctive species in KNE's over 10 years Presence / absence Number of native fauna species in KNE's increase over 10 years Presence / absence **Current objective:** To gather information and promote public understanding of the 'pest' characteristics of mustelids, and to facilitate the voluntary control of mustelids, for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from introduced predators
Vision					
Indigenous biodiversity is protected and sustained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Ministry of Primary Industries • Fish & Game; • Department of Conservation • District Council's • Land Occupier • QEII • TRC internally: • Iwi/hapu • Animal health board (AHB)	• A national rule already exists • TRC sets up control programme, maintenance carried out by landowner • Farmers benefit from vector control • Riparian plantings could cause increase in Mustelids – creation of pest corridors • Stoats top priority, then ferrets, weasals. • Already public concern/interest in mustelids. • Support AHBs survey (logistic support) • Not all KNEs require control	• Effect of prey shifting: mustelids may help control rabbits • Political support • Community support • Economic support	Mustelids are widely distributed at low densities in a variety of habitats. They predate on birds, lizards and invertebrates, and may be a vector of diseases. The Council will aim to minimize the impact of mustelids on biodiversity by: 1. Providing advice and information to landholders about facilitating the community control of mustelids including: a. handling enquiries; b. supplying traps to landowners; c. arranging newspaper articles to promote public awareness; 2. Carrying out site led control of mustelids at KNEs where required 3. Planning, managing, and monitoring the sustained control programme and adaption the approach if necessary. The Council proposes to carry out these activities through a site-led programme in the new Regional Pest Management Plan.

3. Plant pest logic model worksheets

Set out overleaf are the worksheets that were developed for current pest plants (and other harmful plants identified during the life of the strategy) during the intervention logic model workshops. The outcomes from this worksheets feed into the main body of this document, where current programmes are assessed and future directions recommended.

Climbing spindleberry (Oriental bittersweet) *Celastrus orbiculatus*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication** pest (Section 5.1 of strategy Largely addressed via compliance regime • *Distribution:* 12 known sites, in urban, hill country areas, density of known infestations decreasing • *Spread:* vegetative/root suckering and by birds • *Effects:* Competes with and replaces indigenous biodiversity; affecting regeneration and succession. Vision Indigenous biodiversity is protected and sustained for future generations	.2 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control (ground control) of all known infestations at all sites? Inspection, surveillance and enforcement Programme planning, management and monitoring	Passive surveillance **Public awareness and education.** Contractor engagement, website, public enquiries, workshops, newspaper articles Climbing spindleberry control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Eradicate all known infestations of climbing spindleberry in the Taranaki region over 10 years.	Threats to biodiversity across Taranaki are avoided due to reduced infestations of climbing spindleberry

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi	• Eradication is only achievable for species not yet established in the region, i.e. confined to few sites or limited extent • The eradication of climbing spindleberry is technically feasible in a ten year timeframe • Eradication is the most cost effective form of pest management where technically feasible • New infestations will inevitably be discovered as a result of increased surveillance and public awareness • Relying on land occupiers (rules) is not appropriate or equitable • Rate payers to pay due to public benefits • Increased focus is required on surveillance and public awareness to identify sites of interest.	• Not in public eye, minimal drive from wider public	Climbing spindleberry, should it become established, would be a major threat to indigenous biodiversity, particularly in remnant bush ecosystems and Key Native Ecosystems, and may also establish in riparian and urban ecosystems. The Council will aim to eradicate all known infestations of climbing spindleberry in the region to ensure remnant and riparian ecosystems are protected from the spread and establishment of climbing spindleberry over the next 10 years. This will be done by: 1. Increased focus on advice and information to land holders and the wider public about reporting the presence of climbing spindleberry, including: a. Handling enquiries; b. Public awareness campaigns c. Media releases d. Newsletters 2. Inspection and surveillance 3. Carrying out direct control of climbing spindleberry in all areas of infestation. 4. Planning, managing and monitoring the eradication programme and adapting the approach if necessary. The Council proposes to carry out these activities through an eradication programme in the Regional Pest Management Plan.

Darwin's barberry *(Berberis darwinii)*	**Inputs** **What intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication** pest with compliance regime (Section 5.2 of current strategy) • *Distribution:* Widespread, mainly central Taranaki; Stratford/Inglewood. 63 known sites. Waste ground and roadsides. • *Spread:* Free seeding, spread by birds • *Effects:* Biodiversity- suppresses regeneration and agricultural problem – impacting on carrying capacity of the land Vision Economic productivity and indigenous biodiversity is maintained for future generations	.2	Advice and education Public awareness campaign -media release - newsletter - meetings **Direct control** of all known infestations at all sites. Inspection, surveillance and enforcement Programme planning, management and monitoring	Passive surveillance **Public awareness and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Darwin's barberry control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Eradicate all known infestations of Darwin's Barberry in the Taranaki region over 10 years.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down Threats to biodiversity across Taranaki are avoided due to reduced infestations of Darwin's Barberry

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi	• Eradication is only achievable for species not yet established in the region, i.e. confined to few sites or limited extent. The eradication of Darwin's Barberry is not technically feasible in a ten year timeframe • Increased focus is required on surveillance and public awareness to identify sites of interest. • Darwin's barberry is ecologically similar to Himalayan barberry, which is widely used as hedging in the region. • Mainly a problem of roadsides and waste areas, not currently having major impact on biodiversity or agricultural production. • Whole property addressed to prevent biological spread.	• Not in public eye, minimal drive from wider public	Darwin's Barberry can be a threat to indigenous biodiversity, in remnant bush ecosystems and Key Native Ecosystems, and may also establish in riparian and urban ecosystems. It also can become an agricultural problem, impacting on the carrying capacity of the land. However, currently, Darwin's barberry is a problem on roadsides and in waste areas, and is not having a significant impact on biodiversity or agricultural production values. The Council will aim to carry out control of Darwin's barberry in the region through a sustained control programme in the Plan. This will be done by: 1. Increased focus on advice and information to land holders and the wider public about reporting the presence of Darwin's barberry, including: a. Handling enquiries; b. Public awareness campaigns c. Newsletters 2. Inspection, surveillance and enforcement 3. Planning, managing and monitoring the programme and adapting the approach if necessary. 4. Imposing a good neighbor rule on crown and private land to prevent biological spread of the plant and associated eternality impacts.

Giant reed (*Arundo donax)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication** pest (Section 5.3 of the current strategy) • *Distribution:* Currently 7 known sites in coastal areas, NP, Oakura, Patea, Waitara and Onaero • *Spread:* vegetative • *Effects:* Potential threat to biodiversity values in riparian/forest margins; dense clumps suppress regeneration; obstruction of drainage channels (minor threat). Vision Indigenous biodiversity is protected and sustained for future generations	.2	Advice and education Public awareness campaign -media release - newsletter - meetings **Direct control** at all sites of infestation Inspection, enforcement and surveillance Programme management, planning and monitoring	Passive surveillance **Public awareness and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Giant reed control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Reduce the distribution of all known infestations of Giant Reed in the Taranaki region over 10 years. **Maintain remnant ecosystems over 10 years** dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora and fauna) No reduction of rare and distinctive species in KNEs over 10 years	Biodiversity increases across Taranaki due to reduced pressure from Giant Reed

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation, • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi	• Eradication is only achievable for species not yet established in the region, i.e. confined to few sites or limited extent • The eradication of Giant Reed is technically feasible in a ten year timeframe • Eradication is the most cost effective form of pest management where technically feasible • New infestations will inevitably be discovered as a result of increased surveillance and public awareness • Relying on land occupiers (rules) is not appropriate or equitable • Rate payers to pay due to public benefits • Increased focus is required on surveillance and public awareness to identify sites of interest.	• Not in public eye, minimal drive from wider public	Giant reed is a threat to indigenous biodiversity, in remnant bush ecosystems and Key Native Ecosystems, suppressing native regeneration, and potentially obstructing drainage channels The Council will aim to eradicate all known infestations of Giant reed in the region to ensure remnant and riparian ecosystems are protected from the spread and establishment of Giant Reed over the next 10 years. This will be done by: 1. Increased focus on advice and information to land holders and the wider public about reporting the presence of Giant reed, including: a. Handling enquiries; b. Public awareness campaigns c. Media releases d. Newsletters 2. Inspection and surveillance 3. Carrying out direct control of Giant reed in all areas of infestation. 4. Planning, managing and monitoring the eradication programme and adapting the approach if necessary. The Council proposes to carry out these activities through an eradication programme in the Regional Pest Management Plan.

Mignonette Vine (madeira vine) *(Anredera cordifolia)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication** pest (Section 5.4 of current strategy) • *Distribution*: Currently 53 known sites • *Spread*: vegetative tubers • *Effects*: Riparian/ forest margin problem; biodiversity threat, competition, affects succession and regeneration Vision Indigenous biodiversity is protected and sustained for future generations	.2 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control – ground crews Inspection and Enforcement Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Mignonette vine control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	All known infestations of mignonette vine are eradicated in the Taranaki region over/within 10 years. **Maintain remnant ecosystems over 10 years** dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora and fauna) No reduction of rare and distinctive species in KNEs over 10 years	Biodiversity increases across Taranaki due to reduced pressure from Mignonette Vine.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Biodiversity section, • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird, • Land occupiers • District Councils • Iwi	• Very difficult to control once established • Lack of public awareness or interest. • Rules are not working • Rate payers to pay	• Not in public eye, no drive from public	Mignonette Vine is a major threat to indigenous biodiversity, in remnant bush ecosystems and Key Native Ecosystems, and may also establish in riparian and forest ecosystems. The Council will aim to eradicate all known infestations of mignonette vine to ensure remnant ecosystems are maintained and there is no reduction of rare and distinctive flora in KNEs over the next 10 years. This will be done by: 1. Providing advice and information to land holders about the control of mignonette vine, including: a. Handling enquiries; b. Public awareness campaigns c. Media releases d. Newsletters e. Meetings 2. Inspection and enforcement of rules if required 3. Carrying out direct control of Mignonette vine in all KNEs and areas of infestation. 4. Planning, managing and monitoring the eradication programme and adapting the approach if necessary. The Council proposes to carry out these activities through an eradication programme in the new Regional Pest Management Plan. It is anticipated that given the current widespread infestation of Mignonette vine, added inputs will be required to ensure outcomes are achieved.

Pampas – common and purple *(Cortaderia selloana, Cortaderia jubata)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication pest plant** (Section 5.5 of current strategy) • *Distribution:* Widespread- worst in Nth Taranaki, spreading in wild situations, worst in DOC areas. • *Spread:* Wind blown, most seeds drop within 50-60m. • *Effect:* Threat to forestry, biodiversity (sand dunes, edge effects), invades native, shading regeneration, riparian, can collapse into drain to impede water flow • *Benefits:* good shelter (in increasingly bad weather), used extensively as hedgerows	1 FTE Putting $ into biocontrol	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control for KNEs Inspections, enforcement and surveillance Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Pampas control. Number of KNE's actively managed under sustained control, **Compliance with rules** (NODs issued, prosecutions) **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	**Maintain remnant ecosystems over 10 years.** % dieback, bird counts, SEM monitors of canopy cover, number and type of species (flora and fauna) Maintain agricultural productivity over 10 years. **Current objective:** to prevent the spread of infestations of Common Pampas and Purple pampas in the Taranaki region for the duration of the Strategy.	Biodiversity increases across Taranaki due to reduced pressure from pampas
Vision					
Indigenous biodiversity is protected and sustained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game, • Forest and Bird • Land occupiers • District Councils • NZTA • Iwi	• Herbicides available for their control – Velpar (aerial application), costly • Hedgerows- aren't really a problem unless they are seeding • Bio-control is being actively researched • Roadsides well controlled by NZTA in the north • Not many complaints about plant itself, only about compliance • 77 Notices Of Direction issued 10/11, 167 in 2011/12 • Whole property addressed to prevent spread of plant.	• Political interferences • Biological control is a big hope for the future	Pampas is clearly established and widespread in the region, therefore the eradication outcome sought for Pampas grass is not achievable and technically unfeasible. It is proposed that the Council adopts a sustained control programme for Pampas in the new Plan. The Council will aim to prevent the spread of Pampas to ensure maintenance of agricultural productivity by: 1. Providing advice and information to key stakeholders. 2. Carrying out inspection and surveillance, and enforcement of rules if necessary. 3. Imposing a good neighbor rule on crown and private land to prevent the spread of pampas to other properties. 4. Carrying out direct control of Pampas infestations in KNEs 5. Planning, managing and monitoring the eradication programme and adapting the approach if necessary. This involves no significant change to the Councils modus operandi. The Council will continue to apply a significant regulating and compliance regime to ensure land occupiers manage the externality impacts of pampas on neighbouring land.

Senegal tea *(Gymnocoronis spilanthoides)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication** pest (Section 5.6 in the current strategy) • *Distribution:* Currently around 2 known sites • *Spread:* vegetatively, dispersal of seeds by water movement. • *Effect:* biodiversity threat, diminish oxygen available to fish, impede flow of water, covers wetlands/waterways Aggressive freshwater weed Vision Indigenous biodiversity is protected and sustained for future generations	.2 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control Inspection and Enforcement Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Senegal tea control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	All known infestations of Senegal Tea are eradicated in the Taranaki region over/within 10 years. **Maintain remnant ecosystems over 10 years** dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora and fauna) No reduction of rare and distinctive species in KNEs over 10 years	Biodiversity increases across Taranaki due to reduced pressure from Senegal Tea.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Recreational water users • Iwi	• Lack of public awareness or interest. • Rules are not working	• Not in public eye, no drive from public	Senegal Tea is a threat to indigenous biodiversity in waterways, forming dense floating mats which can exclude submerged flora, depleting food and oxygen sources for fish; displacing traditional Maori food sources; and interfering with recreational activities. The Council will aim to eradicate all known infestations of Senegal Tea to ensure remnant ecosystems are maintained and there is no reduction of rare and distinctive flora in KNEs over the next 10 years. This will be done by: 1. Providing advice and information to key stakeholders. 2. Inspection and enforcement of rules if required 3. Carrying out direct control of Senegal tea in all KNEs and areas of infestation. 4. Planning, managing and monitoring the eradication programme and adapting the approach if necessary. The Council proposes to continue these activities through an eradication programme in the new Regional Pest Management Plan.

Undaria *(Undaria pinnatifida)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Eradication pest** (Section 5.7 in current strategy) • *Distribution:* Limited distribution, confined to Port Taranaki, decreasing, prefers man made structures • *Spread:* spores • *Effect:* Significant effect on marine farming, however not an issue here unless ventures established, Once established can replace or exclude native seaweed species and associated marine flora	0.25 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control at Port Taranaki Surveillance Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. *Undaria* control Number of sites where hare control is undertake, McLean scale **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain biodiversity of the Sugar Loaf Islands and other nearby significant marine sites Reduce likelihood of new infestations of *Undaria* in Port Taranaki	Marine biodiversity is maintained in marine ecosystems due to reduced pressure from invasive seaweeds.
Vision					
Indigenous marine biodiversity is protected and maintained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Port Taranaki • Sportfishing/underwater club • TRC internally • Department on Conservation • Fish and Game, • Forest and Bird, • District Councils • Iwi/hapu	• Highly invasive • Very hard to control, expensive and time intensive. • The seabed and Port Taranaki ownership/management could pose legal issues • By kills are likely from control • New incursions are a constant threat • May have beneficial qualities – edible? • Notification rule may be appropriate		*Undaria* is a threat to marine biodiversity and potential marine farming ventures, due its ability to rapidly invade man made structures. Once established it can exclude native seaweed species and associated marine flora. *Undaria* is confined to Port Taranaki, but poses a threat to the nearby Sugar Loaf Islands and Ngamoutu Marine Reserve. Eradication of the pest, as proposed in the current strategy is technically unfeasible, and management is better focused on maintaining infestations at low levels, and reducing spread through pathways (hull and ballast water). The Council (in partnership with Port Taranaki and the Department of Conservation) will aim to reduce infestations of *Undaria* and reduce likelihood of new infestations in Port Taranaki through a **site-led programme**. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out surveillance and monitoring to note any new infestations 3. Carrying out direct control of *Undaria* infestations 4. Planning, managing and monitoring the programme and adapting the approach if necessary.

Australian sedge *(Carex longebrachiata)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Containment pest – current boundary rule – Section 6.1 of the current strategy) • *Distribution:* 3 extensive infestations. 2 at Waitotara covering several farms and 1 at Mohakatino. • *Spread:* by stock movement- potential for infestations to affect other properties. • *Effect:* encroaches onto pasture land, excludes pasture species Vision Economic productivity is maintained for future generations.	.00001 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Inspection and Enforcement Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Australian Sedge control. Reduction in area of infestation **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase capacity of landowners to carry out control of Australian Sedge control over 10 years. Maintain agricultural production over 10 years.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi/hapu	• Hard to identify- looks similar to other sedges • Expensive and labour intensive to control and spot spray • Movement control – self policed • Unpalatable • May cause stock pelt damage • 25m boundary rule sufficient to prevent spread	• Not in public eye, no drive from public	Australian sedge is a threat to agricultural productivity due to its ability to encroach on pasture land, excluding and competing with pasture species. The Council will aim to prevent the spread of Australian sedge to ensure maintenance of agricultural productivity by: 1. Providing advice and information to key stakeholders. 2. Carrying out inspection and surveillance, and enforcement of rules if necessary. 3. Imposing a good neighbor rule within 25m of the boundary of crown and private land to prevent the spread of Australian sedge to other properties. 4. Carrying out direct control of Australian sedge infestations in KNEs 5. Planning, managing and monitoring the programme and adapting the approach if necessary. The Council proposes to carry out these activities through a **sustained control programme** in the new Regional Pest Management Plan. This will require an increase/decrease in inputs to ensure outcomes are achieved

Giant buttercup *(Ranunculus acris)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Containment pest with compliance regime (section 6.2 of current strategy) • *Distribution*: Localised problem in Stratford, Opunake Inglewood, Mangatoki. Has maintained distribution over last 10 years. Mostly dairying problem. Around 155 sites in total. • *Spread:* Seed heavy, drops close to the plant, can be spread by animals/hay • *Effect:* can overwhelm pasture species reducing pasture and dairy production. Vision Economic productivity is maintained for future generations	0.5 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Inspection and Enforcement Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Giant buttercup control. Initial bio-control populations established **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain and increase stock productivity over 10 years $/ha Increased pasture growth over 10 years	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • New Zealand Transport Authority NZTA • Iwi	• Limited options in the tool box Difficult to control - constant effort for huge cost, • Control can upset normal paddock rotation • Increasing resistance to herbicide • Taranaki Regional Council currently only council with rules for buttercup • Has potential to spread through dairy and beef country • 25m boundary rule sufficient to prevent spread in dairy country	• Political support • Community support • Economic support	Giant buttercup is a threat to agricultural productivity due to its ability to encroach on pasture land, excluding and competing with pasture species. The Council will aim to prevent the spread of Giant Buttercup to ensure maintenance of agricultural productivity by: 1. Providing advice and information to key stakeholders. 2. Carrying out inspection and surveillance, and enforcement of rules if necessary. 3. Imposing a good neighbor rule within 25m of the boundary on dairying land only to prevent the spread of giant buttercup to other properties. 4. Planning, managing and monitoring the sustained control programme and adapting the approach if necessary. The Council proposes to carry out these activities through a sustained control programme in the new Regional Pest Management Plan. Dairy farms are to target the entire farm, therefore boundary rules will not apply.

Giant gunnera *(Gunnera manicata, G. tinctoria)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (Section 6.3 of current strategy) • *Distribution:* widespread in wetland, riparian, coastal. Approximately 182 known sites in 2012. • *Spread:* free seeding, seed spread by water and birds, underground rhizomes form clumps • *Effect:* Threat to indigenous biodiversity values, form dense colonies shading out and suppressing regeneration of indigenous flora.	0.25	Advice and education Public awareness campaign - media release - newsletter - meetings Site led control Inspections and Enforcement Programme planning, management and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, workshops, trained and motivated people. Giant Gunnera control Compliance with rules NODs issued **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	**Maintain remnant ecosystems over 10 years** dieback, SEM monitors of canopy cover, number of type of species (flora and fauna) No reduction of rare and distinctive species in KNEs over 10 years	Biodiversity increases across Taranaki due to reduced pressure from Giant Gunnera.
Vision					
Indigenous biodiversity is protected and maintained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi/ hapu	• Herbicides are effective • Control is achievable on private land • Ease of compliance (precautionary approach) • Difficult to control and eradicate • Whole property to be addressed by good neighbour rule to prevent biological spread and associated externality impacts on neighbours.	• Political support • Community support • Economic support	Giant gunnera is a threat to indigenous biodiversity, with the ability to shade out and suppress regeneration of native flora. Giant gunnera is widespread in wetland, riparian and coastal areas. To maintain biodiversity the Council proposes to continue the sustained control programme for Giant gunnera by: 1. Providing advice and information to key stakeholders. 2. Carrying out inspection and surveillance, and enforcement of rules if necessary. 3. Imposing a good neighbor rule to prevent the spread of Giant gunnera to other properties. 4. Planning, managing and monitoring the sustained control programme and adapting the approach if necessary.

Gorse *(Ulex europaeus)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Containment pest (Section 6.4 of current RPMS) • *Distribution:* Widespread, found everywhere, urban problem- Notices of Direction issued in urban areas 90% of the time. Approx 536 known sites • *Spread:* Seed persists in the environment after control. • *Effect:* Impacts on amenity values and production Vision Economic productivity is maintained for future generations	0.5 FTE	Advice and education Public awareness campaign -media release - newsletter - meetings Inspection and Enforcement Bio- control Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Gorse control. Initial biocontrol populations established, direct control **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain and increase stock productivity over 10 years $/ha	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi/hapu	• Production and amenity pest • Could become problem in riparian • Landholder is best placed to carry out control • Good nursery plant • 25m boundary distance sufficient to prevent biological spread of the plant and associated externality impacts on neighbours	• Political support • Community support • Economic support	Gorse is widespread throughout the region, however infestation levels are decreasing. The desired intermediate outcome for Gorse is protection of agricultural production values. However, in documenting the current inputs, it was clear that the majority of enforcement actions (around 90%) have occurred in urban areas, to protect amenity values of neighbouring residential properties. The proposed **sustained control** programme for Gorse is considered appropriate for the management of this species, however the Council recommends that any good neighbour rule should only apply to rural properties. The Council will carry out the sustained control programme by: 1. Providing advice and information to key stakeholders. 2. Carrying out inspection and surveillance, and enforcement of rules if necessary. 3. Imposing a good neighbor rule to prevent the spread of gorse to other properties. 4. Planning, managing and monitoring the eradication programme and adapting the approach if necessary.

Thistles (nodding, plumeless, variegated) *(Carduus nutans, Carduus acanthoides, Silybum marianum)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (Section 6.5 of current RPMS) • *Distribution:* Isolated problem on dairy farms where spraying regimes are in place. 11 sites of nodding thistle, 1 site of plumeless thistle, 3 sites of variegated thistle. • *Spread:* Thistles spread for miles by wind (also through hay and animal pathways). • *Effect:* dense stands suppress pasture and can obstruct livestock movement	.1 FTE	Advice and education Public awareness campaign - media release - newsletter - meetings Inspection and Enforcement Bio-control Programme planning, management and monitoring	**Public education and engagement.** Farm visits, trained and motivated people. **Thistle control** compliance with rules, number of NODs issued, feedback from meetings/councillors, adverse externalities managed. Bio control populations established. Compliance with rules Effective adaptive management	Maintain and increase stock productivity over 10 years $/ha	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down
Vision					
Economic productivity is maintained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi/hapu	• Biological control is effective and spreading. • Control expenses will come down over time if adequately controlled. • Easy win (control doesn't require many resources, supported by farmers, easy to control) • Biological control for nodding thistle is successful (crown weevil) • Whole property to be addressed on dairy land by good neighbour rule to prevent biological spread and associated externality impacts on neighbours. • 25m buffer distance sufficient in eastern hill country to address biological spread and associated externality impacts	• Weather • Stock numbers • Natural disasters/ biosecurity threats • Political/stakeholder support	The Council will continue to carry out surveillance and provide advice and information with regards to the management of thistles, as a **sustained control programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary 4. Imposing a good neighbor rule on dairy land to prevent the spread of nodding and plumeless thistle to other properties. 5. Imposing a 25m boundary rule on crown and private land to prevent the spread of nodding and plumeless thistle to other properties.

Old man's beard *(Clematis vitalba)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest plant (Section 6.6 of current RPMS) • *Distribution:* heavy around south and coastal Taranaki. Continuing to spread. 265 sites. Isolated patches in urban areas and sacrificial catchments (1500ha); not yet problem in eastern hill country. Problem in DOC reserves • *Spread:* Pathways via mulching hedges, birds and water, Spread within 100m (80% germination) • *Effect:* competition and suppression of flora, problem for hedgerows, riparian margins, environmental problem in native environments.	2 FTEs (biodiversity and LM) 1 FTE of other council section support	Advice and education Biological control Direct control **Inspections and Enforcement.** Notices of Direction (NODs) served Programme planning, management and monitoring	**Public education and engagement.** Farm visits, trained and motivated people. Old mans beard control Compliance with rules NODs served Effective adaptive management programme Maps/data strategies and plans	**Maintain remnant forest health over 10 years** % dieback, bird counts, SEM monitors of canopy cover, number of type of species (flora & fauna) Maintain and enhance the condition of riparian margins of Taranaki ring plain rivers and streams over ten years. **Current objective:** To prevent the spread and, if practicable, reduce infestations of old man's beard in the Taranaki region for the duration of the strategy. To reduce heavy infestations of old man's beard in the Kaupokonui stream, Patea river and Waingongoro River through the release and distribution of biological control agents.	Biodiversity increases across Taranaki due to reduced pressure from old man's beard Riparian programme is protected due to reduced pressure from old man's beard
Vision					
Indigenous biodiversity is protected and maintained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Land management section • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi/hapu	• Land occupier is best placed to undertake control • Will continue to spread • Unknown areas exist • No economic loss to farmers • Old mans beard control has biodiversity and riparian benefits • Enforcement works/changes behaviour • Infestations in sacrificial catchments are accessible • Risk: biocontrol agent not working • Compliance programme (protecting DOC and responding to complaints. • 50m buffer distance sufficient to address biological spread	• Landowner control is successful • Staff capability/capacity • Effective biocontrol • Landowner ability to pay for environmental pests vs production pests • Climate change impacts	Old Mans beard is a significant threat to indigenous biodiversity values in the Taranaki region, suppressing regeneration and smothering second growth indigenous forest. The vine is proving difficult to control, and current control methods are not proving effective in areas of heavy infestations The Council proposes to continue the **sustained control programme** for old mans beard, but with a focus on empowering and supporting landowners to carry out control – similar to the possums self help programme. The Council will do this by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary 4. Imposing a 50m boundary rule in badly affected catchments to prevent the spread of old mans beard to other properties. This programme will require an increase in inputs to achieve its objectives.

Ragwort *(Jacobaea vulgaris)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (6.7 of current RPMS). • *Distribution:* widespread throughout central Taranaki and Opunake. • *Spread:* Seed light with parachute, spreads easily, can also be spread by animals/hay/water • *Effect:* Agricultural pest, reducing pasture production, toxic to cattle Vision Economic productivity is maintained for future generations	0.2	Advice and education Public awareness campaign -media release - newsletter - meetings Bio-control Inspection and Enforcement Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Ragwort control. Initial biocontrol populations established **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain and increase stock productivity over 10 years $/ha Increased pasture growth over 10 years Current objective: To prevent the spread of infestations of Ragwort and Pink Ragwort in the Taranaki region for the duration of the strategy.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi/hapu	• Can be controlled – numerous herbicides available. • Good public understanding of the problem • Unpalatable, and poisonous to cattle and horses • Whole property to be addressed on dairy land by good neighbour rule to prevent biological spread and associated externality impacts on neighbours. • 25m buffer distance sufficient in eastern hill country to address biological spread and associated externality impacts	• Political support • Community support • Economic support	Yellow ragwort is principally a problem in dairying parts of Taranaki. Heavy infestations of yellow ragwort will reduce pasture production, reducing the carrying capacity of dairy land. The Council will continue to carry out surveillance and provide advice and information with regards to the management of Yellow Ragwort, as a **sustained control** programme in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary 4. Imposing a 25m boundary rule on the ring plain to prevent the spread of ragwort to other properties.

Pink Ragwort (*Senecio glastifolius)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Containment pest (6.8 of current RPMS) must be eradicated on dairying ringplain. Boundary rule for EHC • *Distribution:* limited, Southern roadsides (Waverley, Waitotara), waste areas, DOC estuary(Phase 1 of the infestations curve model) • *Spread:* Seed light with parachute, spreads easily, can also be spread by animals/hay • *Effect:* Agricultural pest, reducing pasture production, toxic to cattle Vision Economic productivity is maintained for future generations	0	Advice and education Public awareness campaign -media release - newsletter - meetings	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Pink ragwort control. Reduction in area of infestation on a site led basis **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of pink ragwort. Current objective: To prevent the spread of infestations of Ragwort and Pink Ragwort in the Taranaki region for the duration of the strategy.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Landowners • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi/hapu • TRC internally	• Rules unreasonable for pink ragwort • Stock eat pink ragwort		The Council proposes to remove Pink Ragwort from the new Plan, as the plants limited distribution is currently having a negligible effect on agricultural production. The Council will continue to provide advice and information for the management of pink ragwort, and will continue to administer bio control if deemed necessary. Most land owners are effectively managing the plant already.

Wild Broom *(Cystisus scoparius)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** pest (Section 6.10 of current strategy) • *Distribution:* Localised problem in Patea catchment, Stratford region • *Spread:* seeds prolifically, spread by water • *Effects:* Impacts on amenity values and production, shades out pasture and invades riparian areas. Vision Economic productivity is maintained for future generations	0.25	Advice and education Public awareness campaign -media release - newsletter - meetings Inspection and Enforcement Site led control at KNEs Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles **Broom control**. Initial biocontrol populations established **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain and increase stock productivity over 10 years $/ha **Current objective:** to prevent the spread of, and, if practicable, reduce infestations of Wild broom in the Taranaki region for the duration of the strategy.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi	• Reasonable easy to control • Potential to become major threat • More riparian getting restored may result in more broom invasions. • Whole property addressed on dairy land to prevent biological spread and associated externality impacts. • 25m buffer distance sufficient to address biological spread and associated externality impacts in the eastern hill country.	• Political support • Community support • Economic support	Wild broom is principally a problem in pastoral situations were it shades out pasture grass, affecting agricultural production. It also invades riparian areas. The current distribution of wild broom has a negligible effect on economic productivity or indigenous biodiversity, as most infestations occur on waste areas, roadsides, or poorly grazed pasture. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of Wild broom, as a **sustained control** programme in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary 4. Imposing a 25m boundary rule on crown and private land in the eastern hill country to prevent the spread of ragwort to other properties.

Wild ginger (Kahili and yellow) *(Hedychium gardnerianum, Hedychium flavescens)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Containment** Pest (Section 6.11 in current strategy) • *Distribution:* widespread in region, urban NP, gardens, waste areas • *Spread:* free seeding • *Effects:* Smother and replace understory species. Can suppress indigenous regeneration, reducing access, blocking streams.	0.25	Advice and education Public awareness campaign -media release - newsletter - meetings Inspections and Enforcement Site led control at KNEs Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries, sale of traps, workshops, trained and motivated people. Wild Ginger control. Number of KNE's actively managed under sustained control **Compliance with rules.** NODs issued, prosecutions **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	**Maintain remnant ecosystems over 10 years** dieback, SEM monitors of canopy cover, number of type of species (flora and fauna) No reduction of rare and distinctive species in KNEs over 10 years **Current objective:** To reduce known infestations of wild ginger in the Taranaki region for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from wild ginger
Vision					
Indigenous biodiversity is protected and maintained for future generations					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi/hapu	• Wild ginger easy to control, difficult to eradicate • Herbicides are effective • Currently no biocontrol although is being actively researched by LandCare Research • Ease of compliance (precautionary approach) • Control is achievable on private land • Kahili ginger free seeding therefore most invasive of the two • rule to cover whole property, buffer rules not appropriate	• Political support • Community support • Economic support	Wild Ginger is difficult to eradicate, and may have a significant impact on biodiversity by suppressing native regeneration. It may also block streams and restrict access to recreational areas. Wild Ginger is widespread throughout the region (especially in Urban New Plymouth, gardens and waste areas) but currently is not present in areas where it threatens indigenous biodiversity. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of Wild Ginger, as a **sustained control programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary 4. Imposing a good neighbor rule on crown and private land to prevent the spread of wild ginger to other properties.

Brush Wattle (*Paraserianthes lopantha)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance** plant pest (Section 7.1 of current RPMS) • *Distribution:* north Taranaki, Patea,/Waverley, coastal Waste ground. • *Spread:* seeds freely, spreads readily, through water, soil and gravel movement. • *Effect:* Principally on biodiversity values. Visual weed, nuisance value; biodiversity areas , Threat to horticulture, • 20 complaints/enquiries annually – mostly from urban areas Vision Indigenous biodiversity is maintained for future generations	0	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Brush Wattle control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of Brush wattle **Current objective:** To promote the public understanding and gather information on the 'pest' characteristics of Brush wattle for the duration of this strategy.	Biodiversity increases across Taranaki due to reduced pressure from Brush wattle

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi	• Biodiversity impact insignificant	• Political support • Community support • Economic support	Brush wattle is an evergreen tree that seeds freely, and can be difficult to control once established. Its principal impacts are on indigenous biodiversity values, suppressing regeneration of flora. The current restricted distribution of Brush Wattle has a negligible effect on indigenous biodiversity or economic activity. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of Brush Wattle, as a site led programme in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary

Egeria Oxygen Weed (*Egeria densa)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance** plant pest (Section 7.2 of current strategy) • *Distribution:* restricted distribution; small infestations, large infestation in Lake Rotorangi. • *Spread:* vegetative fragments in water • *Effect:* competitive, replaces indigenous aquatic flora reducing species diversity; increase sedimentation, alter chemical & physical characteristics; may interfere with recreational, hydro-electrical and water supply activities Vision Indigenous biodiversity is maintained for future generations	0.1	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Egeria control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of Egeria oxygen weed. **Current objective:** To promote public understanding and gather information on the 'pest' characteristics of Egeria oxygen weed for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from Egeria oxygen weed.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Freshwater scientists • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi/hapu	• Political – rules wont work • Biodiversity impact currently not significant • Difficult and expensive to control	• Political support • Community support • Economic support	*Egeria* can easily spread by vegetative fragments, and can affect water quality on water bodies. It may also affect hydroelectric power generation and recreational activities. The current restricted distribution of *Egeria* does not currently have a regionally significant effect on indigenous biodiversity or economic activity. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of *Egeria,* as a site led programme in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Continuing to administer bio control agents where necessary 3. Planning, managing, monitoring and adapting the approach if necessary

Japanese walnut (*Juglans ailantifolia)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **Surveillance** plant pest (Section 7.3 of current strategy) • *Distribution:* limited, abundant in Uruti • *Spread:* nuts float downstream and germinate on riverbanks • *Effect:* potential threat to biodiversity- competes with riparian/wetland vegetation for nutrients and light. Possible obstruction of drainage channels. Vision Indigenous biodiversity is maintained for future generations	0.05	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Japanese walnut control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of Japanese Walnut. **Current objective**: to promote understanding and gather information on the 'pest' characteristics of Japanese Walnut for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from Japanese Walnut.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi	• Biodiversity impact insignificant	• Political support • Community support • Economic support	Japanese walnut are generally found along rivers and pose a potential threat to indigenous biodiversity values, suppressing the regeneration of indigenous flora, and may obstruct drainage channels. The current limited distribution of Japanese walnut has a negligible effect on indigenous biodiversity or agricultural production. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of Japanese Walnut, as a **site led programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out direct control in KNEs where required. 3. Continuing to administer bio control agents where necessary 4. Planning, managing, monitoring and adapting the approach if necessary

Lagarosiphon oxygen weed (*Lagarasiphon major)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance plant pest (Section 7.4 of current RPMS) • *Distribution:* limited - freshwater ponds and lakes, predominantly Patea catchment • *Spread:* vegetative fragments in water • *Effect:* competitive, replaces indigenous aquatic flora reducing species diversity; increase sedimentation, alter chemical & physical characteristics; may interfere with recreational, hydroelectrical and water supply activities Vision Economic productivity and indigenous biodiversity is maintained for future generations	0.05	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Lagarosiphon oxygen weed control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of Lagarosiphon oxygen weed. **Current objective**: to promote understanding and gather information on the 'pest' characteristics of Lagarosiphon oxygen weed for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from Lagarosiphon oxygen weed.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird • Land occupiers • District Councils • Iwi	• May displace traditional food sources- ie watercress • Difficult to control •	• Political support • Community support • Economic support	Lagarosiphon is a competitive aquatic weed which grows submerged in freshwater lakes, and slow moving streams. It poses a significant risk to Taranaki waterways: biodiversity, water quality, hydroelectric power generation, and recreation. The current limited distribution of *Lagarosiphon* is not of major concern. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of *Lagarosiphon*, as a **site led programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out direct control in KNEs where required. 3. Continuing to administer bio control agents where necessary 4. Planning, managing, monitoring and adapting the approach if necessary

Spanish Heath (*Erica lustinaca)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Surveillance plant pest (section 7.5 of current RPMS) • *Distribution:* Restricted, East Taranaki road cuttings, waste areas, rough country • *Spread:* mechanical, road contractors, livestock, sheep, mulching • *Effect:* capable of totally suppressing pasture. Impact on biodiversity, no native regeneration Vision Economic productivity and indigenous biodiversity is maintained for future generations	0.05	Advice and education Public awareness campaign -media release - newsletter - meetings Direct control at KNEs Inspection and Enforcement Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Spanish heath control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse effects of Spanish heath **Current objective**: to promote understanding and gather information on the 'pest' characteristics of Spanish Heath for the duration of the strategy.	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi	• Controllable, herbicides available, • Difficult to control once well established. • Still spreading on low fertility soil • Less visual	• Political support • Community support • Economic support	Spanish heath is a woody perennial that may grow in dense stands that can impact on agricultural production. The current restricted distribution of Spanish heath has a negligible effect on agricultural production. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of Spanish heath, as a **site led programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out direct control in KNEs where required. 3. Continuing to administer bio control agents where necessary 4. Planning, managing, monitoring and adapting the approach if necessary

Woolly nightshade *(Solanum mauritianum)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• **surveillance** plant pest (Section 7.6 of current RPMS) • *Distribution:* widespread – coastal, riparian, bush, roadside margins. • *Spread:* birds, potential to spread easily • *Effect:* Minor biodiversity impacts, restricts regeneration of native species, human health – respiratory Vision Indigenous biodiversity is maintained for future generations	0.05 of an FTE	Advice and education Public awareness campaign -media release - newsletter - meetings	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles Woolly nightshade control. Reduction in area of infestation **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse impacts of woolly nightshade. **Current objective**: to promote understanding and gather information on the 'pest' characteristics of Woolly nightshade for the duration of the strategy.	Biodiversity increases across Taranaki due to reduced pressure from Woolly nightshade

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation, • Federated Farmers' • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Iwi	Political – rules wont work Biodiversity impact is insignificant	External factors- DOC, public, RFB Political drive	Woolly nightshade is a free seeding, fast growing shrub that is widespread throughout coastal Taranaki, bush remnants, and waste areas. The plant matures quickly and forms dense, often pure stands that restrict the regeneration rate of native species. The current distribution of Woolly nightshade has a negligible effect on indigenous biodiversity or agricultural production. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of woolly nightshade, as a **site led programme** in the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out direct control and surveillance in KNEs where required. 3. Planning, managing, monitoring and adapting the approach if necessary

Yellow bristle grass (*Setaria pumila)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Not currently declared a pest • **Distribution:** infestations have been identified at Urenui, Tikorangi, Motonui, Lepperton, Inglewood, Okato, Manutahi. roadsides, disturbed/waste areas. • **Spread:** Reproduces by seed – dispersed by water, soil movements, animals, hay, machinery • **Effects:** stock health, pasture production Vision Economic productivity is maintained for future generations	0.05	Advice and education Public awareness campaign -media release - newsletter - meetings Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the adverse impacts of yellow bristle grass	Harm to economic activity from pests and diseases is prevented or reduced. Compliance/herbicide costs go down

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Federated Farmers • Fish and Game • Land occupiers • New Plymouth District Council • Ministry of Primary Industries • NZ Transport Authority • TRC internally • Iwi	• Controllable, herbicides available, low fertility plant • 28 day with-holding period following chemical application • Palatable to stock • Seed heads mid Jan-may (stock avoid it during this time) • Difficult to remove once established in weakened pasture. annual feed production may be reduced by 20% - $1,100/ha in lost production • Has been in the region a long time (reported in 1932) • Changes to district council roadside mowing regimes may help prevent spread by machinery.	Public pressure • Political support • Community support • Economic support	Yellow bristle grass is an annual summer grass which is invading pastures from roadside infestations, via road side mowing machinery, stock movement, and in hay/silage. Invasion of pasture by yellow bristle grass can affect pasture production, and stock health. The majority of infestations appear to be on roadsides and waste ground, therefore the Council does not consider direct control or a regulatory approach to be necessary or appropriate. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of yellow bristle grass, outside of the Regional Pest Management Plan. This will be done by: 1. Providing advice and information to key stakeholders. 2. Carrying out surveillance and monitoring to note any new infestations 3. Planning, managing, monitoring and adapting the approach if necessary

Tutsan (sweet amber) (*Hypericum androsaemum)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• Not currently declared a pest • **Distribution:** East Taranaki road cuttings, waste areas, rough country • **Spread:** mechanical, road contractors, livestock, sheep, mulching, birds, • **Effects:** Impact on biodiversity, smothers low growing plant communities, capacity to form extensive patches Vision Indigenous biodiversity is protected and maintained for future generations	0.01	Advice and education Public awareness campaign -media release - newsletter - meetings Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, newspaper articles **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness of the impacts of Tutsan	Biodiversity increases across Taranaki due to reduced pressure from tutsan

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC internally • Department of Conservation • Federated Farmers • Fish and Game • Forest and Bird, • Land occupiers • District Councils • Iwi	• Controllable, herbicides available • Can be difficult to kill, timing is important • spreading on low fertility soil • Less of a visual pest than others • Unpalatable to stock • Consideration was given for a small scale management programme for tutsan in eastern hill country, distribution of plant was far wider than initially thought.	• Political support • Community support • Economic support	Tutsan is a shrub with the capacity to form extensive patches exceeding one hectare in size. Its dense cover of branches and its rotting leaves can smother existing low growing plant communities and inhibit regeneration. Currently tutsan is restricted to waste areas and road cuttings, especially in the eastern hill country. The current limited distribution of tutsan does not have a significant effect on indigenous biodiversity or agricultural production. However, the Council will continue to carry out surveillance and provide advice and information with regards to the management of tutsan **outside** of the Plan by: 1. Providing advice and information to key stakeholders: 2. Carrying out surveillance and monitoring to note any new infestations 3. Planning, managing, monitoring and adapting the approach if necessary.

Hornwort *(Ceratophyllum demersum)*	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
Not in current strategy **Distribution:** Significant infestation found in Lake Rotorangi, April 2012. **Spread:** recreational lake users **Effects:** Aggressive freshwater weed, affecting water quality, aquatic biodiversity, hydro-electric power generation Vision Indigenous aquatic biodiversity and water quality is protected and maintained for future generations.	0.05	Advice and education Public awareness campaign -media release - newsletter - meetings Surveillance Programme planning, management and monitoring	**Public education and engagement.** Contractor engagement, website, public enquiries, workshops, signage, newspaper articles **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Increase public awareness to prevent the spread of hornwort between lakes in the region. Reduce likelihood of new infestations in lakes in the region (pathways management)	Biodiversity is maintained in the freshwater ecosystems due to reduced pressure from invasive freshwater weeds.

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• TRC - internally • Department of Conservation • Trust power • Recreational lake users • Fish and Game, • Forest and Bird, • Land occupiers • District Councils • Lake Rotokare • Iwi	• NIWA/ trust power study confirmed unlikely hornwort will have a significant effect on water intakes for power generation in Lake Rotorangi • Eradication wont be cost effective or technically feasible (could cost up to $400,000 each year) • Pathways management to prevent spread is number 1 priority. • Raise awareness through annual check clean dry programme. • Controlled using selective herbicide diquat	• High public interest in the pest • Political pressure • Economic	Hornwort is a highly invasive aquatic plant that has the potential to negatively freshwater quality, aquatic biodiversity values, and recreational use. As the weed is highly invasive, it could easily be spread by recreational users to other lakes in the region. Trustpower commissioned NIWA to conduct a study of Lake Rotorangi in June 2012 and concluded that the pest was not likely to have a significant effect on hydro-electric power generation. The study confirmed that hornwort is well established and widespread throughout Lake Rotorangi. The Council remains the lead agency for the management of this pest. The programme will be carried out through: 1. Providing advice, education to key stakeholders to increase awareness of the ease of spread: erection of signs, Check Clean Dry summer awareness campaign 2. Carrying out surveillance and monitoring to note any new infestations through the SEM programme 3. Planning, managing and monitoring the programme and adapting the approach if necessary. The Council proposes to restrict the spread of Hornwort through a pathways programme, outside of the Plan. The Check Clean Dry summer campaign is a key opportunity for encouraging recreational users to prevent the spread of hornwort, didymo, and other freshwater pests. The Council will continue to liaise with DOC, Trustpower, NIWA and Iwi to ensure hornwort is effectively managed outside of the Regional Pest Management Plan.

Grateloupia turuturu	**Inputs** **What we intend to invest**	**Activities** **What we intend to do**	**Outputs** **What we intend to produce**	**Outcomes**	
Current situation				**Intermediate**	**Long term**
• New discovery- not currently in strategy • *Distribution:* Limited distribution, confined to Port Taranaki, Waitara • *Spread:* Highly invasive, easily spread by ballast water, ship hulls. • *Effects:* once established can replace or exclude native seaweed species and associated marine flora.	0.25 (with *Undaria*)	Advice and education Public awareness campaign -media release - newsletter - meetings Site led control at Port Taranaki Annual Surveillance Programme management, planning and monitoring	**Public education and engagement.** Number of websites, visits, meetings, brochures, public enquiries *Grateloupia* control Number of sites where control is undertaken, amount of biomass gathered **Effective adaptive management programme.** Operative strategies/plans, data information and maps.	Maintain biodiversity of the Sugar Loaf Islands and other nearby significant marine sites Reduce likelihood of new infestations in Port Taranaki (pathways management)	Biodiversity is maintained in the marine ecosystem due to reduced pressure from invasive seaweeds.
Vision					
Indigenous marine biodiversity is protected and maintained for future generations.					

Key stakeholders to involve	Underlying assumptions and risks	Internal & external factors	Conclusion
• Port Taranaki • Department of Conservation • Ministry of Primary Industries • TRC internally • Fish and Game • Sportfishing and underwater club • Nga motu Marine Reserve Society. • Iwi	• Very hard and expensive to control. • There are currently no effective control tools to manage widespread organisms in the marine environment • New incursions are likely, therefore it is not feasible to eradicate (ballast water, hull fouling) • Possibility of by-kills as it can be hard to identify from native species • May have beneficial qualities – edible? • the limited ability to prevent onward spread via natural dispersal and the risk of new or additional infestations in other regions being spread to Taranaki via pathway • ownership of the seabed/port Taranaki could pose legal problems for management • notification rule may be appropriate	• Political support (MPI) • Community support • Economic support	TRC is the lead agency responsible for coordinating regional intervention in the Taranaki marine environment. The Ministry of Primary Industries and DOC play a supporting role. MPI have previously made the decision that *Grateloupia* cannot be eradicated or contained nationally. Whilst *Grateloupia* poses a significant risk to marine farming, this is not an issue in the Taranaki region unless ventures are established. To protect the biodiversity of the marine environment, especially that surrounding the sugar loaf islands, the Council proposes to manage *Grateloupia* through a site-led pathway programme (in partnership with the Port and DOC). This will involve: 1. Providing advice and information to key stakeholders about *Grateloupia* 2. Carrying out surveillance and monitoring to note any new infestations 3. Carrying out direct control of *Grateloupia* infestations 4. Monitoring pathways 5. Planning, managing and monitoring the sustained control programme and adapting the approach if necessary.