

Towards 'Greening Cambridge'



**Supporting Predator Free Cambridge -
helping to make our dawn
chorus a symphony**

November 2018

This pre-scoping strategy/framework document has been reviewed and approved for release by:



P G Russell
19th November 2018



Cover photograph: Large female possum trapped in Hall Street, Cambridge – June 2018

(Photo source: P Russell)

Acknowledgements

The following people and organisations are thanked for their assistance in preparing this document:

- Susan Emmitt, Claudia Gawler – Waipa District Council
- Dion Patterson, Tania Wells, Carisse Enderwick, Rose [DouglasGraham](#), Andrew Styche – Dept of Conservation
- Dave Byers, Mark Gasquoine – Waikato Regional Council
- Alex Daniel, Environmental Educator, Enviroschools/Trees for Survival
- Members of the wider Cambridge community (Adam Thompson, Joe Dillon, Donna Palmer, David Griffith and Bella and Niki Russell) currently undertaking predator control/raising awareness (*keep up the great work!*)

Disclaimer:

This document has been prepared and written by Better Biosecurity Solutions Ltd for the Department of Conservation and Predator Free Cambridge, to ultimately better engage with schools but also businesses and the wider Cambridge community. The document is intended to provide accurate and adequate information pertaining to the subject matters, within the limitations of the project scope. While every effort has been made to ensure that the information in this document is accurate, Better Biosecurity Solutions Ltd accepts no responsibility or liability for error or fact omission, interpretation or opinion which may be present, nor for the consequences of any decisions based on this information. The author has exercised all reasonable skill and care in the preparation of this information and accepts no liability in contract tort, or otherwise, for any loss, legal prosecution or enforcement action, damage, injury, or expense, whether direct, indirect or consequential, arising out of the provision of this information.



1. Project Scope and Context

Just imagine if Cambridge could sustain its own kokako population!

1.1 Introduction

Predator Free Cambridge (PFC) was established in May 2017, but stepped up its on the ground action in mid 2018 with the granting of \$5,000 worth of materials (approx. 280 rat traps and boxes) by the Department of Conservation (DOC) to increase the momentum behind the project. Funding was also provided to develop a framework for an education programme to better enable PFC to connect with schools, youth and the wider communities in and around Cambridge (*Kemureti* in Te Reo).

DOC has a mandate to facilitate and support the growing nature of community conservation efforts, such as Predator Free 2050 aspirations and accordingly contracted Better Biosecurity Solutions Ltd (BBS) to develop a framework strategy (this document) tailored to the needs of PFC while also considering wider biodiversity issues and connections in the area.

As well as steadily building a community trapping profile and capacity (aiming for a rat trap in every 5th backyard) PFC embarked on rodent control on Waipa District Council (WDC) managed reserve land around Lake Te ~~Ko Utu~~Koo Utu in central Cambridge in mid-September 2018. The results of this work (the mahi) to date are proving successful, with the next step being extension to possum control and consideration of expansion to other sites (e.g. Leamington Walkway, Karapiro Stream). However, PFC has been mindful to focus on realistic and achievable tasks and what its volunteer members can usefully contribute, without expanding too fast into too many areas all at once.

At the same time PFC recognises that the work to date has evolved in the absence of any umbrella strategy or approach for the biodiversity protection/enhancement of the wider Cambridge area. Therefore, this document should be considered as a pre-scoping exercise, to help build a wider understanding of environmental enhancement opportunities in the area and potential partnerships within the community in order to build credibility and backing for projects which will spin off having a high-level strategy in place around 'greening Cambridge'. Predator Free Cambridge is an obvious key project within this strategy. In reality PFC will run parallel with development of any wider strategy developed as numerous operations are already underway.

A key requirement is for existing and new projects and approaches to be developed using DOC's Collaborative Community Education Model (CCEM), which has been trialed on, and mirrors the successful *Greening Taupo* programme, including *Kids Greening Taupo* which incorporates *Predator Free Taupo* initiatives. The CCEM concept, together with practical experiences from the various Taupo projects are directly relevant to Cambridge's situation and aspirations. For example, linking PFC projects with EnviroSchools programmes will hopefully lead to upskilling of teachers, more resources made available, schools adopting sites and opportunities for students to share their knowledge.

This document addresses and considers the following matters:

- Overview of the bigger picture pest related initiatives and outcomes achieved to date in the Cambridge area and wider district;
- What Predator Free Cambridge is focusing on at time of writing – a case study;
- Collaborative Community Education Model – who are the key players, what are they currently doing, who are potential partners, how it all might come together; and
- Key recommendations are made, and the next steps outlined.



The audience for this paper is wide but is primarily aimed at central/local governmental funders, Cambridge community leaders and those interested in community conservation.

1.2 Purpose – why are we doing this?

The purpose of this document is to provide, within a pre-scoping broad strategy approach, a framework for engagement with schools (and ultimately businesses and the wider community in and around Cambridge) on biodiversity enhancement opportunities, focusing on Predator Free Cambridge initiatives. The essential outcomes sought are that PFC projects are:

- Successful and sustainable in the long term (e.g. biodiversity values are enhanced) and contribute to future, bigger picture environmental goals for Cambridge;
- The wider area's schools and early learning centres are increasingly engaged and more actively involved in undertaking 'their own' projects;
- Materials and resources are used wisely (and combined efforts are recognised and celebrated); and projects are
- Worthwhile and add social value (and projects contribute to a sense of pride for those directly involved), with spinoff benefits for various businesses and wider communities.



Tui amongst full kowhai bloom. (Photo source M. Dignan)

1.3 Cambridge's bigger picture connections

There are numerous large and small scale biodiversity/pest related projects, at various stages of implementation, which impact directly and indirectly on the Cambridge area. The key projects are summarised as follows.

Sanctuary Mountain Maungatautari (mainland ecological island and pest free reserve)

One of New Zealand's premier conservation projects is right on Cambridge's 'back doorstep' and the 'spill-over' effect of birdlife in Cambridge has been awe-inspiring for those who have noticed its impact. Because of this 3,500 hectare predator proof fenced and predator free (except field mice) project, where many wildlife reintroductions (including many threatened and endangered species) have been made over a decade, tūi abound in Cambridge, korimako (bellbird) are seen and heard daily, kereru are more numerous, and kaka and karearea (NZ falcon) are being seen more and more.



Predator Free Cambridge aims to leverage off the success of Sanctuary Mountain Maungatautari, raise awareness of these projects and complement the ongoing biodiversity enhancement work carried out.

<https://www.sanctuarymountain.co.nz/>

Hamilton halo project

Tūi and korimako were once abundant in and around Hamilton where they are important pollinators and seed dispersers for native plants and are highly valued. Studies showed that tūi flew directly and daily into Hamilton to feed on exotic plants but returned to summer forest nesting areas up to 20km outside the city (e.g. Pirongia, Mangakawa/Te Miro). Initiated in 2007 by Waikato Regional Council (WRC) the Hamilton Halo was initially focused on bringing tūi back to Hamilton.



Spring/summer breeding success is the key, as without adequate animal pest control, tūi nesting success is only 27 per cent, mostly due to the high populations of ship rats where they nest. The 'Halo' is a ring around Hamilton, taking in the key forest sites within the 20km tūi feeding range. To improve nesting success, intensive rat control is done before the breeding seasons at Halo sites. Halo sites receive pest control on a 'three years on, two years off' basis and rodent populations need to be very low while birds are nesting, even though numbers quickly build up again. Low pest numbers mean more birds can fledge, helping to build the population of birds in each forest block. Birds will disperse from their home areas to new areas and has enabled tūi and other native birds to move into places like Cambridge where numbers are increasing every year. Together with Sanctuary Mountain Maungatautari, the Halo project has had, and will continue to have, the most significant positive impacts on birdlife in Cambridge.

<https://www.waikatoregion.govt.nz/environment/natural-resources/biodiversity/hamilton-halo#>

Whitehall-Te Tapui-Te Miro priority Possum Control Area (PPCA) programme

WRC manages possum control in priority pest control areas (PPCAs) across the region. These are landscape scale areas (10,000 to 30,000 hectares) that have been identified as needing possum control to protect and enhance biodiversity, enhance farm grass production and maintain the gains of many years of historical possum control carried out to eradicate bovine TB. PPCAs are more common along the western side of the region, where there are high biodiversity values. However, an important PPCA is located just east of Cambridge in the Whitehall-Te Miro area.

Possum control occurs across all land but focuses on key bush (habitat) areas where possums live/nest. It involves working closely with each landowner and is funded from rates. All work is contracted, and payment is subject to results. While it is unlikely this PPCA will extend further west into the Cambridge area, much has been learnt about possum control methods for fringe rural areas and urban settings. PFC possum control will complement this work, and vice versa, with operations in the future, potentially extending eastwards towards Whitehall and time may link up.

<https://www.waikatoregion.govt.nz/services/regional-services/plant-and-animal-pests/animal-pests/possums/priority-possum-control-areas/>



Other pest control initiatives in Waipa District

- trapping networks are in place at Lake Ngaroto and Lake Mangakaware,
- pest control at all of the Ohaupo peat lakes, on public land, is supported via Waipa DC, the National Wetland Trust or DOC,
- Lake Serpentine Sanctuary (Rotopiko) - a pest fence was constructed in 2013 and eradication of mammalian pests inside was completed in 2014. The National Wetland Trust has a proposal to reintroduce pateke (brown teal) which relies heavily on all groups who are trapping around the peat lakes to work together, as these birds would disperse from Rotopiko to other sites.

Further afield the Pirongia Te Aroaro O Kahu Restoration Society has a 1,000 ha. intensive pest control operation on the slopes of Pirongia (where kokako have recently been reintroduced) and the Kakepuku Mountain Restoration Project control pests on Mount Kakepuku with bait stations funded by Waipa DC. A trapping network for Yarndley's Bush has been designed by Waipa DC but not yet implemented. In terms of areas closer to Cambridge, long-term, council considers Karapiro Stream and Lamb Street (former quarry) wetland to be sites worthy of investigation for pest control.

Predator Free NZ 2050 opportunities - Landscape scale project – Waikato Basin

The Predator Free New Zealand¹ initiative was announced in 2016, an aspirational goal to eradicate rats, possums and stoats from the country by 2050. It involves supporting large-scale, collaborative predator control (including community-led projects), further breakthrough research leading to new approaches and improving current control methods, to enable eradication of the three target pest species. There are four interim (2025) goals:

- Suppressing predators on a further 1 million hectares;
- Eradicating predators from at least 20,000 hectares without the use of fences;
- Eradicating predators from island nature reserves; and
- Achieving a breakthrough science solution capable of eradicating at least one small mammal predator.

DOC helps facilitate the programme, ensuring the public and private sectors are connected, and has established Predator Free 2050 Ltd. Predator Free Cambridge has leveraged off the Predator Free 2050 programme in terms of obtaining funding to commence local trapping work. The Cambridge area features in a wider WRC/DOC list of candidate Predator Free 2050 projects (Waikato Basin area, from Taupiri to Arapuni - including Sanctuary Mountain Maungatautari, Te Tapui, Te Miro/Mangakawa and Hamilton Halo pest control areas – refer to map in Appendix 1).

1.4 Threats and impacts of the key predators (possums, rats, stoats)

Possums

Possums (*Trichosurus vulpecula*) are a serious environmental threat because they:

- browse and destroy native and exotic trees, feeding on leaves and berries and strip bark;
- feed on native birds (eggs, fledglings and adults);
- feed on native invertebrates, such as insects;
- compete with native birds for habitat and food;
- provide a general nuisance in urban and rural gardens eating roses, defecating and causing disruption at night.

¹ Refer to <http://predatorfreenz.org>

Possums live in a wide variety of places, but forest-pasture margins are their preferred habitat. Their nests are dens in trees, hollow logs, under tangled masses of vegetation, limestone crevices and in hay sheds. Higher concentrations occur in 'unmanaged' areas where there is plentiful food. Possums are known to eat the fruits of at least 65 species of native plants. Possums flourish in and around Cambridge – the town green belt, Waikato river edge, parks and reserves and urban gardens. Not as prolific breeders as rats but require good planning for trapping and disposal.

Controlling possums is vital to protect the integrity of native bush and wildlife (birds and invertebrates) around Cambridge.

Rats

There are ~~two~~ three introduced rat species in New Zealand, the Norway rat (*Rattus norvegicus*), ship rat (*Rattus rattus*) and the now rare kiore or Polynesian rat (*Rattus exulans*). Rats eat almost anything which makes them a direct threat and in direct competition with native wildlife, from invertebrates like wētā and snails to lizards and birds. Rats threaten breeding birds as they prey on eggs and chicks and spread diseases of humans. Ship rats are a particular menace as they are exceptional tree climbers and can reach all parts of trees. Our native birds did not evolve with rats and have no defences against them. Many native bird species also breed very slowly and cannot keep up with the rates of predation that occur.

Intensive rat control is carried out in areas with endangered native species, such as kokako and blue duck, and by community groups where general wildlife values require protection, such as in and around Cambridge. The general aim of rat control is to keep rat numbers low enough during the bird breeding season (October through January) to allow eggs to hatch and young birds to fledge. In areas where rat control has taken place, there is often a great recovery of seedlings, indicating rats also have an impact on vegetation. Rats are prolific breeders and are readily trapped in a range of kill traps – see PFC case study section. Appendix 2 also includes a bigger picture of 'the war on rats' and why we need to take action.

Rats are one of the most important animal pests for which sustained control needs to be implemented around Cambridge because they have very small home ranges and breed prolifically. It is comparatively more expensive and labour intensive than possum control and needs to be tackled in a staged manner.

Stoats

Stoats (*Mustela erminea*) are one of the mustelid family (along with ferrets and weasels) which were introduced to manage rabbit plagues and quickly found an unwanted place in New Zealand's landscape. Mustelids and feral cats are likely to be all found in and around the rural edges of Cambridge, but unlikely in urban areas. Stoats in particular present the biggest threat to nesting birds, as they have caused the extinction of several New Zealand bird species and are the major cause of decline for many other species, including reptiles and invertebrates. They are agile climbers and thrive in forests where there are also high rodent numbers.

Stoat control is an important part of maintaining the biodiversity of the Cambridge environs. However, they have large home ranges and require specific strategies to catch them. Rats and possums are the key focus in the urban areas.



Stoat, ship rat and possum. (Photo source – Department of Conservation)

2. Predator Free Cambridge – the Current Situation

2.1 Overview

Predator Free Cambridge was established in May 2017 by a small group of interested volunteers with a collective passion for, and a range of experiences in, pest control in and around the Cambridge town area. The two main drivers are related to Maungatautari's spill-over success on local birdlife and the ever increasing predator free groups being set up around New Zealand. Based on the 'rule of thumb' approach applied at other PF areas, the early aim for PFC was around establishing a rat trap in every fifth backyard and to encourage town folk to get active in trapping rats as an 'easy' target.

The map at Appendix 3 shows the core area focused on, being the established Cambridge East and Leamington urban areas (inside the general green belt) and eight recent subdivisions (outside the green belt). In total there are 7,471 properties potentially involved (5,495 inside greenbelt and 1,976 outside this area in the subdivisions). On the ratio of 1 in 5, approx. 1,500 traps would be required throughout the town's urban areas. At the time of writing 120 trap boxes had been made and boxes and traps distributed, but actual rat kills were unknown. Trappers are asked to upload trap catch data to the Trap.NZ website.

Increased uptake around the project is being promoted through the Predator Free Cambridge Facebook page <https://www.facebook.com/pfcambridge/> and other events, such as DOC's Conservation Week advocacy. To date PFC has received 276 'likes' with 300 'followers' on Facebook, however those actively involved in the 'doing work' is still very limited.

Local media coverage to date has been excellent (examples contained in links below) and increased political interest has been achieved via WRC local councilor (Stu Kneebone) and MP for Taupo, Louise Upston attending meetings and event launches.

<https://www.stuff.co.nz/environment/100408189/predator-free-cambridge-distributes-free-traps-to-protect-native-birds>

<https://www.stuff.co.nz/waikato-times/life-style/107087047/predator-free-cambridge-looking-to-switch-up-a-gear-after-trapping-300-rats>

www.neighbourly.co.nz/e-edition/cambridge-edition/33962

2.2 Expansion into public areas

As a result of overall increasing interest and the DOC grant made for materials, PFC decided to step-up their effort by undertaking control in a public area and chose a highly visited public area in the heart of Cambridge – Lake Te ~~Ke-Utu~~ Koo Utu. In all 45 rat traps are established on four rat lines around the lake (refer to map in Appendix 4) with good practice being followed and traps spaced out 50 m apart, alternating between Victor or T-rex snap/kill traps. A typical Facebook post (page following) describes the outputs after one month and shows the first kill of the operation. The launch day sheet/awareness campaign for nearby shop/property owners is attached at Appendix 5.

A mix of volunteers are currently involved ranging from business owners, semi-retired people to a few keen secondary school students. At this point no active drive to increase numbers through schools or youth networks has been undertaken, and therein lies a great opportunity to expand the programme to other sites. However, capacity to actively promote and then undertake this work is limited as most people involved have 'day jobs' and/or a host of other commitments. Therefore, a shared approach with many is required.

Three early trap building workshops and/or discussions have been held with three primary schools (Kaipaki, Te Miro and Cambridge Primary) in conjunction with their Enviroschools programme. Potential areas to expand include: possum trapping in the current Lake Te Ko Utu area and possum/rat control along the Leamington Walkway, throughout Cambridge greenbelt areas, along the Waikato River margins (both sides) and in numerous parks and reserves around town (refer also to section 5.5).

Te Ko Utu Rat Trapping update
Time - 1 month
Total Rats Killed - 26
Most in one trap - 7
Hot area - Top of reserve bordering Lakewood
Traps Stolen - 2 (Seriously guys, we give traps away, what idiot is out there trying to sabotage this?)
We're still on the lookout for people to help with checking these. Perhaps once a week or once a fortnight. If you're using the lake tracks all you need to be able to do is to operate a screwdriver and not be afraid of a dead rat once in a while.
If you'd like to be involved please message
hello@predatorfreecambridge.co.nz
Once again a big thanks to Peter, Nikki, Bella, Joe, Donna and David who have been checking the traps regularly.

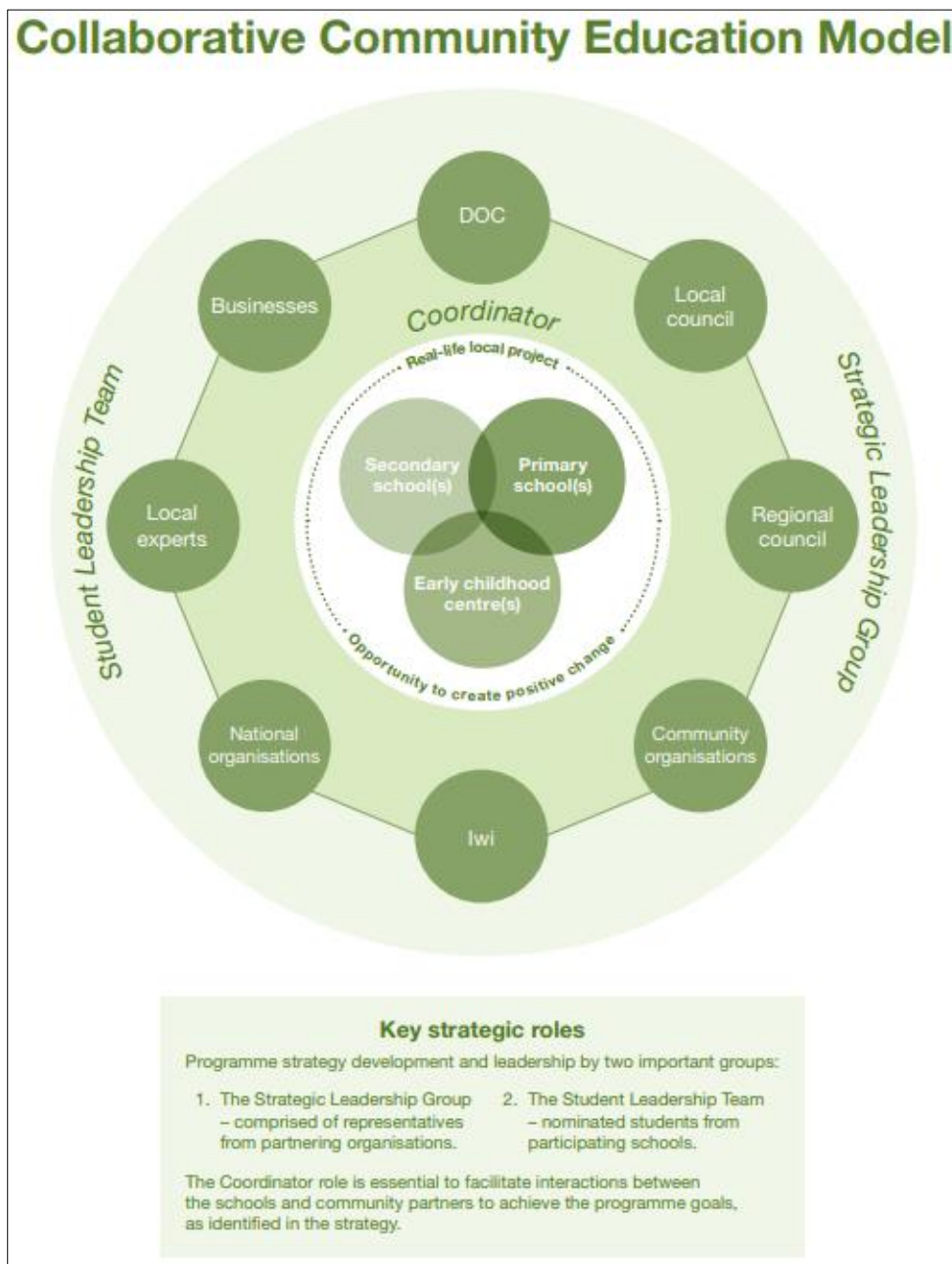


Cambridge based student and PFC stalwart Bella Russell with the first rat kill around Lake Te ~~Ke-Utu~~Koo Utu, 17 September 2018.
(Photo source: P Russell)

3. Collaborative Community Education Model

3.1 How the model works

The Collaborative Community Education Model (CCEM) is well summarised by the diagram below. It shows the eight key groups and organisations that are represented in all communities. Central to and fundamental for all these groupings is the involvement of schools and early childhood centres, where the children in time will become community members and leaders. It is crucial to have two leadership teams in place (strategic focus and student led) to develop a collective vision and to implement a ‘greening’ strategy for an area. The most critical aspect for success is having a dedicated coordinator who can facilitate all the actions required to achieve programme goals. For a ‘Greening Cambridge’ approach, this role could be filled through DOC, the local council or another appropriate organisation, provided the person has the key skills required.



3.2 The Greening Cambridge concept

In adopting the CCEM, 'Greening Cambridge' could be an opportunity for Cambridge schools, residents and businesses to participate in community conservation initiatives, such as Predator Free Cambridge and others such as native plant/tree planting programmes.

Building healthy neighbourhoods by increasing the greenery in our community and promoting 'green urban development' is good for people, business and the environment. Greening Cambridge could mirror the collaborative community education model adopted by *Greening Taupō*, (and *Kids Greening Taupō*) where schools and community partners work together towards a shared environmental education goal. <https://www.greeningtaupo.org.nz/>

The concept of Greening Cambridge requires socialisation and discussion between the key organisations (with passionate individuals to drive actions and progress) and groups coming together to develop a vision around taking conservation to a new level in Cambridge. One such outcome would be to replicate the intensive pest control/conservation work occurring at Sanctuary Mountain Maungatautari, and in the Halo project, into the surrounding community (i.e. Predator Free Cambridge), by building on the wildlife spill-over effects of these iconic projects. Another could involve working closer with the Cambridge Tree Trust and Waipa DC on restoration planting and pest control to create ecological corridors to help increase the number of native birds. Particular attention could be focused on access routes (cycle, road and river) in and out of Cambridge that would also help create an even better sense of arrival in Cambridge.

With collaboration from the whole community the parties could:

- Create a sustainable environment for future generations to enjoy;
- Increase natural heritage protection and restoration;
- Protect and enhance our unique biodiversity and wider environmental values; and
- Increase recreational opportunities.

3.3 Application of the model and concept to Cambridge

Kids Greening Cambridge could become an off-shoot project connecting Cambridge's early learning centres and schools with real-life teaching based on the 'umbrella' vision and work of Greening Cambridge. Based on the Collaborative Community Education Model students would lead restoration projects in the community which then offer a myriad of life learning experiences outside of the classroom. Specifically, this approach in Cambridge would:

- Help more kindergartens and schools develop restoration projects (such as Predator Free Cambridge related ones) in their own school grounds or within walking distance;
- Provide teacher professional development workshops to increase their knowledge, skills and confidence to use the natural environment as a learning opportunity;
- Show-case how everyone can take action for biodiversity in their own backyard, and
- Support a Student Leadership Team, enabling these students the opportunity to develop key skills to organise and implement collaborative restoration projects and conservation events.

3.4 Links with Predator Free Schools Programme

Schools have access to a lot of curriculum based materials but often lack the funding to be able to purchase equipment to give students a hands on experience. In late 2017 the Predator Free NZ Trust together with Kiwibank launched *Predator Free Schools* to enable schools to trap in their own school yard. Selected schools are granted \$1,000 for traps and trapping equipment to give students a hands-on learning experience about the harm mammalian predators are causing our native species and the benefits of predator trapping.





Students are able to detect what predators are in their school environment and where they occur; monitor the variety of the native species that live in their community and what can be done to help them; and place a network of traps around their school grounds to remove predators. The schools create a plan on how to detect predators and how to make their school predator free.

<https://predatorfreenz.org/kiwibank-communities/kiwibank-predator-free-schools/>

Thirty one schools throughout New Zealand have now been selected to take part, including Cambridge's Goodwood School. The following summarises their approach.

Goodwood School is a rural school located outside of Cambridge, attracting a mix of both rural and town based children. The students have identified that predator trapping is essential and have developed a plan named "Predator Free Goodwood. Pest Free is the way to be!". This is a project that the whole school will be involved in and includes undertaking bird counts, making their own tracking tunnels and identifying predators and tracking the number of catches using Trap.nz. They also plan to install a barometer sign on the school grounds showing pest reduction numbers. The students are excited about extending this programme to the wider school community over time by inviting other schools in the area to learn about the project.

The Goodwood example above is exactly what Predator Free Cambridge aspires to see occur throughout the wider Cambridge community. Some other schools and centres (e.g. Little Einstein's Cambridge – *photos below* - Cambridge Primary and Karapiro schools and Leamington Kindergarten) are instigating similar projects. However, it is unlikely to occur in any coordinated sense or with a common purpose without the overarching Kids Greening Cambridge/PFC umbrella approach being adopted.



(Photo source: P Russell)



4. Who are the Key Partners for Predator Free Cambridge?

This section focuses on identifying and fleshing out some high-level details around three different groupings of potential partners, based on current knowledge. They include:

-
- | | |
|--|---|
| <ul style="list-style-type: none"> • Schools/kohanga reo and early childhood centres | <ul style="list-style-type: none"> - separated out as (i) those within or on the greater Cambridge green belt area and (ii) outside the greenbelt in wider community of interest |
| <ul style="list-style-type: none"> • Iwi groups, organisations and businesses in/around Cambridge | <ul style="list-style-type: none"> - Includes councils, government departments, iwi/hapu and consultative groups, private /corporate businesses |
| <ul style="list-style-type: none"> • Non-government/corporate type organisations/trusts | <ul style="list-style-type: none"> - Not for profit groups e.g. Cambridge Tree Trust, National Wetland Trust |
-

The tables in the sections below should be considered as a starting point only and not an attempt to capture all those with potential interest. This will be an iterative process and should be added to over time as the project develops.

4.1 Schools and pre-schools

These education providers are listed in the following tables. Key contact people are identified, any PFC type projects currently supported are noted and current level of interest is summarised by a three colour system – **green** = high interest/motivation; **orange** = medium interest and **blue** = unknown/unsure/low current interest. The Enviroschools Programme in the Waikato is well supported with numerous schools in the Cambridge area involved in different programmes – see also <https://waikatoenviroschools.com/>

Schools within Cambridge (or on/near greenbelt)

Name and type	Key contact details		Current initiatives or interest/comments
Cambridge High School	Swayne Road, C/- Joe or Chris Dillon and others 827 5415		Three groups – Leos (lions for high schools); Trees for Survival (headed by Mrs Ripandelli) and the Environment Committee (Joe Dillon). Need to check in again in early 2019. Marcel Kuijpers also involved.
Cambridge Middle School	Clare Street, 827 5135		Unknown – change of principal last year. They do have a Green Fingers project group – undertaking help at Leamington Community Garden
Cambridge Primary School	Wilson Street, Erin Bracken, 827 5316		Initial meeting held, has an ideal area (Stanway Reserve - outdoor school area below grounds along river margins). Pursuing Greengold status.
Cambridge East School	Williams Street, Sandra Weston 827 7651		Unknown - Sandra runs a 'science class' .. may be interested in doing more ...
Leamington Primary School	Lamb Street, 827 5747		Unknown - focus recently on waste minimisation.
St Peters Catholic School	Anzac Street, 827 6623		Unknown – limited area of immediate school grounds (being within central town area)



Pre-schools / kohanga reo / early learning centres within Cambridge (or on/near greenbelt)

Bunnies Licensed Childcare and Preschool	Thornton Road, 827 5081		Unknown
Cambridge Early Learning Centre	Fort Street, 827 4727		Unknown
Cambridge Kindergartens Waikato	Victoria Street, 827 6250		Unknown
Cambridge Montessori Preschools (x2)	Taylor Street, Cambridge and Raleigh Street, Leamington, 823 5949 and 823 5138		Unknown
Cambridge Playcenter	Vogel Street, 827 4529		Situated on greenbelt area, trapping rats around building with PFC assistance
Grow Early Childhood Care and Education: St Kilda	Kaniera Street, St Kilda 827 4412		New centre in new subdivision
James Gray Kindergartens Waikato	Kingsley Street, 827 4714		Unknown
Jumpstart Educare	Swayne Road, 827 6406		Unknown
Kemureti Te Kohanga Reo	Bracken Street, 827 3306		Unknown - part of Nga Hau E Wha Marae
Leamington Kindergartens Waikato	Thompson Street, Loraine, 827 6680		Involved in Enviroschools and at present working towards Greengold level. Informally talking to the children about the predators around Lake Te Ke <u>UtuKoo Utu</u> .
Leamington Playcenter	Thompson Street, 827 9575		Unknown
Little Einsteins Educare	Swayne Road, Colleen, 027 568 2515 or 823 3300		Undertakes trapping in their own backyard (3-4 traps) adjacent Cambridge section of Waikato Expressway. Interests in forest school at Mangakawa – 6 traps established.
Te Koutu Kohanga Reo	Maclean Street, 827 8509		Unknown
Treetown Early Childhood Centre and Preschool	Wilson Street, Sally Hooker, 823 4570		Undertook an early form of possum control along river bank bordering property in mid-2000's.

Rural schools outside Cambridge

Name and type	Key contact details		Current initiatives or interest/comments
St Peters School	Cambridge Road, Louise Cook 027 5170303 or 827 9899		Recent change in Principal. Involved in Trees for Survival. Runs Owl Farm.
Goodwood Primary School	Fencourt Road, Liz Sudseltd, 021 255 1458 or 827 6817		Kiwibank predator Free School Programme initiated via Sonya Rafter PF Trust (see section 3.4 above). Kicking off school project early 2019.
Te Miro School	Te Miro Road, 827 8146		Gold-level Enviroschool and very engaged in biodiversity initiatives, with Te Miro Reserve an iconic bush area nearby. PFC has had initial contact with trap making.
Tauwhare Primary School	Scotsman Valley Road, Linda Cook 824 0864		Gold level Enviroschool and kids well engaged in biodiversity initiatives. Keen to investigate trapping initiatives in local bush area.
Ngati Haua School	Pukemoremore Road, 827 3049		Unknown
Hautapu School	Hana Lane, 8277466		Unknown - focus recently on waste minimisation.
Kaipaki School	Kaipaki Road, 823 6653		PFC has had initial contact with trap making.
Horahora School	Maungatautari Road, 827 2823		Plans to engage in pest control space, one of closest schools to Maungatautari (as the kaka flies). Nearby area to plant up with native trees.
Karapiro School	State highway 1, Karapiro, 827 7642		Adjoins a gully and bush area by landowner (Ian the Lettuce man) who has commenced trapping/baiting regime in bush. Keen to commence pest control in and around school/gully.
Roto-O-Rangi School	Kairangi Road, 827 3049		Unknown – also one of the closest schools to Maungatautari.

4.2 Organisations and businesses

Iwi/organisations/agencies

Name and type	Key contacts	Potential level of interest/notes
<p>Iwi with overlapping interests in area:</p> <ul style="list-style-type: none"> Ngāti Korokī Kahukura (NKK) Ngāti Hauā (NH) <p>Also, a consultative group is - Nga iwi o Topu o Waipa</p>	<p>NKK = Karaitiana Tamatea mtamatea@waikato.ac.nz; Poto Davies poto@puawai.com);</p> <p>NH = Lisa Gardiner Lisa@ngatihauaiwitrust.co.nz or Jess Samuels</p>	<p>Unknown – no specific dialogue with iwi/hapu/marae to date. Would be ideal to establish some 'iwi directed' projects in area.</p> <p>Another conduit for consultation could be via Shane Te Ruki (Waipa DC iwi coordinator).</p> <p>Nga iwi o Topu o Waipa also via Demelza Murphy.</p>

Department of Conservation (DOC)	Dion Patterson and Jo Macpherson Andrew Styche Carisse Enderwick	Operational team (Dion and Jo) are linked in with PF 2050 national level programmes at DOC. Partnerships team also interested but from a wider 'greening Cambridge' concept.
Waipa District Council (WDC)	Susan Emmitt (Parks and Reserves) Katie Hine – EnviroSchools Waipa	P&R team supportive and engaged in project. Potential funding opportunities through WDC Heritage fund.
Cambridge Community Board (Waipa DC)	Mike Pettit - chair	Mike is principal of Cambridge Primary School.
Waikato Regional Council (WRC)	<ul style="list-style-type: none"> - Alan Saunders (Natural Heritage Team Leader) - Alex Daniel (contractor for EnviroSchools/Trees for Survival) - Samira van Hunen (WaiRestoration pilot programmes in the Waipa and Matamata/Piako districts) – commencing April 2019 	<p>Strong interests in Halo and MEIT projects and funding. Able to relate to local initiatives too. New predator control related community role advertised (11/2018). Potential funding opportunities through WRC small scale community grant fund and WCEET funding coordinator (Judy van Rossem).</p> <p>The WaiRestoration programme's focus is restoration of waterways and biodiversity, but encompasses fencing, planting, biodiversity and pest management.</p>

Businesses in and around Cambridge (helping get biosecurity into the boardrooms)

Key question is how important is this project likely to be for any businesses involved? Or in other words 'what's in it for them'?

Name and type	Potential level of interest/notes
Mitre 10 Mega, Carters Flat	Approached to undertake trapping/trap making in Carters Flat area, possibly extend into Karapiro Stream area.
Bunnings, Lake Street	Supplied initial materials to support Lake Te Ke-Utu <u>Koo Utu</u> rat control – with Mitre 10 could supply a 'tool bank' for use.
Farm supply stores – PGG Wrightson, Farm Source, Farmlands	Potential sponsors being rural farm based providers, attuned to the needs of pest control of farmers.
Printing companies – such as Printech (Carters Flat)	Potential sponsors for printing leaflets and fliers that look professionally laid out and smart, to help engagement and growth.
Nurseries	Potential source of plants to support or be part of 'greening Cambridge' and/or PFC projects. Like-minded business may also sponsor traps or partner in other ways.
Marketing companies	Possible source of help with regards to developing local level campaigns to boost and enhance project – potential free or cost price involvement.

4.3 Non-government /non corporate organisations (not for profits)

Name and type	Potential level of interest/notes
Cambridge Tree Trust – Thornton Road, Don Willoughby https://www.treetrust.org.nz/	Long established group with countless hours and trees planted to beautify Cambridge. Likely good fit with PFC ambitions.
NZ Wetland Trust – Tony Roxburgh/Karen Denyer http://www.wetlandtrust.org.nz	Unsure or interest but seems good fit with PFC, based on pest control work around Waipa peat lakes. Chair Tony Roxburgh is Community Facilities Manager at Waipa DC
Cambridge Community Garden (Resthaven Trust) – Vogel Street, Alison https://www.facebook.com/pages/CCG-Cambridge-Community-Garden/1081943501833641	Runs community garden established on greenbelt, adjoins native plantings and Resthaven restoration projects (Moon spring). Possible good fit with PFC ambitions.
Cambridge Scout Group -Maclean Street, xx https://www.facebook.com/CambridgeScoutGroup/	Likely to be interested in projects given their core ethos.
Cambridge Tramping Club, xx https://www.facebook.com/cambridgetrampingclub/	Likely to be interested in projects due to nature of interest in bush/birds. Also likely to be able to set and maintain traps in difficult terrain.
Cambridge Community Menzshed http://menzshed.org.nz/cambridge/	Possible interest in making trap boxes and related materials. Could link up with Mitre 10 re supply raw materials.
Rotary / Lions	Community minded volunteers – interested in broad projects to support the town – both are very active groups in Cambridge.



Possum good nature trap insitu at Moon Spring, Resthaven, November 2018
(Photo source: P Russell)

5. Framework of Approach – components of a successful Plan

5.1 Overview

This section outlines the key elements in a structured project approach, around PFC ambitions, to help the Cambridge community and supporting organisations determine what is needed for the project to succeed. It covers a likely vision, goal and objectives for discussion/amendment, based on other similar projects around the country. It doesn't attempt to finalise any definite outcomes as this is the role of the group established through the collaborative community education model, where the establishment of strategic and student leadership groups is also carried out.

A summary of the current state of the projects and community attitudes precedes a discussion around some possible approaches and priorities for PFC and suggests some key messages to consider in all promotion and awareness material. The section concludes with the challenges facing community led pest control. It notes ways to lessen them, including likely behaviours that will become evident or changes that will be needed.

5.2 Vision, goal and objectives

'Helping to make our dawn chorus a symphony' could be the vision for PFC, to be realised through the following goal and three objectives.

By 2050, the goal (or aspiration) is to eliminate rat and possum predators² from Cambridge town³ and the immediately surrounding environs, with the objectives of:

- Increasing native bird nesting opportunities in the Cambridge area, by maximising (and complementing) the spill-over effects from the Sanctuary Mountain Maungatautari and Halo projects;
- Engaging the hearts and minds of the 'current crop' of school students and pre-school children and support them to undertake, then sustain, realistic and practicable predator control projects in their localities;
- Targeting priority possum and rat habitat areas first, via strategic planning carried out within the leadership teams, and run in parallel with the wider 'trap in every fifth backyard' community engagement concept.

Key messages to communicate

- Our natural biodiversity is a taonga (treasure) and we need to preserve and enhance (reclaim) it where we can.
- We have the highest rate of threatened species in the world and they are found nowhere else. Many such species live right on Cambridge's back door step and they risk being decimated by introduced predators – rats, possums and stoats.

² Stoats are not on the 'hit list' within urban environments as they are unlikely to be present. They are sometimes recorded and will be present in rural places, where targeting by different trapping regimes is encouraged.

³ Generally defined as within and including the Cambridge town green belt area.

- Predator control efforts around Cambridge need to increase if we want to protect and improve what we have already got. We can all make a difference, and everybody has a role to play (be part of a Biosecurity team of 4.7 Million⁴).
- There is no better time than to start work than right now (as national momentum is building) Place a trap in your backyard and be part of making New Zealand predator free.
- School and preschool students are the community leaders of tomorrow. We need to engender their keenness and youthful enthusiasm - see image below (*PFC needs more 'kids like Jake' in and around Cambridge*).
- Animal welfare at all times is paramount, as is human health and safety.



Jake collects the tracking data from Snells Beach School.

5.3 Coordination and leadership

A wider PFC approach requires excellent coordination and oversight. Following the collaborative community education model requires a two pronged leadership team structure put in place – one comprising the key organisations involved (including likely funders and lead organisations) and the second consisting of interested representatives from schools and preschools that serve the area.

⁴ This term has been coined for Biosecurity 2025, a strategy designed to engage and unite all New Zealanders to participate in the preservation of values we hold dear. *Ko Tatou – This is Us*. About 96% of people know about biosecurity but only 2% think it affects them. Biosecurity is not just treating a pest problem, it's also helping to build social and economic resilience in our communities.

Project coordinator

Establishing the above two groups is a high priority as this will set the tone for the whole project. This liaison and setup is one of the important first tasks of a project coordinator, the appointment of whom is the key first step in launching a whole of Cambridge PF project. A project coordinator from within the community may arise as a result of holding community meetings or through another pre-determined process. An ideal role to model the PFC requirement on is Predator Free Taupo (PFT) who employs a part-time facilitator for 12-20 hours per week. As well as coordinating operational aspects this role would undertake community workshops, raise awareness and other promotional activities.

Key attributes of the person for this role include:

- passionate about NZ native biodiversity
- experienced in community led projects
- an exceptional organiser
- outgoing communicator with energy and drive.

Strategic leadership group

The core of this group would likely comprise of the central and local government agencies listed in section 4.2 and then others as appropriate, nominated through local networks. Suggested number in this group of 6-8 people. A well-known and well connected Cambridge identity (of which there are plenty) would be a bonus on this group, both to engender support and to be the 'public face' of PFC. Such a person would need to be approached as a 'good fit' for the overall aims of the project, with values that ideally match what the project is about.

Student leadership team

This group should include a range of representatives – from high/intermediate and primary schools and also pre-schools. It should include a good balance of within green belt schools and rural schools. The current list of interested and motivated schools identified in section 4.1 should be 'invited' first to participate in such a team, again pulled together through the project coordinator. Suggested representation in this group of 7-9 people (i.e. two high/intermediate level, 3-4 primary level, with rural/urban mix, and 2-3 preschools).

5.4 Current situation

What is PFC trying to achieve?

At the time of writing (November 2018) PFC was an established entity around town, albeit with no formal status, and with a handful of dedicated volunteers (raising awareness, delivering traps, doing control work).

An estimated 100/1,500 traps are out in back yards (six per cent towards the 1 in 5 target), and Lake Te ~~Ke-Utu~~ Koo Utu rat and possum trapping was underway. Opportunities to expand have been identified (refer also to section 5.5 below) as more interest is being shown through publicity efforts.



The PFC steering group is ever mindful not to expand too quickly, doing justice to the operations, all while not overloading volunteers. The group is at the point where they need to harness the momentum and enthusiasm to grow the project, and provide it with more structure, to realise the goal/outcome of increasing birdlife through targeted predator control. One objective to date has been to secure a trap in every fifth backyard and support keen sub-groups undertaking rat

and possum control at specific places, then over time grow the areas so they link up/merge and provide coverage of the Cambridge environs.

What are the strengths and weaknesses around the PFC concept (in the wider community)?

There are more positive aspects about the PF concept than drawbacks, as summarised below.

Strengths	Weaknesses
<ul style="list-style-type: none"> ✓ numerous individuals with high/honed levels of predator control experience (e.g. Maungatautari) ✓ many people well dialed into the benefits of pest control on birdlife and appreciate spillover effects ✓ many 'likeminded' groups exist (e.g. Tree Trust, Tramping Club, Community Garden) ✓ a good number and range of schools are already becoming immersed in PF concepts/work ✓ many rural/farming based businesses likely to be sympathetic to project – higher chance of support ✓ numerous Waipa DC, WRC, DOC staffers live in and around community (and are passionate) ✓ numerous small sites in the wider area which suit a community led approach ✓ unique position of being at the heart of MEIT and Halo project spillover effects (point of difference) 	<ul style="list-style-type: none"> x majority of community unaware of initiative (e.g. normal level of public apathy exists) x lower natural biodiversity values abound in local environs – a few regeneration areas x as anywhere the immediate hurdle will be to find and fund a part-time coordinator x limited time within core curricular for schools/teachers to really engage in project x reliance on a few key individuals, mirrors community led actions elsewhere x concept is unknown/untested with the iwi of the area

How important is the project likely to be to the key players?

Due to limitations of this pre-scoping exercise there has not been capacity to undertake any consultation with the iwi of the Cambridge area (namely Ngāti Hauā and neighbouring Ngāti Korokī Kahukura) around their aspirations for restoring the biodiversity values of the area. However, both iwi are engaged with neighbouring Halo and Maungatautari projects and are likely to be very interested in developments around PFC.

Waipa District Council is viewed by many in the Waikato as a very progressive local authority in terms of natural heritage development and support for biodiversity restoration projects. The PFC steering group is already working closely with WDC representatives in terms of seeking support for work on council administrated land, closely supports the Maungatautari project and WDC has passionate staff already engaged with this work in Cambridge and other sites in the district (e.g. wetlands). PFC should apply to WDC's heritage fund for funding of materials and roles such as project coordinator.

Waikato Regional Council has regional leadership responsibilities around biosecurity and pest control and the Cambridge area is fortunate to have two councilors (currently) very well engaged and supportive of these types of projects. Opportunities exist to tap into WRC's natural heritage funding, along with WCEET and Trust Waikato and Waikato River Authority funds. A new staff position (December 2018) is dedicated to supporting predator focused community groups). Existing biosecurity/natural heritage staff have long standing connections with Cambridge area projects (e.g. Halo, Maungatautari).

DOC, through recent restructuring, has a partnerships group dedicated to assisting community groups to establish and education and conservation understanding is high on their agenda. Initial PFC funding came through a DOC grant (via a predator free national project) which kick-started wider scale control efforts. DOC expects to ramp up their support for groups like PFC.



Involvement of these four groups of organisations is key to future PFC progress and expansion ideas.



5.5 Likely approaches and priorities

This section summarises the broad operational focus as at November 2018. It is expected to change if and when the wider structured approach, advocated through this paper, is developed. It also assumes that engagement is occurring at several levels to gain support and achieve momentum, and that a 'coalition of the willing' is developing.

A two-pronged approach is currently underway and will likely be the focus for the first 2-3 years:

- ❖ **Community-wide (1 in 5 backyards) trapping programme** – starting off targeting rats, then broadening to possums where relevant and appropriate;
- ❖ **Priority areas targeted within and beyond the Cambridge greenbelt** – as above, targeting rats then possums (and stoats as appropriate), building on interest and current programmes.

Community-wide approach

This approach builds on the current programme of appealing to interested landowners first, by advertising through social marketing networks (PFC Facebook), word of mouth and through community members seeing trapping programmes in action on public land. People lodge their interest and a trap is provided to them, on the basis they use it as intended and load trap catch data onto the website Trap.NZ.

A rule of thumb approach to determine the trap numbers needed is followed based on the total number of properties in Cambridge (refer to map in Appendix 3) including eight subdivisions – that is 7,500 properties divided by 5 (to achieve 1:5 ratio) = 1,500 traps estimate:

- 800 traps east of the Waikato River – 556 traps within the Cambridge East urban area and 244 within four subdivisions (St Kilda, Oaks/Tiaki Way, Cambridge North and Kelly Road), and
- 700 traps west of the Waikato River – 543 traps within the Leamington urban area and 157 within four subdivisions (Matos Segedin Drive, River Garden, Cambridge Park and South of Shakespeare Street).

Priority areas targeted

In the absence of any formal prioritisation work, PFC members have undertaken an approach to date based on likely areas to target (e.g. public space at Lake Te ~~Ke-Utu~~ Koo Utu to lift the PFC profile) and where there is current interest. In time it is anticipated that the areas will grow and merge and become linking ecological corridors, to better enable the spread of native birds and other fauna. These areas are not currently mapped but are summarised in the following table, with a brief comment on their status and other supporting information:

Name of area	Status	Comments	Key contact
Lake Te Ko Utu	Active and expanding	45 rat traps placed Sept 2018. Possum control to commence November/ December 2018.	Peter Russell
Leamington Walkway	Initial work in progress	Bush area between Addison / Upper Kingsley streets, Wordsworth Street, Leamington cemetery – 12 rat traps to commence late Nov. 2018, extending to possums.	Donna Palmer
St Kilda subdivision	'In the pipeline'	Expressed interest in undertaking work focused on wetland in new subdivision – rats focus (refer photo).	Tineke Kavanagh



Stanway Reserve – Cambridge Primary School	'In the pipeline'	Rat trapping potential school project – traps and boxes delivered. Outdoor school area below Cambridge Primary School. Could also involve Treetown Kindergarten.	Erin Bracken, CPS
Cambridge suburban trapping in CBD	'In the pipeline'	Joe works at local café and wants to establish a trapline in the town area – as a food hygiene approach first and foremost. Some support gathered to date.	Joe Dillon
Little Einstein's Swayne Road		12 traps delivered – 6-8 to use at forest school Mangakawa and 3-4 around pre-school grounds, adjoining rural area.	Colleen
Resthaven / Moon Spring	'In the pipeline'	Land below Resthaven Village and river edge. Clearance and replanting of native trees. Nominal rat and possum control underway.	Dave Harland, Bill? and Peter Russell
Karapiro School ground and gully	'In the pipeline'	Rats a problem at school and opportunity to undertake work in grounds and gully adjacent.	Alex Daniel Enviroschools and Ian 'the Lettuce Man'
Goodwood School grounds	'In the pipeline'	Grant from Predator Free Trust – aim to start early 2019.	Liz Sudseldt
Lamb Street Quarry (extending to Cambridge Road)	A possible area	Stream and bush/overgrown area behind and below Cambridge Park.	Susan Emmitt – Waipa DC
Karapiro Stream environs	A possible area	Tie in with Mitre 10 Mega sponsorship potential and stream below the Carters Flat area.	David Griffith and Susan Emmitt



Wetland at St Kilda in and around new housing presents an excellent opportunity to tackle rats.
(Photo source: P Russell)

5.6 Behavioural challenges – some social marketing first principles to consider

There are several key factors that typically underpin successful community led projects. Following these principles or considering their effects will increase the likelihood of positive behaviour change in the Cambridge community and the adopting of the project's goal and objectives. Because there is a myriad of issues that can get in the way (e.g. resources available, leadership styles, personalities, degrees of support etc) the following points serve as a guide for current and future implementers of PFC, with schools especially in mind:

- implementing new projects and mass behaviour change, such as a PFC's trap in every fifth backyard, is hard and takes time – look for quick wins (such as supporting those schools/sub-areas already underway and building on these);
- ensure the overall objectives are clear – focusing on the actions needed (not biting off too much) and defining what you want to achieve (as covered in section 5.5 above). By going slow at the beginning we can go faster later;
- understand what motivates the key people involved and the chief audience e.g. any specific values and behavioural drivers of the school/community – have answers (based on the key messages) around 'what's in it for them'. Consider a PFC ambassador and/or key spokes people to harness peer pressure and local influence;
- making it as easy as possible for the community to do the right thing – straight forward process of supply/pickup of traps and easy to use instructions;
- approach marketing of PFC to the community audience through a variety of methods – e.g. continue Facebook, develop and promote partnerships, holding demonstration days;
- devote time to monitoring the outcomes - e.g. using E-bird (5 minute bird counts) to monitor overall success, find out what's working, what isn't and evaluate this info and use it as a catalyst for changing tack if need be;
- apply what you learn along the way – adapt the programme accordingly and use the power of direct experience for people involved. It's more powerful to be hands-on with something (e.g. a trap in their backyard) than merely being told about it; and
- take advantage of the power of networks through developing partnerships and proactively involving stakeholders – what's their world view, open up channels for getting the PFC messaging 'out there' and tapping into others networks.

5.7 Operational challenges for community-led pest control

It is important that the control of pests through this framework approach remains flexible and adaptable to meet the demands and needs of the community as progress occurs. Some identified risks and issues to consider are summarised below:

- Meeting demand – as PFC projects gain momentum there will be different pulls on peoples time, capability and capacity to respond, given many people are undertaking this work in their spare time and otherwise have full-time commitments. While volunteers will continue to do the lion's share of on-the-ground work, the role of a local coordinator will be vital to maintain an overview of the bigger picture of projects, ensure the strategic plan priorities are being adhered with and overloading and mismatching of

skills is minimised. At the same time it's crucial to harness any new interest shown and to utilise people's time and skills without ignoring or forgetting about them.

- Public perceptions around killing animals – an unfortunate consequence of dealing with introduced pest animals effectively involves trapping or poisoning. In some places manipulation of the habitats where possums for example live may be appropriate (e.g. removing fallen trees and wood piles where they could nest). However, this approach generally only shifts the problem elsewhere and won't work for rats as they are so numerous and have much smaller home ranges. The reality is that pests need to be destroyed and PFC is aware of the range of community views on these matters, including being sensitive to some people's views and being discrete in placement of possum traps etc. The vast majority of the community would likely see these animals as undesirable and would be in favour of killing rats and possums for the wider benefits.
- Pest control in urban/built up areas – most broad-scale possum/rat control is carried out in rural areas (like in nearby Whitehall and Mangakawa) and is far removed from residential areas. Implementing pest control in reserves next to residential housing, with children and pets, requires good planning and communications. Reliance for PFC work will be on a variety of kill traps – rats through kill traps placed in boxes to minimise interference by birds, weather and pets and possum kill traps ideally set high in trees above child height, well camouflaged and usually off the beaten track. Possum live capture traps can and do work but require users to dispatch them once trapped. Poisons (e.g. anticoagulants) placed in bait stations are generally not used in urban areas due to potential (albeit small) risks involved to pets/children, but could be considered for remote places within urban areas, such as the Waikato river bank. The other benefit of kill traps is that users can 'see what they are getting' and may better retain interest in trapping programmes as a result of this evidence.
- Maintaining impetus and staving off apathy – its human nature that after the initial interest, project launch and implementation in the first weeks that the 'novelty' factor of projects like trapping pests wears off after a time. Driving the project usually falls back on 1-2 dedicated people who will keep the project ticking along as long as they are able. Again, a key role of the overall project coordinator is to prevent overloading on a few, keep presenting the key messages in local media and celebrating milestones and successes.



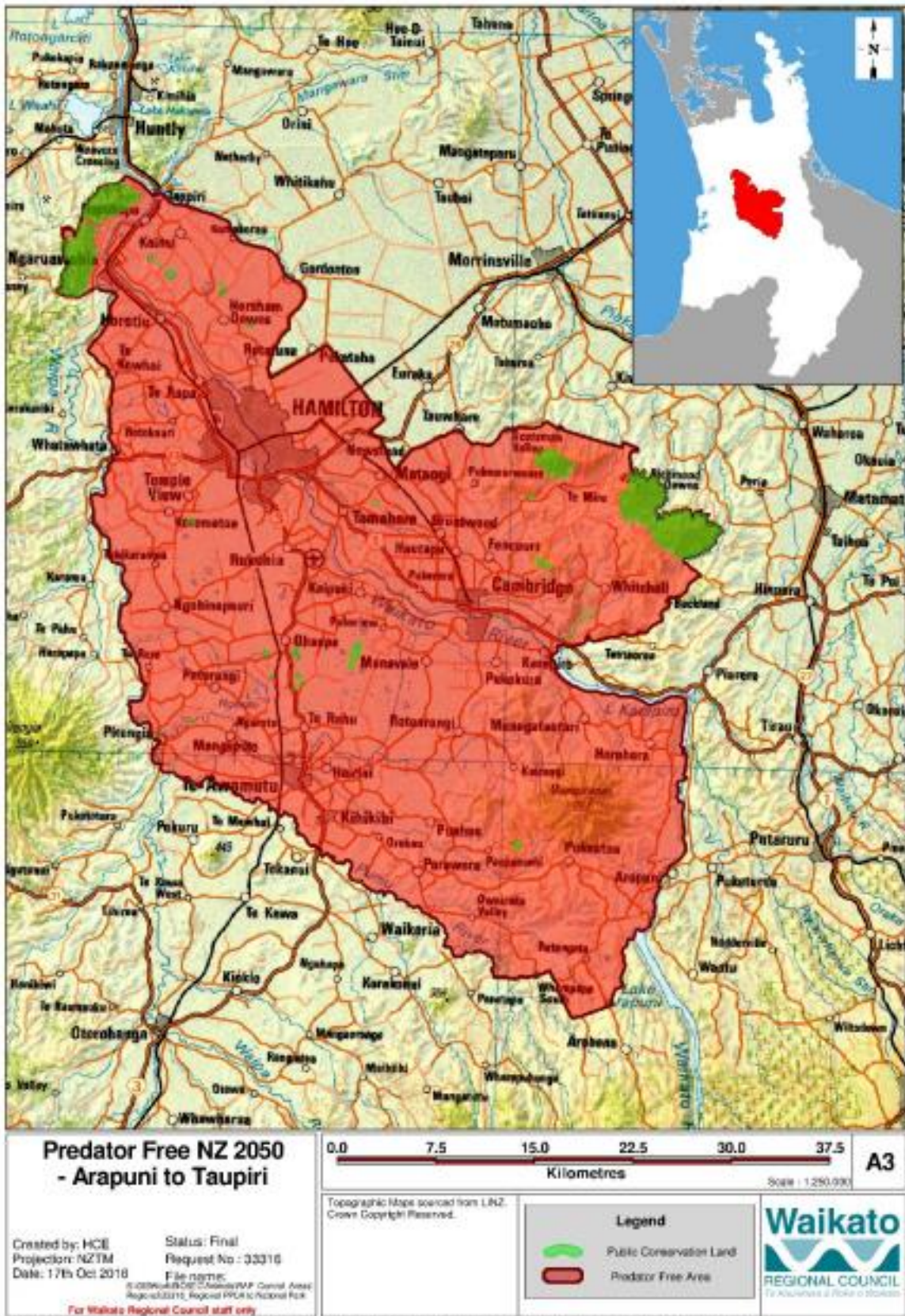
PFC founder Adam Thompson celebrates the launch of Lake Te Kō-Utu/Koo Utu ratting with a symbolic 'rat' cake. (Photo source: P Russell)

6. Recommendations and next steps

Predator Free Cambridge has reached the point where a more structured approach is needed to manage expectations and operations in the next 2-4 years. Key recommendations are set out below, which are essentially the next steps in the project:

- ❖ Lead Predator Free organisations (PFC, WDC, Iwi, WRC, DOC) to establish a strategic leadership group, provisionally by 31 March 2019. This group of 6-8 people would be charged with developing a high level vision, pulling in business interests and putting in place a project coordinator.
- ❖ PFC needs an organisational based, one-the-ground, project coordinator who can lead and champion the project, with multiple players involved and juggling various operational, funding and other initiatives. It should be a funded role, ideally part-time 12-20 hours per week, commencing before mid-2019.
- ❖ A student leadership team, ideally 7-9 representatives, should be set up concurrently with the strategic team/coordinator role above (or soon after) to continue the project's momentum, by mid-2019, building on the high level of interest from several current educator providers. Engaging these providers and their students is at the heart of PFC being successful and sustainable long-term.
- ❖ Iwi consultation is an important part of the development of the above strategic plan. This should be done in discussion with Waipa District Council iwi representatives in the first instance as many of the networks are already established.
- ❖ Development of an operational/action plan by/with the two leadership groups is vital – to identify priority areas to focus on and ensure these areas are well covered (through good practice pest control methods) and adequately resourced (by volunteers). The Plan also needs to address iwi consultation/operational involvement matters, communications, awareness, range of methods and the places being targeted.
- ❖ Application for funding is an ongoing task. There are many different funding streams available through various environmental agencies. PFC requires 1-2 keen individuals to keep the momentum going during 2018/19 and beyond for funding of pest control materials, and importantly funding the coordinator role.
- ❖ Other issues to address include: baseline monitoring and then ongoing outcome monitoring as the programme develops, communications/website development and expanded social marketing.

APPENDIX 1: Predator Free 2050 'emerging project' – the Waikato Basin



How to win the war on rats

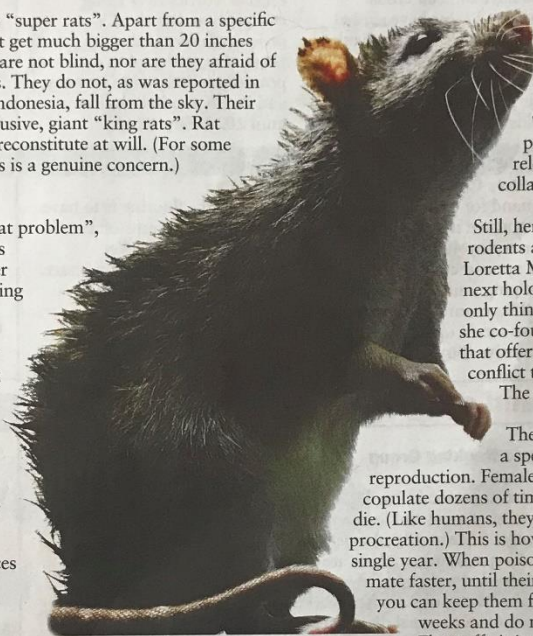
Rats are responsible for more human deaths than any other mammal. For centuries we have tried to find ways to exterminate them – but now a Buddhist biologist claims to have found a gentler solution. Jordan Kisner reports

First, the myths. There are no “super rats”. Apart from a specific subtropical breed, they do not get much bigger than 20 inches long, including the tail. They are not blind, nor are they afraid of cats. They do not carry rabies. They do not, as was reported in 1969 regarding an island in Indonesia, fall from the sky. Their communities are not led by elusive, giant “king rats”. Rat skeletons cannot liquefy and reconstitute at will. (For some otherwise rational people, this is a genuine concern.) Consider this the good news.

In most other respects, “the rat problem”, as it has come to be known, is a perfect nightmare. Wherever humans go, rats follow, forming shadow cities under our metropolises, and hollows beneath our farmlands. They thrive in our squalor, making homes of our sewers, abandoned alleys and neglected parks. They poison food, bite babies, undermine buildings, spread disease, decimate crop yields, and very occasionally, eat people alive. A male and female left to their own devices for one year – the average life span of a city rat – can beget 15,000 descendants.

There may be no “king rat”, but there are “rat kings”, groups of up to 30 rats whose tails have knotted together to form one giant, swirling mass. Rats may be unable to liquefy their bones to slide under doors, but they don’t need to: their skeletons are so flexible that they can squeeze their way through any hole or crack wider than half an inch. They are cannibals, and they sometimes laugh (sort of) – especially when tickled. They do not carry rabies, but a 2014 study from Columbia University found that the average New York City subway rat carried 18 viruses previously unknown to science, along with dozens of familiar, dangerous pathogens, such as *C. difficile* and hepatitis C. Collectively, rats are responsible for more human deaths than any other mammal on Earth.

Humans have a peculiar talent for exterminating other species. In the case of rats, we have been pursuing their total demise for centuries. We have invented elaborate, gruesome traps. We have trained dogs, ferrets and cats to kill them. We have invented ultrasonic machines to drive them away with high-pitched noise. (Those machines, still popular, do not work.) We have poisoned them in their millions. In 1930, faced with a rat infestation on Rikers Island, New York City officials flushed the area with mustard gas. In the late 1940s, scientists developed anticoagulants to treat thrombosis in humans – and some years later, super-toxic versions of the drugs were developed to kill rats by making them bleed to death from the inside after a single dose. Cityscapes and farmlands were drenched with thousands of tons of these chemicals. During the 1970s, we used DDT. These days, rat poison is not just sown in the earth by the truckload, it is rained from helicopters that track rats by radar – in 2011, 80 metric



tonnes of poison-laced bait were dumped onto Henderson Island, home to one of the last untouched coral reefs in the South Pacific. In 2010, Chicago officials went “natural”: reasoning that a natural predator might track and kill rats, they released 60 coyotes wearing radio collars onto the city streets.

Still, here the rats are. Why? “Frankly, rodents are the most successful species,” Loretta Mayer told me recently. “After the next holocaust, rats and Twinkies will be the only things left.” Mayer is a biologist. In 2007, she co-founded SenesTech, a biotech start-up that offers the promise of an armistice in a conflict that has lasted thousands of years. The concept is simple: rat birth control.

The rat’s primary survival skill, as a species, is its unnerving rate of reproduction. Female rats ovulate every four days, copulate dozens of times a day and remain fertile until they die. (Like humans, they have sex for pleasure as well as for procreation.) This is how you go from two to 15,000 in a single year. When poison or traps thin out a population, they mate faster, until their numbers regenerate. Conversely, if you can keep them from mating, colonies collapse in weeks and do not rebound. SenesTech, based in Flagstaff, Arizona, claims to have created a liquid that will do exactly that. In tests conducted in Indonesian rice fields, South Carolina pig farms, the suburbs of Boston, and the New York City subway, the product, called ContraPest, caused a drop in rat populations of roughly 40% in 12 weeks. This autumn, for the first time, the company is making ContraPest available to commercial markets in the US and Europe. The team at SenesTech believes it could be the first meaningful advance in the fight against rats in a hundred years, and the first viable alternative to poison. Mayer was blunt about the implications: “This will change the world.”

“Rat skeletons are so flexible that they can slip through any crack wider than half an inch. Very occasionally, they eat people alive”

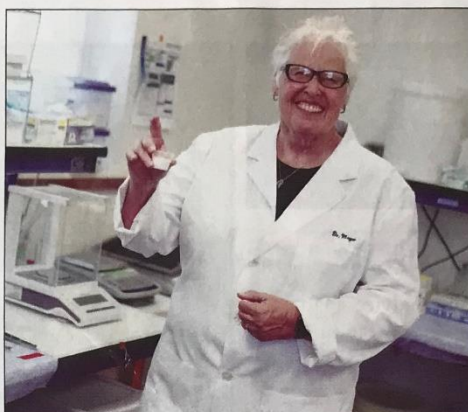
Mayer is a tall, vigorous woman in her mid-60s with bright eyes, spiky grey hair and a toothy grin. Her ideologies of choice are Buddhism and the Girl Scouts. “It’s kind of my core,” she said, “to do for others.” In conversation, her manner is so upbeat that she seems to be on the verge of bursting into song. When asked how she is doing, she frequently responds in a near-rapture: “If I was any better, I’d be a twin!” Mayer came to science later than usual, in her mid-40s, after a stint as the international vice president of Soroptimist, a global volunteer organisation dedicated to improving the lives of women. The career change was unexpected, even to her. After a close friend died suddenly of a heart attack, Mayer called up a biologist she knew and asked how something like this could have happened. The biologist had no satisfying answer; she explained that while heart disease in men had been thoroughly studied, little attention had been devoted to post-menopausal heart disease in women. “Well, you’ve got to change it,” Mayer replied, outraged. The biologist was otherwise occupied, so Mayer decided to do it herself. At 46, she entered a PhD programme in biology at Northern Arizona University.

After graduate school, her initial research as a professor of biology focused on artificially inducing menopause in lab mice, so that she could study changes in the postmenopausal heart. Three years into her efforts, Mayer was contacted by Patricia Hoyer, a colleague in Phoenix, who said she had stumbled across a chemical that seemed to make mice infertile without having any other effects. Together, Mayer and Hoyer synthesised a new compound, which they called Mouseopause.

In 2005, Mayer received a telephone call from a veterinarian in Gallup, New Mexico, who had read about her research. The Navajo reservation where he worked was overrun by wild dogs. There were too many to spay and neuter, so he was euthanising almost 500 a month. "If you could do for a dog what you can do for a mouse, I could stop killing dogs out here," he told her. When Mayer arrived in Gallup and saw the piled corpses, she agreed to test Mouseopause on an initial group of 18 dogs. "I held up that first puppy, who I called Patient Zero," she told me, "and I said, 'I don't know what this is gonna do to you, but you will live on a satin pillow the rest of your days.'" The injection made the dogs infertile, but left them otherwise happy and healthy. (Mayer brought home all 18 dogs and built a kennel in her yard to house them until she could find homes for them. Patient Zero, renamed Cheetah, lived with her until she died of old age – though the pillow was fleece.)

The next call came from Australia in 2006. Biologists there wanted an adaptation of Mouseopause for rats. Rats, they told her, were eating 30% of the rice crop in Australia and Indonesia. If she could reduce the rat population by even half, they claimed, the crops that would be saved could feed millions of people. Mayer was moved by the idea of finding a solution to rat overpopulation that was neither lethal nor toxic. Since its invention, rat poison has been our primary method of curbing rat populations, but it is dangerous. Ingested in high doses, it's fatal to humans, and it poses a particular risk to children, since it's sweet and brightly coloured. In the US alone, more than 12,000 children per year, most of whom live below the poverty line, are accidentally poisoned by pesticide meant for rats. The collateral damage inflicted by rat poison also extends to the environment, leaching into the soil and poisoning house pets, farm animals, and wildlife that feed on rats. Worst of all, rat poison is not very effective at eliminating large infestations. As long as there is still a food source, colonies bounce back.

Persuaded by the research, and by her wife, fellow biologist Cheryl Dyer, Mayer decided to devote her career to developing a new, smarter way to control the rat population. In 2007, they founded SenesTech. "People say never to invest with a husband and wife team," Mayer joked to me. "I say, 'Oh, absolutely not! Then you have dominance.' But wife and wife? Works great!" For Dyer and Mayer, the immediate problem was obvious: while the lab mice and feral dogs had received injections in controlled studies, wild rats would have to eat the formula of their own volition. Rats are neophobic – they avoid what they don't know. What's more, city rats are already well fed. It was Dyer's job to make Mouseopause not just edible but delicious – a tricky proposition since its active ingredient, 4-vinylcyclohexene diepoxide (VCD), is bitter and caustic. Rats have the same taste



Mayer in the lab: "This will change the world"

preferences as humans – they love fat and sugar.

Dyer was also tasked with the greater challenge of adapting Mouseopause to work on rats, which are much harder than mice. While VCD caused the eggs in mouse ovaries to degenerate rapidly, female rats were far less susceptible. Dyer added a second active ingredient: triptolide, which stunted any growing eggs. The results were better, but still not good enough. "They just had smaller litters, goddammit," she said. Eventually, out of curiosity and desperation, Dyer fed it to both males and females. The result was dramatic. It turns out that the triptolide destroyed sperm – the males became sterile almost immediately after ingesting the formula. This was a total surprise: no one had ever tested triptolide on male rats before. Test after test: no pups.

After three years of research and development, they had a product that worked and did not harm other animals. (The active ingredients are metabolised by the rat's body in ten minutes, which means any predator that then eats the rat is not affected; and the compound quickly breaks down into inactive ingredients when it hits soil or water.) ContraPest, the finished product, is viscous and sweet. Pink and opaque, it tastes like nine packets of saccharine blended into two tablespoons of kitchen oil. "Rats love it," Dyer said. "Love it!"

On a Tuesday night in August, Mayer and Dyer held a celebration for staff and investors on the back patio of their rural wood cabin near San Francisco. The company had just received US Environmental Protection Agency registration, a process that usually takes years. It was not a typical investors dinner, but then, SenesTech's nearly 700 stakeholders are mostly firemen. While most biotech start-ups are funded by investment bankers and venture capitalists, Mayer chose to pursue small private investors, all of whom she knows by name. It was a pure accident of networking that so many of them turned out to be firemen, but she is thrilled with the situation. "Firefighters really believe in doing good," Mayer explained to me. "And they're like teenage girls. Once one of them invested, they all wanted in."

"In the US alone, more than 12,000 children every year are accidentally poisoned by pesticides meant for rats"

There were perhaps 25 people gathered on the patio, eating tacos and drinking from Mayer and Dyer's impressive liquor collection, but they made noise

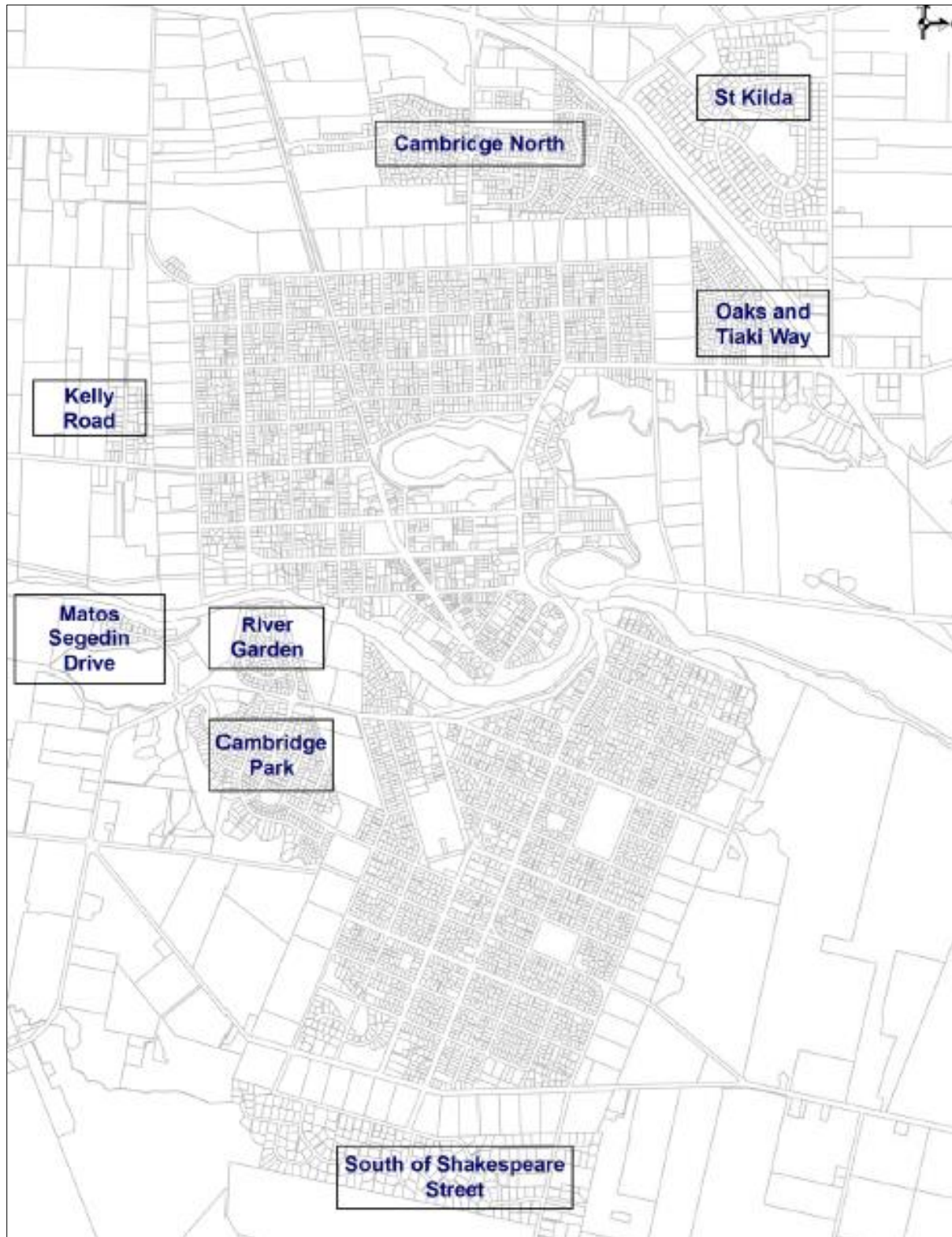
for 50. About half seemed to be wearing Hawaiian patterned shirts. When the time came for Mayer to give a speech, she demurred for a moment before standing. Her toast turned briefly into an anecdote about flattening mouse skeletons in lasagne tins. "But seriously," she continued, "We knew [this day] would come. It's great to be riding this wave with you. It's just so sweet." Glasses heaved into the air. It sounds crazy: a band of animal lovers and firemen in the mountains of Arizona, led by a Buddhist girl scout, making a pink milkshake for rats that may eventually improve the lives of millions of people. But Mayer is unruffled by scepticism. "I mean, why squabble over something and say, 'I can't do that.' Make it so. Find a way. There's always a way."

A longer version of this article first appeared in The Guardian © Jordan Kisner 2016.

Last week we incorrectly attributed the adaptation of Unleashing Demons by Craig Oliver to the Daily Mail. This should have been credited to The Mail on Sunday.



APPENDIX 3: Outline of Cambridge township properties within the green belt and new subdivisions outside the original green belt area (as at December 2017) – source Waipa District Council



APPENDIX 4: Simple map showing layout of rat traps on four lines at Lake Te Ko Utu Koo Utu (as at September 2018) – source Predator Free Cambridge



APPENDIX 5: Information sheet for Lake Te ~~Ke-Utu~~Koo Utu rat control launch
- 15 September 2018

Predator Free Cambridge *Giving Rats the Boot!*



What it's about?



Rats have led a charmed life at Lake Te Ko Utu for over 150 years. However, this is about to end. Starting on September 15th 2018 Predator Free Cambridge, as part of a NZ wide initiative, began a trapping programme around the lake to help protect, among many birds, our treasured tui, korimako (bellbird), piwakawaka (fantail) and encourage them to nest in the bush around the lake.

While they are numerous in and around buildings, rats are rife in all bush areas. There is no part of any tree around the lake that ship rats cannot reach and that's bad news for nesting birds. Rats will destroy eggs, devour newly hatched chicks and they can carry diseases of humans.



How trapping works

With Waipa District's approval several rat trapping lines have been set up. 'A line' consists of 10-15 Victor or T-Rex snap-traps (much like large mouse traps) baited with a lure such as peanut butter or Nutella™ and placed in a wooden box on the ground. The box is hidden from view and protects the bait and trap from rain, dogs, pet cats and falling vegetation .. and rats love running into and through tunnels. Intensive rat control is needed over the Spring nesting time, especially October through December. Our ultimate goal is to rid rats from urban Cambridge and surrounding areas.



How you can help

A team of volunteers will monitor the traps regularly, clear them of dead rats and rebait them. If you see any rats, notice any damage to traps or want to help out here, or in other places around Cambridge, call one of the following people:

Peter – (021) 894460; Adam – (021) 855854; Bella – (022) 1850861

