Regulatory Committee - 13 June 2018 Attachments

Minutes of a meeting of the Regulatory Committee held in the Auditorium, Toitu Museum, Dunedin on Wednesday 2 May 2018, commencing at 12.22pm

Membership

Cr Bryan Scott	*(Chairperson)*
Cr Sam Neill	*(Deputy Chairperson)*
Cr Graeme Bell	
Cr Doug Brown	
Cr Michael Deaker	
Cr Carmen Hope	
Cr Trevor Kempton	
Cr Michael Laws	
Cr Ella Lawton	
Cr Andrew Noone	
Cr Gretchen Robertson	
Cr Stephen Woodhead	

Welcome

Cr Scott welcomed Councillors, members of the public and staff to the meeting.

1. APOLOGIES

No apologies were advised.

2. LEAVE OF ABSENCE

Leave of Absence for Cr Bell was noted.

3. ATTENDANCE

Sarah Gardner	*(Chief Executive Officer)*
Nick Donnelly	*(Director Corporate Services)*
Tanya Winter	*(Director Policy, Planning & Resource Management)*
Sian Sutton	*(Director Stakeholder Engagement)*
Gavin Palmer	*(Director Engineering, Hazards & Science)*
Scott MacLean	*(Director Environmental Monitoring & Operations)*
Ian McCabe	*(Executive Officer)*
Lauren McDonald	*(Committee Secretary)*

4. CONFIRMATION OF AGENDA

The agenda as tabled was confirmed.

5. CONFLICT OF INTEREST

No conflicts of interest were advised.

6. PUBLIC FORUM

No public forum was held.

7. PRESENTATIONS

No presentations were held.

8. CONFIRMATION OF MINUTES

Resolution

That the minutes of the meeting held on 21 March 2018 be received and confirmed as a true and accurate record.

Moved: Cr Scott
Seconded: Cr Woodhead
CARRIED

Cr Scott requested progress on the action for wallaby control discussions with Environment Canterbury to be added back into the Action List.

9. ACTIONS

Status report on the resolutions of the Regulatory Committee.

Report No.	Meeting	Resolution	Status
11.3 Managing the use of coal for domestic heating in Otago and New Zealand (Technical Committee)	31/1/2018	*That the matter of the ability to enforce the current Regional Air Plan AirZone 1 provisions be considered by the Regulatory Committee*	In process

11.4 and 11.5 Enforcement Process and Reporting	21/3/18	*Revision of the enforcement process report be added to the ORC website*.	In process

10. MATTERS FOR COUNCIL DECISION

Nil

11. MATTERS FOR NOTING

11.1. Director's Report on Progress

The report detailed the regulatory activity for the reporting period 27 February 2018 to 9 April 2018, including: biosecurity, compliance activity and the Environmental Risk Response programme.

Discussion was held on when the impact of the release of the RHDV-1 K5 virus could be expected. Mr MacLean advised that the data collated on the virus release in Australia had yet to be published, and explained the anticipated timeframe for spread and impact of the virus. A request would be made of Landcare Research for impact data collated to date. He clarified the night count monitoring methodology in place to assist in establishing the average rabbit number per 100m for evidence of impact. He confirmed regular updates would be provided and that strong and consistent messaging was in place for landholder to continue with primary rabbit control work.

Mr MacLean was asked to provide feedback on the Clean Check Dry surveys to interested stakeholders, such as the Lake Dunstan Aquatic Weed Management Group.

Cr Laws left the room at 12:36 pm.

Resolution

That this report is received and noted.

Moved: Cr Woodhead
Seconded: Cr Noone
CARRIED

11.2. Consents and Building Control

The report covered the consents and building control, and deemed permit replacement progress for the period 23 February to 6 April 2018.

Cr Laws returned to the room at 12:39pm.

Resolution

That this report is noted.

Moved: Cr Woodhead
Seconded: Cr Neill
CARRIED

11.3. Enforcement Activities from 24 February 2018 to 4 April 2018

The report detailed the Resource Management Act 1991, Biosecurity Act 1993 and Building Act 2004 enforcement activities undertaken by the Otago Regional Council during the period 24 February 2018 to 4 April 2018.

Discussion was held on the timing and detail of inform to councillors on legal proceedings underway (enforcement and infringement notices) through formal reporting.

Mrs Gardner advised she would speak with the Legal Counsel on provision of this information, without compromising legal responsibilities. Consideration would be given to providing this information to councillors during public excluded session reporting.

Resolution

That this report be received and noted.

Moved: Cr Hope
Seconded: Cr Kempton
CARRIED

12. NOTICES OF MOTION

No Notices of Motion were advised.

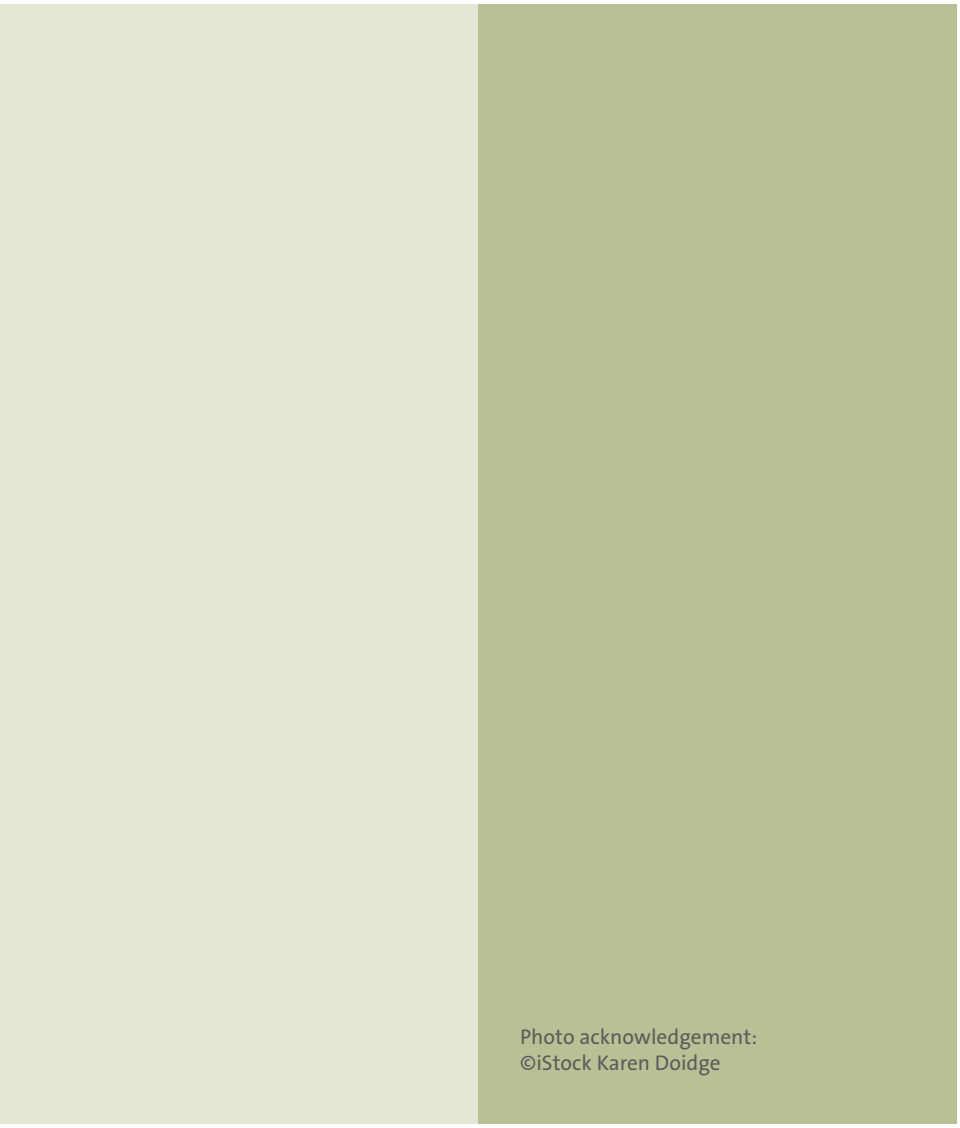
12. CLOSURE

The meeting was declared closed at 12:51 pm.

Chairperson

B.29[18e]

Monitoring how water is used for irrigation



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Monitoring how water is used for irrigation

Presented to the House of Representatives under section 20 of the Public Audit Act 2001.

May 2018

ISBN 978-0-478-44287-8

Contents

Overview

Freshwater is important for our health, our economy, and our lifestyle. It is essential that we manage freshwater resources well. Organisations that manage freshwater need to balance many demands, including an increasing population and its effects on food production, recreation, and conservation.

Part of managing any natural resource effectively and efficiently is knowing how much of it is used. In 2010, the Government introduced regulations that required the people and organisations that use large quantities of freshwater to measure how much they take. This was done with water meters. Local authorities were required to oversee the installation of these water meters. Before the Regulations were introduced, measuring water use was haphazard and inconsistent throughout the country.

This is our first of seven audits that will look at how public organisations manage water. For this audit, we looked at how freshwater used for irrigation is tracked and measured. This included looking at how well water meter installation was managed, the quality of data collected from water meters, how the data was used, and whether this was leading to positive changes in the way water is used. We focused on five regional councils and one unitary council from six different regions.

The six councils we looked at monitor about 90% of freshwater used for irrigation within New Zealand. Overall, these councils have implemented the Regulations effectively. Water meters have now been installed for almost all of the largest water takes. The six councils are starting to use water meter information to educate people and organisations holding water permits (permit holders) about how they can use freshwater more efficiently and to show how much water is used. However, the quality of data collected can be poor, there can be issues with data that is collected manually, and there is scope for more co-ordination between councils.

Appropriate governance and management contributed to effective implementation of the Regulations and helped councils to overcome some initial challenges. These challenges included a shortage of companies to install water meters and historical legal and consenting issues. Most water meters have been installed for users of large quantities of water but more work is needed to increase the installation of meters for lower-use permit holders. In our view, councils that started rolling out metering and developing systems for storing meter data before the Regulations came into effect are now in a better position to use that information.

There are opportunities for councils to improve the quality of their data. Electronically collected and telemetered data (data that is transmitted from a sensor to, for example, a computer server) can be timely and less costly to process than data that is collected or sent to councils manually. Although progress has

been made, councils need to work closely with permit holders to improve the reliability of water meter data. It would be useful to review the Regulations to encourage permit holders to provide timely and complete data to councils to assist with their monitoring of water takes.

The six councils we audited are working to encourage permit holders to use freshwater more efficiently. To do this, they are first improving the way they use their water meter data. Some councils integrate water meter data with climate, soil, crop variation, and irrigation strategy information to produce a more complete picture of water use and water allocations. This allows them to review, calculate, or potentially revise water allocations, which permit holders can compare to their actual water use as recorded by water meters and, if necessary, adjust how they use water.

However, more could be done. In our view, there are opportunities for councils to use data and work together to support permit holders to change to more efficient forms of water use. Central government also needs to take the lead in co-ordinating knowledge and sharing practices that could result in more efficient use of freshwater.

Information from water meters and the story it can tell us is important. There are also important lessons to be learnt from the councils that implemented the Regulations effectively. These councils prepared for system changes early, ensured good data collection, and integrated data from different sources to examine, review, and manage the use of freshwater resources. Integrating data from different sources will help councils to oversee the horticulture and agriculture industries in their regions in an informed and effective way.

I have made four recommendations to help improve the quality of information recorded from water meters and how councils use this information.

I thank the management and staff of the six councils for their help on this audit. I also thank staff from Horizons Regional Council, Waikato Regional Council, the Ministry for the Environment, and Ministry for Primary Industries who contributed to planning for the audit, and staff from Irrigation New Zealand, Forest & Bird, and Hilltop Software Limited.

Greg Schollum
Deputy Controller and Auditor-General

2 May 2018

Our recommendations

We recommend that:

1. the Ministry for the Environment review the part of the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 that allows for manual data collection and annual data provision, and work with councils that have oversight of water metering, to ensure that people and organisations holding water permits regularly submit accurate data using automated processes;
2. councils continue to work with people and organisations holding water permits and intermediary data service providers to improve the timeliness and completeness of water-use data received;
3. the Ministry for the Environment, councils that manage freshwater resources, and other interested groups work together to use water-use data to encourage compliance with water permits and the limits they impose, to enable effective and efficient use of freshwater resources; and
4. the Ministry for the Environment evaluate the benefits of water metering to understand how it has changed the way people and organisations holding water permits have used what they have been allocated.

1 Introduction

1.1 In this Part, we discuss:

- the purpose of our audit;
- implementing the water measurement regulations;
- what we audited;
- what we did not audit; and
- the structure of this report.

The purpose of our audit

1.2 Freshwater is a vital resource. Large quantities of freshwater are used for irrigation in the agriculture and horticulture industries, with about 65% of water permits allocated to irrigation. This accounts for about 51% of the freshwater permitted for use.[1]

1.3 Irrigation systems take water from freshwater resources and use it for dairy farming, crops, and fruit – all of which are important in supporting New Zealanders and the economy. When the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 (the Regulations) were first implemented, irrigation was estimated to have contributed $2.17 billion annually to the economy.[2]

1.4 Because most of New Zealand's allocated freshwater is used for irrigation, it is particularly important that it is monitored closely. Councils need accurate information about water use at local, regional, and national levels. This information allows the councils managing water to track and make efficient use of allocated water, check compliance with resource consent conditions, and plan for future economic growth.[3]

1.5 People taking freshwater from its source (such as rivers, lakes, streams, wells, or bores) usually need a resource consent (called a water permit) issued by the relevant council. There are about 11,500 irrigation water permits.

1.6 The Regulations were introduced in November 2010. They required people and organisations holding water permits (permit holders) and taking relatively high quantities of water to measure its use.

1.7 Our 2017/18 work programme has a *Water management* theme. As part of this theme, we wanted to examine how effective water metering was in creating opportunities for more efficient use of freshwater. We wanted to look at the

1 Irrigation accounts for about 5,047 million litres of water out of 9,874 million litres permitted for use (for non-hydro-electricity generation).

2 NZIER and AgFirst Consultants (2014), *Value of Irrigation in New Zealand*, Wellington.

3 Ministry for the Environment (2010), *Measuring and reporting on water takes: An introduction to the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*, Wellington.

benefits that had been achieved so far and what could be achieved in the future. We also intended to identify lessons from implementing the Regulations and from using information to support compliance and consenting.

Water measurement regulations

1.8 Before 2010, councils throughout New Zealand used different approaches to measuring water use.

1.9 The Regulations required permit holders who take more than five litres of water each second to measure their water use. This required a water meter. These meters would ensure that water consumption for all purposes was monitored. The Regulations are intended to ensure that definitive and reliable data is available about how much water is used, including for irrigation.

1.10 The Regulations affect most uses of freshwater except, for example, hydroelectric uses.[4] Most freshwater use is for irrigation and farming. The Regulations set out how permit holders should record their water use and when and how to provide these records to the council.

1.11 The Regulations were implemented in stages. As shown in Figure 1, permit holders that used the most water were the first to be required to comply with the Regulations.[5]

Figure 1
Instantaneous rate of water taken and date of required compliance with the Regulations

The amount of water the permit holder takes ...	Date the Regulations came into effect for the permit holder
More than 20 litres each second	10 November 2012
Less than 20 and more than 10 litres each second	10 November 2014
Less than 10 and more than 5 litres each second	10 November 2016

Source: Ministry for the Environment.

1.12 To ensure that water meters are installed and record water use accurately, they were usually installed by licensed "Blue Tick" contractors.[6] After the meters were

4 The Regulations do not apply to a water permit if the water being taken is "non-consumptive". Non-consumptive means that the same amount of water is returned to the same water body at or near the location from which it was taken, and there is no significant delay between taking and returning the water.

5 In this report we refer to "high-use permit holders" as those who take 20 litres or more of water each second from their permitted water source.

6 Blue Tick is the quality assurance and accreditation programme developed by Irrigation New Zealand to ensure that contractors who install, verify, and provide ongoing management services comply with the New Zealand Water Measurement Code of Practice and the Regulations.

installed, permit holders were required to provide councils with data at least annually about how much freshwater they were consuming.[7] The Regulations do not specify what councils are to do with this information.

1.13 In our view, it is reasonable to expect councils to use this information to improve how communities and the agriculture and horticulture industries use freshwater.

What we audited

1.14 As part of our audit, we looked at:

- how well the implementation of the Regulations has been managed;
- whether water metering is used to collect good quality data;
- whether data is analysed effectively, with useful information shared with permit holders and communities to inform how freshwater is used for irrigation; and
- whether data and information are used to manage use of freshwater for irrigation and to realise efficiencies.

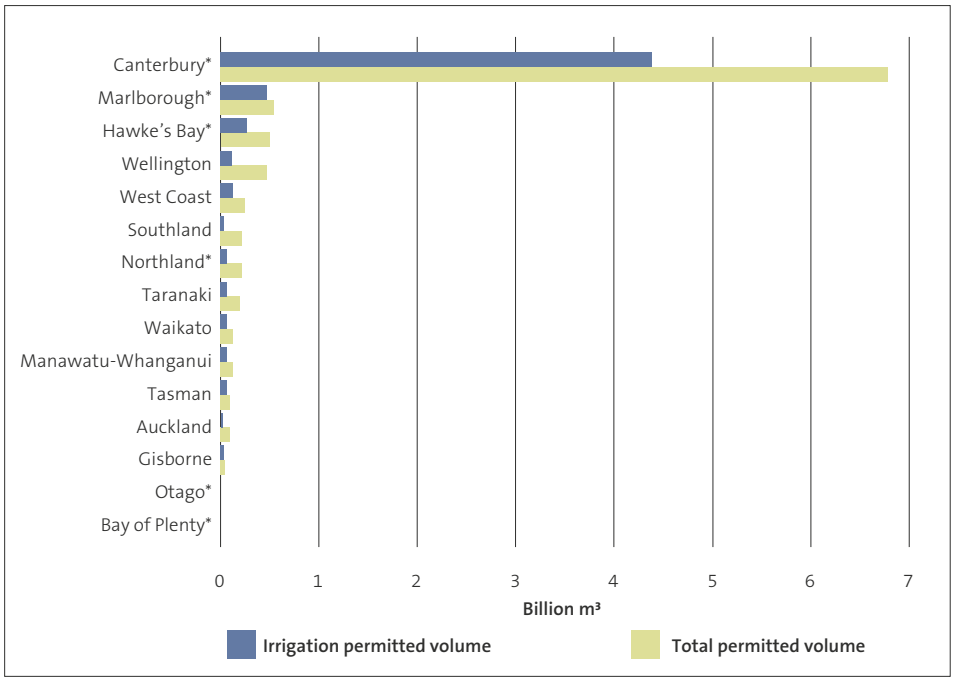
1.15 We selected one unitary and five regional councils (the six councils) to look at for our audit. They were:

- Northland Regional Council;
- Hawke's Bay Regional Council;
- Otago Regional Council;
- Marlborough District Council;
- Bay of Plenty Regional Council; and
- Environment Canterbury.

1.16 We selected these councils because they represent different regional circumstances, with different sizes and volumes of water takes. We selected councils that tend to allocate the most water, because they have the most potential to affect the environment. Figure 2 shows, by region, the total volume of freshwater permitted for use and the volume permitted for irrigation.

7 The Regulations provide regional councils with the discretion to approve the keeping of weekly rather than daily records of water consumption.

Figure 2
Annual freshwater volume permitted for use, by region



*Councils included in our audit.

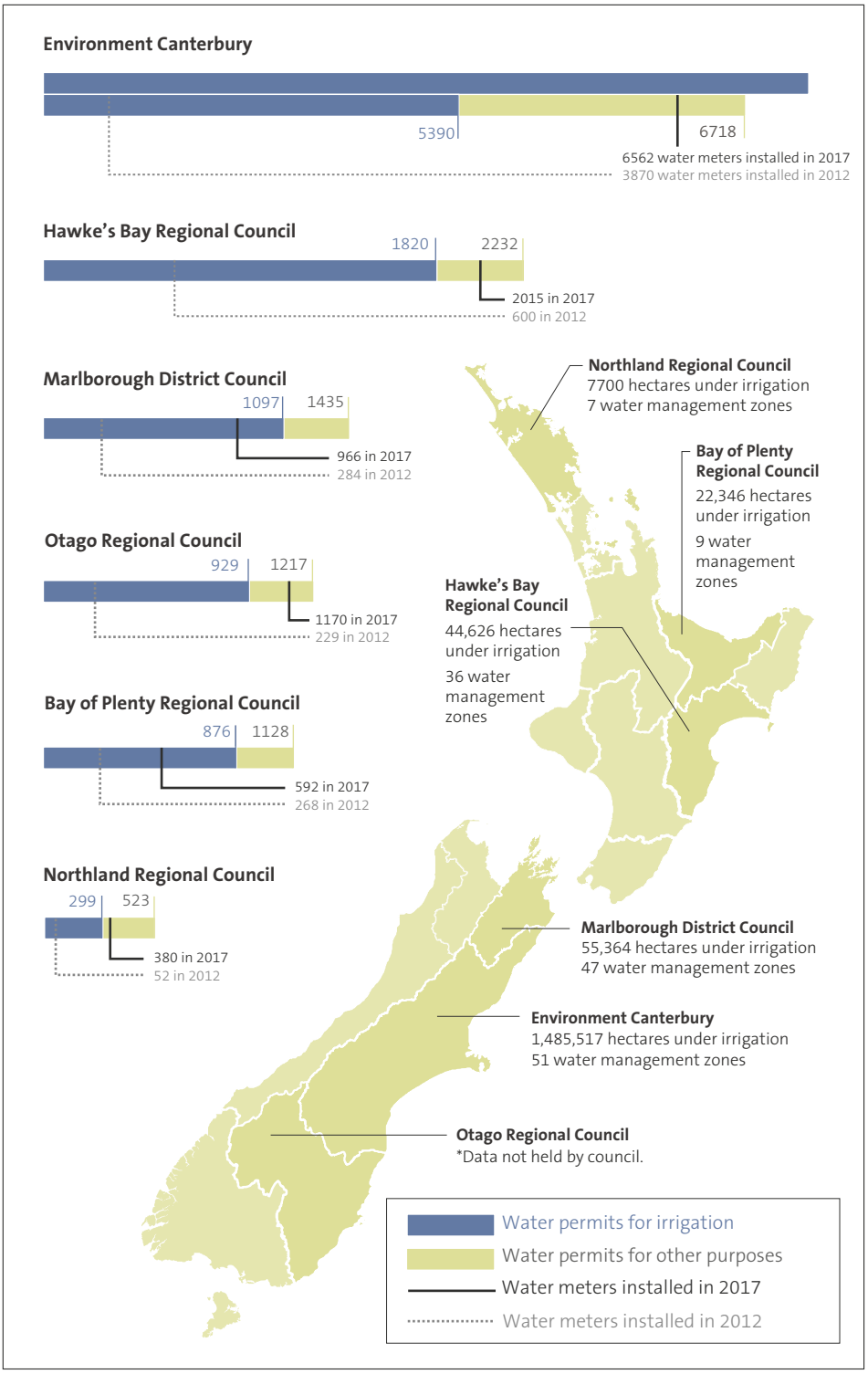
Source: Land, Air, Water Aotearoa. These figures are what councils are currently and publicly reporting on the Land, Air, Water Aotearoa website – www.lawa.org.nz.

1.17 There are other differences between the six councils. Figure 3 shows the total number of water permits and the number of water permits for irrigation, by region. It also includes some selected data about these councils.

1.18 We reviewed documents, internal processes, and publicly accessible information for all of the six councils. We looked at each council in their own regional context, rather than comparing their performance. All of the examples in this report are from the six councils unless otherwise mentioned.

1.19 To understand different perspectives on the issues about metering, we also spoke with people from the Ministry for the Environment, the Ministry for Primary Industries, the National Institute of Water and Atmospheric Research, Forest & Bird, industry groups (including software companies), and Irrigation New Zealand.

Figure 3
Number of water permits for irrigation and total number of water permits, by region, as at October 2017



Note: Some water permits include water meters.
Source: Data provided by each council.

What we did not audit

1.20 We did not look at policy decisions. We did not consider the funding of irrigation schemes or councils other than the six councils.

1.21 We did not look at the long-term sustainability of the water measurement infrastructure (such as water meters, data loggers, telemetry,[8] or databases).

1.22 Irrigation is linked to wider environmental issues, such as water pollution. Although we did not directly address this as part of our audit, properly timed irrigation can reduce nutrient and effluent leeching into water ways.[9] This is why we focus on efficient and sustainable water use by permit holders in Part 4.

1.23 Managing impacts to freshwater quality will be covered in a separate performance audit that we expect to report on later in 2018.

Structure of this report

1.24 In Part 2, we consider how effectively the six councils implemented water metering.

1.25 In Part 3, we discuss water meter data collection and quality, including challenges and improvements.

1.26 In Part 4, we discuss the way councils are using water meter data to help improve behaviours related to the consumption of freshwater.

8 Telemetry is an electronic process for transmitting data from a sensor to, for example, a computer server.

9 Office of the Auditor-General (2011), *Managing freshwater quality: Challenges for regional councils*, Wellington.

2 Implementing the Regulations and initial issues

2.1 In this Part, we discuss:

- how the six councils implemented the water measurement regulations;
- problems that the six councils needed to address when overseeing water meter installation; and
- how some councils anticipated the increased volume of information better than others.

Management and monitoring of the implementation has been largely effective

2.2 Permit holders have installed a considerable number of meters to meet their obligations under the Regulations. At the time of this report, about 99% of high-use permit holders have meters. In some regions, lower-use permit holders (permit holders who take 5-10 litres of freshwater each second) have been slow to install water meters. The relevant councils are continuing to work with these lower-use permit holders to increase the number of water meters. In most regions, this is not a significant problem. We encourage councils to continue to work with lower-use permit holders to install water meters to meet their obligations.

2.3 The installation of meters has led to a significant increase in councils' information about water use. Although permit holders are responsible for recording the quantity of freshwater they are consuming, councils monitor, enforce, and implemented the Regulations.

2.4 For each of the six councils, there were clear plans for measuring water use through water metering. These included action plans, communications plans, and project management plans.

2.5 The six councils' plans for water metering were also integrated with their other plans and strategies, including plans for using and managing sources of freshwater. This helped integrate implementation and data collection with other activities and priorities (see Example 1).

Example 1

Environment Canterbury prepared thoroughly for implementation, including producing a "roadmap" that included timeframes, key roles and responsibilities for staff, detailed costs, and links between the implementation of the Regulations and the desired long-term outcomes.

Environment Canterbury also jointly developed industry-agreed standards. For example, "good management practices" were expected for all farming activities. Farmers and permit holders are required to maintain auditable Farm Environment Plans in case irrigation exceeds the permitted limits. These are checked by farm auditors who are certified by Environment Canterbury.

2.6 Councils set clear priorities and targets for installing and using water meters to ensure that these comply with the Regulations. Setting targets helped councils meet their objectives with installing water meters.

2.7 Appropriate governance and management allowed issues to be resolved when they came up. Governance bodies in the six councils (usually specific council committees) had appropriate oversight and were regularly informed about progress. When specific issues affected implementation and had the potential to slow data collection, such as some farmers' concerns about the cost of meter installation, they were brought to the attention of the governance body.

2.8 The six councils provide support and guidance to permit holders to help them comply with the Regulations. All of the six councils carefully planned how they would support permit holders and targeted their communications to them. This support took different forms according to local needs (see Examples 2 and 3), such as meeting with specific permit holders or local water management groups.

Example 2

Kiwifruit growers and dairy farmers use the highest quantities of freshwater in the Bay of Plenty region. Bay of Plenty Regional Council held five presentations throughout the region targeted at these groups. The presentations covered what permit holders were required to do under the Regulations, how the Regulations related to compliance and permits, and a new water records system.

Example 3

Marlborough District Council targeted support to the companies that verified the water meters that high-use permit holders would install. The Council used its consents database to identify these permit holders.

2.9 The six councils were regularly and comprehensively monitoring, reporting, and sometimes auditing the progress of implementing the regulation's requirements. One council put in place a compliance programme to check that meters were installed correctly, and another council had random inspections to check the installation quality. This information was used to ensure that they were meeting installation objectives.

2.10 We saw councils sharing information and working together to manage the new data from water meters. In one example of good practice, six councils (including one of the smaller ones from our sample) used a shared-software program they developed called IRIS.[10]

2.11 However, in general, we did not see councils working together to explore procurement processes for common software. In our view, this was a missed opportunity and might have helped reduce costs. Some councils were procuring the same type of software from the same providers independently of each other.

10 IRIS is a software system used by councils to manage council functions, including the regulatory areas of consents, compliance, biosecurity, and enforcement.

2.12 Councils are responsible for managing water metering in their regions. The overall programme is funded by rates and, in some cases, costs are recovered from permit holders. Councils also inspect and monitor water meters, which is usually paid for by permit holders.

2.13 In our view, the six councils appropriately considered how to fund implementation of the Regulations. In allocating costs, councils considered different options and relevant regional concerns.

Councils overcame challenges when overseeing water metering

2.14 There were some unexpected challenges with water meter installation, which led to delays (Example 4).

Example 4

Otago Regional Council had a situation that involved "deemed permits" – historical permits issued for mining purposes as much as 140 years ago that allowed the holder to use unspecified amounts of water. Without an allocated amount to compare use to, the Council could not determine compliance. It opted to use water-use data from the past five years to calculate a water allocation limit for people holding deemed permits.

2.15 In one region, an outbreak of the *Pseudomonas syringae pv. Actinidiae* bacteria meant that implementation had to be delayed to prevent the contamination spreading through site visits to permit holders' properties.

2.16 Installing water meters also initially stretched industry capacity. In some places, there was a significant shortage of installers and people to verify that water meters were installed and working correctly. In some cases even the meters were in short supply. This meant that implementation plans for the Regulations were sometimes delayed. These delays were made worse by the time needed to train contractors. To work through this, one council managing a large number of permit holders and water takes issued temporary waivers to permit holders to extend the installation time.

2.17 Contractors who went through the Blue Tick accreditation did most of the work to install and verify meters. One large region had a shortage of contractors and so the council allowed non-Blue Tick accredited installers to install and verify water meters. This region now operates under the Blue Tick programme. Documentation to control installation and verification was sound and appropriate.

2.18 Councils used different approaches to build capacity and capability and engage with stakeholder groups, contractors, and permit holders. Some councils purchased and provided technology for verifying the accuracy of water meters to support permit holders. Others organised workshops and established common definitions and understanding of the requirements of the Regulations and of how meters should be installed.

Some councils anticipated the need to support increased water-metering information

2.19 The six councils use different information technology and ways to store their data. All of the six councils invested in information technology that would enable them to produce good quality information. In our view, some councils were better prepared to receive water meter data. The better prepared councils typically had more water permits and freshwater sources to manage.

2.20 Some councils anticipated the increase in information about freshwater consumption before the Regulations were introduced. One council conducted telemetry trials in the late 2000s. Using these trials, this council was able to test the use of telemetry and data integration. It also prepared databases and registers to record and manage data from water meters and tested integrating data sources to inform water management. In our view, this is an example of good practice. The trials helped the council to ensure that it had robust systems and processes in place before the Regulations came into effect.

2.21 We saw other examples of councils making plans to deal with the increased volume of information. One council had set a clear policy on the increased use of metering data to encourage efficient water use. Wasting freshwater can be avoided by using metering data to better support water permit applications. Another council upgraded its systems to better receive freshwater information in response to more permit holders choosing to send their data automatically. Anticipating the increased volume of water-metering information meant that councils could collect and use this information more effectively once the Regulations came into effect.

3 Improving the timeliness and completeness of data collection

3.1 In this Part, we discuss:

- gaps in the data that the six councils are receiving; and
- problems with data quality.

Gaps in the data received from permit holders

3.2 The Regulations mean that councils are now receiving considerable amounts of data about how much freshwater is used. Permit holders are required to record freshwater consumption daily[11] and send this data to councils at least annually. More timely delivery of data to councils, like that provided through data loggers and telemetry, can help permit holders ensure that they are complying with permit conditions and managing their freshwater consumption. In the region with the largest number of water takes, data is being delivered daily for about 80% of water takes. Overall, permit holders are collecting data mostly as required by the Regulations, and the six councils are receiving this data.

3.3 Before the Regulations took effect, the six councils had made preparations to store and manage the information from permit holders. They produced data submission guidelines for permit holders and made these publicly available. The guidelines explain automatic and manual methods for submitting data.

3.4 To ensure that permit holders were clear about what was expected of them, the six councils put policies in place to explain their role. For example, one large council had documented what permit holders and data service providers needed to do to ensure that they were collecting and submitting good quality data, and what the council would do if the data was not submitted. The council's document also explains what will happen if data is contaminated or lost.

3.5 Councils have worked together and with the irrigation industry, the Ministry for the Environment, and the National Institute for Water and Atmospheric Research to produce standards for installing and validating meters and for collecting and submitting data. In our view, this is an example of good practice and these standards will help improve data quality.

3.6 Councils were also working to ensure that they were receiving and analysing data from water meters effectively and making improvements where necessary. Some councils were working through issues with their systems and processes to improve their databases, phase out some data management tools, and standardise templates for data transfer. For example, one council was reviewing its data collection, storage, and reporting system as a sub-system of the council-wide Water Accounting System. This review was intended to improve data quality and usability.

11 The Regulations require consent holders with consents to approve the keeping of weekly, rather than daily, records of water consumption.

3.7 Despite improvements in how data is collected, some problems remain. Measuring water flow through open races and channels is difficult and costly compared with measuring water flow through enclosed pipes. Water meters can fail or send incorrect data. Power supply outages can interfere with the meter system. Meters in remote areas can be difficult to access, portable meters can be unreliable, and sometimes water meters can be affected by issues outside of permit holders' control – such as ants destroying cabling inside telemetry units and electric fences interfering with signals.

3.8 Permit holders are responsible for dealing with these matters. There are sometimes unavoidable gaps or unusual patterns in the water meter data because of these problems.

Overcoming problems with data quality

Problems with data quality

3.9 Although councils are now receiving data about water use that is required by the Regulations, the problems with submitting data can affect the quality of the information. This is partly because different councils have different requirements for how frequently permit holders need to submit data from water meters. Some councils receive more complete and timely information than others (Example 5).

Example 5

Marlborough District Council phased out manual recordings of water-use data in 2014, anticipating potential problems with human error in the collection and quality of data. The Council was concerned that relying on annual returns put it at risk of losing data for a whole year if there was an unexpected issue or meter failure. To mitigate this, permit holders were required to install automated recording systems called data loggers. Data loggers allow the Council to collect comprehensive information on when and how much water has been taken.

3.10 Manually collected or submitted data also causes significant issues with data quality. Although more water meters, such as telemeters, enable automated data collection, there are still many instances where data is collected manually. This can include handwritten meter readings that are submitted electronically and information recorded and submitted in spreadsheets. This can lead to poor quality data, for example, if handwritten meter readings are misread.

3.11 Other errors, such as misreading meters, can also contribute to poor-quality data. In our view, manual data collection is an issue that affects councils' administrative costs and the quality of data and how it is used to analyse consumption and monitor and enforce compliance.

3.12 Permit holders can contract data hosts, which are private companies that manage the data from water meters. A risk with this arrangement is that councils have less direct control over the supply of data. This can make it difficult for them to build strong business relationships with permit holders and data hosts. When there are issues with the transmission of data from water meters, it can also take longer to resolve the issue. For one council, this issue is particularly prevalent because a large number of data hosts are managing the data for permit holders.

3.13 It can also be time consuming for councils to work with data hosts. This can affect the quality of the data received. For one council, if the data-services provider is unresponsive about data issues or losses, then the council can make the permit holder temporarily non-compliant until the issue is resolved.

Effects of data quality issues

3.14 In our view, it is important for councils to have high-quality data to ensure timely compliance and identify how freshwater could be used more efficiently. The six councils are working to improve the quality of water meter data. For example, some councils (including the council with the largest number of water permits) are working closely with permit holders and data hosts to build their capability and give them a clearer understanding of issues with data quality and possible solutions. This is good practice. In our view, all councils can learn from this approach.

3.15 It is important that all councils outline the specific responsibilities of permit holders and data hosts to ensure that they understand who is responsible for issues with the collection of data, such as when data is missing, lost, or inaccurate. More complete and accurate data will help councils to monitor and enforce compliance with permit conditions.

3.16 To further improve data quality, the six councils are using staff to monitor the quality of data. Where data quality is found to be poor, these councils prioritise its improvement. For example, one council we looked at had assigned a team to review water metering data. The team identifies causes of data quality issues, such as equipment failure, and follows up on these issues.

3.17 There is also room for all councils to improve their own systems and the quality of their water meter data. The six councils are aware of this and are putting in place clear expectations for data standards and guidelines. This includes clearly explaining procedures to manage data when it is received.

3.18 Clearer procedures for data quality have already brought some improvements for a council. When the Regulations were introduced, the council's collection processes were poorly controlled. Spreadsheets were used when purpose-built software had been purchased. This council is now improving its practices for data quality.

Recommendation 1

We recommend that the Ministry for the Environment review the part of the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 that allows for manual data collection and annual data provision, and work with councils that have oversight of water metering, to ensure that people and organisations holding water permits regularly submit accurate data using automated processes.

Recommendation 2

We recommend that councils continue to work with people and organisations holding water permits and intermediary data service providers to improve the timeliness and completeness of water-use data received.

4 Improving freshwater management and its use

4.1 In this Part, we discuss:

- the way the six councils are using data from water meters to improve freshwater management; and
- the importance of co-ordination between councils.

Councils are using data to alert, educate, and influence changes to behaviour

4.2 In our view, councils could use data from water meters to support permit holders to use freshwater more efficiently. Because the Regulations do not prescribe how councils are to use this data, it is up to each council to decide what they do with it.[12] Councils are working independently of each other to use water meter data to influence and change how permit holders use freshwater.

Developing systems and processes

4.3 The six councils were developing systems and processes to allow them to integrate and use their water meter data to influence the way freshwater is used.

4.4 In some councils, water meter data can be combined with a range of other data, modelling, and information. Other councils are planning to integrate their water data in similar ways.

4.5 Some councils had developed systems and processes to combine all of their water-related data in one place (see Example 6). Bringing together water information from different sources, including water meter data and water flow and permit information, gives councils a wider view of water management.

Example 6

Marlborough District Council developed eWater, an online tool, using funding from the Council and the Ministry for the Environment. eWater shows the complete information for each water permit, including the source of water, water management unit, permit number, date of issue, lapse date, any scanned documents, a map of the property, and information about use against allocation. This information is available all in one place to both permit holders and the Council.

eWater also has the functionality (although it is not currently in use) to allow permit holders who do not use all of their allocated amount to transfer some of this to another permit holder using the same water source. The community had initial concerns that this could lead to "water trading", but the Council has taken steps to address these concerns.

4.6 Another council had set up water management groups to encourage permit holders to work together to use freshwater more efficiently (see Example 7). Meetings allow a community to identify ways it could use water more efficiently.

12 The Regulations make permit holders responsible for collecting the data. Levels of investment also provide an incentive for permit holders to use water efficiently. In the Canterbury region, it is estimated that about $50 million has been invested by farmers to comply with the Regulations.

Example 7

Environment Canterbury has formed Water Management Zone Committees. These committees hold meetings about water management, including water metering, to encourage a more efficient use of freshwater. Local rūnanga are represented on the committees, and participants have included Fish & Game New Zealand, the community, and scientists. Environment Canterbury publishes online all of its responses to requests under the Local Government Official Information and Meetings Act 1987. Fish & Game New Zealand, Aqualinc Research Limited, National Institute of Water and Atmospheric Research Limited, and Dairy New Zealand have requested and been provided with information related to water metering.

Water Management Zone Committees are starting to use water meter data to more effectively ration water during periods of drought or low flows through local rivers. The committees make decisions on a number of environmental limits, including allocation limits. By setting up these committees, Environment Canterbury encourages more effective and efficient use of water meter data when dealing with environmental issues.

4.7 Where they saw fit, the six councils were anticipating opportunities to use water meter data and models to set more realistic limits for permit holders. These limits have been determined using estimates and are now often determined using past water-use data from meters and, in some cases, computer models. The six councils have reviewed water use limits when permits expire, catchments or zones are over-allocated, and because of plan changes. These reviews can cause limits to be reset and lowered.

4.8 As the quality of data from water meters improves and more trend information becomes available, councils will have more information to support allocations and limits for water use. All councils have a key role in ensuring that they use all relevant and current information to set realistic and needs-based water allocations.

Better engagement by the six councils

4.9 Most councils have shared information about water metering and freshwater use with the public and interested parties. Feedback from the public and other interested parties shows that they appreciate councils' efforts to work with them.

Permit holders

4.10 Water meter information and analysis are available primarily for permit holders through purpose-built portals on council websites. Individual and groups of permit holders tend to be the primary audience and can use this information to change their water consumption behaviours.

4.11 Some councils are using water meter information to provide feedback and alerts to permit holders when they are in danger of breaching their allocations. Councils are using a combination of compliance and education activities and support to influence behaviour so that more permit holders do not exceed their allocation. This should reduce the need for councils to take corrective action.

4.12 Data hosts also send automated alerts to permit holders to warn them when they are exceeding their allocation. Automated alerts are efficient at ensuring that permit holders do not exceed their allocation.

Stakeholders and the public

4.13 Councils have shared information about water use with their communities. In Example 8, a council successfully engages with communities and stakeholders. This follows its commitment to an overall water management strategy when the Regulations were implemented.

Example 8

Environment Canterbury met with communities to discuss the installation of water meters. Farmers were receptive and have invested in new technology to improve the quality of their data. Environment Canterbury has also established contacts with organisations such as Forest & Bird and Fish & Game New Zealand and met with local iwi. Environment Canterbury has produced specific water reports and held multiple information events about water use and irrigation efficiency.

4.14 Some water meter information is available to the general public. This includes public compliance monitoring reports and water-use reports. One council publishes annual accounts of the water used in each of the different administrative zones in its region. Many councils also used their websites to provide data and information about the quantity of water flowing through rivers in their region. This information helps the public understand the quantity of freshwater used for irrigation.

4.15 Land, Air, Water Aotearoa[13] publishes some national freshwater consumption information online. However, often only permit and allocation data rather than actual-use data is presented. This is because data from councils is not consistent enough. As a result, the public is unable to obtain a national view of freshwater consumption for irrigation. Locally, councils also need to share and promote more information with the public about how much freshwater is used.

4.16 Councils are providing information to their communities and the wider public. In our view, the challenge for councils is to respond to the demand effectively to get the most out of requiring permit holders to record freshwater consumption, and to use this information to improve water consumption behaviours.

4.17 In our view, although some councils are using metering data to influence water use, a lot of work is still needed to embed the use of metering data to change how efficiently freshwater is used. Councils should continue to work with others to improve

13 Land, Air, Water Aotearoa was initially a collaboration between New Zealand's 16 regional councils and unitary authorities. Land, Air, Water Aotearoa is now a partnership between the councils, Cawthron Institute, Ministry for the Environment, and Massey University, with support from the Tindall Foundation. Its aim is to help people communities find the balance between using natural resources and maintaining their quality and availability.

the education, guidance, and support available to permit holders to ensure that the irrigation practices and methods they use are the most effective and efficient.

Co-ordination is needed to realise greater benefits

4.18 In our view, the work individual councils are doing to encourage more efficient use of freshwater has the potential to help change how permit holders consume freshwater. However, co-operation between councils could help achieve better results.

4.19 Water metering is part of a technology-based change in agriculture and environmental monitoring. Councils and the environmental sector need to consider the benefits of integrating different types of data. Water metering in conjunction with other data, such as soil quality data, could provide crucial information and play an essential part in managing resources better. Strong leadership and governance will be needed to find opportunities to integrate water-metering information with other data.

4.20 There is also a significant opportunity for central and local government, permit holders, and other stakeholders to work together to better manage freshwater. The data from water meters provides valuable information about freshwater use. However, data alone will not lead to more efficient use of freshwater. There are many stakeholders, and in our view central government can, through the Ministry for the Environment, co-ordinate knowledge and sharing practices to make better use of water meter data, which will lead to more efficient use of freshwater.

4.21 The Ministry for the Environment was planning to measure some of the benefits of the Regulations and water metering in 2014/15. However, this did not happen. Now that the implementation has taken place, the time is right for the Ministry to assess the effectiveness of water metering and the Regulations. In our view, this should include the effectiveness of water metering in changing how permit holders use freshwater.

Recommendation 3

We recommend that the Ministry for the Environment, councils that manage freshwater resources, and other interested groups work together to use water-use data to encourage compliance with water permits and the limits they impose, to enable effective and efficient use of freshwater resources.

Recommendation 4

We recommend that the Ministry for the Environment evaluate the benefits of water metering to understand how it has changed the way people and organisations holding water permits have used what they have been allocated.

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The Halo Project

Otago Regional Council Report

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Contents

1 Halo Project

1.1 ORC Project Report Objective.

To provide the Otago Regional Council a report on the progress to date of the Landscapes Connection Trust's (LCT), Halo Project in relation to ORC project funding and operational activities.

1.2 Report Audit Methodology

- Liaise and meet with Programme manager and coordinator Rhys Miller and Sophie Penniket.
- Initial visit with programme coordinator to interview landowners and visit trap sites.
- Second site visit to landowners, interview and check trap sites.
- Review Halo project web portal information to assess project success and budget to date.

1.3 Project Overview

The Beyond Orokonui Halo project is a community-based pest control project designed to provide enhanced habitat for threatened species outside the perimeter of the Orokonui ecosanctuary predator proof fence, in areas that are inhabited by not only the project members but the community as a whole.

The project uses active and trained volunteers and the immediate the goals for the initial phase of the Halo project were to:

- Significantly reduce the number of pests in the Inner Halo and buffer the Orokonui Ecosanctuary from invasion by stoats, possums and rats.

- Provide a haven for wildlife in the 3,900 ha Inner Halo area surrounding the ecosanctuary, increasing breeding success of birds, enhancing reptile and invertebrate populations and enhancing forest health.

- Empower community members with the skills and knowledge so as to participate in a manner that delivers strategic and cohesive conservation and community wellbeing outcomes.

The project employs two coordinators that assist individuals and groups to become trained in best practice pest control, Health & Safety, and monitoring outcomes.

Figure 1 – Project information board at entrance to Orokonui estuary track.

1.4 ORC Funds

The generous support of the Otago Regional Council has underpinned the ability of the Landscapes Connection Trust to rapidly rollout the Halo Project.

The Otago Regional Council funding was earmarked within the project for trapping hardware and associated hardware costs.
$60,335.00 of the $134,000.00 grant has been spent between December 2016 and 10th of October 2017.
To the 23rd of April 2018 this has risen to $85,072.00 (see appendix 1.)

Rather than buying all trap boxes "off the shelf", the Landscapes Connection Trust has worked with both the Corrections Department and Cargill Enterprises (who employ people with significant disabilities) to have these boxes constructed locally. This has been both more cost effective and has provided additional social benefits from the project.

Project spending to 10/10/2017 as follows;

Breakdown of ORC funds, used in Halo Project to 10/10/2017.

Items Cost	
Traps, trap box materials, construction and labour	$55,026.08
Three GPS units for locating traps	$ 1,539.10
Storage Container, for trapping equipment and tools	$ 3,214.00
Freezer for trap bait	$ 555.82
	$60,335.00

1.5 The Halo Project area

The Halo project area is a very similar land area as to that which is covered by OSPRI NZ/TB Free NZ's Heyward's operational area (see figures 1 and 2).

As a result of a recent bovine tuberculosis outbreak in cattle herds within the general Dunedin North area, OSPRI NZ and TB Free have employed contractors to control possums that may have spread the disease.

Over the entire area approximately 11,000 possums have so far been killed. There have been approximately 4000 possums killed in the Heyward operational area.

OSPRI have budgeted an annual spend of approximately $1 million, over 5 years, this should help to eliminate TB from the greater Dunedin North area and will have enormous benefits for biodiversity.

The Landscapes Connection Trust and the Halo project have a working relationship with OSPRI, where LCT work in the urban areas of the Mt Cargill and Heyward TB eradication programme.
This relationship recognises that the Halo Project is more likely to successfully engage with urban residents across the project area.

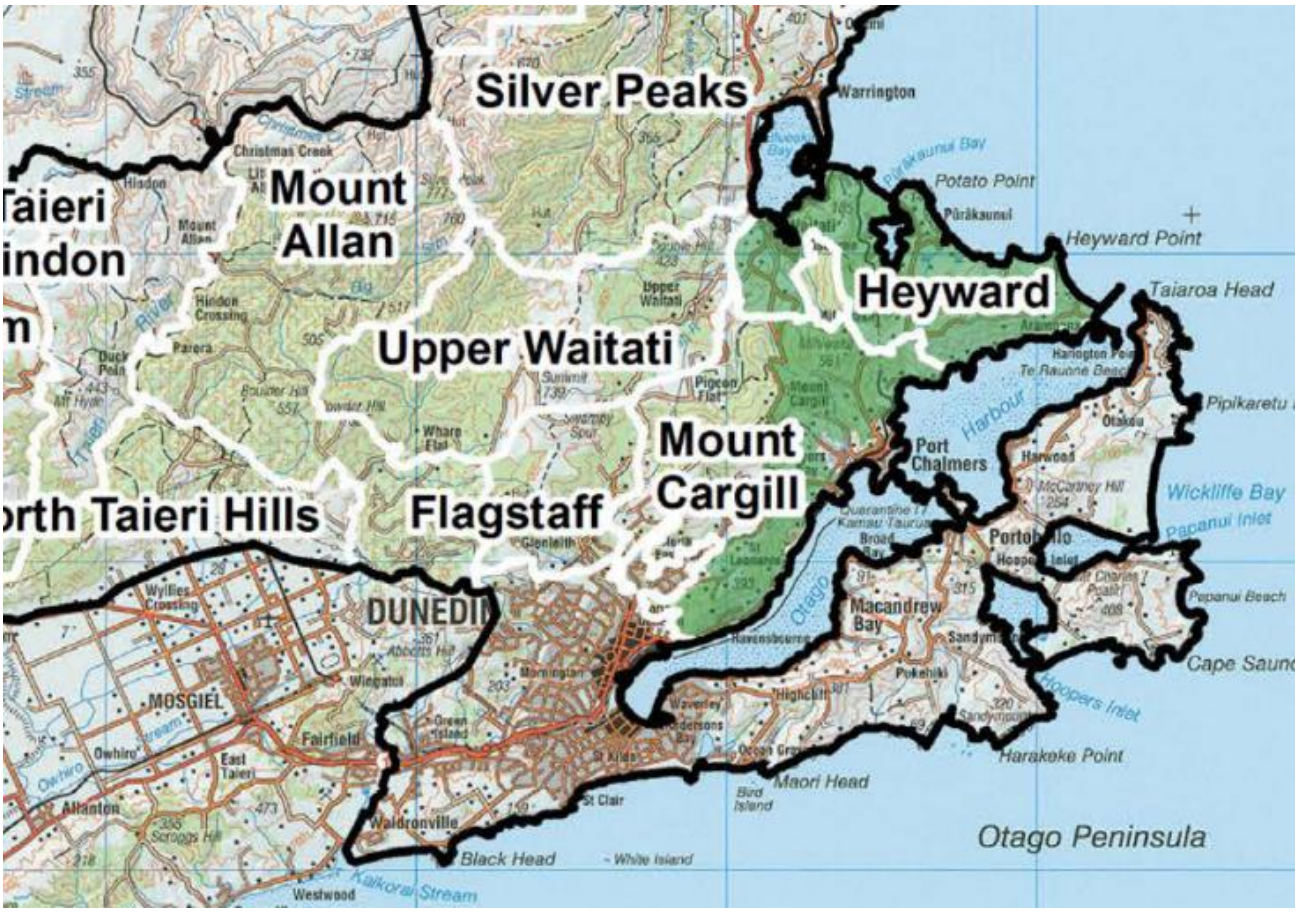

Figure 2 – TB Free operational areas

Trap locations and traps used within the project.

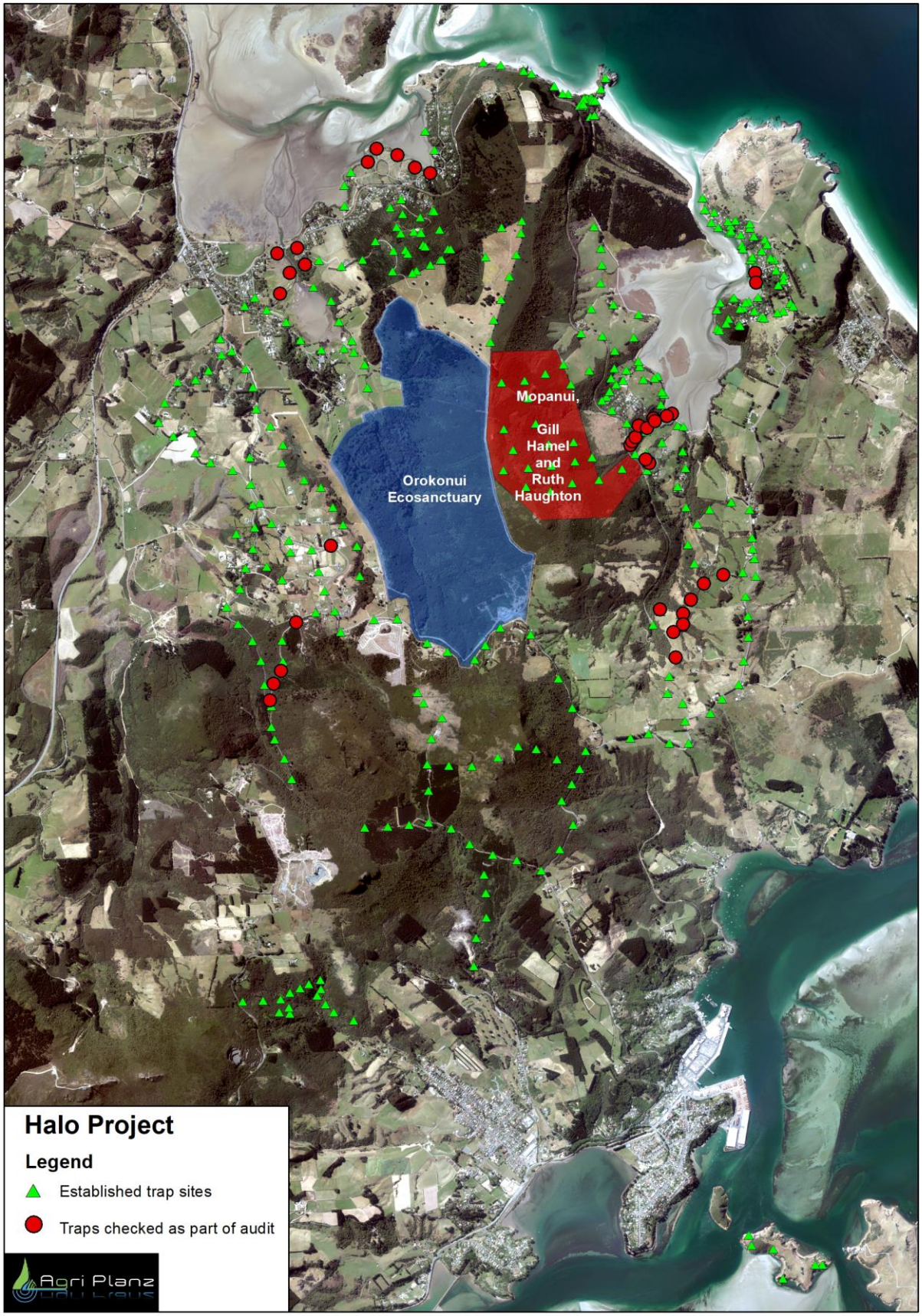

Figure 3 – Map of Halo project trap locations.

1.6 Number and type of traps used in the project to 8/4/2018

Trap type	Number of traps
Single DOD 250	2
Single DOC 200	118
Single DOC 150	27
Double DOC 200	26
Double DOC 150	57
Tunn 200	68
Timms	22
A24 self-resetting	1
Trapinator	21

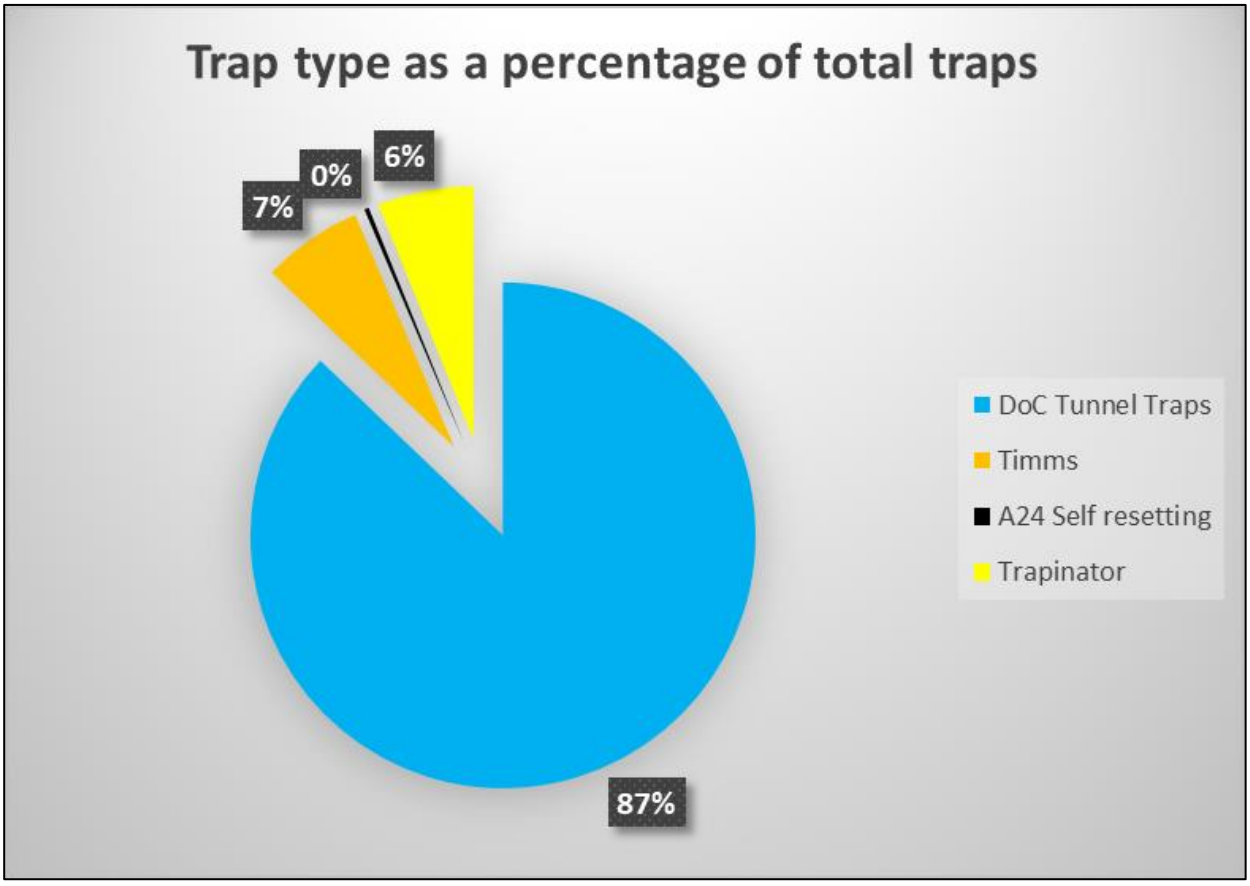

Figure 4 – Percentage of traps by type.

Latest Reconciliation - Traps supplied by the Halo project trap reconciliation report as at 23/4/2018 (see appendix 1).

Note: This report shows the purchase of 23 Goodnature, self- resetting traps that are in the field with another 10 on hand. The information contained in the trap reconciliation requires to be updated with what is actually deployed in the field as the trapping portal only shows one good nature trap in use at present. The same can be said of the trapinator traps with 44 in the report and only 21 deployed in the field.

Figure 5 – Box tunnel trap using a DOC trap

Figure 6 – DOC trap alongside the Orokonui estuary.

Figure 7 – A Trapintor trap with lid open

1.7 Pest species trapped to 8/04/2018

Ship Rats	152
Norway Rats	9
Mice	3
Hedgehog	132
Ferrets	21
Stoat	41
Weasel	5
Feral Cats	6
Possums	35
Total	**404**

1.8 Possums within the TB Free Heywards operational area

During the winter of 2014 a possum and rat control operation was carried out at Gill Hamel and Ruth Haughton's 126-hectare Mopanui property. This property is adjacent to the Orokonui Ecosantuary, see map figure 3.
Pest control of the Mopanui property was carried out during August 2014. A network of 100 Philproof bait stations were set up and pre-fed, then the possums were targeted with 2 rounds of feratox encapsulated cyanide three weeks apart, following this the bait stations were emptied and baited with cholecalciferol for ongoing rat control.
Results of possum poisoning found there were 478 possums killed during the first round of feratox and a further 119 at the second round, meaning a total of 597 possums were removed from the property.
There were no records to indicate the reduction in the rat population following the two rounds of cholecalciferol as this toxin has a longer acting mode of action.

During the current TB Free possum control programme, Contract Wild Animal Control have been contracted to carry out control in the Mt Cargill and Heywards operational areas.

The above property was trapped by a subcontractor who caught 228 possums and there were more that were killed by feratox but not recorded.

All up to date the TB Free contractors have removed approximately 4000 possums from the TB Free Heywards operational area (see map at figure 2. for operational area)

1.9 Comments from Halo Project Landowners

Trap checks

Traps are checked fortnightly.
Check the traps every two weeks which usually takes 2.5 hours per inspection and around 75 hours per year.
Usually take 1 ½ hours to go around traps.
Check traps on average every 2 weeks.
There are 6 active people checking the traps and the area is divided into two parts with a northern section and southern area.
Group coordinator has 4 active members

Trap and bait comments

Have 21 box type traps and 26 timms traps spaced 200m apart
Have 16 traps to check.
Have 24 traps to check, 7 members in the group with 34 traps in total.
Have caught 41 pests altogether.
Mostly catch rats and hedgehogs.
Only has 1 Timms trap in the group.
There are 19 traps which are all DoC 150's, 200's and DoC 250's
Have Trapinator traps in the group now.
Traps are spaced at 100 to 200m spacings
Traps are at 100m spacings
Bait used is eggs, fresh rabbit, chicken and sometimes peanut butter on an egg.
Bait is mainly rabbit and apple.
Traps are baited mainly with fresh rabbit but have used eggs.

Project comments

There is now more structure to the project with Matt Thomson and Sophie Penniket as project coordinators.
The coordinators are very good and Sophie is a good communicator.
There is good enthusiasm in the group.
The project manager would be happier if members entered data into portal.
We keep a sheet at back door for other members to fill in when they check the traps.
There are a lot of people checking the traps but they are not very good at entering the data in the portal.
Do all of the input of information into the portal as location coordinator.
TB Free contractors have been through in the last few months using leghold traps and feratox.
There is a freezer at the Purakanui School now to store rabbit for the Halo project.
The Halo project appears to be having a positive effect on birdlife.

1.10 The Portal

The portal is an integral component of the overall Halo project https://traps.haloproject.org.nz/ and currently holds over 5600 records which are growing daily.

The portal is used by the members of the group, and when they check traps a record of each event is entered into the website.

The portal records the following information:

- The Halo project geographical area eg: Purakanui Creek
- The individual trap name/identifier.
- The trap type.
- The date of each event eg: rebaited or checked.
- The event type eg: sprung and empty.
- Who checked the trap
- What bait was used.
- What species was trapped
- What the sex of the trapped animal was.
- Trap site coordinates
- A section for comments.

The portal will provide valuable data for the Halo project and the information gathered as part of this project will be very valuable for similar projects in the future.

A myriad of data can be retrieved from the portal once the information is downloaded and saved into an excel spreadsheet, this data should be used to help drive further improvements for the project going forward.

Below is an example of the type of information that can be extracted

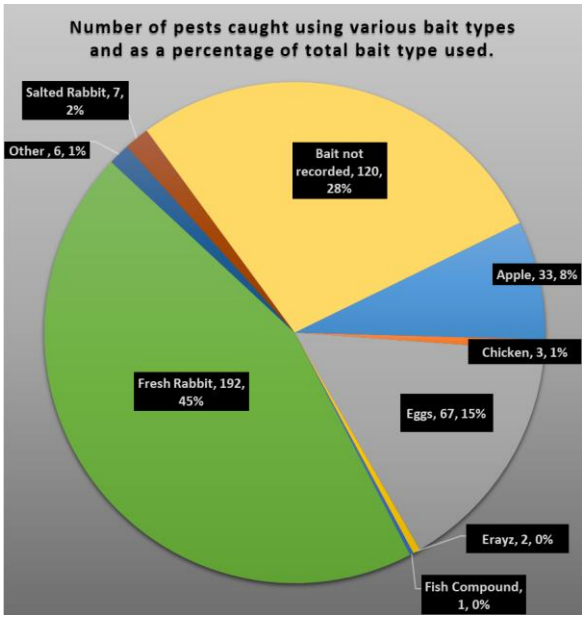

Figure 8 – Type of bait being used across the project area.

The chart above highlights the success of the bait type used, but needs to be understood clearly.

As an example apple used as a bait, has trapped 33 pests but it is predominantly used in the Timms traps of which there are 22 or 7% of the total traps, while the DOC traps make up 87% of total trap types used within the group and a mixture of most of the other bait types have been used in these traps.

The information above also highlights the need for ongoing accuracy and education of the group's members if the portal is to continue to provide quality data into the future.

There was 28% or 120 pests trapped where the bait type was not recorded.

The portal will require continual diligence from group members to keep it accurately updated, and this may need to be facilitated by the programme coordinators in order to provide quality data.

When the portal was checked for activity in February 2018 some trap sites had not been checked for 2 months, while others had been checked a matter of days before.

It was found that of the total traps deployed there were 28 that had not recorded a single capture since the inception of the project.

The following graph shows the number of mustelids trapped and during what month they were trapped.

This information can be used to highlight and drive the trapping around these species.

Ferrets and other mustelids breed during the spring and can have around 8 to 10 young in their litters. They then stay in a family group until the mid to late summer period before they disperse and find their own territory.

If trapping can be concentrated around the spring any of the mustelid species caught at this time will reduce the breeding numbers within the area. The graph below shows clearly the number of mustelids caught is greatest when they are still in their family groups as one trap can catch a whole family at this time.

This type of information clearly identifies strategies for pest control and the benefit of the portal.

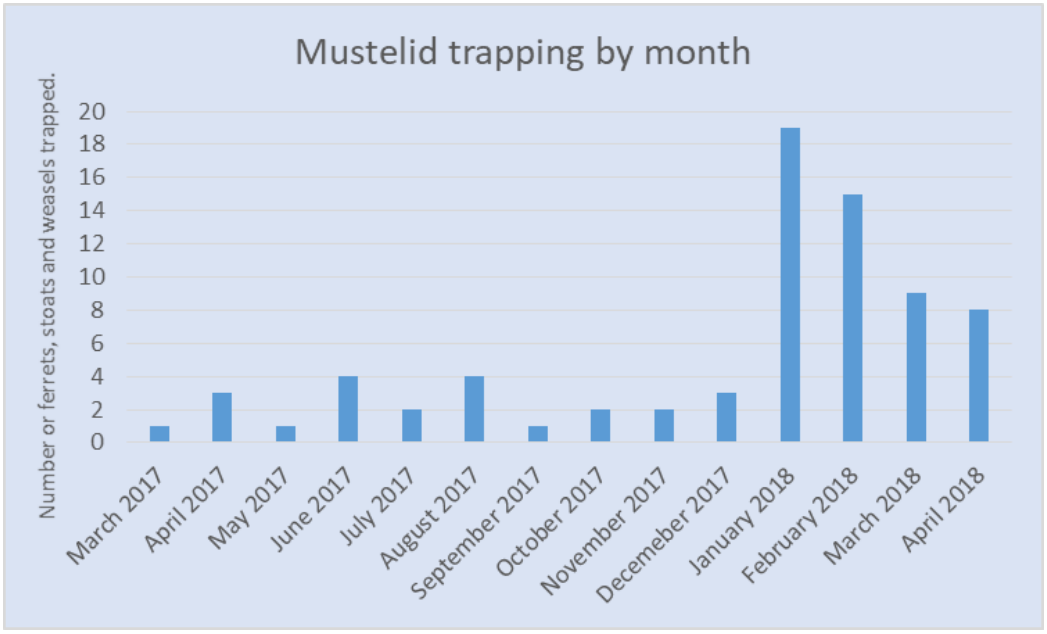

Figure 9 – Mustelid trapping data.

Figure 10 – DOC Trap set alongside road.

1.11 Report findings and recommendations.

- Trap Locations

  Traps are located spatially so that they are placed at around 100 to 200 m spacings.

➢ Account should be taken of optimum trap sites to allow for the best possible chance of trapping animals.
Optimum trap sites take into account locations near waterways were certain pest frequent. As an example mustelids use crossings near waterways such as culverts and dam walls or will use a sheep track or a run when moving around their territory, other prime areas are near hen houses etc.
Traps for possums should also be placed on or near certain tree species to achieve the best possible chance of capture. Trees that should be targeted are old and very large pine or macrocarpa trees along with a wide range of native species such as cabbage trees that are present throughout the project area.
If the required spacings are around the 100 or 200m distance the traps should ideally be moved to the above type of habitat even if it is quite a distance away. The trap locations should not be limited by spatial placement unless for a scientific study.

- Trap sites

  In general, trap sites are in easy to access areas.

➢ This is great for the volunteers that are active in this project but long term there needs to be control through all areas eg: the denser bush such as the Mopanui forest.

  A present there are large areas where no traps are located, see the map at figure 3, and the information at 1.6 regarding the possum control operations through the greater Heywards area and also the Mopanui forest, where there was a four year gap between major control operations but significant numbers of possums have built up again over what is a relatively short period. This also applies to other pest species which can reproduce in greater numbers than the possum.

- Best management Practice.

➢ Best management practice in pest control means that all methods of pest control should be investigated and the most appropriate used where practical, these include both traps and toxin use and the use of trained and competent operators.
Traps have been predominantly baited with rabbit or eggs and during the very hot summer period the rabbit bait went off very quickly so salted rabbit was tried.

  The project is limited by what trap types have be used in what is a predominantly urban or semi urban environment in order to protect pets, this has seen a majority of the tunnel/box DOC traps being used and project members have been trained in their use.

  This has limited the range of traps available therefore reducing the opportunity to have the optimum kill across the target species. There are a wide range of traps available on the market many of which provide a more economical option than the DOC traps and associated boxes.

While conducting the field visits I was informed of two instances where these DOC type traps had caught someone's cat by a front paw. These traps have now been modified as a result to extend the distance from the trap entrance to the trap itself.

Timms traps were observed where apples or plums had been used as bait.
A cut apple with the cut edge sprinkled with cinnamon would provide a greater chance of trapping a possum.
Several Trapinator traps were either set on posts in a paddock or tree trunks with a small amount of gelatinous bait applied to the trigger mechanism.

There was no evidence of prefeeding or luring of trap sites apart from bait inside the traps.

These traps could be lured below the trap with a blaze of icing sugar and flour lured with either cinnamon, aniseed or orange oils etc. The white blaze of the flour acts as a visual attractant along with the smell and sweet taste of the flavoured oil lure and the icing sugar.

It would be advisable to have a field day/s for project members with assistance from experienced pest control operators such as Elton Smith from the Orokonui Ecosanctuary or Kirk Robertson from the Otago Regional Council.
This field day could concentrate on alternative traps and control methods, how to find the best trap sites, the best traps to use in different situations, how to bait and set them.

The current methods preclude the use of toxin. TBFree are conducting possum control over the next 4-5 years, but the number of possums will rise once this operation has concluded as can be seen in the data around the Mopanui forest area.

Toxin use should be considered in areas that are suitable, ie the larger areas of bush. There are several toxins that will control a number of species at once eg; cholecalciferol which can be used to control mice, rats and possums.

- Volunteers/Halo members

The project members who each volunteer their time for this project, check the traps on average every 2 weeks and most members spend about 1.5 to 2 hours each visit.

This is a big commitment from the members who all are very enthusiastic about the project and on a project wide basis would amount to a considerable amount of volunteer hours.

If each group spent a minimum of 2 hours every fortnight across the 15 groups that would equate to around 800 hours. This would rise by the time education and training by the two project coordinators is taken into account.

- Other opportunities

  The Halo project could purchase up to 100 leghold traps and access could be given to a suitably experienced pest control operator to use these traps to either do trapping lines or they could run poison lines through the bush areas that are not covered by the current trap layout.

  The contractor or pest control operator's access could be managed by the project coordinators who would liaise with the landowners around property access.

  The contractor could either then trap for fur or skins, or poison using feratox for skins.

  The sale of either possum fur or skins should be enough incentive to keep them employed throughout the project area.

  This contractor could also set up a bait station network that could be pre fed and assist with either trapping or poisoning of possums. This would enable the bait stations to be used for rodent control also, using toxins such as cholecalciferol that members of the groups can use without having the need to hold a controlled substance licence.

  There should be provision to purchase possum trapping equipment for future use as the TB Free NZ programme is for only 5 years in this area at present. This equipment should include bait stations and other forms of traps such as Victor 1's and Timms.

1.12 Summary of Recommendations

- Using the portal information investigate trap sites that are working well, relocate other traps to locations that will provide the best possible chance of pest capture by targeting appropriate habitat.
- Encourage and ensure that the group members enter accurate information into the trapping portal.
- Plan how the larger bush areas will be controlled following OSPRI / TB Free possum control.
- Ensure there is provision within the budget for purchase of a range of traps and bait stations so that the project is not unduly limited in the future.
- Continue to encourage and support the great work that is currently being undertaken by all of the group members.
- Hold a series of field days across the group hosted by the project coordinators but with assistance from industry people such as Elton Smith from the Orokonui Ecosanctuary to look at best management practice.
- Investigate how the use of an external contractor might work to carry out control in the areas that are not covered by the current network of trap sites.

ORC Trap Reconciliation.

1: Current MUSTELID/RAT devices; field deployed across 15 project sites in Inner Halo

(data from trapping portal export list)

Mustelid and Rat Traps	NUMBER:
DOC 200 Single (Long Baffle)	122
DOC 200 Double (Long Baffle)	26
DOC 150 Single (Long Baffle)	28
DOC 150 Double (Long Baffle)	58
TUN 200 (Double set run-thru)	70
DOC 250 Single (Short Baffle)	2 (actually not in field due to risk)
A24 Goodnature self-resetting	23
	TOTAL DEVICES: 327

The above constitutes;

- DOC 200 traps total (metal traps not boxes) x **318**
- DOC 150 traps total (metal traps not boxes) x **144**

TRAPS: Possum Traps	**NUMBER**:
Trapinator possum kill trap	44
Timm's possum kill trap	27
	TOTAL: 71

Total devices deployed in the field = 398

2: Current traps and associated materials on-hand (combined locations not deployed)

TRAPS: Mustelid and Rat Traps	**NUMBER:**

DOC 200 Single (old/short Baffle)	23
DOC 200 Single (new/Long Baffle)	0
DOC 200 Double (old/short baffle)	6
DOC 150 double (old/short baffle)	26
DOC 150 Single (old/short baffle)	0
DOC 150 Single (new/Long Baffle)	14
DOC 150 Double (new/Long Baffle)	18
TUN 200 (Double set run-thru)	61
DOC 250 Single (Short Baffle)	4
A24 Goodnature self-resetting	10
Bulk Traps; DOC 200's (zinc/SS)	60
Bulk Traps DOC 150's (zinc/SS)	135
Trapinator Stoat/Rat plastic housings (no trap)	30
TUN 200 boxes/housings (no trap)	30

TRAPS: Possum Traps.	
Trapinator possum kill traps	70
Timm's Traps	76
Sentinal Traps	20
Possum live cage traps	8

The above constitutes:

- DOC 200 single boxes/trap x 23
- DOC 200 double boxes/traps (TUN and Trad) x 67
- TUN boxes without traps x 30
- DOC 150 single boxes/trap x 14
- DOC 150 double boxes/trap x 44
- DOC 200 individual traps total (boxes and bulk) x 134
- DOC 150 individual traps total (boxes and bulk) x 235

3: Sensors

100 Motiv sensors are currently being built for LCT, as part of the Thinxtra sensor trial. The ORC agreed to fund these traps as part of the capital expenses.

4. Expenses

To date, $85,072.00 of the ORC grant has been spent. It has not beem easy to break apart the labour component from materials, as in some instances trap boxes were purchased built (labour and materials included), and in other instances we purchased the materials and provided the materials to the builders. Some boxes, notably the TUNN 200s, are more expensive to build due to expensive treated plywood, stainless screws and a higher labour cost.

An indicative breakdown of costs are:

1. Labour $12,000.00
2. Traps and trap box building materials $60,432.00
3. Sensors $12,640.00