I hereby give notice that an ordinary meeting of the Environment Committee will be held on:

Date:	**Wednesday, 15 August 2018**
Time:	**To follow the Catchment Operations Committee Meeting**
Venue:	**Tararua Room** **Horizons Regional Council** **11-15 Victoria Avenue, Palmerston North**

ENVIRONMENT COMMITTEE

AGENDA

MEMBERSHIP

Chair	Cr GM McKellar
Councillors	Cr JJ Barrow
	Cr LR Burnell
	Cr DB Cotton
	Cr EB Gordon JP (ex officio)
	Cr RJ Keedwell
	Cr NJ Patrick
	Cr PW Rieger, QSO JP
	Cr BE Rollinson
	Cr CI Sheldon
	Cr WK Te Awe Awe

Michael McCartney
Chief Executive

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Palmerston North 4442

Full Agendas are available on Horizons Regional Council website
www.horizons.govt.nz

Note: The reports contained within this agenda are for consideration and should not be construed as Council policy unless and until adopted. Items in the agenda may be subject to amendment or withdrawal at the meeting.

for further information regarding this agenda, please contact:
Julie Kennedy, 06 9522 800

CONTACTS	**24 hr Freephone : 0508 800 800**	**help@horizons.govt.nz**		**www.horizons.govt.nz**
SERVICE CENTRES	**Kairanga** Cnr Rongotea & Kairanga-Bunnythorpe Rds, Palmerston North	**Marton** Hammond Street	**Taumarunui** 34 Maata Street	**Woodville** Cnr Vogel (SH2) & Tay Sts
REGIONAL HOUSES	**Palmerston North** 11-15 Victoria Avenue	**Whanganui** 181 Guyton Street		
DEPOTS	**Levin** 11 Bruce Road	**Taihape** Torere Road Ohotu		
POSTAL ADDRESS	Horizons Regional Council, Private Bag 11025, Manawatu Mail Centre, Palmerston North 4442			
FAX	06 9522 929			

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AGENDA

1 Welcome/Karakia

2 Apologies and Leave of Absence

At the close of the Agenda no apologies had been received.

3 **Public Forums:** Are designed to enable members of the public to bring matters, not on that meeting's agenda, to the attention of the local authority.

Deputations: Are designed to enable a person, group or organisation to speak to an item on the agenda of a particular meeting.

Requests for Public Forums / Deputations must be made to the meeting secretary by 12 noon on the working day before the meeting. The person applying for a Public Forum or a Deputation must provide a clear explanation for the request which is subsequently approved by the Chairperson.

Petitions: Can be presented to the local authority or any of its committees, so long as the subject matter falls within the terms of reference of the council or committee meeting being presented to.

Written notice to the Chief Executive is required at least 5 working days before the date of the meeting. Petitions must contain at least 20 signatures and consist of fewer than 150 words (not including signatories).

Further information is available by phoning 0508 800 800.

4 Supplementary Items

To consider, and if thought fit, to pass a resolution to permit the Committee/Council to consider any further items relating to items following below which do not appear on the Order Paper of this meeting and/or the meeting to be held with the public excluded.

Such resolution is required to be made pursuant to Section 46A(7) of the Local Government Official Information and Meetings Act 1987 (as amended), and the Chairperson must advise:

(i) The reason why the item was not on the Order Paper, and

(ii) The reason why the discussion of this item cannot be delayed until a subsequent meeting.

5 Members' Conflict of Interest

Members are reminded of their obligation to declare any conflicts of interest they might have in respect of the items on this Agenda.

Minutes of the ninth meeting of the tenth triennium of the Environment Committee held at 9.00am on Tuesday 12 June 2018, in the Tararua Room, Horizons Regional Council, 11-15 Victoria Avenue, Palmerston North.

PRESENT	Crs GM McKellar (Chair), JJ Barrow, LR Burnell, DB Cotton, EB Gordon JP (ex officio), RJ Keedwell, NJ Patrick, PW Rieger QSO JP, BE Rollinson, CI Sheldon (to 9.48am and from 10.36am), and WK Te Awe Awe.	
IN ATTENDANCE	Chief Executive	Mr MJ McCartney
	Committee Secretary	Mrs KA Tongs Mrs JA Kennedy
ALSO PRESENT	At various times during the meeting:	
	Mr R Strong (Group Manager River Management), Ms A Matthews (Science & Innovation Manager), Dr N Peet (Group Manager Strategy & Regulation), Mr G Bevin (Regulatory Manager), Mr R Smillie (Biodiversity, Biosecurity & Partnerships Manager), Mr G Shirley (Group Manager Regional Services & Information), Ms S Carswell (Coordinator District Advice), Mr L Brown (Freshwater & Partnerships Manager), Dr J Roygard (Group Manager Natural Resources & Partnerships), Mr P Joseph (Area Engineer), Mr J Bell (Investigations & Design Manager), Mr J Watson (Manager Catchment Data), Ms H Pouwhare-Anderson (River Management Analyst), Ms E Whale (Graduate River Management Analyst), Mrs M Patterson (Senior Scientist, Water Quality), Dr E Daly (Scientist Ecology), Mr S Collins (Groundwater Scientist), Ms C Morrison (Media & Communications Manager), Mrs C Hesselin (Senior Communications Advisor), Mr A Duker (DairyNZ), Ms P Fourie and Ms Reddish (Fonterra), and a member of the press.	

The Chair welcomed everyone to the meeting.

The meeting adjourned at 9.01am.

The meeting reconvened at 9.34am.

APOLOGIES

ENV 18-71 ***Moved*** ***Sheldon/Burnell***

That the Committee receives an apology from Cr Sheldon (leaving early)

CARRIED

PUBLIC FORUMS / DEPUTATIONS / PETITIONS
There were no requests for public speaking rights.

SUPPLEMENTARY ITEMS
There were no supplementary items to be considered.

MEMBERS' CONFLICTS OF INTEREST

Cr Rollinson noted a possible conflict of interest regarding the Freshwater programme. A Freshwater activity was shortly to be completed on his property.

Cr Patrick noted a possible conflict of interest through her employment with Te Kaahui o Rauru in regard to the Te Mana O Te Wai projects, and the Swim Spot Monitoring Programme activity in the Science & Innovation Progress Report.

CONFIRMATION OF MINUTES

ENV 18-72 ***Moved*** ***Rollinson/Keedwell***

That the Committee:

confirms *the minutes of the Environment Committee meeting held on 10 April 2018 as a correct record, and notes that the recommendations were adopted by the Council on 24 April 2018, as amended with an amendment to Environmental Education, Report No. 18-48 – amend reference to 'EE' to read 'Ms Galley'.*

CARRIED

ENVIRONMENTAL EDUCATION

Report No 18-98

This item provided an Environmental Education progress report for the period from 3 April 2018 – 30 June 2018. Ms Morrison (Media & Communications Manager) took the report as read and highlighted an upcoming event on Friday 15 June at St Johns Hill School in Whanganui. The event would celebrate the school's Enviroschools Green Gold status and Councillors from both Horizons Regional Council and Whanganui District Council would be in attendance. Ms Morrison also mentioned community grant decisions would be made shortly. She noted Ms Galley's (Environmental Educator) recent marriage, and name change to Mrs Williams. On behalf of Mrs Williams and herself, she acknowledged the late Cr Pat Kelly as a champion for environmental education. The Chair also acknowledged the late Cr Pat Kelly's passion for environmental education.

ENV 18-73 ***Moved*** ***Rieger/Patrick***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-98 and Annex.

CARRIED

DISTRICT ADVICE UPDATE

Report No 18-99

This report informed Members of the District Advice activities carried out over the eleven month period from 1 July 2017 to 31 May 2018. Mr Shirley (Group Manager Regional Services & Information) introduced Ms Carswell (Coordinator District Advice) who gave the background on the role of the District Advice Office and highlighted Figures 1 and 2 in the report which illustrated both the number of requests for information during the eleven month period, and the type of enquiries received.

Cr Sheldon left the meeting at 9.48am.

Ms Carswell explained the intention from the Minister for Ministry for the Environment and the Minister for Building & Construction to return the regulation of dam safety to the Building Act, rather than regulate dam safety under the Resource Management Act. She then commented on the Horizons Regional Council submissions made to the Horowhenua District Council proposed Plan Change 1 and 2, and also to the Palmerston North City Council Plan Change and Variation. Mr Shirley and Ms Carswell answered questions from Members which included the number of requests about flooding enquiries, how territorial authorities could be encouraged to be more proactive in managing stormwater, and the use of the GNS Website for subdividers, prospective purchasers, and territorial authorities.

ENV 18-74 ***Moved*** ***Burnell/Barrow***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-99 and Annexes.

CARRIED

DAIRY NZ - INTRODUCTION TO THE PARTNER FARMS PROJECT

Report No 18-101

Mr Duker, Catchment Engagement Leader from DairyNZ, gave a presentation on the Partner Farms Project and reflected on the ongoing relationship between DairyNZ and Horizons. The presentation was a snapshot proposal of how DairyNZ could address and assist farmers in terms of One Plan land use consents, specifically in Upper Manawatu Catchments. Mr Duker mentioned the newly established Horizons Dairy Leaders Group which would act on behalf of the dairy industry. He said the dairy industry was committed to undertake Good Management Practices (GMP) and sought options to reduce the environmental footprint. Mr Duker highlighted the role of the Plantain Project and explained its objective to achieve a step change in N-loss across the dairy footprint through the use of plantain. In answering Members questions, Mr Duker mentioned the research trial blocks that had achieved nitrogen reduction. The true test was in the water itself and incorporating science programmes to track water quality would achieve a maximum update on farms and Overseer would be a vehicle to achieve that.

The Chair thanked Mr Duker for his presentation.

ENV 18-75 ***Moved*** ***Keedwell/Barrow***

That the Committee recommends that Council:

a. receives the presentation from Adam Duker of Dairy NZ.

CARRIED

FONTERRA - UPDATE ON DAIRY ACCORD PERFORMANCE AND FARM MONITORING

Report No 18-102

Ms Fourie introduced Ms Reddish and gave a presentation on both the Dairy Accord performance and the farm monitoring that Fonterra was involved with. Ms Fourie highlighted that there were 845 dairy farms in the region and not 542 as mentioned in the presentation and that Fonterra had now aligned with the UN Sustainable Development Goals. She also gave an overview of Fonterra's New Zealand Targets, Fonterra's Plan for Water and their Farm Environment Plan. Mention was made of a new software solution which now gave a detailed layer of information to create an holistic farm environment plan, Fonterra's sustainability targets which included Net Zero emissions by 2050, and the focus on working with communities to restore 50 freshwater

catchments across New Zealand. Members' questions were answered and included discussion around the reporting of implementation of Farm Environment Plans.

Cr Sheldon joined the meeting at 10.36am.

The Chair thanked Ms Fourie and Ms Reddish for their presentation. Mr Fourie gave an invitation to the Committee to visit the manufacturing site and/or Fonterra's Research & Development Centre to gain an understanding of how global needs and targets were being met.

ENV 18-76 ***Moved*** ***Patrick/Sheldon***

That the Committee recommends that Council:

a. receives the presentation from Philippa Fourie from Fonterra.

CARRIED

REGULATORY MANAGEMENT REPORT - APRIL TO MAY 2018
Report No 18-100

This report updated Members on regulatory activity, for the period April to May 2018. Dr Peet (Group Manager Strategy & Regulation) drew Members' attention to Annex C, "Compliance, monitoring and enforcement by Regional Councils: a report for the Minister for the Environment", produced by WynnWilliams Lawyers. Mention was made of the current work with other councils responding to the Office of the Auditor General on water report, and the ongoing discussions with the New Zealand Transport Agency regarding a replacement for the Manawatu Gorge road and how it would be resourced. Dr Peet mentioned the number of enforcement actions and prosecutions that were underway, and the current issues of non-compliance. Dr Peet and Mr Bevin (Regulatory Manager) answered Members' questions and discussion was had on matters including the process of prosecution, the length of time of the consenting process, and compliance best practice guidelines in relation to cultural values.

Mr Bevin and Dr Peet updated Members on the Horowhenua District Council's consent application for the north-east Levin stormwater infrastructure upgrade project and responded to Members' questions.

Cr Sheldon referred to Annex B Freshwater & Partnerships Progress Report, para 6.2.14, and noted she had attended both the January and March Tū te Manawa Governance Group meetings.

ENV 18-77 ***Moved*** ***Cotton/Te Awe Awe***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-100.

CARRIED

MEMBERS' QUESTIONS

A report to Council about what tools were available to prevent forestry issues occurring was requested.

In response to a complaint received about rural burn-off in Horowhenua area, Dr Peet undertook to followup on the issue.

The Meeting adjourned at 12.10pm.

The Meeting reconvened at 12.47pm.

BIODIVERSITY, BIOSECURITY & PARTNERSHIPS PROGRESS REPORT

Report No 18-04

This item updated Members on the progress made in the Biosecurity and Biodiversity activity over the period 1 March to 30 April 2018. Mr Smillie ((Biodiversity, Biosecurity & Partnerships Manager), summarised the report and highlighted the review by Landcare Research Ltd on the possum control programme, the emergence of Myrtle Rust in the region, the presence of Lake Snow in the Moawhango River, the use of 'Rusty' the dog to detect velvetleaf, and the impact of mycoplasma bovis which had now been detected in the region. Mr Smillie responded to Members' questions about the activities contained in the report. He provided an update on the Possum Control Operation targets and monitoring activity.

ENV 18-78 ***Moved*** ***Cotton/Keedwell***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-04 and Annexes.

CARRIED

FRESHWATER & PARTNERSHIPS PROGRESS REPORT

Report No 18-103

This item introduced the Freshwater & Partnerships Progress report for the period 1 March to 30 April 2018. Dr Roygard (Group Manager Natural Resources & Partnerships) referred Members to a revised set of resolutions which sought councillor representation on the Manawatū Freshwater Improvement Fund Governance Group.

Mr Brown (Freshwater & Partnerships Manager) highlighted the completion of the pest fish monitoring in Lake Horowhenua, noted that six community planting days were planned for next month, gave an update on the riparian planting and fencing targets, and said the Deed of Funding for the Whangaehu and for the Manawatū Freshwater Improvement Fund would commence on 1 July 2018. Mr Brown then referred Members to the Urban Eels report attached at Annex A and noted that the recommendation sought Horizons Regional Council to become a signatory. He then responded to Members' questions about Horizons responsibilities as a signatory to the Urban Eels project and responsibilities associated with councillor representation on the Manawatū Freshwater Improvement Fund Governance Group. Cr Keedwell was nominated as Horizons representatives on the Manawatū Fresh Improvement Fund Governance Group and Cr Rollinson for the Whangaehu Fresh Improvement Fund Governance Group.

With the resignation of Ms Clare Ridler (Freshwater Coordinator), the Environment Committee acknowledged and thanked Ms Ridler for her contribution and service.

ENV 18-79 ***Moved*** ***Patrick/Sheldon***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-103 and Annexes.

b. endorses Councillor Keedwell as the Horizons representative on the Manawatū Freshwater Improvement Fund Governance Group;

c. endorses Councillor Rollinson as the Horizons representative on the Whangaehu Freshwater Improvement Fund Governance Group;

d. endorses Horizons becoming a signatory to the Urban Eels project and the Chair signing the document to demonstrate this.

CARRIED

SCIENCE & INNOVATION PROGRESS REPORT

Report No 18-105

This item introduced the Science and Innovation Progress report for the period 1 March to 30 April 2018. Ms Matthews (Science & Innovation Manager) guided Members through the Water Quantity and Quality Activity Overview. She outlined the programmes to benefit from the $176,799 Envirolink funding secured by Horizons during 2017-18, the support and positive feedback through the Long-term Plan process for climate change research, and outlined the benefits and positive feedback received from the public in regard to the Swim Spot monitoring programme and public campaign. Ms Matthews responded to Members' questions about activities contained in the report.

In discussing the Swim Spot Monitoring Programme, Faecal Source Tracking (para 4.3.6), Cr Patrick declared a potential conflict of interest in regard to three sites in Whanganui where faecal source tracking was conducted to identify potential sources of faecal contamination. Ms Matthews and Dr Roygard (Group Manager Natural Resources & Partnerships) responded to questions about monitoring results for the various sites.

ENV 18-80 ***Moved*** ***Gordon/Sheldon***

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-105 and Annex.

CARRIED

MEMBERS' QUESTIONS

Information regarding the consultation on the Zero Carbon Bill would be presented to Members through the Strategy & Policy Committee when it became available.

The meeting closed at 1.55pm.

Confirmed

_____ _____

CHAIR GROUP MANAGER STRATEGY & REGULATION

_____

GROUP MANAGER NATURAL RESOURCES & PARTNERSHIPS

Report No.	18-126
Information Only - No Decision Required	

REGULATORY MANAGEMENT REPORT - JUNE TO JULY 2018

1. PURPOSE

1.1. This report updates Members on regulatory activity, for the period June to July 2018. This report follows the revised format that was detailed to Council at previous meetings and focuses on the municipal wastewater treatment plant programme.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-126.

3. FINANCIAL IMPACT

3.1. Year end the programme ended up in an unfavourable position of $230k for the regulatory business. This is primarily due to revenue being lower than budget and costs incurred in June in relation defended hearings. In June there was an increase of $70k in staff time spent on Resource Management Advice. Regular updates have been provided to the Audit and Risk Committee

4. COMMUNITY ENGAGEMENT

4.1. This is a public item and therefore Council may deem this sufficient to inform the public.

5. SIGNIFICANT BUSINESS RISK IMPACT

5.1. There is no significant business risk associated with this item.

6. OVERVIEW

6.1. Over the 2017-2018 year, Horizons received 337 applications and granted 300 resource consents. This does not take into account that at the start of financial year we already had approximately 36 applications still in process. These applications cover a wide range of activities, of varying complexity.

6.2. Horizons is continuing to progress a number of significant applications, including the Whakapapa, Pahiatua, Eketahuna and Foxton **Wastewater Treatment Plants (WWTPs)**. As previously discussed, whilst the volume of these larger applications is comparatively low, the time taken to process them is significant.

6.3. In relation to the major applications, the following provides a summary of their current status:

i. The **Department of Conservation (DOC)** Whakapapa WWTP applications have been notified. DOC have been providing regular updates and are near to a position to confirm their final design and application. Once this is confirmed the consent will continue to proceed through the consenting process.

ii. The hearing for the Foxton WWTP direct referral reconvened in December last year. The Court is still considering the issue regarding the intensive land use component of the application. A decision from the Court is still pending

iii. In relation to the Pahiatua WWTP, the commissioners released their decision on 5 March 2018. The Commissioners granted a resource consent for just over 12 years. In making its decision, the Commissioners noted that the environmental effects of the proposal would not be significant and that **Tararua District Council (TDC)** had made some upgrades to the WWTP. The Commissioners also recognised tangata whenua concerns over the proposal. Two appeals have been made and a number of parties have joined the proceedings as section 274 parties. Mediation with all parties occurred during the week of 30 July.

iv. The hearing for the Eketahuna WWTP has been deferred. The applicant is seeking additional consent applications for the wetland design. These applications were lodged in late June and are subject to the limited notification process.

v. The timeframe for the re-consenting of the Woodville WWTP has been amended to allow engagement with both Rangitane Tamaki Nui a Rua and Ngati Kahungunu to occur. The revised timeframe will result in a revised application being lodged by 15 August 2018.

vi. A modest application for some legal costs, associated with this process has been made by Council in relation to the NZE Appeal. The costs decision has yet to be released by the Court.

vii. The AFFCO Feilding processing plant appeal is still before the Environment Court. The appeal results from the granting of consents, by Commissioners, for discharge to land and water from the Feilding plant. The substantive issue relates to the term of consent granted by the Commissioners, with AFFCO seeking a term of 32 years, as opposed to 12 years granted by the Commissioners. The hearing date before the Environment Court has been delayed while additional monitoring data is collected and analysed. It is expected that a hearing will be later in 2018, subject to availability of the Court.

viii. Further information requested of **Horowhenua District Council's (HDC)** application relating to the discharge of stormwater into the Koputaroa Stream catchment has been received. However information relating to water quality effects and erosion and sediment control has not been fully addressed. The next step in the process is to determine whether the applications need to be notified in accordance with section 95 of the **Resource Management Act 1991 (RMA)**.

ix. HDC has lodged a consent application for the operation of the Levin WWTP discharges (commonly known as 'The Pot'). The application is currently being assessed by Horizons experts to determine if any additional information is required. The application will then be publically notified as requested by HDC.

6.4. The Manawatu Gorge replacement project "Te Ahu a Turanga" is progressing. At present the **New Zealand Transport Agency (NZTA)** are preparing for the Notice of Requirement process. This will see the envelope of the project defined and will be processed by the District Councils. The regulatory team are in the process of establishing a project team to assist with the processing of the regional consenting matters. Experts have been approached and Horizons staff have been meeting with NZTA experts in relation to various technical matters that will impact on the regional consenting process, including discussions around baseline aquatic monitoring protocols.

6.5. Horizons has written to **Horowhenua District Council (HDC)** regarding its timeframes for lodging the required resource consent application for the discharge of stormwater from Levin Township into Lake Horowhenua. We have requested an update on progress by HDC in meeting the lodging date of 24 December 2018.

6.6. Staff have also been meeting with some District Councils around consent renewals. The focus has been on ensuring appropriately detailed applications are lodged that minimise unnecessary delays through the process. Another focus of these meetings is ensuring District Councils have clear project plans and milestones in place in relation to consent preparation and lodgement.

6.7. The **National Environmental Standard for Production Forestry (NES-PF)** recently came into effect and the Regulatory team have begun processing notification and consents under this standard. To date we have received three (3) resource consent applications and 17 notifications of permitted activities.

6.8. In addition to the above, the compliance monitoring approach to implementation of the NES-PF is to adopt the four (4) E's model as promoted by the Regional Sector's Strategic Compliance Framework. This will see Horizons seek to engage with, support in educating and enabling the sector, whilst at the same time reserving its right to take enforcement action where appropriate.

6.9. Horizons will be adopting a risk based approach to monitoring that is similar to other regional councils. This will result in those high risk operations being focused on as part of the monitoring programme. The factors that are considered in determining risk include; landscape (slope angle and length, location of waterbodies), nature of the receiving environment (environmental and cultural values, presence of important infrastructure), harvesting methodology and compliance history of the operator.

6.10. In a previous Environment Committee meeting questions were raised regarding how the NES regulates the risk of slash from harvesting entering waterways. In summary, the NES regulates this either via permitted activity conditions (regulation 69) or via a resource consent if required. In relation to permitted activity conditions these note(1) that slash from harvesting must be placed onto stable ground;(2) slash from harvesting that is on the edge of landing sites must be managed to avoid collapse of slash piles;(3) slash from harvesting must not be deposited into a waterbody or onto land that could be covered water during a 5% AEP event; and if (3) cannot be complied with slash must be removed from a waterbody and the land that would be covered during a 5% AEP unless to it is unsafe to do so to avoid certain listed matters (including blocking and damming of a waterbody, eroding banks, damage to infrastructure or property).

7. COMPLIANCE PROGRAMME

The intention of this section is to focus on one key part of the regulatory business. The focus for this report is to provide a summary of those compliance activities associated with the Rural Programme for the 2017-2018 year.

Rural Programme

7.1. As discussed in previous Environment Committee reports, this programme assesses the compliance of **Farm Dairy Effluent (FDE), Intensive Land Use (ILU)** and Stock Water resource consents.

7.2. During the year a total of 397 FDE resource consents were inspected. In addition to this 14 follow-up inspections occurred due to significant non-compliance being detected. The number of consents inspected is less than planned 700. This is due to vacancies, staff resource being diverted to support investigations and subsequent legal proceedings and implementing the NPS-FM.

7.3. Table 1 summarises the compliance assessments in relation to FDE consents for the year. In summary of the 397 assessments undertaken there were 21 and 13 non-compliance and significant non-compliance detected, respectively. This represents a 91.5% compliance rate across those consents assessed. The non-compliances detected mainly related to exceedance in cow numbers, minor ponding and minor pond or weeping wall

overflows, whilst significant non-compliances related to significant pond overflows, failure to install adequate storage and significant ponding at or in the vicinity of the irrigator.

Table 1. Number FDE Consents Inspected and Associated Compliance Gradings

Compliance Rating	No. Consents
Comply - Exceeds	
Comply - Full	219
Comply	24
Comply - On Track	6
Comply - At Risk	114
Non - Compliance	21
Significant Non Compliance	13
Total Consents Monitored This Season	**397**

7.4. Figures 4-4 illustrate some of the issues identified during the year.

Figure 1: Effluent ponding by irrigator

Figure 2: Effluent discharged into drain

Figure 3. Overflowing effluent storage facility

7.5. During the year a total of 146 ILU on farm inspections were undertaken. As previously reported, the focus of these inspections is to assess those conditions that can assessed on-site. Table 3 summarises the compliance gradings received. Of particular note is no non-compliances or significant non-compliances were detected.

Table 2. ILU Consents Inspected

Compliance Rating	Number of Consents
Comply - Exceeds	
Comply - Full	94
Comply	2
Comply - On Track	44
Comply - At Risk	6
Non - Compliance	0
Significant Non Compliance	0
Total	**146**

7.6. The ILU programme also assesses compliance against nutrient budget reporting. During the year a total of 180 nutrient budgets were assessed. Given the annual nature of the assessment and when the budgets are provided, the budgets assessed were for the 2016-2017 year. Table 3 below summarises the gradings for the year.

7.7. The non-compliances and significant non-compliances related to failure to meet nutrient leaching limits. Please explain letters were sent to those operations that were non-compliant. In some instances the non-compliances could not be explained, due to personnel changes occurring on the farm between when the budget was prepared and the assessment taking place. In these instances, the matter has been referred to our Rural Advice Team, who are providing advice in relation to reducing N leaching.

Table 3. ILU Nutrient Budgets Assessed

Compliance Rating	Number of Consents
Total Reported on	180
Comply Full	120
Comply at Risk	51
Non Compliance	7
Significant Non Compliance	2

7.8. The Rural programme also assess compliance against stock water consents. Table 4 summarises the stock water programme for the year.

Table 4. Rural Water Take Assessed

Compliance Rating	Number of Consents
Comply - Exceeds	
Comply - Full	70
Comply	9
Comply - On Track	3
Comply - At Risk	12
Non - Compliance	32
Significant Non Compliance	1
Not Assessed	22
Total Assessed	**149**
Permitted Activity	207
Require Consent	12

7.9. Overall 32 non-compliances and one significant non-compliance were detected from the149 consents that were assessed. This represents a compliance rate of 85 percent. The non-compliances related to flow meters not being verified, minor exceedances in

volumes and flow meters not being installed, whilst the significant non-compliance related to repeated non-compliance.

7.10. In addition to this, 207 permitted activities were assessed and an additional 12 water takes were identified as requiring resource consent. In relation to the latter timeframes were set for resource consent applications to be lodged.

7.11. Whilst regulatory action is reported on in section 10 below, table 5 summarises the enforcement action taken in relation to the Rural Programme for the 2017-2018 year.

Table 5. Rural Programme – Enforcement Action

Type of Enforcement	Number of Actions
Formal Warning	27
Abatement Notice	13
Infringement Notice	6

8. COMPLIANCE AND NON-COMPLIANCE

8.1. Approximately 1400 resource consents were assessed during the 2017-2018 year, with 174 of these being non-compliant with at least one condition. This represents a compliance rate of 88% across the programme for the year.

8.2. During the reporting period there were 58 compliance monitoring assessments. Of these, four non-compliances and five significant non-compliances were detected. This equates to an 86% compliance rate across the entire programme for the reporting period.

8.3. Below is a breakdown of the non-compliances by consent area, for the reporting period:
Industry: One non-compliance and three significant non-compliances; and
Rural: Two non-compliances and two significant non-compliances.

8.4. In addition to the above, Horizons currently has five prosecutions before the District Court and two significant investigations underway. Three prosecutions have had decisions on guilt and sentence during the reporting period. These are summarised below.

8.5. Staff have been undertaking preparatory work in relation to a programme that will proactively monitor how growers in the Horowhenua district are complying with the cultivation rules in the Regional Plan. Site visits will commence in August. The focus of the programme is to engage with the industry to explain and provide education on the rules around cultivation. However, it is important to note that undertaking this programme will impact on other compliance programmes, notably the Rural Programme.

9. INCIDENTS

9.1. Over the reporting period, a total of 66 complaints were received, with a total of 792 being received for the 2017-2018 financial year. For the reporting period the majority of these complaints (24) related to discharges to air. The remainder of the complaints related to discharges to land (20) and water (22).

9.2. All complaints are categorised and responded to accordingly. A response can include an immediate or planned inspection, a phone call, or being referred to another agency such as a Territorial Authority or Civil Aviation.

10. REGULATORY ACTION

10.1. The reporting period has seen two defended hearings and one sentencing take place in the District Court. These matters have had a reasonable impact on the compliance business

over the last 12 months as staff have investigated and then dealt with the subsequent legal proceedings. The details of these cases are summarised below.

Table 6. Summary of Court Action

Defendant	Summary	Court Decision	Sentence
MWRC v Whanganui District Council	Discharge of wastewater from pump station to the Mowhanu Stream	Guilty	To occur in November
MWRC v Land Meats NZ Ltd	Discharge of wastewater associated with a meat processing plant to the Whanganui River	Guilty	To occur on 21 August
MWRC v Le Poulet Fabuleux Limited	Discharge of washdown water from a chicken rearing operation	Pleaded Guilty	Fined 57,000

10.2. Table 7 below, provides details of the regulatory action taken during the reporting period.

Table 7. Regulatory action taken during reporting period.

Person	Regulatory Action Taken	District	Date Issued	Section of RMA Contravened	Actions/nature of contravention
Mellington Dairy	Infringement Notice	Rangitikei	June 2018	S15(1)(b)	Ponding of effluent
Mellington Dairy	Abatement Notice	Rangitikei	June 2018	S15(1)(b)	Cease ponding of effluent onto land where it may enter water
Palmerston North City Council	Abatement Notice	Palmerston North	July 2018	S 9(2)	Cease Unauthorized earthworks
Palmerston North City Council	Abatement Notice	Palmerston North	July 2018	S9(2)	Stabilise site to ensure compliance with resource consent

11. SIGNIFICANCE

11.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Greg Bevin
REGULATORY MANAGER

Nic Peet
GROUP MANAGER STRATEGY & REGULATION

ANNEXES
There are no attachments to this report.

Report No.	18-127
Information Only - No Decision Required	

FRESHWATER & PARTNERSHIPS PROGRESS REPORT

1. PURPOSE

1.1. The purpose of this item is to introduce Members of Council's Environment Committee, the Freshwater & Partnerships Progress report for the period 1 May to 30 June 2018.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-127 and Annex.

b. endorses Councillor xxxx as the Horizons representative on the Lake Horowhenua Freshwater Improvement Fund Governance Group.

3. FINANCIAL IMPACT

3.1. There is no financial impact associated with recommendations in this paper. It is noted that the report does update Councillors on a number of items related to financial management of the programme.

4. COMMUNITY ENGAGEMENT

4.1. The Freshwater programme at Horizons is reported on publicly to the Environment Committee regularly throughout the year and also communicated via various forums and methods.

5. SIGNIFICANT BUSINESS RISK IMPACT

5.1. There is no significant business risk associated with this report.

6. SUMMARY

6.1. The Freshwater programme is the implementation component of the water quality and quantity activity in the Annual Plan, which is primarily driven through riparian fencing, planting, and aquatic habitat improvement in collaboration with landowners and multiple stakeholders. The activity also includes a range of other water quality intervention work as a part of collaborative work programmes such as the Manawatū River Leaders Accord, the Lake Horowhenua Accord and the Freshwater Improvement Fund projects.

6.2. The last two months of the 2017-18 financial year have continued to see a high level of enquiry for co-funding of works around the region and a number of projects being completed. Some of the highlights for the last 12 months being:

- All six annual plan targets were achieved in the 2017-18 year;
- Completion of the construction of the sediment trap next to the Arawhata Stream;

- Commencement of construction of the access road to the weed harvester boat ramp at Lake Horowhenua;
- Completed construction of two fish passes in tributaries of the Manganui o te Ao Stream near National Park with co-funding from the Whanganui River Enhancement Trust (WRET), and NZ Transport Authority (NZTA). Completed a further six fish pass repairs in the Manawatū Catchment with co-funding from the Te Mana o te Wai project;
- The official announcements of the Manawatū, Whangaehu, Lake Waipu and Lake Horowhenua Freshwater Improvement Fund projects; and
- Completed across the entire programme: 63.7 kilometres of stream fencing, planting of 113,262 riparian plants, and remediation of eight fish barriers.

- The level of allocated works completed was much higher for riparian planting, 85% compared to 61% for stream fencing (Table 1). The challenge for allocated fencing being completed was also an issue for the SLUI programme with fencing contractors being in demand. Lack of fencing contractors was the primary reason for the difference percentage of completion of allocated works. Other factors included the usual change of circumstances for landowners or inability to access sites due to wet conditions. Another key factor was workload for staff with considerable staff change occurring in the Freshwater Team, particularly the regional programme in 2018. Recruitment is underway for two positions and two others were appointed in May/June 2018. To address the lower percentage of completion of allocated works new systems/processes and grant structures are being considered for use in 2018-19. The majority of the uncompleted work is expected to be completed in 2018-19.

Table 1 Summary of allocated and completed work for the riparian fencing and planting portfolio programme in 2017-18.

	Riparian Fencing			Riparian Planting		
	Allocated	Completed	Percentage complete	Allocated	Completed	Percentage complete
	Km	Km	%	Plants	Plants	%
Regional	39.53	20	51%	47,915	33,778	70%
Manawatū	61.9	41.8	68%	73,529	69,803	95%
Lake Horowhenua	2.9	1.9	65%	12,217	9,681	79%
Total	**104.33**	**63.7**	**61%**	**133,661**	**113,262**	**85%**

Freshwater Improvement Fund projects

6.3. During the reporting period the Deed of Funding were signed with the Ministry for the Environment (MfE) for the Manawatū and Whangaehu projects with both projects commencing on the 1st July 2018.

6.4. The Lake Horowhenua Deed of Funding has also been signed between the Lake Horowhenua Trust and MfE. As part this project a Governance Group needs to be established. The Lake Horowhenua Trust has invited a Horizons Councillor onto this Governance Group. This paper seeks a recommendation from Council for a Councillor to be appointed to this Governance role. A Horizons staff member also assisted the Governance Group as nominated advisors (without a vote). This model has also been proposed for the Freshwater Improvement Fund projects. This follows Councillor Sheldon being a Governance Group member for the proceeding (and soon to be completed) Te Mana o te Wai project for Lake Horowhenua.

6.5. Work is on-going with MfE finalising the Lake Waipu project and annual work plans.

6.6. The other successful Freshwater Improvement Fund project in the Region is working in the Waiwiri Catchment which is the outflow from Lake Waiwiri/Papiatonga. The project is taking lab based trials of Manuka's ability to remove E. coli and nitrogen from human waste water when it is applied to land. The project is being led by Lowe Environmental (a Palmerston North based Environmental Consultancy) with involvement from ESR, HDC, iwi/hapū and universities. Horizons Regional Council is involved through assisting as part of the Technical Advisory Group with Logan Brown being a member of that group.

Logan Brown
FRESHWATER & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Freshwater & Partnerships progress report

Annex A

FRESHWATER ACTIVITY

1 Waterway Enhancement & Protection

1.1 Activity Overview

Horizons Freshwater Team is a small group that works closely with other Horizons teams, and people external to the organisation, to implement water quality improvement works. We draw on the scientific monitoring work carried out by Horizons and other agencies to prioritise and focus implementation efforts. The team works with landowners and a number of external agencies, including iwi and hapū, district and city councils, central government, industry and community groups to undertake collaborative projects. The team also actively seeks funding from other sources, allowing the acceleration of works.

The team's main activities include riparian fencing and planting for water quality improvement and fish habitat enhancement (Table 1 and Figure 1), as well as the identification and enhancement of whitebait spawning habitat and fish passage improvement. Other activities include a wide range of works on projects such as the Manawatū River Leaders' Accord, Lake Horowhenua Accord, and **Te Mana o Te Wai** (TMOTW) projects; these works include sewage treatment plant upgrades, establishing sediment traps and lake weed harvesting. All six annual plan targets for this area were achieved with some being considerably exceeded.

Table 1 Summary of riparian fencing and planting in 2017-18 financial year.

	Riparian Fencing			Riparian Planting		
	Allocated	Completed	Percentage complete	Allocated	Completed	Percentage complete
	Km	Km	%	Plants	Plants	%
Regional	39.53	20	51%	47,915	33,778	70%
Manawatū	61.9	41.8	67.5%	73,529	69,803	95%
Lake Horowhenua	2.9	1.9	65%	12,217	9,681	79%
Total	**104.33**	**63.7**	**61%**	**133,661**	**113,262**	**85%**

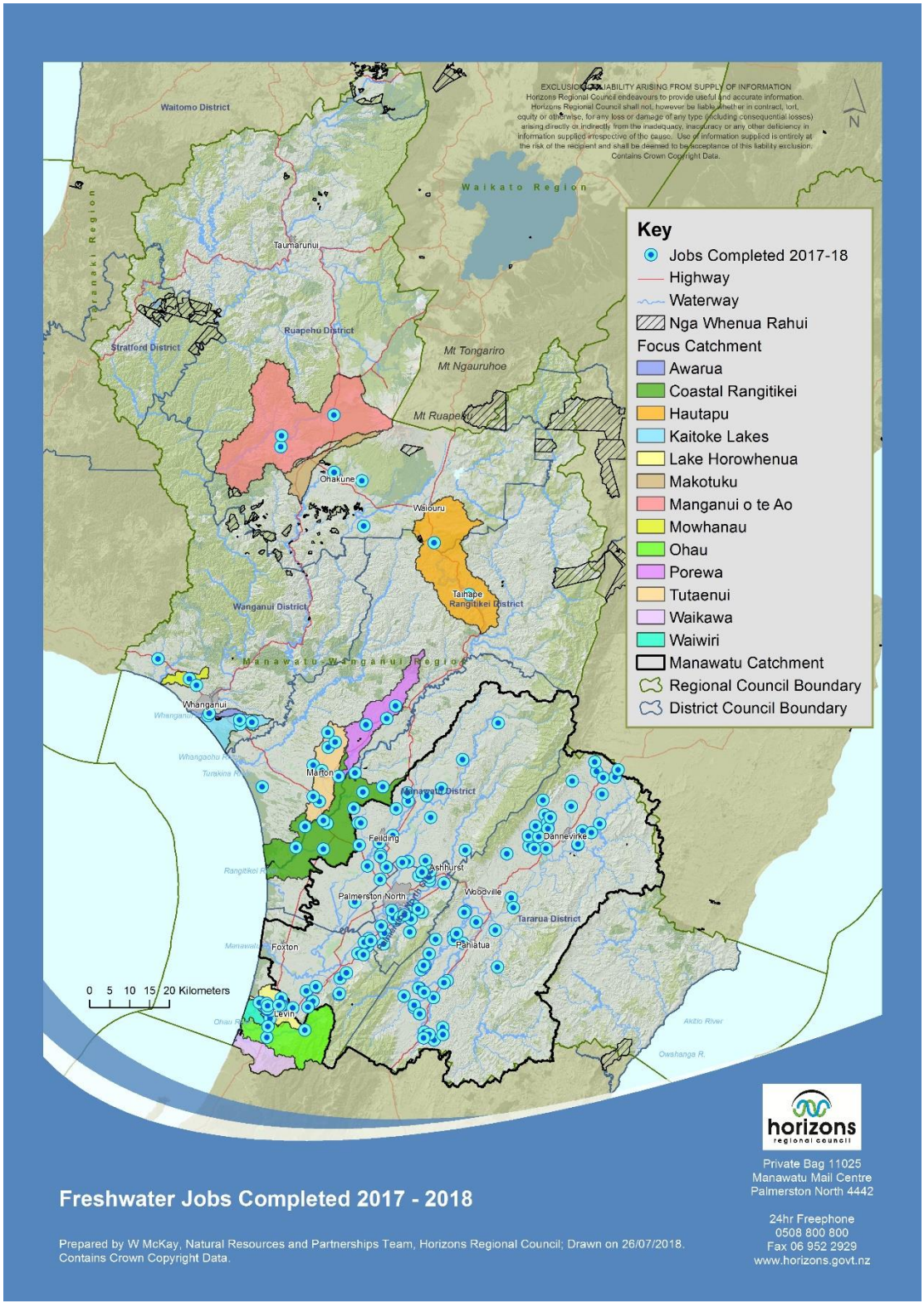


Figure 1 Location of the completed Freshwater Grants works for 2017-18 including the Regional, Manawatū and Horowhenua programmes. Each point on the map represents one fencing or planting project.

Annex A

2 Regional Freshwater Programme

2.1 Activity Overview

This programme focuses on the protection and enhancement of waterways across the Region. This section of the report does not include work in the Manawatū and Horowhenua catchments, which are reported on in other sections of this report. The main component of the Regional Freshwater Programme is supporting stock exclusion from waterways (via Freshwater Grants, advice and education), riparian enhancement and planting where desirable, aquatic habitat enhancement and supporting industry and community-led initiatives. A summary of progress against the annual plan targets for the 2017-18 year is shown in Table 2. Both annual plan targets for this part of the project were well exceeded. This reflects the strong interest in the programme from external partners and the level of external funding secured for the 2017-18 year.

2.2 Targets

Table 2 Annual Plan performance measures and assessment against year-end 2017-18 for the Regional Freshwater Programme, excluding the Manawatū Accord work for the Manawatū Catchment and the Clean-Up Fund for the Horowhenua Catchment.

Measure	Year end	Target	% Complete	% Allocated
Continue to work with, and provide advice to, individuals, landowners, community and iwi groups to improve waterways *1	159 (90 advice only)	25	636%	n/a
Freshwater Grants are provided each year, with priority given to working in focus catchments and improving aquatic habitat *1	69 grants (45 completed)	20	225%	345%

*1 *Annual Plan (AP)/ Long-term Plan (LTP) targets*

2.3 Activity Highlights

Work with individuals, community groups and iwi to improve waterways

2.3.1 During the reporting period the Deed of Funding was signed with the **Ministry for the Environment** (MfE) for the Whangaehu **Freshwater Improvement Fund** (FIF) project and work continues to progress the Ratana/Lake Waipu work programme. The Whangaehu project commenced on 1 July 2018 and the Lake Waipu project is aiming for a start date of October 2018. The first Governance Group meeting for the Whangaehu will be held in August 2018.

2.3.2 The Freshwater Team provided technical advice (but no funding) to 90 people or groups during the 2017-18 financial year, and provided advice to a further 69 people/groups that were approved for grants. Of the 69 approved, 45 were completed prior to the end of the financial year. The annual

plan target of 20 grants was exceeded by 225%. This resulted in 159 people/groups provided advice in total against the annual plan target of 25 (please note each project is only counted once, even if multiple people and/or visits are involved).

2.3.3 During the report period Clare Ridler left Horizons and has joined the Defence Force as a Senior Environmental Officer.

Freshwater Grant applications supported

2.3.4 There continues to be a significant demand for the Regional Freshwater Grants programme. Any new enquiries are being put on hold until the planting season quietens down and the team are able to visit them.

2.3.5 The major focus for the reporting period has been the riparian planting part of the programme with planting starting during late April. A large number of jobs were completed during May and June and more are to be completed in July, August and into September for the Ruapehu area.

2.3.6 The Regional Freshwater Programme has resulted in 20 km of stream fencing, 33,778 riparian plants being planted, and two fish barriers being remediated in the 2017-18 financial year.

Figure 2 Students from Bulls School planting at a property in the Lower Rangitīkei (June 2018).

Figure 3 New plantings in the Tutaenui Catchment, May 2018.

2.3.7 Given the high level of demand in the Regional Freshwater Programme the team are preparing to implement a prioritisation process for approving grants. This will mean that at times some works will be declined in the financial year in which they are applied for, as they don't rank as highly on the prioritisation score as other works. This process will be developed during the next 12 months will and implemented.

3 Manawatū River Accord

3.1 Activity Overview

The Manawatū River Leaders' Accord Action Plan includes an array of activities related to improving water quality, to achieve the goals of the Accord. This activity funds works to improve water quality in the Manawatū Catchment as part of the Accord, including excluding stock from streams, riparian planting, improving fish passage and supporting community projects. All of the annual plan targets for 2017-18 were met (Table 3).

3.2 Targets

Table 3 Annual Plan performance measures and assessment against the year-end for 2017-18 for the Manawatū River Accord. These figures include works as part of the Te Mana o Te Wai project in the Manawatū Catchment (Tū te Manawa).

Measure	Year end	Allocated Work	Target	% Complete	% Allocated
Stream fencing. Measure lineal metres (km) of fencing installed (all types).	41.8 km	61.9 km	30	139%	206%
Improve native fish habitat and fish passage. Number of sites protected/ enhanced.	84 sites, 69,803 plants, 6 fish passes	94 sites, 73,529 plants; 6 fish passage fixes	20	420%	470%
Community involvement projects.	6	7	4	150%	175%

3.3 Activity Highlights

Manawatū River Leaders' Accord and Action Plan

3.3.1 The next Manawatū River Leaders' Accord Forum will be held in November 2018, with a hui-a-iwi to be held on the 10 August 2018.

3.3.2 During the reporting period the Deed of Funding was signed with the **Ministry for the Environment** (MfE) for the FIF project and the first governance group meeting was held on 29 June 2018.

Manawatū River Accord Targeted Rate

3.3.3 The focus this reporting period has been on delivering plants, planting, helping with community planting events and completing claims.

3.3.4 69,803 riparian plants were planted during the year ending 30 June 2018 and the season continues with more planting and community events planned through until September; 41.8 km of fencing was completed in the 2017-18 financial year with 22 km being completed in this reporting period (1 May to 30 June 2018).

3.3.5 Six of the seven community projects funded through the Manawatū River Accord community grant funds have been completed, with the last planting day scheduled for 9 August 2018. It will be hosted by the Oroua Catchment Care Group in conjunction with AFFCO and the Bartlett Family. The Mangaone West Catchment Care Group purchased 10,591 plants, 1,100 more than planned as the budget allowed and demand grew from the community. Te Taiao Ukaipo project in the Tararua completed two planting days involving whanau and students from Te Kura Kaupapa Tamaki Nui a Rua with 2006 riparian plants being planted across the two sites. The Oroua Catchment Care Group hosted a community planting on 15 July 2018 near Awahuri Forest – Kitchener Park with approximately 25 people attending and planting 406 riparian plants.

Figure 4 Taiao Ukaipo project - planting along the Otamaraho Stream in the Tamaki Catchment, Tararua. This was one of two planting days undertaken as part of this project.

3.3.6 In addition to the Long Term Plan targets, six fish pass repairs were completed with co-funding from the Te Mana o te Wai project.

4 Lake Horowhenua Accord and Lake Horowhenua Freshwater Clean-Up Fund

4.1 Activity Overview

The Accord is a partnership between the Lake Horowhenua Trust, Horowhenua Lake Domain Board, Horowhenua District Council, Horizons Regional Council and the Department of Conservation to address water quality issues in Lake Horowhenua. Horizons has the lead role in delivering on the Lake Horowhenua Freshwater Clean-Up Fund, which consists of eight projects designed to contribute to the restoration of the lake. The Clean-Up Fund has now been completed in terms of the funding arrangements with the **Ministry for the Environment** (MfE) and the final project reporting has been approved by AuditNZ. Several of the projects of the Clean-Up Fund have an ongoing work component. Horizons also has a role in delivering some of the Te Mana o Te Wai projects and a component of the upcoming Freshwater Improvement Fund project.

4.2 Targets

Table 4 Annual Plan performance measures and assessment against year-end 2017-18 for the Lake Horowhenua Accord and Freshwater Clean-Up Fund.

Measure	Reporting Period					YTD Actual	Target	% Complete
	1st	2nd	3rd	4th	5th			
Obtain consents and operate a lake weed harvester on Lake Horowhenua (Environment Court process for consents completed and 50 ha harvested)*1	Consents granted. High Court decision in June 2017 ruled in favour of Horizons to proceed with weed harvesting	Tender documents prepared for boat ramp construction	Tenders close 6 February 2018	Three tenders received yet to be awarded	Contract awarded and work commenced	1	Consents obtained	100%

*1 *AP targets*

4.3 Activity Highlights

The Lake Horowhenua Accord and Freshwater Clean-Up Fund

4.3.1 The Lake Horowhenua Clean-Up Fund project is now complete from MfE's perspective. The final audit report has been received with the project receiving a clean audit and MfE have accepted the final project report.

4.3.2 Construction of the road to the boat ramp close to the confluence with the Arawhata Stream commenced in early April and good weather enabled significant progress. During the reporting period an application for an injunction was placed on the land owned by the Lake Horowhenua

Trust. The application for the injunction was dismissed at a hearing on 17 May 2018. This decision has subsequently been appealed in July 2018.

4.3.3 In addition, during the construction of the road on the land that Horizons owns two archaeological finds were made and works have since ceased. We are applying to Heritage New Zealand for an authority and once this is received works will be able to proceed.

4.3.4 Preparation is continuing for the commencement of Horizons' component of the Freshwater Improvement Fund project in the Lake Horowhenua catchment. The Horizons-led work involves further refining the groundwater inputs into the lake and will focus on filling information gaps that have been identified in previous reports. Commencement date was 1 July 2018.

4.3.5 During the Long Term Plan hearings Councillors resolved to remove funding for the lake weed harvesting project in the 2018-19 year in recognition of the challenges of harvesting this season. Monitoring and some other activity at the lake was put on hold following threats to Horizons staff. An item on the Lake Horowhenua Accord is being prepared for the August Council meeting.

5 Te Mana O Te Wai Projects

5.1 Activity Overview

The Te Mana o Te Wai Fund, administered by MfE, has had one round of project funding open to iwi/hāpu/marae for freshwater restoration works. Horizons supported a number of applications and four projects were successful in their funding bids. Approximately half of the available funding from the TMOTW has been secured for work in our Region, although one project involves work in both the Taranaki and Manawatū-Whanganui regions. The projects run over a two-year timeframe with two officially beginning on 1 March 2016 and two on 1 July 2016; several of these projects have been extended and will now be completed in the 2018-19 financial year .

5.2 Activity Highlights

Rangitīkei – Ngā Puna Rau o Rangitīkei

5.2.1 During the reporting period riparian planting at both the Moawhango and Paharakeke sites commenced, with the remaining planting to be completed in July 2018.

5.2.2 The Governance Group (including Councillor Patrick) has requested an extension to the project and the project has been extended through to June 2019.

5.2.3 A Project Governance Group meeting was held on Friday 1 June 2018 with the next meeting scheduled for 7 September 2018.

Figure 5: Unloading plants from Taupō Native plant nursery for the Moawhango and Paharakeke plantings.

Lake Horowhenua – Te Kakapa Manawa o Muaūpoko – The Heartbeat of Muaūpoko

5.2.4 The sediment core collection work was completed during April 2018 and the samples are with the lab for analysis. A report of the findings is due in August 2018.

5.2.5 The fencing and planting component of the project is nearing completion with 5.7 km of fencing completed against a target of 5 km. In total, 10,281 riparian plants have been planted and a few more sites were to be planted through to late August, including a staff planting day when approximately 1,300 plants will be planted.

5.2.6 A successful community planting day was held on 15 July 2018 along the road frontage of the sediment trap and another two community planting days are planned. One on 4 August will align with the original Accord signing date, and another will be held in late August; all are weather dependant.

5.2.7 A Te Kakapa Manawa o Muaūpoko Governance Group meeting was held in June 2018.

Figure 6:Planting and fencing completed in the Lake Horowhenua catchment as part of the Te Kakapa Manawa o Muaūpoko project.

Manawatū – Tū te Manawa

5.2.8 Horizons has been sub-contracted to complete the riparian planting and stream fencing component of the Tū te Manawa project over the life of the project. This included 50 km of stream fencing, planting 60,000 riparian plants and remediating six fish barriers.

5.2.9 This project was extended to the end of the calendar year (31 December 2018). However, the Horizons deliverables had been achieved at 30 June 2018.

5.2.10 A Governance Group meeting was held in June 2018.

Lucy Ferguson
FRESHWATER COORDINATOR

Logan Brown
FRESHWATER AND PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS

Report No.	18-128
Information Only - No Decision Required	

BIODIVERSITY, BIOSECURITY & PARTNERSHIPS PROGRESS REPORT

1. PURPOSE

1.1. The purpose of this item is update members of Council's Environment Committee on the progress made in the Biosecurity and Biodiversity activity over the period 1 May to 30 June 2018.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-128 and Annexes.

3. FINANCIAL IMPACT

3.1. There is no financial impact associated with recommendations in this paper.

4. COMMUNITY ENGAGEMENT

4.1. This is a public item and therefore Council may deem this sufficient to inform the public.

5. SUMMARY AND HIGHLIGHTS

5.1. The programme aimed to deliver treatment to 118 of 120 PCOs totaling 1,106,644 hectares, and two are being deferred. This level of treatment exceeds that of previous years where typically 80 PCOs or 60-70% of the area was treated. The additional level of treatment is possible as the programme did not take on any new areas this year. At the end of the year 94.8% of the planned work had been completed with control delivered to 1,049,436 ha. By comparison last year's control was delivered to 901,104 ha.

5.2. Monitoring of the possum control operation has been completed and results are all below the target for each level of control. Thirty PCOs were monitored using waxtag methodology.

5.3. Eleven rabbit night counts were completed over the reporting period. The results indicate that rabbit populations are slightly higher than the last count in June 2016, but are still at low levels across the Region. The scale for rabbit counts is the Modified McLean Scale which measures rabbits on a scale from 1 (number of sign or rabbits seen) to 10 maximum level. The results show 1.42 rabbits per kilometer surveyed, which equates to 45% of the lines at 2 or less, and 55% of the lines at 3 or less – the modified McLean scale.

5.4. The teams have been working to implement the new Regional Pest Management Plan (RPMP) since it became operative in December and which has a few significant changes when compared to the previous Regional Pest Plant Management Strategy; These include changes to engagement with the Crown and councils and the mechanisms it gives staff and occupiers when dealing with pests. All local city and district councils were recently engaged around their future obligations according to the RPMP.

5.5. This year saw an increase in activity in both our biological control programme with world first releases of agents against tutsan and field horsetail, and in the managed site

component of our Eradication and Progressive containment – mapped programmes. As a consequence staff spent a correspondingly reduced effort in the Awareness and Exclusion programmes.

5.6. With the closing of the financial year and the annual reporting from our WEEDS2.0 data set we again were pleased to see an increase in the number of sites we manage achieving a zero-level rating.

5.7. Horizons received notification that on June 11 the Notice of Direction placed on 181 Guyton St (Wanganui Regional House) due to the discovery and subsequent removal of myrtle rust on the premise, was revoked. This has returned the property to business as usual with the only requirement being to not compost any green waste from the garden.

5.8. Lake snow (Lindavia intermedia) was confirmed as present in our region during the reporting period and created quite a bit of work involving consultation with many stakeholders within the region and our neighbouring partners due to the Lake Mowhango location implicating the Waikato river catchment. The Horizons communications team worked across government and councils to put together a communication plan which included press releases, meetings and web information.

5.9. An initiative currently underway is the implementation of a stocktake and review process of the non-regulatory biodiversity bush remnants and wetlands programme (colloquially known as the Top 100/200 programme). The first stage of this work: a stocktake and review of current processes, tools and site inventory has identified areas where we can align with other regions, update our prioritisation practices, and deliver a robust biodiversity programme. The review team are developing plans to implement these changes and build a more effective and efficient programme.

5.10. Mid-June saw a flood event cause significant damage to the reserve, infrastructure, and buildings. We are working with our insurers to effect repairs.

- Office/ablution block clean up and repairs are near complete, with carpet and furniture replacement underway.
- Playground chip will need to be replaced prior to the camping season.
- Working through process of repairing driveway and asphalt damage.
- Totara Reserve is closed until Labour weekend.

6. SIGNIFICANCE

6.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Rod Smillie
BIODIVERSITY, BIOSECURITY & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Biodiversity progress report

B Biosecurity Animals progress report

C Biosecurity Plants progress report

BIODIVERSITY ACTIVITY

Annex A

1 Biodiversity Protection Programme

1.1 Activity Overview

This programme aims to have 100 of the Region's best wetlands and 200 of its best bush remnants under active management by 2028-29. Active management means that the site is being protected from livestock, pest animals and pest plants that threaten it, and that necessary enhancement work (eg., planting) is undertaken.

All annual targets for the Biodiversity Protection programme were met or exceeded. The programme is undergoing a review and section 1.4.1 of this report briefly updates the progress of the review to date.

1.2 Targets – Year to Date Actual

Measure	YTD Actual	Target*[1]
Additional top 100 wetlands actively managed *[2]	3	3
Additional top 200 bush remnants actively managed *[2]	6	6
Environmental Grants supported *[2]	32	30

*[1] Annual target, *[2] AP/LTP targets

1.3 Targets – Life to Date Actual

Measure	LTD Actual	LTD Target*[3]
Total high priority wetlands under active management *[2]	65	65
Total high priority bush remnants under active management *[2]	130	130

*[3] LTD target at end of financial year.

Annex A

1.4 Activity Highlights

General

1.4.1 The implementation of a stocktake and review process of the non-regulatory biodiversity bush remnants and wetlands programme (colloquially known as the Top 100/200 programme) is underway. The first stage of this work, a stocktake and review of current processes, tools and site inventory, has identified areas where we can align with other regions, update our prioritisation practices, and deliver a robust biodiversity programme. The review team are developing plans to implement these changes and build a more effective and efficient programme.

Community/private biodiversity support

1.4.2 Thirty-two Biodiversity Grants awarded this year against an annual target of 30. In 2018-19, the Environmental Grant ceases to exist and its budget is being split between the Biodiversity Support (to assist the high priority sites work and review) and Community Biodiversity Projects budgets.

High priority wetlands

1.4.3 Three new high priority wetland sites were added to the managed list this year as per the annual target. The new sites were:

- Cape Turnagain;
- Tree Daisy Wetland; and
- Pipibank Dunes.

1.4.4 Eleven high priority wetland sites were visited at least once during the year for one or more of these purposes: maintenance, audits, **rapid ecological assessments** (REA) and predator trap servicing. During site audits, staff check for evidence and impact of stock or pest animals, new pest plant infestations, fence integrity and any other damage.

Wetland Site Type	REA	Vegetation Monitoring	Pest Plants	Audit	Predator traps
High Priority sites (11)	2	0	3	4	4
Non-Prioritised sites (3)	2	0	1	0	0

High priority bush remnants

1.4.5 Six new high priority sites were added to the managed list this year as per the annual target. They were:

- Pukehou (Wright's) Bush QEII;
- Jackson Pori Rd QEII;
- Morrison Hinau Bush QEII;
- Moastone Bush;
- Moastone Beech Bush; and
- Dandy Pond Bush.

1.4.6 Thirty-nine high priority bush sites were visited at least once during the year for one or more of these purposes: maintenance, audits, rapid ecological assessments (REA) and vegetation monitoring. During a site audit, staff check for evidence and impact of stock or pest animals, new pest plant infestations, fence integrity and any other damage.

Bush Site Type	REA	Vegetation Monitoring	Pest Plants	Audit	Predator traps
High Priority sites (39)	6	5	25	26	0
Non-Prioritised sites (7)	2	2	3	0	0

2 Community Biodiversity

2.1 Activity Overview

2.1.1 The community biodiversity activity encompasses work completed in collaboration with others to deliver biodiversity and recreational benefits to the Region via projects such as the Manawatū Gorge and Pukaha Mount Bruce, and projects to support community-led initiatives such as the Rangitīkei Environment Group's (REG) efforts to control old man's beard. This activity also includes Totara Reserve Regional Park. All annual targets in the Community Biodiversity activity were met or exceeded.

2.2 Targets – Year to Date Actual

Progress on Specific Projects	Target	YTD Actual
Support community involvement in biodiversity protection		
Continue to support existing community-based biodiversity improvement projects*[4]	10	15
Support community involvement in biodiversity protection		
Operate a regional park and camping facility that is appreciated by the community, responding to all enquiries and complaints within 48 hours. Track and report the number of campers to the park and the number of complaints/queries as a % of this figure *[4]	100% response	100% response

*[4] *AP/LTP target*

Community Biodiversity Projects supported

2.2.1 The 15 projects supported in 2017-18 were:

- Ahimate Reserve (previously Waitoetoe Park);
- Awahuri Forest – Kitchener Park;
- Bushy Park;
- Genesis Moawhango River Restoration;
- Kahuterawa Stream Biodiversity project;
- Kia Wharite;
- Manawatū Estuary & Predator project;
- Massey Hill;
- Pukaha Mt Bruce;
- Rangitikei Environment Group (REG);
- Tawata Mainland Island;
- Te Apiti Manawatū Gorge;
- Te Potae o Awarua Predator project;
- Turitea Reserve;
- Waitarere Beach; and
- Weedbusters PN.

Community Biodiversity Projects supported

2.2.2 In addition to the projects above, the following groups were awarded funding from the Community Grant for projects during the 2017-18 year:

- Bulls River Users Group;
- Bushy Park Education Group;
- Carlton School;
- Hiwinui School;
- Hospice Whanganui;
- Kairanga School;
- National Park School;
- Ohakune 2000;
- Progress Castlecliff;
- Rapanui Brunswick Playcentre;
- Sisters of St Joseph of the Sacred Heart; and
- South Makirikiri School.

2.3 Activity Summary

Totara Reserve Regional Park

2.3.1 Two finds in Totara Reserve Regional Park this year caused a great deal of excitement. One was the discovery of shells of our native giant carnivorous snail near the Fern Walk track and the other was detecting long-tailed bats (long suspected of being present but never proven). This was tempered by a lower than expected income from the campground, theft of plumbing infrastructure, and significant flood damage from the June event.

2.3.2 Mid-June saw a flood event cause significant damage to the reserve, infrastructure, and buildings. We are working with our insurers to effect repairs.

- Office/ablution block clean up and repairs are near complete, with carpet and furniture replacement underway.
- Playground chip will need to be replaced prior to the camping season.
- Working through process of repairing driveway and asphalt damage.
- Totara Reserve is closed until Labour weekend.

Aaron Madden
ENVIRONMENTAL COORDINATOR – BIODIVERSITY

Rod Smillie
BIODIVERSITY, BIOSECURITY & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS

3 Collaboration Projects – Horizons / Department of Conservation (DOC)

3.1 Activity Overview

This report captures some Horizons and DOC collaborative projects that are not covered elsewhere in Environment Committee reports.

3.2 Activity Highlights

Kia Whārite

3.2.1 Consultation with adjoining landowners and interested parties for this year's aerial pest control operation is almost complete. The Mangapurua and Whitianga Trust blocks are on a 3-yearly treatment cycle. After the Mangapurua operation we will have a 'break year' from aerial operations. Procurement for the bait and helicopter is underway.

3.2.2 Tenders for the ground 1080 work in the 'Aramahoe Reserve' (located in the Waimarino Forest west of Raetihi Township) have been sent to seven external pre-qualified contractors. We will have the procurement process completed in late July and by late August/early September we aim to have the 1080 in the 800 bait stations positioned in the Reserve.

Pukaha/Mount Bruce

3.2.3 Horizons staff supported the Pukaha Mt Bruce project with pest control services on land surrounding the reserve. The table below reports the outputs achieved.

Table 1 Pest control outcomes for the Pukaha Mt Bruce project

Pest Species	Number controlled
Ferrets	8
Stoats	7
Rats	56
Cats	25
Hedgehogs	9

Manawatū Estuary

3.2.4 A drone survey for structures was undertaken at Manawatū Estuary in conjunction with Horizons Regional Council. The Department used this as an opportunity to investigate whether a drone could be used to survey for spartina – with promising results.

Te Apiti Manawatū Gorge Project

3.2.5 Planning for the aerial 1080 operation continues. Meetings have been held with Ngati Kahungunu, Rangitaane o Manawatū and Rangitāne o Tamaki nui a Rua and have identified some sensitive sites. Meetings with neighbouring landowners are well underway. Initial meeting with Medical Officer of Health has been held. Thirty A24 traps have been purchased to place around the boundaries of the two Māori land blocks within the proposed treatment area.

3.2.6 Rodent monitoring using tracking tunnels on the night of 20 June 2018 found 46% rat tracking in south block and 93% rat tracking in north block.

3.2.7 The Milson Scout Troop (DOC Community Fund recipients) have been given an Horizons' grant to increase their stoat trapping efforts on the Northern side of the Gorge. The Ashhurst Volunteer Stoat Trappers continue to check and maintain their traps on the Southern side of the Gorge.

3.2.8 The Te Apiti Manawatū Gorge Governance Group met on 26 April and the next meeting is scheduled for 24 August.

Northern Ruahine Battle for our Birds aerial 1080 operation

3.2.9 Northern Ruahine Battle for our Birds aerial 1080 operation was carried out in November 2017. Post-operational monitoring has been completed.

3.2.10 The rat tracking target was a tracking index of < 2% within six weeks of the toxic application (Table 2).

Table 2 Northern Ruahine rat tracking index post-operation

Date tracking tunnel papers put out	Rat tracking index	Mouse tracking index
8 June 2017 (pre-operation)	11%	3%
7 December 2017 (3 weeks post-operation)	0%	0.6%
27 January 2018	0%	0.6%
7 May 2018	1%	16%

3.2.11 The *Powelliphanta marchanti* snail outcome monitoring target was defined as: The incidence of recent possum predation on *Powelliphanta marchanti* within the operational area is significantly lower than outside the operational area within seven months of the operation.

3.2.12 *Powelliphanta marchanti* outcome monitoring results: Across the 10 Ruahine Corner plots a total of 43 live, 52 empty and 12 preyed upon shells were found. Across the 15 Mokai Patea Range plots a total of 52 live, 59 empty and 15 preyed upon shells were found. The identities of predators at both sites are listed in Table 3. The Fisher's exact tests found there was a highly statistically significant difference in possum predation rates between the two sites, both when

possum predation between sites was compared with the number of live snails found (P= 0.0007) and with the number of live and other recently predated snails (P=0.0002).

Table 3 Total numbers of predated snails across 10 plots in Ruahine Corner and 15 plots in Mokai Patea. Note the Ruahine Corner plots are all within the Battle for our Birds operational area. The Mokai Patea plots are either outside or just on the boundary of the operational area.

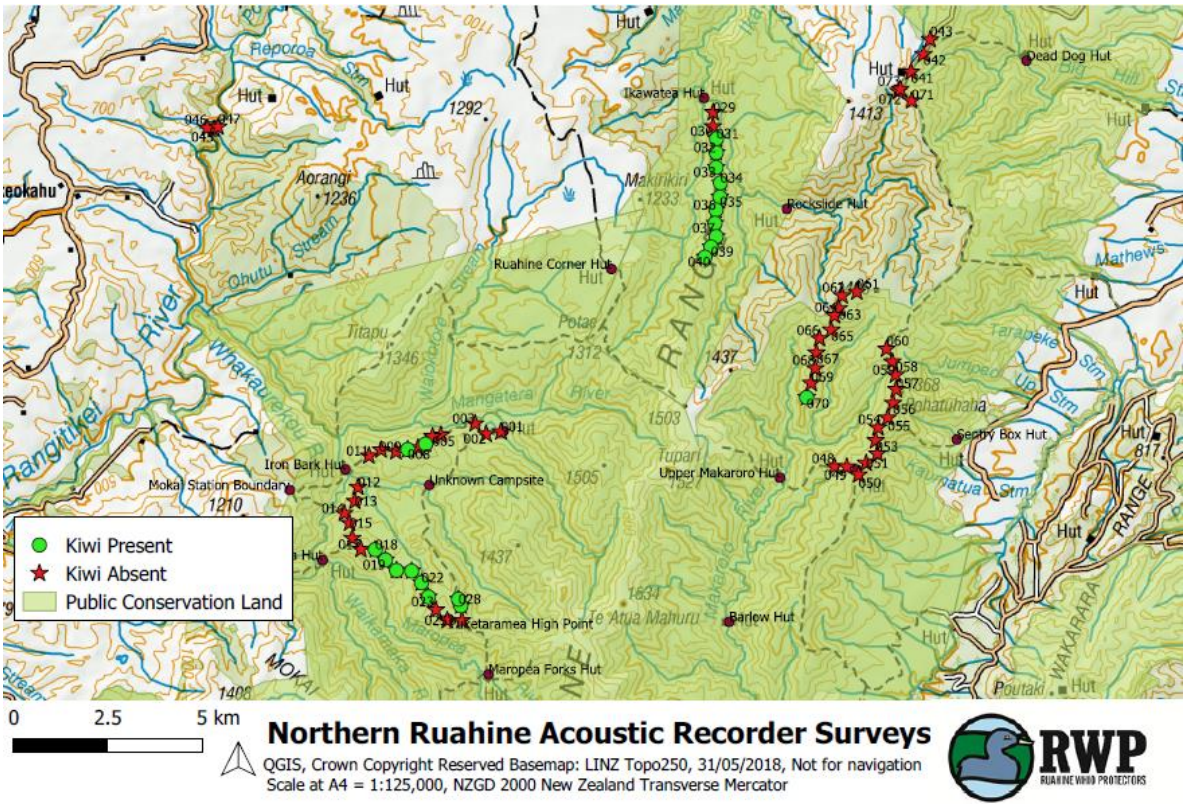
Site	Possum predation	Rat predation	Pig predation	Thrush predation
Mokai Patea	14	1	0	0
Ruahine Corner	0	0	9	3

3.2.13 Although the operation has been very successful at reducing rat and possum numbers, the snail monitoring highlighted a new threat at this site - pig predation. DOC will be working with tangata whenua to manage this threat at Ruahine Corner.

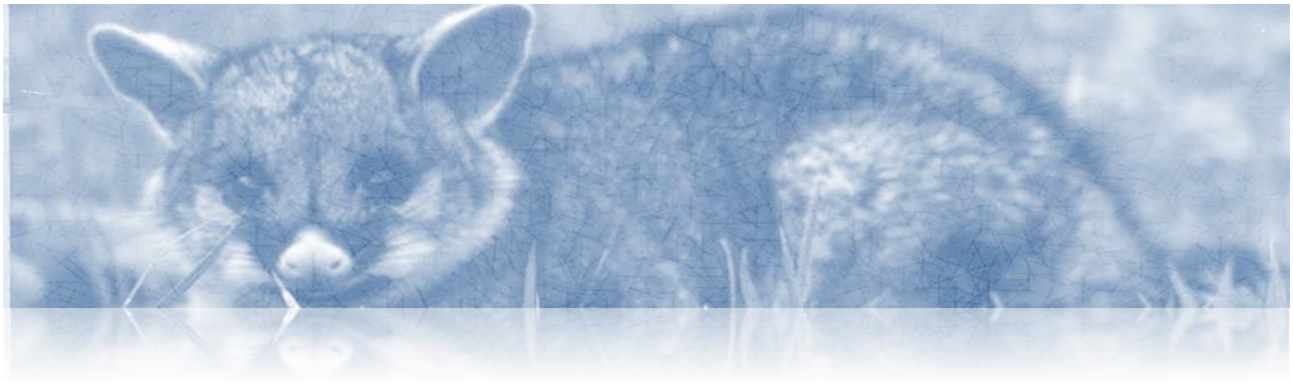
3.2.14 There are extensive stoat trapping networks throughout the Ruahine Ranges, primarily for whio protection, operated by groups in the Ruahine Whio Collective. The Department has approved two DOC Community Fund applications to extend stoat trapping networks in the Northern Ruahine Ranges.

3.2.15 The Ruahine Whio Protection Trust have completed their kiwi survey (DOC Community Fund grant) using acoustic recording devices. Their report shows kiwi considerably further south on both the eastern and western sides of the Ruahine Ranges than they were previously known to be.

3.2.16 The Department has purchased 100 new stainless-steel DOC 200 trap mechanisms and flown them into the Northern Ruahine to replace existing rusty old-style DOC 200 traps.



Map 1 Locations where kiwi were detected and not detected using acoustic recorders May 2017 – May 2018



Annex B

BIOSECURITY ANIMALS ACTIVITY

1 Possums (Possum Control Operations - PCOs)

1.1 Activity Overview

This report summarises the operational and management work involved in the 2017-18 Possum Control Operation (PCO). A more detailed overview of the PCO is provided in the Biosecurity – Animals Operational Plan 2017-18.

1.2 Targets – 2017-18 Year

Measure	Prior to this Period	This Period	Completed at Year End	Target	Completed %
Internal Regional Response Team					
PCOs completed (by count and hectares)	47 425,348 ha	10 114,431 ha	57* 539,779 ha	61 573,678 ha	93% 94%
External Contractors					
PCOs completed (by count and hectares)	40 474,627 ha	13 35,030 ha	53** 509,657 ha	57 532,966 ha	93% 96%
Total					
PCOs completed (by count and hectares)	87 899,975 ha	23 149,461 ha	110 1,049,436 ha	118 1,106,644 ha	93% 95%

*** Excludes 3 PCOs that were underway and approximately 52% complete at year end, 1 PCO not started.**
**** Excludes 3 PCOs that were underway and approximately 50% complete at year end, 1 PCO not started.**

1.3 Activity Highlights

Overall

The programme aimed to deliver treatment to 118 of 120 PCOs totaling 1,106,644 hectares, and two are being deferred. This level of treatment exceeds that of previous years where typically 80 PCOs or 60-70% of the area was treated. The additional level of treatment is possible as the programme did not take on any new areas this year. At the end of the year 94.8% of the planned work had been completed with control delivered to 1,048,436 ha. By comparison, last year's control was delivered to 901,104 ha

Internally Delivered Possum Control

1.3.1 The 2017-18 Horizons **Regional Response Team** (RRT) programme involved maintenance control in 61 of the 118 operational areas for the 2017-18 financial year.

1.3.2 Status of the RRT PCO as at 30 June 2018 (Figure 2):

- 57 PCOs (treatment delivered across of 539,779 ha) have been completed;
- 3 PCOs are underway and on average are 52% complete (treatment delivered across 18,333 ha) ;
- 1 PCO was not started (Bunnythorpe PCO 16,975 ha). This PCO is currently being worked as a part of the 2018 year;
- The RRT has delivered control measures across 539,779 ha of the targeted 573,678 ha (94% of the total RRT PCO operational area).

1.3.3 The RRT's capacity was reduced over the year by 8 months of an FTE due to injury to staff members and the Levin Depot fire. The team worked hard to make up the lost time.

1.3.4 There was difficulty in sourcing short-term capacity externally to gain additional delivery. This has led to the operation falling short of our planned work programme. We are considering options around additional capacity for the current year's programme.

1.3.5 Planning has started for the setup of a new operational base for two RRT members from the Taihape depot.

- The Regional Response Supervisor's role has been accepted by Paul Bowers of Mangaweka. Paul is a local contractor with previous experience in possum control operations and excellent local knowledge and relationships, who will make a great addition to the team.

External

1.3.6 External service providers were contracted to complete 57 of the 118 PCOs across the Region in 2017-18 with the balance worked by the RRT. The external pest control companies range from large firms with multiple operational teams to smaller firms with one to three people.

1.3.7 By the end of June 2018, 96% of the external contractor programme was completed.

1.3.8 Thirteen operations were completed during the reporting period, bringing the total completed for the year to 53. Control work was underway in a further three operations (Waihoki, Mangaweka and Pukeokahu) and ceased at the end of the financial year. Around 50% of the bait stations in these operations had been filled when control ceased. The main reason that the operational work was not completed in full was due to a couple of spells of wet weather in June which resulted in quad/LUV access being difficult/dangerous.

1.3.9 The Pohonui PCO was the only programme that didn't get started and this was due to the contractor not being able to commence work due to illness. Given the time of the year it wasn't possible to engage another contractor to commence the work as all had prior commitments.

1.4 Planning for the 2018-19 year

1.4.1 Planning for the 2018-19 year has advanced over the reporting period. The plan for the 2018-19 Possum Control programme is outlined in the Operational Plan as reported elsewhere in this agenda.

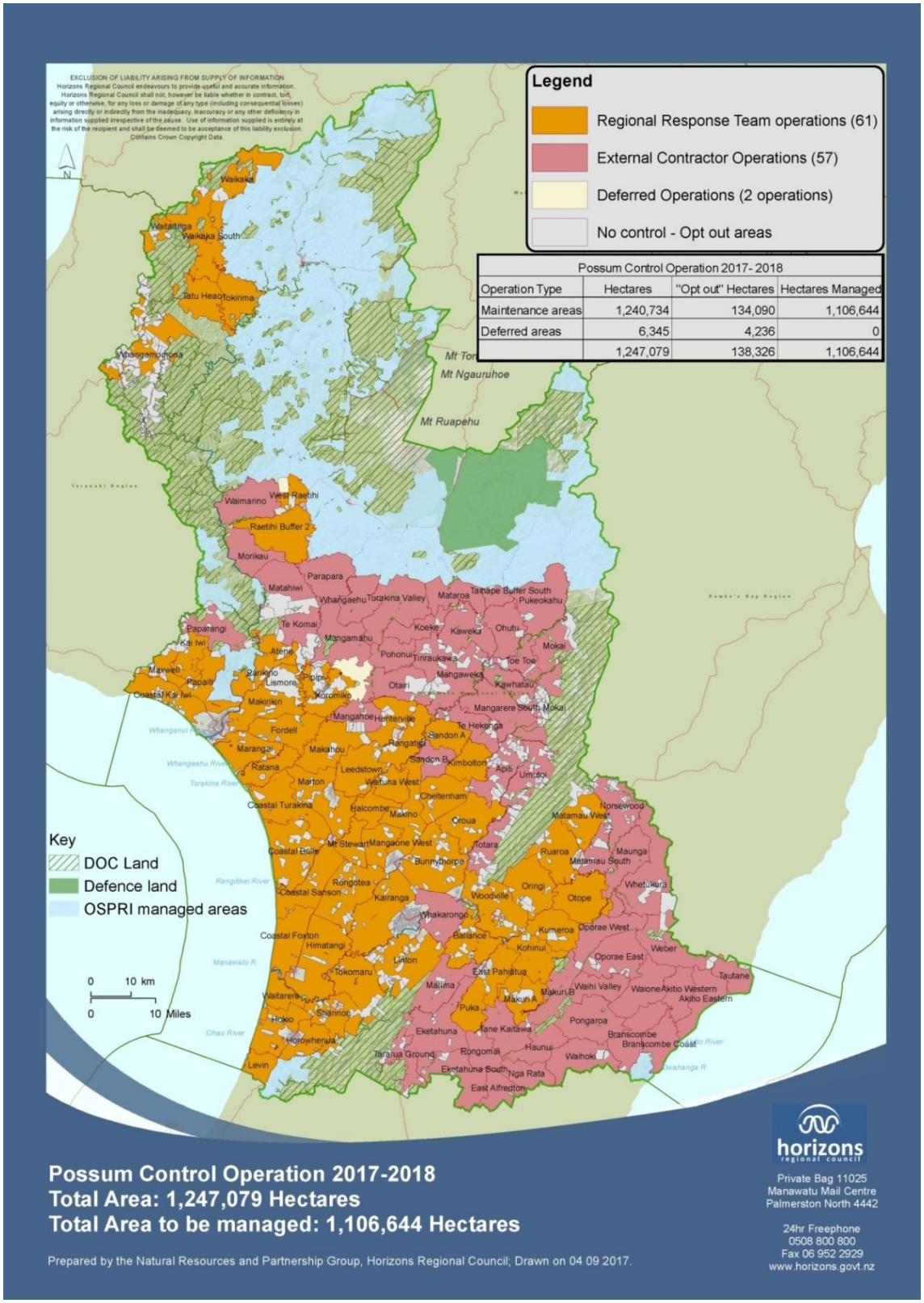


Figure 1 Possum Control Operation 2017-18 (Year 12).

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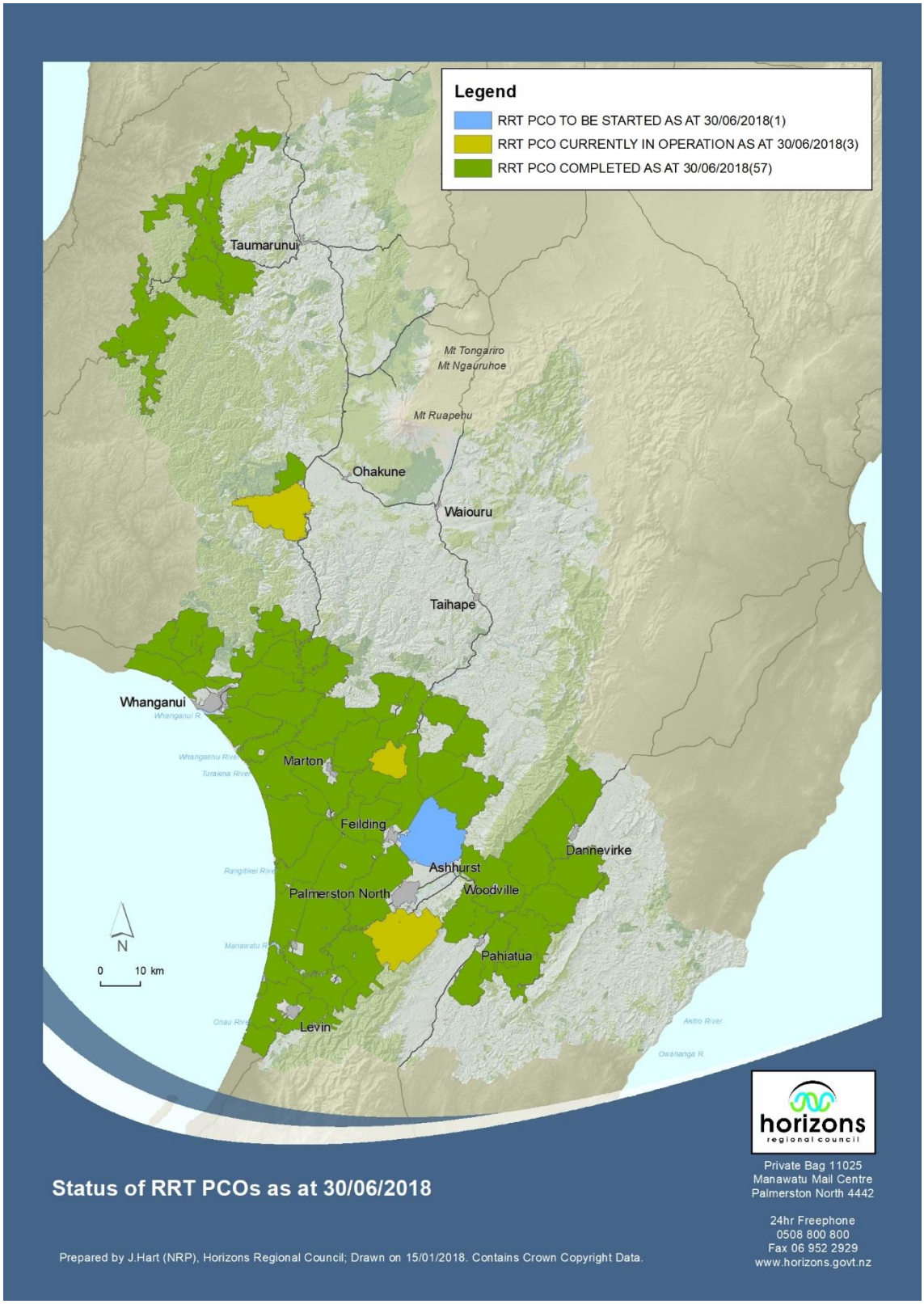

Figure 2 Status of current RRT Possum Control Operations as at 30 June 2018.

2 Rooks

2.1 Activity Overview

2.1.1 This report summarises the operational and management work involved in the 2017-18 regional rook programme. A more detailed overview of the rook programme is provided in the Combined Regional Pest Management Operational Plan 2017-18.

2.1.2 Aerial Rook control was carried out in the spring of 2017 with excellent results due to information received from the public regarding the presence of rooks, and local RRT knowledge.

2.1.3 Ground control has been carried out when the opportunity has presented itself.

2.2 Targets 2017-18

Measure	To Date	This Period	Completed to Date	Target	Completed %
Existing rook colonies (rookeries) (a)	56		Complete	Record	100%
New rookeries (b)	18		Complete	Record	100%
Total rook colonies (rookeries) (a + b)	74		74	Record	100%
All known rookeries are treated annually to reduce crop losses and damage *1	100% (74 rookeries/137 active nests)		100% (74 rookeries/137 active nests)	100%	100%
Ground poisoning operations	1		1	Control attempted	Achieved
Report ground control efficacy (% estimated kill)	81% (22 birds found deceased from 27 sighted)		81% (22 birds found dead from 27 sighted)	Control attempted	Achieved
Breeding rookery database updated by January 2017	Completed		Completed	Record	100%

[1] AP/LTP targets

2.3 Activity Highlights

2.3.1 There is allocated effort for reactionary control to be delivered should the need arise.

2.3.2 Rook control was undertaken earlier this year when 135 active breeding nests were treated.

2.3.3 The number of active rookeries increased slightly from 69 last year to 72 this year.

2.3.4 No rook control was delivered during this reporting period.

2.4 Outcomes

2.4.1 Sustained rook control has been delivered throughout the Region with good results.

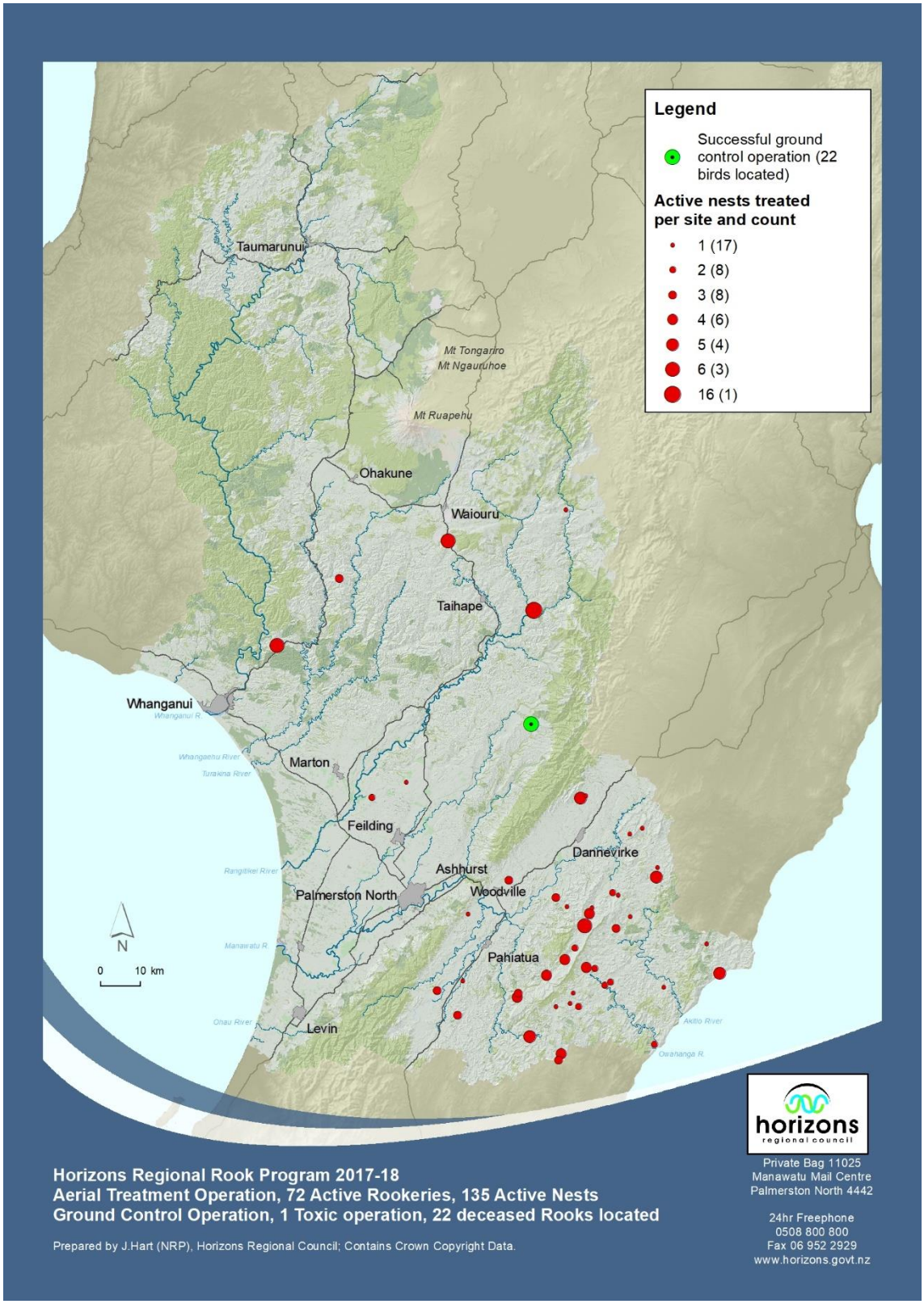

Figure 3 Aerial and Ground Control of Rooks throughout the Region as at 28 February 2018

3 Monitoring

3.1 Activity Overview

This report summarises the operational and management work involved in the 2017-18 Regional Animal Pest Monitoring programme. A more detailed overview is provided in the Biosecurity – Animals Operational Plan 2017-18.

3.2 Targets – Year to Date Progress

Measure	Reporting Period						YTD Actual	Target*1
	1st	2nd	3rd	4th	5th	6th		
Possum densities are maintained at/below 10% **residual trap catch** (RTC) in existing /new possum control operation areas. This is to enhance production, biodiversity, disease protection and amenity values.*[1]	0	0	9.9%(1)	2.9%(3)	4.4%(6)	3.73%(11)	4.11%(21)	<10% RTC
Possum densities are maintained at/below 5% RTC for all maintenance control programmes *[1]	0	0	3.4%(1)	0%(2)	2.3%(3)	0.03%(3)	1.2%(9)	<5% RTC
Record all inputs associated with the management and control of possums in the PCOs including inputs (maps); input/habitat ratio; inputs (labour & consumables); medical officer of health approvals	✓	✓	✓	✓	✓	✓		All operational data to be collected as per the contract specifications
Undertake wax tag monitors (by count)	0	0	2	5	9	14	30	Monitoring completed to the new protocol in 30 PCOs

**1 AP/LTP targets*

Annex B

Table 1 Average results for possum monitoring completed to date as part of the possum control operation.

Monitor results for the life of the Possum Control Operation	
Ex-OSPRI NZ operations 5% target	Initial operations 10% target
1.83% average (51 monitors)	4.28% average (92 monitors)
Overall average 3.41% (143 monitors)	

3.3 Activity Highlights

Possum monitoring

3.3.1 In 2017-18 the monitoring programme for possums has been significantly increased. In previous years the aim was to undertake monitoring in 10% of the PCOs. Through the Annual Plan this was increased to 25% to enable each PCO to be monitored once every four years, and for more monitoring in each of the PCOs when monitoring is done via 25 monitoring lines. This aims to increase our knowledge of the variability of possum populations within the PCO and to provide a more robust estimate of the populations within individual PCOs and the overall programme. This was based on advice provided in a report by Landcare Research in 2016-17. To deliver the 30 monitoring operations, 26 were put out to tender and four delivered by the internal team.

3.3.2 The tender for the supply of possum monitoring services late last year was won by Holden Contracting Ltd from Nelson, which has field staff operating in both the North and South Islands for various Regional Councils and OSPRI.

3.3.3 The last 15 of the 30 PCO monitors planned to be implemented this year have been completed. Three of the monitors were ex-OSPRI operations with a 5% RTC target. The results were:

Table 2 PCO monitoring results

PCO	RTC Result
Pongaroa	0.1%
Taihape Buffer South	0%
Tautane	0%

3.3.4 Eleven Horizons initial operations were also monitored, with all returning results under the 10% RTC target. The operations monitored were:

Table 3 ex-initial monitoring results

PCO	RTC Result
Horowhenua	5.7%
Kaweka	3.4%
Makino	1.8%
Ohutu	0.1%
Oringi	0.1%
Oroua	3.7%
Puka	6.8%
Ruaroa	0.9%
Te Hekenga	4.3%
Tiriraukawa	9.6%
Whangamomona	4.6%

3.3.5 As previously reported, one of the outcomes of the recent workshop with Landcare Research identified that obtaining a sample of pre-control and post-control monitoring information would be helpful to more accurately predict the percentage reduction in possum populations after control work. The percentage reduction in possum numbers following control is an important factor in the possum population modelling tool that assists the decision-making process when selecting PCOs that potentially can be 'deferred' from control work for one or more years.

3.3.6 Five pre-control monitors were undertaken in the Oringi, Puka, Horowhenua, Ohutu and Pohonui PCOs earlier in the year. We have recently completed the post-control monitors in 4 of the 5 operations. The Pohonui post-monitor wasn't carried out due to the operational work in the area not being completed.

3.3.7 Two of the four post-control monitors produced unexpected results with 2 PCOs (Horowhenua and Puka) returning results higher than the pre-control monitor. Please refer to Table 4 below.

Table 4 Pre- and post-control monitoring results

Pre- and Post-Control PCO Monitors				
PCO Name	**Pre-Control Wax Tag Index**	**Post Control Wax Tag Index**	**% Increase**	**% Decrease**
Horowhenua	17	24	41%	
Ohutu	3	1		67%
Oringi	10	3		70%
Puka	27	28	4%	

3.3.8 In light of these higher results, comment was sought from Andrew Gormley (Landcare Research Ltd) who said that the higher results could mean that control was not effective, but it could also be due to things such as the activity rate of individuals changing. A low pre-monitor with a lot of animals on the ground can be lower than a post-monitor when there are fewer animals, but those animals are more active and are more likely to interact with the wax tags.

3.3.9 Andrew also commented that there is a lot of research to show that home range increases when population size is lower. This means that individuals cover more ground and can potentially interact with more devices.

3.3.10 We plan to pre- and post-monitor another five PCOs in the 2018-2019 year (all ex-OSPRI operations). We will also post-monitor the Pohonui PCO when control is completed later this year. The results from these monitors will provide further information on possum control efficacy.

Rabbit monitoring

3.3.11 The eleven rabbit night counts were completed over the reporting period. The results indicate that rabbit populations are slightly higher than the last count in June 2016, but are still at low levels across the Region. The scale for rabbit infestation is the McLean Scale which measures rabbits on a scale from 1 (No sign found, no rabbits seen) to 8, maximum level.

3.3.12 The overall encounter rate for the counts completed is 1.42 rabbits per kilometre which equates to a score of 3 or less on the Modified McLean Scale.

Modified McLean Rabbit Infestation Scale

The following modified scale (Version 1.0) was adopted by the New Zealand Rabbit Coordination Group, on 12th October 2012.

For citing purposes, it should be referred to as the Modified McLean Scale (2012).

1.	No sign found. No rabbits seen.
2.	Very infrequent sign present. Unlikely to see rabbits.
3.	Pellet heaps spaced 10m or more apart on average. Odd rabbits seen; sign and some pellet heaps showing up.
4.	Pellet heaps spaced between 5m and 10m apart on average. Pockets of rabbits; sign and fresh burrows very noticeable.
5.	Pellet heaps spaced 5m or less apart on average. Infestation spreading out from heavy pockets.
6.	Sign very frequent with pellet heaps often less than 5m apart over the whole area. Rabbits may be seen over the whole area.
7.	Sign very frequent with 2-3 pellet heaps often less than 5m apart over the whole area. Rabbits may be seen in large numbers over the whole area.
8.	Sign very frequent with 3 or more pellet heaps often less than 5m apart over the whole area. Rabbits likely to be seen in large numbers over the whole area.

3.3.13 Given the generally low levels recorded the Operational Plan for 2018-19 does not include any planned work to monitor rabbit populations (note the figures in the table below are encounter rates, not McLean Scale).

Table 5 Rabbit Night Count Results 2017-2018

Count Route	Rabbits per Kilometre				
	2009-2010	2010-2011	2011-2012	2015-2016	2017-2018
Whenua Tapu Station	0.37	0.21	0.21	0.33	0.14
Koiro Station	0.9	0.37	0.29	0.24	0.19
Papanui Station	0.05	0.23	0.18	0.25	0.09
Carver	1.43	1.27	0.40	1.47	2.41
Thompson	1.53	1.05	0.89	0.46	1.21
Whisker & Hocking	2.89	2.08	2.83	3.37	3.64
Everton & Rowe	0.98	0.03	0.00	0.38	0.55
Balfour Station	0.13	0.16	0.56	0.58	0.60
Ora Station	1.17	2.01	1.52	0.75	2.13
Pipi Bank Station	3.00	3.15	2.43	1.84	2.73
Owahanga Station	2.17	2.73	1.55	2.80	1.90
	1.33	**1.21**	**0.99**	**1.13**	**1.42**

45% of the lines have a Modified McLean Scale of 2 (Refer to 3.3.12).

55% of the lines have a Modified McLean Scale of 3 (Refer to 3.3.12).

Annex B

4 Amenity Pests

4.1 Activity Overview

This report summarises the operational and management work involved in the 2017-18 Amenity Pest programme. A more detailed overview of the programme is provided in the Biosecurity – Animals Operational Plan 2017-18.

4.2 Targets – Year to Date Progress

Measure	Reporting Period						YTD Actual	Target	%
	1st	2nd	3rd	4th	5th	6th			
Provide an urban/peri-urban animal pest management service to assist urban ratepayers with specialist advice and equipment	109	132	126	132	91	72	662	>300 responses/ year	221%
Animal pest control assistance requests / enquiries are responded to with 48 hours *[1]	109	132	126	132	91	72	100% (662 responses)	100%	100%
Close out or action all enquiries within 5 working days of receipt	109	132	126	132	91	72	662	100%	100%

4.3 Activity Highlights

4.3.1 A total of 72 enquiries were received during the reporting period.

4.3.2 All landowners making enquiries were contacted and/or visited within the prescribed timeframes and provided with advice, equipment (traps etc) or small amounts of toxins to help them deal with their particular pest issues.

4.3.3 The 'All other' section comprised enquiries relating to bees (1), pigeons (1) and general enquiries (4).

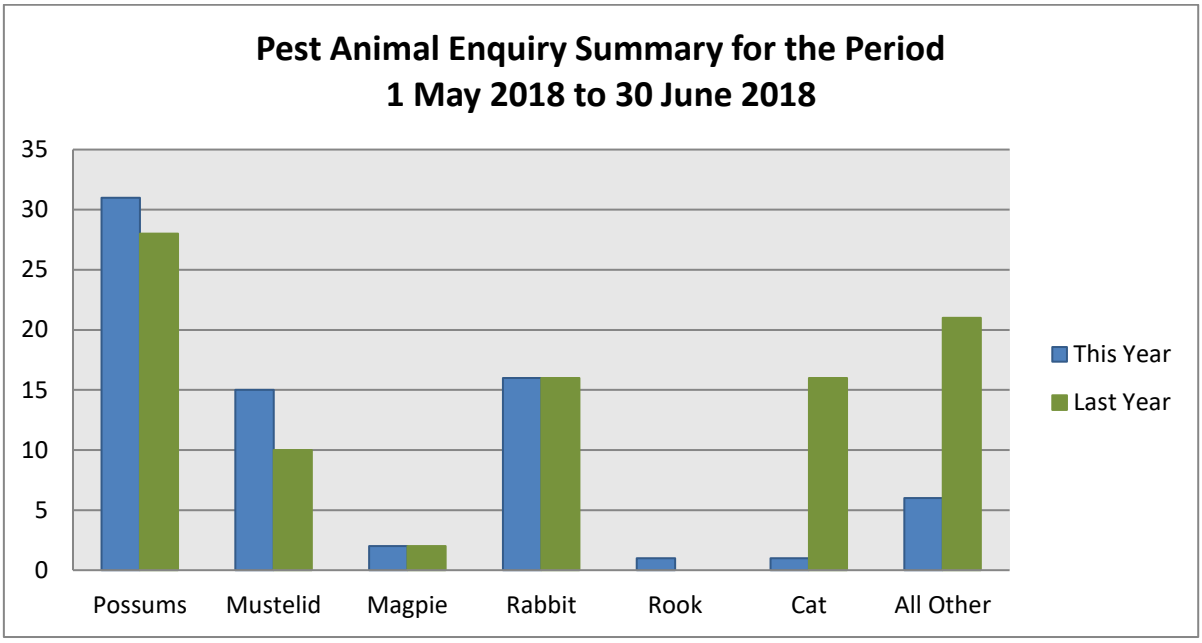

Figure 4 Pest Animal Enquiry Summary – by Pest Type.

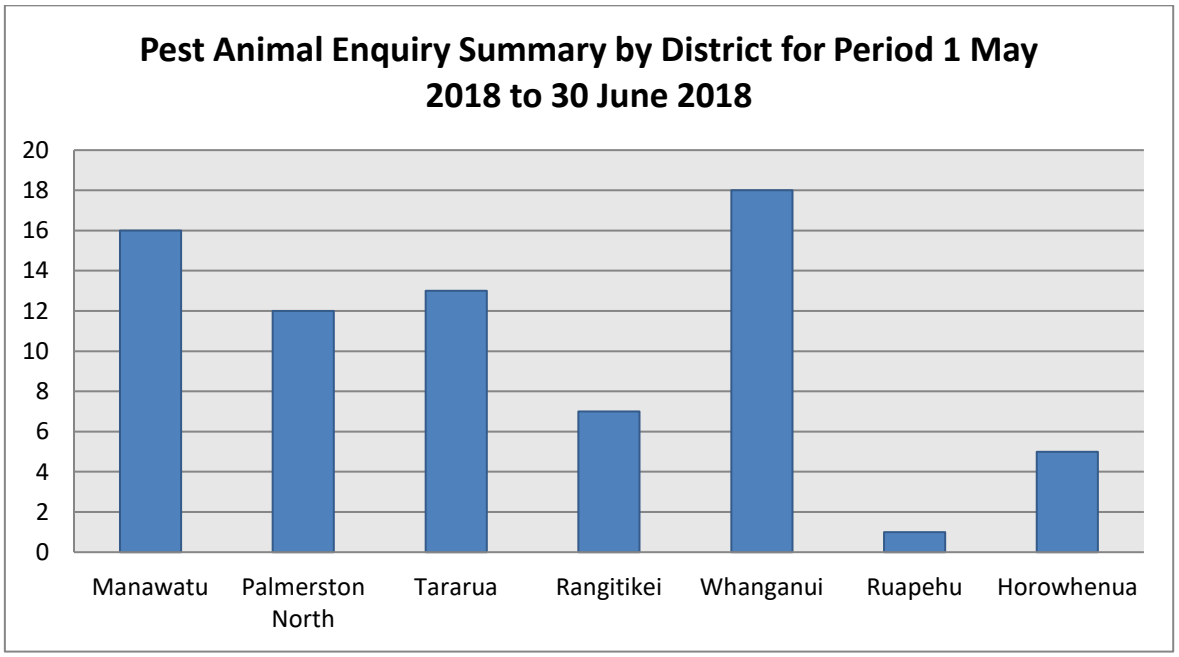

Figure 5 Pest Animal Enquiry Summary – by District.

Annex B

4.4 Activity Progress Report

Project	Key Deliverables	Progress to Date
Possum Control Operation	Operational implementation	▪ 2017-18 operational work was 94.8% complete at the end of the year. ▪ Vertebrate toxic agents' permits have been obtained for all programmes.
	Success indicators	▪ 30 trend monitor designs completed. ▪ 30 monitors completed ▪ 5 pre-control and four post-control monitors completed.
	Data management	▪ Post-operational reports received. ▪ GPS data uploaded into GIS database.
Rook Management	Aerial nest baiting	▪ Completed.
	Ground control	▪ Ongoing as opportunities arise.
	Rook database	▪ Updating database with new sightings and confirming historical nesting sites
Amenity Pest Programme	Respond to enquiries & complaints within agreed timeframes	▪ Frontline database reviewed daily. ▪ 662 enquiries received to date this year. ▪ Individual 'enquiries' actioned. ▪ Database updated regularly.
	Assist landowners with advice on appropriate pest control techniques	▪ Ongoing – advice provided as appropriate. ▪ Loan traps & other equipment supplied.
	Initiate appropriate enforcement action against land occupiers who do not comply with strategy rules.	▪ No action required to date.
	Ensure that information on control methods for amenity pests is available at www.horizons.govt.nz	▪ Ongoing (updated as required).
Animal Pest Monitoring Programme	Possum Control Operation	▪ The 2017-18 PCO monitoring programme is 100% completed (including five pre-control monitors)

Jason Hart
REGIONAL RESPONSE TEAM COORDINATOR (ANIMALS)

Eric Dodd
ENVIRONMENTAL PROGRAMME COORDINATOR (ANIMALS)

Rod Smillie
BIODIVERSITY, BIOSECURITY, AND PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS

BIOSECURITY ACTIVITY - PLANTS

Annex C

1 Biosecurity Plants

1.1 Purpose

1.1.1 The purpose of this report is to update Council on the progress of programmes giving effect to the Regional Pest Management Plan (RPMP) and other works, according to the 2017-18 Pest Plant Operational Plan for the period 1 May to 30 June 2018.

1.2 Executive summary

1.2.1 The 2017-18 year closed with pest plant control operations happening right up to June 29.

1.2.2 The team have been working to implement the new RPMP since it became operative in December and which has some significant changes when compared to the previous Regional Pest Plant Management Strategy. These are especially around engagement with the Crown and councils, and the mechanisms it gives staff and occupiers when dealing with pests. All local City and District Councils were recently engaged concerning their future obligations according to the RPMP.

1.2.3 This year saw an increase in activity in both our biological control programme with world first releases of agents against tutsan and field horsetail, and in the managed site component of our Eradication and Progressive containment – mapped programmes. As a consequence staff spent a correspondingly reduced effort on the Awareness and Exclusion programmes.

1.2.4 With the closing of the financial year and the annual reporting from our WEEDS2.0 data set we again were pleased to see an increase in the number of sites in which we achieved a zero-level rating (Figure 1). Pest plant sites are usually found when adult and self-sustaining via seeding or vegetative means, and the RPMP goal is to reduce the viability of every site to one where only regrowth or seedlings are produced ie., zero-levels. The team's succeeded searching for and finding 415 new weed sites and also through effective control increase the number of sites at zero-levels is a very good achievement.

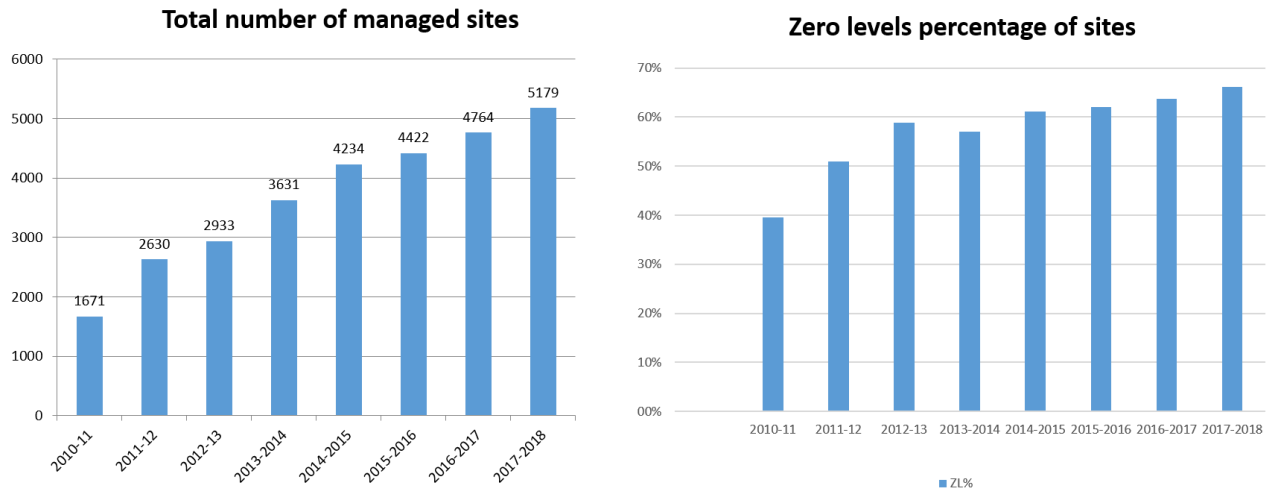

Figure 1 Weed site numbers showing total number of sites managed and 66% of these at zero-levels.

1.3 Targets

1.3.1 The Long-term Plan targets were all met except for the 48 hour response time target to enquiries. We endeavor to address all enquires as soon as practicable given workload, staff absences and occasionally passing on to the most appropriate person for the enquiry.

Measure	Reporting Period						YTD Actual	Target	% Complete
	1st	2nd	3rd	4th	5th	6th			
Number of listed pest plant species controlled to zero density/containment increases as per Regional Pest Plant Management Strategy (RPPMS)	6	6	6	6	6	6	6	6	100%
No new listed pest plants established in the Region	0	0	0	0	0	0	0	0	100%
Financially support the national bio-control agent development programme	0	0	2	0	2	0	4	4	100%
Frontline enquiries for plant pest control assistance are responded to within 48 hours	78%	56%	76%	36%	81%	90%	70%	100%	Not achieved

1.4 Background

1.4.1 Pest plant management is mandated under the Biosecurity Act (1993) and Horizons has chosen to undertake management via a Regional Pest Management Plan as well as activities detailed in an annual Operational Plan. These activities focus on transformative pest plants which, if left un-controlled or unmanaged, would reduce the value of the Regions biodiversity and productive capacity by either increasing the costs of traditional production or preventing it entirely. This report overviews the work undertaken according to the Operational Plan structure, which features the RPMP programmes first followed by the other programmes.

1.4.2 For those pests that are in New Zealand but not in our Region, our goal is to prevent establishment via the Exclusion programme. Our aim is to detect these pests before they become widely established in the Region and facilitate a quick response through appropriate funding that will enable the control or management of these species on rateable land.

1.4.3 Those high-risk species which we believe should be totally removed from the region are managed via the Eradication programme.

1.4.4 Where population levels or difficulty and expense of control prevent achievement of a Region-wide zero-density objective, high-threat pest plant species will be managed under a Progressive Containment objective. For each species managed this way, an active management zone is defined within which the pest plant species will be controlled wherever it is found, as per the Eradication designation.

1.4.5 Production pests are managed using a mix of a clear land rule and a good neighbour rule. These species are widespread but parts of the Region are clear of them and it is desirable to keep those areas clear. This programme is called Progressive containment – unmapped.

1.4.6 The Response programme aims to provide immediate and effective assistance to all national or regional biosecurity incursions and any transitions to long-term management.

1.4.7 Our Investigation and Surveillance programme aims to prevent the propagation, sale and distribution of legislated plants, determine the current extent in our Region of potential plants and investigate management options and prevent further establishment of notifiable plants by working with other pest management agencies.

1.4.8 Many of the entrenched pest plants within the Region are now the target of our Biological control programme which has aims to assist the development of insects and diseases to control a wide range of pest plants and to release, distribute and monitor those within the Region.

1.4.9 Alerting the community to the issues, threats and solutions of weed management is the aim of our Awareness programme.

2 Reports on progress

2.1 Exclusion Pest Plants Activity Overview

2.1.1 We received an enquiry regarding the extensive *Phragmites kaka* infestation at Tangimoana and an apparent new incursion at the Whangaehu River mouth. While not *Phragmites australis,* the listed Exclusion species, it is virtually impossible for the untrained eye to tell them apart. Staff investigated the Whangaehu site to discover an extensive population spread over at least 2 km upstream of the estuary, and replied to the Tangimoana enquiry. Both of these populations are best dealt with under a site-led control approach.

2.1.2 Earlier in the year we fielded an enquiry regarding Chilean needle grass growing in stock yards. We inspected and found it not to be the case but thanked the farmer for being proactive and alerting us.

2.2 Eradication Pest Plants Activity Overview

2.2.1 Species worked against this period: Cathedral bells, Chilean rhubarb, climbing spindleberry, and woolly nightshade.

2.2.2 All of the above species are worked against throughout the year, but this period is the best for working on climbing spindleberry. Given its striking golden autumn foliage it is much easier to find in autumn and staff were able to find at least 11 new sites which had spread from historic populations by bird dispersal.

2.2.3 The annual WEEDS2.0 data report shows for all the species we are targeting for Eradication, 59% of all sites are at zero-levels. This is an improvement on last year's figure of 53%, and especially pleasing as there are five new species in this designation not previously controlled.

2.3 Progressive Containment – mapped Pest Plants Activity Overview

2.3.1 Species worked against this period: Banana passionfruit, contorta pine, Darwins barberry and old man's beard.

2.3.2 Old man's beard is known as the most damaging terrestrial pest plant in our Region, given the wide range of habitats it transforms, the entrenched populations across the middle of the Region and the cost required to control sites. The 2017-18 season saw an increase of sites we manage from 1,747 to 1,930. Even though the site numbers increased we were still able to increase the overall percentage of sites managed to zero-levels from 63% to 64%. If we look at this in terms of numbers of sites, we currently manage 1,930 locations and 1,238 are at zero-levels. Other metrics able to be drawn from our new WEEDS2.0 data set from the season show:

- A reduced rate of site expansion on previous years; 12% compared to 15%;
- In the Active Management Zone (AMZ) staff intensively search 3,117 hectares; and
- Of this area the plant cover is 33 hectares;
- Of which 26 hectares are adult plants.

2.3.3 The annual WEEDS2.0 data report shows for the Progressive Containment – mapped species category we have managed for the previous Strategy, 66% of all sites are at zero-levels. This is an improvement on last year's figure of 60%. In terms of numbers of sites, we currently manage 3,725 locations and 2,442 are at zero-levels.

2.4 Progressive Containment – un-mapped Production Pest Plants Activity Overview

2.4.1 Species we dealt with in this period are: blackberry, broom, nodding thistle and tutsan.

2.4.2 We have had a small number of complaints across the district and State Highway road networks that we have attended to for blackberry, broom and other 'Good neighbour' species.

2.4.3 The new Regional Pest Management Plan and the implementation of rules and programmes by local councils was the topic of a fruitful meeting with all the councils of the Region represented in Marton on 7 June. Councils are required under our RPMP to liaise with Horizons and via memorandums and/or Approved Management Plans (AMP) put forward and then report on yearly works against the RPMP pests on land they manage. The meeting agreed that a template AMP be created for councils to adopt or align their current work plans to. The first reports are due at the end of July 2019 and we expect AMPs to be worked up in the first quarter of this financial year. The table below shows the progress of engagement with the local councils and Crown.

Measure	Reporting Period						YTD Actual	Target	%
	1st	2nd	3rd	4th	5th	6th			
MOU/Liaison progress	1	0	2	0	1	7	11	11	100%

2.5 Response Activity Overview

2.5.1 Staff have been busy this year on three bodies of work under this programme: continuing surveillance work for velvetleaf, localised response to myrtle rust, and dealing with the news that Lake Snow, or at least the algae *Lindavia intermedia* that is able to form lake snow, has been in our Region since at least 2005.

2.5.2 Horizons received notification that on June 11 the Notice of Direction placed on 181 Guyton St (Wanganui Regional House) due to the discovery and subsequent removal of myrtle rust on the premise was revoked. This has returned the property to business as usual with the only requirement being to not compost any green waste from the garden.

2.5.3 Lake snow (*Lindavia intermedia)* was confirmed as present in our Region during the reporting period and created quite a bit of work involving consultation with many stakeholders within the Region and our neighbouring partners, due to the Lake Mowhango location implicating the Waikato river catchment. Our communications team worked across government and councils to

put together a communication plan which included press releases, meetings and web information.

2.5.4 The surveillance for velvetleaf was undertaken by farmers, staff and a Horizons-funded contractor using a detection dog. We plan to continue this approach in following years as all land owners are on board and proactively taking action to best manage velvet leaf by either good crop selection or allowing surveillance activity to take place.

2.6 Investigation and Surveillance Activity Overview

2.6.1 A permanent plot monitoring programme to assess change over time within select wilding conifer control areas was put in place according to national guidelines. Different control sites and types of ground cover were included so over time, we can assess both control site effectiveness and post- control vegetation change. We used GPS located photo points along 300-500 metre transects.

2.6.2 Staff assisted Sarah Jackman from AgResearch in the second round of data collection for the giant buttercup mowing trial. This involved a few different data collection methods. The first was a presence/absence count called the “winkle picker technique”. The second involved mowing 2.5 metre strips and collecting the mown grass for dry matter tests. The third was mowing a half of a square metre with an electric hand piece and collecting the grass for species identification and percentage composition. These measuring days occur twice yearly for the three-year trial.

2.6.3 Staff conducted National Pest Plant Accord (NPPA) inspections across the Region visiting all applicable retailers and finding nothing of concern. It was an opportune time to talk with owners of the stores and nurseries about myrtle rust.

2.7 Biological Control Activity Overview

2.7.1 No activity occurred during this period apart from a staff member noticing scotch thistles being attacked by green thistle beetles once their preferred Californian thistles die away over winter.

2.7.2 2017-18 was a very successful year for our biological control programme with world-first introductions of two agents against tutsan, the leaf beetle (3) and seed feeding moth (27), and a weevil against field horsetail (1). We also had introductions to the Region of a population of Japanese honeysuckle white admiral moth to Taumarunui (1), as well as three introductions of the privet lace moth to both Taumaraunui (2) and Levin.

2.7.3 Staff made transfers of the woolly nightshade lace bug to two locations in Whanganui, ragwort plume moth (3), green thistle beetles (16) and broom gall mites (4) across the Region.

2.7.4 Year-to-date progress of biological control site inspections and releases/transfers.

Measure	Reporting Period						YTD Actual
	1st	2nd	3rd	4th	5th	6th	
Monitor and report on bio-agent release sites: • **Sites inspected.**	0	7	40	12	3	0	62
Monitor and report on bio-agent new releases and re-distribution: • **New releases/transfers.**	3	3	30*	16	2	0	54

*Includes 27 tutsan moth releases not previously reported.

2.8 Awareness and Promotion Activity Overview

2.8.1 The main topics of enquiries during this period were:

- Production Blackberry
- Zero-Density Old man's beard
- Non-Strategy Ivy

2.8.2 This last period saw a number of articles produced via active press release or direct contact from the press around topics not included in the RPMP. Staff are often called upon to advise or assist land occupiers with left-field weed issues or provide information around the best way to act when out there enjoying our Region. The following table lists the topics picked up in the media last period.

ACTIVITY	WHAT
Media	Myrtle rust in Whanganui - Wanganui Chronicle
	CCD at duck shooting – Horowhenua Chronicle
	Milk weed sends landowners to hospital – Wanganui Chronicle
	Lake snow at Lake Moawhango – multiple articles across NZ and on RadioLive and Radio Waatea (an Auckland Urban Maori radio station).

2.8.3 Enquires were low despite a number of publicised responses (Figure 2). All myrtle rust enquiries were sent to MPI as per their protocol, and only a low number of "business as usual" type enquiries were received.

2.8.4 Staff were able to respond to 70% of all enquires within the expected timeframe. Over the 2017-18 year (Figure 3) we received a total of 350 enquires, a drop on last years, though the number does fluctuate from year to year.

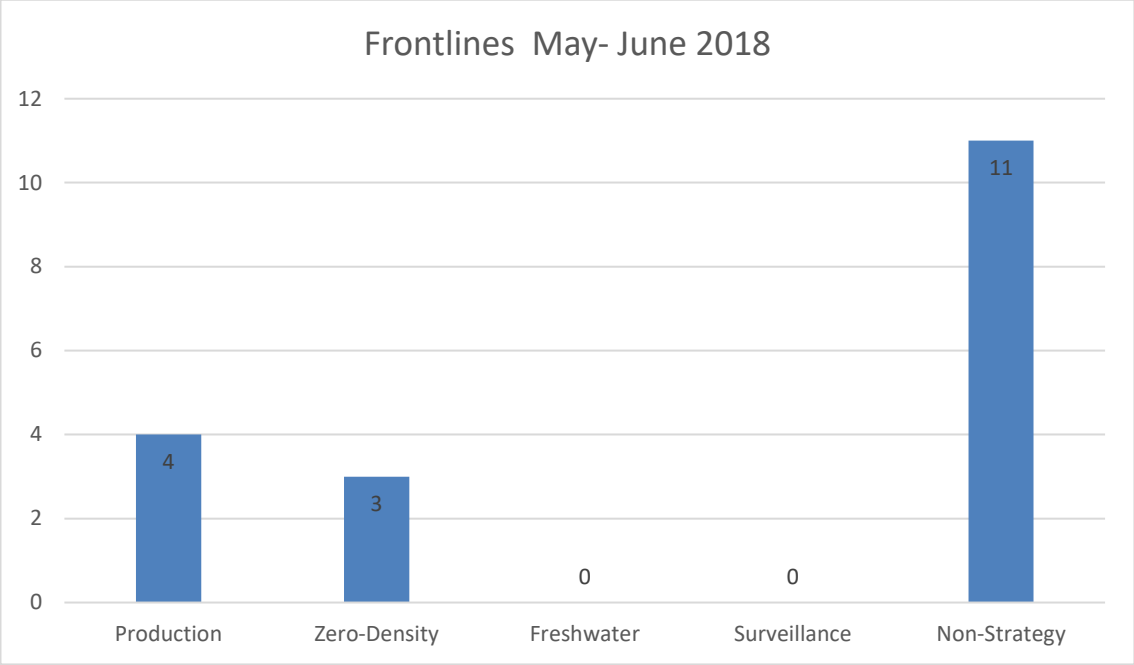

Figure 2 Pest plant enquiries summary - reporting period.

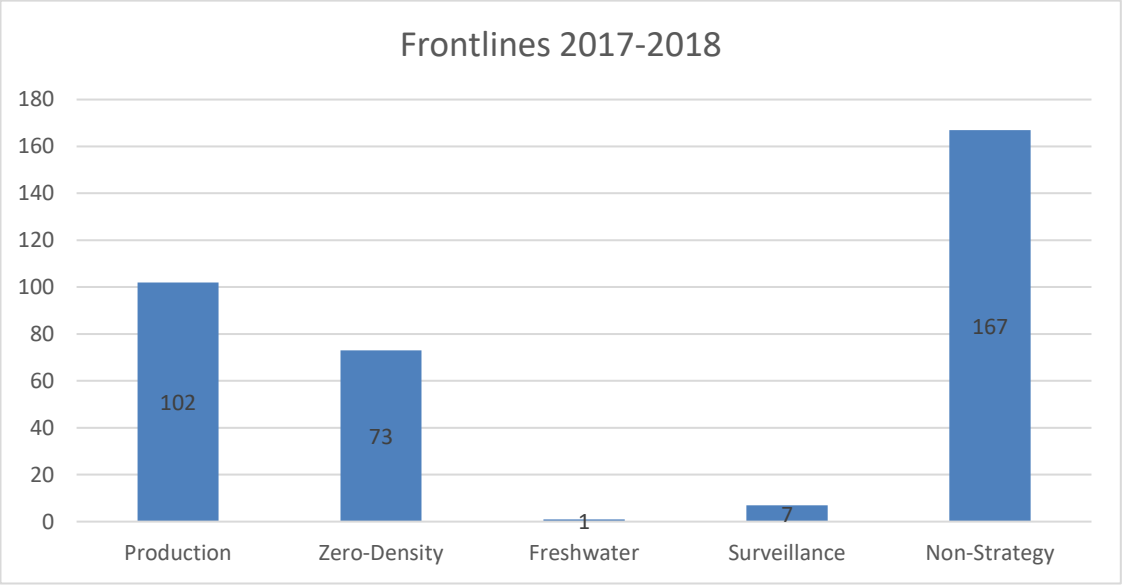

Figure 3 Pest plant enquiries summary – 2017-18

3 Activity Summary

Project	Key Deliverables	YTD Progress
Wilding Conifer - Central North Island Regional Steering Group (RSG) – Fund holder and Chair	Work with partners and other stakeholders re: 1. Planning for Management Unit activity and reporting 2. Bi-annual meetings scheduled	Met in August with Regional Steering Group (RSG) and wider stakeholders; held planning and update meeting along with two workshops; LINZ national Wilding Conifer Information System and Ministry of Primary Industry's (MPI) wildings programme and current best practice workshop. Funding received and work about to begin across the Kaimanawa Management Unit. Operations are ongoing with approximately 75% of budget used/area covered by end of February. Forecast and planning meeting held 4 April in Taupo. This year's work expected to run through until June. Group prepared for next funding request and business case to Treasury for years 4-8. Programme wrapped for year with all partners apart from DoC Taupo and Waikato Regional Council requiring funding.
Waimarino-Tongariro National Park Darwin's barberry control programme	Coordinated control across public and private land to increase the protection of previously cleared areas.	Programme completed on time during this period.
Rangitikei Horsetail Group	Assist group financially and with actions as required.	Funding for group contribution completed. A first 'soft' release of a very small number of weevils was made in Rangitikei District in November 2017. This involved school children from Clifton School in Bulls in a major release event organised by NZ Landcare Trust and Horizons.
Tutsan Action Group	Assist group financially and with actions as required.	Met in early August and endorsed application to Sustainable Farming Fund (SFF) for extension to project, which has been successful, for another three years of funding to assist with beetle breeding issues. Inspected early 2017 release sites of tutsan fruit moth for damage and none was found. Met again in December to coincide with Landcare Research assessment trip.
Desert Road Invasive Legume Control Group	▪ Relationship between parties maintained. ▪ MOU maintained and outworked ▪ Coordinated action in priority areas is undertaken against the target species	Meeting held on 17 October. No aerial photography this year – coordinated control programmes highlighted again.
Freshwater Pest Partnership Programme and Check, Clean, Dry (CCD) advocacy programme.	Representing Horizons at national forum to champion behaviour change and freshwater pest protection. Attendance at high-risk events and strong advocacy with the main users of waterways in our headwater areas.	Advocate out and about in Central Plateau. New North Island national coordinator role established and interviews finalised. MPI funded programme completed and reported on. Good tourist and local engagement achieved.

Craig Davey
ENVIRONMENTAL COORDINATOR – PLANTS

Rod Smillie
BIODIVERSITY, BIOSECURITY & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS

Annex C

Report No.	18-129
Information Only - No Decision Required	

SCIENCE & INNOVATION PROGRESS REPORT

1. PURPOSE

1.1. The purpose of this item is to introduce Members of Council's Environment Committee, the Science and Innovation Progress report for the period 1 May to 30 June 2018.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-129 and Annex.

3. FINANCIAL IMPACT

3.1. There is no financial impact associated with recommendations in this paper.

4. COMMUNITY ENGAGEMENT

4.1. The Science and Innovation work programme at Horizons is reported on publicly to the Environment Committee regularly throughout the year and also communicated via various forums and methods.

5. SIGNIFICANT BUSINESS RISK IMPACT

5.1. There is no immediate financial impact associated with this report.

6. SUMMARY

6.1. The Science and Innovation team will farewell team member Miriam Niessen, who is heading off to travel and work in Canada, in October. Miriam has been a valued member of the Biomonitoring Team for the past two years, recently taking over the co-ordination of the periphyton monitoring programme. We wish both Miriam and her partner Berni all the very best for their next big adventure.

6.2. Recruitment is now underway for a Research Associate to assist with the delivery of the biomonitoring programme.

6.3. Our Science Operational Plan 2018-19 is presented as a separate agenda item and sets out the planned work programme for this financial year. Along with delivery of core monitoring, research projects, and policy and implementation support, communication of our science will be a focus for the team. This includes the development of a strategy for science communication, and the launch of our State of Environment 2018 report prior to Christmas.

6.4. Highlights for 2017-18 included: delivery of core monitoring programmes; initiation of regional work programmes for stormwater and drinking water; regional reporting on water resource availability, state and trends of groundwater and surface water quality, groundwater levels, macroinvertebrates and periphyton, analysis of potential periphyton drivers and an assessment of regional swimability; fluvial surveying of the Manawatū Catchment; sediment transport investigations in the Oroua Catchment; a review of the

biodiversity programme and implementation of recommended changes; the release of new LAWA website modules; and delivery of around $176,000 of Envirolink-funded advice to support Horizon's science and implementation programmes.

6.5. Annual Plan performance targets were met and the programme, as set out in the Science Operational Plan for 2017-18, was largely delivered as designed. There was some adjustment to project timeframes for reporting, to allow staff to respond to emerging issues such as the Levin Depot fire and PFAS investigations which diverted staff time for periods of time throughout the latter half of the reporting year.

6.6. June 2018 was largely dedicated to the completion of programmed work, peer review of external technical work, and end of year reporting. Throughout the month, the team dedicated time to finalising the Science Operational Plan for 2018-19. With much of the technical work now complete, drafting of the State of Environment 2018 report is now a key focus from July 2018.

6.7. An investigation into the detection of PFAS in the Bulls public water supply is now underway. Initial sampling of bores in the vicinity of the Bulls water supply was completed in early July 2018, with results currently pending.

6.8. The Science and Innovation Activity Report accompanying this Progress Report provides an annual summary of the science work programme for 2017-18, as well as covering outputs for the month of June 2018.

7. SIGNIFICANCE

7.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Abby Matthews
SCIENCE & INNOVATION MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Science & Innovation progress report

SCIENCE & INNOVATION ACTIVITY

Annex A

1 Activity Overview

Horizons' Science and Innovation team oversees a board range of monitoring and research across a range of Council activities including Water Quantity and Quality, Land, Biosecurity and Biodiversity, and Environmental Reporting and Air Quality Monitoring.

Highlights for 2017-18 included: delivery of core monitoring programmes; initiation of regional work programmes for stormwater and drinking water; regional reporting on water resource availability, state and trends of groundwater and surface water quality, groundwater levels, macroinvertebrates and periphyton, analysis of potential periphyton drivers and an assessment of regional swimability; fluvial surveying of the Manawatū catchment; sediment transport investigations in the Oroua catchment; a review of the biodiversity programme and implementation of recommended changes; the release of new LAWA website modules; and delivery of around $170,000 of Envirolink advice to support Horizon's science programmes. State of Environment reporting is also underway and will be delivered later in 2018.

Performance measures, as set out in the Annual Plan 2017-18, required reporting to Council on progress five times during the year. Reports were delivered in August, October and December 2017, and February, April and June 2018. Please note that these performance measures have been reformatted for the purpose of this report, and that these measures change with the initiation of the new Long-term Plan from July 2018.

Measures include:

Measure	Reporting Period					YTD Actual	Target
	1st	2nd	3rd	4th	5th		
Undertake research and monitoring to:							
Track changes in the health of the Region's water resource *[1]	✓	✓	✓	✓	✓	100%	100%
Inform policy and non-regulatory programme development *[1]	✓	✓	✓	✓	✓	100%	100%
Assess policy implementation effectiveness *[1]	✓	✓	✓	✓	✓	100%	100%
Complete State of the Environment report	✓	✓	✓	✓	✓	100%	100%

Measure	Reporting Period					YTD Actual	Target
	1st	2nd	3rd	4th	5th		
including reviewing and updating environmental indicators*1							
Undertake policy and programme implementation effectiveness monitoring and provide input into programmes and policies that are in development*1	✓	✓	✓	✓	✓	100%	100%
Environmental information is made available to the public via Horizons' website, Environment Committee reporting and on request, including contributions to national level reporting*1	✓	✓	✓	✓	✓	100%	100%
Monitor and report on air quality*1	✓	✓	✓	✓	✓	100%	100%

**1 AP/LTP targets*

This report covers the final reporting period from 1 June to 30 June 2018, as well as providing an annual summary of activity completed throughout the reporting year.

2 Water Quantity and Quality

Water is an important resource that provides for the cultural, environmental and economic needs of our Region. The Science and Innovation team serves the Water Quality and Quantity activity of Horizons' Annual Plan through a range of science monitoring and research programmes that track changes in the water resource and inform decision-making around water management. A summary of the team's Water Quality and Quantity activity during 2017-18 is provided below.

2.1 Water Quantity

Surface Water

Seasonal Conditions

2.1.1 An early onset of low flows occurred in the Region's rivers and streams, with lower than normal rainfall recorded in December 2017. This resulted in rapidly decreasing river flows at a time when most irrigators are usually making the most of their consented water takes. At the peak of the dry spell (2 January 2018) restrictions were in place at nine monitoring sites. Throughout the remaining season, dry periods were relatively short-lived and rainfall events occurring throughout the season minimised low-flow restrictions for the majority of water users.

2.1.2 Throughout the year, levels of surface water allocation remained relatively stable with no significant new applications to take water received. Several large water permits, including Shannon and Taumaranui municipal water supplies, remain on hold awaiting provision of further information.

Allocation and Addressing Over-allocation

2.1.3 Work to resolve over-allocated catchments continued during the year. Work in this area focussed on resolving over-allocation in the Upper Manawatū Water Management Zones which are within the cumulative allocation overall, but five sub-zones are over-allocated. The Raparapawai, the Region's most over-allocated sub-zone (based on percentage) was resolved through consents granted in August 2017 following work with irrigators in this catchment. The new consents provide time for the irrigators to modify their infrastructure and the zone will be within allocation limits by 1 September 2018.

Water Metering

2.1.4 The water metering programme oversees the collection of records for compliance monitoring and to meet the needs of the National Water Metering Regulations. Additional resources were put in place during 2017-18 to increase the number of inspections, including maintenance and repairs.

Groundwater and Lakes

2.1.5 Groundwater levels continued to recover throughout 2017-18, following an extended period of reduced recharge from 2012-16. Above average rainfall for the year to October 2017 helped recharge groundwater aquifers, before what turned out to be an unusually dry November and December.

2.1.6 Throughout much of the Region, groundwater levels are tracking in the normal to high range. In areas of recent abstraction pressure, such as Santoft and Rongotea, levels have also shown signs of recovery but remain in the normal to low range based on our long-term data record. Groundwater level data was recently analysed for long-term trends which will be presented in the State of Environment 2018 report.

2.1.7 To understand the fluctuation of lake levels over time, Horizons monitors levels automatically every 15 minutes at Lake Horowhenua and Lake Koitiata. During the reporting year manual monitoring was carried out on the levels of Lakes Poroa, Dudding, Pauri, Wiritoa, Westmere and Kohata.

2.1.8 An Envirolink-funded project, completed by Aqualink, investigated the application of Eigenmodelling for groundwater level forecasting. This approach will require further testing and development but initial results are encouraging, with model forecasts of up to 30 days showing good reconciliation with monitored data. A copy of the following report is now being finalised and copies can be made available on request:

Rutter, H., KC, B. and Weir, J. (2018). Groundwater Level Forecasting. Aqualinc Research Limited Client report prepared for Horizons Regional Council, July 2018.

2.1.9 Reporting on groundwater and surface water allocation was presented to Horizons' Environment Committee via the October 2017 Science and Innovation Activity report and included an overview of potential options for integrated management of the water resource.

2.2 Water Quality

Surface Water

2.2.1 The SoE and Discharge monitoring programme was completed, with additional water quality parameters included from April 2018 to provide essential information for our Catchment Characterisation programme (refer Section 2.4).

2.2.2 Water quality is monitored at 15 lakes in the Region. Eleven lakes have been monitored by helicopter since 2015 and Lakes Dudding, Wiritoa and Pauri have been monitored quarterly by boat since 2014. Lake Horowhenua has been monitored monthly by boat since 2013 and also has had a permanent monitoring buoy deployed for continuous monitoring for a range of parameters at various water depths. However, security issues since mid-2018 require the lake to be monitored by helicopter.

2.2.3 Results from these programmes have been analysed for the State of Environment 2018 report and a draft state and trend report is now being reviewed, with information to be presented later in 2018.

Groundwater

2.2.4 Groundwater quality monitoring was completed at 31 sites on a quarterly basis. State and trend analysis was completed during the reporting year, with the results due to be published in the State of Environment 2018 report later this year.

2.2.5 Planning for the 2018 National Pesticides Survey is now underway. It will include additional monitoring for analytes such as glyphosate (found in Round-up) and a suite of emerging contaminants found in animal and human effluent discharges. Further information about the survey was presented to the Environment Committee in the June 2018 Science and Innovation activity report.

Swim Spots

2.2.6 Swim spot monitoring was completed at 82 popular recreation spots at lakes, rivers and beaches across the Region from early November 2017 to late April 2018. Our Swim Spot public campaign was also delivered, while monitoring data was regularly published to both Horizons' and the LAWA websites.

2.2.7 To identify potential sources of bacteria, faecal source tracking was completed at a number of sites in the Region including Whanganui coastal streams (primarily ruminant, but also avian sources),

Lake Dudding (only an avian source was detected at the time of sampling) and Hokowhitu Lagoon (a mixture of sources including human, dog and avian). A summary of the Swim Spot programme and faecal source tracking was presented in the June 2018 Environment Committee Science and Innovation Activity report. This reporting has been used to inform future areas of research and both Land and Freshwater implementation programmes.

2.3 Biomonitoring

Periphyton

2.3.1 Periphyton monitoring is carried out at 63 sites in the Region and the programme has now been running for seven years, providing us with the largest – and most comprehensive – periphyton dataset in the country. To follow on from the regional state and trend analysis of periphyton data (completed in 2016-17), further analysis of the data was undertaken to establish potential drivers of periphyton in the Horizons Region.

2.3.2 The drivers report has significantly advanced our understanding of the relationships between nutrient, flows and periphyton, and produced "look up" tables that identify nutrient concentrations for specific periphyton outcomes. This work has been picked up and used as a case study for the Ministry for Environment report A Draft Guide to the Periphyton Attribute Note: Under the National Policy Statement for Freshwater Management 2014 (amended 2017).

2.3.3 The following report on periphyton drivers by NIWA, DairyNZ and Horizons is now complete:

Kilroy. C., Greenwood, M., Weh, J., Stephens, T., Brown, L., Matthews, A., Patterson, M. and Patterson, M. (2018). *Periphyton - environment relationships in the Horizons region: Analysis of a seven-year dataset*. NIWA Client Report 2018123CH prepared for DairyNZ and Horizons Regional Council, March 2018.

2.3.4 A 2017-18 Envirolink-funded report detailing literature reviews and experiments carried out by NIWA has determined that increasing concentrations or proportions of ammoniacal nitrogen in river waters below the levels known to be toxic to aquatic life lead to faster periphyton growth and greater biomass than equivalent increases in nitrate-nitrogen.

2.3.5 Point source discharges from wastewater treatment plants (WWTP) often contribute only a small amount of the total nitrogen (N) load in a catchment compared to contributions from diffuse discharges (ie., land use). Nitrogen can exist in many different forms in the environment and in low oxygen environments, such as downstream of WWTPs, nitrogen often exists as ammoniacal nitrogen (NH_4) which has long been known to be more readily assimilated by algae than nitrate. This results in faster growth and potentially larger total amounts of biomass.

2.3.6 The experiments showed that at high proportions of ammoniacal nitrogen (77%) compared to nitrate, periphyton chlorophyll a developed faster, and had a higher peak biomass compared to a relatively low proportions of ammoniacal nitrogen vs. nitrate. A copy of the full report is now available:

Kilroy, C., Sinton, A. Wech, J., Lambert, P. and Carlin, L. (2018). *Stimulation of river periphyton growth by ammoniacal-N vs. nitrate-N: An experimental investigation*. NIWA client report prepared for Horizons Regional Council, June 2018.

Macroinvertebrates

2.3.7 Macroinvertebrate communities are widely used as indicators of stream ecosystem health because they include a wide range of species, each with relatively well-known sensitivity or tolerance to stream conditions. The most common stream health indices are taxa richness, percentage of EPT taxa and the Macroinvertebrate Community Index (MCI).

2.3.8 Aquatic macroinvertebrate monitoring is undertaken annually in the Horizons Region and state and trends are reported on following the analysis of samples. Of the 88 sites monitored in 2017, 20 (23%) were classed as excellent, 38 (43%) were classed as good, 22 (25%) were classed as fair and 8 (9%) were classed as poor. These included:

- Mangatera Stream at Timber Bay (Site 13);
- Hautapu River at Papakai Road (Site 50);
- Hautapu River upstream Rangitikei confluence (Site 51);
- Arawhata Stream at Hokio Beach Road (Site 71);
- Hokio Stream at Lake outlet weir (Site 72);
- Manganaonao Stream at Kuku Beach Road (Site 80);
- Manakau Stream at Cemetery; and
- Owahanga at Branscombe Bridge (Site 87).

2.3.9 Sites in good or excellent condition tend to be located in the upper parts of the catchments. Sixty-two sites had sufficient data (six or more years) to undertake trend analysis. Of these, 23 showed statistically significant trends in MCI at face value, with six negative and six positive trends (Table 1). After additional analysis however, only two statistically significant trends remain (Whanganui River at Pipiriki and Hautapu River upstream of Rangitikei).

Table 1 Improving and degrading sites for MCI in the Horizons Region (bold indicates sites with the strongest trends, after the Benjamini-Hochberg FDR procedure was applied).

Improving Sites	Degrading Sites
Whanganui River at Pipiriki	**Hautapu River upstream Rangitikei**
Whanganui River @ Te Maire	Oruakeretaki Stream @ SH2
Mangatainoka River @ SH2 Bridge	Mangatainoka River u/s Tiraumea Confluence
Manawatu River @ Teachers College	Tamaki River @ Stephensons
Kahuterawa Stream @ Johnstons Rata	Tokiahuru Stream @ Karioi
Ōhau River at Gladstone Reserve	Owhahanga River @ Branscombe Bridge

2.3.10 Further detail is available in the June 2018 Environment Committee Science and Innovation Activity Report, and the following report is also available:

Stark, J. (2018). *Aquatic invertebrate communities of the Manawatu – Wanganui Region – Trends in river health (1999 – 2017)*. Stark Environmental Client Report prepared for Horizons Regional Council, February 2018.

2.3.11 In additional to this annual state and trend reporting, Horizons – in partnership with DairyNZ and NIWA – is currently undertaking an analysis of our regional data to determine drivers of macroinvertebrate health. This work will be ongoing throughout 2018.

Fish Data Review

2.3.12 Horizons commissioned the he Cawthron Institute to work with **Wellington Fish and Game Council** (WF&G) to undertake a stocktake of freshwater fish data held by WF&G and identify how Horizons might be able to incorporate this data into work streams.

2.3.13 The stocktake concluded that while the existing data is not spatially extensive or specifically targeted enough to be useful for policy effectiveness monitoring or SoE reporting in a broad sense, the data may be useful for applications such as catchment report cards, or to help guide the development of a more comprehensive fish monitoring programme. The stocktake also highlighted a number of opportunities for collaborative and targeted studies in the future. Further information is available in the February 2018 Environment Committee Science and Innovation Activity report. A copy of the full report is also available:

Shearer, K. and Waters S. (2018). *Review of freshwater fish data in Horizons Region*. Prepared for Horizons Regional Council and Wellington Fish & Game Council. Cawthron Report No. 3003. 25 p plus appendices.

2.4 Catchment Characterisation

Field Investigations

2.4.1 The overall management of freshwater relies on a good fundamental understanding of catchment geology and hydrology. Work completed during the reporting year included: continuation of the Ohau and Waikawa study which is now in its third year of intensive monitoring; initiation of a similar investigation in the Rangitikei catchment in partnership with NIWA, GNS Science, Landcare Research and Massey University; and further analysis of age tracers and isotopes to quantify lag times from land to water in these catchments. Information about water age was presented to the Environment Committee in the June 2018 Science and Innovation Activity report.

Massey PhD Studies

2.4.2 Scoping of up to three PhD studies is underway as part of Horizons' collaborative research partnership with Massey University. These studies are expected to begin in 2018-19.

2.5 Water Resource Study

2.5.1 A Regional Growth Study, implemented by Accelerate25 for the Horizons Region, identified a number of priorities and opportunities to increase its economic potential, some of which require sufficient water to be available. During 2017-18 we contracted Pattle Delamore Partners Ltd. to compile required information that Horizons holds regarding water resources availability across the Region. A report is currently being drafted and is scheduled for delivery in September 2018.

2.6 One Plan and NPS-FM Implementation

2.6.1 A range of work across the Science and Innovation work programme contributed to implementation and effectiveness monitoring of Horizons One Plan and National Policy Statement for Freshwater Management. In 2017-18 this included production of regional resource accounts and ongoing support for the joint Foundation for Arable Research (FAR) and HortNZ's fluxmeter project.

2.6.2 In addition to these projects, NIWA also completed a literature review summarising known information on dissolved oxygen (DO) requirements and potential DO thresholds for New Zealand native fish and invertebrate species, as well as trout. Analysis of continuous DO data recorded over the past six years from six monitoring sites showed that daily minimum dissolved oxygen saturation met the One Plan target 90% of the time at all six monitoring sites, and met the NOF A/B guideline 75% of the time. Further information is available in the December 2017 Environment Committee Activity Report and in the following report:

Graham, E. and Franklin, P. (2017). Dissolved Oxygen Thresholds and Management. NIWA Client Report prepared for Horizons Regional Council, June 2017.

Singh, R. and Elwan, A. (2017). Resource Accounting in the Manawatū-Whanganui Region. Massey University Client Report prepared for Horizons Regional Council, July 2017.

2.7 Drinking Water

2.7.1 Ensuring the security of drinking water supplies requires collaboration between territorial authorities, water suppliers, public health offices and Horizons. A new work programme initiated during 2017-18 seeks to ensure that all parties are aware of any risk associated with each supply, that their roles and responsibilities are understood, and that there is adequate flow of information to ensure each agency is meeting its requirements.

2.7.2 A regional stocktake and risk assessment of drinking water supplies was completed by Pattle Delamore Partners Ltd. in consultation with staff at Horizons, local Territorial Authorities and Midcentral Health. It identified a number of water supplies in the Region that were of medium-high risk for failing to meet the requirements for public water supplies. Further work is now underway to ensure regional water supplies are able to meet these requirements, with additional

funding introduced through Horizons LTP 2018-28. Further information can be found in the following report:

Pattle Delamore Partners Ltd. (2017). Community Drinking-Water Supply Assessment in Horizons Region. Pattle Delamore Partners Ltd. Client Report prepared for Horizons Regional Council, November 2017.

2.8 Swimability

2.8.1 During the reporting year, a regional case study report on progress toward improving swimability was prepared jointly by Dr Ton Snelder of LWP, for the Ministry for the Environment and Horizons. The report provided a regional comparison to targets for swimming in New Zealand's lakes and rivers established as part of the National Policy Statement for Freshwater Management (NPS-FM) in 2017, focussing on pathogen and sediment indicators over 10 and 7 year periods that ended in 2016.

2.8.2 A video of the report author, Ton Snelder, discussing the project findings is available on Horizons' website, along with a copy of the following report:

Snelder, T. (2018). Assessment of recent reductions in *E. coli* and sediment in rivers of the Manawatū-Whanganui Region: Including associations between water quality trends and management interventions. LWP Client Report 2017-06.

2.9 Stormwater

2.9.1 Communities and stakeholders across New Zealand are becoming increasingly aware of the impacts of urban discharges and land use on our waterways and coastal waters. To ensure that these impacts are being adequately addressed and that agencies are meeting the requirements of both national and regional policy, Horizons commissioned Morphum Environmental Ltd. to complete a GAP Analysis for stormwater management in urban centres across the Region.

2.9.2 The aim of the report was to provide an informed understanding of the current status quo with regard to stormwater and identify opportunities to implement programnes and/or actions which support a comprehensive understanding and transition towards improved management of urban stormwater. Further information is available in the following report:

Morphum Environmental Ltd. (2018). Regional Stormwater Management GAP Analysis. Morphum Environmental Ltd. Client Report prepared for Horizons Regional Council, May 2018.

2.10 Lakes Research

2.10.1 The objective of Horizons' lake monitoring and research programme is to provide information that defines the current state of water quality and ecological condition of a selection of the Region's lakes, and measures changes in their health.

2.10.2 During 2017-18 delineation of a capture zone and water balance for Lake Koitiata, which has several years of continuous lake level data to inform the water balance model, was completed by Jacobs Ltd.

Jacobs. (2018). Lake Koitiata Water Balance. Jacobs Client Report prepared for Horizons Regional Council, June 2018.

2.10.3 During 2017-18 we initiated a work programme to develop and implement a comprehensive regional strategy for the management of the Region's lakes. This will combine management of water quality, biodiversity values and biosecurity of regional lakes and their catchments. A system to prioritise lakes based on these and other key criteria will be developed and form the basis for regional management.

2.10.4 Horizons has an annual work programme in place with NIWA to learn more about the ecological condition of the Region's lakes. Lake SPI uses Submerged Plant Indicators (SPI) to assess the ecological condition of New Zealand lakes.

2.10.5 A Lake SPI index ranges from 0% (heavily impacted lakes) to 100% (pristine, unimpacted lakes) and provides five descriptive categories of condition. Lake SPI complements traditional water quality monitoring such as Trophic Level Index (TLI) by providing ecological information. Lake SPI field work for this year was completed in December 2017 with nine new lakes assessed and two lakes reassessed. This brings the total number of lakes assessed for Lake SPI to 31. The Horizons Region has more than 220 lakes. Results for 2017-18 are presented in the following report:

Burton, T. (2018). Assessment of 31 lakes in the Manawatu-Wanganui Region using LakeSPI. NIWA Client Report prepared for Horizons Regional Council, June 2018.

2.10.6 Horizons is participating in the national 'Lakes380 – Our lakes' health: past, present, future' project is now underway. Funded by MBIE, the project is run jointly by GNS Science and Cawthron Institute in partnership with iwi and hapū, and supported by several regional councils. Lake sediments act as a natural archive for water quality and biodiversity, and this project aims to characterise New Zealand's lakes "by uncovering their environmental history from sediment cores taken from 380 lakes" around NZ, of which 22 are located in the Horizons Region. A range of techniques will be employed to characterise both historic and current lake health and investigate the rate and cause of changes over the past 1,000 years. Further information is available in the April 2018 Environment Committee report and at https://lakes380.com/.

2.10.7 Two reports exploring restoration options for shallow and deep lakes in the Horizons Region were funded through Envirolink during 2017-18. The following reports are now being finalised and can be made available on request:

Waters, S., Kelly, D., Doehring, K. and Floerl, L. (2018). Restoration planning for deep dune lakes: data review and recommendations. Cawthron Client Report prepared for Horizons Regional Council, June 2018.

Waters, S., Kelly, D., Doehring, K. and Floerl, L. (2018). Restoration planning for shallow dune lakes: data review and recommendations. Cawthron Client Report prepared for Horizons Regional Council, June 2018.

2.11 Coastal and Estuarine Environments

Coast

2.11.1 A stocktake of Horizons coastal environment was complete by NIWA during 2017-18 with funding from Envirolink. The report presents a compilation of existing accessible baseline information and knowledge on the Region's open coastal waters and provides recommendations for further information that may be obtained for the Region. The report identifies 16 information gaps and suggests a two-phase approach to addressing these gaps. Further detail is provided in the February 2018 Environment Committee Science and Innovation Activity report. A copy of the full report is also available:

MacDiarmid, A., Milne, J., MacDonald, I. and Rickard, G. (2018). A Review of Available Information for the Open Coastal Waters of the Manawatu-Whanganui Region. NIWA Client Report prepared for Horizons Regional Council, January 2018.

Estuaries

2.11.2 Estuaries are important coastal receiving environments of high ecological and recreational value. However, increased nutrient and sediment loads can degrade these important habitats. Following an initial vulnerability assessment of all the Region's estuaries for eutrophication and sedimentation in 2016, an ongoing programme is now being delivered for several estuaries in the Region.

2.11.3 During 2017-18, estuary mapping included fine-scale mapping of the Manawatū estuary, broad-scale mapping of the Rangitikei estuary, sediment monitoring in the Whangaehu estuary, and synoptic surveys for Ohau and Waikawa estuaries. Broad-scale habitat mapping of the Rangitikei estuary focussed on sedimentation and eutrophication issues as well as habitat modification. Overall, the Rangitikei estuary was scored at a moderate state.

2.11.4 The Ohau estuary was surveyed in March 2018. Combining the survey results with the last two years of chlorophyll *a* data collected by Horizons' fortnightly investigation programme in this catchment resulted a moderate score for eutrophication issues.

2.11.5 Synoptic monitoring of the Waikawa estuary revealed eutrophication symptoms were moderate, taking into account this survey and the monitoring data collected by Horizons throughout the year, which show the presence of microalgae blooms. Overall, the estuary rates at a moderate risk.

2.11.6 Further detail about Horizons' estuary mapping is provided in the June 2018 Environment Committee Science and Innovation Activity report. Copies of the following reports are also available:

Robertson, B. and Robertson, B. (2018). Ōhau Estuary Synoptic Intertidal and Subtidal Survey 2017-18. Wriggle Ltd. Client Report prepared for Horizons Regional Council, June 2018.

Robertson, B. and Robertson, B. (2018). Waikawa Estuary Synoptic Intertidal and Subtidal Survey 2017-18. Wriggle Ltd. Client Report prepared for Horizons Regional Council, June 2018.

Stevens, L. (2018). Rangitīkei Estuary 2018 Broad-Scale Habitat Mapping. Wriggle Ltd. Client Report prepared for Horizons Regional Council, June 2018.

3 Land

Land Activity covers both the Land Management and Fluvial programmes and provides technical support to Horizons' main land-based initiatives: our **Sustainable Land Use Initiative** (SLUI) and River Management programme. Land Activity also informs One Plan implementation and policy development for both wastewater and nutrient management.

Fluvial surveying of the Manawatū River was undertaken during 2017-18, while research focused on supporting the review of the SLUI programme; advancing a **National Science Challenge** (NSC) project investigating the transport of sediment and its effects within the Manawatū and Whanganui catchments; and initiating a work programme with Landcare Research and Massey University to further investigate sedimentation rates in the Oroua River, including analysis of changes in sediment deposition over a decade from 2006 and sediment source tracking using fingerprinting techniques and geochemical analysis. Delivery of a regional wastewater workshop was a further highlight.

3.1 Gravel Use Monitoring and Reporting

3.1.1 Quarterly processing of gravel use records helps us monitor the amount of gravel being utilised and ensure that targeted rates for gravel use (gravel levies) are appropriately calculated.

3.1.2 Gravel use records collected at the end of the fourth quarter of the 2017-18 financial year (Figure 3) show that less gravel has been taken than the same quarter in previous years, though the overall revenue for 2017-18 is similar to the previous financial year.

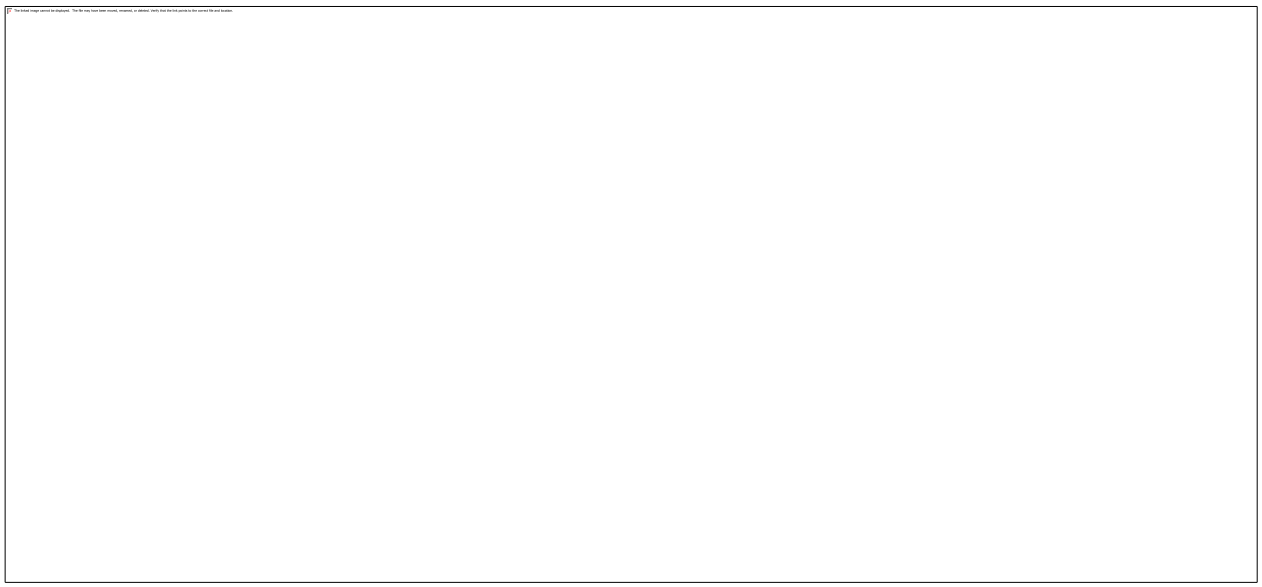

Figure 3 Plot showing amount of gravel taken through consented takes in each quarter since mid-2011, including the (currently estimated) fourth quarter of 2017-18 financial year. Q1 = July to September, Q2 = October to December, Q3 = January to March, Q4 = April to June.

3.2 Manawatū Fluvial Survey

3.2.1 The fluvial survey programme provides information on the changes in levels of aggradation or degradation of river channels and berms. During 2017-18, cross-sectional surveying was carried out along the Manawatū River from Ashhurst to the Tasman Sea.

3.2.2 An updated cross-sectional survey of both phases of the river will be used to assess further changes to the geomorphology, and sediment and gravel movement through the channel, with a focus on whether reducing the gravel take allowance has reduced the degradation in the upper reaches. This will be used alongside LiDAR data to further understand rates of sedimentation in the lower reaches.

3.3 SLUI Support

3.3.1 The Science Programme informs both the implementation and future direction of Horizons' **Sustainable Land Use Initiative** (SLUI), including a current review of the efficacy of the SLUI programme. To support the review, during 2017-18 Horizons contracted Landcare Research to deliver two reports. The first report provides current SedNetNZ model predictions of long-term sediment loss reduction resulting from SLUI works, incorporating the latest farm plan works. This includes an update to future climate change scenarios for sediment loss and predictions of the effects of SLUI on water clarity. The second report uses predictive models to include the potential impact of SLUI on reducing phosphorus, nitrogen and *E. coli* loads in rivers using three different approaches. Copies of the reports are now available:

Basher, L., Spiekermann, R., Dymond, J., Herzig, A., Hayman, E. and Ausseil, A. (2018). SedNetNZ, SLUI and contaminant generation: Part 1 Sediment and Water Clarity. Manaaki Whenua – Landcare Research Client Report prepared for Horizons Regional Council, March 2018.

Spiekermann, R., Dymond, J., Manderson, A. and Basher, L. (2018). SedNetNZ, SLUI and contaminant generation: Part 2 Nitrogen, phosphorus and *E. coli.* Manaaki Whenua – Landcare Research Client Report prepared for Horizons Regional Council, April 2018.

3.3.2 The SLUI review is also informed by findings from: (1) the sediment transport work programme (Section 3.4) to assess the suitability of LiDAR and sediment fingerprinting techniques used to identify sources of sediment; and (2) the Regional Swimability project (Section 2.8) which assesses the impact of SLUI on water quality outcomes.

3.4 Spotlight On… Sediment Transport Research

3.4.1 The processes of accumulation, degradation and transport of sediment in a river channel are important to understand, both for the purposes of water quality and effects on the ecological community as well as flood protection and managing erosion. During 2017-18 this programme focussed on two novel approaches to better understand the sources and movement of sediment in the Oroua catchment: sediment fingerprinting to identify sources of sediment; and identification

of areas of sediment accumulation and degradation within the river channel using LiDAR-derived digital elevation models (DEMs).

3.4.2 Sediment fingerprinting was completed by Dr Simon Vale at Manaaki Whenua - Landcare Research, who collected samples from several potential sediment sources in the catchment, and within the river (the sediment "sink"), as shown in Figure 1 below.

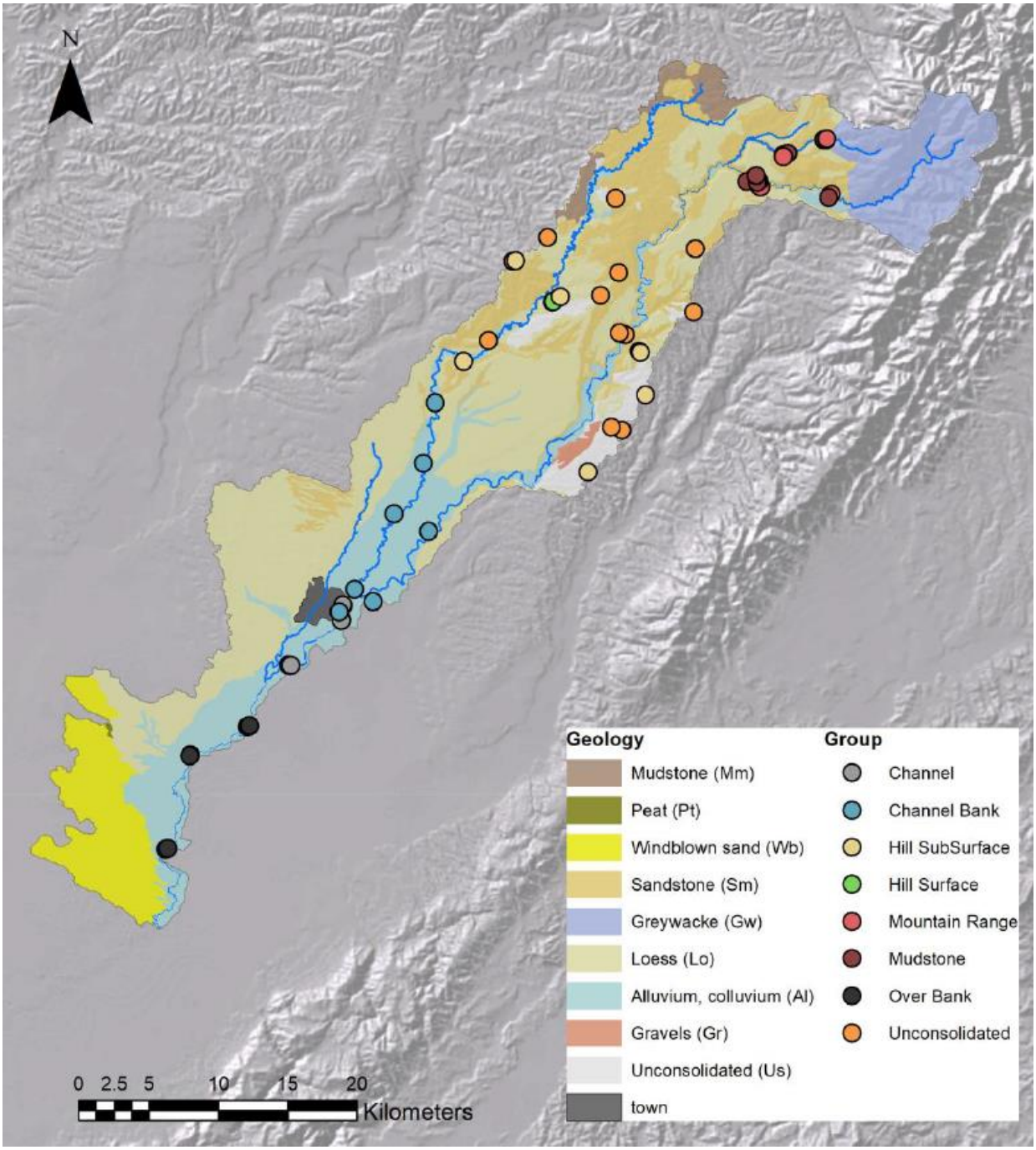

Figure 1 Sediment sampling locations in the Oroua catchment.

3.4.3 Laboratory analyses for particle size, geochemical, radionuclide and mineralogy are then carried out on the samples and this data is used to characterise the sediment sources and derive relative sediment source contributions to the in-stream samples.

3.4.4 The samples taken were able to be geochemically characterised and the findings from the report showed that hill subsurface (31-37 %) and unconsolidated sediment sources (26-27 %) were the dominant sources contributing to sediment deposition in the river. The main sources related to land management areas were hill surface and subsurface (38-45 %). These areas were mostly steep hill country and agricultural land. Natural erosion sources were mountain ranges and mudstone which accounted for 18-25 % of the sediment.

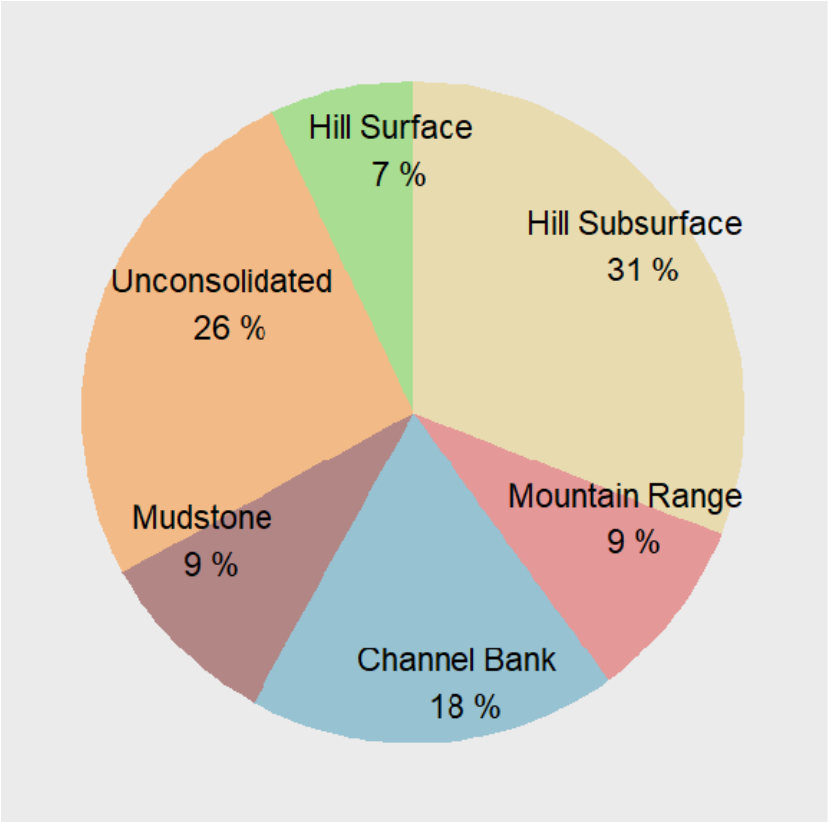

Figure 2 Pie graph of sediment source contribution estimates from all sediment size fractions (Model 2).

3.4.5 Horizons holds Light Detection and Ranging (LiDAR) data for the Oroua River collected in 2006 and again in 2016. The possibility of using those datasets to determine sediment volume changes over that time was explored by Dr Ian Fuller and Dr Robert Dykes at Massey University. The LiDAR data was used to generate digital elevation models (DEMs) from which a DEM of Difference (DoD) was created. The DoD can show differences in elevation between the two datasets (2006 and 2016) and therefore difference in volume of sediment. Supporting datasets of aerial photography and cross-section surveys were used to verify the results. The results showed that DEMs created from LiDAR data could be used to identify morphological changes in a river system; however, a degree

of error arises from the creation of DEMs. The total volumetric change in the river over the 10-year period was calculated as a net increase of 130,068 ± 530,209. In general, deposition has occurred in the upper reaches and erosion has occurred in the lower reaches as shown in Figure 3 (note that Reach 1 is at the confluence with the Manawatu River).

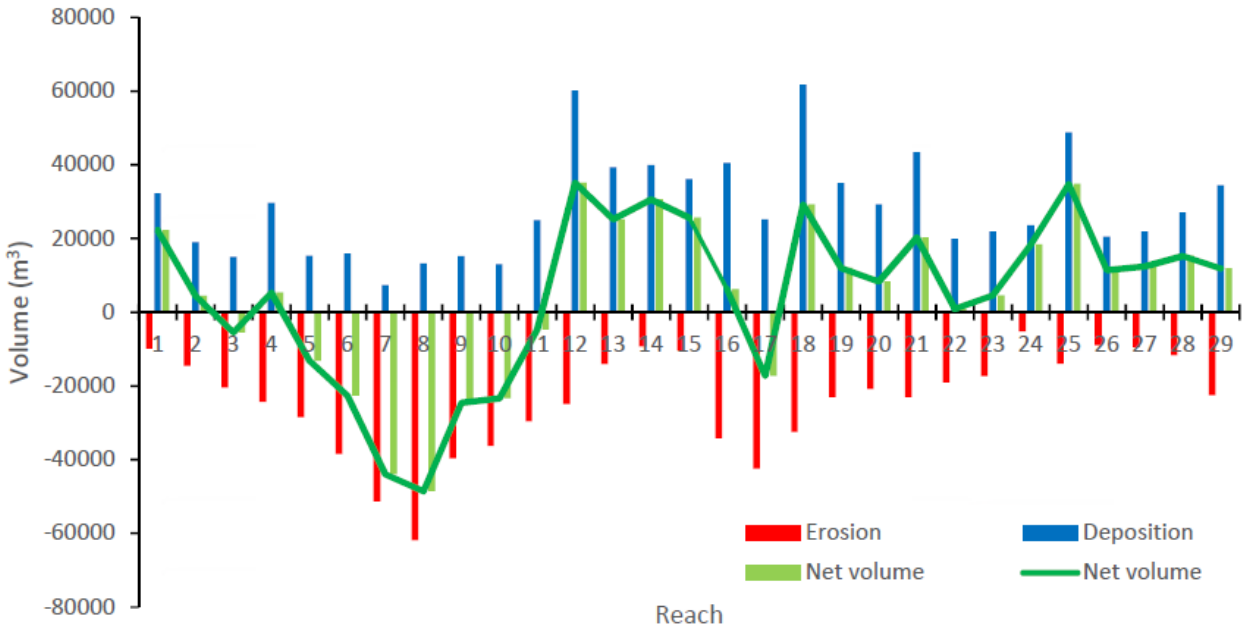

Figure 3 Conservative DoD sediment volume changes within reaches of the Oroua River

3.4.6 Copies of the following reports are being finalised and copies (including the journal paper) can be organised on request:

Dykes, R. and Fuller, I. (2018). Assessment of LiDAR for detecting changes in floodplain morphology and sediment movement in the Oroua River. Massey University Client Report prepared for Horizons Regional Council, May 2018.

Dymond, J. and Vale, S. (2018). An event-based model of soil erosion and sediment transport at the catchment scale. Geomorphology 318, 240-249.

Vale, S. (2018). Quantifying sediment sources of floodplain deposits in the lower Oroua River using sediment fingerprinting. Landcare Research Client Report prepared for Horizons Regional Council, June 2018.

4 Biosecurity and Biodiversity

Biosecurity and biodiversity management are core functions of Horizons that add significantly to the environmental, economic, social and cultural prosperity of the Region, by enhancing the quality of indigenous ecosystems and reducing the impacts of pest plants and animals. This group of activities includes Horizons' species-led pest plant and pest animal control (Biosecurity function) and the protection of bush and wetlands though site-led approaches, including support of community biodiversity programmes (Biodiversity function).

The work programme for 2017-18 included a contribution to finalising the new Regional Pest Plan, and initiation of a review of the Biodiversity programme around Bush Remnants and Wetlands, to increase efficiency and effectiveness of the biodiversity monitoring programmes which will be ongoing in 2018-19.

4.1 Forest Fragments and Wetlands Monitoring

4.1.1 During 2017-18, Manaaki Whenua – Landcare Research reviewed Horizons' wetland monitoring protocols and processes to assess consistency with nationally proposed wetland monitoring guidelines. Recommendations include: (1) reassessing the Top 100 wetlands, using information subsequently gathered, to ensure representativeness of different wetland types and forms across the Region; (2) rationalising the monitoring programme; and (3) identifying representative wetlands for SoE and policy effectiveness monitoring, and developing a sampling strategy for this monitoring. This information is summarised in report:

Clarkson, B. (2017). Horizons wetlands monitoring protocols and processes: review. Landcare Research report prepared for Horizons Regional Council, August 2017.

4.1.2 A review of Horizons' Bush Remnants Monitoring Protocol, developed by Horizons in 2016, was completed by Peter Handford (Groundtruth) during the reporting year. The monitoring protocol was found to be suitable for initial monitoring of changes in bush remnants, is practical and quick (requiring only a single visit), and is relatively simple to understand and communicate. The current approach enables us to monitor aspects (eg., understory) likely to show important short-term change, although it lacks an assessment of mature tree canopy health. Summaries of monitoring data could be enhanced. Further information from the review was provided in the June 2018 Environment Committee Science and Innovation Activity Report, and a copy of the following report is also available:

Handford, P. (2018). Monitoring the One Plan Biodiversity Policy: A Desktop Review of the Proposed Approach. Groundtruth Client Report prepared for Horizons Regional Council, March 2018.

4.2 Biodiversity Implementation Support

4.2.1 A series of projects to support the implementation of Horizons' Biodiversity Programme are now underway.

4.2.2 The first stage of this work programme is to complete a stocktake and review of current processes, tools and site inventory. A series of workshops was held in early 2018 to define and document a range of processes and protocols concerning active management and decision-making for the high-value biodiversity sites in the Region. Local expert Peter Handford (Groundtruth) has been engaged to facilitate and document the outcomes of these workshops. The final workshop was scheduled for June to discuss draft findings and recommendations, after which the report will be finalised and made available to Council upon completion.

4.2.3 Nick Singers (NSES Ltd.) has been contracted to complete the Singers and Rogers potential ecosystem mapping process for the Region. Developed by the Department of Conservation and now adopted by most regional councils, this process draws on a wide range of resources available that describe both the biotic and abiotic attributes of ecosystems. Migrating to this system has the potential to introduce a range of opportunities for Horizons, including improvements to non-regulatory protection initiatives. This work contributes to the combined initiative between the Science and Innovation and Biosecurity, Biodiversity and Partnerships teams to complete a biodiversity stocktake for the Region.

4.3 Totara Reserve Bird Monitoring

4.3.1 Annual bird monitoring in Totara Reserve Regional Park was completed in December 2017. This round of monitoring is the first applying an improved methodology recommended by Wildlands following a review of the monitoring protocol in 2017.

4.3.2 Fifteen indigenous and 17 introduced bird species were recorded in 2017, including kārearea (bush falcon), pōpokatea (whitehead), kererū (wood pigeon), pīpīwharauroa (shinning cuckoo), riroriro (grey warbler) host parents; and sulphur-crested cockatoo were heard throughout all three zones. Native to Australia, these birds have established populations in Pohangina, Port Waikato and Turakina. Further information is available in the April 2018 Environment Committee report.

4.4 Groundwater Ecosystems

4.4.1 An Envirolink-funded report on groundwater ecosystems has been completed by NIWA for use by Regional Councils to better integrate groundwater ecosystem values into their planning documents. Groundwater ecosystems (GEs) include microbes, biofilms and aquatic invertebrates (stygofauna) that provide important ecosystem services such as water purification and nutrient recycling. The main threats to GEs from human activities are changes in organic carbon and DO concentrations, changes to the groundwater hydrological regimes and the introduction of contaminants. The report provides a summary of the current state of knowledge of New Zealand's

GEs and provides recommendations to further develop our understanding of these systems and their function. The following report is now available:

Fenwick, G., Greenwood, M., Williams, E., Milne, J., Watene-Rawiri (2018) *Groundwater Ecosystems: Functions, Values, Impacts and Management*. NIWA Client Report 2018184CH.

5 Environmental Reporting and Air Quality Monitoring

Effective management of the Region's natural resources depends on accurate and timely information about the environment and its health, along with ready access to this information and having it packaged in a way that is understandable for the intended audience.

The air quality monitoring programme will continue to monitor and report on air quality in Taihape and Taumarunui, the two airsheds designated under the National Environmental Standard for Air Quality. Environmental reporting focussed on delivery of data to the Land, Air, Water Aotearoa (LAWA) website, responding to public enquiries and general requests for monitoring data and information; and supporting national work programmes including development and implementation of the **National Environmental Monitoring Standards** (NEMS).

5.1 Air Quality

5.1.1 **New Zealand's National Environmental Standards for Air Quality** (NESAQ) require that Regional Councils monitor and report exceedances of the short–term **World Health Organisation** (WHO) guideline values for outdoor air quality. Monitoring of air quality is undertaken by Horizons in two designated airsheds, Taihape and Taumarunui.

5.1.2 Data collected over the last 12-month period at Taihape and Taumarunui are presented below. The graphs are from the Horizons AirQuality Matters website and comprise telemetered 'raw' data.

Taihape

5.1.3 The daily mean PM_{10} concentrations recorded at Taihape are shown in Figure 4 below. Despite a couple of elevated concentrations in December 2017 and April this year, the monitoring data shows compliance with the NESAQ during the 2017-18 year.

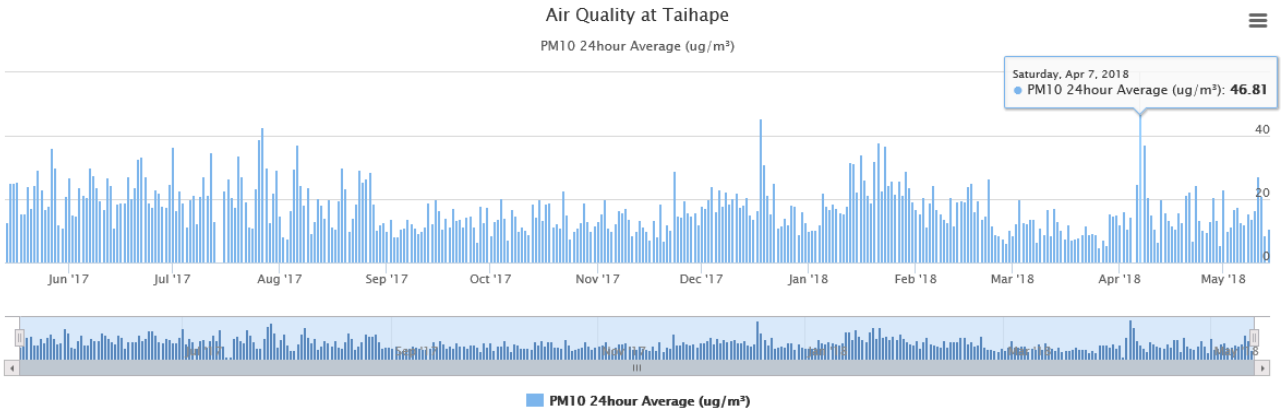

Figure 4 Air quality monitoring for particulate matter at Taihape from June 2017 to June 2018, reported as a 24-hour average (µg/m^3)

Annex A

Taumarunui

5.1.4 The Taumarunui recording site was moved in late January 2018 from the Baptist Friendship Centre at 250 Taupo Road to the Horizons Service Centre to eliminate issues encountered with regular power supply to the **Beta Attenuation Recorder** (BAM) unit (seen as gaps in the data the daily mean PM_{10} concentrations recorded at Taumarunui, as shown in Figure 5, below). Figure 5 shows Compliance with the NESAQ for the 2017-18 year.

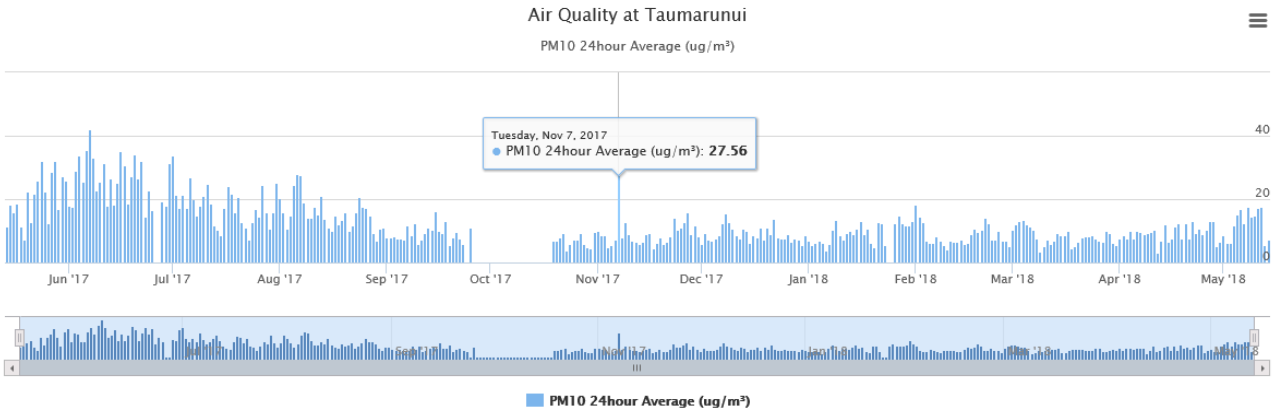

Figure 5 Air quality monitoring for particulate matter at Taumarunui from June 2017 to June 2018, reported as a 24-hour average (µg/m3).

5.1.5 The BAM units installed at the Taihape and Taumarunui sites had their annual independent calibration check completed by Watercare during May 2018.

Annex A

5.2 LAWA

5.2.1 Horizons provides science support for the continued evolution of the **Land, Air, Water Aotearoa** (LAWA) website: a Regional Council-driven initiative to present data and information about New Zealand's environment and natural resources.

5.2.2 During 2017-18 Horizons contributed data to all modules, including real-time water quantity data and an annual update for a range of water quality modules. LAWA upgraded the *Can I Swim Here?* module to make it more user-friendly and provide more comprehensive information about New Zealand's favourite swim spots. A new *Land Cover* module is also available.

5.2.3 Further information about LAWA is available in the December 2017 (*Can I Swim Here?)* and April 2018 (Land Cover) Environment Committee reports; or at http://www.lawa.org.nz.

5.3 Public Information and RMA Advice

5.3.1 The Science and Innovation team regularly responds to data and information requests, and provides RMA advice to internal and external clients. External information sharing is an important part of Horizons' business. The purpose of this project is to communicate programme outputs, and to inform and educate resource consent holders and the public about the value of these programmes and how they contribute to the wider management of the Region's water resources.

5.3.2 The Science and Innovation team continued efforts to work closely with Horizons' Communications team to regularly produce consumable "sound bites", respond to media requests, and assist with the provision of public information. During 2017-18 this included responding to media inquiries around water use, drinking water management, swimmability and the emerging issue of per- and polyfluoroalkyl substances; as well as responding to data and information requests – particularly around swim spot monitoring and groundwater levels.

5.3.3 Public information included contributions to the Irrigation NZ newsletter, a summer edition of 'Across the Region' dedicate to Swim Spot monitoring, and the release of public guidance information around groundwater takes and managing artesian water supplies.

5.4 Community and National Engagement

5.4.1 External information sharing is an important part of Horizons' science programme, with an increasing focus on communicating science to our wider community. Opportunities to communicate information can range from data provision, over-the-phone (non-RMA) advice, site visits, and provision of guidance material, through to community workshops. During 2017-18, Horizons science team have contributed to community and national engagement through:

- Participation in a number of regional sector **Special Interest Groups** (SIGs) to advance regional sector needs at a national level.

- National leadership and project management of the **National Environmental Monitoring Standards** (NEMS), including development of the NEMS for Discrete Water Quality, and the NEMS for Periphyton monitoring.
- Contribution to national reviews of the **National Environmental Standard** (NES) for Sources of Human Drinking Water and NES for Air Quality.
- Participation in workshops to guide new regulations and monitoring protocols eg., for new recreational guidelines for cyanobacteria at the **Ministry for Environment** (MfE) and marine litter monitoring.
- Workshops with MfE to develop the Ecosystem health component of the National Objective Framework National Policy Statement for Freshwater Management.
- Attending workshops with MfE to investigate new potential new developments in the national use of macroinvertebrate metrics.
- Providing advice and helping with sampling for National Science Challenges projects eg., Naturalised *E. coli* project in the "Our Land and Water" challenge.
- Members of the Science team participated in field days and a career expo during this period, provided lectures to Massey University students, and also engaged with school groups.

- Staff also attended community meetings and workshops, and presented to community groups throughout the Region including DairyNZ farmers and the Taumarunui Sustainable Land Management group.

Stephen Collins
SCIENTIST - GROUNDWATER

Staci Boyte
SCIENTIST - LAND

Harold Barnett
SCIENTIST

Mike Patterson
SCIENTIST – FRESHWATER

Elizabeth Daly
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Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS

Report No.	18-130
Decision Required	

BIOSECURITY ANIMALS OPERATIONAL PLAN 2018-19

1. PURPOSE

1.1. This item is to present to Council the Regional Pest Management (Animal) Operational Plan for the 2018-19 year

2. EXECUTIVE SUMMARY

2.1. The operational plan for the Biosecurity – Animals programme is attached as Annex 1. The operational plan outlines the work programme that includes the possum control operations, the rook control programme and the amenity pest programme.

2.2. In 2018-19, possum control activities will cover 1,292,519 ha (an increase of approximately 185,000 ha, or 17%) of which 917,715 ha is projected to receive some control. The OSPRI withdrawal has made 22 areas available for inclusion in the programme. Sixteen of these areas will be added to the programme in the 2018-19 year. Four further areas will receive planning effort in 2018-19 for treatment to occur in 2019-20. The 917,715 ha to receive control is lower than the over 1,049,436 ha that did receive control in 2017-18. This reflects the additional effort and costs with establishing bait station infrastructure in the new ex-OSPRI areas.

2.3. It is noted that originally Horizons had anticipated 11 ex-OSPRI areas (135,688 ha) being available at the start of 2018-19, however we are now planning to work 16 areas ex-OSPRI (approximately 185,000 ha). The move to control more of the ex-OSPRI operations in the 2018-19 year than anticipated may require additional capital investment than budgeted for. Should this eventuate, a paper will be presented to Council outlining options. The options include controlling these areas with the potential extra capital costs (currently estimated to be in the order of $40,000), the option not to do this work and the option to focus on other areas that have been deferred that already have the infrastructure in place for control.

2.4. To enable the new areas to be treated in 2018-19, an increased number of possum control areas are being deferred for treatment in 2018-19. Last year 10 PCO's did not receive either full treatment or any treatment at all, 6 of these 10 PCO's were approximately 50% treated at the end of the financial year. In 2018-19, 41 PCOs (374,804 ha) of the 120 PCO's that were in the programme last year will be deferred. These have been selected using the Landcare Research Tool developed for Horizons Regional Council. The deferred blocks have been selected based on having low possum populations i.e. ≤ 2.5% residual trap catch (RTC). One small block has been deferred due to the large amount of opt out[1] in the area, another small block has been deferred as it is on a three yearly cycle of 1080 ground baiting in bait stations.

2.5. The new monitoring programme for the PCO programme completed its first year in 2017-18 with 30 PCO's monitored. The increased monitoring programme for possums will continue this year with 36 possum control operations to be monitored (approximately 25% of the programme). Note: the number of PCO's to be monitored has increased from the 30 done last year, to reflect the increase in the number of PCO's in the programme. Pre and post control monitors are planned at 5 possum control areas this year. The monitoring programme for the 120 maintenance PCO's is set for the next two years.

[1] Land areas where the landowner has opted not to have control completed.

2.6. The Rook Control and Management project encompasses all aerial and ground operational work planned for the coming year. This year the programme will have a stronger focus on ground and responding to reported sightings.

2.7. The amenity pest programme will continue this year, responding to enquiries around management of pest animals.

3. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-130 and Annex.

b. This item is to present to Council the Regional Pest Management (Animal) Operational Plan for the 2018-19 year

4. FINANCIAL IMPACT

4.1. The Operational Plans reflect previously endorsed budgets approved as part of Council's Long Term Plan process. These Operational Plans overview the allocation of this budget to specific activities within the overall programme. The nature of these programmes can result in some adjustments within the budgets over the year to account for changing circumstances and opportunities that arise.

5. COMMUNITY ENGAGEMENT

5.1. The community have had the opportunity to comment on budgetary aspects of the Operational Plan referred to in this item as part of the engagement and submissions run during the Annual Planning and Long Term Planning processes. The biosecurity animals programme will continue to be communicated via Environment Committee and a range of other streams.

6. SIGNIFICANT BUSINESS RISK IMPACT

6.1. There is no significant business risk associated with this item.

7. SIGNIFICANCE

7.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Rod Smillie
BIODIVERSITY, BIOSECURITY & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Biosecurity Animals Operational Plan 2018-19

Draft

Biosecurity Animals Operational Plan 2018-19

July 2018

Annex A

Endorsed by Council at the Environment Committee meeting on _____

Author
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Front Cover Photos
Horizons Regional Council

July 2018
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Report No: 2018/EXT/1586

1.1. Executive Summary

This Operational Plan outlines the nature and scope of activities Horizons intends to undertake for pest animal management and the implementation of the Manawatu-Whanganui Regional Pest Management Plan during the 2018-19 financial year.

The budget for the programme (Table A) was confirmed through the Long-term plan process with additional funding being added to the programme to enable new areas that OSPRI NZ Ltd (OSPRI) are exiting from delivery of possum control. The Long-term Plan process in 2017-18 revised the performance targets for the Biosecurity –Animals work programme. The new targets (Table B) include alignment with the goal of the Regional Pest Management Plan for possum populations to be maintained below 10% residual trap catch (RTC) and the addition of new hectares for possum control following the phased withdrawal of OSPRI from possum control in the region. Other targets relate to rook control and the amenity pest programme. The sections below provide a summary of these programmes for 2018-19.

Possums

In 2018-19, possum control activities will cover 1,292,519 ha an increase of approximately 185,000 ha, or 17%) of which 917,715 ha is projected to receive some control. The OSPRI withdrawal has made 22 areas available for inclusion in the programme. Sixteen of these areas will be added to the programme in the 2018-19 year. Four further areas will receive planning effort in 2018-19 for treatment to occur in 2019-20. The 917,715 ha to receive control is lower than the over 1,049,436 ha that did receive control in 2017-18. This reflects the additional costs with establishing bait station infrastructure in the new ex-OSPRI areas.

It is noted that originally Horizons had anticipated 11 ex-OSPRI areas (135,688 ha) being available at the start of 2018-19, however we are now planning to work 16 areas ex-OSPRI (approximately 185,000 ha). The move to control more of the ex-OSPRI operations in the 2018-19 year than anticipated may require additional capital investment than budgeted for. Should this eventuate, a paper will be presented to Council outlining options. The options include controlling these areas with the potential extra capital costs (currently estimated to be in the order of $40,000), the option not to do this work and the option to focus on other areas that have been deferred that already have the infrastructure in place for control.

To enable the new areas to be treated in 2018-19, an increased number of possum control areas are being deferred for treatment in 2018-19. Last year 10 PCO's did not receive either full treatment or any treatment at all, 6 of these 10 PCO's were approximately 50% treated at the end of the financial year. In 2018-19, 41 PCOs (374,804 ha) of the 120 PCO's that were in the programme last year will be deferred. These have been selected using the Landcare Research Tool developed for Horizons Regional Council. The deferred blocks have been selected based on having low possum populations i.e. ≤ 2.5% residual trap catch (RTC). One small block has been deferred due to the large amount of opt out[2] in the area, another small block has been deferred as it is on a three yearly cycle of 1080 ground baiting in bait stations.

The new monitoring programme for the PCO programme completed its first year in 2017-18 with 30 PCO's monitored. The increased monitoring programme for possums will continue this year with 36 possum control operations to be monitored (approximately 25% of the programme). Note, the number of PCO's to be monitored has increased from the 30 done last year, to reflect the increase in the number of PCO's in the programme. Pre and post control monitors are planned at 5 possum control areas this year. The monitoring programme for the 120 maintenance PCO's is set for the next two years.

[2] Land areas where the landowner has opted not to have control completed.

Rooks

The rook work programme will be similar to 2017-18 and will include a systematic aerial nest baiting campaign to be followed by targeted ground control work.

Amenity pest advice and assistance

Horizons will continue to provide an urban/peri-urban animal pest management service to assist urban ratepayers with specialist advice and equipment.

Annex A

Table A Budget for the Biosecurity Animals programme in the 2016-17 Annual Plan and 2018-19 Long Term Plan.

Projects	Budget 2016-17	Budget 2018-19	Difference
Possum Control Operations (PCO)	$3,385,881	$3,600,623	$214,742
Audit and monitor	$310,694	$325,876	$15,182
Rook Control and Management	$145,246	$151,947	$6,701
Amenity Pest Programmes	$156,618	$166,012	$9,394
Total Annual Plan Budget	$3,998,439	4,244,458	$246,019

Table B Long-term Plan performance measures for the Biosecurity Animals programme in the 2018-19 Long Term Plan.

Pest	Long-term Plan Performance Measure	Target
Possums	Possum densities are maintained at/below 10% residual trap catch (RTC) in all existing/new possum control operations.	<10% RTC
Possums	Additional hectares included in the control programme.	135,688
Rooks	All known rookeries are treated annually to reduce crop losses and damage.	100%
Pest Animal Response/Amenity Pest	Provide an urban/peri-urban animal pest management service to assist urban ratepayers with specialist advice and equipment and animal pest control assistance/enquiries are responded to within two working days	100%

1. CONTENTS

Annex A

2. Introduction

2.1. Background

Under the Biosecurity Act 1993, Horizons Regional Council (Horizons) has prepared the Manawatu-Whanganui Regional Pest Management Plan (the Pest Plan). The Pest Plan outlines work programmes for four pest animal species of regional significance. The Regional Pest Management Plan became operational on 28 November 2017, and this Operational Plan has been written to align with the requirements outlined in the new Pest Plan.

The Pest Plan outlines how each pest animal type will be managed over a 20-year period. Responsibility for control work lies with Horizons, the Crown and land occupiers. Horizons has responsibilities to ensure land occupiers are aware of and meet their obligations for pest management on their properties, and the Council will undertake direct pest control where there is clear justification and regional benefit.

Under section 100B of the Biosecurity Act, the management agency for a pest management strategy must prepare an annual Operational Plan. The plan must be reviewed and reported on annually, no later than five months after the end of each financial year. Copies of the Operational Plan and the report on its implementation must be made available to the public.

This document is the second Operational Plan to be prepared under the new Manawatu-Whanganui Regional Pest Management Plan. Beyond the Regional Plan Horizons has non-regulatory activities to contribute to the management of a range of other pests. This Operational Plan is focussed on pest animal management and the management of pest plants is discussed in a separate Operational Plan.

2.2. Report Format

This Operational Plan outlines the nature and scope of activities Horizons intends to undertake for pest animal management and the implementation of the Manawatu-Whanganui Regional Pest Management Plan for the 2018-19 financial year. Performance measures and other targets by which performance can be judged by Council are identified.

This Operational Plan delivers on the key priorities for pest animal management established through the Pest Plan and Horizons' non-regulatory pest animal management activity.

3. Implementation of Programmes

Introduction

An assessment was undertaken of nominated potential pest animals, which resulted in each pest species being placed into one of three management categories. This assessment was based on the particular effects, distribution, density and available control methods:

- **Exclusion** – These pests are present in New Zealand but are outside the Manawatu-Whanganui Region. They have the potential to expand their range into the Region and become a problem. Wallaby species are listed as exclusion pest animals.
- **Eradication** – These pests are present in the Manawatu-Whanganui Region but are either limited in their size or extent of infestation, or their eradication is feasible and a cost-effective solution to protect production or environmental values. The rook is the only pest animal listed as an eradication pest in the Region.
- **Sustained Control** – This covers species which Horizons seeks to control to levels where their impacts on economic values and/or environmental values are cost-effectively reduced. These pests are widespread and throughout the Region. Possums and rabbits are listed in this category.

Methods and Resources

Horizons achieves effective pest management through the following methods:

- **Direct Management** - Horizons funds and organises control for two pest animal species across the Region (i.e. possums and rooks). Horizons also provide assistance to landowners to overcome localised pest animal issues as part of the amenity pest service.
- **Regulation** - Rules and restrictions are set, and compliance enforced with appropriate processes and penalties, including the recovery of costs incurred. Enforcement of the Pest Plan rules, particularly its good neighbour responsibilities, aims to prevent the adverse effects of pest animals on adjacent landowners' properties and is a strong theme of Horizons new approach through the Pest Plan.
- **Advice** – Advice is given to raise awareness of pest problems and to provide land occupiers with information to control their own pests. This includes explaining people's obligations under the Pest Plan and responding to complaints and enquiries from the public. Horizons' goal is to provide an initial response to a complaint within two working days of it being received.
- **Surveillance** - Horizons undertakes inspections of potential infestation areas for high-threat pest animals not presently known in the Region. Horizons will monitor for, and act to eradicate, any infestation of the Exclusion species to them prevent them adversely affecting production and natural areas.
-

Management and Reporting

The management and implementation of pest control programmes, including preparation and delivery of the Operational Plan, is the responsibility of the Natural Resources and Partnership Group (NRP). The Natural Resources and Partnership operational teams will undertake approximately half of the field operational work i.e. possum control operation (PCO), rook, amenity and monitoring. The balance is undertaken by external service providers. The NRP team members working on these programmes are spread throughout the Region, in the Palmerston North, Marton, Woodville, Whanganui, Taihape and Taumarunui Service Centres. Reporting is outlined in Table 1.

Table 1 Summary of the Reporting for the programmes.

Report	Comment
Environment Committee Report (approximately bi-monthly)	Environment Committee reports will be prepared to report progress towards meeting annual targets.
Pest Animal Operational Plan	The Operational Plan will be presented to Council for consideration in August.
Amenity Pest Database	Enquires to the Amenity pest programme and progress on these will be recorded by the Frontline database.
Financial	Budget information will be reported to Council's Audit & Risk Committee as required.
Operational Reports	Each PCO has an input map/treatment plan and post-operational report.

4. Financial and Activity Overview

The projects and financial expenditure relating to the pest animal activity in the 2018-19 year (year one of the current Long-term Plan) are summarised into four project groups as shown in Table 2. Overall the budgets have increased by $246,019 (6.1%) in the 2018-19 year reflecting some inflationary increases and additional funding for the new ex-OSPRI areas (17% more area) to be added to the programme.

Table 2 Summary of the budgets for 2017-18 and 2018-19 years.

Projects	Budget 2016-17	Budget 2018-19	Difference
Possum Control Operations (PCO)	$3,385,881	$3,600,623	$214,742
Rook Control and Management	$145,246	$151,947	$6,701
Amenity Pest Programmes	$156,618	$166,012	$9,394
Audit and monitor	$310,694	$325,876	$15,182
Total Annual Plan Budget	$3,998,439	4,244,458	$246,019

Annex A

- The Possum Control Operation (PCO) project relates to all operational and management work undertaken in the 2018-19 Possum Control Operation programme.
- The Rook Control and Management project encompasses all aerial and ground operational work planned for the coming year.
- The Statutory Pest Programmes budget is for staff time and costs associated with enquiries received from ratepayers and members of the public in the Frontline database during the year.
- The Audit and Monitor project incorporates possum monitoring work for the Possum Control Operation (PCO) programme, and rabbit night counts to monitor regional rabbit populations when required. There will be no rabbit monitoring in 2018-19.

The following sections provide more detail on these programmes.

5. Possums

Overview

The 2018-19 year is the 13th year of Horizons' Possum Control Operation (PCO). This year's PCO will involve ongoing maintenance work in 79 of the 120 operational areas currently set up in the programme (Annex A). Twenty two new ex-OSPRI areas were available to be part of the programme this. In addition to this a further 16 new ex-OSPRI operations have been added to the programme (Annex B). Four other new ex-OSPRI areas are not included in the programme, however will receive planning for their control next year (2019-20).

In summary, total possum control activities in 2018-19 will cover 1,292,519 ha (Figure 1), an increase of approximately 185,000 ha or 17% over the programme size last year[3]. Within this area 917,715 ha is projected to receive some control, a decrease of 131,721 ha or 13% from last years programme. Ninety five PCO areas will receive control including 16 new areas. Forty one areas will be deferred. Thirty nine of these are projected to have possum populations less than 2.5%, one other is small has high levels of opt out and another small block is on a three yearly cycle for 1080 ground control.

The operational make-up of the PCO programme is a mixture of maintenance and new areas (ex-OSPRI areas). Each of these programmes has a different budgeted cost of delivery. The activity for the

[3] Please note the areas exclude areas of the programme where land owners have opted-out of the programme.

"maintenance" and the "new ex-OSPRI" operations have similar costs for the delivery of bait (one fill per year). The ex Ospri area will have additional operational cost (approx. 50% more) for establishing the bait stations. The bait stations also have a capital cost. Given the uncertainty of possum numbers in the new ex-OSPRI areas there may be additional bait costs as more bait may be put out in the planned single fill of bait stations. Potentially some of these areas may require a second fill, however this has not been budgeted for at this stage.

Horizons have been taking on areas exited by OPSRI over the life of the Possum control programme and a map showing the areas that were previously managed by OSPRI but now managed by Horizons is provided in Figure 2. The current projected plan to take on new ex-OSPRI areas over the next five years and beyond is shown in Figure 3, this should be considered as indicative only.

Maintenance operations

The 120 Possum Control Areas of the programme last year total 1,106,644 ha (excluding the opt outs).

Last year, 2017-18, 110 of these received full control covering 1,049,436 ha, with a further 6 PCO's that were started but only 50% completed at year end. The 2017-18 year was the first year with no new area added to the programme.

In 2018-19, the operational plan has outlined 41 of these areas, 374,804 ha, for deferral i.e. will not be receiving any maintenance control. Decisions on which operations to defer were primarily based on the 'PosSim' tool that was developed by Landcare Research for Horizons in the 2017-18 year. The tool uses the results from the upgraded monitoring programme (see below) or population estimates based on previous monitoring, population growth estimates and previous levels of control for each of the 120 Control areas on the programme. The sites selected for deferral have possum population estimates or measurements below 2.5% RTC (see Annex C). One small area "creek" has been deferred due to the low amount of opt in farms in the area. Another "Wamarino pipipi" is also deferred as it is on a three yearly cycle of 1080 bait station work.

New Ex-OSPRI operations

The OSPRI withdrawal has made 22 areas available for inclusion in the programme. Sixteen of these areas will be added to the programme in the 2018-19 year, all of which were previously managed by OSPRI NZ Ltd. Four others will receive planning work from the management budget to enable treatment in 2019-20 (Ahuahu, Mangaporau and Ruatiti Buffer Stage 1 & 2).

It is noted that originally Horizons had anticipated 11 ex-OSPRI areas being available, 135,688 ha at the start of 2018-19, however the number has grown. We are now planning to control approximately 185,000 ha (37% more). The move to control more of the ex-OSPRI operations in the 2018-19 year than anticipated may require additional capital investment than budgeted for. This is due to the increased requirement to set up bait station infrastructure. The ex-OSPRI areas are understood to have very little if any infrastructure established. All budgeting has been done on the basis of no infrastructure being present. If this is the case and a greater area is to be controlled, more bait station infrastructure may be required. Should this eventuate, a paper will be presented to Council outlining options around controlling these areas and the potential extra capital costs (currently estimated to be in the order of $40,000), or the option not to do this work including the ability to focus on other areas that have been deferred and already have the infrastructure in place for control.

Internal and External delivery

The Horizons Regional Response Team (RRT) and external service providers will undertake the operational work.

Last year a change was made to the programme with the Regional Response Team managing areas closer to the service centres (offices) that they work from (Figure 4). This change has proven to be very effective with a noticeable improvement in the overall efficiency of the team.

The change to the locations of the work (new areas added and further areas deferred) has resulted in considerable changes to the locations of the work for the internal and external team. In response to this the RRT has recently had a review of their operational capacity which has resulted in one of the team moving from the Central area to the Taihape Service Centre. Also, a new position (Pest Management Officer - Taihape) has recently been approved in the Long-term Plan (LTP). We anticipate that the new two-man team will be in operation in the Taihape area by late-July 2018.

In summary, the split of work between the internal team and external contractors (Figure 5) is:

- The internal team will deliver 62 operational areas, compared to 61 last year. This is 59 maintenance and 3 new ex-OSPRI areas.
- External Contractors will deliver 33 operational areas, compared to 57 last year. This is 20 maintenance and 13 new ex-OSPRI areas.

These changes show a significant reduction in areas treated by external contractors. This reduction is somewhat offset by the increased cost per hectare for the treatment of the new ex-OSPRI areas.

Horizons are working through a new procurement process for the external contracts in 2018-19. This process is planned for August/September with the work for the 33 PCO's to go through a tender process. The outcome of the total tender prices may require some alteration to the number of areas worked e.g. if prices are higher than expected, fewer areas may be able to be worked and vice versa. We have the potential to start other new 'ex-OSPRI' operations should the budgets enable this.

One aim for the contracting this year will be earlier completion of work, with an aim to avoid the experience of last year where several external contracts were not fully completed at year end. Further budgets and progress will be monitored over the year and the balance between internal and external delivery may be varied as required.

The areas quoted in this report reflect the areas of land where the landowners have opted into the programme. Within the 120 PCO's that were in the programme in 2017-18, 139,114 ha[4] were opted out.. These opt out areas represent a potential further area of approximately 11% that could be managed. We have not budgeted for or planned actively canvasing these landowners joining the programme. There is potential to do this, however there would be implications in terms of workload to do this task and then additional budget spend required to deliver the control on the properties that do opt in.

[4] Please note this reflects the total as assessed two years ago.

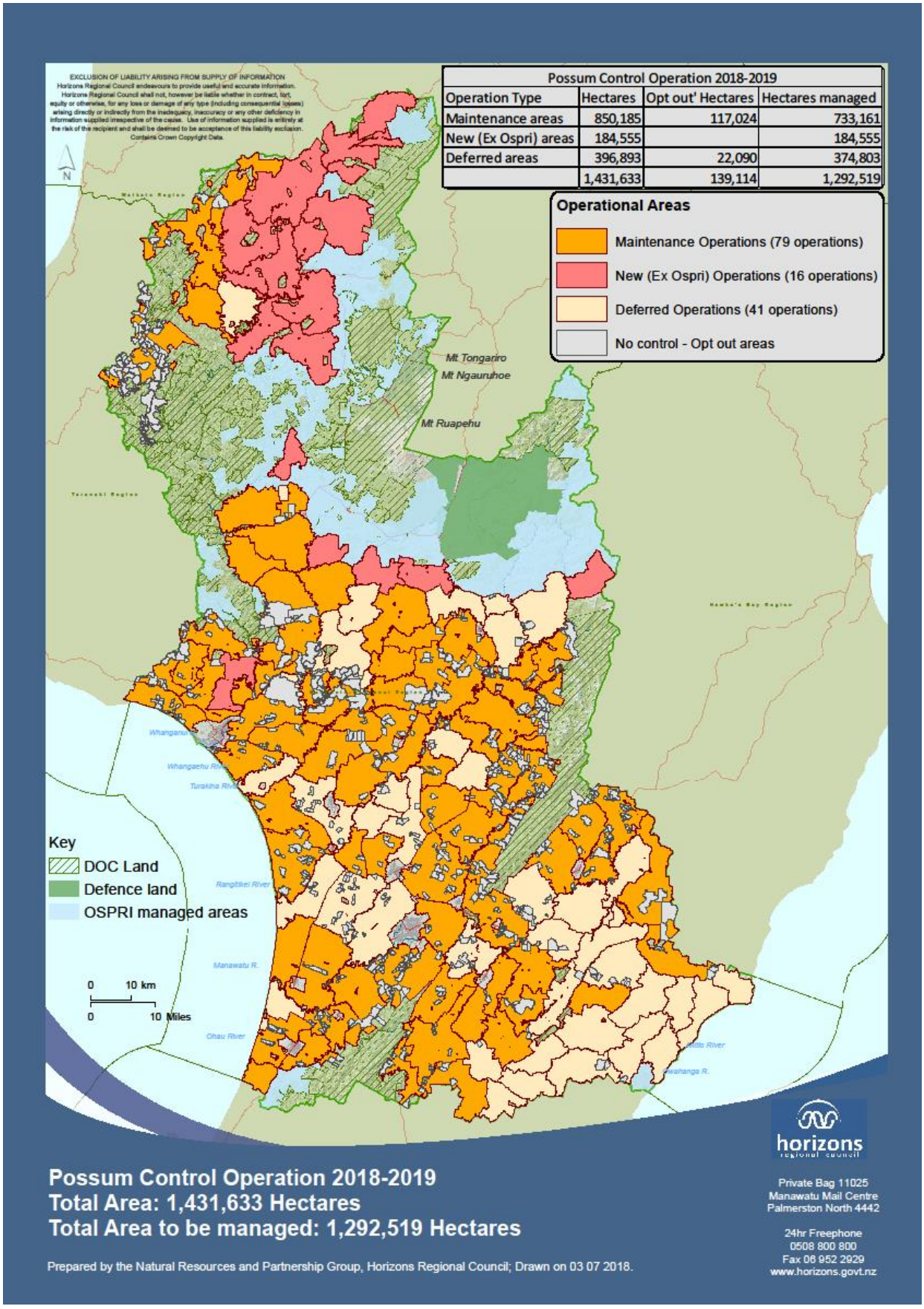

Figure 1 Possum Control Operation 2018-2019.

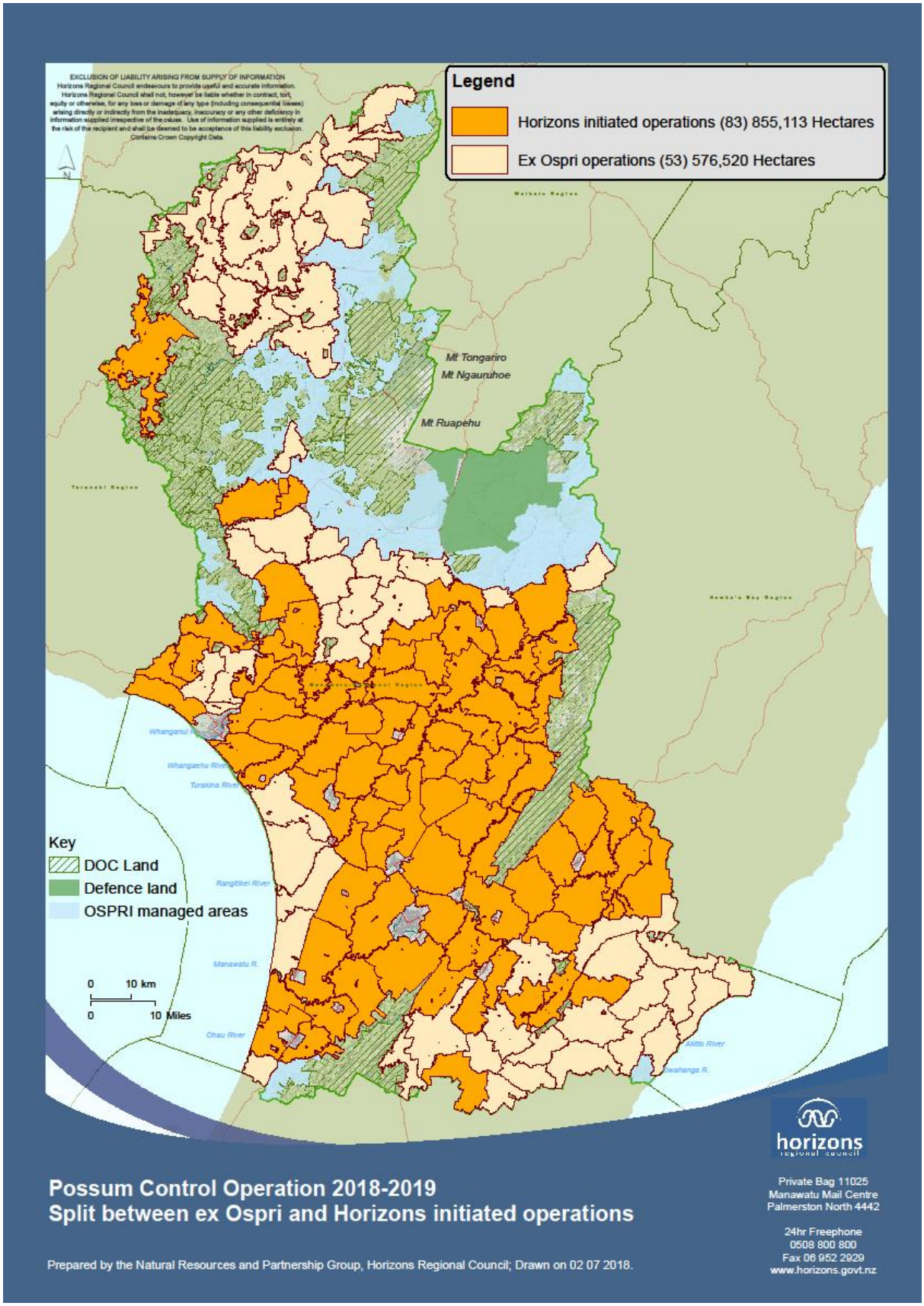

Figure 2 Possum Control Operation 2018-2019 showing ex-OSPRI and Horizons-initiated programmes.

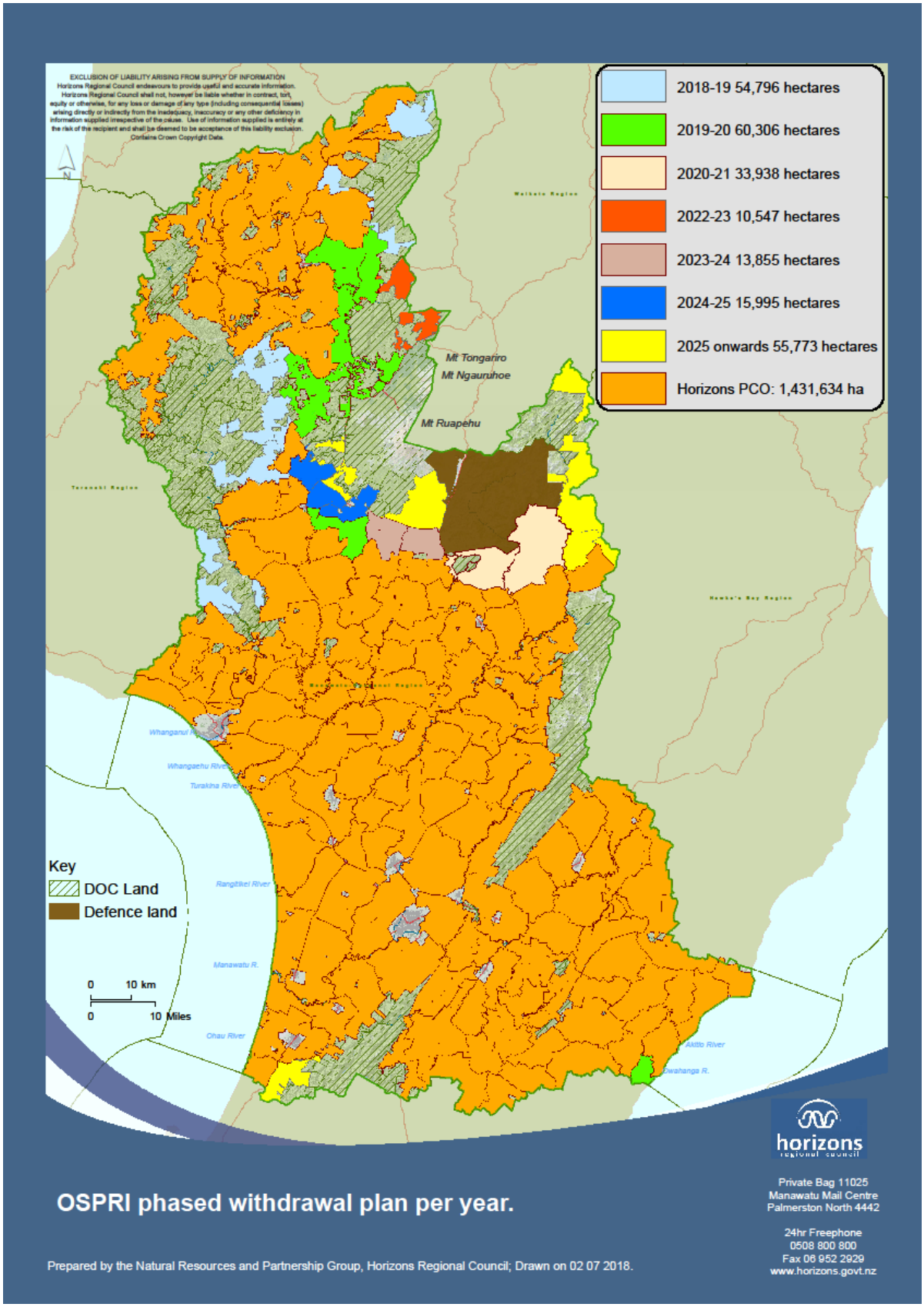

Figure 3 Ospri phased withdrawal plan by year.

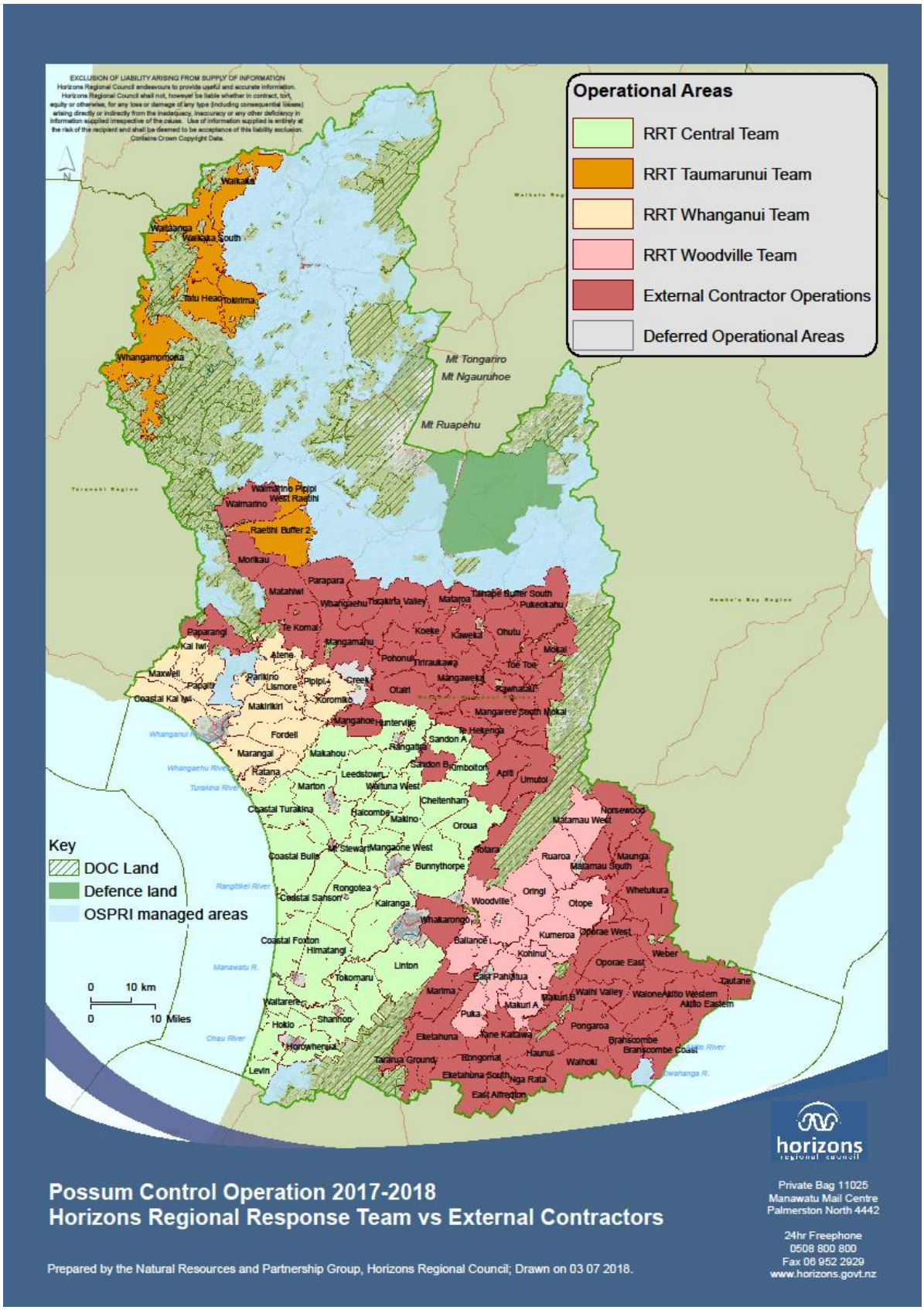

Figure 4 2017-2018 PCO operational areas.

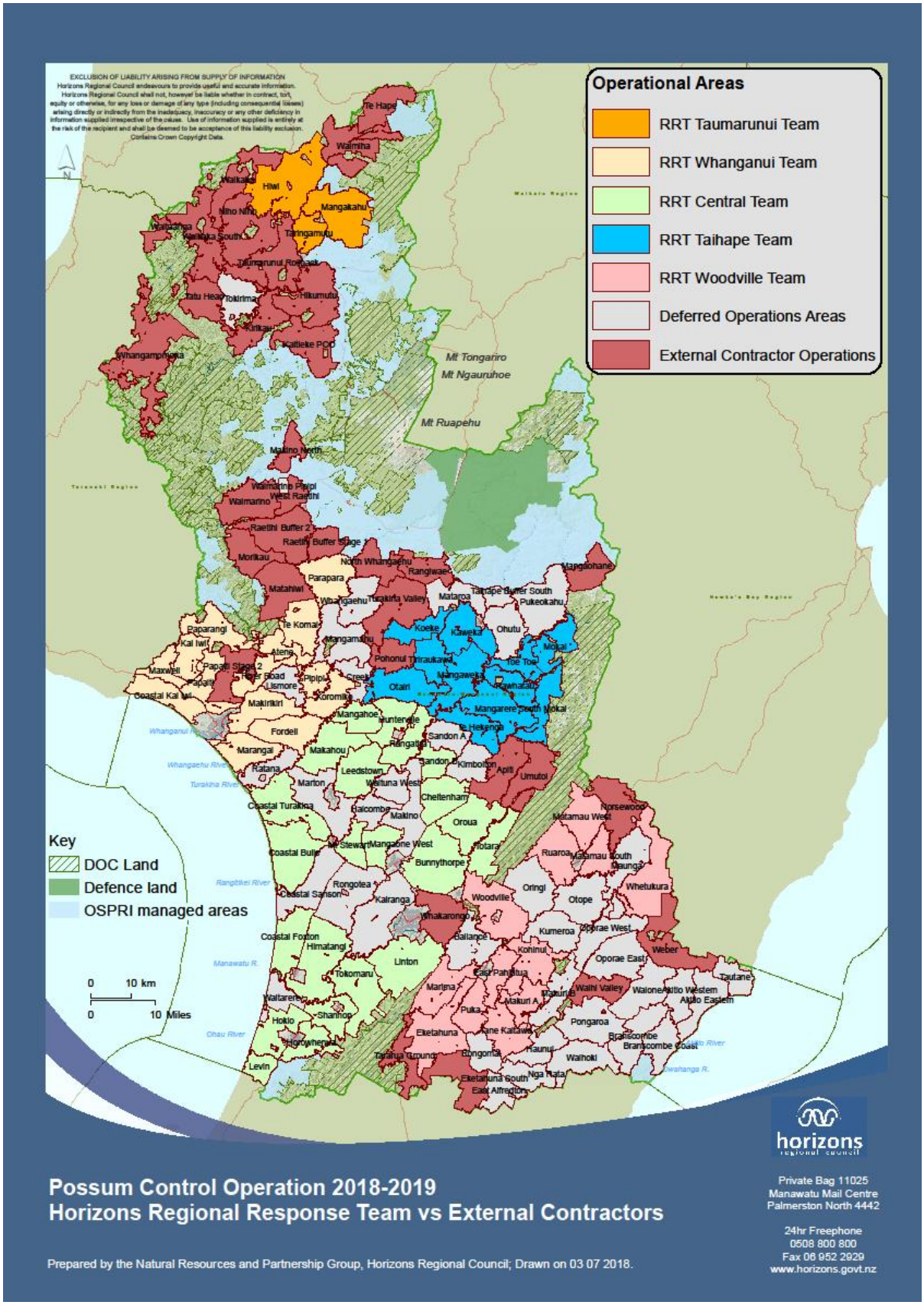

Figure 5 2018-2019 PCO operational areas.

5.1. Performance Measures

Table 2 Performance measures and targets – possums

Performance Measures	Target
Possum densities are maintained at/below 10% residual trap catch (RTC) in all existing/new possum control operations.	<10% RTC

Comment

- **79 maintenance PCOs and 16 new operations will be undertaken in 2018-19 year.**
- **All control work will be completed by 30 June 2019.**
- **Operational inputs will be recorded.**
- **Audits will be undertaken to ensure compliance with operational and contract standards.**
- **RTC monitoring will be undertaken (refer to monitoring section).**

Photo 1 A bait station set up in the Whangamomona PCO (J Hart).

6. Monitoring

All of the 2018-2019 monitoring budget will be used to monitor the PCO (no rabbit monitoring will be undertaken this year). We plan to monitor 26% of the existing maintenance PCOs i.e. 31 of the 120 programmes and also pre- and post-monitor five of the 16 new ex OSPRI operations. Of the 31 maintenance operations to be monitored, nine are being 'deferred' from control this year.

The majority of the monitoring work will be undertaken by external contractors with the personnel from the RRT scheduled to complete five of the programmes. In the majority of the areas 25 wax tag lines will be set up, with the line position being randomly selected in areas of possum habitat. Each line will have 10 wax tags out in the field for seven nights. The PCO monitoring programme will be reported to Council via the Environment Committee and in the end of year Pest Animal Monitoring Report.

The rabbit night counts undertaken in 2017-18 to monitor the rabbit population across the Region reported a slight increase from 1.13 rabbits per km in 2015-16 to 1.42 per km in 2017-18. In 2018-19 no rabbit monitoring will be undertaken.

6.1. Performance Measures

Table 5 Performance Measures and Targets – Monitoring

Performance Measures	Target
Possum densities are maintained at/below 10% RTC for all maintenance control programmes	<10% RTC
Comment **Possum monitoring:** • **The monitoring is to be carried out in accordance with National Pest Control Agency (NPCA) protocols.** • **Thirty-one maintenance PCOs have been selected for monitoring** • **Five new (ex-OSPRI) PCOs will be pre- and post-monitored** **Wallabies:** • **Horizons staff will liaise with Waikato Regional Council personnel to monitor the proximity of wallaby populations adjacent to the regional boundary.** • **Inspections will be undertaken as required.**	

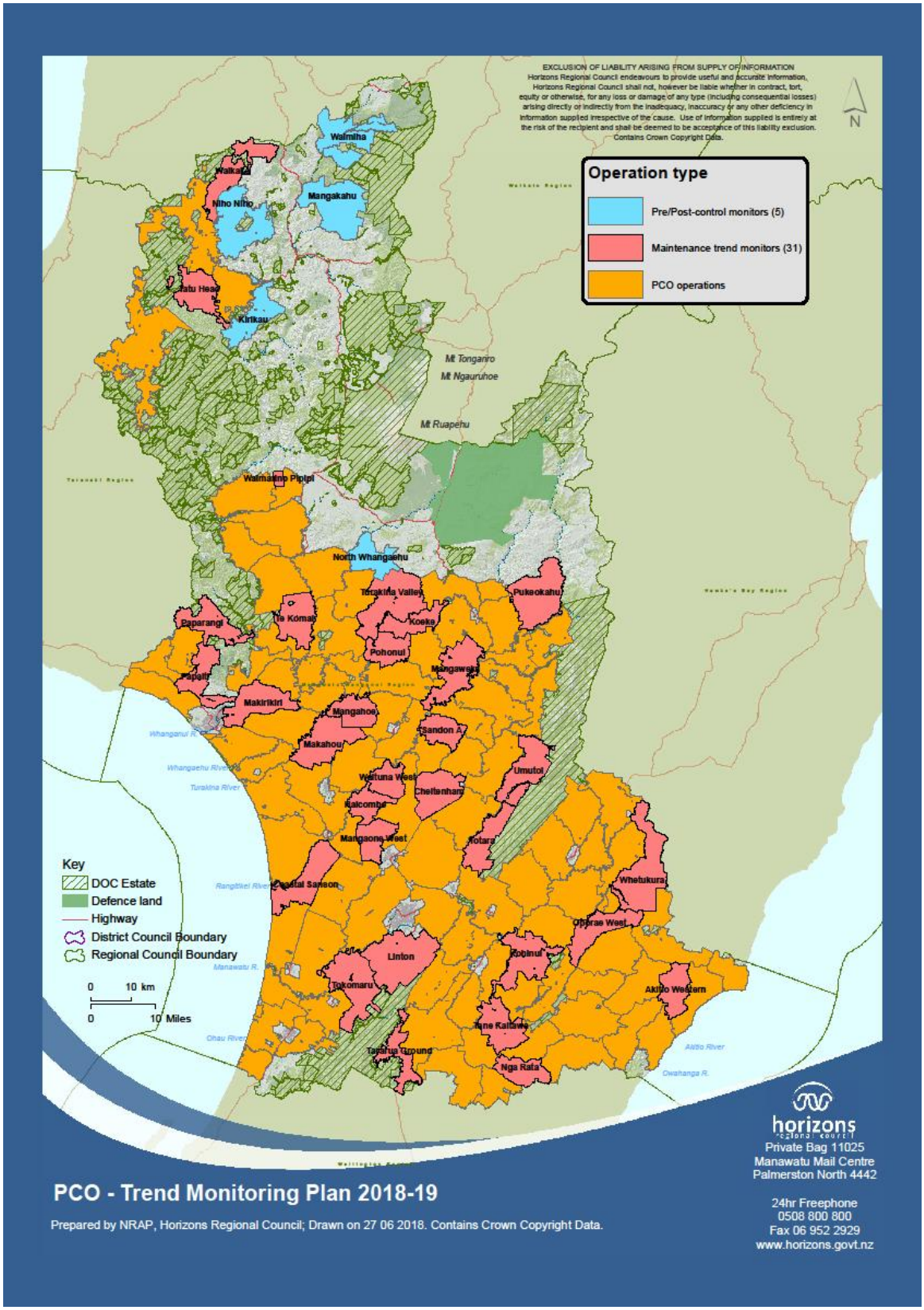

Figure 8 PCO Monitoring 2018-2019.

7. Rooks

This year's work programme will be similar to the 2017-18 programme and will include a systematic aerial nest baiting campaign to be followed by targeted ground control work.

The aerial work targets breeding rookeries with control likely to run from early October into November 2018.

Prior to implementing the aerial work, ground and aerial surveys will be undertaken to establish the optimum timing. During the ground surveys, all inactive rookeries recorded over the past five seasons will be revisited to establish whether birds have returned to these sites. This will save helicopter-flying time.

Aerial work involves the application of DRC-1339 poison (mixed into petroleum jelly) to the rim of active breeding nests. This method has a proven track record and has substantially reduced rook populations across the Region. Similar results have been experienced by other Regional Councils using the aerial baiting technique.

This will be the 13th consecutive year that all breeding rookeries in the Region have been treated. A limited number of ground control operations will be undertaken during summer/autumn, targeting birds that are feeding on crops and young grass paddocks. This year we plan to also use the recently registered 'macaroni' bait.

Since the inception of the of the region-wide aerial nest baiting programme, the number of active breeding nests i.e. nests that have either eggs or chicks present, has reduced by 95%, down from 2,942 nests in 2005-06 to 135 nests in 2017-18. Figures 6 and 7 show the change in frequency and distribution of active rook nests from 2005-06 to 2017-18.

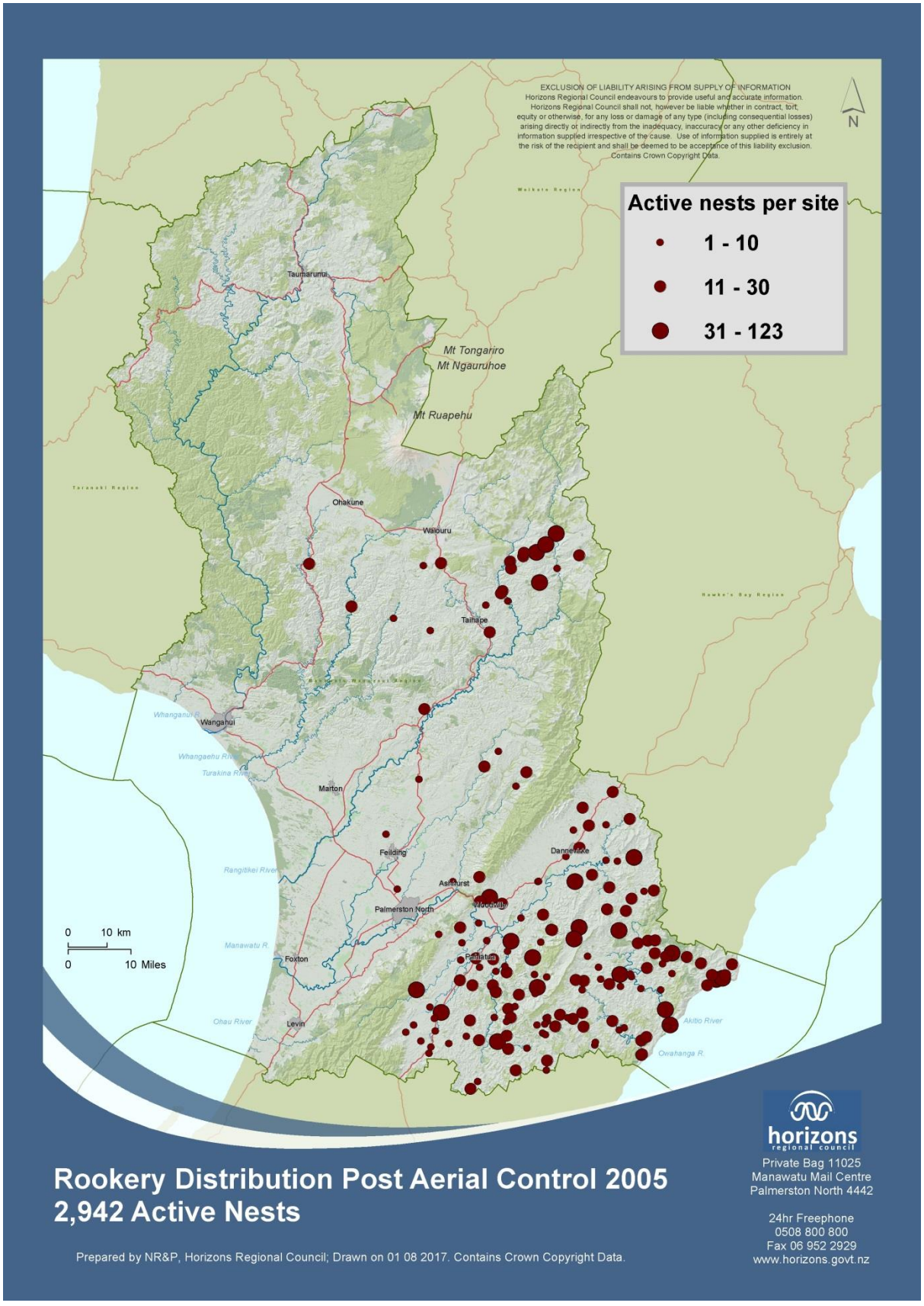

Figure 6 Post-operational rook control 2005-06

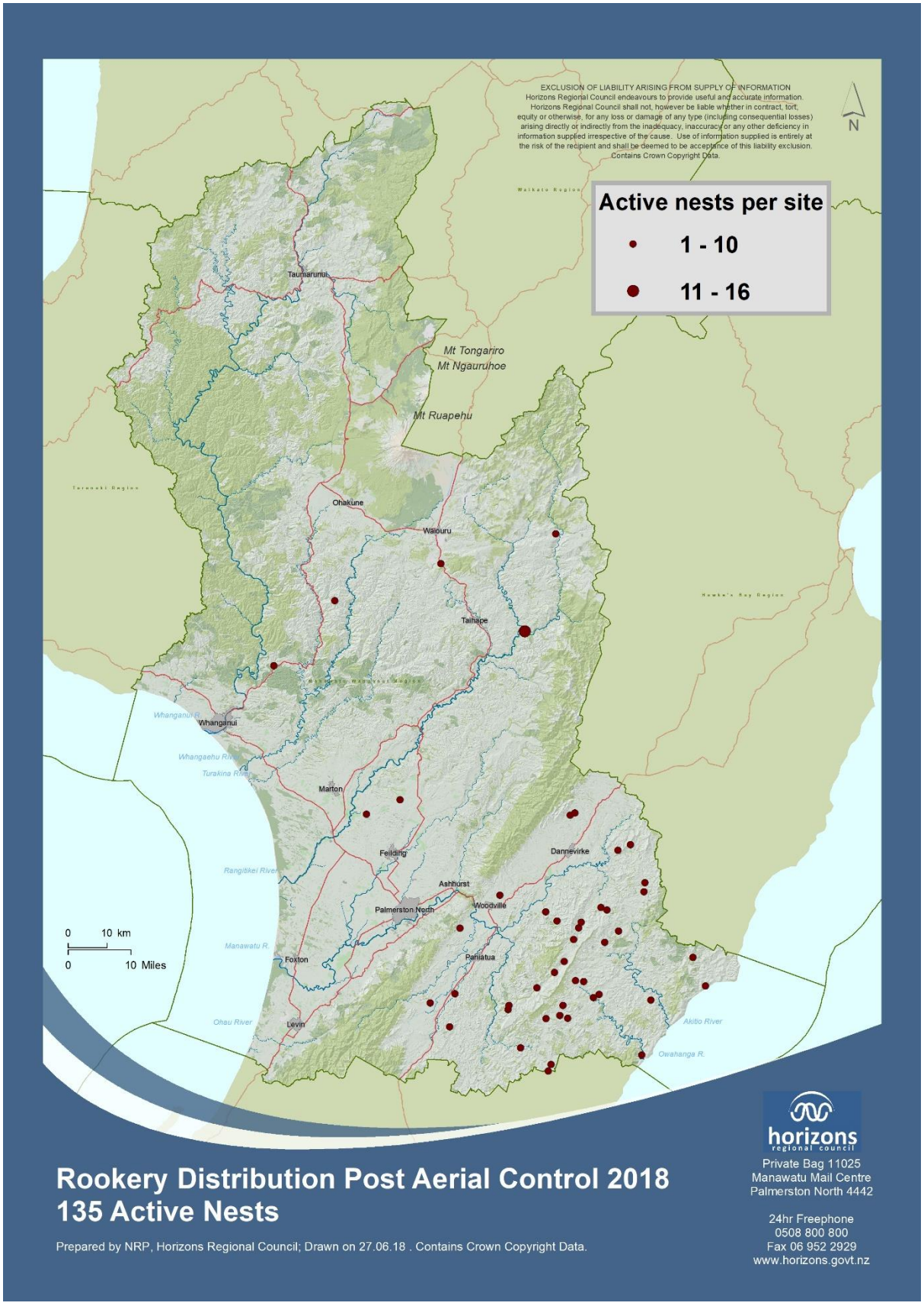

Figure 7 Post-operational rook control 2017-18

7.1. Performance Measures

Table 3 Performance Measures and Targets – Rooks

Performance Measures	Target
All known rookeries are treated annually to reduce crop losses and damage.	100% of rookeries to be treated.
Comment • **Helicopter nest baiting control will be undertaken in the breeding season (September/October), targeting all identified active rookeries; in recent years this has equated to 120-160 active nests.** • **Ground control operations will be undertaken as opportunities arise.** • **The results of this work will be reported to the Environment Committee throughout the year.**	

8. Pest Animal Response/Amenity Pest

Horizons receive a large number of enquiries from landowners across the Region relating to pest animal issues and in recent years, the number of enquiries has steadily risen and now ranges between 700-800 per year.

Most enquiries received relate to 'nuisance' animals (possums, mustelids, rabbits etc) in 'amenity'-type situations, e.g. around lifestyle blocks, gardens etc. In these situations, Horizons animal pest management staff provide advice on control techniques and supply loan traps to landowners. We also receive a number of complaints about pests (mainly rabbits) spreading from neighbours' properties and causing problems. In these situations, ground inspections and discussions with affected landowners are required, and if the problem is unable to be resolved enforcement options can be used.

All enquiries are recorded into the Frontline database and the aim is to respond within two working days of receipt.

All actions taken in regard to enquiries are recorded in Frontline and are summarised in the bi-monthly Environmental Committee Report. A summary of the full year's enquiries (with pest type/GPS location) is summarised in the end of year Pest Animal Strategy Monitoring Report.

8.1. Performance Measures

Table 4 Performance Measures and Targets – Amenity Pest

Performance Measures	Target
Horizons will provide an urban/peri-urban animal pest management service to assist urban ratepayers with specialist advice and equipment.	100% of enquiries will be responded to within two working days
Animal pest control assistance/enquiries are responded to within two working days	

9. Annex A: Summary of Possum Control Operations

Table 6 PCO areas 2018-19

Maintenance Operations 2018-2019		
Operational Name	**Hectares**	**Service Provider**
Apiti	11921	External (To be tendered)
Atene	5971	RRT Whanganui Team
Bunnythorpe	19331	RRT Central Team
Cheltenham	10502	RRT Central Team
Coastal Bulls	16955	RRT Central Team
Coastal Foxton	11041	RRT Central Team
Coastal Kai Iwi	9761	RRT Whanganui Team
Coastal Turakina	14786	RRT Central Team
East Pahiatua	6785	RRT Woodville Team
Eketahuna	17744	RRT Woodville Team
Eketahuna South	11965	External (To be tendered)
Fordell	11508	RRT Whanganui Team
Himatangi	19077	RRT Central Team
Hokio	9958	RRT Central Team
Horowhenua	7472	RRT Central Team
Hunterville	8536	RRT Central Team
Kai Iwi	7366	RRT Whanganui Team
Kaweka	11364	RRT Taihape Team
Kawhatau	7187	RRT Taihape Team
Koeke	7168	RRT Taihape Team
Kohinui	12499	RRT Woodville Team
Koromiko	8303	RRT Whanganui Team
Leedstown	12202	RRT Central Team
Levin	4463	RRT Central Team
Linton	18417	RRT Central Team
Makahou	12886	RRT Central Team
Makirikiri	11234	RRT Whanganui Team
Makuri A	7594	RRT Woodville Team
Mangahoe	7626	RRT Central Team
Mangaone West	7078	RRT Central Team
Mangarere	13325	RRT Taihape Team
Mangaweka	12377	RRT Taihape Team
Marangai	10320	RRT Whanganui Team
Marima	11214	RRT Woodville Team
Matahiwi	13222	External (To be tendered)
Matamau South	6847	RRT Woodville Team
Matamau West	10923	RRT Woodville Team
Maxwell	5363	RRT Whanganui Team
Mokai	8671	RRT Taihape Team
Morikau	9467	External (To be tendered)

Maintenance Operations 2018-2019		
Operational Name	**Hectares**	**Service Provider**
Mt Stewart	5728	RRT Central Team
Norsewood	12892	External (To be tendered)
Oroua	13136	RRT Central Team
Otairi	13351	RRT Taihape Team
Papaiti	9171	RRT Whanganui Team
Paparangi	10179	RRT Whanganui Team
Parapara	12394	RRT Whanganui Team
Parikino	6616	RRT Whanganui Team
Pipipi	5351	RRT Whanganui Team
Pohonui	7435	External (To be tendered)
Puka	7640	RRT Woodville Team
Raetihi Buffer 2	15631	External (To be tendered)
Rangatira	8760	RRT Central Team
Ruaroa	12396	RRT Woodville Team
Sandon B	5790	RRT Central Team
Shannon	8258	RRT Central Team
South Mokai	9028	RRT Taihape Team
Tane Kaitawa	10272	RRT Woodville Team
Tararua Ground	7367	External (To be tendered)
Tatu Heao	9681	External (To be tendered)
Te Hekenga	8593	RRT Taihape Team
Te Komai	10291	RRT Whanganui Team
Tiriraukawa	7887	RRT Taihape Team
Toe Toe	6267	RRT Taihape Team
Tokomaru	15512	RRT Central Team
Totara	9219	RRT Central Team
Turakina Valley	16508	External (To be tendered)
Umutoi	12109	External (To be tendered)
Waihi Valley	7962	External (To be tendered)
Waikaka	11007	External (To be tendered)
Waikaka South	15738	External (To be tendered)
Waimarino	12552	External (To be tendered)
Waitaanga	3232	External (To be tendered)
Weber	14459	External (To be tendered)
West Raetihi	4417	External (To be tendered)
Whakarongo	11052	External (To be tendered)
Whangamomona	26949	External (To be tendered)
Whetukura	18793	RRT Woodville Team
Woodville	16136	RRT Woodville Team
Total Maintenance	850,185	This includes the “opt outs”. With the opt outs (117,024 ha) excluded this totals 733,161 ha

New (ex-OSPRI) Operations 2018-2019		
Operational Name	**Hectares**	**Servive Provider**
Kirikau	9,861	External (To be tendered)
Waimiha	14,313	External (To be tendered)
Te Hape	8,871	External (To be tendered)
Taumarunui Rollback	15,930	External (To be tendered)
Taringamutu	6,188	Internal Team - Taumarunui
Raetihi Buffer Stage 1	5,940	External (To be tendered)
Papaiti Stage 2	8,996	External (To be tendered)
Niho Niho	16,437	External (To be tendered)
Hiwi	23,776	Internal Team - Taumarunui
Mangakahu	16,648	Internal Team - Taumarunui
Makino North	5,093	External (To be tendered)
Mangaohane	7,602	External (To be tendered)
Hikumutu	15,939	External (To be tendered)
Rangiwae	7,800	External (To be tendered)
North Whangaehu	8,092	External (To be tendered)
Kaitieke PCO	13,067	External (To be tendered)
Total New Work	184,555	Assuming everyone “opts in”

Deferred Operations 2018-2019		
Operational Name	**Hectares** Note includes areas of opt outs in these PCO’s	**Reason for deferral (all low RTC)**
Akitio Eastern	9,662	0.7 RTC (predicted from PosSim model)
Akitio Western	7,685	0.5 RTC (predicted from PosSim model)
Ballance	11,078	0.4 RTC (predicted from PosSim model)
Branscombe	11,218	0 RTC (monitored 2017-18)
Branscombe Coast	8,008	1.1 RTC (predicted from PosSim model)
Coastal Sanson	12,550	0.2 RTC (predicted from PosSim model)
Creek	5,446	Aerial Block (High percentage of opt out)
East Alfredton	6,344	0.9 RTC (predicted from PosSim model)
Halcombe	6,088	0.8 RTC (predicted from PosSim model)
Haunui	7,922	1 RTC (predicted from PosSim model)
Kairanga	18,443	0.1 RTC (predicted from PosSim model)
Kimbolton	7,666	1.4 RTC (predicted from PosSim model)
Kumeroa	10,251	0.1 RTC (predicted from PosSim model)
Lismore	6,342	0.6 RTC (monitored 2017-18)
Makino	12,767	1.8 RTC (monitored 2017-18)
Makuri B	8,709	1.3 RTC (predicted from PosSim model)
Mangamahu	13,080	0.6 RTC (predicted from PosSim model)

Deferred Operations 2018-2019		
Operational Name	**Hectares** Note includes areas of opt outs in these PCO's	**Reason for deferral (all low RTC)**
Marton	14,924	0.5 RTC (predicted from PosSim model)
Mataroa	8,890	0.5 RTC (predicted from PosSim model)
Maunga	11,741	1.5 RTC (monitored 2017-18)
Nga Rata	7,102	0.6 RTC (predicted from PosSim model)
Ohutu	10,024	0.1 RTC (monitored 2017-18)
Oporae East	13,249	0.2 RTC (predicted from PosSim model)
Oporae West	10,287	1.2 RTC (predicted from PosSim model)
Oringi	13,041	0.1 RTC (monitored 2017-18)
Otope	13,185	2.1 RTC (predicted from PosSim model)
Pongaroa	14,120	0.1 RTC (monitored 2017-18)
Pukeokahu	15,724	1.1 RTC (predicted from PosSim model)
Ratana	7,025	0.1 RTC (monitored 2017-18)
Rongomai	6,800	0.6 RTC (predicted from PosSim model)
Rongotea	16,500	0.8 RTC (predicted from PosSim model)
Sandon A	6,732	0.1 RTC (predicted from PosSim model)
Taihape Buffer South	3,113	0 RTC (monitored 2017-18)
Tautane	5,895	0 RTC (monitored 2017-18)
Tokirima	9,152	1.2 RTC (predicted from PosSim model)
Waihoki	11,892	0.1 RTC (predicted from PosSim model)
Waimarino Pipipi	899	Ground 1080 (3 yearly cycle)
Waione	12,117	0 RTC (monitored 2017-18)
Waitarere	5,769	0.2 RTC (predicted from PosSim model)
Waituna West	6,100	0.1 RTC (predicted from PosSim model)
Whangaehu	9,354	0.4 RTC (predicted from PosSim model)
Total Deferred	396,893	Includes opt outs of 22,090 ha Total area excluding opt outs is 374,803 ha

OVERALL POSSUM CONTROL OPERATION 2018-2019	
Operation Type	**Area (Hectares)**
Total Maintenance operations –opt ins only	733,161
Total New operations – assumes all opt ins	184,555
Total Deferred operations –opt ins only	374,803
Total Area PCO 2018-2019	1,292,519

Report No.	18-131
Decision Required	

SCIENCE & INNOVATION OPERATIONAL PLAN 2018-19

1. PURPOSE

1.1. This item is to present to Council the Science & Innovation Operational Plan for the 2018 19 year

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-131 and Annex.

b. recommends that Council formally adopts and releases the 2018-19 Operational Plan annexed to this item.

3. FINANCIAL IMPACT

3.1. There are no financial impacts associated with this item. The Operational Plan reflects previously endorsed budgets approved as part of Council's annual planning and long term planning processes. The Operational Plan also outlines a range of collaborative and/or externally funded projects.

4. COMMUNITY ENGAGEMENT

4.1. The community have had the opportunity to comment on budgetary aspects of the Operational Plan referred to in this item as part of the engagement and submissions run during the annual and long term planning processes. The science programme will continue to be communicated via Environment Committee and a range of other mechanisms.

5. SIGNIFICANT BUSINESS RISK IMPACT

5.1. There is no significant business risk associated with this item.

6. DISCUSSION

6.1. As Horizons' Science and Innovation Team, our goal is to inform and support decision making around the sustainable development of our Region's natural resources. This includes the management of land, water, air and biodiversity. In addition to Horizons' core monitoring programmes, the Operational Plan sets out the functional tasks, projects and overarching work programmes for the Science and Innovation Team during the 2018-19 reporting year.

6.2. In addition to delivery of our core monitoring programmes, key outputs for the reporting year include improving systems and processes around the management of drinking water supplies, investigating future climate change impacts in the Whanganui Catchment, supporting Accelerate25 initiatives and Our Freshwater Future, as well as further developing our knowledge of how our actions and interventions can provide better outcomes for biodiversity, water quality and our coastal environment.

6.3. Our aim is to deliver a forward-thinking, effective and efficient research and monitoring programme that continues to improve our knowledge. This includes providing targeted science and research to underpin sustainable resource management decision-making, as well as guiding policy implementation and future development. Communication of our science to the people of our Region will continue to be a focus, with the development of a new science communication strategy and launch of our next State of Environment Report in 2018.

7. SIGNIFICANCE

7.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Abby Matthews
SCIENCE & INNOVATION MANAGER

Jon Roygard
GROUP MANAGER - NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Science & Innovation Operational Plan 2018-19

Draft

Science Operational Plan 2018-19

July 2018

Annex A

Endorsed by Council at the Environment Committee meeting on _____

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EXECUTIVE SUMMARY

Public interest in our environment and the management of our natural resources continues to grow. Climate change, natural hazards, changes in freshwater quality and threats to our native biodiversity present challenges in terms of how our environment should be managed. Technology is rapidly advancing and there is an increasing need for ready access to data and information. As resource managers, we must strive to not only keep pace but forge ahead to ensure the right information is ready, available and accessible when decisions need to be made.

Striking the balance between enabling growth and protecting the environment understandably generates tension within communities. Changes in land use and demand for resources have placed significant pressure on our natural environment and infrastructure. Climate change adds further complexity as we consider the impact of our actions today on the future of the Region's air, biodiversity, land and water.

However, challenge is accompanied by opportunity. Our science and research programme continues to improve our understanding of our Region, helping us make good decisions and target interventions more effectively. Increasing public awareness and interest in the management of natural resources provides an opportunity to work together with stakeholders and our communities, empowering people to contribute toward making our Region a great place to live, work and play.

As Horizons' Science and Innovation team, our goal is to inform and support decision making around sustainable development of our Region's natural resources. This includes the management of land, water, air and biodiversity. The Science and Innovation team identify five values that underpin our service to Horizons, Council and our community. One of these values is maintaining a strong customer focus. This value will provide the overarching theme for the 2018-19 Science Operational Plan.

Our aim in 2018-19 is to deliver a forward-thinking, effective and efficient research and monitoring programme that continues to improve our knowledge. This includes providing targeted science and research to underpin sustainable resource management decision-making, as well as guiding policy implementation and future development. Communication of our science to the people of our Region will continue to be a focus, with the development of a new science communication strategy and launch of our next State of Environment Report in 2018.

In addition to delivery of our core monitoring programmes, key outputs for the reporting year include improving systems and processes around the management of drinking water supplies, investigating future climate change impacts in the Whanganui catchment, supporting Accelerate25 initiatives and Our Freshwater Future, as well as further developing our knowledge of how our actions and interventions can provide better outcomes for biodiversity, water quality and our coastal environment.

This operational plan sets out the functional tasks, projects and overarching work programmes for the 2018-19 reporting year. We look forward to sharing progress with you throughout the year.

Abby Matthews
SCIENCE AND INNOVATION MANAGER

Jon Roygard
GROUP MANAGER - NATURAL RESOURCES AND PARTNERSHIPS

CONTENTS

1. Introduction

The key role of Horizons' Science and Innovation team is to inform evidence-based decision making through the provision of information and technical advice. As such, the team is an "enabling" team in Horizons with a part to play in coordinating the collection and dissemination of quality information at each stage of the process – including how best to collect the data in the field, data storage, analysis and reporting information to consumers. The team gathers a significant amount of information through Horizons' own monitoring and research, and by working with other Regional Councils, Central Government and science providers.

In terms of organisational structure, the Science and Innovation team sits within the Natural Resources and Partnerships group, which includes implementation teams for biodiversity, biosecurity, land and freshwater. A key function of the Science and Innovation team is co-ordination and delivery of a range of monitoring and research functions to support those activities in collaboration with those other teams.

The focus of the Science and Innovation team continues to evolve in response to our community's needs and the requirements of Central Government. While freshwater continues to take centre stage, developing our understanding of both land and water is necessary to support and inform action. With 'Our Freshwater Future' we will take steps – in collaboration with our community – toward giving effect to the National Policy Statement for Freshwater Management 2014 (NPS-FM) and reviewing our existing tools and techniques for managing natural resources in our Region.

In recent years, there has been development and review of core monitoring programmes to ensure that these programmes provide information relevant to the Regional Council's need for State of Environment reporting. The benefits of these monitoring programme upgrades are now showing through in products such as a regular data feed into the Land, Air and Water Aotearoa (LAWA) website, and the informed development of non-regulatory programmes to address water quality issues such as the Manawatū and Lake Horowhenua Accords, land management including our Sustainable Land Use Initiative (SLUI), biodiversity initiatives and biosecurity response.

During the development of the One Plan, the Science and Innovation team had a considerable focus on informing policy development. Careful consideration has been given to align work programmes with the objectives, methods and anticipated environmental results set out in the One Plan, to support the Council's need to monitor and report on policy effectiveness. The team is also required to be responsive to changes in national policy, environmental standards and new legislation, and these changes are taken into account when setting our work programme and strategic direction. Of particular focus at present is accommodating any future changes to the NPS-FM, and likely amendments to the National Environmental Standards (NES) for Sources of Human Drinking Water and NES for Air Quality. The work programme of 2018-19 will also need to inform potential plan change processes for the One Plan nutrient management rules, as well as the longer-term catchment review process that Horizons will undertake with 'Our Freshwater Future'.

Developing tools to support decision-making is increasingly a focus for Horizons. In the fast-paced world in which we live, there is an increasing need to seek efficiency gains in data collection, processing and reporting. This can, in part, be delivered through improvements to existing processes and systems which requires an organisation-wide commitment to delivery and prioritisation of activities that promote improvement. Increasing the transparency of our workflow, from collection, processing and analysis through to reporting and dissemination of information is also key to building trust in our science and research.

Providing data and information across multiple channels such as LAWA, Horizons website, newsletters, radio, and in print ensures that we better connect with our community. There are many opportunities to increase productivity, including efficiency gains in terms of provision of information, and these opportunities will continue to be actively explored and championed.

Finally, providing scientific advice and guidance is a fundamental part of our work programme. In addition to responding to requests for data, information and advice, the Science and Innovation team are preparing public information and guidance to better communicate our science and research. This year our focus will be on the delivery of a science communication strategy and our 2018 State of Environment Report.

2. 2018-19 Work Programme

Horizons' science monitoring and research activity is divided across four key areas, as set out in Horizons' Long-term Plan (LTP): Water Quality and Quantity; Land Management; Biosecurity and Biodiversity; and Environmental Reporting and Air Quality Monitoring.

Work programmes are allocated across a number of portfolios overseen by the Science and Innovation team. They include: Air, Biodiversity, Land, Fluvial, Water Allocation, Groundwater, Water Quality Monitoring and Research, and State of Environment Reporting and Policy Monitoring.

Staff and Resourcing Requirements

Delivery of the Science Operational Plan requires staff time to oversee the management of science portfolios, carry out monitoring and research, and provide support for policy effectiveness monitoring and policy development and implementation. The role of the Science and Innovation team also includes the provision of technical advice and information to Horizons staff, Council and the public, as well as participation in national research programmes and reporting on the state of the environment. This includes support for both regulatory functions such as Consents and Consents Monitoring and non-regulatory functions such as the Manawatū and Lake Horowhenua Accords, land management including our Sustainable Land Use Initiative (SLUI), and biodiversity and biosecurity work programmes.

Monitoring, data processing and provision of data and information is also provided by Horizons' Catchment Data team, as well as external contractors. An agreed annual work programme for services provided by the Catchment Data (Hydrology) team is set out in the Hydrology/Science Memo, detailing both the core work programme and direct requests that are associated with specific projects. A similar service agreement exists between the Science and Innovation and Catchment Information teams.

During 2018-19, we will be working to build both data management and geospatial capability within the Science and Innovation team to ensure that the team is well-placed to support its own needs, as well as utilising the expertise of others. Recruitment for any future staff vacancies will include this focus.

Budget

The science programme has an annual budget of $5,921,142 for 2018-19 that is primarily funded by a mix of rates ($4,290,892) and resource user (also known as "Section 36") charges ($1,590,250).

The annual rates are specified in the Annual Plan and funding is spread over four activities: Water Quality and Quantity, Land, Biosecurity and Biodiversity, and Environmental Reporting and Air Quality Monitoring. Resource user charges are associated with both surface and groundwater quantity and quality activity, and gravel use.

For some work, the Horizons' Science and Innovation team is contracted by others to complete monitoring or science work, with the revenue contributing to the overall budget. In the 2018-19 budget for Miscellaneous Revenue, this includes $40,000 for monitoring carried out by Horizons on behalf of consent holders.

Additional sources of funding include:

- Envirolink – a contestable fund where generally up to $120,000 per annum is secured to complete a range of small advice grants of up to $5,000, medium advice grants of up to $20,000 (or up to $40,000 with a partner council). Tools grants are also available for significant, nationally relevant projects that exceed $200,000. It is noted that this funding is not received to Horizons accounts, but is directly paid to the external science providers.
- Co-contributions sourced from external research programmes funded through our collaborative research programme with Massey University, the National Science Challenges, MBIE Endeavour Fund, Crown Research core funding, Sustainable Farming Fund, as well as research supported by the Ministry for the Environment and industry groups such as DairyNZ.

Implementation and Reporting

The delivery of the science programme, including reporting on project progress and summary information, is primarily made to Council though the Environment Committee, with occasional reporting to Strategy and Policy, Regional Council and Catchment Operations Committees when appropriate.

Performance measures are set out for each activity area and generally require a specified number of reports (five) to be provided to Council throughout the reporting year. These performance measures are set out in each section of this report. The Long-Term Plan (LTP) process in 2017-18 has enabled a review of these targets and several new measures have been added, including the move to an annual State of Environment report and the addition of measures for the new work funded in the LTP for climate change and drinking water research.

Programme outputs can include technical reports, public information and community engagement. Where appropriate, publications are circulated among staff, Council, research partners, key stakeholders and the public. These are released throughout the year, as they are made available.

Key Deliverables

Key deliverables for the Science Programme during 2018-19 are set out in Table 1.

Table 1 Key deliverables for Horizons' Science Programme 2018-19

Water Quality and Quantity
▪ Deliver core monitoring programmes for water quantity and quality, and biomonitoring ▪ Review groundwater allocation limits ▪ Provide support to One Plan review and 'Our Freshwater Future' including catchment accounting ▪ Report on Horizons' regional swimability target ▪ Prioritise our lake monitoring programme ▪ Complete estuary habitat mapping of Manawatū, Whanganui, Waikawa, Hōkio and Kai Iwi Estuaries, and sedimentation monitoring of Whangaehu Estuary
Land Management
▪ Complete fluvial surveys of the Pohangina and Whangaehu catchments ▪ Investigate contamination of Bulls public water supply by per- and poly-fluoroalkyl (PFAS) primarily arising from the use of fire-fighting foam.

▪ Advance and report on sediment transport investigations in the Oroua catchment
▪ Support research into the management of nutrients in the Region
Biosecurity and Biodiversity
▪ Deliver core monitoring programmes for wetlands and forest fragments
▪ Complete a stocktake of all managed sites
▪ Implement the Singers and Rogers ecosystem classification system
Environmental Reporting and Air Quality Monitoring
▪ Deliver core monitoring programme for air quality
▪ Investigate climate change impacts on flood management in the Whanganui catchment
▪ Delineate drinking water protection zones and inspect groundwater bore supply infrastructure
▪ Report on the State of the Environment and develop a framework for annual reporting
▪ Ensure environmental data is made available to the public via the LAWA website
▪ Undertake an annual public education campaign around air quality
▪ Produce an annual activity report for Science and Innovation

3. Water Quality and Quantity

The Water Quality and Quantity activity focusses on improving knowledge and understanding of the Region's water resource.

Supporting 'Our Freshwater Future' and implementation of requirements under the National Policy Statement for Freshwater Management 2014 (NPS-FM) will be a priority for the coming year. The new 2017 Clean Water package requires Councils to develop a long-term work programme around improving water quality in major river systems and lakes throughout New Zealand. Horizons has decided on a regional target of 70% swimable rivers by 2040, and a plan outlining how we will meet this target is due to the Ministry for the Environment (MfE) by December 2018.

During 2018-19, we will continue supporting the implementation of the One Plan and also provide technical input into potential plan change processes around nutrient management. Meeting the reporting needs of the National Regulations for measurement of air quality and water takes will continue to be a focus. National changes to the management of public drinking water have prompted Horizons and our Territorial Authorities to take action. A work programme was established during 2017-18 and this will continue, with additional investment, through the 2018-28 Long-term Plan. Potential changes to the National Environmental Standard for Sources of Human Drinking Water will also be a focus for the Science and Innovation team during the reporting year.

Implementation of the Accelerate25 programme requires a good understanding of water availability to support regional growth initiatives. Characterising our freshwater systems and improving our understanding of the interactions between land and water, and availability of water for use is required to inform decision-making at a regional level.

With the recent introduction of our coastal, lakes and estuary monitoring programmes, we will continue building knowledge of our lakes and coastal environment during 2018-19.

Finally, this information will also be useful to inform decision-making, State of Environment reporting and, in some cases, measurement of policy effectiveness. A key focus for the team will be improved reporting of water quality and water quantity information, along with the production of the 2018 State of Environment Report. We will continue to work closely with our Freshwater team and Partnerships, Land, and Biodiversity, Biosecurity and Partnerships teams to inform implementation of non-regulatory programmes.

The 2018-19 Annual Plan sets out a budget of $4.886 million for Water Quality and Quantity activities. Water Quality activity will have a dedicated operating expenditure of $2.456 million. This includes additional funding introduced in 2018-19 to continue our expanded swim spot monitoring programme. Water Quantity activity (including Water Allocation and Groundwater Management) will have a dedicated operating expenditure of $2.431 million.

Water Quality and Quantity monitoring and research programmes will be measured against the following performance measure:

Performance Measures for Levels of Service	Annual Plan 2018-19
Improve Knowledge and Understanding of the Region's Water Resource	
Water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website.	Data provided to LAWA as required
Annual report on water quantity and quality monitoring, and research activity.	Develop an annual reporting framework and produce an annual report

3.1. Monitoring Programmes

Monitoring programmes are carried out across the Region to track changes in the state of the environment, as well as identify areas of emerging pressure. A table showing the breakdown of sites for each freshwater management unit (FMU) is presented as Appendix 1 of this Science Operational Plan 2018-19.

Water Quantity Monitoring

Objective: To track changes in the state of environment and identify areas of emerging pressure. A further objective is to quantify water use and to ensure that Horizons meets the requirements of the National Regulations on Water Measurement and Reporting and the requirements under the One Plan, while also providing meaningful data for future freshwater accounting, as required by the National Policy Statement for Freshwater Management 2014 (NPS-FM).

Context: Horizons undertakes a wide range of monitoring relating to water quantity including measurement of river level, flow, rainfall, soil moisture, lake and groundwater levels and water use. Data and information is collected from monitoring sites throughout the Region to measure the environmental response to policy in time and space, and understand the effects of water use on existing users as well as the environment. The programme also helps to assess compliance with requirements of Resource Consents, National Regulations and to assist resource management decision-making.

As part of the implementation of our core monitoring programmes (water allocation, groundwater quantity and water use), we are required to account for the resources allocated to the Catchment Data (Hydrology) and Survey teams so that they can undertake the core work programme. Throughout the year this work is guided by the Hydrology/Science Memo that describes the contents of the core hydrology programme for the year and outlines any direct requests by the Science and Innovation team for time from the Catchment Data team.

Water metering is a fundamental component of managing water allocation. The data is crucial for assessing the actual volumes of water taken compared to consented volumes. The actual water use information is used for assessing consent compliance and assisting in resource management decision-making. The water metering programme is also vital for meeting Horizons' requirements under the National Regulations on Water Use Measurement and Reporting, and requirements under the One

Plan and NPS-FM. The project is delivered by a cross-organisational water metering team involving members from Catchment Data, Consents Monitoring and Science and Innovation.

The programme continues to grow as more consent holders upgrade infrastructure to ensure compliance with the regulations and adopt technology that helps improve efficiency of use. During 2018-19, we will maintain resourcing to this work programme to ensure the field team can keep pace with the demand for telemetry infrastructure installation and ongoing maintenance. We will also be focussing efforts on quality assurance around the water metering data and information to advance the implementation of compliance reporting.

A focus for 2018-19 reporting year will be processing and analysing data for the annual report to the Ministry for the Environment, and the 2018 State of Environment Report. Provision of data to resource users and the public via Horizons' WaterMatters website and LAWA – the national repository for publically available environmental information – is a core function of this programme. Checking on and prioritising data processing is a key role for staff in this project.

Budget: A budget of $1,238,480 is set aside for staff time, laboratory budget and travel time associated with water allocation, groundwater quantity and water metering programmes.

Annual Performance Measure: Improve knowledge and understanding of the Region's water resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"* and ensuring that *"water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website"*.

Partnerships: Catchment Data, Survey, Catchment Information, Strategy and Policy teams, Crown Research Institutes, Territorial Authorities, Public Health Officers, irrigation suppliers, water users and Ministry for the Environment.

Water Quality Monitoring

Objective: To track changes in the state of environment and identify areas of emerging pressure.

Context: Horizons undertakes a wide range of environmental monitoring programmes, including climate, soil moisture, surface water (including rivers and lakes) and groundwater quantity and quality, water use, coastal, estuary and seawater intrusion. Data and information is collected from monitoring sites throughout the Region to:

- Understand and report on environmental state and trend at sites depicting the cumulative catchment (zone) outputs;
- Identify the drivers of deteriorating water quality (issues including and in addition to point-source discharges);
- Measure the environmental response to policy in a temporal and spatial context;
- Understand the effects of land use and discharges on water quality;
- Monitor ongoing effectiveness of management interventions such as the Manawatū and Lake Horowhenua Accords and SLUI programme;
- Assess compliance with the requirements of resource consents and national regulations while also assisting resource management decision-making; and
- Undertake monitoring contracted for external parties and to ensure costs of monitoring are recovered from external agencies.

Much of this work is undertaken by the Catchment Data team (Hydrology) and guided by the Hydrology/Science Memo, which sets out our service level agreement and prioritised work plan for the year.

During 2018-19, a key focus will be progression toward aligning our processes with the new National Environmental Monitoring Standard for Discrete Water Quality. The first component of this will be to test how Horizons' current monitoring differs from the new standard and identify any implications for adopting the nationally-consistent protocol.

An assessment of water quality state and trends, and compliance with One Plan targets and National Objectives Framework (NOF) attributes will also be completed.

Provision of data to resource users and the public via Horizons' WaterMatters website and LAWA – the national repository for publically available environmental information – is a core function of this programme.

Budget: A budget of $1,810,058 is set aside for staff time, laboratory budget and travel time for our surface water and groundwater quality monitoring programmes.

Annual Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"* and ensuring that *"water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website"*.

Partnerships: Catchment Data, Survey, Catchment Information, Strategy and Policy teams, Crown Research Institutes, Ministry for the Environment, Territorial Authorities, Public Health Officers, irrigation suppliers, water users.

State of Environment Monitoring - Biomonitoring

Objective: To monitor and report on the health of the aquatic ecosystem, and identify areas of emerging pressure.

Context: Water quality management is strongly related to biological outcomes in rivers, lakes and estuaries. This programme includes a range of measures and indicators of aquatic ecosystem health in waterways around the Region.

The aim of the project is to:

- Monitor indicators of ecosystem health such as nuisance algae, macroinvertebrates and fish to determine state and trends in the Region;
- Undertake biosecurity surveillance for the presence of *Didymosphenia geminata* (didymo) within the Region's high-risk waterways, as agreed through the Lower North Island (didymo) Regional Response Group;
- Monitor the effectiveness of regional (One Plan) and national policy (National Policy Statement for Freshwater Management 2014);
- Assess the effectiveness of catchment rehabilitation work being undertaken by the Freshwater and Partnerships team, including initiatives such as the Manawatū River Leaders Accord;
- Improve our understanding of cause and effect with regard to water quality and aquatic ecosystem health, from activities such as land use practices and discharges of waste to water and land; and

- Identify areas of pressure for catchment-scale investigations and targeted management intervention.

Figure 1: Fish monitoring in the Upper Manawatū (Image courtesy of Brad Boniface)

During 2018-19, the biomonitoring programme will continue as it has in previous years. The Ōhau and Waikawa study is due to conclude early in the reporting year. However, it is important that we assess the data collected to date and ensure that we have sufficient information before making decisions around the future monitoring network design, and this will be carried out during the reporting year.

We will be reporting on the outcome of the periphyton (algae) ammonia uptake work completed by NIWA in 2017-18. The joint research programme with DairyNZ and NIWA includes research into drivers of periphyton growth and macroinvertebrate health. Annual reporting on periphyton and macroinvertebrate state and trends will also be provided within the reporting year in conjunction with the broader assessment of water quality state and trends, and compliance with One Plan targets and NOF attributes.

Budget: Biomonitoring costs are shared with the water quality monitoring programme as these programmes are carried out in tandem. However, an additional $360,673 is set aside for biomonitoring-related costs including staff time, sample processing, equipment and external consultancy costs.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"* and ensuring that *"water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website"*.

Partnerships: Freshwater and Partnerships team, Cawthron Institute, NIWA.

Swim Spot Monitoring

Portfolio: Water Quality

Objective: To determine the suitability of freshwater and marine sites with regard to health risks of contact recreation in the coastal environment; identify areas for targeted management interventions; and monitor the effectiveness of water quality policy.

Context: Horizons' swim spot (contact recreation) monitoring programme includes testing for microbiological water quality in rivers and lakes, as well as our coastal area. We also monitor for the presence of potentially toxic algae in rivers and lakes used for recreation (benthic *Phormidium* in rivers and a range of planktonic cyanobacteria in lakes). In 2016-17, the monitoring programme was expanded from 17 to more than 80 popular swimming spots around the Region so 2018-19 will be the third year that we have run this expanded programme.

The programme is run in close collaboration with the MidCentral District Health Board (DHB) and Territorial Authorities (TAs). The DHB is responsible for ensuring appropriate health warnings are in place if a site is unsuitable for swimming. Our TAs oversee the maintenance and management of a number of public reserves and recreation areas so we work with each district to ensure that we are monitoring suitable sites. Guidance around the roles and responsibilities of each authority are set out in the Ministry of Health's Microbiological Water Quality Guidelines for Recreational Water (2003).

In the Region's rivers, the presence of potentially toxic algae (*Phormidium*), also known as cyanobacteria or blue-green algae, has been notable over the past decade. In some cases, the presence of potentially toxic algae has led to closure of swimming spots because abundance is above the New Zealand Guidelines for Cyanobacteria in Recreational Freshwaters (interim guidelines).

Monitoring is used to identify areas for further investigation, employing methods such as faecal source tracking - a genetic technique that uses a range of marker genes to identify faecal sources from human, bird and other animals. Tools such as faecal source tracking assist in targeting further response to address the key issues so that we can continue to improve water quality for contact recreation.

Budget: $177,126 for monitoring and swim spot public campaign.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an "*annual report on water quantity and quality monitoring and research activity*" and ensuring that "*water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website*".

Partnerships: Freshwater and Partnerships team, Ministry of Health, Ministry for the Environment and Crown Research Institutes.

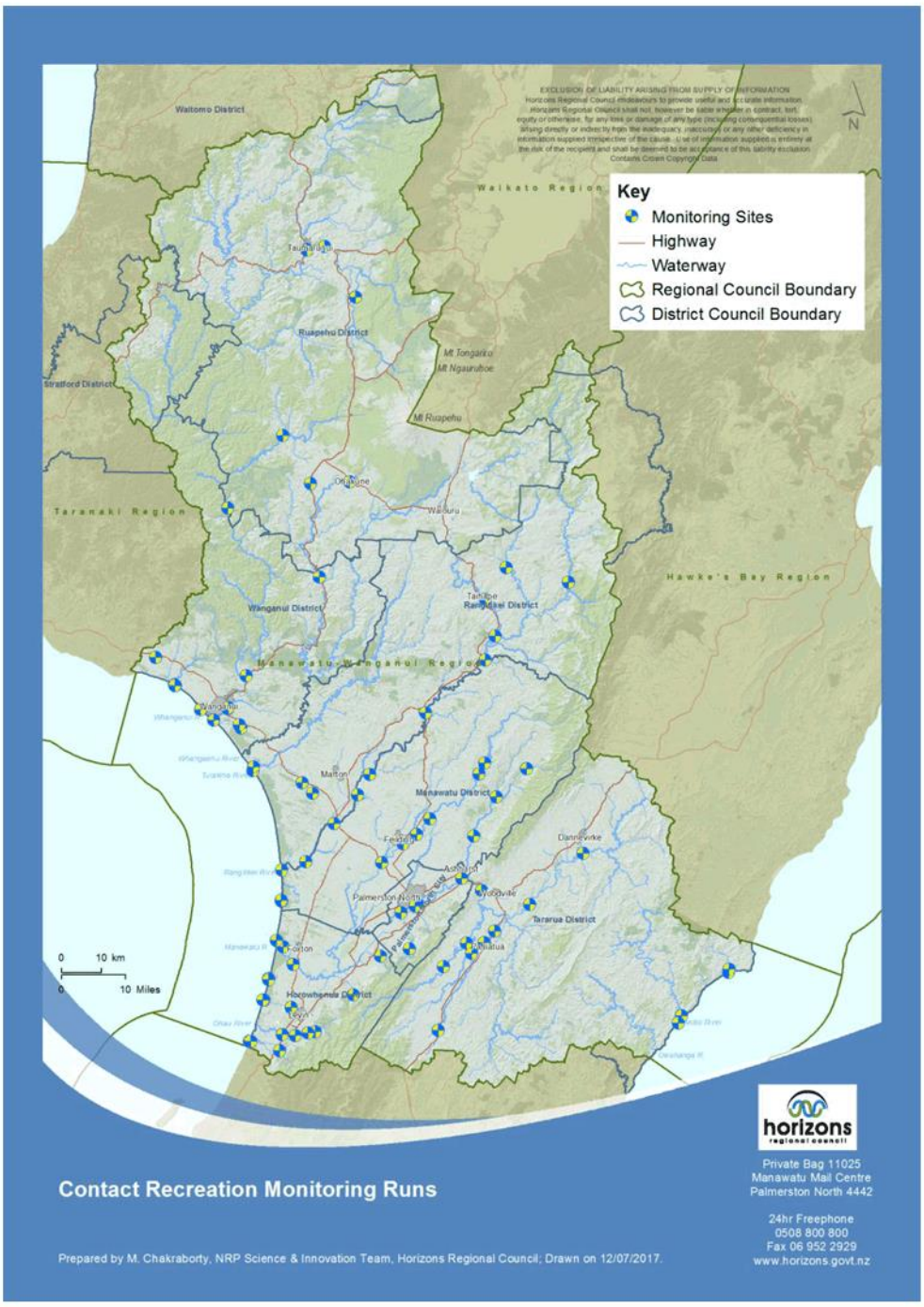

Figure 2: Map of Regional Swim Spots for the 2018-19 year.

3.2. Information Management

Portfolio: All portfolios.

Objectives: To seek continuous improvement to Horizons' management systems for environmental data; to ensure there is one source of the truth for environmental data collected and maintained by Horizons; to ensure Horizons' data management processes are aligned with national data standards; and to maximise efficiency in the collection and use of data.

Context: Environmental data is acquired from numerous sources including Horizons teams, drillers, consent applicants, consent holders and consultants. At present, data are stored in various places and utilised to various extents. There is a need for ongoing continuous improvement to ensure data and information are robust and that there is efficiency of access and ongoing reliability in the collection, processing and storage of data.

Project objectives include centralising data and ensuring compatibility of datasets and software for future use by all end users; improving accessibility and efficiency to enable end users to have access to all appropriate datasets and ability to extract data in a timely manner; improving both the quality and reliability of the data by developing and implementing a quality management system; and enabling Horizons science staff to improve data interpretation by incorporating data into industry standard software packages for data interpretation.

The data management work programme for 2018-19 includes:

- Further development of the automated quality control process to incorporate the National Environmental Monitoring Standards (NEMS) quality coding requirements, with data processing steps to follow once the NEMS has been finalised;
- Integration of groundwater data from across a range of databases and quality assurance of these data.
- Improvements to software used to store and manage water quantity and quality information (Groundwater Database, Hilltop and Hilltop Sampler);
- Continued development of field data capture to improve efficiency and quality of data collection;
- Exploring options to update the freshwater bio-data archival system developed by Cawthron Institute, to enable direct importing of in-field electronic data, automatic QC process, and incorporation of fish length and habitat data;
- Developing a system to improve the tracking of science information requests, and recording of information around permitted activities e.g., domestic wastewater, water use, vegetation clearance and forestry harvesting, in a manner that can be more efficiently reported and tracked over time; and
- Historical data archiving including groundwater level data and flow data in Qualarc, water quality data from Qualarc that matches gauging sites and parameters such as metals not carried over for the current network.

Budget: $267,604 has been set aside for staff time to improve our data management systems and processes, as well as covering licensing for software.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"* and ensuring that *"water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website"*.

Partnerships: Catchment Information, Catchment Data, and information technology teams, software providers, Regional Councils.

3.3. Catchment Characterisation

Portfolio: Groundwater and Water Quality

Objectives: Provide a collective analysis of catchment information on the state and trends for each Freshwater Management Unit (FMU) to:

- Inform Horizons' science monitoring and research programmes, including validate and/or establish representative monitoring sites for catchments at FMU, catchment management zone and sub-zone scale, and to guide research to targeted issues;
- Establish a framework for catchment-scale reporting;
- Incorporate community values (the four well-beings required by legislation) including social, cultural and economic as well as environmental;
- Measure the success of active management and remediation and/or intervention in maintaining and/or enhancing water quality and meeting regional and national policy objectives; and
- Act as a communication tool for stakeholders.

Context: To adequately manage the natural environment we must first understand our catchments, their natural characteristics and suitability for different activities. This enables us to manage our environment within its natural limits, inform decision-making and ensure that future development considers these characteristics. In recent years we have focused on the Manawatū catchment (Mangatainoka River) and more recently on the Ōhau and Waikawa catchments – all of which are identified as target catchments for nutrient management within Horizons' One Plan.

In 2018-19, we will continue our characterisation of the Rangitikei River catchment, with further investigation into the fate and transport of nutrients in groundwater and surface water systems. This is being undertaken directly through three key work programmes:

1. NIWA's five-year National Hydrological Project which is being carried out in partnership with Regional Councils, Landcare Research and GNS Science;
2. Our Land and Water National Science Challenge: Physiographic Environments of New Zealand – the national application of a physiographic science approach to catchment characterisation; and
3. Our collaborative work programme with Massey University for which three new PhD studies have been proposed.

Supported by funding and in-kind support from Horizons, researchers from across these organisations will work with input from the Science and Innovation team to advance our understanding of catchment characteristics and dynamics. A number of these programmes run across multiple years and while each programme will have tangible outputs during the next five years, final reporting is not anticipated during the reporting year.

National Hydrological Project

The National Hydrological Programme is a five-year core-funded NIWA research programme that aims to develop a national modelling framework for catchment characterisation and contaminant accounting in response to the requirements of the National Policy Statement for Freshwater Management (NPS-FM). The work programme includes developing a national geospatial database and complete characterisation of catchments in terms of their soils, geology, water flow paths and lag

times. Three regions (Horizons, Southland and Gisborne) have been selected to inform the development of the modelling framework, and the programme is to run collaboratively with representation from each organisation.

The outputs during the reporting year will be a geospatial database version 1.0; the Digital Network 3 version 1.0; GIS layers and associated metadata; and guidance documents on data layers, data collection and data provision to the Crown Research Institute consortium (NIWA, GNS, Landcare Research).

Our Land and Water: Physiographic Environments of New Zealand

A number of key catchment characteristics are likely to influence water quality outcomes and these characteristics are often readily identifiable. Key characteristics include physical, chemical and/or biological environmental attributes such as soil characteristics, geology, and water chemistry that can be integrated to better understand the drivers for water quality within different catchments. This approach has provided a useful means of communicating the natural suitability of catchments for different activities such as land use.

This project aims to provide a national physiographic map of New Zealand based on existing regional data. This programme is widely supported by both the research community and Regional Councils through 'Our Land and Water' National Science Challenge. Initial sampling was carried out during 2017-18 with analysis due to be completed during 2018-19.

Massey University Collaborative Research Programme

A key focus for research in the Rangitikei is assessing the denitrification potential of different soil types and the flow paths between farms and surface waters to better understand nutrient transport across/through farms and into waterways. This work underpins our conceptual understanding of the importance of various processes, such as attenuation of nutrients and how management options may influence these. To date, this research has been carried out primarily in the Upper Manawatū and Mangatainoka catchments of the Tararua area. This work programme now moves to the Rangitikei catchment to test the findings of our previous work in a different hydrogeological setting.

Up to three new PhD projects will be initiated during the 2018-19 reporting year. The studies propose to focus on land use impacts on water quality. Further development of these work programmes and scoping of these studies will take place during the reporting year.

Horizons' collaborative research programmes are fundamental to advancing scientific research in our Region. As such, Horizons committed in the Annual Plan 2016-17 to a new investment of $30,000 per annum to support Massey University studies. This investment will ensure the ongoing support and development of this research programme, which is providing crucial insight into the capacity for nutrient attenuation in the subsurface, and will inform regulatory and non-regulatory decision making around land use effects on water quality.

Further support is also provided to Horizons Freshwater and Partnerships team around freshwater management initiatives in the Rangitikei catchment.

Budget: $236,894 in staff and external costs, with additional funding provided by external partners.

LTP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"*.

Partnerships: Massey University, GNS Science, NIWA, Landcare Research, Land and Water Science Ltd., Our Land and Water National Science Challenge, Regional Councils.

3.4. Regional Water Resources

Portfolio: Allocation

Objectives: To provide guidance and information on water resources in the Horizons Region to inform decision-making around the implementation of Horizons' One Plan, and identify opportunities for water use in the Region to support the Regional Growth Accelerate25 programme.

Context: There is a great deal of information about groundwater and surface water availability in the Region which this project seeks to draw together to provide up-to-date information to key stakeholders and the public, while supporting informed decision-making.

Reporting will continue to advance work initiated in 2017-18 and provide an assessment of water resources in the Region, in alignment with regional growth opportunities outlined in the Regional Growth Study and subsequent Accelerate25 implementation programme.

Opportunities identified in the Regional Growth Study and accompanying Action Plan, such as land use optimisation and the production of fresh vegetables and horticulture will require a thorough understanding of water availability. In areas where water resources are subject to pressure or emerging demand for use, this knowledge will inform decision-making around consenting and regulation, as well as opportunities for development in areas where water is currently available for use.

To this end, during 2018-19 we will focus on reviewing the One Plan groundwater allocation framework in light of the science and monitoring that has been undertaken since the inception of the One Plan. This will include reviewing current limits across the Region, and giving further consideration to areas where groundwater and surface water are strongly connected. This work will also inform Our Freshwater Future (section 3.5).

Budget: $53,774 in staff time and external costs. External funding may be sought.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an "*annual report on water quantity and quality monitoring and research activity*" and ensuring that "*water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website*".

Partnerships: Ministry for Primary Industries, Accelerate25, freshwater and partnerships, consents, Consents Monitoring, Rural Advice and Strategy and Policy teams.

3.5. One Plan Changes and 'Our Freshwater Future'

Portfolio: SoE and Policy (and others)

Objectives: To support and inform the implementation of Horizons' Regional Policy Statement and Plan (One Plan) and National Policy Statement for Freshwater Management (NPS-FM) 2014 around freshwater and coastal management.

Context: Implementation of the One Plan and NPS requirements for freshwater management requires support from the Science and Innovation team, particularly around the interpretation of data and information collected by Horizons and others. This work traverses water quality management of both point sources and diffuse sources of contaminants.

The Science and Innovation team also carries out research to complete catchment accounting, document best practice management and develop tools to enable better management. This project continues to provide support to these activities, with a particular focus during 2018-19 on the

management of diffuse nutrient losses from intensive farming and potential plan change processes associated with the One Plan nutrient management rules. The research work is undertaken in close collaboration with our Strategy and Policy, Rural Advice, Consents and Consents Monitoring teams.

During 2017-18 the focus of this work programme was completion of a regional update on state and trends of water quality in relation to regional (One Plan) and national (NPS-FM) targets and values. In 2018-19 resourcing will support delivery of:

- Contaminant source attribution, development of intervention logic, and production of resource accounts and catchment summary documents to support the implementation of activities specified in the One Plan, as well as non-regulatory implementation programmes;
- An analysis and comparison of One Plan and NPS-FM objectives and metrics;
- Provision of technical support and advice around the effects of land use on water quality to support decision-making; and
- Provision of technical support and advice around the management of point source discharges.

Further work with our Strategy and Policy team around policy evaluation and policy effectiveness monitoring will also be ongoing.

Budget: $156,500 for staff time and external costs to advance research and science to support 'Our Freshwater Future'.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"*.

Partnerships: Regulatory group, consent holders, DairyNZ, Federated Farmers, HortNZ, Ravensdown, Foundation for Arable Research (FAR), Fonterra.

3.6. Swimability

Portfolio: Water Quality Monitoring and Research

Objectives: To meet requirements of the Ministry for the Environment around national swimability targets and implementation of the National Policy Statement for Freshwater Management (NPS-FM) 2014.

Context: The Ministry for the Environment recently consulted on national targets to improve swimability in New Zealand rivers and lakes by 2040. During 2017-18 Horizons completed a regional case study looking at how action has contributed to water quality outcomes in our Region's rivers. This information set the scene for council discussion around the regional target for working toward the NZ target of 90 per cent of major rivers being swimmable by 2040, with an interim target of 80 per cent swimable by 2040. Horizons is aiming for 70 per cent swimable by 2040.

The Minister for the Environment has requested regional councils report on how they will meet their specified swimability target by December 2018. During 2018 we will continue to map past catchment improvement works and complete our analysis of water quality interventions in relation to water quality changes and outcomes. This will include identifying areas with potential for improvement and prioritising these areas based on water quality information and pressures.

Finally, the project aims to model a range of costs and mitigation options in the Horizons Region to inform the target setting process. This will include prioritisation of interventions for water quality improvement including both water quality benefits and costs.

Budget: $70,195 in staff time for data preparation and programme support.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an "*annual report on water quantity and quality monitoring and research activity*".

Partnerships: Ministry for the Environment, consultancies

Figure 3: Swimming at Waitoetoe Park, Manawatū River

3.7. Stormwater

Portfolio: Water Quality Monitoring and Research

Objectives: To develop a monitoring and research programme to support the implementation of Horizons Regional Policy Statement and Plan (One Plan) and National Policy Statement for Freshwater Management (NPS-FM) 2014 around stormwater management.

Context: Requirements of the NPS-FM include accounting for diffuse and point source contaminants, including from urban discharges such as stormwater. Morphum Environmental Ltd has recently completed an initial gap analysis and opportunities assessment. This included consideration of existing institutional capacity, data availability, environmental drivers and current relevant initiatives such as the Manawatū Accord, Horowhenua Accord and Accelerate-25. This work programme is being led by Horizons, in partnership with the Region's city and district councils.

Further scoping of a long-term work programme will be undertaken during the reporting year. The overarching aim of this work programme will be to improve processes and outcomes around stormwater consenting and management in the Horizons Region. Scope includes developing technical capability, data and information transfer, and consistency with design and delivery across the Region.

If resourcing permits, regional sector approaches to assessing and quantifying, where possible, the contribution of stormwater to overall water quality throughout the Region will also be investigated.

Budget: $6,448 for staff time, external research and reporting.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an *"annual report on water quantity and quality monitoring and research activity"*.

Partnerships: Territorial Authorities, Ministry for the Environment

3.8. Lakes Research

Objective: To advance lake research that prioritises and informs monitoring and implementation programmes to improve the water quality and ecological condition of the Region's lakes.

Context: Investment through Horizons' LTP was introduced in 2015 to investigate the quality of coastal lakes in the Region and identify options for improving biodiversity enhancement where necessary. This monitoring programme includes two main areas: (1) development of a strategy for lake monitoring and research in Horizons' Region; and (2) a programme to monitor the health of other lakes to establish the current state of health and investigate options for their management if needed. In addition to our monitoring of 15 of the Region's lakes, research is underway to improve our understanding of lake systems and processes to better inform their management. Priorities for 2018-19 include:

Lakes Stocktake and Prioritisation

The development and implementation of a comprehensive regional strategy for the management of lakes within the Horizons Region, initiated in 2017-18, is a two stage process.

The initial phase will identify lakes with high values including the presence of sustainable populations of endangered species, regionally and nationally rare communities and protection of representative and unique ecosystems. The second stage identifies threats to these values and development of a management template to guide the prioritisation of actions, and help achieve the most efficient and effective management approach possible.

Each type of lake will have special management needs which will depend on their hydrology, condition, current lake utility and land uses within the catchment. The template will also facilitate the measurement of the consequent environmental outcomes both in the intermediate and long term. Any gaps in the knowledge of the Region's lakes will be identified and where appropriate advice will be provided on the best way to rectify these gaps.

Support for the Lake Horowhenua Accord

The Lake Horowhenua Te Mana o te Wai project and national lake restoration research programme are investigating sediment nutrient legacies in lakes and the potential for management to restore ecological integrity. This work is being conducted in Lake Horowhenua, and includes a team of lake scientists from Massey University, NIWA, University of Otago, University of Waikato and Muaūpoko iwi. Horizons is providing information and data analysis to the accord parties; identification of priority areas within each catchment for works implementation; ensuring actions identified in the second generation action plan are being implemented; completing mapping of lake weed, and working with the Freshwater and Partnerships team to deliver intervention packages associated with Freshwater Improvement Fund projects.

Scientific research to support the implementation of the Horowhenua Accord during the 2018-19 year includes support for the Lake Horowhenua Clean-up Fund, including monitoring and technical advice and support for the use of the sediment management, weed harvesting, fish pass installation and maintenance, and riparian planting.

Lakes 380

The Lakes380 – Our lakes' health: past, present, future project is funded by the MBIE Endeavour fund and run jointly by GNS Science and Cawthron Institute in partnership with iwi and hapū, and supported by several Regional Councils, including Horizons.

Lake sediments function as a natural archive for water quality and biodiversity and this project aims to characterise New Zealand's lakes "by uncovering their environmental history from sediment cores taken from 380 lakes" around NZ. To achieve this, a range of techniques will be employed to characterise both historic and current lake health and investigate the rate and cause of changes over the past 1,000 years.

Twenty-two lakes within the Horizons Region have been selected for the project. Several of these are monitored regularly for water quality to assist in validating information collected from the sediment cores, including Lake Horowhenua (with permission) and Lakes Dudding, Westmere, Wiritoa, Pauri, Kohata, William, Heaton, Waipu, Koitiata, Herbert, Omanuka and Pukepuke Lagoon. To ensure a representative selection of lakes are covered in the project, Karere Lagoon, Lakes Virginia, Pounamu, Otamataraha, Mahangaiti, Colenso, Papaitonga, Poroa, and Voss Lagoon will also be included.

Budget: $74,453 in staff time and external costs, with an additional $20,000 to be sought from Envirolink.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an "*annual report on water quantity and quality monitoring and research activity*".

Partnerships: Freshwater and Partnerships team, River Management group, Muaūpoko iwi, NIWA, Waikato University, Massey University, Otago University, Regional Councils.

3.9. Coastal and Estuarine Environments

Portfolio: Water Quality SoE and Discharge

Objectives: To track changes and report on the state of our coastal and estuarine environments and identify areas of emerging pressure.

Context: Our coastal and marine environment is the ultimate receiving environment for the activities we undertake on land. Developing a better understanding of both the current state and emerging pressures on our coastal and marine environment is required to inform the implementation of Horizons One Plan and assist with decision-making around land and freshwater management, as well as hazard management.

Estuary habitat mapping is already underway throughout the Region and will continue in 2018-19 with a focus on the Manawatū Estuary (the final year of the three-year fine-scale habitat mapping programme for which a final report will also be delivered), Whanganui Estuary (this will be the first year of a three year fine-scale habitat mapping programme), synoptic surveys of the Waikawa (year two of three), Hōkio and Kai iwi Estuaries, and sedimentation monitoring in the Whangaehu Estuary.

During 2018-19, we will advance our knowledge of the Region's coast. A high priority is the interrogation of the existing physical ocean model of the South Taranaki Bight, which will provide a detailed description of the present state of natural coastal processes (such as waves, currents and sand movements); determine the added scientific value of Horizons deploying an offshore oceanographic buoy in its western Coastal Management Area (CMA); and address concerns and

questions about the fate of terrigenous sediments carried into the CMA via the Region's major river systems.

An internal review of the coastal monitoring programme based on advice received by NIWA last previous financial year will be conducted to improve effectiveness of the programme.

Budget: $100,759 for staff and external costs, with an additional $32,000 to be sought from Envirolink.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource through the delivery of an "*annual report on water quantity and quality monitoring and research activity*".

Partnerships: Salt Ecology, Robertson Environmental, NIWA, Cawthron, Regional Councils.

Figure 4: Hokio Estuary, Horowhenua

4. Land Management

Land research and monitoring informs the identification of priorities for management of the Region's land and fluvial resources, and provides for assessments of the effectiveness of these work programmes. The two research programmes overseen by the Science and Innovation team are:

Land Monitoring and Research

Land monitoring and research includes support of the Sustainable Land Use Initiative (SLUI) programme, project work around effluent management and treatment, including on-site wastewater treatment, and further research generally in partnership with others around nutrient management on farms.

Fluvial Monitoring and Research

Fluvial monitoring and research completes monitoring and project work around gravel management and sediment movement/storage in the Region's rivers. A major component of this work is regular cross-section surveys of the Region's rivers to measure changes in river channel capacity. The Fluvial Monitoring and Research portfolio has close connections to other outputs, particularly aquatic biodiversity, environmental monitoring and reporting, and the management of flood protection schemes.

A new focus for this portfolio is a long-term work programme to investigate options that extend the life of the flood protection infrastructure, by improving knowledge about sediment movement and deposition in rivers. This work will be scoped collaboratively with the cross-organisational team and includes new investment through Horizons' Long-term Plan from 2018.

The 2018-19 Annual Plan sets out a budget of $80,607 for Land Monitoring and Research, and $227,242 for the management of Fluvial Resources. Land activity will be measured against the following performance measure:

Performance Measures for Levels of Service	Annual Plan 2018-19
Research and Monitoring	
Annual report on the land and fluvial monitoring and research activity.	Develop an annual reporting framework and produce an annual report

4.1. Gravel Use Monitoring and Reporting

Portfolio: Fluvial

Objective: To complete an analysis of annual gravel use and allocation in the Region, in the context of gravel allocation limits set in policy, consents and flood scheme management documents.

Context: Sustained gravel supply and the efficient allocation of gravel are important for roading and other infrastructure projects. Where, when and how gravel is taken is important for flood scheme management and the ecology of the rivers. This project sets out to provide a regular update of the volume of gravel being removed through consented gravel takes. Quarterly records are regularly reported to Environment Committee.

The fluvial monitoring and research programme is partly funded by way of charges on the amount of gravel used (RMA Section 36 gravel levies). To obtain this revenue, the actual use volume records need to be obtained and the appropriate invoicing needs to be completed. This project also encompasses the administration of the RMA Section 36 gravel levies. The budget revenue for user charges in 2018-19 is $136,345.

Budget: $21,956 to process gravel records, improve data management, and report on gravel use.

LTP and AP performance measure: Land Research and Monitoring to deliver an "*annual report on the land and fluvial monitoring and research activity*".

Partnerships: River Management Group, consent holders.

4.2. Fluvial Surveying

Portfolio: Fluvial and Land

Objective: To complete cross-section surveys of river systems to identify sources and transport of sediment in our rivers, to inform gravel allocation and management, and to provide information for flood management schemes.

Context: The fluvial survey programme is completed as a part of a long-term survey plan that has been developed cross-organisationally and is overseen by the engineering investigations and design team. This project funds cross-section surveys and reports to provide information on the changes in levels, due to aggradation or degradation, of river channels and berms.

River cross-sections are typically completed by the Survey team and funded by the research and monitoring (science) budget. Where negotiated, the River Management group also provides resource for survey costs, project write-ups and documentation. The River Management group typically presents final project documents to the Catchment Operations committee. The focus for 2018-19 will be the Manawatū (Pohangina) and Whangaehu catchments. If resourcing permits, the team will also progress survey work in the Eastern Ruahine area of the Manawatū, which is currently scheduled to follow the Whangaehu catchment.

During 2016-17, the team initiated an analysis of 2006 and 2016 LiDAR data for the Oroua River catchment. Initial analysis was completed in 2017-18, with reporting scheduled for 2018-19 to complete this work programme. This included quantification of sediment volumes, comparing how trends identified in the past decade compare with longer-term bed level trends in the river, and identifying the likely sources of sediment in the catchment.

Figure 5: Surveys of changes in our river systems are an important part of the fluvial and land monitoring and research programmes.

Budget: A budget of $90,503 in staff time and external costs has been set aside to contribute toward fluvial surveying.

LTP and AP performance measure: Land Research and Monitoring to deliver an "*annual report on the land and fluvial monitoring and research activity*".

Partnerships: River Management group, Catchment Data, Catchment Information and Survey teams.

4.3. Contaminated Land

Portfolio: Land

Objective: To advance our understanding of contaminated land and its impacts on the receiving environment, including natural resources, in the Region. During 2018-19 the focus of this work programme is the investigation into detection of per- and polyfluoroalkyl substances (PFAS), primarily arising from fire-fighting foam, in the Bulls public water supply.

Context: The Region has a number of contaminated sites arising from closed landfills, timber treatment sites and other industrial facilities, as well as – for example – former gas works, sheep dips, fuel storage and defence force activities. A programme of work to investigate the impact of such activities in the Region will be scoped during the reporting year.

During 2018-19, this work will focus on investigations into contamination of land and water with per- and polyfluoroalkyl substances (PFAS) primarily arising from the use of fire-fighting foam. This includes reporting on local investigations underway at Ohakea Air Base, the Bulls public water supply and Palmerston North Airport, in addition to the completion of a regional stock take and prioritisation of other potential sites. Additional funding for Horizons to investigate the detection of PFAS in the Bulls water supply was approved by Council in May 2018 and will be completed early in the reporting year.

Budget: A budget of $100,000 has been committed by Council to be funded through Reserves.

LTP and AP Performance Measure: Land Monitoring Methods Research to "*Track changes in the health of the Region's land and fluvial resource*" and "*Inform policy and non-regulatory programme development*".

Partnerships: Consents and Consents Monitoring teams, Territorial Authorities, PFAS All-of-Government group, consultants.

4.4. Innovative Land Use Mapping

Portfolio: Land and Water Quality

Objective: To explore innovative techniques for improved (robust and repeatable) mapping of land use information to support catchment characterisation studies, nutrient management research and our Natural Resources and Partnerships implementation programmes (for Land, Freshwater and Biodiversity and Biosecurity).

Context: Land use information is a critical State of the Environment indicator used to account for the effects of land use on water quality, terrestrial and wetland biodiversity, and efficient and sustainable use of soil types.

Regional Councils, Central Government agencies, Crown Research Institutes and industry groups have rich sets of often disparate land use information that is not frequently brought together or maintained,

despite having both needs and obligations relating to the use and re-use of this type of information across the many different purposes for which it can be used.

This project is aimed at identifying methods to bring regional-scale land use information together in a robust and repeatable manner that dovetails with a national level research project on integrating land use information being completed by Landcare Research. It is intended that the process provides land use information that is robust enough to be used for:

- Assessments of nutrient contribution from the different land use classes, applicable for nutrient accounting at catchment level or freshwater management unit level;
- Analysis of water quality improvement arising from management actions to inform decision-making around how Horizons will meet our proposed swimability target;
- Land use as an indicator of ecological integrity for terrestrial biodiversity Tier 1 reporting; and
- Land use as an indicator of sediment input for sustainable land management.

Budget: A budget of $18,715, with an additional $20,000 to be sought from Envirolink.

LTP and AP Performance Measure: Land Monitoring Methods Research to "*Track changes in the health of the Region's land and fluvial resource*" and "*Inform policy and non-regulatory programme development*".

Partnerships: Land Management and Rural Advice teams, Landcare Research.

4.5. Sediment Source and Transport

Portfolio: Fluvial, Land and Water Quality.

Objective: To scope and deliver integrated monitoring and research projects relating to the implementation of One Plan policy, State of the Environment monitoring, river scheme management and Sustainable Land Use Initiative (SLUI); and to improve understanding of sediment transport effects on water quality in key catchments.

Context: One of the purposes and functions of the Fluvial Monitoring and Research programme is to give effect to Method 5-11 of the One Plan. This project is to identify methods and reporting tools that allow the Fluvial portfolio to transition from the current emphasis on fluvial surveys and the monitoring of gravel use, to a more integrated programme that accounts for effective flood scheme management and scheme asset protection, as well as the effects of sediment transport and deposition on in-stream life-supporting capacity. Information arising from this project also contributes to, and is informed by, SLUI outcomes research under the Land Monitoring and Research portfolio.

The transport and deposition of sediment in our Region's waterways not only reduces the lifespan and efficacy of flood protection but can also impact the health of our freshwater systems. During 2018-19, the work programme includes:

- Completion of the National Science Challenge (NSC) project 'Cascade of soil erosion to river sediment', a $1.6 million research project led by Landcare Research in partnership with Horizons and 'Our Land and Water' National Science Challenge (NSC), which aims to develop a spatial-temporal model of erosion/sedimentation to characterise sediment generation and transport; and
- Reporting on the investigation of sediment source and transport in the Oroua River catchment, including sediment fingerprinting that was undertaken during 2017-18.

Budget: $104,718 in staff time and external costs.

LTP and AP Performance Measure: Land Research and Monitoring to deliver an "*annual report on the land and fluvial monitoring and research activity*".

Partnerships: River Management group, Land, Freshwater and Partnerships, Catchment Data and Catchment Information teams, Massey University and Landcare Research.

4.6. Wastewater Management

Portfolio: Land and Groundwater

Objective: To assist with the implementation of the One Plan regarding on-site wastewater performance, by providing advice on best-practice standards and wastewater systems.

Context: The One Plan sets out a new approach to managing on-site wastewater systems across the Region. A key component of successful implementation of this approach is working with Territorial Authorities to ensure implementation is cost-effective to customers, and with practitioners who sell, install and provide advice on compliant systems.

Horizons provides advice on the suitability of on-site wastewater systems in a range of ways, including direct consenting for larger systems, as a result of enquiries, and as a consequence of any Regional Council 'sign off' (that the system design meets One Plan standards) to conform to provisions in any District Council building consent requirements.

Following on from the successful delivery of a regional workshop on implementing the Manual for On-Site Wastewater Systems Design and Management (2010), the next step is to establish a memorandum of understanding (MOU) between agencies to clarify roles and responsibilities and provide for a smoother process in future.

A financial co-funding of $10,000 is also provided for the Ministry for the Environment's Small Community Collective Biosolids Strategy.

Budget: $60,011 will cover staff time and external costs, including $10,000 contribution toward the Biosolids Strategy.

LTP and AP Performance Measure: Land Research and Monitoring to deliver an "*annual report on the land and fluvial monitoring and research activity*".

Partnerships: Strategy and Policy team, Territorial Authorities, on-site wastewater providers.

4.7. Nutrient Management Research

Portfolio: Land

Objective: To investigate the impacts of land use on soil health and water quality, and explore opportunities for improved management.

Context: The effective management of nutrients arising from intensive land use is an important aspect of addressing water quality in the Horizons Region. The Science and Innovation team maintain an active research programme to support the development of tools and management approaches to reduce nutrient loss and improve management practices. This research work is undertaken in close collaboration with other teams particularly the Policy, Rural Advice, Consents and Consents Monitoring Teams.

Specific activities of 2018-19 include the provision of technical support for nutrient management consent decision-making, and support for research programmes that will be delivered in collaboration with a range of external partners. Horizons is supporting external research projects including:

- The MPI Sustainable Farming Fund (SFF) project 'Future Proofing Vegetable Production'. The project, fronted by Dan Bloomer of LandWISE in collaboration with growers and funding partners (including Horizons) will develop and test new production and nitrogen mitigation techniques to develop new generation good management practices.
- The continuation of a joint programme led by Foundation for Arable Research (FAR) and Horticulture NZ's Sustainable Farming Fund fluxmeter project that is measuring nutrient loss rates from cropping and horticulture farms in the Region;
- A pilot study assessing water and nutrient flow pathways from intensive winter grazing on gravel soils in the Rangitīkei and quantify the likely impact of this nutrient loss on the Rangitīkei River; and
- A further SFF Project: Innovative Drainage Management Technologies. This project is being delivered by Massey University in partnership with industry groups and local land owners in the coastal Rangitīkei area. It will evaluate and demonstrate novel in-field and edge-of-field drainage management technologies, as targeted and cost-effective solutions to reduce water and nutrient losses from farm production systems.

- Provide technical advice and support for a DairyNZ project investigating the uptake of plantain to reduce nitrogen loss from farms in the Upper Manawatu catchment.

Budget: $67,948 for staff time and external costs to support these projects.

LTP AND AP Performance Measure: Land Research and Monitoring to deliver an "annual report on the land and fluvial monitoring and research activity".

Partnerships: FAR, HortNZ, Rural Advice team, Massey University, LandWISE, DairyNZ, AgFirst Consultants Ltd., Balance Agri-nutrients, Tararua Growers Association, MPI, Gisborne District Council, Beef and Lamb, Waitatapia Farming, O'Brien Group, ACRE Group.

5. Biosecurity and Biodiversity

Biosecurity and biodiversity management are core functions of the Regional Council that add significantly to the environmental, economic, social and cultural prosperity of the Region by enhancing the quality of indigenous ecosystems and reducing the impacts of pest plants and animals. This group of activities includes Horizons' species-led pest plant and pest animal control (biosecurity function) and the enhancement of bush and wetlands though site-led approaches, including support of community biodiversity programmes (biodiversity function).

The Biodiversity and Biosecurity monitoring and research programme assists these functions by informing prioritisation of biodiversity sites, measuring the effectiveness of biodiversity work programmes and undertaking research to inform pest management under the regional pest management strategy and plan.

A key focus during 2018-19 will be implementation of the key work objectives outlined in the Biodiversity Review.

The 2018-19 Annual Plan sets out a budget of $193,136 for biodiversity research to improve knowledge and understanding of the Region's biodiversity. Biodiversity and biosecurity activity for scientific monitoring and research will be measured against the following performance measure:

Performance Measures for Levels of Service	Annual Plan 2018-19
Improve Knowledge and Understanding of the Region's Biodiversity	
Annual report on biodiversity monitoring and research activity.	Develop an annual reporting framework and complete an annual report

5.1. Biodiversity Implementation Support

Portfolio: Biodiversity and Biosecurity Monitoring and Research

Objective: To provide technical support to the Biodiversity team.

Context: Among the non-regulatory tools to protect and preserve indigenous biological diversity in the Region, Horizons has a programme to actively manage 200 high priority bush remnants and 100 high priority wetlands. At the end of the 2017-18 financial year a review of this programme was initiated. A number of gaps were identified and work will begin in the 2018-19 financial year to address these and develop a more systematic approach to the management of the Region's biodiversity resource. Full implementation is expected over the following 18-24 months.

The priorities for 2018-19 are to:

- Complete a stocktake of all managed sites;
- Review the current managed site list to identify gaps in habitat representativeness;
- Implement the Singers and Rogers ecosystem classification system; and
- Explore prioritisation tools, such as Zonation software, and begin implementation of chosen tool.

Once developed this ecosystem classification system will be used to better understand potential ecosystem spatial pattern in the Region and determine the representation and distribution of remaining ecosystems. This will allow for a more robust prioritisation model to determine which sites should be managed by Horizons Regional Council. By aligning methods with other councils this information would also feed an International Union for the Conservation of Nature (IUNCN) system for identifying nationally threatened ecosystems.

Budget: $36,678 for staff time and development of the ecosystem classification system, with an additional $20,000 to be sought through Envirolink.

LTP and AP Performance Measures: Improve Knowledge and Understanding of the Region's biodiversity through the delivery of an "*annual report on biodiversity monitoring and research activity*".

Partnerships: Biosecurity, Biodiversity and Partnerships and Strategy and Policy teams.

Figure 6: Native Forest, Tararua District

5.2. Forest Fragment and Wetlands Monitoring

Portfolio: Biodiversity and Biosecurity Monitoring and Research

Objective: To collect information and maintain records on the condition and extent of high priority bush remnants and wetlands to determine if management programmes are effective.

Context: Among the non-regulatory tools to protect and preserve indigenous biological diversity in the Region, Horizons has a programme to actively manage 200 high priority bush remnants and 100 high priority wetlands. The anticipated environmental result is that the managed bush remnants and wetlands are in better condition than that measured prior to the One Plan becoming operative.

The Science and Innovation team has supported this programme over many years by undertaking wetlands inventories throughout the Region and identifying priority sites. Now that Horizons is more than halfway through the target number of actively managed sites under both programmes, the programme will shift toward assessing the state and trend of actively managed sites.

In 2016 the Horizons Science and Innovation team developed a bush remnants monitoring protocol and have been trialling the use of this protocol. During 2017-18 a peer review of the monitoring protocol for both forest fragments and wetlands was undertaken to inform future implementation.

The priorities for 2018-19 are to:

- Maintain the integrity of the Rapid Ecological Assessment process;
- Develop activity monitoring in managed bush remnant and wetland sites;
- Continue to refine the methodology for tracking biodiversity state and trend in actively managed sites; and

- Undertake site re-surveys as part of a structured policy effectiveness assessment, to determine if the One Plan's anticipated environmental results for the wetlands and forests are being met.

Budget: $121,612 for biodiversity monitoring and peer review of these programmes.

LTP and AP Performance Measures: Improve Knowledge and Understanding of the Region's Biodiversity through the delivery of an "*annual report on biodiversity monitoring and research activity*".

Partnerships: Biosecurity, Biodiversity and Partnerships and Strategy and Policy teams.

5.3. Tōtara Reserve Bird Monitoring

Portfolio: Biodiversity and Biosecurity Monitoring and Research

Objective: To complete annual surveying of bird populations in Tōtara Reserve.

Context: Tōtara Reserve Regional Park is the only Regional Park in the Horizons Region. Vested in Horizons management at the beginning of the 2011-12 financial year, it was previously jointly managed in partnership with Manawatū District Council. Tōtara Reserve is considered the best remaining example of lowland forest in the Manawatū Plains Ecological District. Horizons initiated intensive pest animal control in 2006 and bird monitoring in 2012 to determine the effectiveness of predator control within the Reserve. Monitoring of pest animal populations is incomplete. A review of the bird monitoring programme at Tōtara Reserve was undertaken in July 2017 and a subsequent monitoring has implemented a number of the suggested changes.

In 2018-19 monitoring will continue to apply the updated methodology. If budget allows, monitoring will be extended to include surveys of pest populations within the treatment and control blocks to compare the relative abundances of mammals targeted for control. Bird monitoring as a means of assessing the success of animal pest control will be reviewed in the future.

Budget: A budget of $16,887 for staff time and external monitoring and research is set aside for recreational biodiversity.

LTP and AP Performance Measures: Improve Knowledge and Understanding of the Region's Biodiversity through the delivery of an "*annual report on biodiversity monitoring and research activity*".

Partnerships: Biosecurity, Biodiversity and Partnerships team, consultants.

6. Environmental Reporting and Air Quality Monitoring

Effective management of the Region's natural resources relies on accurate, accessible and timely information about the environment and its health. The environmental reporting activity includes the core monitoring and reporting function and the work to raise the community's awareness of the environment – how it works, how it is changing and the drivers of change.

Environmental Reporting

Environmental monitoring and reporting is critical for effective management as it provides knowledge of the state of the resource and allows the early detection of changes and trends. Further, it enables the effectiveness of policies, approaches and management to be evaluated and informs decision-making. Environmental monitoring and reporting activities also contribute to annual state of the environment reporting for the Region and national-level reporting such as through the Land and Water Aotearoa (LAWA) website.

During 2018-19, key outputs for Environmental Reporting activity will include the development of a science communication strategy, research into future climate change impacts on the Whanganui catchment, and delivery of our 2018 State of Environment Report. Work programmes will also include contributions to national level reporting via the Land, Air, Water Aotearoa (LAWA) website, Environment Aotearoa 2019 report (published by MfE and StatsNZ), and reporting in relation to national requirements such as those of the National Policy Statement for Freshwater Management (NPS-FM).

Active participation in national resource management forums and discussions ensures our regional programmes are informed and supported at a national level. In the spirit of Horizons' Big 5, a focus on providing opportunities for collaboration with key internal staff aims to increase our capability and capacity across the organisation.

Air Quality Monitoring

The air quality monitoring programme will continue to monitor and report on air quality in Taihape and Taumarunui, the two airsheds in the Region designated under the National Environmental Standard for Air Quality. Monitoring equipment in these air sheds is now due for replacement and may need to be upgraded pending potential changes to the National Environmental Standard for Air Quality.

Further guidance on monitoring requirements is anticipated from the Ministry for the Environment during the early stages of the current LTP. The MfE and StatsNZ National Environmental Report for Air is due to be published in October 2018.

A public awareness campaign to provide guidance around ways to improve air quality in the Region is a key component of the air quality monitoring programme. The LTP provides a small budget to undertake this work.

The 2018-19 Annual Plan sets out a budget of $281,279 for SoE Policy and Performance Monitoring and $58,493 for Air Monitoring. New commitments include $50,000 per annum for climate change research and $100,000 per annum for improving drinking water management in the Region.

These programmes will be measured against four performance targets:

Performance Measures for Levels of Service	Annual Plan 2018-19
Environmental Reporting and Air Quality Monitoring	
Provide an annual summary report on the state of the environment.	Annual reporting framework is developed and a report produced
Develop and implement a science communication strategy.	Strategy and implementation plan developed
Complete drinking water supply research with a focus on Council-operated drinking water supplies and complete an annual report on this to Council.	1
Investigate one aspect of climate change impact in the Region and report on this to Council.	1
Air quality is monitored in Taihape and Taumarunui and reporting is made available to the public via LAWA and the annual state of environment report.	Completed
Undertake an annual public education air quality campaign.	1

6.1. Air Quality Monitoring

Portfolio: Air Quality Monitoring and Reporting.

Objective: To monitor air quality in the Taumarunui and Taihape air sheds and report monitoring results via Horizons' Air Quality Matters website.

Context: Air quality monitoring is carried out in the Taumarunui and Taihape airsheds to meet requirements of the National Environmental Standards (NES) for air quality, which specify a 24-hour average threshold (standard) for fine particulate contaminants (PM^{10}). The NES allows for one exceedance of the average standard per year (termed a 'permissible exceedance') before formal implementation of air quality management strategies. Any breaches of the NES will be investigated following a defined response protocol, and reported to Council through the Environment Committee.

The main component of the Air Quality Monitoring Programme is to continuously monitor the Taumarunui and Taihape airsheds to detect breaches and report the daily results to the community, in order to raise awareness of the problem. Information is provided to the public via AirQualityMatters, which is a dedicated air quality reporting page on Horizons' website.

Maintaining collaborative relationships with the Ministry for the Environment (MfE) and air quality science agencies is the most efficient means by which Horizons stays up to date with crucial industry knowledge developments. MfE is signalling potential inclusion of a very fine particulate matter ($PM^{2.5}$) standard. Scoping of the cost and timing of replacement of the aging air quality monitoring units is also a focus for the 2018-19 programme.

Budget: A budget of $58,648 is set aside for air monitoring and a public campaign to raise awareness of air quality issues for the 2018-19 year.

LTP AND AP Performance Measures: Environmental Reporting and Air Quality Monitoring whereby *"air quality is monitored in Taihape and Taumarunui and reporting is made available to the public via LAWA and the annual state of environment report"* and we *"undertake an annual public education air quality campaign"*.

Partnerships: Catchment Data and Communications teams, Territorial Authorities.

6.2. Climate Change

Portfolio: Climate Change

Objective: To better quantify the impacts of climate change on our Region.

Context: As the effects of climate change become more evident, the Region is predicted to experience more extreme temperatures and changed patterns of rainfall. Rainfall is likely to increase across most of the Region, west of the Ruahine and Tararua Ranges in winter and spring, while eastern areas are projected to have decreased rainfall. In the west of the Region, it is likely that floods will increase in both frequency and magnitude for both the Rangitikei and Whanganui catchments, while higher rainfall is also likely to have similar effects for the land drainage schemes that cover much of the Lower Manawatū floodplain.

Climate change effects are likely to be most pronounced for those communities along the western coastline – a consequence of the combined effect of increased rainfall and sea-level rise as well as other consequential effects, such as increased frequency of storm surges.

The Science and Innovation team have committed to investigate one aspect of climate change impact on the Region each year. During 2018-19 this funding will be directed toward investigating the impacts of climate change on flood management in the Whanganui catchment.

Budget: $59,436 for research into the impacts of climate change on the Whanganui catchment.

LTP AND AP Performance Measures: Environmental Reporting and Air Quality Monitoring to "*investigate one aspect of climate change impact in the Region and report on this to Council*".

Partnerships: River Managers group, Catchment Data team, Crown Research Institutes.

6.3. Drinking Water

Portfolio: Environmental Reporting and Air Quality Monitoring

Objectives: To improve the overall management of drinking water supplies in the Horizons Region.

Context: The recent enquiry into the contamination of the Havelock North public water supply has highlighted a number of areas for improvement in the management of public water supplies throughout New Zealand. To ensure the relevant agencies in our Region are meeting their requirements regarding the protection of drinking water quality, Horizons is working in consultation with local Public Health Officers and Territorial Authorities to improve overall management of drinking water supplies.

A stocktake and risk assessment for community drinking-water supplies in the Horizons Region has highlighted a number of areas for improvement which is now informing the development of a dedicated work programme to inform decision-making around the management of existing and future public water supplies.

Since July 2018, Council has included additional funding of $100,000 per annum in the LTP, and a further $175,000 has been committed by our Territorial Authorities, to enable Horizons to complete its functions around drinking water supply management, including ensuring communication with other agencies involved in drinking water supply management. The first step in this programme is the delineation of protection zones for council-operated water supplies and drinking water supplies

servicing more than 500 people. Inspections of groundwater wellhead infrastructure will also be completed to ensure the groundwater supplies themselves are secure from ingress of surface water. Finally, an update of the regional stocktake and risk assessment will be completed with the most up-to-date information available.

Budget: $42,500 for staff time associated with project management and workshop facilitation, and $360,000 for the delineation of drinking water protection zones for 55 water sources providing water for 30 public water supplies, wellhead security inspections for groundwater sources, and an update to the stocktake and risk assessment report completed in 2017-18.

LTP AND AP Performance Measure: Environmental Reporting and Air Quality Monitoring to "*complete drinking water supply research with a focus on Council-operated drinking water supplies and complete an annual report on this to Council*".

Partnerships: Drinking Water Assessors, Territorial Authorities, MidCentral Health, consultants.

6.4. State of Environment 2018

Portfolio: SoE and Policy (with contribution from other portfolios)

Objective: To report on the current state of the environment.

Context: State of Environment (SoE) reporting is a component of the environmental monitoring and reporting outputs across all of the other science portfolios (Land, Air, Water and Biodiversity) in accordance with our legislative requirements to monitor the state of the environment.

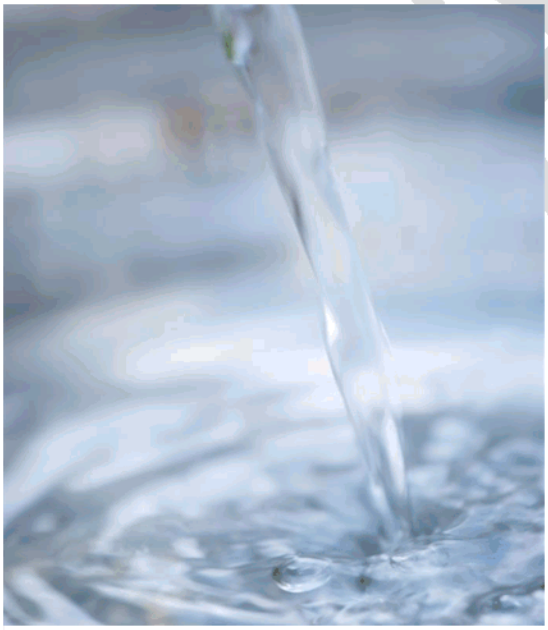

Figure 7: Rivers and aquifers supply drinking water to urban and rural communities throughout the Region

SoE reporting is a means of gathering all of this information together and reporting environmental state and trends to key stakeholders and Horizons' community. The last SoE report was published in 2013.

During 2018-19 we will be working to complete data analysis and compile information and stories from around the Region. The report is due to be published in November 2018. Following the delivery of this report, we will develop a framework for annual state of environment reporting.

Budget: $127,822 has been set aside for staff time for data preparation, analysis, reporting, peer review of technical work, including external budget for design, publishing and promotional costs associated with the State of Environment Report.

LTP and AP Performance Measure: Environmental Reporting and Air Quality Monitoring to "*provide an annual summary report on the state of the environment*".

Partnerships: Policy, Catchment Data, Consents Monitoring teams, natural resources, partnerships, and river management groups, NIWA, Landcare Research, Massey University, GNS Science, Cawthron Institute.

6.5. Science Communication Strategy

Portfolio: SoE and Policy

Objective: To develop and implement a science communication strategy.

Context: Sound communication of science is critical to inform stakeholders, advise decision-makers and empower communities. We recognise that scientific information is often targeted to the science community and this can create difficulties in conveying this information in ways that engage the wider public. By ensuring the communication of science is purposeful and targeted to key audiences we can increase uptake and improve understanding of the issues and, in turn, empower those involved in making decisions about how natural resources can best be managed.

During 2018-19, Horizons' Science and Innovation team will, alongside our Communications team, develop and implement a strategy for communicating science to a range of end-users.

Budget: A budget of $5,000 for staff time to develop and implement the strategy.

LTP and AP Performance Measure: Environmental reporting and Air Quality Monitoring to "*Develop and implement a science communication strategy*".

6.6. LAWA

Portfolio: SoE and Policy (with contribution from other portfolios).

Objective: To provide science support for the continued evolution of the Land, Air and Water Aotearoa (LAWA) website and to ensure Horizons' data conforms to common data exchange standards.

Context: The LAWA website is a Regional Council-driven initiative to present information about the state and trends of New Zealand's natural resources. The LAWA web portal now hosts water quality, quantity, lakes and air monitoring information. The groundwater quality module is due for release later this year and the land module is also in development.

This project has been set up to account for Horizons' contribution to the LAWA project in terms of Science-funded time needed to ensure our own datasets conform to LAWA standards and to facilitate exchange between scientists (within and between Regional Councils and CRIs) that is otherwise not catered for by the co-funded coordination work. The project supports a level of staff time for additional modules that are anticipated, such as the module for biodiversity.

Budget: A budget of $44,837 to cover staff time dedicated to co-ordination and data provision.

LTP and AP Performance Measure: Improve Knowledge and Understanding of the Region's Water Resource whereby "*water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' website. Data provided to LAWA as required*";

Environmental Reporting and Air Quality Monitoring whereby "*Air quality is monitored in Taihape and Taumarunui and reporting is made available to the public via LAWA and the annual state of environment report*".

Partnerships: Environmental Monitoring and Reporting (EMaR) steering group, Catchment Information and Catchment Data teams; Cawthron Institute, Tindall Foundation, Massey University, Regional Councils.

6.7. Public Information and RMA Advice

Portfolio: SoE and Policy (with contribution from other portfolios)

Objective: To ensure up-to-date and relevant science information is effectively communicated to Horizons staff, councillors, iwi, the public, external agencies, and any other parties interested in aspects of natural resource management. This project also includes our contribution to national engagement through Special Interest Group (SIG) participation, conference and workshop presentations, development of national monitoring, and reporting of Horizons' science and research.

Context: External information sharing is an important part of Horizons' business. The purpose of this project is to communicate programme outputs, and to inform and educate resource consent holders and the public about the value of these programmes and how they contribute to the wider management of the Region's water resources. This can include:

- On-site (pre-consent/non-project/short-lived) investigations;
- Technical assessments of consent applications;
- Over-the-phone advice on resource availability, resource use and One Plan implementation;
- Public workshops, conferences and presentations, and local government workshops and forums; and
- External newsletters and public information campaigns.

The project also seeks to build on work to update the Horizons website to better communicate scientific monitoring and research outputs. The Science and Innovation team continues efforts to work closely with Horizons' Communications team to regularly produce consumable "sound bites", respond to media requests, and assist with the provision of public information.

Budget: A budget of $109,322 is set aside for the provision of information to the public relating to our science and monitoring programme, with a further $44,034 set aside for RMA advice.

LTP and AP Performance Measure: Environmental Reporting and Air Quality Monitoring to '*Develop and implement a science communication strategy.*'

Partnerships: Horizons staff, Territorial Authorities, external agencies, Public Health, industry, iwi and the public.

6.8. Community & National Engagement

Portfolio: SoE and Policy (with contribution from other portfolios)

Objective: To ensure up-to-date and relevant scientific information is effectively communicated to Horizons staff, councillors, consent holders, iwi, the public, and any other parties interested in aspects of natural resource management. This includes staff participation in national work programmes, such as:

- National Objectives Framework (NOF);
- Environmental Monitoring and Reporting (EMaR);
- National Environmental Monitoring Standards (NEMS);
- Contact recreation guidelines;
- Other national guidance material, e.g., NPS-FM guidance; and
- Regional Sector Special Interest Group (SIG) leadership and participation.

Context: External information sharing is an important part of Horizons' science programme. The purpose of this project is to communicate programme outputs to inform and educate resource consent holders and the public of the value of these programmes and how they contribute to the wider management of the Region's natural resources.

Opportunities to communicate information can range from data provision, over-the-phone (non-RMA) advice, site visits, and provision of guidance material, through to community workshops. The project also seeks to build on work to update the Horizons website to better communicate information about the environment and natural resource use.

Public education of the available tools and philosophy around the availability and use of natural resources, such as water use efficiency and best practice is also of value to help implement Horizons' Regional Policy and Plan (One Plan).

This project also provides the time for staff engagement, including leadership roles, across national working groups to support, guide and develop reporting frameworks, national environmental monitoring standards and guidance material. Staff time is also set aside to ensure that Horizons can quickly respond to new and emerging needs of Central Government environmental science and management initiatives.

Budget: $57,526 is set aside for staff time and travel costs. No external costs are anticipated.

LTP and AP Performance Measure: Environmental Reporting and Air Quality Monitoring to *'Develop and implement a science communication strategy'*.

Partnerships: Horizons staff, Territorial Authorities, Regional Councils, Ministry for the Environment, Statistics New Zealand, Crown Research Institutes, universities, external agencies, Public Health, industry, water user groups, iwi and the public.

Figure 8 Horizons' Science and Innovation team

horizons regional council

7. Appendices

Appendix 1

Monitoring Sites by Freshwater Management Unit							
	Manawatū	Horowhenua	Whanganui	Turakina / Whangaehu	Rangitikei	East Coast	Total
Water Quantity							
Groundwater Level	122	24	14	7	25	0	192
Flow	32	3	8	12	8	2	65
Water Quality							
SoE	46	14	13	8	8	1	90
Discharge (upstream)	12	0	1	6	6	1	26
Discharge (source)	15	0	2	6	8	1	32
Discharge (downstream)	12	0	0	6	7	1	26
Groundwater Quality	17	7	1	0	6	0	31
Lakes	0	1	4	1	9	0	15
Coastal and Estuary	2	1	2	0	3	1	9
Biomonitoring							
Macroinvertebrates	44	8	5	10	7	0	74
Periphyton	38	4	3	11	7	0	63
Contact Recreation							
Swim Spots	27	11	17	7	15	5	82
TOTAL	**367**	**73**	**70**	**74**	**109**	**12**	**705**

Report No.	18-132
Decision Required	

FRESHWATER & PARTNERSHIPS OPERATIONAL PLAN 2018-19

1. PURPOSE

1.1. This item is to present to Council the Freshwater and Partnerships Operational Plan for the 2018-198 year.

2. RECOMMENDATION

That the Committee recommends that Council:

a. receives the information contained in Report No. 18-132 and Annex.

b. formally adopts and releases the 2018-19 Freshwater and Partnerships Operational Plan annexed to this item.

3. FINANCIAL IMPACT

3.1. This Operational Plan overviews the budgets for the freshwater programme including additional funding sourced via various funding mechanisms including the Te Mana o Te Wai programmes and Freshwater Improvement Fund funding. The budget also includes funding approved by Council for use of reserve funding. Some budgets are subject to external decisions e.g. the amount recovered from court processes for Lake Horowhenua restoration consent processes and the tender amounts for works as a part of the Lake Horowhenua restoration work.

4. COMMUNITY ENGAGEMENT

4.1. The community have had the opportunity to comment on the freshwater work programme referred to in this item as part of the engagement and submissions run during the annual and long term planning processes as well as some other forums/processes/meetings.

5. SIGNIFICANT BUSINESS RISK IMPACT

5.1. There is no significant business risk associated with this item. There are some aspects of business risk associated with the delivery of the Lake Horowhenua work programme following threats made to Horizons regarding this work programme. This is scheduled to be discussed at the August Council meeting when the Lake Horowhenua Trust will also attend.

6. DISCUSSION

6.1. This financial year will see the Freshwater and Partnerships Team continue to build on the successes of previous years. Over the year, this will involve a transition from the 2017-18 year that focused on the core work programme, the Lake Horowhenua Clean Up Fund, and the Te Mana o Te Wai projects to the 2018-19 year that will focus on delivery of the core programme completion of the Te Mana o Te Wai projects, commencement of the Freshwater Improvement Fund projects across the Region, work with the horticulture sector and continuation of the Lake Accord project.

6.2. The Manawatū and Whangaehu Freshwater Improvement Fund projects start on the 1st July 2018 and Governance Groups and sub-contracts have and are being appointed for the delivery of some of these projects. The Freshwater Improvement Fund projects have some fairly ambitious targets for the Team to be able to deliver over the life of the projects, especially over the next 12 months. Delivery of these targets will consume most of the Team resources with some changes likely required to how some of our core work is delivered to enable them to be met.

6.3. If the current climate is a reflection of the future the demand for the Freshwater and Partnership Team's time, advice and co-funding opportunities is likely to continue to increase with rising public interest in freshwater and the changing environmental landscape both at a national and regional level. This may mean that at times, if landowners are dependent on co-funding or advice from Horizons to get the work completed, there may be an increased delay between signing parties up and completion of the works.

6.4. The year ahead has plenty of challenges but also provides ample opportunities to work, and engage with numerous stakeholders throughout the Region with a common goal of improving water quality and aquatic habitat.

7. SIGNIFICANCE

7.1. This is not a significant decision according to the Council's Policy on Significance and Engagement.

Logan Brown
FRESHWATER & PARTNERSHIPS MANAGER

Jon Roygard
GROUP MANAGER - NATURAL RESOURCES & PARTNERSHIPS

ANNEXES

A Freshwater & Partnerships Operational Plan 2018-19

Freshwater Operational Plan 2018-19

July 2018

Endorsed by Council at the Environment Committee meeting on _____

Annex A

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Front Cover Photos
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1. EXECUTIVE SUMMARY

The Water Quality and Quantity Activity of Horizons Regional Council's (Horizons) Long-term Plan (LTP) has two main components:

1. Implementation work to address water quality, e.g. physical works to improve water quality such as fencing and planting of stream margins; and
2. Monitoring and research to track the state and trends of water quality, inform policy and non-regulatory programme development and to assess the effectiveness of work programmes and policies to manage water quality.

This report, the Freshwater and Partnerships Team Operational Plan, overviews Horizons' work programme for the implementation works to address water quality issues during the 2018-19 financial year.

Achievements during the 2017-18 financial year included: 63.7 kilometres of stream fencing completed, 113,262 riparian plants planted, eight barriers to fish passage remediated, completion of seven community projects under the Manawatū Accord Community Fund, and the announcement of five Freshwater Improvement Fund projects within the Region with Horizons as the lead agency for three. In addition, significant progress has been made at Lake Horowhenua with the Accord partners through the completion of Freshwater Clean Up Fund projects and continuation of the Te Kakapa Manawa o Muaūpoko project. Additionally, significant progress has been made on the Ngā Puna Rau Rangitīkei, Tu te Manawa, and Ngā Rauru Te Mana o te Wai projects.

The new financial year has seen the Freshwater and Partnerships Team gain an additional Team member, additional hours from the Land Team, and an increase of $200,000 towards environmental grants through the Long-term Plan, reflecting the demand that the Team has experienced during the last few years. New funding will also allow our work with the Horticulture Growers to continue, with Horizons contributing to the Sustainable Farming Fund project for future-proofing vegetable production. While the focus area is the Horowhenua catchment, the outcomes of that work will be able to be applied across the Region.

This financial year will see a transition for the Freshwater and Partnerships Team from the core work programme and the Te Mana o Te Wai projects to completion of the Te Mana o Te Wai projects, delivery of the core programme and commencement of the Freshwater Improvement Fund projects across the Region. The Manawatū and Whangaehu Freshwater Improvement Fund projects started on 1 July 2018 and Governance Groups and sub-contracts being appointed for the delivery of some projects. The Freshwater Improvement Fund projects have some fairly ambitious targets for the Team to be able to deliver over the life of the projects, especially over the next 12 months. Delivery of these targets will consume most of the Team resources with changes likely required to how some of our core work is delivered to enable them to be met.

If the current climate is a reflection of the future the demand for the Freshwater and Partnership Team's time, advice and co-funding opportunities is likely to continue to increase with rising public interest in freshwater and the changing environmental landscape both at a national and regional level. This may mean that at times, if landowners are dependent on co-funding or advice from Horizons to get the work completed, there may be a further delay between signing parties up and completion of the works.

The year ahead has plenty of challenges but also provides ample opportunities to work, and engage with numerous stakeholders throughout the Region with a common goal of improving water quality and aquatic habitat.

Annex A

2. CONTENTS

Annex A

1. Introduction

Overview

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2. Monitoring and research to track the state and trends of water quality, inform policy and non-regulatory programme development and to assess the effectiveness of work programmes and policies to manage water quality.

This report, the Freshwater and Partnerships Team Operational Plan, overviews Horizons' work programme for the implementation works to address water quality issues during the 2018-19 financial year. A separate report, the Science and Innovation Team Operational Plan, outlines the work programme for the monitoring and research component of the Water Quality and Quantity Activity.

Work Programme 2018-19

The Freshwater and Partnerships team at Horizons is a small Team that works closely with other Horizons Teams and people external to the organisation to implement works for water quality and aquatic habitat improvement. This Freshwater and Partnerships Team Operational Plan document is arranged in six sections to provide further information on the work programmes for:

- The Manawatū River Accord including the Freshwater Improvement Fund project (see Chapter 3);
- Ngā Wai Ora o te Whangaehu Awa Freshwater Improvement Fund Project (see Chapter 4);
- Regional Freshwater Grants (see Chapter 5);
- Te Mana o Te Wai (see Chapter 6);
- The Lake Horowhenua Accord including the Freshwater Improvement Fund Project (see Chapter 7);
- Work with the horticultural sector to reduce nutrient and sediment loss from horticultural operations (see Chapter 8); and
- Lake Waipu Freshwater Improvement Fund Project.

This report provides an overview of these programmes, including information on the prioritisation of projects for the 2018-19 financial year.

The other successful Freshwater Improvement Fund project in the Region is working in the Waiwiri Catchment which is the outflow from Lake Waiwiri/Papiatonga. The project is taking lab based trials of Manuka's ability to remove E. coli and nitrogen from human waste water when it is applied to land. The project is being led by Lowe Environmental (a Palmerston North based Environmental Consultancy) with involvement from ESR, HDC, iwi/hapū and universities. Horizons Regional Council is involved through assisting as part of the Technical Advisory Group with Logan Brown being a member of that group.

Alignment with the One Plan

The work of the Freshwater and Partnerships Team has close alignment with several aspects of the One Plan, including a direct link with the objectives and policies around maintaining and enhancing water quality. The Team's work programme formally aligns with the non-regulatory methods of the One Plan. In many cases, the Team has been working to achieve the goals of these methods for some time. The key

non-regulatory methods of the One Plan to which the Freshwater and Partnerships Team's work is directly related are:

- Method 5-6 Lake Horowhenua and other Coastal Lakes;
- Method 5-7 Lake Quality Research, Monitoring and Reporting;
- Method 5-8 Trout and Native Fish Spawning habitat;
- Method 5-9 Water Quality improvement;
- Method 6-3 Sites of Significance – Aquatic; and
- Method 6-4 Inanga Spawning and Native Fishery Sites.

Provision of Advice and Financial Support

A key role for the Freshwater and Partnerships Team is providing specialist advice and assistance on freshwater matters, with staff responding to requests from landowners, iwi, district/city councils, community groups and schools. Non-financial support is provided in the form of advice, project planning and management.

The programme also provides financial support for works to improve water quality and aquatic habitat in the Region. The works primarily involve fencing-off streams and planting of riparian margins, as well as work to restore in-stream habitat through removal of willows and remediation of fish barriers.

The Freshwater and Partnerships Team works with a range of agencies to both co-fund and implement works. Often the programmes have criteria for the level of funding that can be provided to landowners as part of a specific work programme. For example, the Manawatū River programme has a co-funding level of up to 50% for stream fencing and planting projects up to a total cost of works of $10,000; works outside this scope need to be approved by the Freshwater and Partnerships Manager or Group Manager Natural Resources and Partnerships.

Emerging issues/opportunities

Although not addressed in detail in the Operational Plan, future pressures/issues/opportunities may present themselves over the next 12 months. These are opportunities that the freshwater Team will need to keep a watching brief on if we are to remain an agile Team/organisation and it will also allow us to respond to new issues/concerns as intervention logic develops further. This may require that resources are redirected into these areas or that we come back to Council with a package that can be considered in the future for funding, including applying for further external funding. This section is to flag that we are working in an area that is informed by science and policy and that the intervention logic that is most effective might change over time. A few of the key future pressures/opportunities are:

The Stock Exclusion Regulations

- In February 2017 the Clean Water Package announced by then Environment Minister Dr Nick Smith included stock exclusion from certain waterways. The current Government has been silent on the current direction of these regulations and there is currently uncertainty as to how, when or if they will proceed. However, if they do proceed in the notified or another form there is likely to an increase in demand from livestock owners who are captured by the regulations.

Requirements for Swimmability

- Central Government has set requirements around rivers being swimmable by 2030 and 2040. Council has established an interim target of 70% swimmable by 2030, with the target to be finalised by December 2018. This attribute state applies to streams fourth order and above. However, all stream/rivers that flow into fourth order streams will be contributors to the *E. coli* measured in fourth order and above streams. This is likely to result in further demand for further stream fencing in the short and medium term.

Freshwater National Policy Statement – Band D lakes:

- Within the Freshwater National Policy Statement (NPS) a number of attribute states apply to lakes. Where these are below national bottom lines ie. In Band D the NPS requires enhancement of the water body to achieve results above the national bottom line (Band C or better). Monitoring of a selection of coastal lakes in the Region has shown that a number fall into Band D for a range of attributes. Given the recent experience with Lake Horowhenua, we know that simply dealing with the catchment-wide issues will not necessarily result in the attribute state being met without some type of in-lake intervention occurring. Any catchment interventions also need to consider in-lake interventions that may be required e.g. sediment capping, weed harvesting and grass carp etc. Solutions will likely need to be lake-specific. Work has been advanced around intervention logic for a range of lakes in the 2017-18 year. During the next 12 months further work is likely to proceed on intervention logic that can be applied to some of our coastal lakes.

Freshwater National Policy Statement – Band D requirements and declining trends

- Within the Freshwater NPS there is a requirement for monitoring of macroinvertebrate (MCI) communities and a section on the development of action plans if monitoring shows that a site is below 80 (considered poor in the water quality classification) or has a declining trend. Horizons has monitored macroinvertebrate communities at a number of sites around the Region for a number of years and monitoring undertaken over the 2017 summer shows that Hautapu River upstream of Rangitikei confluence, Mangatera at Timber Bay, Ōwahanga at Branscombe Bridge, Arawhata Stream at Hōkio Beach Road, Hōkio Stream at Lake outlet, Manganaonao Stream at Ōhau West Road, and Manakau Stream at Cemetery have an MCI score below 80 and/or a declining trend. Many of these sites have active restoration and/or science work associated with them. In some cases there is work to do to prioritise the best course of action to improve these results. These areas will be a priority for the Freshwater Team's work over the year.

2. Last financial year

The Freshwater and Partnerships Team has a number of annual performance targets contained in the Annual Plan, which are reported on to Environment Committee on a regular basis. All six annual plan targets were achieved last year. Riparian fencing and planting completed in the previous year is reproduced in Table 1. Those areas where works were undertaken are shown in Figure 1.

Numerous other activities were undertaken over the year, with 'big ticket' items including:

- Completion construction of sediment trap next to Arawhata Stream;
- Commenced construction of access road for the weed harvester boat ramp at Lake Horowhenua;
- Completed construction of two fish passes in tributaries of the Manganui o te Ao Stream near National Park with co-funding from the Whanganui River Enhancement Trust (WRET), and NZ Transport Authority (NZTA);
- The official announcements of the Manawatū, Whangaehu, Lake Waipu and Lake Horowhenua Freshwater Improvement Fund projects; and
- Completed across the entire programme were: 63.7 kilometres of stream fencing, planting of 113,262 riparian plants, and remediation of eight fish barriers.

Table 1: Riparian fencing and planting allocated and completed within the 2017-18 financial year.

	Riparian Fencing		Riparian Planting	
	Allocated	Completed	Allocated	Completed
	Km	Km	Plants	Plants
Regional	39.53	20	47,915	33,778
Manawatū	61.9	41.8	73,529	69,803
Lake Horowhenua	2.9	1.9	12,217	9,681
Total	**104.33**	**63.7**	**133,661**	**113,262**

The number of enquiries and request for assistance to the Freshwater and Partnerships Team has continued to increase during the last financial year.

The results for the 2017-18 year are further reported on in the august 2018 Environment Committee report.

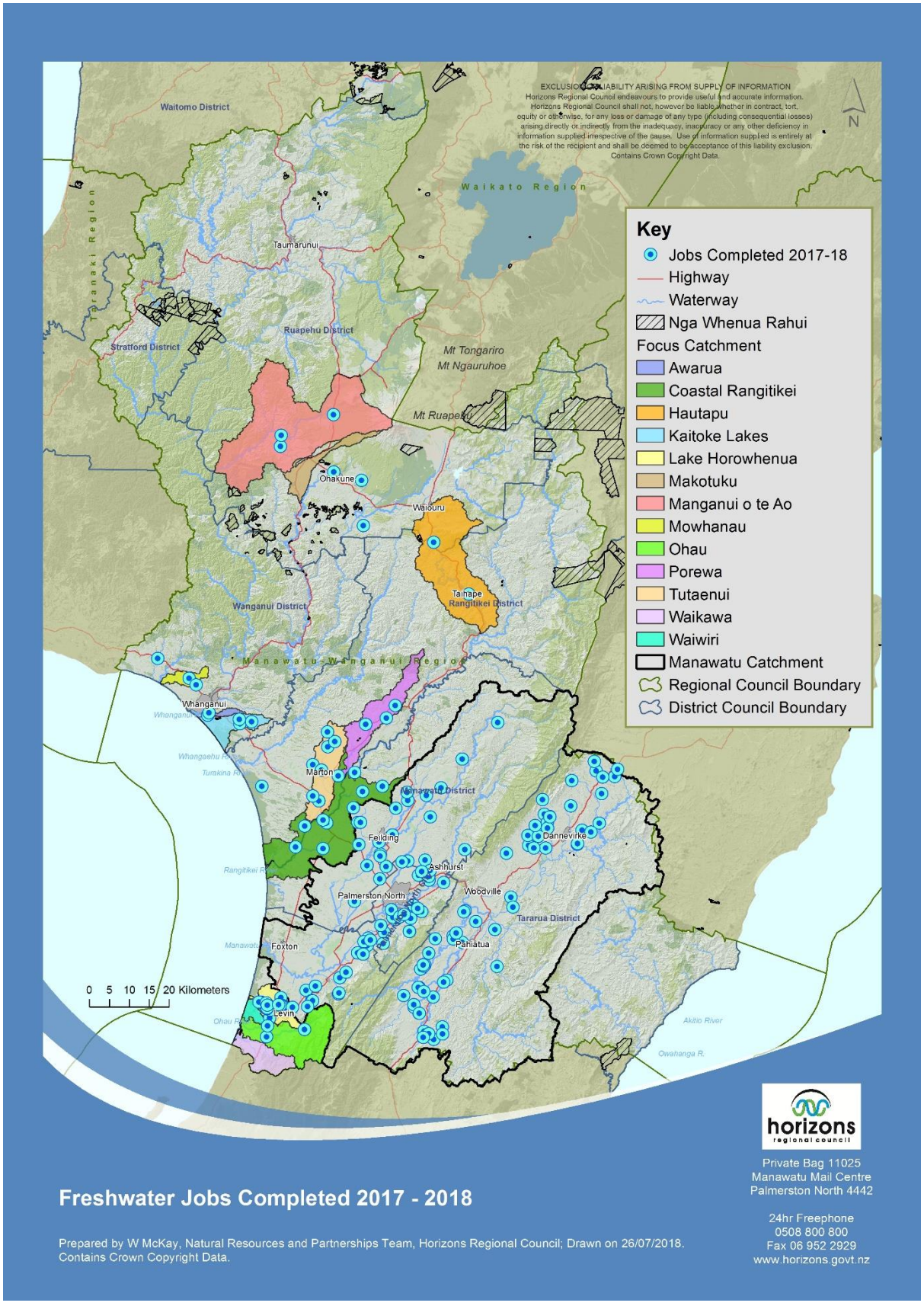

Figure 1 Location of the completed Freshwater Grants for 2017-18 including the Regional, Manawatū and Horowhenua programmes. Each point on the map represents one fencing or planting project.

3. Manawatū River Accord

Overview

Early in 2010, Horizons Regional Council's Chair invited key leaders with an interest in the Manawatū River to meet and discuss the state of the river. They represented those sectors and groups that have an impact on or interest in the river, including local government, iwi/hapū, farming, industry and environmental groups.

The overall goal is to improve the Manawatū River and the mauri (life-force) of the Manawatū River, so it sustains fish species and is suitable for contact recreation, in balance with the social, cultural and economic activities of the catchment community. This goal represents a community opportunity to develop leadership in catchment improvement and capture the social and economic benefits of such leadership.

Specific goals set out in the Accord are:

1. The Manawatū River becomes a source of regional pride and mana;
2. Waterways in the Manawatū Catchment are safe, accessible, swimmable, and provide good recreation and food resources;
3. The Manawatū Catchment and waterways are returned to a healthy condition; and
4. Sustainable use of the land and water resources of the Manawatū Catchment continues to underpin the economic prosperity of the Region.

The Manawatū Accord has resulted in a number of achievements since its development and as a very brief timeline:

- In August 2010 the members of the Manawatū River Leaders' Forum signed an Accord to take action to improve the state of the Manawatū River;
- In June 2011 they released an Action Plan with more than 130 tasks (Action Plan);
- In 2014, the Manawatū River Leaders' Forum secured $5.2 million from Central Government towards the Manawatū Clean-Up Fund project, which contributed to more than $46 million of work being committed to the Accord goals.
- In March 2016, the then Minister for the Environment, Dr Nick Smith, launched the (second) new Action Plan prepared by the Manawatū River Leaders' Forum. The revised action plan includes 104 actions.
- In September 2016, the success of Tu Te Manawa, a project lead by iwi in the Manawatū catchment, was announced.
- In September 2017, the successful application to the Freshwater Improvement Fund was announced.

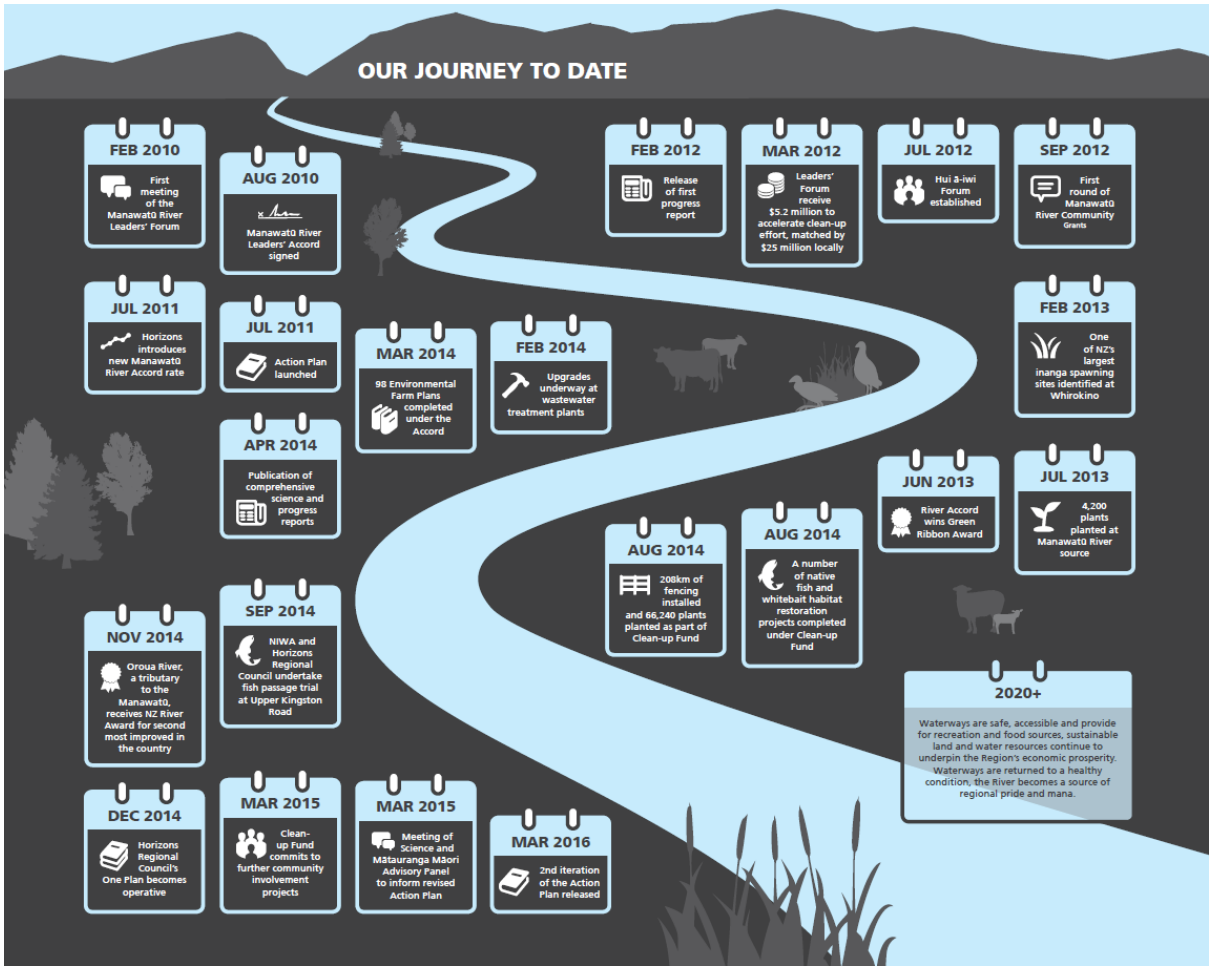

Figure 2 Shows the journey of the Manawatū River Leaders' Forum and the Accord from the first meeting of stake holders in 2010 to the launch of the second Action Plan in March 2016.

More information on the Manawatū River Leaders' Accord and the Action Plan for the Manawatū can be found at the website www.ManawatuRiver.co.nz

Manawatū River Leaders' Forum

Objective: Facilitating the Manawatū River Leaders' Forum.

Context: The Manawatū River Leaders' Forum typically meets twice a year. This project incorporates the time, a budget for initiating, holding and facilitating these meetings, and the reporting and collation of material for them. The Forum last met on the 27 April 2018 and the next meeting is scheduled for November 2018.

Deliverables/Targets: Two Manawatū River Leaders' Forum Meetings held. These meeting are an opportunity for groups to provide updates on progress on the Accord actions and any issues that the forums members have experienced.

This financial year sees the half way point for the current Action Plan. To enable the progress to date on this Action Plan to be tracked, a progress report will be completed and released at the same time as the Manawatū Accord website is updated. The updated website will enable a more interactive experience for users and provides information in an easier to understand format.

Manawatū Awa Freshwater Improvement Fund project and Long-term Plan Targets 2018-19

The major focus of this financial year will be on servicing the deliverables that have been funded through the Manawatū Awa Freshwater Improvement Fund project. For Horizons, these also align with our Long-term Plan (LTP) targets and the obligations Horizons has committed to through the Manawatū River Accord Action Plan 2016. The Manawatū Awa Freshwater Improvement Fund project is to be delivered over five years, across a number of project, organisations and funding partners as shown in Table 2.

Table 2 Proposed budget for the Manawatū Awa Freshwater Improvement Fund project over the five- year term.

Project	HRC	HDC	MDC	PNCC	Landowners	MfE	Total
Tokomaru land discharge		$600,000				$600,000	$1,200,000
Stream fencing	$872,917				$860,417	$872,917	$2,606,250
Riparian planting	$429,167				$416,667	$429,167	$1,275,000
Fish passes	$75,000					$75,000	$150,000
Mātauranga Māori	$300,000					$300,000	$600,000
Community projects	$250,000		$58,335			$191,665	$500,000
Urban streams				$422,750		$422,750	$845,500
Governance, H&S	$35,000					$35,000	$70,000
	$1,962,083	$600,000	$58,335	$422,750	$1,277,083	$2,926,498	$7,246,750

The LTP targets for the Manawatū River Accord are to be achieved through the $410,000 targeted rate, Freshwater Improvement funding and landowner co-funding. The revenue received from the Manawatū Accord targeted rate therefore results in significant leverage of funding to enable works within the catchment. The targets for the 2018-19 financial year are shown in Table 3. These targets are aligned with the deliverables contained in the Deed of Funding with the Ministry for the Environment for the Freshwater Improvement Fund project:

Table 3 Annual Plan targets for Manawatū River Accord work programme for 2018-19.

Activity	Target
Stream fencing (kms)	50 km
Riparian plants	40,000
Community involvement projects	9
Fish passes	4
Annual report	1

In regards to the annual programme for this project, Horizons has committed $440,000[5] of funding for freshwater initiatives in the Manawatū Awa this year. This funding will help to advance the goals of the Manawatū Accord. Table 4 below gives further details on how this funding is proposed to be spent this year. Staff costs are additional to the amounts in the Tables above and below and do not count towards the overall spend for the Freshwater Improvement Fund.

In addition, the Manawatū River Accord has money sitting in reserves and Council has provided permission via a resolution to allow works to be allocated up to the amount held in reserves. This will allow further freshwater initiatives/investments within the Manawatū Catchment in the 2018-19 financial year.

Table 4 Proposed Horizons budget for the Manawatū Awa Freshwater Improvement Fund project for the 2018-19 year.

Project	HRC	MDC	Landowners	MfE	Total
Stream fencing	$174,583		$349,166	$174,583	$698,332[6]
Riparian planting	$85,834		$171,668	$85,834	$343,336[7]
Fish passes	$15,000			$15,000	$30,000[8]
Mātauranga Māori	$60,000			$60,000	$120,000
Community projects	$50,000	$11,667		$38,333	$100,000
Governance, H&S	$8,250			$8,250	$16,500
	$393,667	$11,667	$520,834	$382,000	$1,308,168

As a requirement of the Deed of Funding for the Freshwater Improvement Fund project a Governance Group was required to be established. This group has been established with Cr Keedwell and Mr McCartney as the Horizons representatives.

[5] $30,000 comes from Policy for the Freshwater Improvement Fund Mātauranga Māori and cultural monitoring project.

[6] This works on the assumption of the landowner contributing 50%. The Deed of Funding with MfE allows the split to be 33:33:33. Depending on allocation levels and the ability to meet the milestones the landowner contribution may need to be decreased.

[7] This works on the assumption of the landowner contributing 50%. The Deed of Funding with MfE allows the split to be 33:33:33. Depending on allocation levels and the ability to meet the milestones the landowner contribution may need to be decreased.

[8] This is budgeted on no contribution from the structure owner. It is normal practice to receive some contribution from the structure owner.

4. Ngā Wai Ora o te Whangaehu Awa Freshwater Improvement Fund project

The major focus within the Whangaehu catchment will be the delivery of the Ngā Wai Ora o te Whangaehu Awa Freshwater Improvement Fund project, the milestones for which also align with the commitments that Horizons has made in the LTP for this catchment. A Horizons budget of $160,000 has been set for the Ngā Wai Ora o te Whangaehu Awa project. This is a new programme to be funded through the LTP as historically any works in the Whangaehu catchment were funded out of the Regional Freshwater Programme. In addition to the Horizons funding, the Freshwater Improvement Fund and landowner co-funding will enable the targets to be meet. The LTP targets for the 2018-19 financial year are shown in Table 5.

Table 5 Long Term Plan targets for Whangaehu Freshwater Improvement Fund work programme for 2018-19.

Activity	Target
Stream fencing (kms)	17 km
Riparian plants	3,333
Community involvement projects	4
Fish passes	2
Annual report	1

The Ngā Wai Ora o te Whangaehu Awa project was submitted on behalf of numerous stakeholders in the Whangaehu catchment, the project was mostly developed through the Ngā Wai Ora o te Whangaehu Awa group that Ruapehu District Council established for the catchment. The originally proposed project was to be delivered over a five-year timeframe. However, this was shortened to three years as a result of the Freshwater Improvement Fund assessment process.

The projects that Horizons will lead over the three-year life of this project are:

- Stream fencing (50 km);
- Riparian planting (10,000 plants);
- Fish barrier remediation (5 fixes);
- Community projects (10 projects);
- Governance, Health and Safety.

A restoration project specific to the Tokiahuru Catchment is to be managed by Ngāti Rangi.

The Deed of Funding for this project has been signed commencing on 1 July 2018. A Governance Group is being established and will likely meet in August to confirm Terms of Reference for the group. Cr Rollinson is the Horizons representative on the Governance Group.

The three-year budget for the Ngā Wai Ora o te Whangaehu Awa project is contained in Table 6:

Table 6 Proposed budget for the Ngā Wai Ora o te Whangaehu Awa Freshwater Improvement Fund project over the five-year term.

Project	Horizons	Ngati Rangi	Landowners	MfE	Total
Ngāti Rangi		$112,000		$112,000	$224,000
Stream fencing	$345,833		$333,333	$345,833	$1,025,000
Riparian planting	$31,667		$31,667	$31,667	$95,000
Fish passes	$25,000			$25,000	$50,000
Community projects	$50,000			$50,000	$100,000
Governance, H&S	$25,000			$25,000	$50,000
Total	$477,500	$112,000	$365,000	$589,500	$1,544,000

Breaking the project into the budget for this financial year, the allocations for individual projects are contained in Table 7.

Table 7 Proposed Horizons budget for the Ngā Wai Ora o te Whangaehu Awa Freshwater Improvement Fund project for the 2018-19 year.

Project	Horizons	Ngāti Rangi	Landowners	MfE	Total
Stream fencing and riparian planting	$125,834		$251,668	$125,834	$503,336[9]
Fish passes	$8,333			$8,333	$16,667[10]
Tokiahuru fencing and planting		$56,000		$56,000	$112,000[11]
Community projects	$16,667			$16,667	$33,333
Governance, H&S	$8,333			$8,333	$16,667
	$159,167	$56,000	$251,668	$215,167	$682,002

Ruapehu District Council are likely to pull together the Ngā Wai Ora O Te Whangaehu Group and seek to establish a Catchment Action Plan during this financial year. This is likely to require resourcing through staff time this financial year, although Horizons' input may have to be limited as the focus for the catchment will need to be on delivering the projects in the Freshwater Improvement Fund project. Horizons will seek to align these projects as much as possible to enable economies of scale in the work we complete.

[9] This works on the assumption of the landowner contributing 50%. The Deed of Funding with MfE allows the split to be 33:33:33. Depending on allocation levels and the ability to meet the milestones the landowner contribution may need to be decreased.
[10] This is budgeted on no contribution from the structure owner. It is normal practice to receive some contribution from the structure owner.
[11] This project is being led by Ngāti Rangi and has no financial contribution from Horizons.

5. Regional Freshwater Grants

Overview

This output is part of Horizons Regional Council's non-regulatory response to water quality. The Regional Freshwater Grant project is a core component of the Freshwater and Partnerships Team's work to support water quality improvement and to continue what has been a concerted effort over time to undertake this type of work. It involves primarily the fencing-off of streams and planting of riparian margins but also covers the restoration of in-stream habitat through the clearance of willows and remediation of fish barriers. Opportunities to work with other agencies to achieve water quality outcomes are actively sought.

There are three main work streams within the work programme:

1. Aquatic habitat enhancement work includes improving or opening up habitat for native fish through willow clearance, fencing and planting (where necessary) riparian zones, and remediating barriers to fish passage where passage to good habitat upstream is impeded.

2. Stream fencing or planting projects to provide stock exclusion from waterways and to reduce contaminants, such as nutrients and bacteria, reaching waterways. These projects often result from enthusiastic landowners, iwi and community groups seeking advice and assistance from Horizons staff, and projects tend to be spread throughout the Region.

3. Providing advice, information and collaboration with others. Staff respond to a wide range of requests from landowners, community groups, schools, iwi, councils and external agencies. Support is provided in the form of specialised advice, financial assistance where appropriate criteria are met, and project planning and management.

LTP funding increased the budget within this programme from $160,000 to $200,000. In addition, the Water Quality and Quantity targeted Reserve has money in reserves and Council has provided permission via a resolution to allow works to be allocated up to the amount held in reserves. This will allow further freshwater initiatives/investments within the Regional Freshwater programme in the 2018-19 financial year.

Long-term Plan Targets 2018-19

During the 2018-19 financial year the Freshwater and Partnerships Team will set about achieving the Long-term Plan targets in Table 8:

Table 8 Long-term Plan targets for the Regional Freshwater work programme for 2018-19.

Activity	Target
Stream fencing (kms)	12 km
Riparian plants	20,000
Community involvement projects	1
Fish passes	1

Given the current demand on the Regional Freshwater programme, the Freshwater Team intends to develop a prioritisation process for future applications to the fund seeking co-funding. This ultimately will result in some applications for work being declined; however, it is required to ensure that limited resources are directed to those areas where they will have the greatest environmental and community benefit.

6. Te Mana o Te Wai

The national Te Mana O Te Wai (TMOTW) Fund announced in 2014 provided $5 million funding over two years. The concept of TMOTW reflects the recognition of freshwater as a natural resource whose health is integral to the social, cultural, economic and environmental well-being of communities.

The purpose of the TMOTW Fund is to provide funding to enable Māori to improve the water quality of freshwater bodies (including lakes, rivers, streams, estuaries and lagoons) that are of importance to them by:

- Supporting iwi/hapū to play an active part in improving the water quality of their local freshwater bodies;
- Enabling iwi/hapū to actively participate in managing their local freshwater bodies;
- Developing partnerships and working in collaboration with others; and
- Assisting iwi/hapū and the wider community to recognise the importance of freshwater in supporting a healthy ecosystem, including supporting human health.

Within the Horizons Region four projects obtained resourcing through the TMOTW Fund: Ngā Puna Rau Rangitīkei, Tu te Manawa, Te Kakapa Manawa o Muaūpoko, and Ngā Rauru.

From a Horizons financial perspective the Tu te Manawa, and Ngā Rauru projects have been completed. Tu te Manawa still has some commitments around Governance and support functions through staff time as the other component of the project establishing whare (or information kiosks) is continuing in the 2018-19 financial year.

Horizons' remaining commitments for the Ngā Puna Rau Rangitikei, and Te Kakapa Manawa o Muaūpoko projects will need to be funded through the Regional Freshwater programme this financial year as no dedicated budget exists in this financial year. The remaining projects and commitments are below:

Ngā Puna Rau Rangitīkei

Objective: To assist in the delivery of the Ngā Puna Rau Rangitīkei, project and meet the requirements of the contractual arrangement for the works that have been sub-contracted to Horizons.

Context: Ngā Puna Rau Rangitīkei was funded from the Central Government Fund TMOTW and was publicly announced in September 2016. This project was successful in bringing additional funds to the Rangitīkei Catchment to allow further works to be undertaken.

Horizons' estimated commitment over the life of the project is $70,000. Most of the works in the project have been completed with some remaining to be completed this year. These projects sit within our normal grant criteria and the following catchments have works remaining for this financial year:

- Moawhango River (fencing and planting – approximately $5,000 Horizons commitment);
- Lake Oporoa (fencing and planting – Horizons commitments only relate to staff time and there are no monetary commitments);
- Pourewa Stream (fencing and planting – approximately $5,000 Horizons commitment); and
- Hautapu River (restoration plan involving staff time, and may also including fencing and planting if the Ngā Puna Rau Rangitīkei budget allows. This will be co-funded if Horizons has capacity in our budgets).

Please note this links to a river that has macroinvertebrate scores that are below national bottom lines.

Councillor Patrick is a Horizons representative on the Governance Group for this project, with staff also attending governance meetings – one staff member in a Governance role for the Te Mana o te Wai project and others in technical support roles.

Please note this project has a range of other deliverables that Horizons are not as actively involved in including establishing a Catchment Management Plan

Deliverables/Targets: The Ngā Puna Rau Rangitīkei project had a completion date of the end of June 2019.

Te Kakapa Manawa o Muaūpoko

Objective: To deliver on Horizons' commitments to the Lake Accord Action Plan.

Context: Te Kakapa Manawa o Muaūpoko (The heartbeat of Muaūpoko) is led by the Lake Horowhenua Trustees, who have formed a Governance Group that includes representation from Horowhenua District Council and Horizons.

This TMOTW project includes a range of actions identified in the Lake Horowhenua Action Plan. The project has three key objectives:

- To enhance the ability of mana whenua to actively exercise their kaitiakitanga to restore and protect the lake and to grow direct community engagement and action in lake clean-up and protection activities;
- To complete physical interventions to protect, clean-up and reduce impacts on our streams and lake; and
- To restore native fish populations as key indicators of lake/catchment health and water quality, enabling mana whenua to exercise their customary fishing rights.

Horizons operates under contract conditions with The Lake Trustees for financial transactions to occur.

Councillor Sheldon is the Horizons representative on the Governance Group for this project, with staff also attending Governance meetings in technical support roles.

The Te Kakapa Manawa o Muaūpoko projects was to be completed by June 2018; however, the project completion date has been extended to the end of August 2018. Horizons' remaining financial commitments (riparian planting of approximately $5,000) will need to be paid for through the regional programme, the majority of costs are likely to be staff time.

7. The Lake Horowhenua Accord

Overview

Lake Horowhenua is a regionally significant lake that has been identified as being in poor health and having declining water quality. Horizons has a long history of working with various parties to improve the lake through initiatives such as the Lake Horowhenua and Hōkio Stream Strategy and through Environmental Grant work.

In response to concerns about the condition of the lake, Horowhenua District Council has led the development of a Lake Horowhenua Accord. The key agencies involved in the Accord are:

- Horowhenua District Council;
- Lake Horowhenua Trustees;
- Lake Domain Board;
- Department of Conservation; and
- Horizons Regional Council.

In August 2013 the five parties listed above signed the Lake Horowhenua Accord with the intent of providing leadership, halting the degradation and putting in place remedial measures on Lake Horowhenua and the Hōkio Stream that will ensure these taonga hold pride of place in the Horowhenua community. The Lake Horowhenua Accord Document objectives are to:

1. Return Lake Horowhenua as a source of pride for all people of Horowhenua;
2. Enhance the social, recreational, cultural and environmental aspects of Lake Horowhenua in a fiscally responsible manner that will be acceptable to the community of Horowhenua;
3. Rehabilitate and protect the health of Lake Horowhenua for future generations; and
4. Consider how to respond to the key issues, management goals and 15 guiding action points set out in the Accord document.

Since the Accord has been signed, the signatories have worked together to develop the Lake Horowhenua Action Plan, which outlines eight key issues affecting the lake and 15 management actions to address them, and also identifies the roles and responsibilities of each signatory. The Lake Accord Action Plan was released in August 2014.

Long Term-plan Targets 2018-19

Horizons has committed to the LTP targets in Table 9 for Lake Horowhenua Accord this year. These are funded through the targeted rate for Lake Horowhenua and the Water Quality and Quantity rate. How this is to be achieved is covered in greater detail in the project below.

Table 9 LTP targets for the Lake Horowhenua Accord work programme for 2018-19.

Activity	Target
Annual report to Council on lake restoration activity including the Freshwater Improvement Fund project for Lake Horowhenua.	1
Annual report on the work with the horticulture sector through the Freshwater and Partnerships programme to improve water quality.	1

Project 1: Lake Horowhenua Accord support

Objective: Assisting with the administration (technical support) of the Lake Horowhenua Accord and representing Horizons at meetings.

With the Lake Accord signed in August 2013 this project has moved from the development stage to support and implementation. Accord meetings are held approximately every three months. This project encompasses the Freshwater and Partnerships Team's time and costs associated with attendance at meetings, the work between meetings in support of the Accord that sits outside the Science and Innovation Team's contribution and the two projects outlined below.

Deliverables/Targets: Meetings of the Accord group attended as requested and advancing the achievement of the goals of the Accord.

Project 2: Responsibilities under the Lake Accord Action Plan (Lake Horowhenua Restoration)

Objective: To deliver on Horizons' commitments to the Lake Accord Action Plan.

Context: The Lake Accord Action Plan was publically released in August 2014. The Lake Horowhenua Restoration programme is funded through a targeted rate for 80% of the revenue and the remaining 20% is funded through the Water Quality and Quantity targeted rate.

Deliverables/Targets: The following are to be completed this financial year:

Recover of costs

1. Recovery of costs from the Hōkio A Trust for both the Environment Court and High Court hearings. These costs were awarded to Horizons as part of the decision. Across Horizons as the applicant and regulator these costs amount to approximately $130,000.

Sediment Trap

2. Completion of the planting of the bunds with native trees to screen the sediment trap from the roadside and grassing the bunds. The area also requires ongoing weed control, particularly for purple loosestrife.
3. Fish entrapment monitoring needs to be completed in the sediment trap as required by the resource consent conditions.

Lake weed harvesting

4. The Long Term Plan outlines a plan to complete lake weed harvesting in the 2019-20 financial year. To achieve this the access way and boat ramp need to be completed over the coming construction season to enable the weed harvester to access the lake next spring. This includes receiving an authority to disturb from Heritage New Zealand. Further it will require responding to the recent appeal to the decision by the Maori Land Court to dismiss the application for an injunction of the works. Once works are completed there are consent requirements to complete the planting strategy that was submitted as part of the mitigation package, specifically in relation to the native stinging nettle.
5. To complete the weed harvesting a number of consent requirements need to be fulfilled. This includes the establishment of two monitoring buoys on the lake for up to 12 months while the initial year of harvesting (the harvesting trial) is undertaken, and likely at least one round of weed mapping.

Lake Horowhenua Freshwater Improvement Fund

The Lake Horowhenua Trust was the lead agency for the application to the Freshwater Improvement Fund. The project commenced on 1 July 2018 and consists of three broad projects:

- Stormwater upgrades throughout the network in Levin township which eventually discharge into Lake Horowhenua (led by Horowhenua District Council);
- Establishment of a cultural monitoring programme for the lake (led by the Lake Trust); and
- Refinement of the groundwater model for the Lake Horowhenua capture zone as well as a better understanding of the temporal variability in groundwater quality (led by Horizons).

Horizons has committed to co-funding of $100,000 over the life of the project, which equates to $33,333 per year. The cost of the entire package for the groundwater component of the project is $140,000, including the $100,000 Horizons' co-funding.

During the 2018-19 year, the focus will be installing two flow sites, one in the Patiki Stream, and the other in the Mangaroa Stream. This information is to feed into refining the groundwater balance for Lake Horowhenua building on previous work. In addition, further work will be undertaken looking at the quality of the groundwater that feeds the lake and may involve collecting additional groundwater quality samples and other groundwater information.

8. Freshwater Improvement Work with the Horticultural Sector

Overview

Building on previous work with the Tararua Growers Association as a part of the Freshwater Clean-Up Fund project, Council established new funding of $70,000 per year for work with the horticulture sector to reduce nutrient and sediment loss from horticulture farms. This funding will be used in part to contribute to a Sustainable Farming Fund project future proofing vegetable production (see below).

The balance of the funding will be prioritised to implantation of work to reduce nutrient and sediment losses from horticultural farms eg. establishment of sediment traps etc, similar to the way freshwater grants are paid for fencing and planting of waterways. It is noted that this funding may be utilised to design the proposed interventions.

Future proofing vegetable production

This project is mainly funded through the Sustainable Farming Fund with a number of other co-funders. The project is not specific to the Lake Horowhenua catchment, although a lot of the ground work and trails are to occur within the catchment where the relationships have already been established through other work programmes such as the Clean-Up Fund. Once these projects have been trialled in the Lake Horowhenua catchment they can be moved out into other parts of the Region. This project has three main deliverables:

1. Guidelines for Novel Nitrogen Recapture Techniques;
2. Updated Good Nutrient Management Practices;
3. Common Pool Resource Management which is about getting actual change for the better happening on farms.

The sustainable Farming Fund project is also being supported by Gisborne District Council, Landwise and Potatoes NZ. Horizons has asked that the work be presented to growers outside of the Horowhenua as a part of the project. A Massey phD study with support from Horizons Science and Innovation programme is aligned with this work.

9. Lake Waipu Freshwater Improvement Fund project

The Lake Waipu project is a small discrete package of work that involves removal of the Rātana wastewater treatment plant (WWTP) discharge to Lake Waipu and instead applying the discharge to land. This involves upgrades to the treatment plant (more storage) and a land treatment system being established. In-lake monitoring is to occur prior to, during and after removal of the WWTP discharge, to allow the effects to be monitored and also help inform any further in-lake interventions that will need to be undertaken to help restore the health of the lake.

The payments from the Freshwater Improvement Fund will commence in 2019-20. Prior to this the project will commence identifying suitable land and starting the resource consent process, which is to be led by Rangitikei District Council. Horizons will develop the Lake monitoring plan and start collecting some baseline information this financial year. This monitoring is likely to include:

- Collection of water quality samples on a quarterly basis; and
- Continuous monitoring for pH, DO, conductivity and temperature during the summer period.

The budget for the Lake Waipu Freshwater Improvement Fund project for the five years is contained in Table 10.

Table 10 Proposed budget for the Lake Waipu Freshwater Improvement Fund project over the five-year term.

Project	HRC	RDC	MfE	Total
Wastewater upgrades and land treatment		$950,000	$800,000	$1,750,000
Science and monitoring	$75,000		$75,000	$150,000
Total	$75,000	$950,000	$875,000	$1,900,000

The LTP also contains a target for the Lake Waipu project as shown in Table 8.

Table 11 Annual Plan targets for Waipu Freshwater Improvement Fund work programme for 2018-19.

Activity	Target
Annual report to Council on the Waipu Catchment Freshwater Improvement Fund project.	1