



SCIENCE & INNOVATION

1 ACTIVITY OVERVIEW

Horizons' Science and Innovation Team works in partnership with other teams across the Natural Resources and Partnerships (NRP) Group, and the wider organisation, to inform decision-making and support Horizons' natural resource management functions.

The team's main activities include co-ordinating a range of environmental monitoring and research programmes covering air, land and water. This involves collecting, analysing and reporting on data and information collected by Horizons and others. This information helps prioritise and focus the implementation efforts of the wider NRP Group, and supports policy and plan development and implementation. The team's work also informs other functions such as river management and emergency management.

Research is carried out in-house and in partnership with government, industry and independent researchers. Key projects currently underway include the five-year Smarter Targeting of Erosion Control programme, led by Manaaki Whenua, and the development of a National Water Model, led by the **National Institute for Water and Atmospheric Research** (NIWA). Horizons is also one of a few Councils eligible for external funding through the **Ministry of Business, Employment and Innovation's** (MBIE) Envirolink scheme, which enables us to receive science advice relating to environmental management. The team has a number of Envirolink-funded projects underway:

Other key activities recently introduced through Horizons' Long-term Plan 2018-28 include research into the effects of climate change and drinking-water security. The team also works closely with Horizons Communications team to share data and information via Horizons' and **Land, Air, Water Aotearoa** (LAWA) websites, as well as provide annual State of Environment reporting, a summer swim spot campaign and public information around topics such as air quality.

The August 2019 Environment Committee report provides an annual summary of the 2018-19 Science and Innovation work programme, as well as outlining science activities for the 2019-20 year in the NRP Operational Plan. This February 2020 report provides a summary of progress to date for the 2019-20 year (from 1 July 2019 to 31 January 2020).

1.1 Activity Update

Telemetered Water Metering Project

- 1.1.1 Monitoring water use across the region is a key priority for Horizons. A key aspect of this project is the installation and maintenance of water metering equipment, and collection and reporting of water use data for consented water takes, which is a requirement of [national regulations](#).
- 1.1.2 Peak water demand typically coincides with reducing river flows and summer is generally the busiest time of year for the water metering project team. In preparation for the 2019-20 season, the focus has been on increasing the accuracy and efficiency of our data collection processes with the implementation of new tools for field data capture.
- 1.1.3 Increased integration of field data capture with Horizons' Iris database has greatly improved the field team's efficiency; for example, it is now possible to easily identify groups of sites in a spatial format on an iPad and plan site visits more effectively to minimise travel time. The team is on track to deliver the majority of site inspections during the 2019-20 summer season, increasing the available time for new telemetry installations, addressing faults and outages, and upgrading the existing telemetry framework.

Swim Spot Monitoring

- 1.1.4 Monitoring of the region's popular swimming and recreation spots, numbering more than 80 sites, resumed in November 2019. The programme is delivered in collaboration with MidCentral District Public Health Service and local territorial authorities with results reported weekly using the traffic light system (Figure 1) via both the Horizons and LAWA websites.



Figure 1 Horizons and LAWA use the traffic light system to communicate the level of health risk at more than 80 popular swim spots in our region.

- 1.1.5 In the region's rivers, monitoring data suggests conditions have mirrored those of previous seasons with warnings/alerts generally associated with higher levels of bacteria following periods

of rain. Popular swim spots such as the Rangitikei River at Vinegar Hill, Pohangina River at Raumai Reserve, Whanganui River at Mosquito Point and Ohau River at Gladstone Reserve have been suitable for swimming for much of the season. Coastal streams continue to return higher results for bacteria and permanent health warnings remain in place for the Kai iwi, Mowhanau and Ototoka Streams.

- 1.1.6 Prior to Christmas, Lake Dudding was deemed unsuitable for swimming due to high levels of cyanobacteria and was closed in December 2019. The lake re-opened prior to Christmas and caution has been advised since (amber alert). Lake Wiritoa has been suitable for swimming and recreation throughout much of the season, with just one amber alert issued at the start of the season.
- 1.1.7 Monitoring during 2019-20 shows that beaches have been suitable for swimming and recreation almost all of the time.
- 1.1.8 Community engagement and communication is an important part of the swim spot monitoring programme delivered via our public campaign. A key objective is to continue the conversation with our communities about when and where they can swim within the region. Further, the campaign provides an opportunity to communicate how our monitoring programme and science helps to inform Horizons' work programmes and initiatives, raising awareness of the wider functions of the Regional Council. Celebrating partnerships and highlighting the work that is already underway to improve water quality is an opportunity to celebrate success and encourage continued participation. During 2019-20:
- Our Communications team is running our annual swim spot photo competition where members of the public can snap a photo of their favourite swim spot, tag the location and Horizons at **#swiminourregion**, and go in the draw to win a \$1,500 water-related prize (Figure 2). Last years' entries were so outstanding we had three winners! Julie, our second-equal prize winner spent her prize with whanau up the Whanganui River. You can check out the winning photos in Figure 3.



Figure 2 Visit Horizons' website or Facebook page to **#swiminourregion** and WIN!



Figure 3 Horizons received so many fantastic entries for the 2018-19 competition we had three winning photo. From top to bottom are photos of the Mangawhero River near Ohakune by our first prize winner, Robyn Wilson; the Kahuterawa Stream by Julie MacLean (left) and Vinegar Hill by Tui Bolger (right), our second-equal winners.

- Council's social media accounts are used to promote the #swimouregion photo competition, as well as to raise awareness of Horizons' monitoring programme, highlight popular swim spots that some people may not be aware of, show videos and photos of people enjoying swim spots, information about what Horizons is doing to improve water quality and good news stories. People are primarily being driven to the LAWA website (lawa.org.nz) for results. Our website (horizons.govt.nz) also has a swim spots map and results, as well as further detail about work Horizons is undertaking to improve water quality..
- The December 2019 edition of Horizons' Across the Region newsletter to residents highlighted the swim spot monitoring programme and competitions, 2018-19 monitoring results, actions Horizons is taking to improve water quality and quotes from our Councillors – see the Ruapehu edition of Across the Region below (Figure 4).

ACROSS THE REGION RUAPEHU

YOUR COUNCILLORS
Weston Kirton
 There seems to be a ground swell of farmers taking the opportunity of subsidised plants and materials for the fencing and planting of private wetlands. I have been invited to various farms, dairy and beef, and have seen excellent examples of fenced-off wetlands, all of which contributes to the wider water quality picture. This goes to show how aware farmers are of protecting the waterways and their desire to do the right thing for the environment. The general feeling I get is farmers are grateful for the advice and support they are getting from Horizons field staff. The challenge moving forward is can the Council sustain the growth of enthusiasm among farmers to jump on board doing the right thing for waterways.
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A WIDESPREAD EFFORT TO IMPROVE SWIM SPOTS
 So what is Horizons doing to help improve swimmability and water quality? In response to the additional funding from the Freshwater Improvement Fund for projects mentioned on the front cover, Council has increased staffing and provided additional ratepayer funding to enable stream fencing and planting grants to be provided in catchments where there is not a Freshwater Improvement Fund project. Council has also enabled the use of reserve funding to complete additional fencing and planting grants in recent years, including in 2018-19 for both the Freshwater and Sustainable Land Use Initiative programmes.
 Actions within the Freshwater and Partnerships programme beyond fencing and planting that contribute to improved swimmability of the region's waterways include work to improve discharges of treated wastewater to water and funding to transition these discharges to land.
 Compliance also has a role to play, which combined with the efforts of local landowners and other agencies, contributes to improvements in swimmability in the region. When necessary we also take enforcement action, for example when a wastewater treatment plant is not performing as it should.
 An area of focus that combines a number of aspects of our business, is the work Horizons has been prioritising in areas where E. coli levels exceed guideline values for swimmability due to faecal bacteria. This work includes intensive monitoring surveys and faecal source tracking to determine the source of the bacteria (generally cows, sheep, birds or human) and guide interventions. These include working with landowners in identified catchments to exclude stock from waterways and plant riparian margins and working with district councils to install UV treatment on wastewater discharges and/or seek funding for land application of wastewater.
 Finally, we note that while all this work is a good step in the right direction, we know that there is always more that needs to be done and we are looking to work further with partner organisations, territorial authorities and community groups to do this. If you'd like to learn more about what you can do to contribute to improving water quality, check out the 'Help protect our waterways' page on our website.

TRACKING E. COLI LEVELS IN THE WHANGAEHU CATCHMENT
 In 2016, the contact recreation programme was upgraded to monitor more of the popular swimming spots in the Ruapehu District.
 Monitoring during the first year in the Makotuku and Mangawhero found at times E. coli concentrations that exceeded the thresholds for the river being considered swimmable. Given the closeness of these sites to the Tongariro National Park, and the pristine water that leaves there, further work was undertaken to confirm what the source of this contamination was.
 To investigate potential sources of faecal contamination in the Makotuku and Mangawhero Rivers, faecal source tracking was undertaken. This tracking looks specifically at humans, sheep, cows, and birds as potential sources and is able to distinguish between these groups and show the major contributor. Key Findings from this programme found the E. coli was derived from ruminants (cattle).
 In April 2017 Horizons in conjunction with iwi partners and a number of stakeholders, made an application to the central government Freshwater Improvement Fund administered by the Ministry for the Environment. The project called Nga Wai Ora o te Whangaeahu was partially funded with a focus on stream fencing for stock exclusion and riparian planting for improving aquatic habitat within the Whangaeahu Catchment.
 This programme seeks to focus on the Makotuku and Mangawhero headwaters around the central plateau and improve the swimmability of these rivers.
 The programme goes until 30 June 2021 and Horizons is still actively seeking landowners to complete stream fencing on their properties to prevent stock access to streams. The project looks to complete at least 60kms of stream of fencing and plant 14,000 riparian plants over three years. If you're interested or want to learn more about what grants and help is available, please contact Ben Fraser in the freshwater team on 0508 800 800.

RUAPEHU SWIM SPOTS MONITORING RESULTS FOR 2018-19
 CHECK OUT YOUR FAVOURITE SWIM SPOT AND SEE HOW IT RATED LAST SUMMER.
 Proportion of time from 1 Nov 2018 – 30 Apr 2019 that a site was suitable for swimming.*

WHAT TO CONSIDER BEFORE DIVING IN
 Water quality is one of a number of things to consider before heading off to your favourite swim spot. It is also important to remember:
 • To look for potential hazards such as unstable cliffs and banks, sunken rocks and logs, and rips at beaches.
 • If you see musty-smelling, black mat-like growth during low flows, avoid swimming.
 • If it's three days after rain and the water is not dirty or flowing fast, it should be safe to swim.
 When checking the water quality status on LAWA or our website, you'll see a grading for each site according to a handy traffic light system that is part of the Ministry of Health and Ministry for the Environment guidelines. The system provides guidance to Councils and District Health Boards on how they should act when certain levels of indicator bacteria or algae are detected. For our lakes and rivers:
 GREATER THAN 550 E. COLI PER 100ML AVOID SWIMMING
 201-550 E. COLI PER 100ML COULD BE HEALTHY RISK
 LESS THAN 200 E. COLI PER 100ML SHOULD BE SAFE TO SWIM
 If a site falls into the red category we contact the Public Health, who advise when warning signs need to be erected and that information is provided to the public that the site is considered unsuitable for recreational use.

WHAT'S HAPPENING IN YOUR DISTRICT
 4,717 NATIVE PLANTS PLANTED SINCE 2013
 29 SITES MONITORED FOR WATER QUALITY
 297.9km OF FENCING BUILT UNDER SLUI
 8,622ha RETIRED UNDER HORIZONS' SUSTAINABLE LAND USE INITIATIVE (SLUI)

Visit www.lawa.org.nz to find out current swim spot ratings for your favourite swim spots.

Figure 4 A swim spot themed edition of Across the Region was circulated in December 2019.

- In December, Horizons water quality scientist Amber Garnett spoke with radio hosts at MoreFM and The Breeze, highlighting Horizons' monitoring programmes and some of the actions Horizons is taking with our community to improve water quality in the region. This interview is part of a #canlswimwhere radio campaign that is running from 16 December to 13 March to raise awareness of the monitoring programme and where results can be found

(lawa.org.nz). The radio campaign also includes a 'get involved' element to educate people on what they can do to contribute to water quality.

- The Manawatū Standard recently reported on our swim spot programme. You can read more [here](https://bit.ly/36mRpxm) at <https://bit.ly/36mRpxm>.
- As part of Horizons' Swim in our Regio' campaign, vehicles were again branded with campaign material for the summer, working as moving billboards throughout the region. Monitoring staff took advantage of the fine weather over the Christmas break to hand out drinks at popular swim spots, raising awareness of Horizons' work and encouraging our communities to check LAWA for up-to-date information about their favourite swim spots.
- The season was scheduled to include a Te Oranga o te Awa - Manawatū River Improvement Festival on 1 February 2020. The aim of the festival is to encourage people to enjoy the river environment, learn about what efforts are underway to improve the catchment and how they can do their bit. For information, including the line-up of food trucks and musicians, check out 'The Manawatu River' facebook page.

1.1.9 Staff are planning to carry out another faecal source tracking investigation over the next 2-3 months. These surveys have been conducted at sites where we observe high levels of *E. coli* and where the source of bacteria is unclear. Previous investigations have included the Waikawa catchment in Horowhenua, and more recently the Ototoka Stream north of Whanganui where we found the likely source of *E. coli* to be ruminant (cows), due to upstream sections of the stream being unfenced. Staff are currently assessing water quality data to determine the location of the 2020 survey.

One Plan Changes and Policy Support

1.1.10 Horizons' Science and Innovation team is currently working with the Policy team to provide technical support for plan change and policy implementation/review processes. The current focus for the team is to provide: (1) technical support for the Plan Change 2 process; (2) a science plan to inform regional and national policy implementation (including regulatory and non-regulatory activities); (3) a compilation of catchment information, documentation of intervention logic and development of options to improve water quality across the region; and (4) annual State of Environment catchment summary reports.

1.1.11 Staff are also assisting the **Ministry for the Environment** (MfE) with 'road-testing' the **National Policy Statement for Indigenous Biodiversity** (NPSIB). The aim is to assist central government in understanding how councils, including Horizons, are likely to implement the proposed policies. It is intended that the proposed policies be tested using real-world implementation scenarios, including in areas that present challenges or risks. Science staff are collaborating with the Biodiversity and Policy teams to deliver this work, in addition to providing feedback as part of the NPSIB public consultation process.

Land and Fluvial Activity

- 1.1.12 Fluvial surveys to be carried out this year include the Whangaehu catchment and completion of the Eastern Ruahine catchments. In addition to completing river cross-sections, surveying of the Whangaehu in early 2020 will extend to the coast so that we can assess sedimentation of the estuary as part of our broader fluvial research programme, a key issue identified through our estuary habitat monitoring programme.
- 1.1.13 In recent years Horizons has invested in furthering our understanding of river geomorphology and sedimentation in the Lower Manawatū and Oroua Rivers. Research to date has explored the linkages between hill country erosion, climate change, water quality and flood protection. We are ready to identify and prioritise sedimentation mitigation tools for these rivers and their wider catchments. A workshop with key experts to build on this knowledge is in the planning stage. The outcome of this workshop will be the development of a sedimentation strategy and programme of work for the Lower Manawatū and Oroua Catchments.

Biodiversity and Biosecurity Activity

- 1.1.14 The Science and Innovation team continues to provide support to the Biodiversity team for planning, data entry and data management of priority biodiversity sites. Work continues to identify opportunities for alignment with other NRP teams to increase protection at high value biodiversity sites. The biosecurity pest animals team have supplied recent monitoring results from waxtag lines and these will be used to identify high-value biodiversity sites that may benefit from additional possum control.
- 1.1.15 Work is underway using the recently produced Potential Ecosystem mapping (Singers 2019) to classify remaining ecosystems by the **International Union for Conservation of Nature's** (IUCN) classification. This work will identify what ecosystem types are critically endangered, endangered or vulnerable, to assist with targeting and adding new sites to Horizons' priority sites programme.
- 1.1.16 The third and final bird monitoring survey at Tōtara Reserve was completed in November and December 2019. Analysis and reporting on the most recent three years of monitoring data are anticipated early this year. An alternative bird monitoring programme for the Horizons region is now being investigated.

Lake Monitoring

- 1.1.17 Annual Lake **Lake Submerged Plant Indicators** (SPI) assessments were carried out by NIWA for six lakes in December 2019. Three of the lakes have been assessed in the past with two (Lake Otamangakau and Lake Otamataraha) confirming the maintenance of good condition. The third revisited lake (Lake Ngaruru, near Hunterville), showed rapid range expansion of the invasive pond

weed hornwort which was identified in 2016. Two of the lakes visited for the first time (an unnamed wetland lake near Ohakune, and Lake Waipakuranui) were free of invasive species and had good populations of native aquatic plant species. The third lake (Lake Rotokauwau) was in good condition but there was evidence of a fairly recent incursion of an invasive species. The full report will be completed later in the year.

- 1.1.18 Recent **State of Environment** (SOE) monitoring indicates that two of the region's popular recreation lakes, Dudding and Wiritoa, both south of Whanganui, are thermally stratified and the lower layers of the lake are anoxic. Similar conditions were reported during summer last year. An expert panel, convened during 2019, agreed that these conditions are likely to be reflective of a lake with reduced resilience and there is a risk of the lake 'flipping' – i.e. transitioning from a macrophyte-dominated state to an algal-dominated state. Some lakes, such as Lake Horowhenua, have unique conditions that enable them to shift their state (flip) on an annual basis however, in some cases the change is permanent and difficult to reverse. Interventions are available to decrease the risk of this recurring; however, each lake responds differently to these intentions and identifying the appropriate toolbox of actions requires good knowledge of individual lake conditions. This is why collecting robust monitoring data on our region's lakes is crucial to informing restoration options. Horizons Science and Freshwater teams continue to work with lake experts to develop a suite of recommended actions to restore the health of these lakes.

Drinking-water

- 1.1.19 Phase one of the drinking-water source protection zone work programme was completed in late 2019 and progress reported to Council's Strategy and Policy Committee in December 2019. This project delineated three zones for each council-operated drinking water supply serving more than 500 people and made a number of recommendations for management within these zones to ensure protection of the water source. These recommendations are in the process of being actioned by the relevant authorities.
- 1.1.20 Phase two of this project has recently been contracted and will cover the remaining council-operated water supplies as well as larger non-council suppliers such as Massey University and New Zealand Defence Force. A further update of the regional drinking-water source prioritisation report, incorporating information from the 2018-19 compliance reports, will also be delivered before 30 June 2020.

Climate Change

- 1.1.21 A contract to develop a regional greenhouse gas (GHG) inventory has been awarded to AECOM. This inventory will improve our understanding of the contributions different activities in our region make to GHG emissions. Work is now underway to quantify the region's emissions and their sources at a district-scale, to identify opportunities and risks and help determine Horizons' role in the mitigation aspect of climate change in the region.
- 1.1.22 Information on climate change research and initiatives is now available on [Horizons' website \(horizons.govt.nz\)](https://horizons.govt.nz), under the Managing Natural Resources tab. This includes information from our 2019 State of Environment Report, as well as copies of the 2019 'Climate change implications for the Manawatū- Whanganui Region' report and the 2016 'Climate change and variability' report.
- 1.1.23 At a Council level, an internal cross-organisational team continues to work on a draft set of objectives and policies for Horizons' Climate Change Strategy. This group has also been working alongside territorial authorities to produce a climate change action plan for the region. A **Memorandum of Understanding** (MOU) between territorial local authorities and Horizons outlines our intention to work together towards climate change adaptation. A copy of the MOU is available on Horizons' [website](#).

1.2 Annual Plan Targets

Table 1 Progress reporting for Science and Innovation Long-term Plan targets for 2019-20.

Performance Measures for Levels of Service	Target 2019-20	Progress Update
Water Quantity and Quality Activity		
Water quantity and water quality information is made available to the public via LAWA (www.lawa.org.nz) and Horizons' websites.	Data provided to LAWA as required	Data is available on the LAWA website. The latest water quality data was published on the website on World Rivers Day, 22 September 2019. Swim spot data is regularly updated as results become available.
Annual report on water quantity and quality monitoring and research activity.	1	An annual report on water quantity and quality activity will be produced and presented to Council in June 2020.
Land Management Activity		
Annual report on land and fluvial monitoring and research activity.	1	An annual report on land and fluvial activity will be developed and presented to Council in June 2020.
Annual report on biodiversity monitoring and research activity.	1	An annual report on biodiversity research activity will be developed and presented to Council in June 2020.
Environmental Reporting and Air Quality Monitoring Activity		
Provide an annual summary report on the state of the environment.	1	Annual State of Environment – Catchment Summary reports were completed for each Freshwater Management Unit (FMU) in September 2019.
Develop and implement a science communication strategy.	Report progress to Council annually	A strategy for science communication was developed mid-2019; an action plan has been developed and is now being drafted.
Complete drinking water supply research with a focus on Council-operated drinking water supplies and complete an annual report on this to Council.	1	Staff have scoped a programme for drinking water research for 2019-20 and this is now underway. An annual progress report to Council was delivered to Horizons' Strategy and Policy Committee in December 2019.
Investigate one aspect of climate change impact in the Region and report on this to Council.	1	A greenhouse gas inventory for the region has been contracted to AECOM and will begin in January 2020.
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	Monitoring is ongoing and data is made available to the public via the Horizons and LAWA websites. Horizons' ability to accurately report on air quality at Taihape and Taumarunui is now compromised with equipment due for replacement.
Undertake an annual public education air quality campaign.	1	The next public campaign is scheduled for February 2020.

1.3 Activity Summary

Project	Key Deliverables	YTD Progress
Water Quality and Quantity Activity		
Monitoring Programmes	Carry out core monitoring of water quality, quantity, ecosystem health.	<p>Monitoring is progressing to schedule.</p> <p>Summer monitoring of macroinvertebrates is underway and is progressing well.</p> <p>Minor changes to the monitoring programme have occurred as a result of a recent landslide in the Whangaehu catchment.</p> <p>Swim spot monitoring began on Sunday 3 November 2019 and is ongoing</p>
	Undertake a review of our water monitoring network.	A project proposal and work plan for this review is now being developed, with input from a cross-organisational group including Emergency Management, River Management, Environmental Data and Science.
Catchment Characterisation	Improve our understanding and better characterise the region's catchments.	<p>NIWA's 5-year water national water model project continues.</p> <p>Two PhD studies are progressing, exploring the fate and transport of nutrients in the sub-surface environment.</p>
One Plan and Policy Support	Provide science support to One Plan review programme and Our Freshwater Future.	Staff are supporting policy through the provision of technical advice, including PC2. A key deliverable is the development of a science programme to support future plan changes and implementation of regional and national policy.
Lakes Research	Continue 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.	<p>A groundwater investigation in the Lake Horowhenua catchment is progressing, with the recent installation of flow monitoring in major inflows and additional groundwater monitoring.</p> <p>Annual lake submerged plant indicators (SPI) monitoring was completed in early December with related reporting due at the end of financial year.</p> <p>The national Ministry of Business, Innovation and Environment (MBIE) funded Lakes 380 programme continues, for which 22 lakes in the region have been selected for sediment core analysis. The project aims to uncover the environmental history of 380 lakes in New Zealand.</p>
Coastal and Estuarine Environments	Continue to advance our understanding of the region's coast and estuaries.	Estuary habitat monitoring is contracted and scheduled for mid-late January. Key deliverables include the second year of fine scale-monitoring for the Whanganui estuary, sediment monitoring in the Whangaehu

Project	Key Deliverables	YTD Progress
		<p>estuary, and monitoring at the Ohau and Waikawa estuaries.</p> <p>An Envirolink-funded project investigating the use of an ocean glider to collect <i>in situ</i> measurements of physical ocean properties to inform future monitoring of river plumes from high rainfall events is underway.</p>
Land Management Activity		
Gravel use monitoring and reporting	Track annual gravel use and allocation to support consent decision-making and flood scheme management.	First and second quarter gravel levies have been processed.
Fluvial surveys	Complete fluvial surveys of the Whangaehu and Eastern Ruahine catchments.	Surveys are planned and due to be undertaken in the Whangaehu catchment and Southeastern Ruahines (Manawatū catchment) during early 2020.
Sediment source and transport research	Advance and report on sedimentation transport investigations.	The development of a sedimentation and drainage plan for the Arawhata catchment contracted to Tonkin + Taylor is now underway.
Wastewater management	Assist with the implementation of the One Plan regarding on-site wastewater performance.	Staff continue to provide support through consent technical assessments and working with Territorial Authorities to ensure systems are installed in-line with One Plan requirements.
Nutrient management research	Support research into the fate, transport and management of nutrients in the region.	<p>A range of nutrient management investigations is underway, including three Sustainable Farming Fund (SFF) projects: Future Proofing of Vegetable Production, Innovative Drainage Management Technologies, and Tararua Plantain Project.</p> <p>Other work underway includes investigations of nutrient loss from horticulture and arable farming, and a pilot study investigating nutrient loss from intensive winter grazing.</p> <p>Staff are working with the Policy team and external providers to develop a regional land use map and framework for future mapping, and to undertake an assessment of nutrient losses from horticultural practices in the region.</p>
Biodiversity and Biosecurity Activity		
NRP support	Identify opportunities for alignment with other NRP teams e.g. biosecurity animals and land teams.	Opportunities identified with Horizons Biosecurity Animals team and initial information provided. This workstream will continue to be refined. Opportunities for alignment with Land team are being pursued.

Project	Key Deliverables	YTD Progress
Priority site management	Support the biodiversity team to complete assessments at 100 putative ¹ priority biodiversity sites.	This work is ongoing.
	Continue to refine the activity monitoring for priority biodiversity sites.	A process for this has been developed. Biodiversity staff need to be trained in its use.
	Develop management prescriptions for 10 high priority sites.	Initial workshops for this project were held in early November.
Tōtara Reserve	Complete the third year of the bird monitoring programme in Tōtara Reserve, and report on findings.	Bird monitoring at Tōtara Reserve was completed in November-December with full analysis and reporting due at the end of the financial year.
Environmental Reporting and Air Quality Monitoring		
Air quality	Deliver the core monitoring programme for air quality and undertake an annual public education campaign about air quality.	Monitoring is ongoing and data is made available to the public via the Horizons and LAWA websites, noting that there are ongoing issues with the current infrastructure, as discussed earlier in the report. An annual public education campaign is due to begin in early 2020.
Climate change	Investigate one aspect of climate change and report to Council.	A regional greenhouse gas inventory has been contracted to AECOM. This work is now underway and expected to be delivered within the reporting year.
Drinking water	Continue to work with city and district councils to improve management of public drinking water supplies.	A presentation of outputs from the 2018-19 drinking water programme was presented to Horizons Strategy and Policy committee on 10 December 2019. The 2019-20 programme is scoped and underway.
State of Environment report	Provide an annual report on the State of the Environment (SoE) via catchment summaries	Annual State of Environment – Catchment Summary reports were completed for each Freshwater Management Unit (FMU) in September 2019. Planning for 2020 SoE catchment summary reporting will begin in early-mid 2020.
LAWA	Ensure environmental data is made available to the public via the LAWA website.	Data is available on the LAWA website. The latest water quality data was published on the website on World Rivers Day, 22 September 2019. Preparation is underway for the 2020 release. Swim spot data is updated weekly as the results become available.

¹ Putative sites are those which have been inferred from a model although, for the majority, no direct evidence of their status is available.

Project	Key Deliverables	YTD Progress
		Proposed future modules include groundwater quality, which is in development.
Science communication	Implement Horizons' science communication strategy	<p>An action plan to complement the science communication strategy sets out key science communication activities for the reporting year, to help prioritise resourcing and identify new opportunities. This is currently in draft form.</p> <p>Public information and Resource Management Act (RMA) advice continue to be provided as necessary.</p> <p>Community engagement has included radio interviews and advertisements to start the contact recreation season and the Swim in our Region campaign, handing out drinks to the public and providing them with more information about how to access swim spot results and speaking to students at the Himatangi lifesavers club about our swim spot monitoring.</p>

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