



ENVIRONMENTAL REPORTING & AIR QUALITY MONITORING

1 ACTIVITY OVERVIEW

The science and Innovation team serves a range of environmental reporting functions including research into the effects of climate change and drinking water security, and ongoing development of data management tools to support environmental reporting. The team works closely with Horizons Communications team to share data and information via the Horizons and **Land, Air, Water Aotearoa (LAWA)** websites, as well as provide annual **State of Environment (SOE)** reporting, and a summer swim spot campaign. The team also monitors air quality in Taihape and Taumarunui and works alongside the Communications team to run public information campaigns about good wood-burning practices.

The activity update below reports on progress on environmental reporting and air quality activities during the reporting period (1 July 2020 to 30 September 2020).

2 ANNUAL PLAN TARGETS

2.1.1 The Annual Plan targets for Environmental Reporting and Air Quality Monitoring are aggregated in Table 1 below.

Table 1 Progress reporting for Environmental Reporting and Air Quality Monitoring Annual Plan targets for 2020-2021.

Performance Measures for Levels of Service	Target 2020-21	Progress Update
Environmental Reporting and Air Quality Monitoring Activity		
Provide an annual summary report on the state of the environment.	1	Catchment summary reports are due to be finalised in December 2020
Develop and implement a science communication strategy.	Report progress to Council annually	The strategy and action plans for science communication will be implemented throughout the year
Complete drinking water supply research with a focus on Council-operated drinking water supplies and	1	This year the drinking water programme will be funding the groundwater bore inspections in

Performance Measures for Levels of Service	Target 2020-21	Progress Update
complete an annual report on this to Council.		priority source protection zones and this will be reported on to territorial authorities and to council.
Investigate one aspect of climate change impact in the Region and report on this to Council.	1	This year the climate change research budget will be used fund a Regional Climate Change Risk Assessment. Community engagement has is underway and contracting for project management is in the final stages.
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. New air quality monitoring equipment (5014i BAMS) for the Taihape and Taumarunui sites will be installed by December 2020.
Undertake an annual public education campaign on air quality.	1	A public awareness campaign was completed in March-April 2020 and guidance information on 'good' burning was shared via social media through winter. A similar campaign will be commence in the summer 2021.

3 ACTIVITY UPDATE

STATE OF ENVIRONMENT REPORTING

- 3.1.1 The previous **State of Environment (SOE)** report was published in May 2019 and a framework for annual reporting, in the form of catchment summary report cards, was developed. In September 2019, we published a suite of SoE summary report cards for each major catchment or **Freshwater Management Unit (FMU)** in the region.
- 3.1.2 Staff are currently working on updating the catchment summary report cards, with a view to publishing these in the latter half of 2020.

LAWA

- 3.1.3 The LAWA website is a regional sector-driven initiative, working with a range of partners to present information about the state and trends of New Zealand's natural resources. It now hosts surface and groundwater quality, quantity, lakes, swim spot monitoring, and air monitoring information, including for Horizons.
- 3.1.4 Data to the end of 2019 for surface and groundwater quality, water quantity, lakes and macroinvertebrates was released on World Rivers Day (27 September 2020) alongside a national picture of water quality which focused on land use and urban streams, in particular. At the national scale there are now around 1,500 monitoring sites displayed on the Rivers Water Quality section alone, with around 1.2 million data points. This reflects the collective effort and

investment by the sector. The remainder of this section focuses on the results from Horizons River water quality network.

3.1.5 A summary of LAWA NOF (National Objectives Framework) grades at SOE sites within the region can be seen in Figure 1. All chemical and microbiological parameters are presented for 109 sites. MCI (Macroinvertebrate Community Index) is presented for 82 sites with data. State of river sites analysed for these measurements are based on data from January 2015 – December 2019.

3.1.6 At the majority of State of the Environment sites in our region, Ammoniacal-N (NH_4) toxicity is not an issue, a few sites fail to achieve the national bottom line of Band C. Both Dissolved Reactive Phosphorus (DRP) and MCI vary across sites from Band A to Band D. *E.coli* frequently breaches contact recreation values across the region. A few SOE sites within the region are below the national bottom line (Band C) for Nitrate concentrations (Figure 1). Noting that the national bottom line for Ammoniacal-N and Nitrate has recently changed from a Band D (NPSFM 2017) to Band C in the new NPSFM 2020.

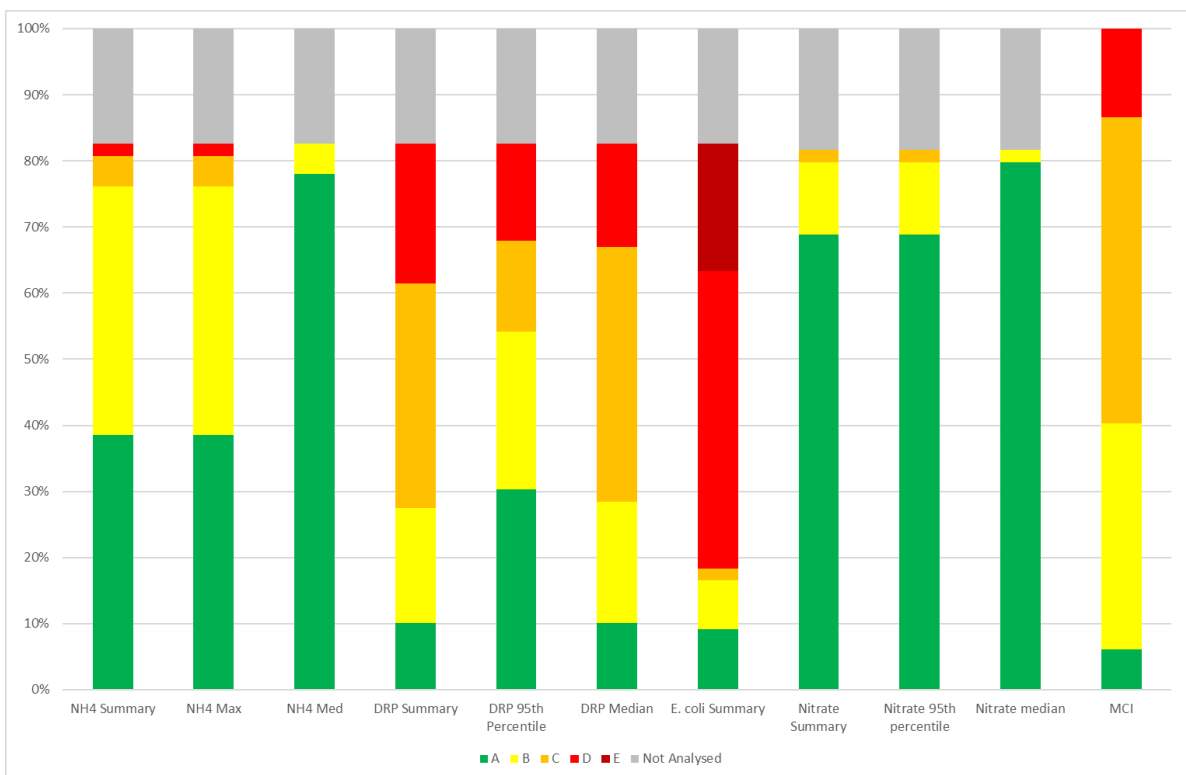


Figure 1 Summary of LAWA NOF grades at SOE sites in the Horizons Region. Data is from January 2015 – December 2019. Not analysed indicates insufficient data.

3.1.7 A summary of LAWA NOF grades at impact sites within the region can be seen in Figure 2. Impact sites within the Horizons region are those sites that are monitored downstream of a

known point source discharge. All chemical and microbiological parameters are presented for 29 sites. MCI is presented for 8 sites with data. State of river sites analyzed for these measurements are based on data from January 2015 – December 2019.

3.1.8 The proportion of sites that fall below the national bottom line for DRP is greater than for SOE sites (refer to Figure 1), with the majority of sites in Band D for all measures of DRP.

3.1.9 Ammoniacal-N (NH₄) toxicity is an issue, with nearly half of the sites failing to achieve the national bottom line of Band C. MCI is mostly in band C with around 25 per cent of sites falling below the national bottom line. *E.coli* generally falls below the national bottom line, within Band D and Band E. Impact sites have a greater proportion in Band E than SOE sites. Nitrate concentrations are largely Band A for all measures, a few impact sites fall below the national bottom line (Band C).

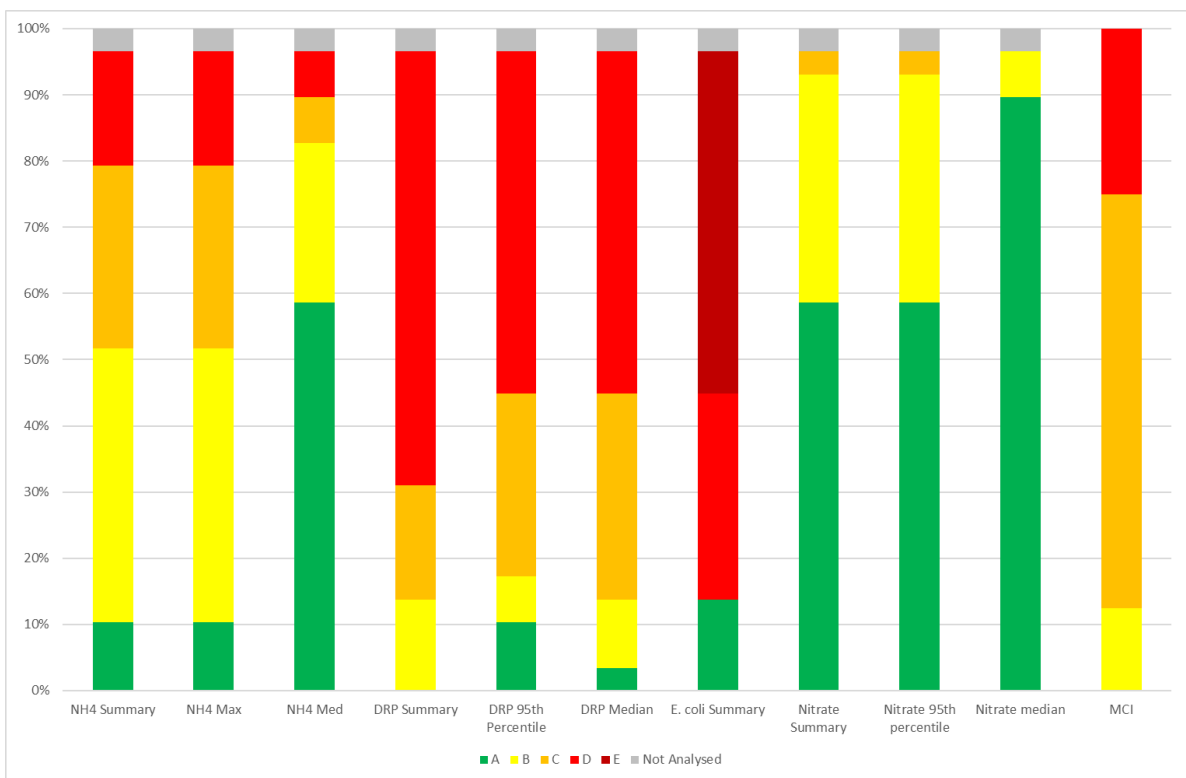


Figure 2 Summary of LAWA NOF grades for impact sites in the Horizons Region. Data is from January 2015 – December 2019. Note NA indicates insufficient data.

3.1.10 A breakdown of the LAWA NOF bands for DRP, *E. coli*, MCI and Nitrate Toxicity can be seen in Figure 3 through to Figure 6 below.

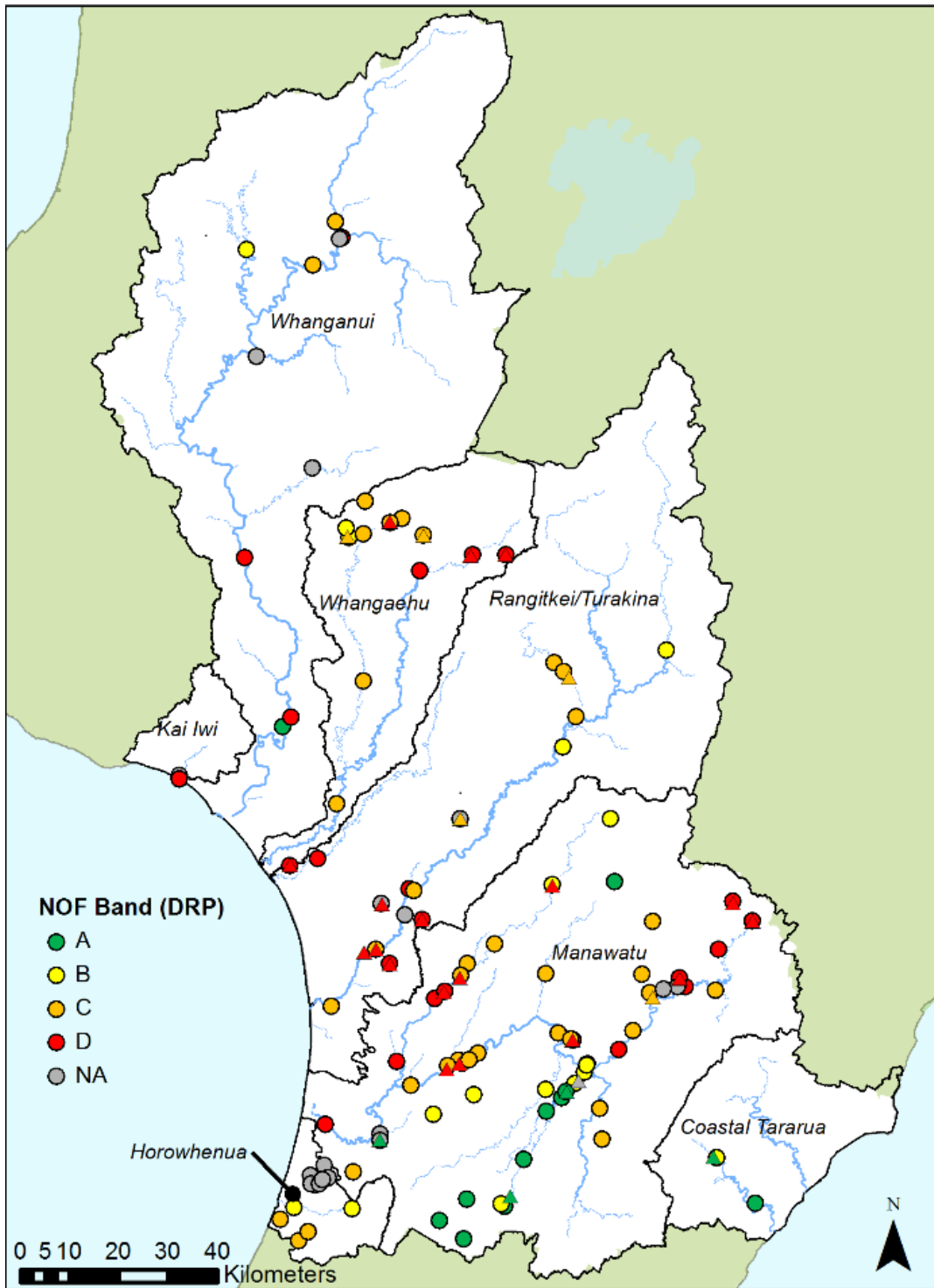


Figure 3 Summary of NOF bands for DRP concentrations across the region (January 2015–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

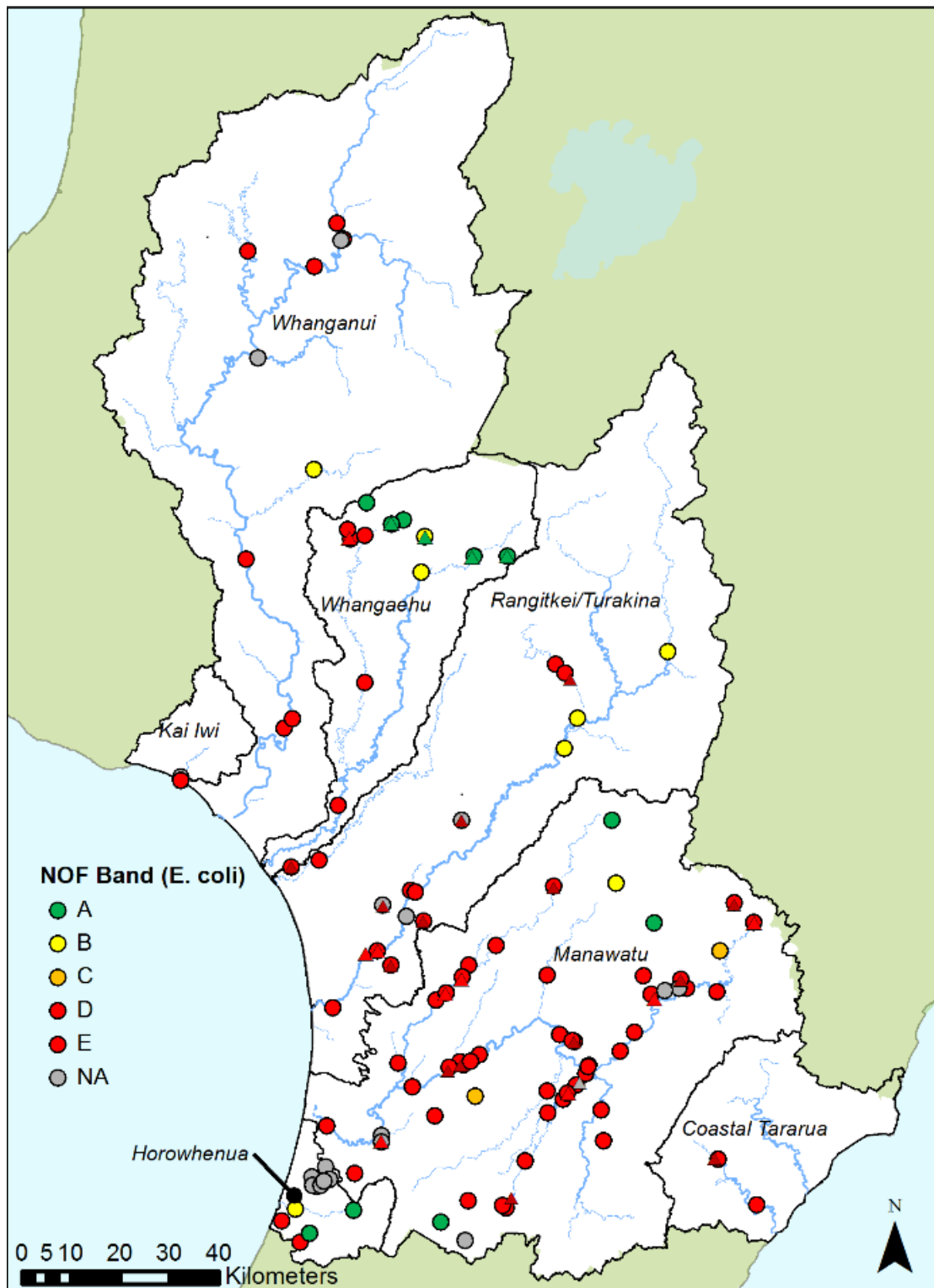


Figure 4 Summary of NOF bands for *E. coli* across the region (January 2015–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

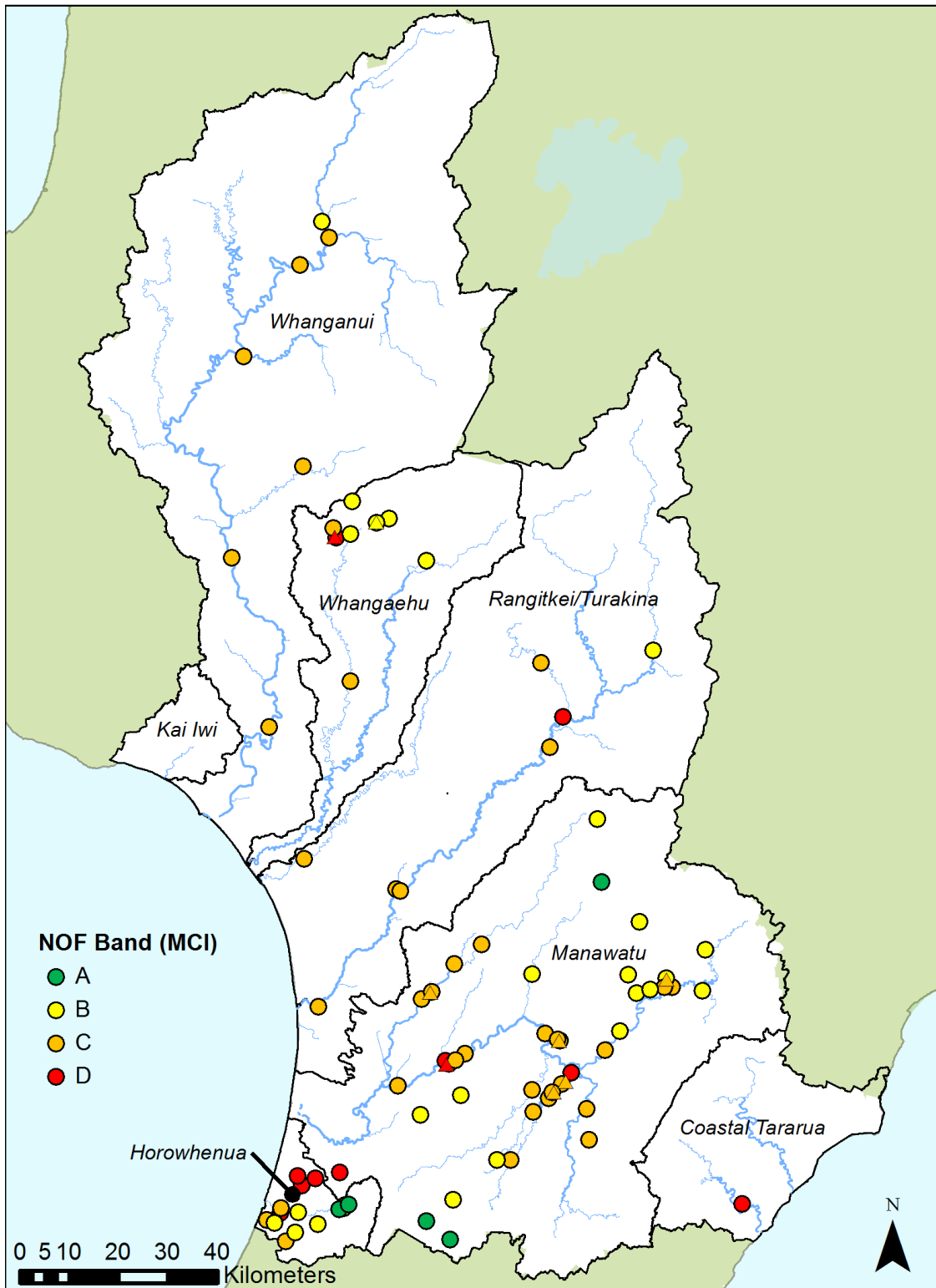


Figure 5 Summary of NOF bands for MCI across the region (January 2015–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

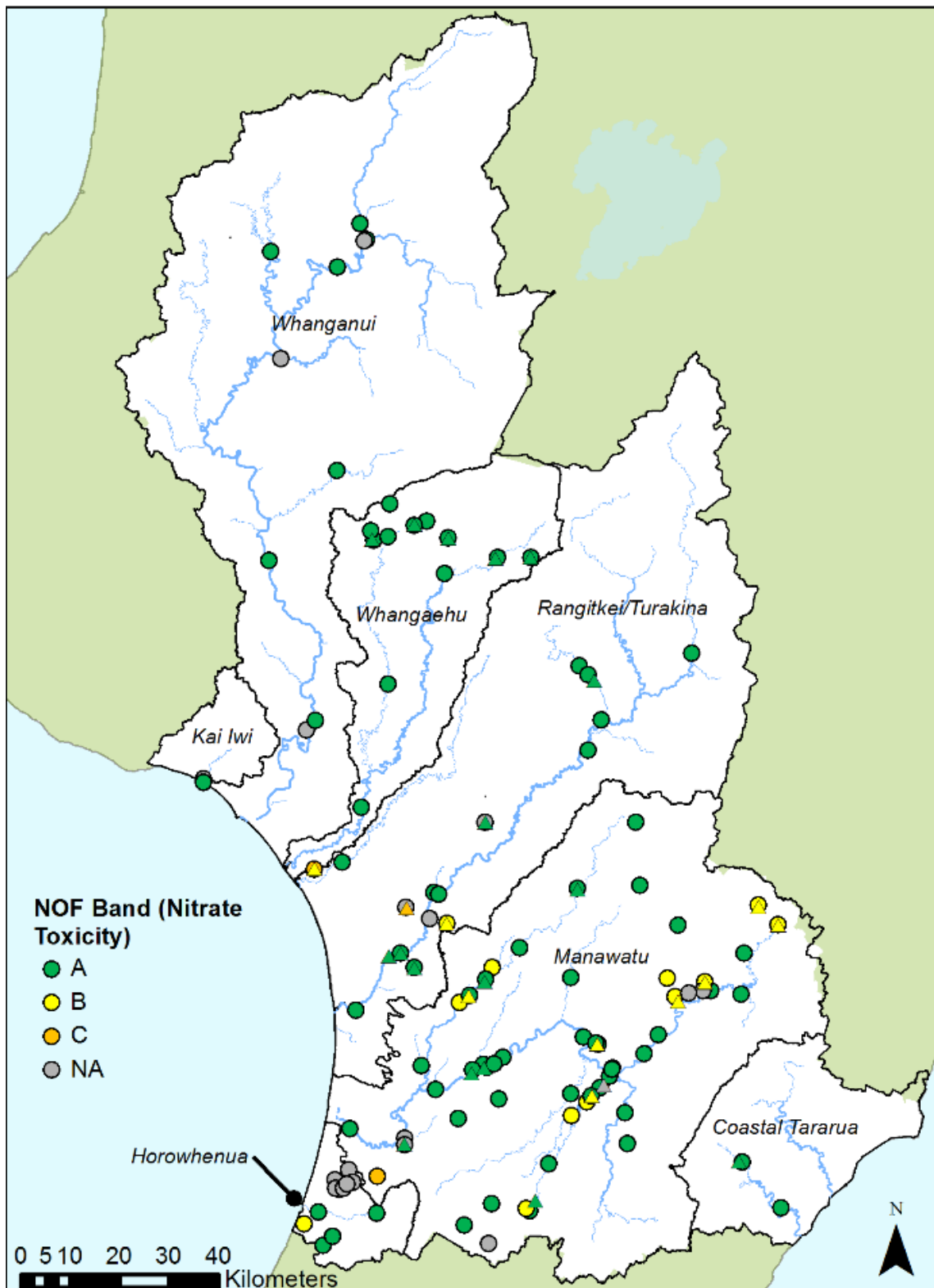


Figure 6 Summary of NOF bands for Nitrate Toxicity across the region (January 2015–December 2019). Where circles represent SOE sites, and triangles represent impact sites.

3.1.11 A summary of LAWA State (median contaminant concentration) at SOE sites within the region compared to the quartiles for all sites nationally can be seen in Figure 7. The total number of sites reported for Clarity is 82, for Turbidity, *E. coli* and Total Oxidized Nitrogen is 105 and for Ammoniacal-N (NH₄), Total Nitrogen, DRP and Total Phosphorus is 106. State of river sites analyzed for these measurements are based on data from January 2015 – December 2019.

3.1.12 When compared with the larger national dataset more than half of the SOE sites are in the worst 50% of sites nationally (i.e. in the worst 50 and worst 25 percent categories) for Clarity, Turbidity, *E.coli*, Total Nitrogen, DRP and Total Phosphorus . Conversely, nearly 70% of SOE sites are within the best 25% of sites nationally for Ammoniacal-N (NH₄) and just over 50% of sites for Total Oxidized Nitrogen are within the best 50% of sites nationally.

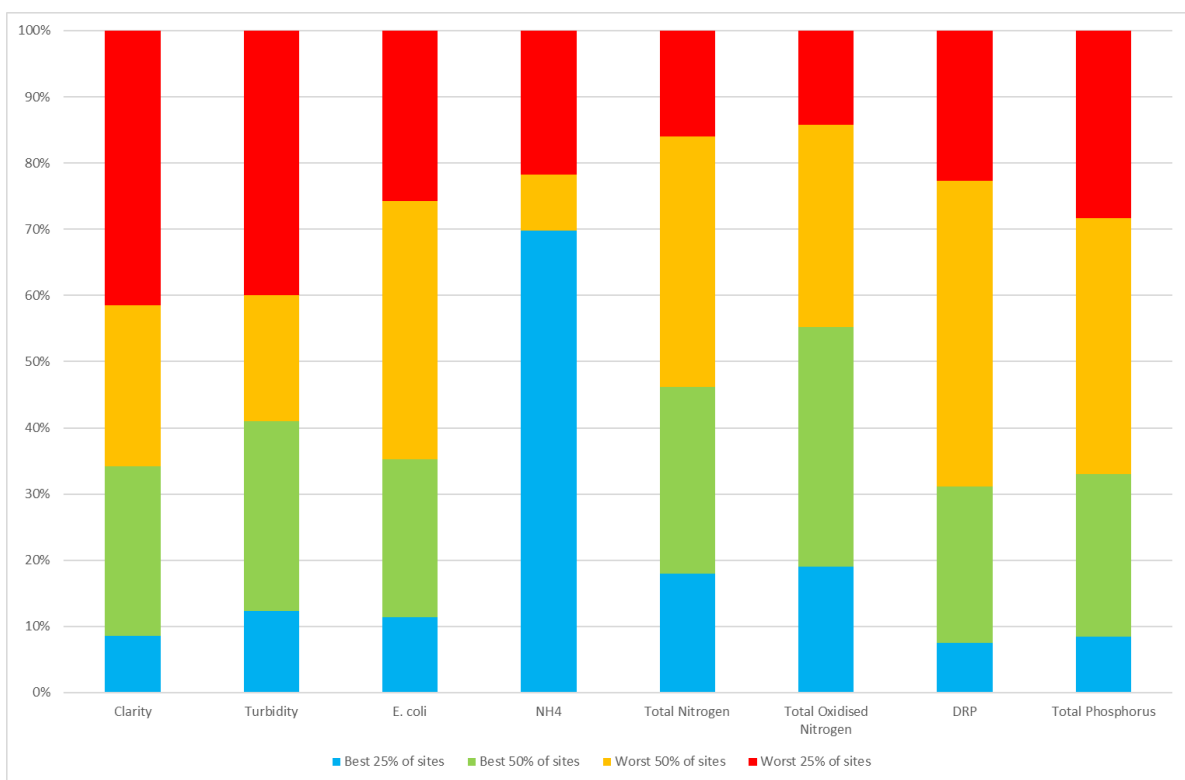


Figure 7 Summary of LAWA state at SOE sites in the Horizons Region

3.1.13 A summary of LAWA State (median contaminant concentration) at impact sites within the region compared to the quartiles for all sites nationally can be seen in Figure 8. The total number of sites reported for clarity is 19, and all other parameters, 29. State of river sites analyzed for these measurements are based on data from January 2015 – December 2019.

3.1.14 More than half of sites monitored for Clarity, Total Nitrogen and Total Oxidized Nitrogen are within the worst 50% of sites (i.e. in the worst 50 and worst 25 percent categories). Almost 50% of sites monitored for Turbidity, *E.coli*, and DRP fall within the worst 25% of all sites. More than half of sites monitored for Ammoniacal-N (NH₄) and Total phosphorus are in the worst 25% of all sites.

3.1.15 Impact sites within the Horizons Region will be proportionally worse as they are compared to all other sites submitted by councils, and Horizons are the only council to submit impact site data. Therefore, these sites are being compared against all SOE sites nationwide.

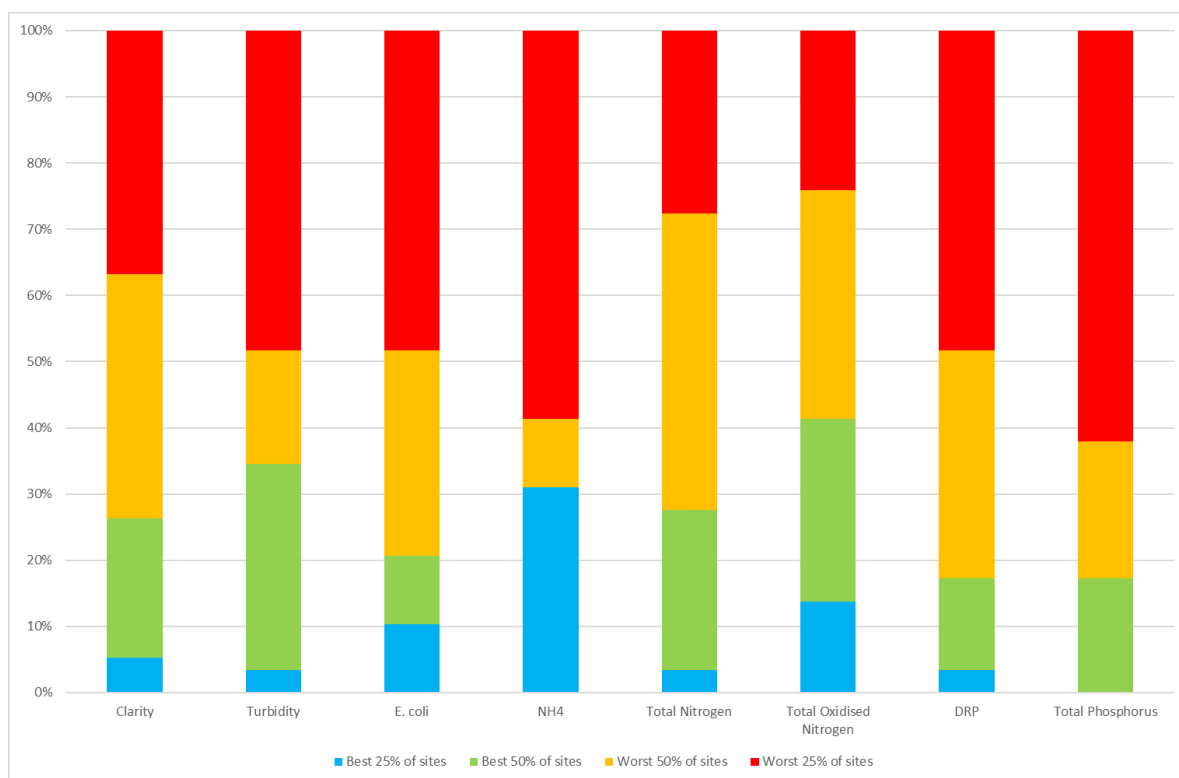


Figure 8 Summary of LAWA state at impact sites within the Horizons Region

3.1.16 A 15-year trend analysis for all SOE sites with sufficient data is presented in Figure 9. More than half of all SOE sites are showing improvement in *E. coli* and Ammoniacal-N (NH₄) whereas more than half of the monitored sites are showing degradation in clarity and approximately half in Total Nitrogen. Trends in Turbidity, *E.coli*, Total Oxidized Nitrogen, DRP and Total Phosphorus are a mixed bag. The majority of MCI sites have an indeterminate trend.

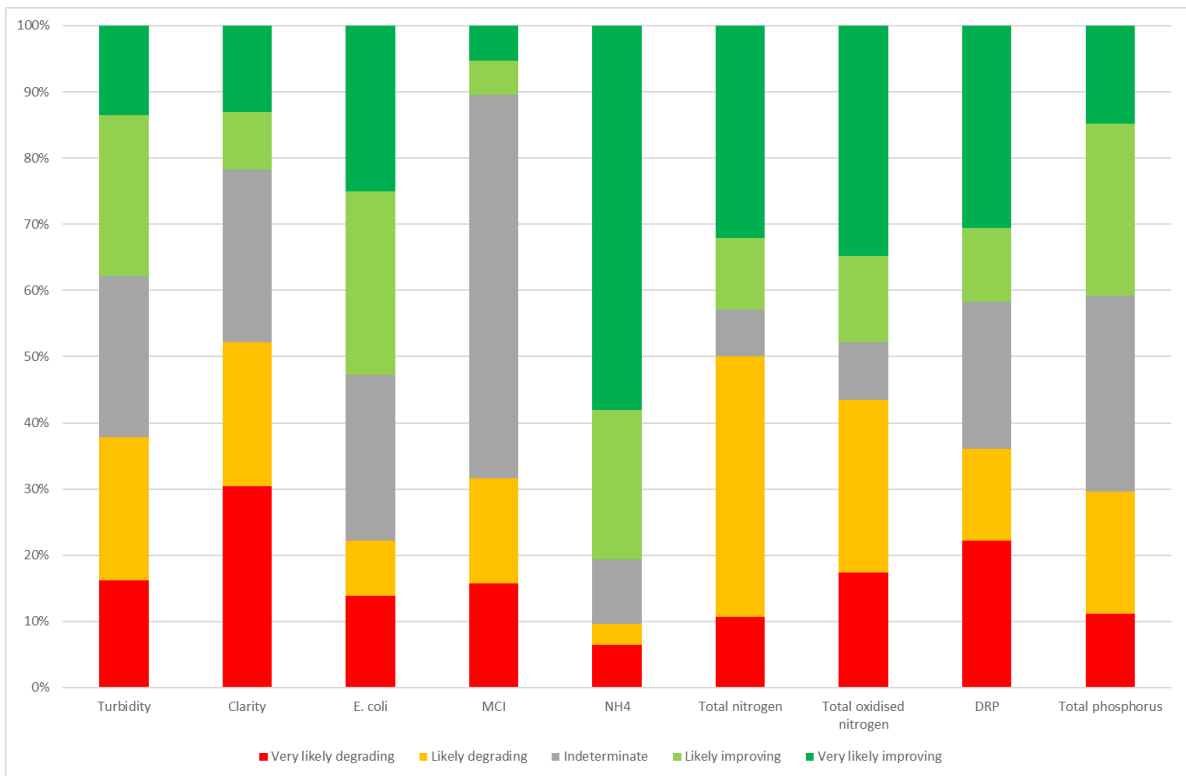


Figure 9 Summary of 15-year raw trends (January 2005 – December 2019) at SOE sites within the Horizons Region.

3.1.17 A 10-year (January 2010 – December 2019) trend analysis for all SOE sites with sufficient data is presented in Figure 10. More than half of the sites with sufficient data are degrading for Turbidity, Clarity, MCI, and Total Phosphorus. More than half of all SOE sites monitored for Ammoniacal-N (NH₄) are very likely improving and more than half of all SOE sites with sufficient data for Total Nitrogen are improving. More than half of all SOE sites monitored for DRP are very likely degrading. Trends in Total Oxidized Nitrogen and *E. coli* are a mixed bag for this time period.

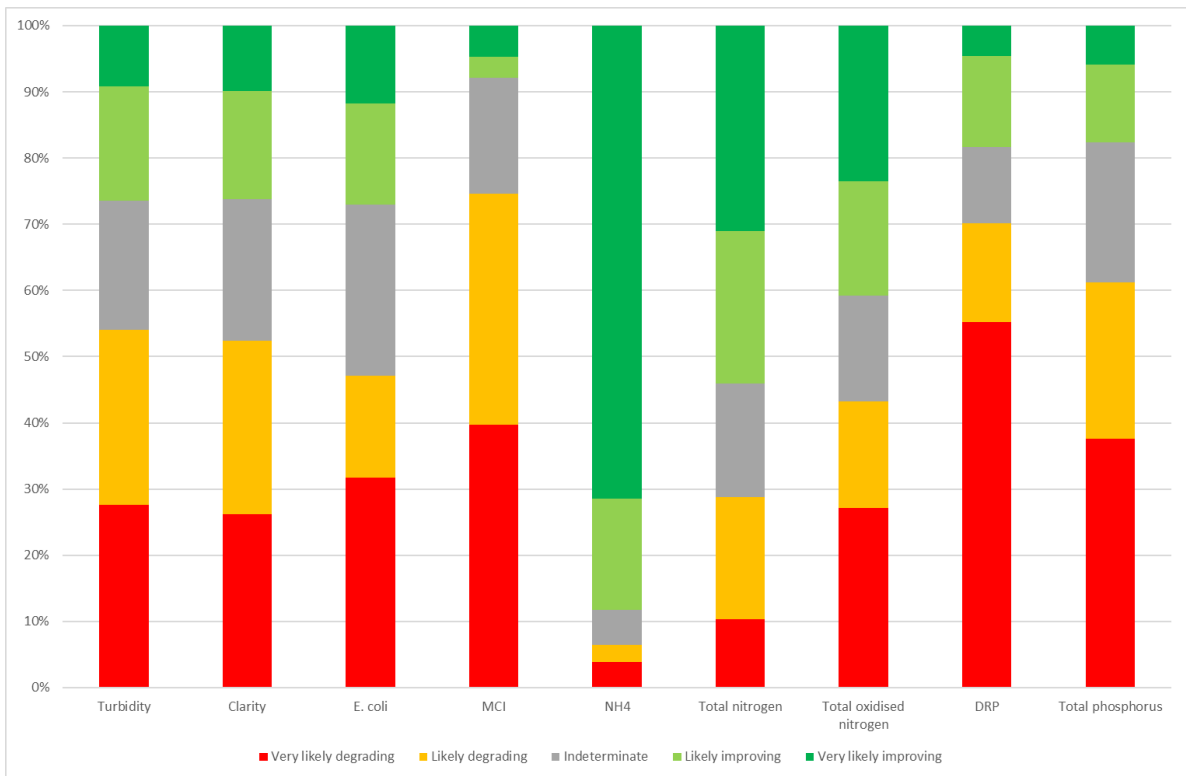


Figure 10 Summary of 10-year raw trends (January 2010 – December 2019) at SOE sites within the Horizons Region.

3.1.18 A 10-year trend analysis for all impact sites with sufficient data is presented in Figure 11. More than half of impact sites with sufficient data are degrading for Clarity, and DRP. More than half of are very likely degrading for Total Phosphorus. More than half of impact sites with sufficient data are improving for Ammoniacal –N (NH₄). *E. coli*. Total Nitrogen, and Total Oxidized Nitrogen are a mixed bag. Around half of all impact sites monitored for MCI are likely degrading.

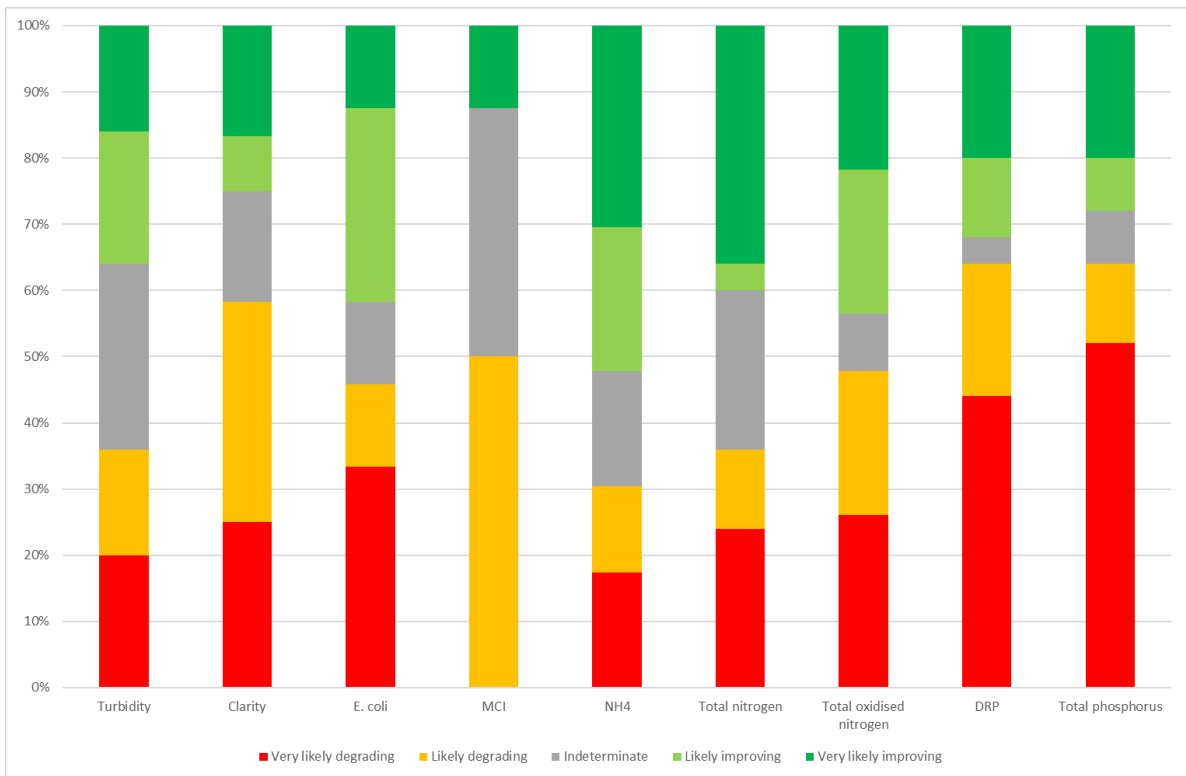


Figure 11 Summary of 10-year raw trends (January 2010 – December 2019) at impact sites within the Horizons Region.

3.1.19 A breakdown of the 10-year raw trends for DRP, *E. coli*, MCI and Total Oxidised Nitrogen can be seen in Figure 12 through to Figure 15 below.

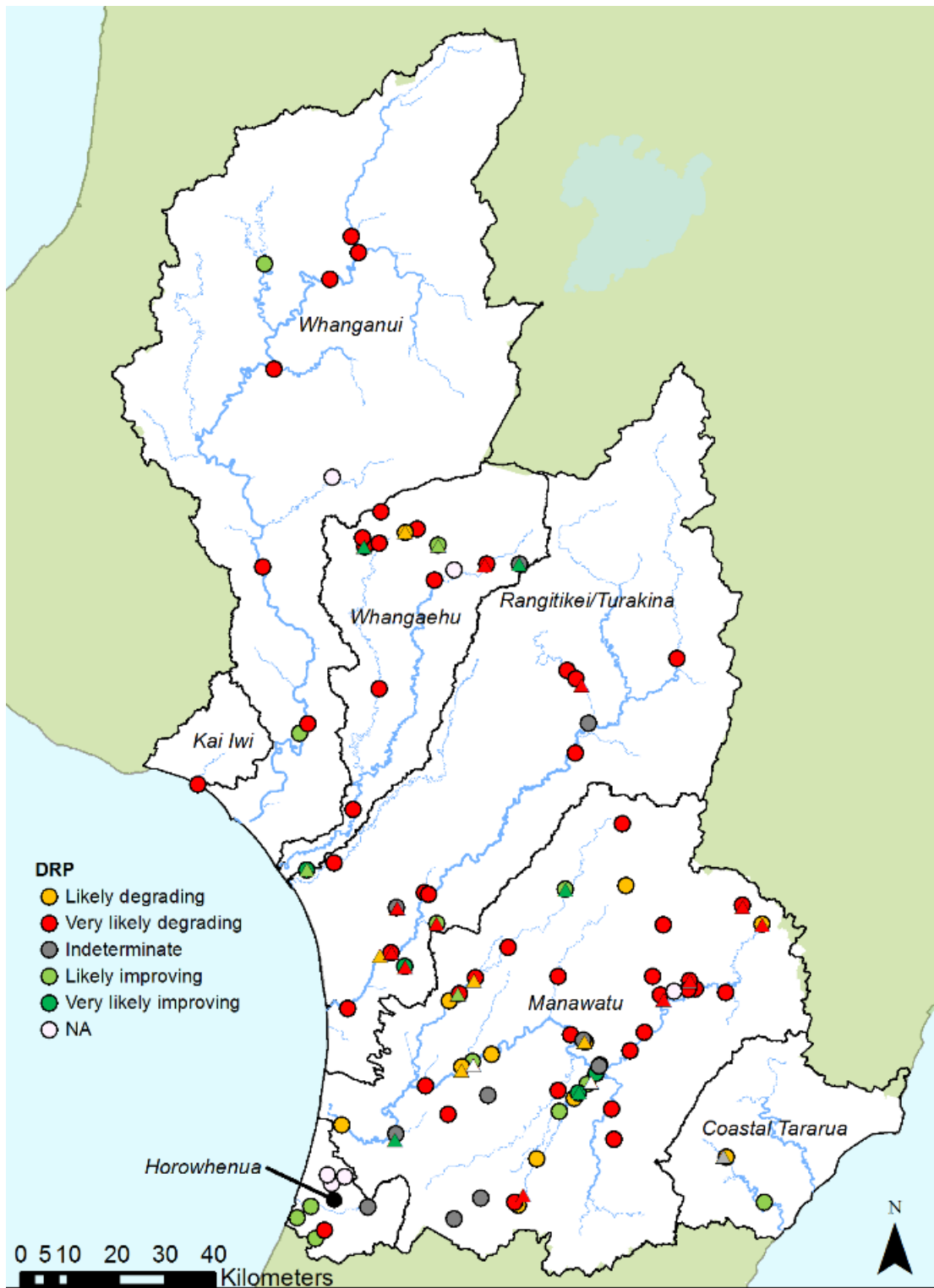


Figure 12 Summary of 10-year raw trends for DRP concentrations across the region (January 2010–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

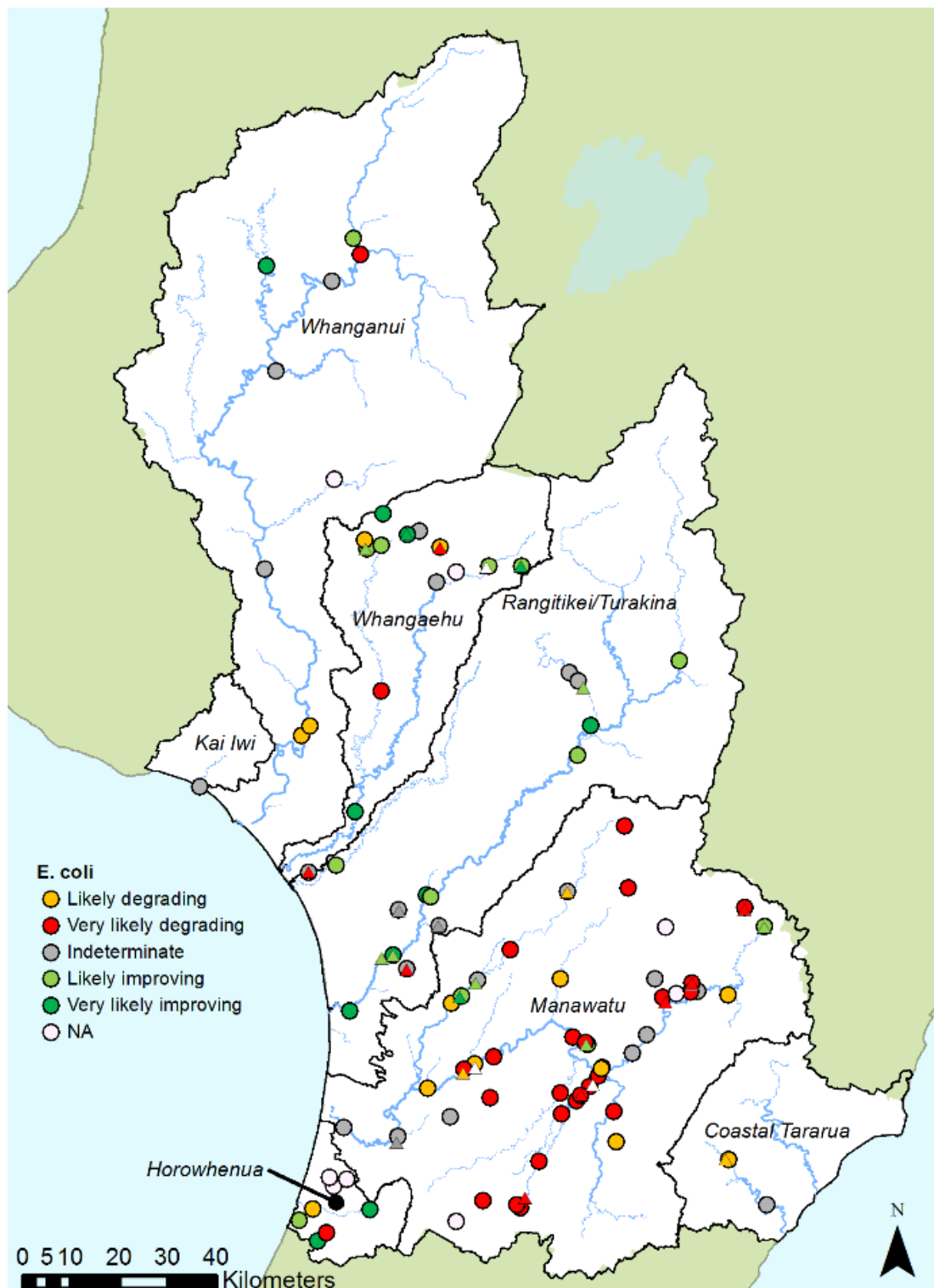


Figure 13 Summary of 10-year raw trends for *E. coli* concentrations across the region (January 2010–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data. Note NA indicates insufficient data.

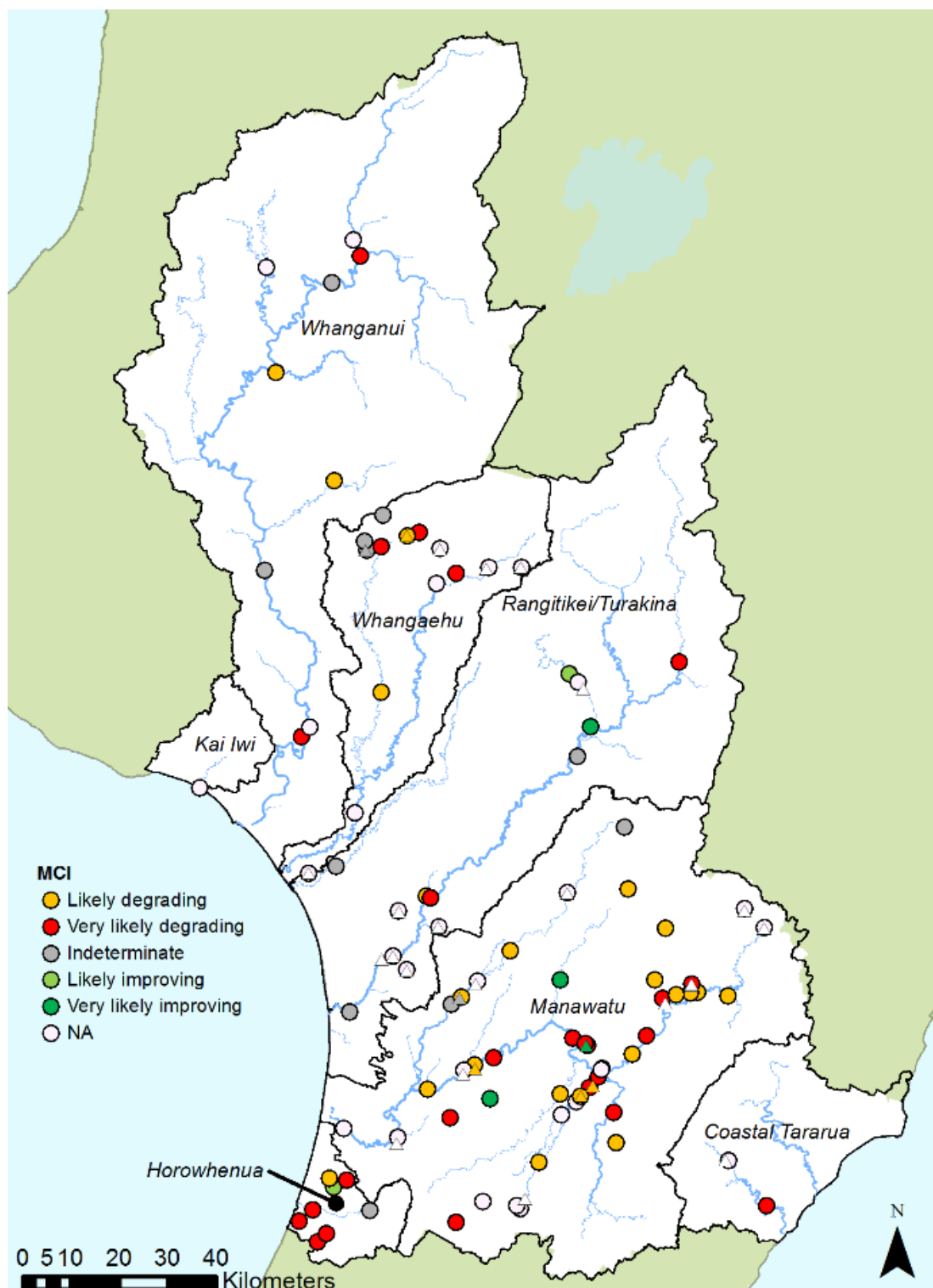


Figure 14 Summary of 10-year raw trends for MCI across the region (January 2010–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

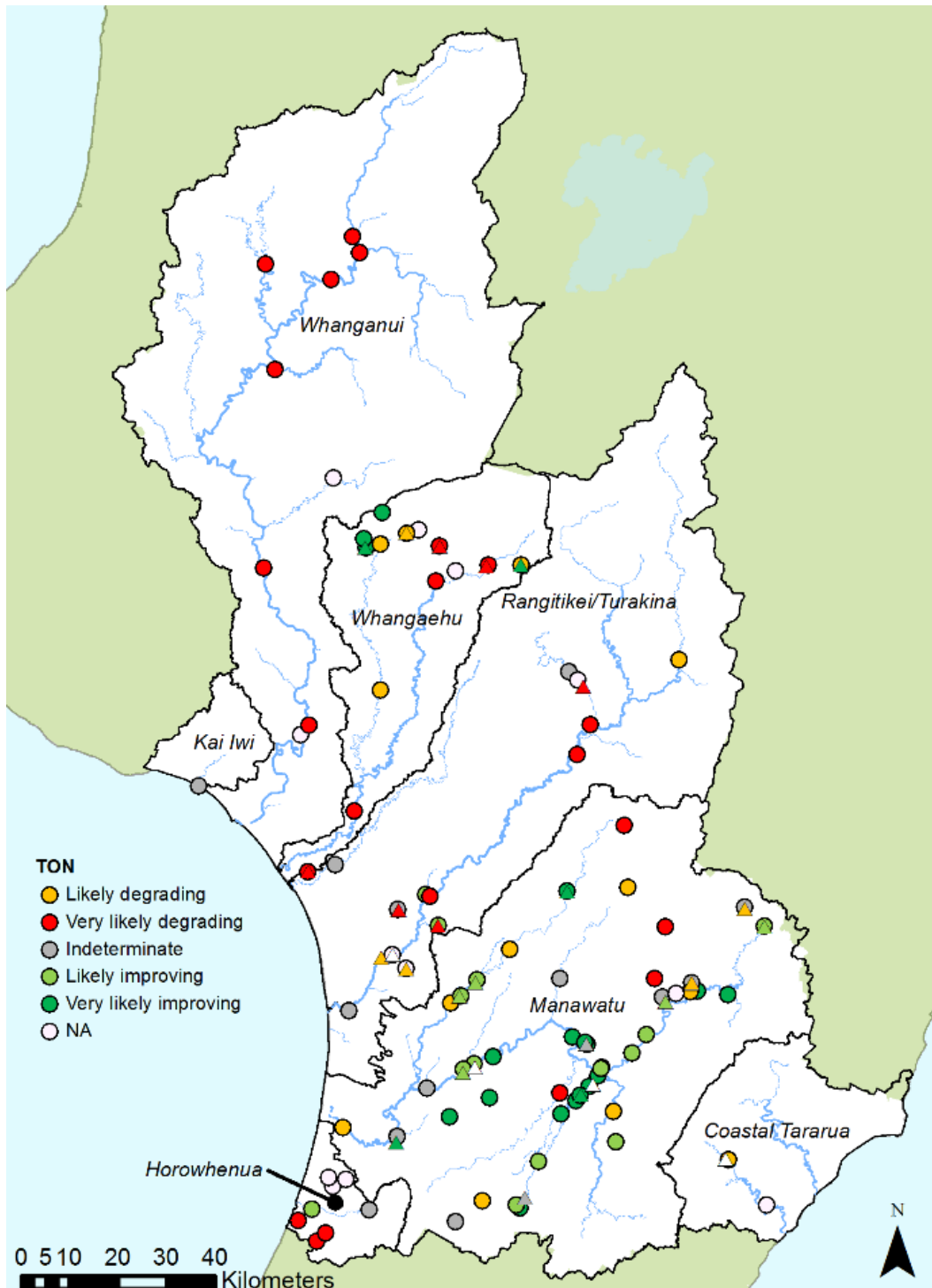


Figure 15 Summary of 10-year raw trends for Total Oxidised Nitrogen (TON) across the region (January 2010–December 2019). Where circles represent SOE sites, and triangles represent impact sites. Note NA indicates insufficient data.

- 3.1.20 Monitoring of point source discharges as a part of Horizons State of the Environment program commenced in July 2007, as such no impact sites have sufficient data for a 15-year trend analysis.
- 3.1.21 Further updates to LAWA in the next few months include a new release of contact recreation data and land cover data. Contact recreation data is currently being compiled and is due to be released late October, ahead of the 2020-21 contact recreation season which begins Nov 1 2020.
- 3.1.22 Land cover at regional and catchment level boundaries is processed using the national dataset Land Cover Database 5 (LCDB5), developed by Manaaki Whenua using satellite imagery. Waikato Regional Council are leading the update for the land cover data release. This most recent update was completed by Manaaki Whenua earlier this year and is a snapshot representing the 2018 year. The current land cover map on LAWA displays the previous 2012 dataset (LCDB4).
- 3.1.23 LAWA can be accessed through www.lawa.org.nz

AIR QUALITY

- 3.1.24 Air quality monitoring at Horizons designated airsheds, Taihape and Taumarunui, continues. Existing BAM units have had their pre-winter independent annual calibration checks and at present are operating adequately. There have been no verified exceedances of the Air Quality National Environmental Standards (NES) recorded at either location this year.
- 3.1.25 We have two new 5014i BAM units that are capable of monitoring both coarse and fine particles, PM₁₀ and PM_{2.5}. These units have been trialed in the office and the new housings have been delivered – they will now be installed at Taihape and Taumarunui by December 2020. The new BAM units will enable us to maintain a long-term record for PM₁₀ at the sites and will also allow us to comply with the proposed change to PM_{2.5} monitoring under the proposed National Environmental Standards for Air Quality.
- 3.1.26 Further details on our air quality monitoring and reporting, including the new requirements, will be presented to Council's Strategy and Policy Committee in November.

CLIMATE CHANGE RESEARCH

- 3.1.27 The Regional climate change action plan was finalised and released in September and is available on our [website](#) (along with all other climate change reports including the recently

published greenhouse gas inventory). This document has been developed between Horizons and the territorial authorities. It outlines local government's role in the climate change response and summarises some of the actions taken to date across the region.

- 3.1.28 This financial year, Horizons is leading the development of the Region's first Regional Climate Change Risk Assessment (RCCRA). The RCCRA aims to identify community risks, prioritise those risks for action, and share information about vulnerabilities and the approach we are taking with communities. A high-level risk assessment will allow decision-makers to identify hotspots, raise awareness and prioritise action. It is a preliminary step to a more in-depth consideration of what actions could be taken in a particular place, utilising existing datasets, reports, information and expert knowledge.
- 3.1.29 This project is a collaboration led by Horizons, with a Steering Group representing the District Councils, facilitation by an external consultant and a project team across the Councils in the Region.
- 3.1.30 The project is divided into two stages, Stage One: Exposure and Stage Two: Vulnerability and Consequence. The first stage considers hazards and consequences in terms of community values. This is currently underway. An online interactive survey has been used as a key engagement tool to allow for wider participation across the region. This survey was live for the month of September and received approximately 200 contributions from the public. More detail on this is available below in the Science Communication section.
- 3.1.31 A final report and presentation of the RCCRA to Council is planned for delivery in July 2021.

SCIENCE COMMUNICATION

- 3.1.32 To support Phase One of the Regional Climate Change Risk Assessment, for the month of September, Horizons launched the Social Pinpoint interactive map and ran a social media campaign called #ClimateChangeInOurRegion. The purpose of this campaign was to identify and confirm community values that may be affected by climate change in the Region. The tool enabled people to drop 'pins' on a map of the Region in areas that they are worried about being affected by climate change (Figure 8) and allowed participants to interact with each other and support or discuss ideas. It also provided a survey option as an alternative or additional option. 127 pins were dropped on the map and 80 online surveys were completed during September in addition to discussion held on the Horizons Facebook posts.

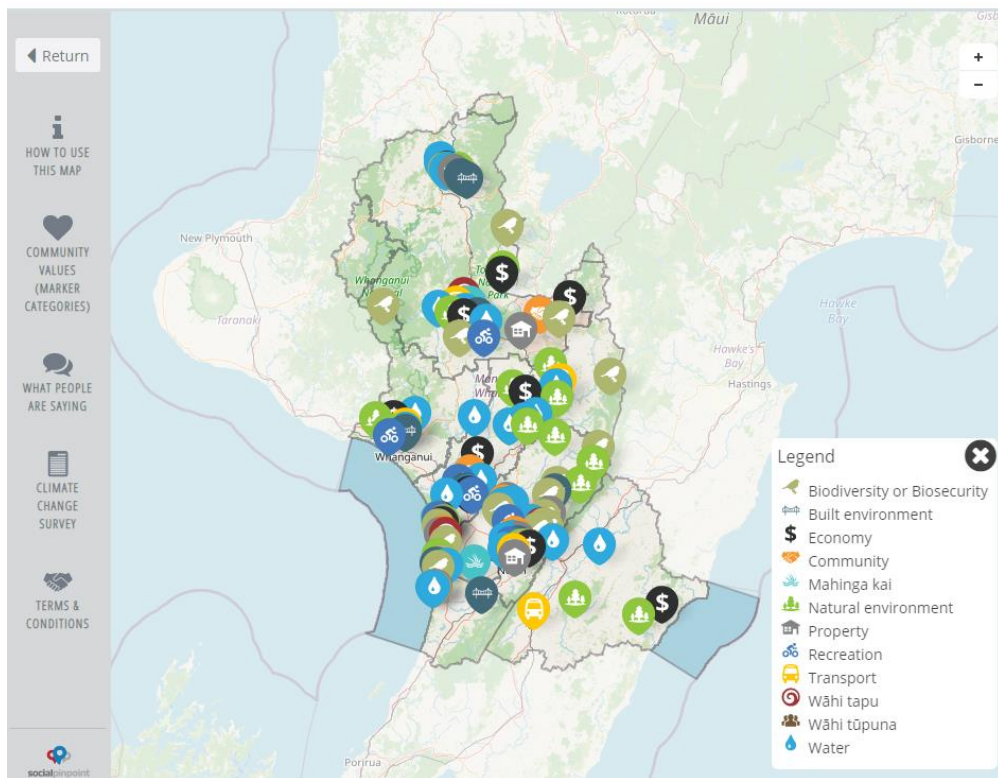


Figure 16. A screenshot of the Social Pinpoint webpage on the Horizons website

3.1.33 The graph below (Figure 9) shows the breakdown of comments by pin category and the word cloud illustrates the most commonly used words in the responses provided (Figure 10). The process is currently underway to collate responses across social media and Social Pinpoint to integrate into the stage one analysis. A more detailed report to Council will be provided by the risk assessment project team in due course.

- 3.1.35 In October, our Ecology Scientist Dr. Lizzie Daly attended a National Policy Statement for Indigenous Biodiversity (NPSIB) workshop hosted by MfE and DoC. The aim of the workshop was to clarify issues raised in submissions and test practicalities of some proposed policy changes considered in response to submissions.
- 3.1.36 A discussion document and the draft NPSIB was released for consultation on 26 November 2019. The draft NPSIB aimed to provide a comprehensive, nationally consistent approach to addressing the decline of indigenous biodiversity. The draft NPSIB could have a significant impact on how we manage and regulate indigenous biodiversity in the Horizons Region, changing the way we manage biodiversity through the One Plan.
- 3.1.37 Staff have been increasingly engaging with regional sector special interest groups (SIGs) involved in the implementation of Government's Essential Freshwater package, through SIG meetings and workshops. A freshwater implementation group comprised of council key contacts (Abby Matthews for Horizons), implementation directors (Nic Peet) and SIG Conveners with connections to freshwater implementation has been established and will convene in October 2020. Further to this, a separate implementation SIG focused on delivery of the Jobs for Nature projects has been formed with representation across the regional sector. Jon Roygard is a co-convenor of the group.

Staci Boyte
SCIENTIST - LAND

Amber Garnett
ENVIRONMENTAL SCIENTIST – NATURAL RESOURCES

Harold Barnett
ENVIRONMENTAL SCIENTIST

Abby Matthews
SCIENCE AND INNOVATION MANAGER

Jon Roygard
GROUP MANAGER NATURAL RESOURCES AND PARTNERSHIPS