



Federated Farmers of New Zealand

Rural Connectivity Survey 2022

Exploring the state of telecommunications across rural New Zealand

About Federated Farmers of New Zealand

Federated Farmers is one of New Zealand's largest membership-based business organisations and the largest independent representative of New Zealand's farmers. Being voluntarily funded, our positions on policy are member-driven, with members' views regularly canvassed to inform submissions to central and local government. Federated Farmers is democratically accountable to our farmer members.

Federated Farmers has evolved over many years and is the product of farming families and leaders with passion, drive and commitment to campaign for and support both rural communities and the agricultural industry.

Federated Farmers consists of 24 provinces and six industry groups, giving farmers a collective voice at both a national and provincial level.

Our membership covers a range of farming systems including arable crops, beef cattle, dairy cattle, sheep, deer, goats, and some horticultural systems. We also represent the interests of rural butchers and home kill operators. A number of our members also have tourism operations on their farms. Our members are a mix of established farming families and those newer to the industry, and range from small family run units (the majority) through to large farming operations operating under a range of business structures including sole traders, partnerships, companies and corporations.



Introduction

The Federated Farmers' mandate revolves around 'empowering New Zealand's farmers to excel'. The food and fibre we produce lands in highly competitive international marketplaces, and with ever-increasing consumer expectations on sustainability and quality, our farmers need – and deserve – high quality connectivity.

Precision agriculture, productivity gains and increasingly stringent regulatory demands and reporting are underpinned by technology, devices, apps and clever software. All that is pretty useless if the farm business's internet is slow and unreliable, or the mobile phone coverage is patchy and quite often non-existent.

This is the fifth annual Federated Farmers Rural Connectivity survey. Nearly 1200 farmers have helped us identify the current state of play with rural connectivity, and we've used GIS to map their locations and pinpoint coverage and reliability blackspots. We know the government (right up to Prime Minister Jacinda Ardern) and government agencies have used our survey results to inform investment decisions. It means our advocacy on behalf of our members is based on strong data and real life frustration in those parts of districts where service is so poor that farm operation is hampered, and farming family life, children's education and – as this 2022 survey shows, emergency and medical response – is compromised.

Federated Farmers acknowledges government investment in improving rural connectivity has run into the tens of millions of dollars. There has been progress, but this survey shows there is a long way to go to get hundreds of farming businesses and families out of the connectivity 'slow lane'.

It's unfair, and a handbrake on our export-led economy, that more than half of the survey respondents report internet download speeds at or less than what could be considered a bare minimum (20 megabytes per second/Mbps) and those who said their mobile phone service had declined in the last 12 months jumped from 20% to 32%.

Richard McIntyre

Federated Farmers National Board member and telecommunications spokesperson



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1.0 About the survey

Rural connectivity has long been a challenging issue to address. Central government and telecommunications companies have invested heavily in the roll-out of broadband and mobile network infrastructure in recent years. Despite that, many of our farmer members continue to tell us of their frustrations with poor connectivity on their farms.

In 2018, we ran the first of our Rural Telecommunications Surveys with particular focus on the farmer experience of internet connections to the farm, mobile coverage on the farm and landline connections to the farm. Responses to that survey helped inform our advocacy for greater investment in rural telecommunications.

In 2019, we expanded the survey to explore how farmers use cloud software and smartphone applications to support the farm business, and the farmer experience of hosting telecommunications infrastructure, like underground cables and aboveground towers.

In 2020, we replaced questions about telecommunications infrastructure on farm with questions about farmers' experience of regulatory data compliance. The reporting of farm data has become increasingly necessary to both inform and validate farmer regulatory compliance as well as support the efficient operation of the farm business.

In 2021, we expanded the survey to explore whether farmers had observed connectivity on their farm improving, remaining the same, or declining in the previous 12 months. We also included new questions exploring the experience of cybercrime on farms to complement findings from an earlier Federated Farmers survey on rural crime.

This year, we have expanded the survey to explore more aspects of the rural consumer experience with their service providers. In previous surveys and discussions, we've received consistent comments around the need for improved rural connectivity to address health, safety and wellbeing concerns. As a result we added questions this year that focussed on the relationship between connectivity and health, safety and wellbeing on farm.

Through running these surveys every year, Federated Farmers aims to chart not only the evolving experience of rural telecommunications, but also to identify those parts of the country that desperately need investment to address poor connectivity.

1.1 Survey methodology

The survey questions were designed to be used on an annual basis to identify change in the rural telecommunications over time.

Survey123 (Esri, 2019) was used to identify GIS locations of survey respondent properties when farmers completed the survey as one of the survey questions. The data from the survey questions becomes associated with that geopoint to provide the maps included in this report.

The survey was promoted in printed Federated Farmers publications, via email, in electronic newsletters, and through specific Federated Farmers member advisories explaining the importance of responding to the survey.

The survey was run between 17 June 2022 and 29 June 2022.

1.2 Survey respondents

Federated Farmers received 1,185 responses to the 2022 survey, of which 97.4% are members of the organisation.

By farm type, respondents are :

Industry type	% Respondents
Meat and Wool	38%
Dairy	42%
Mixed System	9%
Arable	3%
South Island High Country	2%
Other	6%

Table 1.2.1: survey respondents by industry type

Overall number of responses for 2022 is generally similar to those received in 2021.

The 2022 survey maintains good representation of geographical spread and farm types across the country.



2.0 Internet to the farm

The survey poses questions around the type of internet connections used on farms and farmer experiences of internet connections, as well as metrics around download and upload speeds to understand the performance of internet connections.

New questions were included in this year's survey on topics exploring who their service provider was, how long they have been with that service provider and how recently they had reviewed their monthly plan. These questions were included to help broaden our understanding of some of the factors behind the responses provided.

2.1 Internet connections

98.0% of farmers indicate they have internet to the farm (table 2.1.1). This high rate of reported internet connectivity to the farm is to be expected where respondents are invited to fill in an online survey. This is an increase of around 1% from what was reported in 2021.

Do you have internet to the farm / house?	2022	2021	2020	2019
No	2%	3%	2%	3%
Yes	98%	97%	98%	97%

Table 2.1.1 Internet to the farm/house 2019-2022

Wireless broadband appears to be the dominant type of internet connection to the farm, comprising slightly over half of farmers surveyed (table 2.1.2). This is likely due to more bespoke builds being carried out on farm to install repeaters, extenders and other equipment that deliver a more reliable internet connection to the property than might otherwise be the case.

How does your farm / house get its internet?	2022	2021	2020	2019
Copper line broadband (ADSL/VDSL)	19%	23%	27%	25%
Copper line dial up	1%	2%	1%	1%
Fibre optic	1%	2%	2%	1%
Mobile broadband	7%	8%	8%	6%
Satellite broadband	19%	14%	13%	17%
Wireless broadband	52%	51%	49%	49%

Table 2.1.2 Proportion of respondents on how their farm/house gets the internet 2019-2022

Survey respondents provided comments on their experiences with farm internet connections.

Negative comments and observations summarised:

- Value for money is the most prominent aspect to comments received from respondents. In particular, comments frequently raised concerns around quality of service ("seriously slow"), reliability of service ("non-existent most of the time"), and the cost of monthly plans for internet connections that suffered from being slow and/or unreliable. Farmer frustration around these factors remains consistent with previous years, and relates to the proportion of farmers indicating their internet connections had declined in the last 12 months.

- To a slightly lesser extent, respondents raised concern around poor or limited access to higher-speed internet connections. There are a number of references to the unfairness of high-speed fibre cables being located near the front gate or the farm more generally, yet remaining unavailable to the farm itself. Similarly, respondents commented on the unfairness of enduring the only internet connection service available to their property.
- Interestingly, there was a greater number of comments than in previous years remarking that the quality and reliability of their internet connections had deteriorated as local network infrastructure had become over-subscribed, either by increased numbers of users or increased demand of users.

Positive comments and observations summarised:

- A number of respondents commented they were happy with their internet connections. Some remarked that their experience had improved as they upgraded their internet connections to higher-speed types, whether with their incumbent provider or by moving to a new provider.
- Others shared that their internet connection had improved from the installation of new in-home modems and routers. While the experience of installing new in-home modems or routers was generally positive for respondents, there are a few comments suggesting this step did not deliver any perceived improvements to internet connections to the farm. The mixed response to the installation of new in-home modems and routers is likely due to there being broader issues with the internet connection for some farms.
- Interestingly, there was less mention of an improved experience from providers offering higher download cap or unlimited monthly download plans to their rural customers than was the case in 2021.

2.1.1 Copper line dial-up

Copper line dial-up has consistently achieved 1-2% uptake since 2019, likely due to those respondents lacking access to higher-speed internet connection types, or perhaps being unaware of the availability of such connections in their area.

This is widely recognised as the oldest and poorest performing internet connection type among the range of internet connection types available. Distance is a factor in the performance of copper line dial-up connections, with longer copper line connections being more vulnerable to factors impacting their performance. Given the distances involved in rural areas, copper line dial-up connections have tended to perform worse in rural areas than in more densely-populated areas where network congestion was a more relevant issue.

The same copper lines that provide dial-up internet connections are the same copper lines that provide landline phone connections. When considering the issues that many respondents have with their copper line landline phone connections to the farm, it makes sense that the same factors impacting the quality of voice calls would be similarly affecting dial-up connections. Traditionally, electric fence interference was responsible for a persistent clicking sounds on the phone and likely would have been a factor behind frequent drop-outs in internet connections. More recently, respondents have also commented on loud echoing and other noises on copper line phone calls with adverse weather conditions featuring as a more prominent factor in respondent comments.

2.1.2 Fibre broadband

Fibre broadband has consistently achieved 6-8% uptake since 2019, due to the limited rollout of fibre beyond urban centres with cost being the primary factor in delivering fibre to the farm. Another aspect relevant here is the amount of fibre that runs through rural areas tends to be older backhaul type of fibre that does not allow for splicing in new connections along the fibre cable's route. When these older cables were installed, it was to connect regions and bring high-speed internet connections to towns around the country. More recently installed fibre cables would generally allow for splicing along the cable's route, but rolling out this kind of fibre remains cost-prohibitive in most rural situations on a customers per km basis. This is likely a contributing factor to the high cost of constructing new towers in rural areas, as towers tend to need a fibre connection to the provider's network to support the making of voice calls and use of data.

We hoped that an amendment to the Telecommunications Act 2002 allowing high-speed fibre cables to be strung along a local line company's powerlines might see fibre reach further into rural areas. We supported the amendment on the basis that such a rollout would reduce rollout costs for providers and compensate the lost property rights of affected landowners. Since the amendment was passed, there does not appear to have been much fibre connected to farms, and what little there is does not appear to have grown as a proportion in recent years.

2.1.3 Satellite broadband

There are a handful of providers offering satellite broadband connections in rural areas. The provider that had the most recorded mentions among survey respondents is the Starlink low-earth orbit satellite broadband service operated by SpaceX.

The timing of this year's survey meant that we were able to capture uptake by farmers of the Starlink service. Starlink is seen by many as a "game changer", with a number of respondents making the move to the service almost as a last resort to achieve a reliable internet connection to the farm. Many of those respondents previously endured especially poor connectivity in remote and rural areas with little to no alternative service providers they could turn to for a better internet connection.

As happy as we are with the reported experience of Starlink customers among survey respondents, we are aware that there is a limit to the number of customers that Starlink can service within New Zealand. The Starlink service is still a work-in-progress as SpaceX looks to increase the number of satellites in their network, launch newer generation satellites, and construct additional base stations. As it does so the finite number of customers they can service in New Zealand should similarly increase, but the pacing of this expansion does raise questions around its continuing suitability as a silver bullet for poor rural connectivity.

Satellite connections tend to involve a higher installation cost to the consumer than is the case for other internet connection types. Starlink has an installation cost of \$599, whereas more terrestrial internet connection types come with free installation. For those that have made the move to satellite, the installation cost is seen as worthwhile to have a reliable internet connection. For others, the installation cost is a limiting factor in them making the move to satellite. The technology needed to enable a satellite internet connection costs what it costs. That this cost may come down over time as technology evolves and providers achieve greater cost efficiencies from increased scale means little to rural consumers seeking better connectivity sooner rather than later. This suggests that a subsidy of some kind to help cover installation costs would be needed for satellite broadband to see greater uptake in rural areas.

2.1.4 Internet service providers

This year's survey includes new questions that explore rural consumer relationships with internet service providers. These questions are the product of comments provided in previous surveys regarding the performance of their internet service provider at the time, whether in relation to positive or negative experiences of their internet service provider. A better understanding of these experiences helps us more clearly identify some of the likely factors contributing to how well their internet connection to the farm is performing.

With that in mind, the survey asked which company was providing the internet connection to their property. Spark appears to be the dominant internet service provider among respondents with a little over 1 in 4 farmers. Vodafone came in a close second with around 1 in 5 farmers.

There are a great many internet service providers that service rural areas, most of whom are regional wireless internet service providers that operate in distinct geographic areas. For simplicity, Table 2.1.3 only describes % for those providers representing greater than 2% of respondents. The full list of internet service providers is available in Appendix 1.

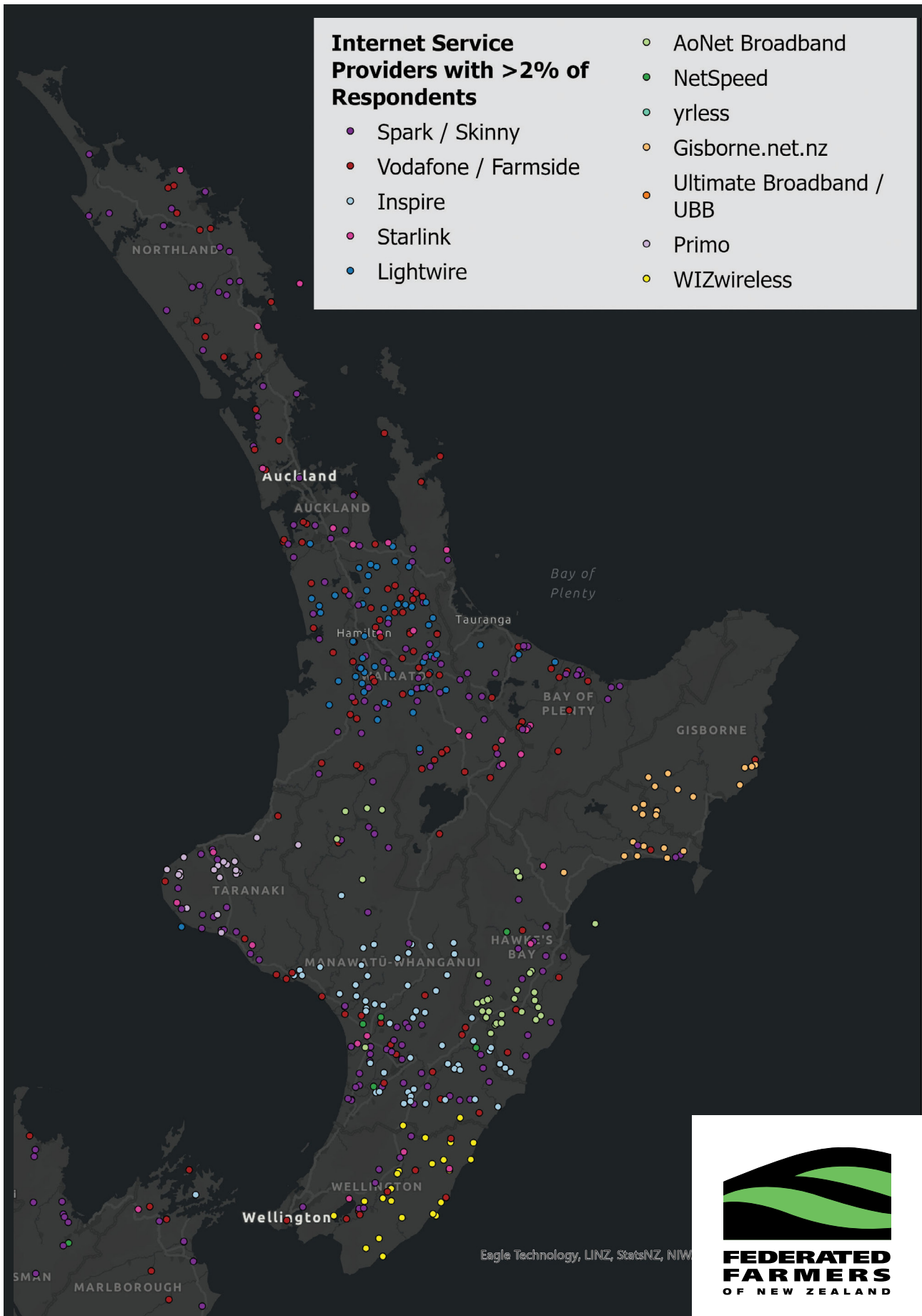
Service Provider	% Respondents
Spark / Skinny	26.4%
Vodafone / Farmside	19.9%
Inspire	6.0%
Starlink	5.3%
Lightwire	5.2%
AoNet Broadband	3.4%
NetSpeed	3.3%
yrless	2.9%
Gisborne.net.nz	2.4%
Ultimate Broadband / UBB	2.3%
Primo	2.2%
WIZwireless	2.1%
Other Providers (less than 2% individually)	16.0%

Table 2.1.3 Internet service providers (greater than 2.0% of respondents)

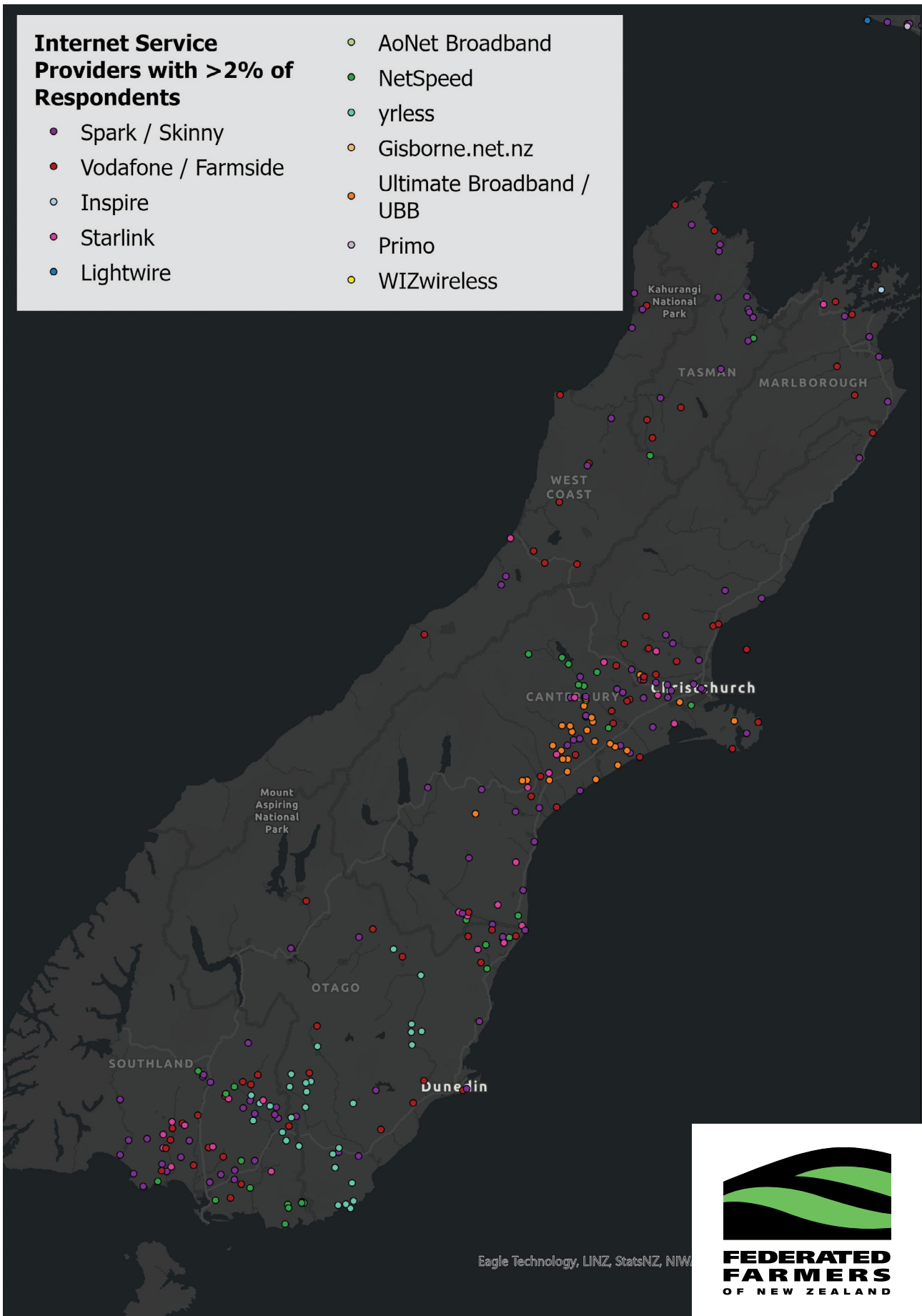
Maps 2.1.1 and 2.1.2 show the distribution of internet service providers with greater than 2.0% of respondents. It is worth noting the clusters in each map showing where particular companies dominate among farms in those areas. In many parts of the country, regional wireless internet service providers have been able to carve out a niche for themselves. A number of these clusters indicate that there are farmers out there that either cannot connect to those providers' networks or may be unaware that those networks provide internet connections to others in their area.

This is relevant when considering the high number of comments from respondents of there being limited or no availability beyond legacy providers like Spark or Vodafone (both being first movers in the provision of internet connections in many rural areas).





Map 2.1.1: Internet providers with over 2% of respondents – North Island



Map 2.1.2: Internet providers with over 2% of respondents – South Island

The survey asked respondents how long they have been with their internet service provider. Spark appears to be the internet service provider the most respondents have been with the longest with almost 2 in 3 farmers being with the company for more than a decade (figure 2.1.1).

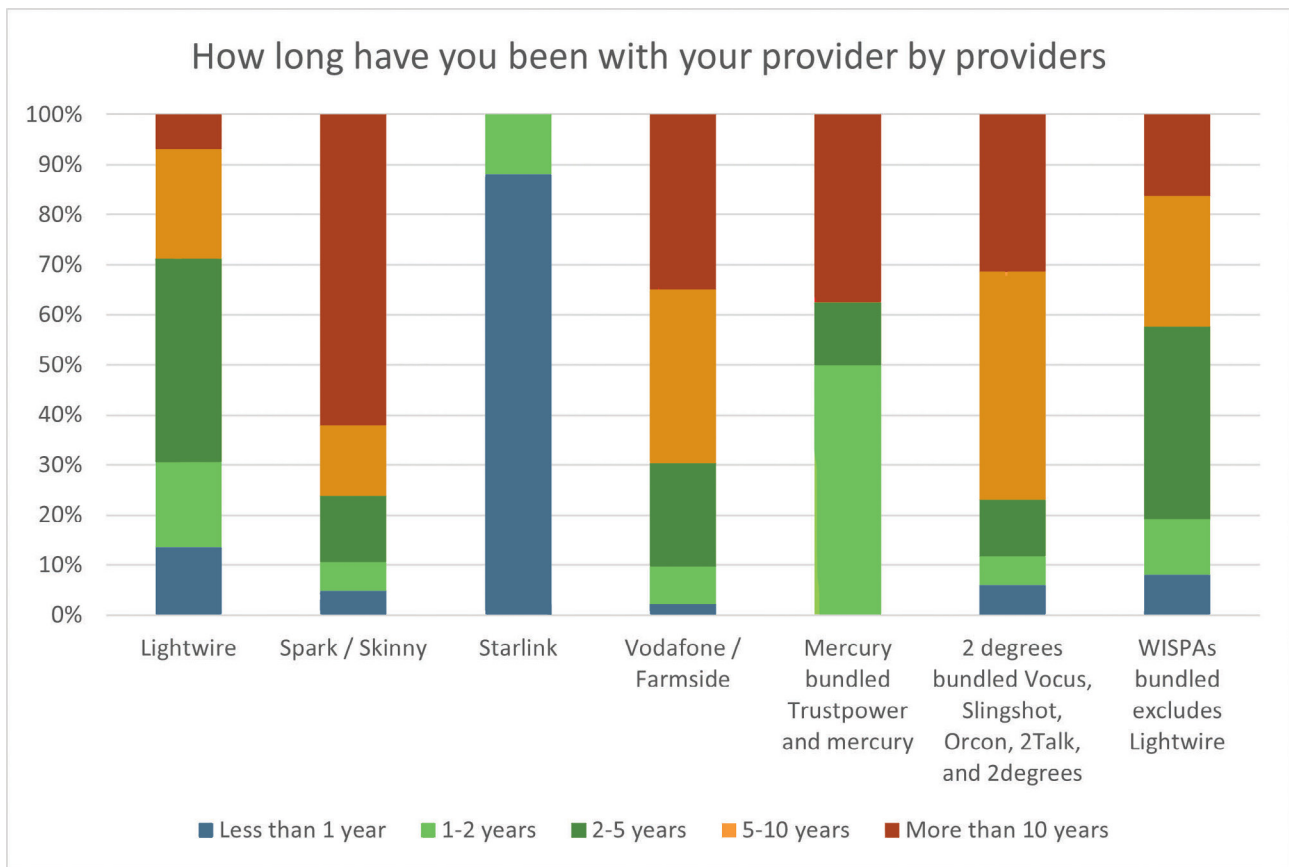


Figure 2.1.1 Time with internet service provider by provider

The purpose of this question was to better understand the extent to which farmers may have been victim to ‘provider lock-in’ or otherwise limited by circumstance to their internet service provider.

This is reinforced in analysis that shows respondents on copper line dial-up and copper line broadband internet connections were more likely to be with their provider for more than 10 years at 50% and 58% respectively (table 2.1.4), compared to those with satellite broadband and wireless broadband internet connections at 17% and 22% respectively.

How long have you been with your provider?					
How does your farm / house get its internet?	Less than 1	1-2 years	2-5 years	5-10 years	More than 10 years
Copper line broadband (ADSL/VDSL)	4.1%	6.0%	11.5%	20.7%	57.6%
Copper line dial up	0.0%	0.0%	21.4%	28.6%	50.0%
Fibre optic	0.0%	6.3%	31.3%	18.8%	43.8%
Mobile broadband	8.0%	12.0%	24.0%	17.3%	38.7%
Satelite broadband	30.5%	7.0%	20.7%	24.9%	16.9%
Wireless broadband	7.7%	9.9%	32.7%	28.2%	21.6%
Grand Total	11.1%	8.7%	25.7%	25.2%	29.4%

Table 2.1.4 Length of time with provider by internet type 2022

Similarly, analysis shows that those who have been with their provider for more than 10 years were also more likely to have speeds below 5Mbps at 43.0 % compared to those with faster speeds (table 2.1.5). Those with speeds greater than 100Mbps were the most likely to have been with their provider for less than a year at 70.2%. This is followed by those with speeds of 81-100Mbps being with their provider for less than a year at 29.0%.

At your farm / house, what is your average download speed?	How long have you been with your provider?				
	Less than 1 year	1-2 years	2-5 years	5-10 years	More than 10 years
0-5 Mbps	7.3%	3.3%	21.9%	24.5%	43.0%
6-10 Mbps	3.6%	7.2%	29.5%	22.9%	36.7%
11-15 Mbps	8.5%	11.0%	24.6%	24.6%	31.4%
16-20 Mbps	8.3%	9.3%	36.1%	29.6%	16.7%
21-40 Mbps	10.1%	9.3%	25.4%	31.5%	23.8%
41-60 Mbps	12.7%	13.9%	22.8%	22.8%	27.8%
61-80 Mbps	11.4%	20.0%	17.1%	14.3%	37.1%
81-100 Mbps	29.0%	16.1%	12.9%	9.7%	32.3%
Greater than 100 Mbps	70.2%	10.6%	10.6%	4.3%	4.3%

Table 2.1.5 Time with provider by download speed 2022

Despite the improvements that have been observed more generally from the rollout of broadband into rural areas over the years, it is clear that these improvements have not reached far enough with many of those on older copper line internet connection types generally enduring slower speeds for longer. It can be strongly inferred that the more recent movement of consumers has seen them take up newer and better performing internet connection types, usually through a different provider.

Respondents using Spark/Skinny as their internet provider demonstrated the slowest download speeds with nearly half experiencing download speeds below 10Mbps and a quarter below 5Mbps (table 2.1.6). Those with Vodafone/Farmside were much similar with 41.8% experiencing speeds below 10Mbps. Respondents with the bundled regional wireless internet service providers (rWISPs) and Lightwire had far fewer respondents experiencing speeds below 10Mbps at 25.3% and 13.2% respectively. The majority of respondents with these providers experienced speeds over 21Mbps.

	0-5 Mbps	6-10 Mbps	11-15 Mbps	16-20 Mbps	21-40 Mbps	41-60 Mbps	61-80 Mbps	81-100 Mbps	greater than 100 Mbps
Lightwire	1.9%	11.3%	15.1%	7.5%	28.3%	22.6%	9.4%	3.8%	0.0%
Spark / Skinny	24.0%	24.0%	13.0%	6.5%	17.2%	6.5%	4.2%	2.7%	1.9%
Starlink	0.0%	0.0%	0.0%	3.6%	3.6%	10.7%	1.8%	17.9%	62.5%
Vodafone / Farmside	22.8%	19.0%	14.3%	10.1%	25.4%	4.2%	1.1%	2.1%	1.1%
Mercury bundled Trustpower and mercury	33.3%	0.0%	16.7%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2 degrees bundled Vocus, Slingshot, Orcon, 2Talk, and 2degrees	33.9%	11.7%	29.7%	0.0%	20.0%	0.0%	2.5%	0.0%	2.2%
rWISPs bundled excludes Lightwire	14.9%	10.4%	11.1%	9.5%	39.2%	8.4%	2.1%	3.9%	0.4%

Table 2.1.6 Download speed by internet service provider

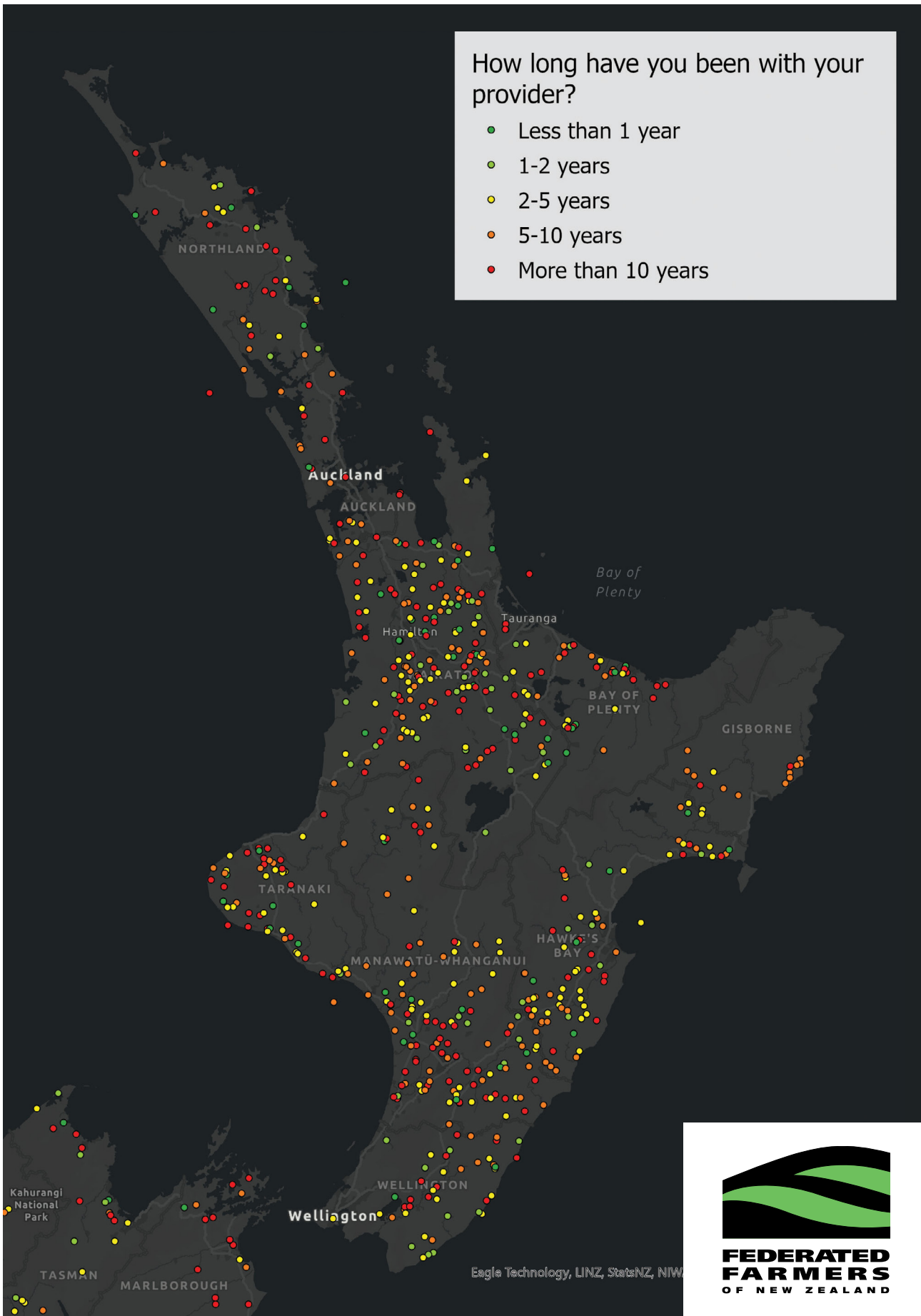
Lack of competition in the provision of rural internet connections has been persistently remarked upon by respondents over the years. Whether that stems from a lack of alternative internet service providers on any given farm or unhappiness with having to 'take it or leave it' as it relates to their slow or unreliable internet connection to the farm.

Analysis of responses by geographic location, suggests there are limits to provider coverage in particular areas that prevent some rural consumers from transitioning to newer, more reliable internet connection types.

Remoteness and terrain is another factor for some as can be seen in maps 2.1.3 and 2.1.4, with the locations of many of those indicating they have been with their provider for 10 years or more in more remote parts of the country or where terrain likely makes the transition to newer internet connection types more difficult.

Providers tend to either provide a core internet connection service that they themselves are responsible for providing, or augment that core service with additional internet connection types that rely on the network infrastructure of other companies. A few providers may solely rely on reselling access to another company's network infrastructure. While these types of arrangements do allow for a broader range of internet connection types and monthly plans for consumers, the limiting factor remains that of the network infrastructure that enables internet connections.

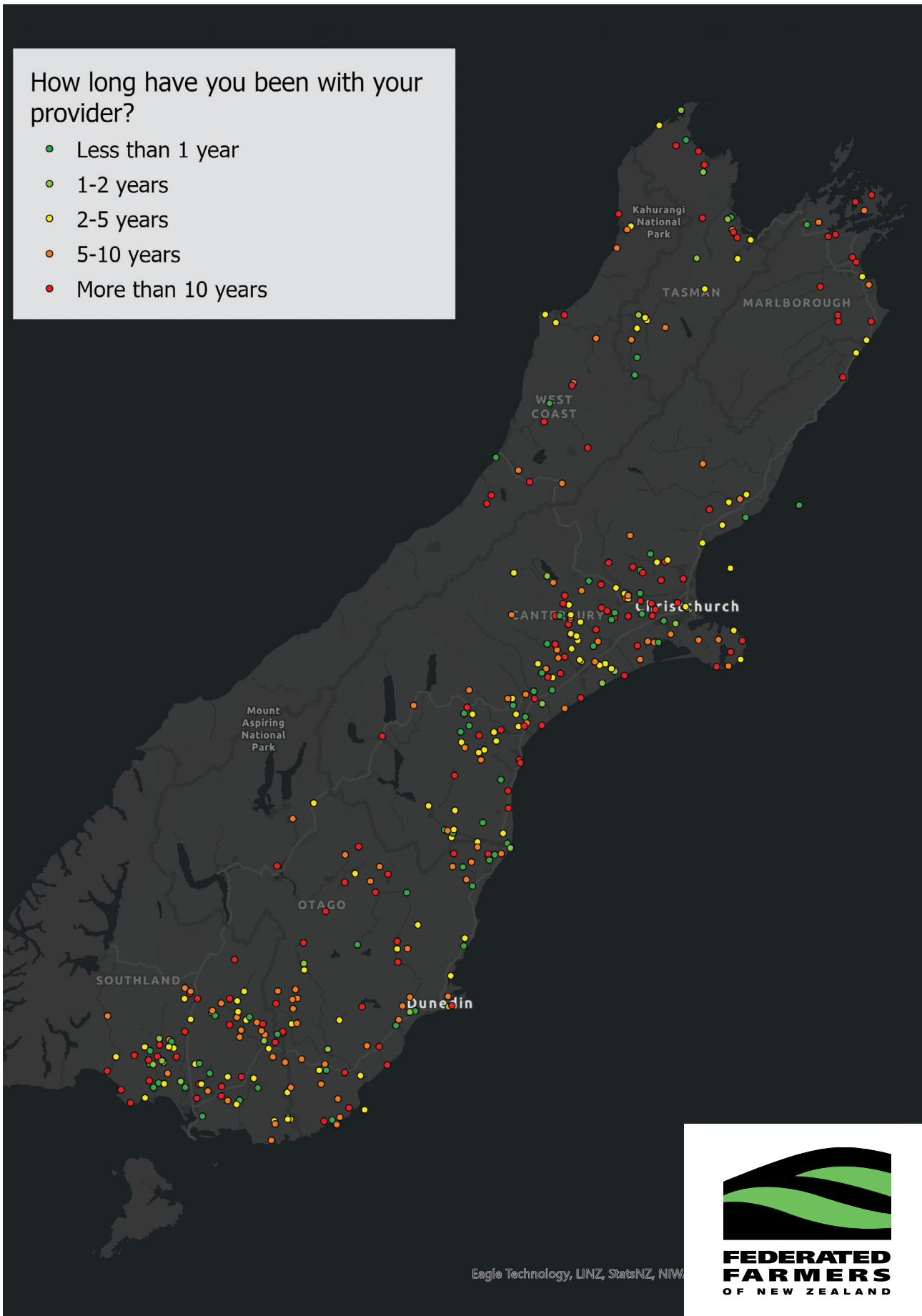




Map 2.1.3: Length of time with Internet Service Provider – North Island

How long have you been with your provider?

- Less than 1 year
- 1-2 years
- 2-5 years
- 5-10 years
- More than 10 years



Eagle Technology, LINZ, StatsNZ, NIWA



Map 2.1.4: Length of time with Internet Service Provider – South Island

The survey asked respondents when they last reviewed their monthly plan. Providers are frequently changing the plans they offer, whether by price, monthly download limit or other factors. Responses to this question help us better understand the extent to which farmers ensure they are on the best monthly plans for their particular situation.

Analysing responses to this question by internet connection type, it is reassuring to see the greater proportion of farmers generally having most recently reviewed their monthly plan within the last year (table 2.1.7). That said, more effort should perhaps be put into increasing rural consumer awareness of the importance of reviewing monthly plans on a more frequent basis to ensure they are on the plan that best suits their needs.

The analysis of responses to this question by provider shows Starlink as the stand out as the provider with the highest proportion of respondents that have reviewed their monthly plans within the last year (table 2.1.7). This is likely a reflection of the Starlink service being the most recent provider to service rural areas. The 10% of respondents indicating they last reviewed their monthly plan with Starlink 1-2 years ago are likely early adopters during the beta release of the service before it became more widely available.

When was the last time you reviewed your monthly plan?					
How does your farm / house get its internet?	Less than 1 year	1-2 years	2-5 years	5-10 years	More than 10 years
Copper line broadband (ADSL/VDSL)	32.7%	26.3%	22.1%	15.2%	3.7%
Copper line dial up	7.1%	28.6%	35.7%	21.4%	7.1%
Fibre optic	43.8%	25.0%	6.3%	12.5%	12.5%
Mobile broadband	32.9%	36.8%	23.7%	5.3%	1.3%
Satelite broadband	46.3%	23.8%	22.4%	6.5%	0.9%
Wireless broadband	31.8%	31.6%	25.2%	8.3%	3.1%

Table 2.1.7 How the farm/house gets their internet by when was the last time respondents reviewed their plan 2022

The spread of respondents across other providers again suggests that more effort needs to be made to encourage farmers to review their monthly plans to ensure they are on the plan that best suits their needs.

It may be possible that some farmers see little point in reviewing their monthly plans when they have only the one provider that can provide an internet connection to their farm. This is especially relevant where they have been with the provider for a longer period of time. That said, it would still be worthwhile for farmers in this situation to more frequently review their monthly plans in case there have been any developments in the pricing of plans offered, download limits within those plans, or other factors.

When was the last time you reviewed your monthly plan?					
Who is your internet service provider?	Less than 1 year	1-2 years	2-5 years	5-10 years	More than 10 years
Lightwire	45.8%	32.2%	16.9%	3.4%	1.7%
Spark / Skinny	33.6%	28.4%	21.9%	12.3%	3.8%
Starlink	90.0%	10.0%	0.0%	0.0%	0.0%
Vodafone / Farmside	29.5%	40.9%	24.1%	5.0%	0.5%
Mercury bundled Trustpower and mercury	0.0%	50.0%	25.0%	0.0%	25.0%
2 degrees bundled Vocus, Slingshot, Orcon, 2Talk, and 2degrees	23.5%	13.3%	27.5%	31.8%	4.0%
rWISPs bundled excludes Lightwire	29.2%	29.4%	26.6%	9.5%	5.3%

Table 2.1.8 Internet provider by when was the last time respondents reviewed their plan 2022

2.2 Data cap per month

Higher data cap or unlimited data plans are preferred by farmers surveyed, with 80% of farmers surveyed taking up these types of monthly plans (table 2.2.1).

By data caps per month, 2022 sees decreases of 8-9% in the 1-20GB, 21-50GB and 51-100GB plans, with increases of 3% for 100+GB plans and 24% for unlimited plans compared to 2019. In this year's survey, we provided more options with the inclusion of 100-200GB and 200GB+ monthly plans, together representing ~30% of the monthly plans of respondents. We included these additional options to better understand the increments in bandwidth taken up by respondents.

While it is a positive sign that the proportion of farmers surveyed with higher download cap or unlimited data plans has increased when compared to responses to the 2019 survey, it is worth noting that around 1 in 5 respondents still have monthly data caps of less than 100GB. This is a concern as farm business transactions, whether for compliance or other reasons, are increasingly converting to online-only and are reliant on the use of data-heavy software that continuously uploads and downloads data.

What is your data cap per month?	2022	2021	2020	2019
1-20 GB	3%	6%	8%	12%
21-50 GB	5%	8%	10%	14%
51-100 GB	12%	20%	20%	21%
100+ GB	30%	29%	28%	27%
100-200 GB	19%	-	-	-
200+ GB	11%	-	-	-
Unlimited	50%	37%	33%	26%

Table 2.2.1 Internet plan data cap per month 2019-2022

Monthly data caps have long been used to limit the strain put on a network by its customers as a means of balancing reliability with usefulness. Often this is implemented by offering extensions to the amount that a customer can download (many respondents considered these unnecessarily expensive), or by ‘throttling’ or a provider reducing internet connection download speeds once data limits had been exceeded. Consistent with comments in previous surveys, respondents struggle to understand why higher download limit or unlimited monthly plans remain unavailable. This is especially relevant when many providers increased monthly data caps during Level 4 lockdowns in 2021, demonstrating that such plans were indeed possible for many rural consumers.

If the key constraint to providers continuing to provide higher bandwidth or unlimited monthly plans is that of capacity constraints on local network infrastructure, then we can only hope that announced capacity upgrades not only address quality of service declines in many areas, but also encourage providers to increase download limits in the monthly plans they offer to rural consumers in those and other areas. While these upgrades are not expected to occur everywhere across the country, they should both improve the situation for many rural consumers and demonstrate the value in ensuring local network infrastructure is maintained and upgraded to meet the continuing needs of rural consumers.

When asked how frequently they exceed their monthly data cap, respondents rarely seem to use more data than they currently can. Around 3 in 4 farmers who responded to the survey indicated that they rarely or never exceed their monthly data cap (table 2.2.2).

It is a positive sign that the proportion of farmer respondents that never exceed their monthly data cap has increased by 12% since 2019. A positive perspective might look to the increasing uptake of higher-bandwidth and unlimited monthly plans (table 2.2.1) as a factor. A negative perspective might look to perceived declines in internet service in the last 12 months (table 2.4.1) and respondent comments of slow and unreliable internet connections to the farm as factors hindering rural use of monthly download limits.

Do you ever exceed your data cap?	2022	2021	2020	2019
Never	60%	52%	46%	48%
Rarely	17%	21%	24%	25%
Occasionally	16%	17%	19%	18%
Often	7%	10%	11%	9%

Table 2.2.2 Exceeding internet plan data cap 2019-2022

2.3 Download / upload speeds

Download speeds continue to be a serious concern with around 55% of farmers indicating their average download speed is between 0-20Mbps (table 2.3.1).

Online streaming service Netflix recommends a connection speed of 5Mbps or higher for the viewing of high definition quality streaming. Applying that as a baseline, it is concerning to see that around 1 in 7 farmers surveyed would struggle to watch Netflix, let alone do so at the same time as when other members of the household are also using the internet.

The likelihood of more than one person wanting to use the internet at the same time in the same home is high enough that 20Mbps is a more useful baseline of a bare minimum download speed. It is concerning that more than half of respondents endure download speeds within the 0-20Mbps range. That those within this range appear to have decreased since 2019 is a positive sign of some progress being achieved. That so many remain within this range also shows that more needs to be done to improve the usefulness and fit-for-purpose of many internet connections to the farm.

At your farm / house, what is your average download speed?	2022	2021	2020	2019
0-5 Mbps	15%	19%	24%	-
6-10 Mbps	17%	20%	21%	-
11-15 Mbps	12%	12%	12%	-
16-20 Mbps	11%	13%	12%	-
0-20 Mbps	55%	65%	68%	61%
21-40 Mbps	25%	19%	21%	21%
41-60 Mbps	8%	8%	6%	10%
61-80 Mbps	4%	3%	2%	4%
81-100 Mbps	3%	3%	2%	3%
Greater than 100 Mbps	5%	2%	1%	1%

Table 2.3.1 Average internet download speed 2019-2022

When analysing download speeds by internet connection type, a picture emerges of what appears to be a better fit-for-purpose for farmers. Fibre optic and satellite broadband are the clear standout technologies with the smallest proportions of respondents in the 0-20Mbps range (table 2.3.2), and noticeably larger proportion of respondents in the higher download speed ranges.

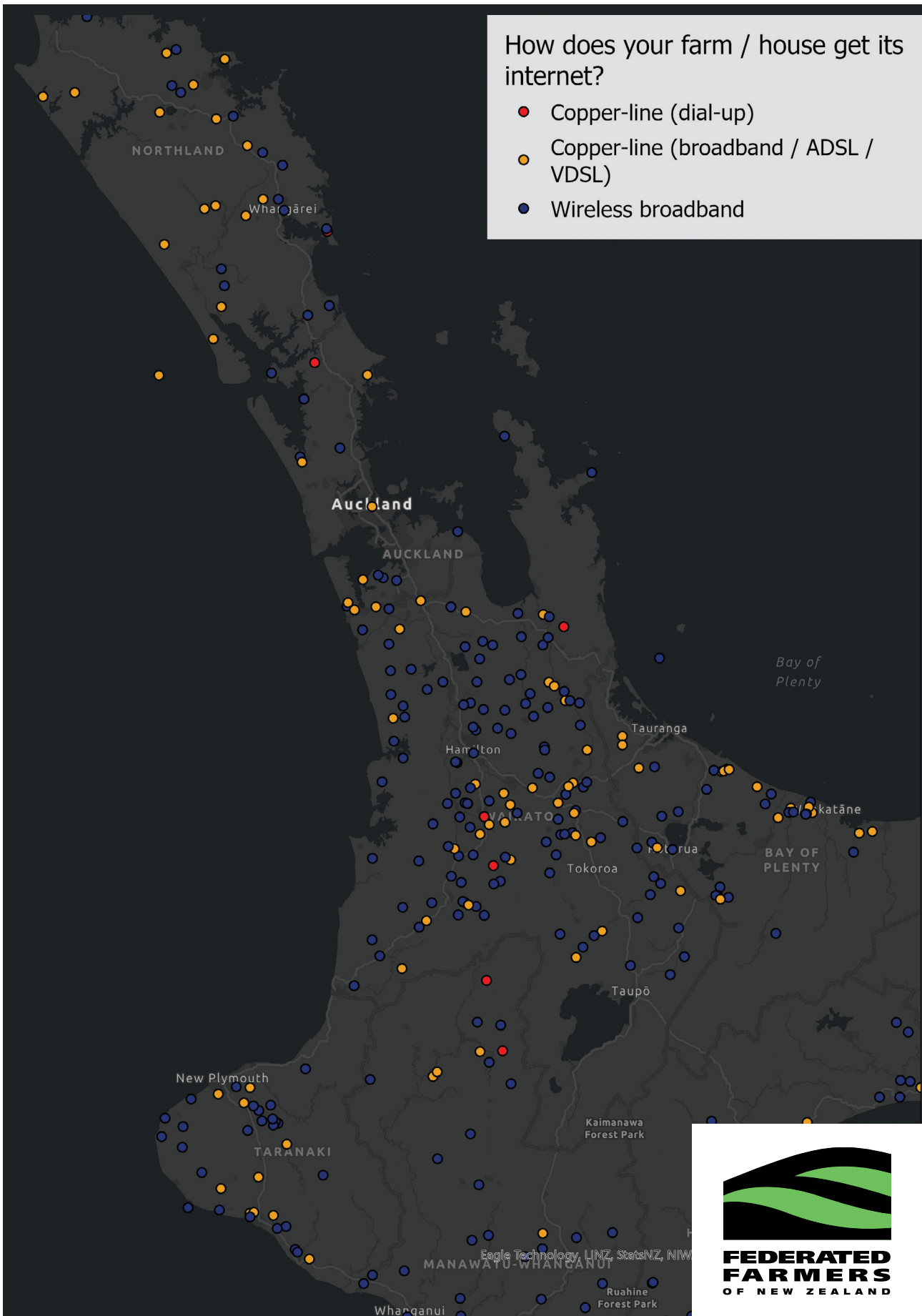
A more useful perspective might be to compare the performance of copper line internet services (whether dial-up or broadband) with that of wireless broadband. Previous reports have mentioned respondent remarks on how a move from the former to the latter generally delivered a better internet connection to the farm. Table 2.3.2 shows that much better download speeds are generally experienced by those with wireless broadband when compared to those with copper line dial-up or copper line broadband.

How does your farm / house get its internet?	0-5 Mbps	6-10 Mbps	11-15 Mbps	16-20 Mbps	21-40 Mbps	41-60 Mbps	61-80 Mbps	81-100 Mbps	Greater than 100Mbps
Copper line broadband (ADSL/VDSL)	42%	22%	12%	7%	12%	3%	2%	1%	1%
Copper line dial up	50%	40%	10%	0%	0%	0%	0%	0%	0%
Fibre optic	15%	0%	15%	8%	23%	0%	0%	15%	23%
Mobile broadband	6%	19%	21%	8%	31%	6%	4%	3%	3%
Satellite broadband	8%	12%	7%	10%	23%	10%	3%	8%	20%
Wireless broadband	9%	17%	12%	13%	31%	10%	4%	2%	1%

Table 2.3.2: Internet download speeds by how house/farm gets the internet 2022

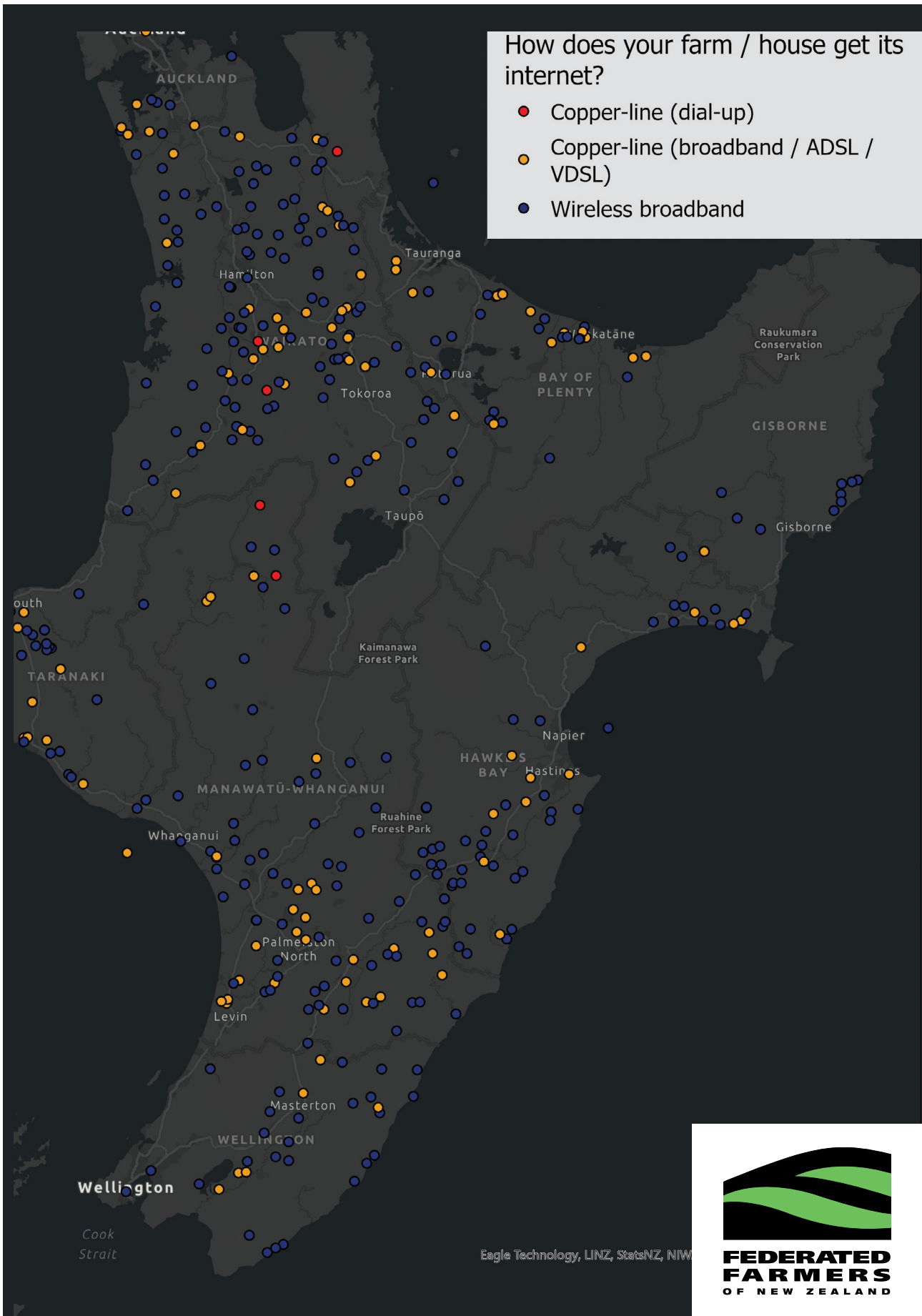
Unfortunately, fibre broadband will likely remain cost-prohibitive to further rollout to any significant extent in rural areas to be a viable solution to the problem of poor rural connectivity. Cost is a similar factor for satellite broadband, with installation and set-up costs in the thousands of dollars. Satellite may be a solution for those farmers in remote or otherwise hard to service locations, but a subsidy of some kind would likely be needed to help them overcome upfront installation and set-up costs for it to become a more realistic alternative to more terrestrial internet connection types.

Maps 2.3.1, 2.3.2, 2.3.3 and 2.3.4 show that opportunities likely exist for some farmers to potentially move to better-performing wireless broadband connections. Wireless broadband connections rely on there being line of sight between the farm house and the provider's tower, so terrain may prove an issue for some. Likewise, the location of some farms may be too distant from nearby wireless broadband towers to ensure a reliable connection. That said, it would be worth further exploring the potential for upgrading farmers from copper line dial-up or copper line broadband connections to wireless broadband, especially when it is already being provided to nearby farms. Some farmers may be unaware that it is available to them, or that the situation may have evolved since they last enquired about coverage. This is especially relevant where a wireless broadband provider may have previously visited the property and determined a wireless broadband connection was not possible at that time.



Map 2.3.1: Geographical spread of copper line based internet and wireless broadband – Upper North Island

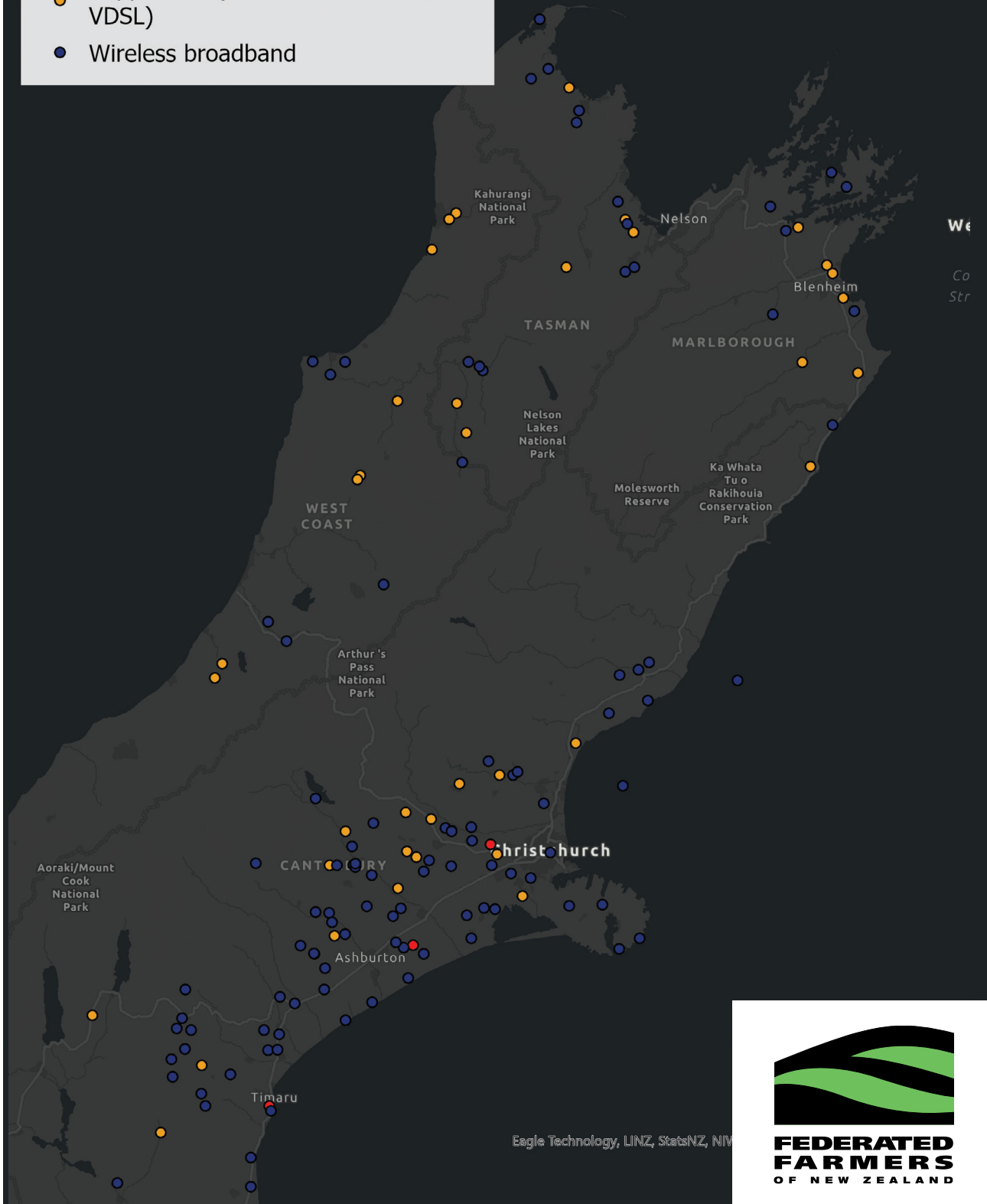




Map 2.3.2: Geographical spread of copper line based internet and wireless broadband – Lower North Island

How does your farm / house get its internet?

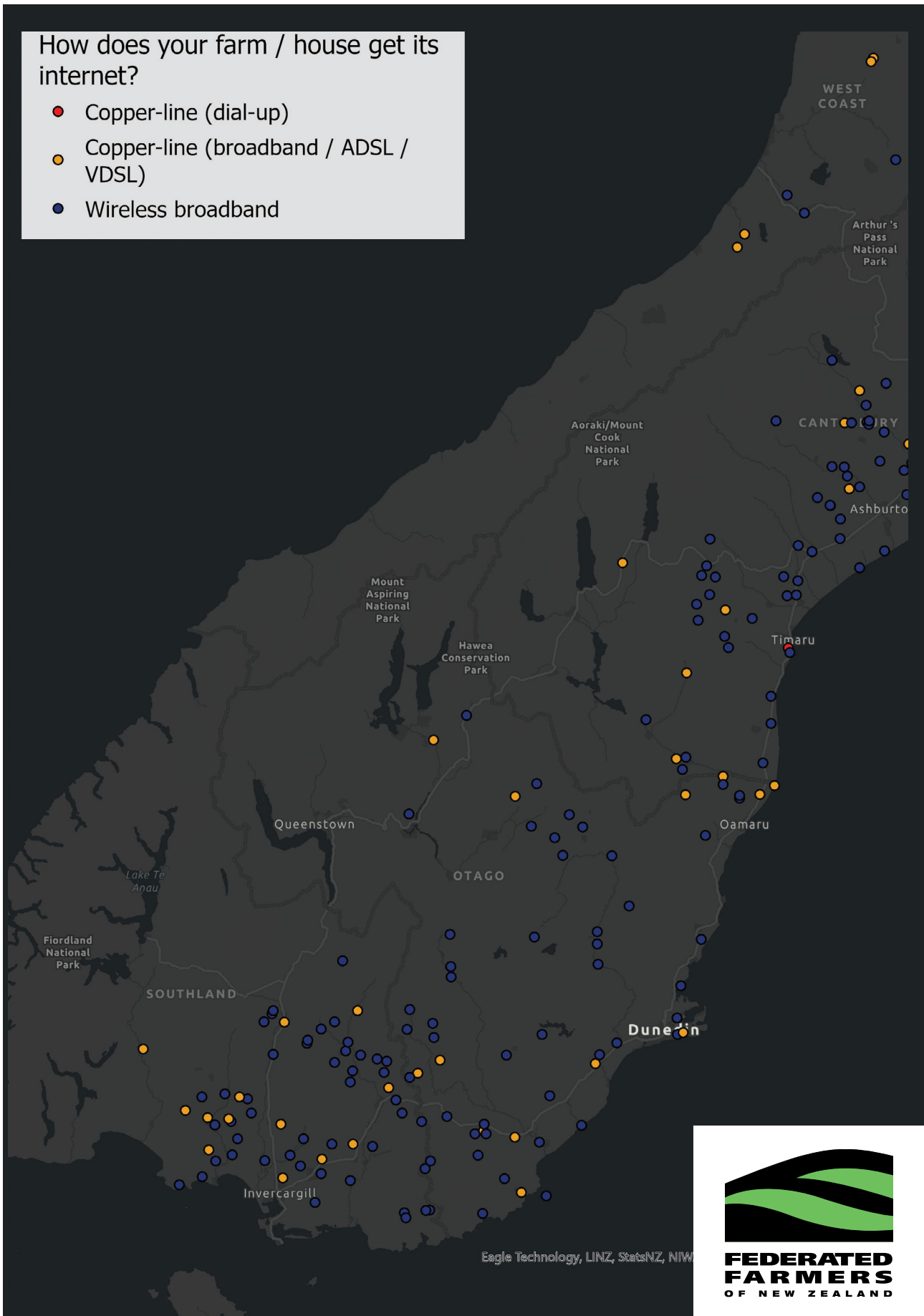
- Copper-line (dial-up)
- Copper-line (broadband / ADSL / VDSL)
- Wireless broadband



Map 2.3.3: Geographical spread of copper line based internet and wireless broadband – Upper South Island

How does your farm / house get its internet?

- Copper-line (dial-up)
- Copper-line (broadband / ADSL / VDSL)
- Wireless broadband



Eagle Technology, LINZ, StatsNZ, NIW



Map 2.3.4: Geographical spread of copper line based internet and wireless broadband – Lower South Island

Farmers are frequently required to upload documents, participate in online meetings, or complete online transactions, whether to conduct farm business or satisfy regulatory requirements. For this to happen in a manner that ensures the transaction actually happens requires an upload speed sufficient to do so. Online reports commonly use 10Mbps as a baseline for working from home.

As such, it is concerning to see around 2 in 3 farmers surveyed are enduring upload speeds in the 0-10 Mbps range (table 2.3.3).

The trend since 2019 is that there has been a substantial decrease in the proportion of respondents in the 0-10 Mbps range. While this is a positive outlook, more needs to be done to improve upload speeds in rural areas. This is especially relevant as the reliance on online transactions to demonstrate compliance with regulatory requirements increases with expected growth in the compliance burden on farmers from new and emerging regulations.

At your farm / house, what is your average upload speed?	2022	2021	2020	2019
0-2 Mbps	20%	25%	29%	33%
2-4 Mbps	13%	16%	13%	16%
4-6 Mbps	16%	17%	18%	16%
6-10 Mbps	18%	24%	23%	19%
0-10 Mbps	67%	82%	83%	83%
11-20 Mbps	16%	-	-	-
21-30 Mbps	7%	-	-	-
Greater than 30 Mbps	10%	-	-	-

Table 2.3.3 Average internet upload speed 2019-2022

2.4 Internet connection performance

It is concerning that rural internet connections seem to have worsened over the last 12 months more than they have improved (table 2.4.1). That the proportions have changed between 1% and 4% since 2021 strongly suggests that more needs to be done to improve the performance of internet connections in rural areas.

In the last 12 months has your internet connectivity:	2022	2021
Declined	32%	31%
Not changed	58%	62%
Improved	11%	8%

Table 2.4.1 In the last 12 months has your internet declined, not changed or improved, 2021-22

Analysing responses by internet connection type, the greater proportions of decline appear to be with internet connections via copper lines (dial-up and ADSL/VDSL) and mobile towers (figure 2.4.1).

Copper line services have earlier been reported as poor performing technologies for rural internet connections when compared to other internet connection types. The solution here might be to look to migrate farmers to newer and better performing internet connection types.

Mobile broadband internet connections likely suffer from demand exceeding the capacity of local network infrastructure. This is supported by comments from a number of respondents of network congestion or capacity constraints likely being a factor affecting service performance from nearby towers. The solution here might be to increase the capacity of mobile broadband towers to better handle demand on those sites. Another solution might be the construction of new towers to spread demand over a greater number of sites as part of a move to increase mobile voice service coverage in many rural areas.

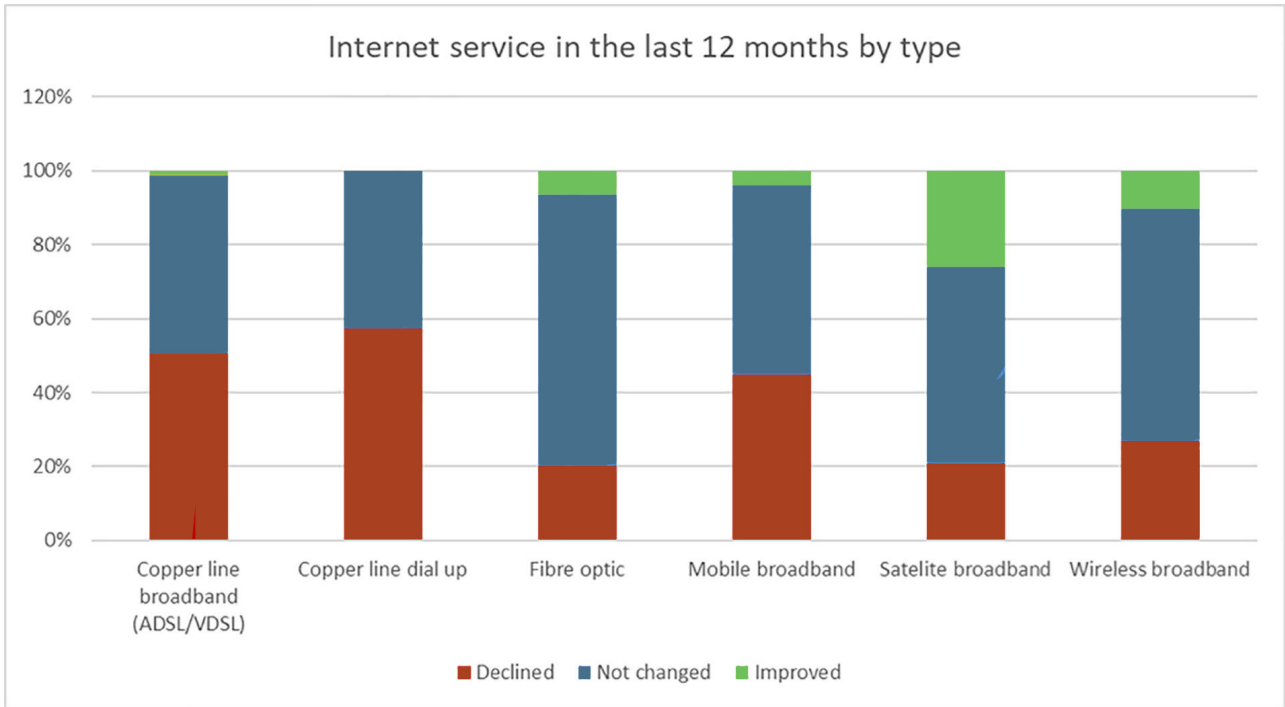


Figure 2.4.1 Internet service declining, not changing or improving by how house/farm gets the internet 2022

When asked if their internet connectivity had declined, not changed or improved in the last 12 months, 46.3% of Spark/Skinny respondents and 40.7% of Vodafone/Farmside respondents felt their service had declined (table 2.4.2). This compares with regional wireless internet service providers (rWISPs) where no more than 30.3% of respondents felt their service had declined, with as few as 4.0% reporting that their service had declined in the last 12 months (Primo).

Who is your internet service provider?	Declined	Not changed	Improved
Spark / Skinny	46.3%	48.7%	5.0%
Vodafone / Farmside	40.7%	55.2%	4.1%
Inspire	17.9%	70.1%	11.9%
Starlink	9.8%	21.3%	68.9%
Lightwire	15.5%	63.8%	20.7%
AoNet Broadband	25.6%	71.8%	2.6%
NetSpeed	28.9%	68.4%	2.6%
yrless	25.0%	71.9%	3.1%
Gisborne.net.nz	7.4%	77.8%	14.8%
Ultimate Broadband / UBB	15.4%	69.2%	15.4%
Primo	4.0%	80.0%	16.0%
WIZwireless	4.2%	87.5%	8.3%
Other Providers (less than 2% individually)	30.3%	59.7%	10.0%

Table 2.4.2 Internet service declining, not changing or improving by provider 2022

The analysis of responses by the length of time they have been with their provider showed that those respondents who had been with their provider for more than 10 years were more likely to report that their internet connectivity had declined in the past 12 months at 38.4% (table 2.4.3). This compares to those whose internet connectivity had not changed and have been with their provider for more than 10 years at 27.3%. This makes sense given analysis also shows that those who have been with their provider for longer tend to rely on older internet connection types, particularly copper line dial-up and copper line broadband.

Those who had been with their provider for less than a year were the most likely to report that their internet connectivity had improved (at 52.0%) out of all respondents who had reported an improvement in the last 12 months. This likely reflects the positive experience of those that had changed provider to take up a newer and better performing internet connection type.

How long have you been with your provider?					
In the last 12 months has your internet connectivity:	Less than 1 year	1-2 years	2-5 years	5-10 years	More than 10 years
Declined	5.9%	7.3%	23.4%	24.9%	38.4%
Not changed	6.1%	10.1%	29.4%	27.1%	27.3%
Improved	52.0%	5.7%	14.6%	13.8%	13.8%

Table 2.4.3 Time with provider, internet service in the last 12 months 2022

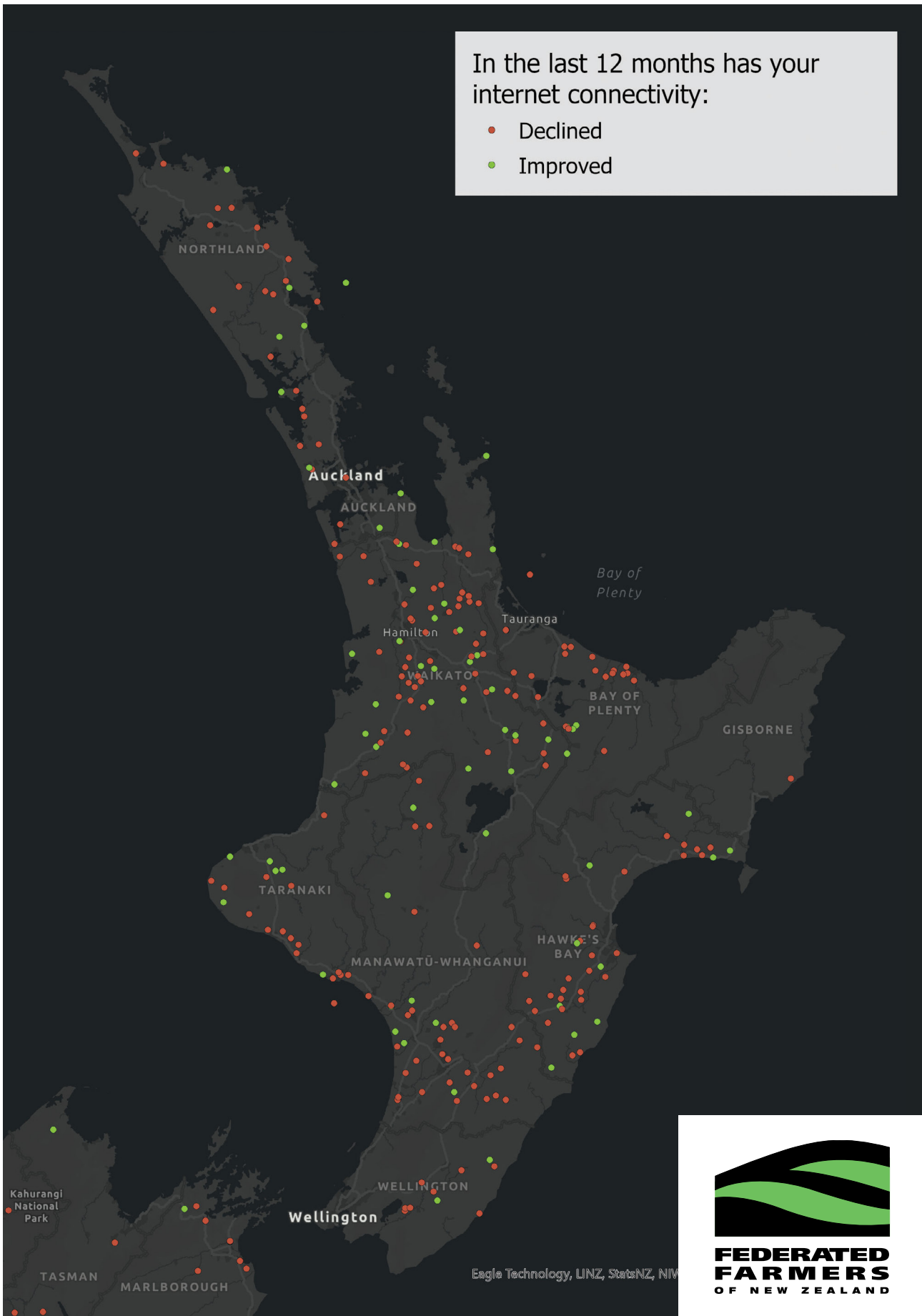
When analysing responses by download speed, there is a strong correlation between download speed and perception of whether one's internet connection had declined, not changed, or improved in the last 12 months (table 2.4.4). Those in the 0-5Mbps range observed the greatest proportionate decline in their internet connection. Similarly, those with download speeds >100Mbps observed the greatest proportionate increase in their internet connection. This fits with analysis by internet connection type and how long a respondent had been with their provider.

Declined/Not Changed/Improved by download speed			
At your farm / house, what is your average download speed?	Declined	Not changed	Improved
0-5 Mbps	61.8%	36.8%	1.3%
6-10 Mbps	44.0%	50.6%	5.4%
11-15 Mbps	41.5%	52.5%	5.9%
16-20 Mbps	33.3%	58.3%	8.3%
21-40 Mbps	19.8%	68.5%	11.7%
41-60 Mbps	19.0%	67.1%	13.9%
61-80 Mbps	21.2%	57.6%	21.2%
81-100 Mbps	16.1%	51.6%	32.3%
Greater than 100 Mbps	6.4%	38.3%	55.3%

Table 2.4.4 The proportions that have declined, not changed or improved in the last 12 months of each download speed category 2022

Another analysis of responses based on location showed several clusters where respondents reported their internet service had declined in the last 12 months. In particular, there are clusters from the North Island in Northland, East Waikato, Bay of Plenty, South Taranaki, Gisborne, Hawkes Bay, and Manawatu (map 2.4.1). In the South Island clusters where shown in Tasman, Marlborough, Mid and North Canterbury, North Otago, and Southland (map 2.4.2).

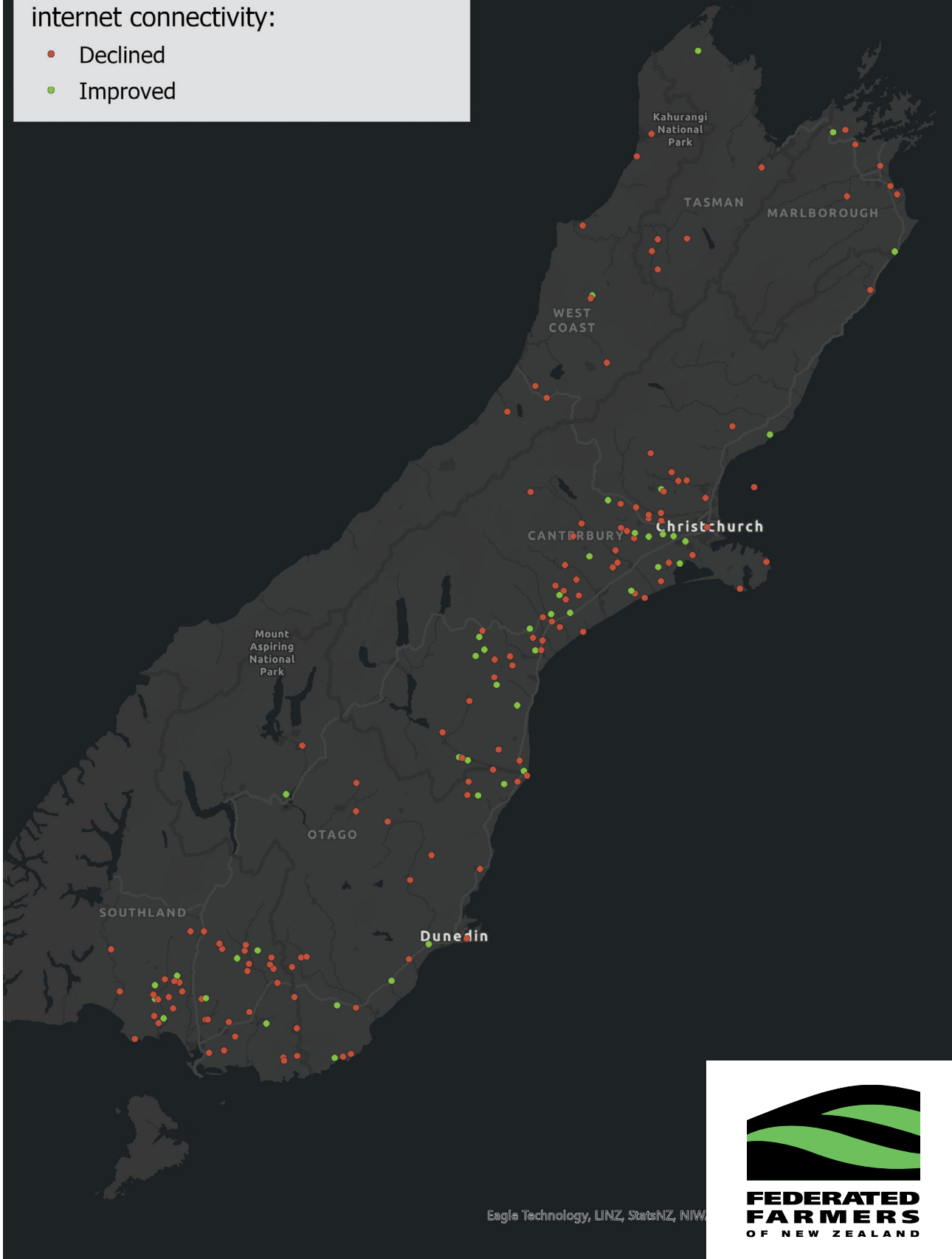
Based on our analysis of responses by location and provider, there are several clusters that providers perhaps ought to pay closer attention to address any factors impacting the quality of their service (maps 2.4.3 and 2.4.4).



Map 2.4.1: Declining/Improving Internet Services – North Island

In the last 12 months has your internet connectivity:

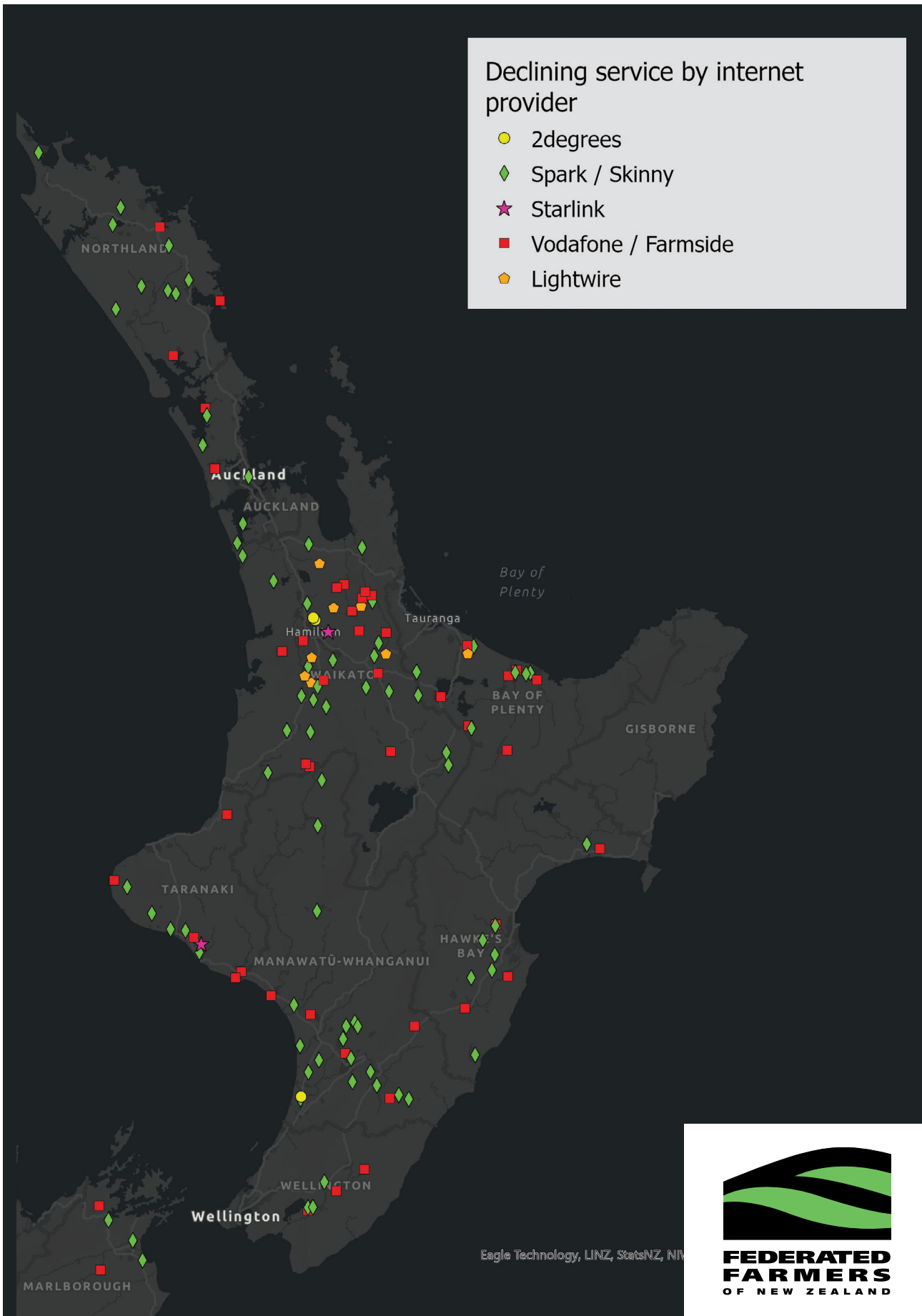
- Declined
- Improved



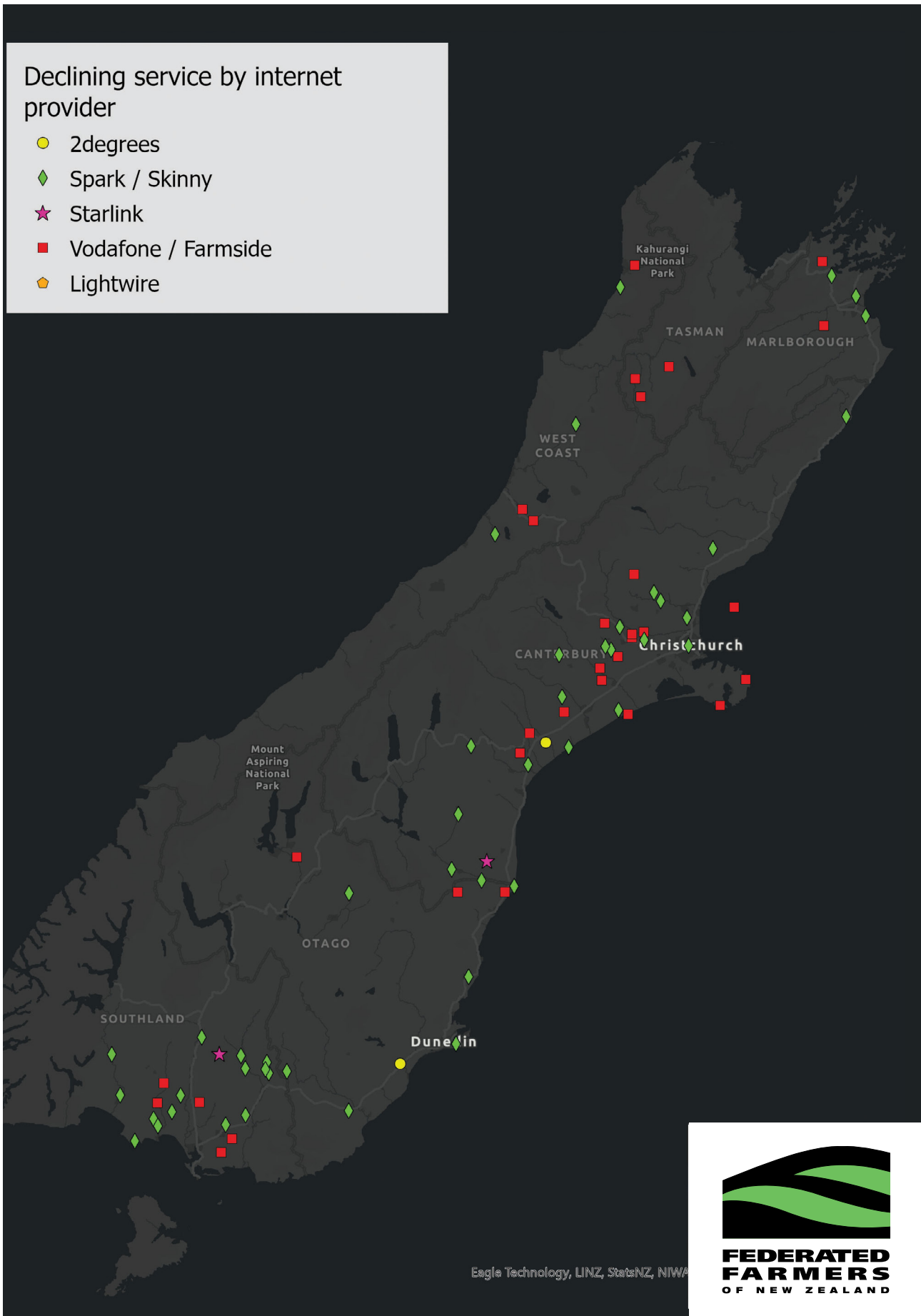
Eagle Technology, LINZ, StatsNZ, NIWA



Map 2.4.2: Declining/Improving Internet Services – South Island



Map 2.4.3: Declining internet connections by provider (excluding rWISPs) – North Island



Map 2.4.4: Declining internet connections by provider (excluding rWISPs) – South Island

3.0 Mobile phone use on farm

The survey poses several questions around mobile phones and the use of them on farms. Survey questions particularly looked at uptake and use of smartphones to support the farm business, and the extent of mobile coverage on farms, as well as metrics around the type of mobile spectrum and quality of mobile reception on farms.

New questions were included in this year's survey on topics exploring the experience of voice call dropouts, being unable to send or receive text messages, and their mobile service provider. These questions were included to help broaden our understanding of some of the factors behind the responses provided.

3.1 Mobile and smartphone uptake on farm

Mobile phone use on farms remains very high (table 3.1.1) with slightly fewer farmers indicating their mobile phones were also smartphones (table 3.1.2). Proportions of mobile phone and smartphone use on farm have not changed much since 2019, with use of both mobile phones and mobile smartphones quite high at >90%.

Do you have a mobile phone?	2022	2021	2020	2019
Yes	94%	95%	95%	94%
No	6%	5%	5%	6%

Table 3.1.1: Mobile phone use on farms 2019-2022

Is your mobile a smartphone?	2022	2021	2020	2019
Yes	93%	95%	92%	91%
No	7%	5%	8%	9%

Table 3.1.2: Smartphone use on farms 2019-2022

3.2 Mobile spectrum

Decisions on farm are best made in real-time and being able to make those decisions on a mobile phone while away from the farm office is becoming increasingly necessary to the efficient operation of a farm business. Much of this functionality comes from the use of smartphone apps and having the accessibility to many apps that rely on being able to connect to higher-bandwidth mobile spectrum (being 4G or 5G).

4G spectrum continues to be the dominant spectrum for mobile phones on farms, with almost 60% of farmers indicating this was the spectrum they could connect to while on the farm (table 3.2.1).

It's a good sign that almost 2 in 3 farmers surveyed can connect to 4G and 5G spectrum while on their farm. While many smartphone functions can operate on 3G networks, many of the newer smartphone apps work better and more reliably on 4G or 5G networks, meaning smartphones are more likely to deliver greater usefulness to those farmers that can connect to those spectrums.

If over 1 in 3 farmers surveyed can only connect to 2G or 3G spectrum that is a clear indication that more needs to be done to increase access to newer mobile spectrums to better enable functionality that supports the farm business.

It is good to see that even a small proportion of farmers are able to connect to 5G mobile spectrum while on the farm. 5G mobile tends to have a much smaller coverage footprint from tower sites than earlier spectrum like 3G and 4G, making it less cost-effective to roll-out in rural areas as opposed to more densely-populated centres. That said, we are keen to see 5G rolled out in as many rural areas as possible to limit the extent to which a digital divide occurs between urban and rural on mobile phone functionality, in much the same way as is happening on internet connections to the home.

What generation / spectrum are you able to connect to on your farm with your mobile phone?	2022	2021	2020	2019
2G	4%	3%	4%	8%
3G	34%	30%	31%	36%
4G	58%	61%	63%	56%
5G	4%	5%	2%	-

Table 3.2.1: What generation / spectrum are respondents able to connect to on their farm with their mobile phone 2019-2022

3.3 Mobile coverage

The ability to communicate is important for the efficient operation of a modern farming business, whether to support swiftly provided advice, making decisions, or seeking help and assistance. Farmers need to be able to do all that while out on the farm and not solely near the few spots on the farm where they can get a mobile phone signal.

Mobile coverage remains a concern with only around 1 in 3 farmers surveyed indicating that 50% of their farm receiving mobile coverage (table 3.3.1). This is despite the most significant change since 2019 being the decrease in those indicating they had mobile coverage over 0-25% of their farm.

There has been little change in the proportions for each since 2021, reinforcing the need for investment in constructing new mobile towers. An increase to the capacity of mobile towers helps address quality of service issues, but seems to have done little to address situations where accessibility and availability of service is an issue.

Over what percentage of your farm do you have mobile coverage?	2022	2021	2020	2019
0-25%	20%	19%	23%	32%
25-50%	16%	15%	14%	17%
50-75%	28%	28%	23%	20%
75-100%	36%	38%	40%	32%

Table 3.3.1: Over what percentage of their farm respondents have mobile coverage 2019-2022

Comments from respondents where mobile coverage is generally poor frequently mention how there may be a single spot on the farm where they can get a decent mobile signal. Often this is far away from where they spend most of their time working on the farm.

The construction of new towers is one solution that would resolve a number of connectivity issues, from mobile coverage to reliable internet connections, and do so for multiple properties for every new tower that is built. The capital cost of constructing new towers is a limiting factor in the push to construct new towers. This is the case for those areas where there is already some degree of coverage or service from existing towers, or in those areas where a new tower would not be able to connect to enough customers to justify the investment.

In these situations, a farmer's options become one of two things. Work with other nearby farmers to get a new tower built in their area, or install technologies on farm that extend the range of wi-fi or similar internet service beyond the farm residence. Range extenders, are currently available to help with that to some degree. However, it seems unlikely that most farmers would be aware of how they might improve connectivity on farm without external advice on which devices to get and how best to install them.

3.4 Mobile reception

Farmers have previously commented that incoming calls are often missed and that text messages are more reliably sent and received on farm than voice calls, which limits the usefulness of mobile phones and smartphones on farm.

Signal bar strength has generally been used as a proxy for call quality, with more bars in signal strength suggesting a lower likelihood of voice calls dropping out. It is a common assumption that the signal bar strength indicated on one's mobile phone is a reliable indicator of whether or not a call is likely to go through. Overall, bars of signal strength have not changed substantially since 2020 when we saw fewer respondents report 1 and 2 bars of signal at its strongest (table 3.4.1).

Where the signal strength is strongest on your farm, what is the signal strength?	2022	2021	2020	2019
1 bar	5%	6%	5%	10%
2 bars	14%	14%	14%	17%
3 bars	33%	31%	30%	30%
4 bars	32%	31%	30%	25%
5 bars	16%	19%	20%	18%

Table 3.4.1: Where the signal strength is strongest on your farm, what is the respondents signal strength 2019-2022

The assumption has been that signal strength of 1 or 2 bars indicates a high likelihood of voice calls dropping out. This year the survey sought to challenge that assumption by asking about call drop outs, being unable to make phone calls and text messages not sending despite having 2 bars of signal. An astonishing 69% responded "yes" to this question (table 3.4.2).

Do you find calls drop out on you, unable to call out or send/receive text messages despite having more than 2 signal bars?	
No	31%
Yes	69%

Table 3.4.2: Respondents finding calls drop out on them, are unable to call out and/or are unable to send/receive text messages despite having more than 2 signal bars

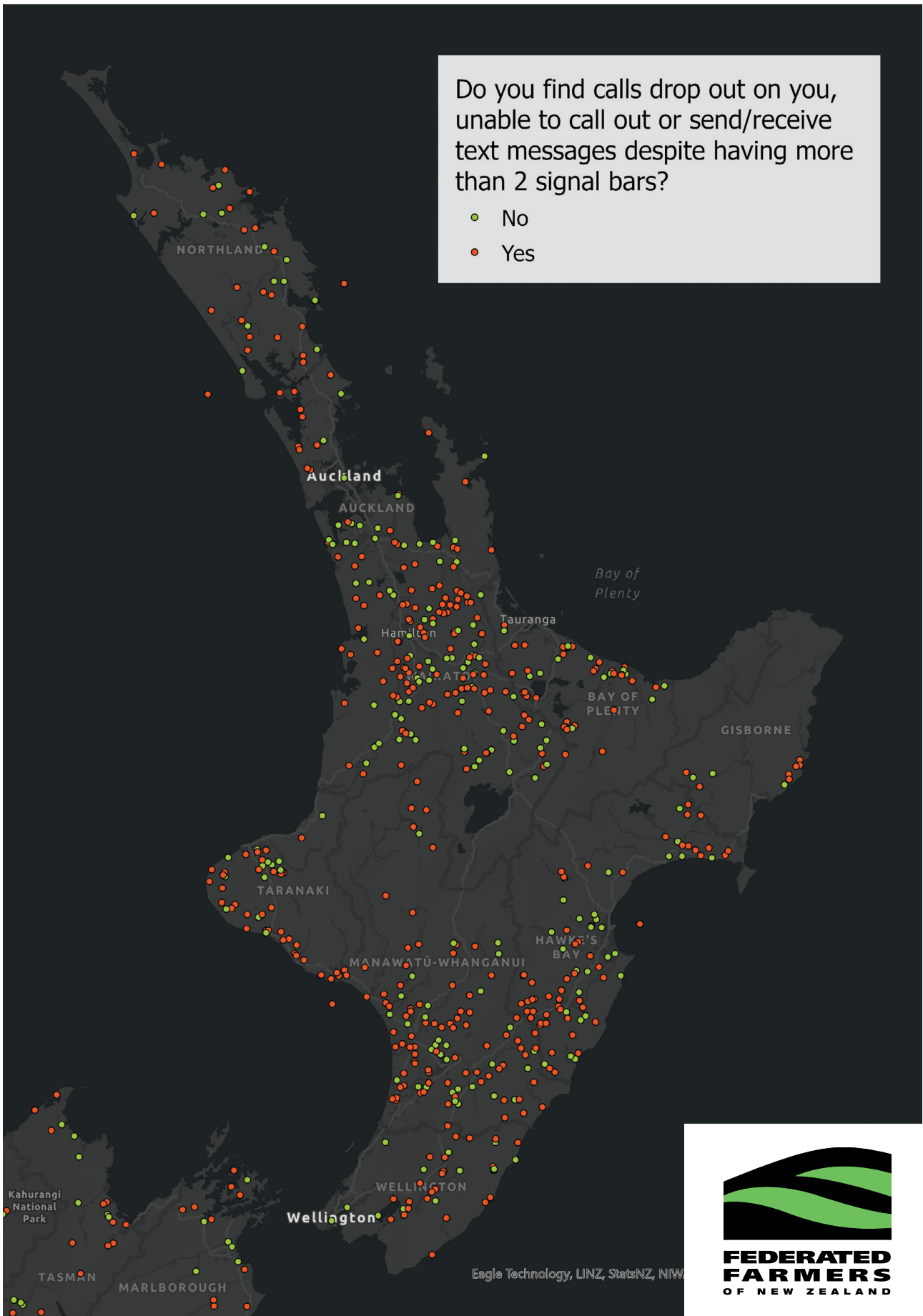
In the analysis of responses as they relate to provider, 2degrees customers were the most likely to indicate calls dropped out or were unable to send or receive text messages of the larger three providers at 79.4% (table 3.4.3). We received two responses from The Warehouse mobile customers who also had calls drop out on them, which explains why this provider's total is 100%.

Do you find calls drop out on you, unable to call out or send/receive text messages despite having more than 2 signal bars?		
Who is your mobile service provider?	No	Yes
2degrees	20.6%	79.4%
Skinny Mobile	43.8%	56.3%
Slingshot Mobile	25.0%	75.0%
Spark	32.1%	67.9%
The Warehouse Mobile	0%	100%
Vodafone	29.8%	70.2%
Grand Total	31%	69%

Table 3.4.3 Call drop outs by mobile service provider

The incidence and prevalence of calls dropping out or farmers being unable to send or receive text messages raises concerns around the fitness-for-purpose of mobile services in most rural areas. On top of the impact such unreliability has on the ability to make and communicate real-time decisions while out on the farm, are the health and safety implications of not being able to communicate the need for help in an area where that ought to be able to occur.

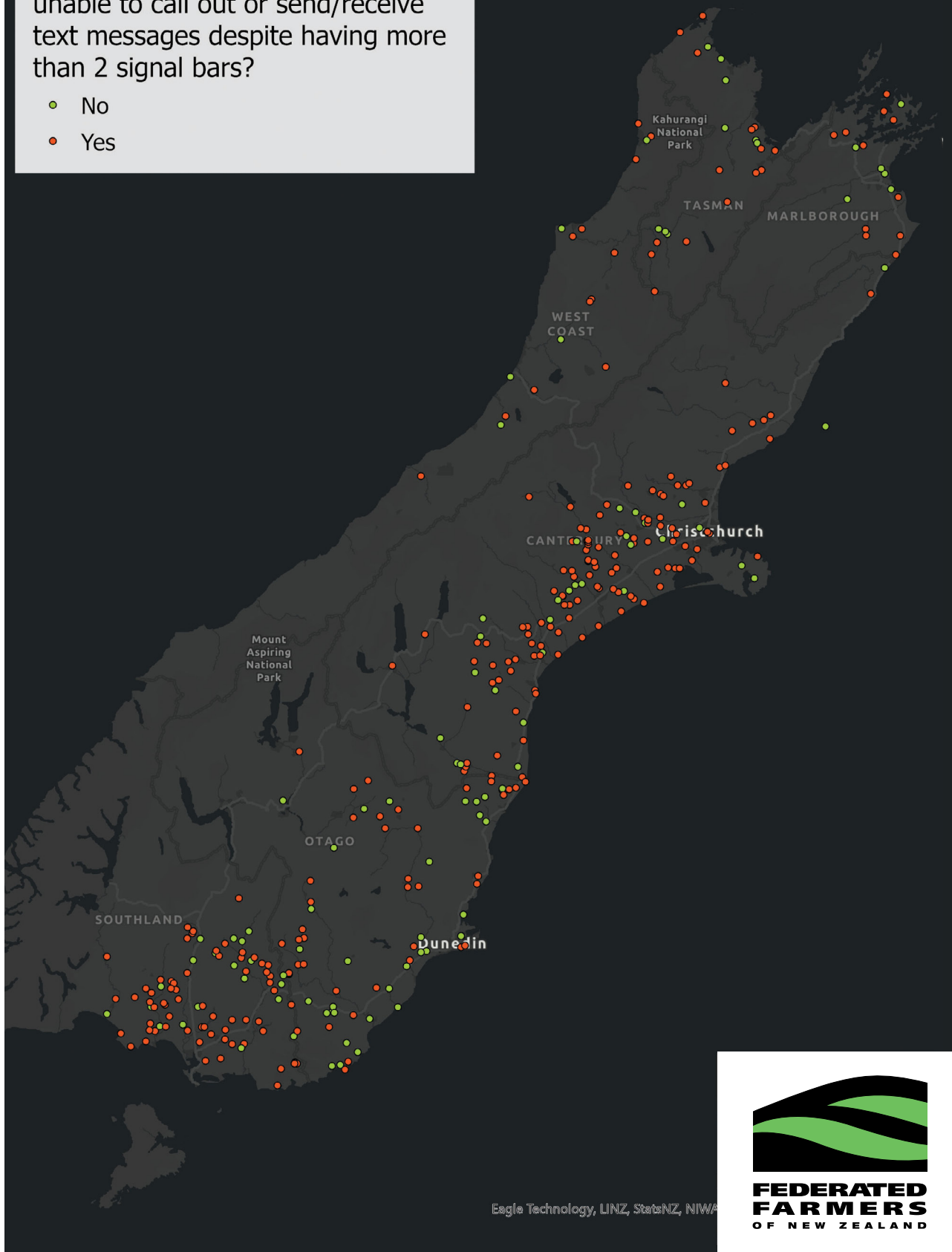
If you look at the responses in relation to location, it suggests that the issue of call drop-outs and being unable to send or receive text messages is widespread (maps 3.4.1 and 3.4.2). In many locations, nearby properties are reporting different experiences, raising questions as to why this might be the case. If response locations were more uniformly clustered, then that would suggest issues with towers providing service in that particular area, whether from network congestion or similar factors.



Map 3.4.1: Respondents with call drop outs, unable to receive calls and/or unable to send/receive text messages with more than 2 bars of signal – North Island

Do you find calls drop out on you, unable to call out or send/receive text messages despite having more than 2 signal bars?

- No
- Yes



Map 3.4.2: Respondents with call drop outs, unable to receive calls and/or unable to send/receive text messages with more than 2 bars of signal – South Island

3.5 Mobile phone service performance

It is concerning that mobile phone service performance seems to have worsened over the last 12 months (table 3.5.1). The proportion of respondents reporting declining mobile coverage in the last 12 months increased substantially from 20% in 2021 to 32% in 2022.

In the last 12 months has your mobile phone coverage:	2022	2021
Declined	32%	20%
Not changed	62%	72%
Improved	7%	8%

Table 3.5.1: Proportion of respondents rating their mobile service as declining, not changed or improved from 2021-2022

Many of the farmers surveyed indicated their mobile connectivity had declined in the last 12 months which points out severe reliability issues. For many, the decline in mobile service meant they were no longer able to rely on mobile broadband as a back-up for those times where their internet connection to the farm had become increasingly unreliable. For others, it appears that nearby mobile towers seem to have become incapable of handling voice calls and mobile data as they have become overburdened by more people making greater use of the same towers.

We would have expected a higher proportion of farmers surveyed to indicate their mobile connectivity had not changed in the last 12 months seeing as there has been no significant change in mobile coverage on farm, in mobile spectrums accessible on farm, or signal bar strength on farm since 2021.

Analysis of responses as they relate to mobile phone coverage on farm showed that those with better farm coverage were less likely to report declining mobile coverage of 21% for those with 75-100% farm coverage (table 3.5.2). This is compared to those with 0-25%, 25-50% and 50-75% farm coverage (at 33.8%, 43.5% and 38.5% respectively).

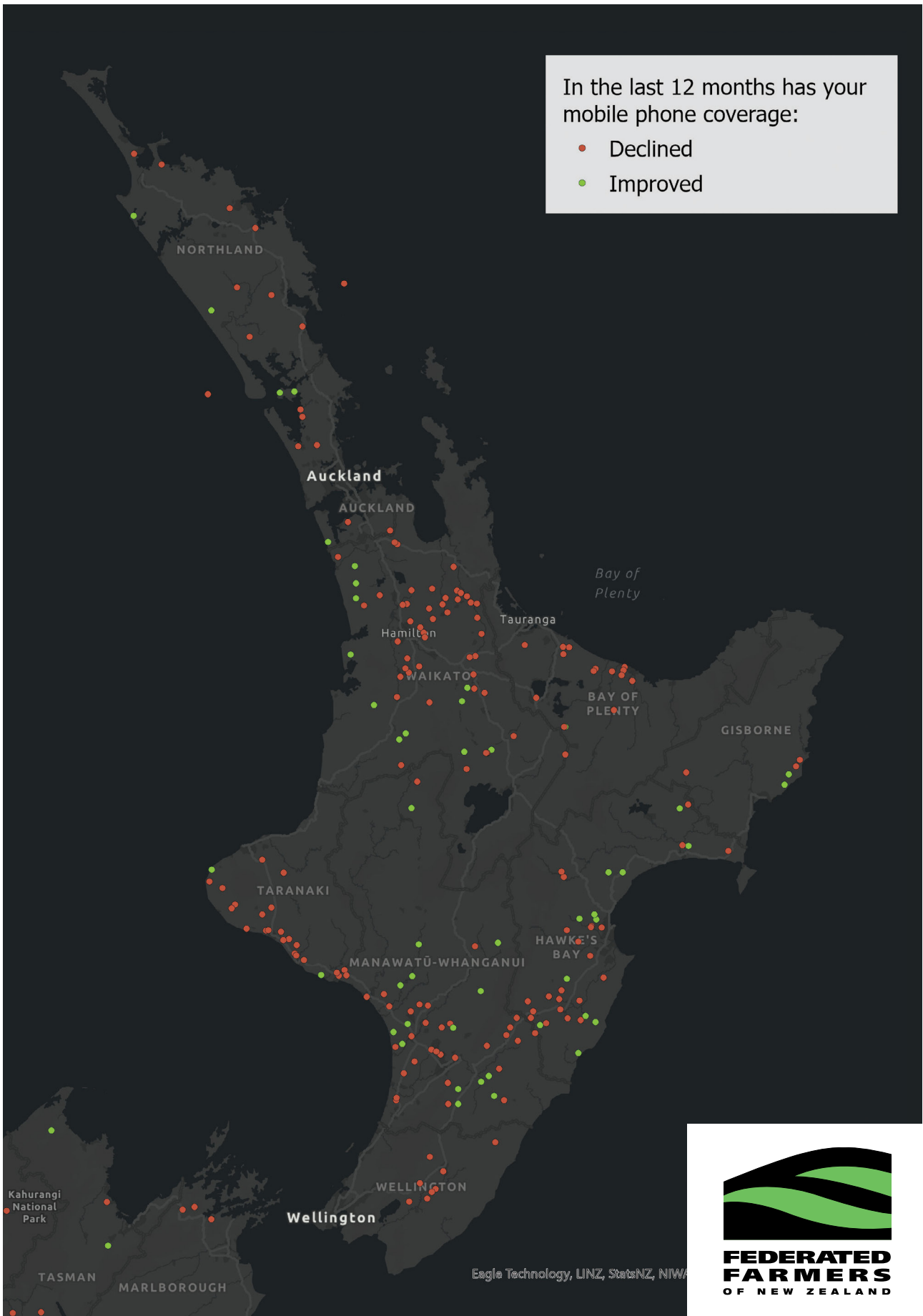
In the last 12 months has your mobile phone coverage:			
Over what percentage of your farm do you have mobile coverage?	Declined	Not changed	Improved
0-25%	33.8%	61.0%	5.2%
25-50%	43.5%	45.2%	11.3%
50-75%	38.5%	54.8%	6.7%
75-100%	21.3%	73.6%	5.1%
Average	32.0%	61.5%	6.5%

Table 3.5.2 Mobile phone coverage in the last 12 months and over what percentage of their farm they have mobile coverage

When analysing responses by location, we saw large clusters of respondents who had experienced a decline in their mobile phone coverage (maps 3.5.1 and 3.5.2). It is clear from these statistics that there is a widespread need to improve the performance of mobile services across the country. In those few areas that indicated mobile coverage had increased in the last 12 months, it also appears these reports are surrounded by nearby properties indicating the opposite.

This raises questions around the extent to which work already undertaken to upgrade the capacity of nearby towers had an impact on the connectivity experience of rural consumers in the last 12 months. This is less to suggest that any upgrades undertaken were unnecessary, but rather to question whether they were sufficient. We understand capacity upgrades of mobile towers are continuing, so we will be in a stronger position to assess their success rates the next time we run the survey.

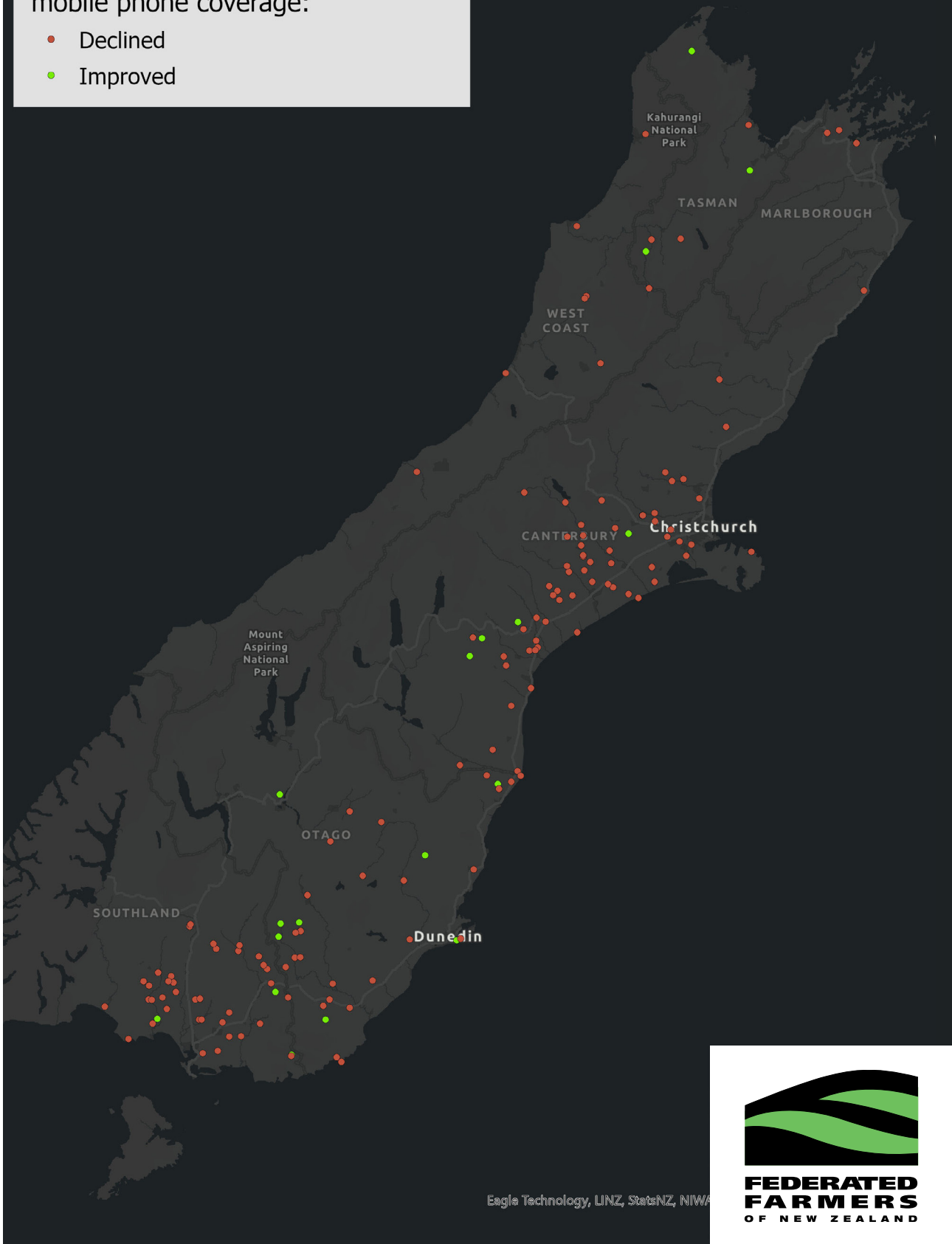




Map 3.5.1: Respondents rating their mobile coverage declining or improving in the last 12 months – North Island

In the last 12 months has your mobile phone coverage:

- Declined
- Improved



Map 3.5.2: Respondents rating their mobile coverage declining or improving in the last 12 months – South Island

4.0 Farm productivity

Connectivity has the potential to enable the use of a range of technologies that would support the farm business (table 4.1.1). The survey poses questions around the uptake and experience of smartphone apps and cloud software on-farm .

4.1 Smartphone app use

The use of smartphone apps to support the farm business is quite high, as indicated by around 3 in 4 of farmers surveyed (table 4.1.1).

Do you use smartphone apps to support the farm business?	2022	2021	2020	2019
Yes	77%	76%	75%	61%
No	23%	24%	25%	39%

Table 4.1.1: Smartphone app use to support the farm business 2019-2022

It is good to see smartphone app uptake has increased by around 16% since 2019. This can be attributed to some degree to improved access to newer mobile spectrums on farm, like 4G and 5G. Recent smartphone and smartphone apps tend to be designed with use of 4G and 5G mobile spectrum in mind, so access to these newer mobile spectrums is important for enabling farmers to get the most out of their smartphones to support the running of their farm business.

4.1.1 Smartphone apps

Weather apps and messaging apps dominate the smartphone apps mentioned by farmers in the survey. To a slightly lesser extent, online banking apps feature heavily, as do farm record apps (like MINDA, NAIT, and processor company apps). Interestingly, there is a noticeable increase in reported use of productivity and utility apps like the calculator app, task management apps, and calendar apps. We have also noticed a small, but growing, number of mentions of security camera apps and drone apps, suggesting that these technologies are seeing increasing uptake to support the farm business.

Farm type specific apps are understandably popular among those farmers surveyed in those industries. Likewise, there are a number of mentions of farm administration apps like Paysauce, Xero and MYOB among others mentioned by respondents as a reflection of farmers conducting administration tasks while away from the farm office.

The types of smartphone apps used to support a farm business is not significantly different to survey results in 2019. That said, the number of smartphone apps a farmer might be using has noticeably increased, as has the frequency with which specific smartphone apps are mentioned. This is a continuing trend from previous years.

4.1.2 Smartphone app usefulness

When surveyed on the usefulness of smartphone apps to support the farm business, farmers surveyed were asked to indicate a rank between 1 and 10, where 1 is least useful and 10 is most useful. The highest proportion of farmers surveyed went to the rank of 10, with the median rank being 8 (table 4.1.2).

How would you rate the usefulness of mobile phones in terms of assisting in the running of the farm business?	2022	2021	2020	2019
1	4%	5%	6%	14%
2	3%	2%	2%	8%
3	4%	5%	3%	7%
4	3%	3%	4%	5%
5	7%	6%	7%	7%
6	6%	8%	7%	4%
7	11%	9%	10%	11%
8	21%	19%	18%	15%
9	15%	15%	11%	9%
10	27%	27%	30%	20%

Table 4.1.2: Smartphone app usefulness to support the farm business 2019-2022

The overall positive appreciation of smartphone apps to support a farm business and positive shifts in proportion away from lower score rankings of smartphone app usefulness since 2019 are a useful indicator of farmer willingness to make use of new and emerging technologies on farm. That the median rank has shifted from 7 to 8 since 2019 speaks to the improved uptake of more app options and the usefulness of smartphone apps to support the farm business.

Mobile coverage and the performance of mobile services on farm are a limiting factor in the use of smartphone apps to support a farm business. As such, it would be interesting to observe what changes emerge from the range and type and usefulness of smartphone apps as mobile coverage and mobile service performance improves.

4.2 Cloud software use

Cloud software offers a number of benefits for necessary administrative and other tasks, and it is good to see most farmers indicating that they use cloud software to support the farm business.

Do you use cloud software to support the farm business?	2022	2021	2020	2019
Yes	59%	58%	34%	48%
No	41%	42%	66%	52%

Table 4.2.1: Cloud software use to support the farm business 2019-2022

The 2022 survey results establish an 11% increase in the use of cloud software to support the farm business since 2019, which is good to see. That cloud software uptake has increased at this rate suggests a combination of factors such as farmers upskilling on the use of cloud software, cloud software increasingly featuring as a component of necessary online transactions, and improvements many have seen to the overall quality of their internet connection. This is especially relevant in regards to those that have changed provider since 2019 to take up a better performing internet connection type. Cloud software relies on the farm having a reliable internet connection with speeds sufficient to both download and upload documents and data to the cloud.

The dominant type of cloud software used by farmers to support the farm business are for farm administration tasks. Xero is the dominant cloud software used by farmers surveyed with CashManager, Microsoft Office / OneDrive, Farm Focus, and Figured rounding out the more frequently mentioned cloud software . Cloud storage services to support the farm business continue to rate consistent mention, whether it be OneDrive, Google Drive, iCloud or Dropbox.

There is an obvious overlap between the cloud software and smartphone apps to support the farm business. The identified commonality across both are farm record software like MINDA Live, processor company apps or software, NAIT software, and software particular to types of farms. That necessary tasks can be completed in the farm office or out on the farm is a clear benefit of fit-for-purpose rural connectivity.

5.0 Landline service on the farm

The survey poses questions around the continued use and type of landline service used on farms, as well as quality of landline service enjoyed by survey respondents.

New questions were included in this year's survey on topics exploring the underlying technology behind the landline service provided on farms.

5.1 Landline use

Landline use continues to decrease with 64% of respondents having a home landline this year compared to 80% in 2019 (table 5.1.1).

The retention of landlines on farms surveyed is still quite high even if it has decreased by 16% since 2019, and done so at a steady rate of around 5% each year. It is interesting to note the rate of decrease remains steady despite mobile phones superficially offering a more versatile means of making and receiving voice calls on farm. The reality is that mobile phone coverage and service performance remains an issue on many farms, with the landline serving as the only way for some farms to connect to the outside world.

Does your home still have a landline?	2022	2021	2020	2019
No	36%	31%	24%	20%
Yes	64%	69%	76%	80%

Table 5.1.1 Landline retention 2019-2022

Comments from farmers surveyed can be grouped into:

- Those that still have a landline because it's their only option for voice calls. For these farmers, mobile coverage and mobile service performance is unreliable on their farm as an alternative to the landline. For others, they worry about being effectively cut-off during adverse weather events or power outages and prefer the reliability of a landline service through the initial stages of an outage. It was also mentioned that farmers retain their landline so they can be contacted by older family members.
- Those that still have a landline, but would have it disconnected soon. This group mainly comprises those with adequate or functional mobile coverage or mobile service performance on their farm, as they are more likely, of late, to receive a call on their mobile phone rather than on their landline.

5.2 Landline connection type

This year's survey includes a new question that looks into the technology behind how the landline service comes into the farm. We introduced this question in light of more recent offerings of a voice call service that runs through the internet connection (voice over internet protocol or VOIP) as an alternative to the more traditional copper line landline. Almost 1 in 3 respondents with a landline get their landline through their internet connection (table 5.2.1).

It will be interesting to see to what extent these proportions change over time, especially as it relates to the performance over time of internet connections in rural areas.

How do you get your landline?	2022
Copper line	69%
VOIP (through your internet connection)	31%

Table 5.2.1 Landline type 2022

Uptake of VOIP could be a reflection of the experience of some farmer customers enduring a poor quality copper line landline service, or finding themselves unable to get a copper line landline connection to the farm house. The latter element is especially relevant for those properties where mobile coverage or performance remains too poor to rely on mobile phone service as an alternative to a landline voice service. We have had a number of members call Federated Farmers for advice and support when they have found themselves in this situation.

If you look at mobile reception responses, those with one bar of signal strength as the strongest they could achieve on farm were more likely to have a landline than those with two bars or more (table 5.2.2). Those with one bar and still have a landline were also more likely to have a copper line landline at 81% compared to the average of 64% of respondents with landline.

Does your home still have a landline?		
Where the signal strength is strongest on your farm, what is the signal strength?	No	Yes
1 bar	19%	81%
2 bars	35%	65%
3 bars	39%	61%
4 bars	42%	58%
5 bars	36%	64%

Table 5.2.2: Mobile phone signal strength at its strongest by home still having a landline 2022

Interestingly, those experiencing mobile phone call dropouts or issues sending or receiving text messages with two or more bars of signal were less likely to have a landline than those without call dropouts at 64.4% and 59.3% respectively.

5.3 Landline service quality

Quality of landline service remains an issue for many farmers with over half of farmers rating their landline service as poor or average (table 5.3.1). It is concerning to see that the percentage of farmers rating their landline as poor was at its highest level ever at 17%. Additionally, those rating their landline as excellent or good was at its lowest level ever at a combined total of 43%.

How would you rate your landline service?	2022	2021	2020	2019
Poor	17%	14%	12%	16%
Average	40%	36%	37%	35%
Good	34%	41%	41%	38%
Excellent	9%	8%	11%	11%

Table 5.3.1 Landline service ratings 2019-2022

Comments from farmers surveyed rating their landline service as poor or average tended to focus on the unreliability of their landline connection, with some specifically mentioning that faults were common and repairs slow to happen or improve the situation. On the latter element, this may be due to providers relying on the faulty landline connection to schedule contractor visits to address faults in the landline service on those properties with little to no mobile coverage. That landlines are in many cases retained because of issues with poor mobile coverage or mobile service performance backs this up as a challenge for those experiencing faults in their landline service.

In our own discussions with affected members, they have often wondered why the company does not instead just turn up and fix the problem, irrespective of whether the visit was previously scheduled with the farmer. Further, the lack of ability to contact the farmer likely extends to situations where the provider was scheduled to visit at a certain time on a certain date, and did not. If there were alternative means of contacting the farmer available, they likely would have been informed of any variations to the timing of a scheduled visit to the farm. Few things frustrate a farmer more than scheduled appointments not being kept. Especially if the farmer has had to re-organise their own activities on the farm to be available for the visit, which when you take animal welfare and seasonal tasks into account, is not an easy task.

5.4 Landline service performance

It is concerning that landline services seem to have worsened over the last 12 months than have improved over the same period (table 5.4.1). Further, that the proportion of those for whom landline service has declined has increased since 2021.

In the last 12 months has your landline service:	2022	2021
Declined	23%	20%
Not changed	76%	79%
Improved	1%	1%

Table 5.4.1: Proportion of respondents rating their landline as declining, not changed or improved from 2021-2022

Analysis of responses by landline connection type shows that those farmers who noticed a decline in their landline service were more likely those with a copper line landline at 24.8%, compared to 18.4% for those with a VOIP landline service (table 5.4.2).

How do you get your landline?	Declined	Not changed	Improved
Copper line	24.8%	74.0%	1.2%
VOIP (through your internet connection)	18.4%	80.7%	0.9%
Average overall	23.0%	75.9%	1.1%

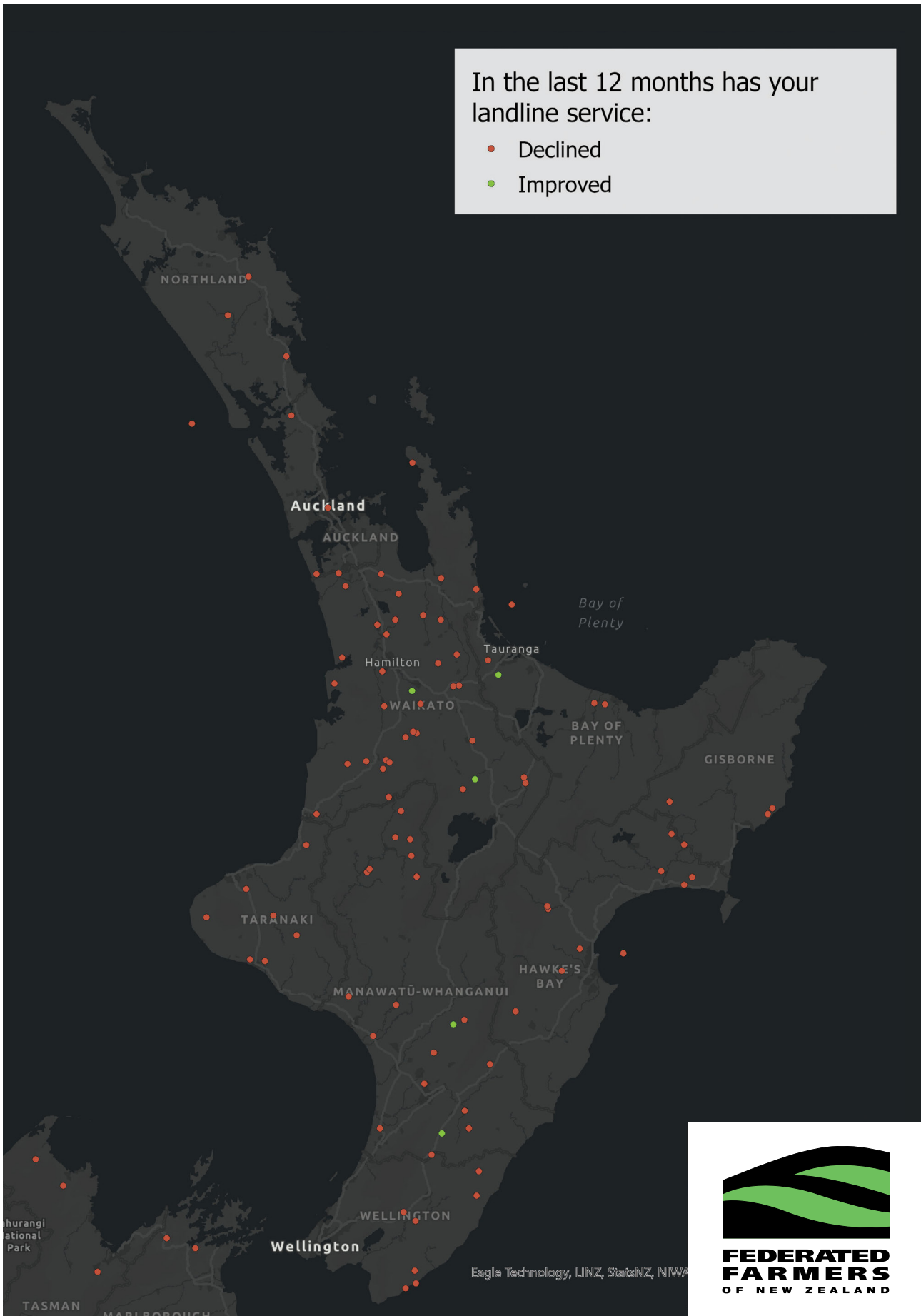
Table 5.4.2 How respondents get their landline by how they rated their landline as declining, not changed or improved 2022

Any decline in a VOIP landline service would be a reflection of the performance of their internet connection over that same period, as both services are provided through the same connection to the farm. The same is not necessarily the case for copper line landlines as many farms get their internet connection through a different technology.

If you then look at responses by location, declining landline service appears to be widespread across the country (maps 5.4.1 and 5.4.2). The few instances indicating the landline service has improved is unexplained, as these few locations seem to appear almost surrounded by properties experiencing the complete opposite.

There is a clear correlation between the responses on the performance of other connectivity services over the last 12 months. Statistics from the survey showed that 46.6% of those who reported declining landline services also reported declining mobile phone coverage and 46.2% reported declining internet connectivity. This suggests that for many farmers it was not simply that the performance of a connectivity service to the farm had declined, but multiple connectivity services to the farm had declined in the last 12 months.





Map 5.4.1: Declining and improving landline services by how respondents receive their landline services North Island

In the last 12 months has your landline service:

- Declined
- Improved



Map 5.4.2: Declining and improving landline services by how respondents receive their landline services South Island

5.5 Fax use

Faxes seem to have all but disappeared from use on farms, with the less than 1% response rate coming from one respondent in the last two surveys we have run (table 5.5.1).

Do you still use a fax?	2022	2021	2020	2019
Yes	0.2%	0.3%	8%	10%
No	99.8%	99.7%	92%	90%

Table 5.5.1 Fax use on farms 2019-2022



6.0 Health, Safety and Wellbeing

A special set of questions were included in this year's survey exploring the relation between connectivity and health, safety and wellbeing on farm. We have consistently received many comments from respondents in surveys run in previous years raising concerns around how poor connectivity has made health and safety events more stressful or traumatic for farmers.

We have also had a lot of feedback on how poor connectivity during the COVID-19 pandemic has made it difficult to connect with friends and family, as well as for those on farms to look after their mental and physical wellbeing with appointments often being cancelled.

We wanted to understand the vulnerabilities on farm for health and safety from poor connectivity, as well as gauge the potential for telehealth consultations as an alternative to travelling off the farm for in-person appointments.

6.1 Health and Safety

Farmers and their staff often work for extended periods of the day in those parts of the farm with little to no mobile coverage or while far from the landline at the farmhouse. A concern that has frequently been raised in comments in previous surveys is how poor connectivity impacts a farmer's ability to call for help or connect with employees and/or family members should an event occur on farm. This is consistently raised in relation to mobile coverage on farm, as well as landline service to the farm to a lesser, if still significant, extent.

6.1.1 Incidence of Health and Safety events on farm impacted by poor connectivity

17.5% of all survey respondents had had someone in their household or on their farm that was made more stressful / traumatic or negatively impacted by the lack of connectivity (table 6.1.1). In urban areas the ability to make a call to emergency services is taken for granted, with almost constant coverage and quick response times from first responders. Limited or no connectivity, combined with distance from emergency services, can have very serious consequences for emergencies in rural areas.

Has anyone in your household, or on your farm, had an event or incident that was made more stressful/traumatic or negatively impacted by a lack of connectivity?	2022
Yes	18%
No	82%

Table 6.1.1: Has anyone in a respondents household, or on their farm, had an event or incident that was made more stressful/traumatic or negatively impacted by a lack of connectivity

Of those respondents who indicated a lack of connectivity had had an impact, a medical event was the most common type of health and safety event at 25.4%, followed by vehicle-related events at 12.9% (table 6.1.2). Of those events indicated as other, they include events such as sea rescue, tree felling, missing children, when there has been a power outage, attempts to check-in on older family members, home invasion. Some of these events involved the death of someone on the property.

What was the most significant health and safety event that your household has experienced where connectivity was an issue in the response?	2022
Animal-related	10.0%
Burns	0.5%
Cut, strain or sprain	4.0%
Machinery-related	7.5%
Medical event	25.4%
Mental health event	2.5%
Slip, trip or fall	6.0%
Vehicle-related	16.4%
Weather or natural event-relate	14.9%
Other	12.9%

Table 6.1.2 The most significant health and safety event that the farm/household had experienced where connectivity was an issue in the response

On the question of how recently poor connectivity had impacted a health and safety event on farm, 40.8% of these events occurred in the last 12 months, and a further 24.9% in the last 1-2 years (table 6.1.3). This suggests that the incidence of poor connectivity impacting a health and safety event on farm remains a very current issue for many farmers.

When did this occur?	2022
Less than 1 year ago	40.8%
1-2 years ago	24.9%
2-5 years ago	18.4%
More than 5 years ago	15.9%

Table 6.1.3 How long ago did the most significant health and safety event occur that the farm/household had experienced where connectivity was an issue in the response

6.1.2 Connectivity a continuing concern for Health and Safety

On the question of whether connectivity is a frequent or ongoing concern for health and safety, just over half of respondents felt it was (table 6.1.4). No or unreliable connectivity has serious consequences for farmers and their staff who work alone. Alongside the inefficiency and technological limitations of having no connectivity throughout the day, the inability to communicate in an emergency is a serious limitation for many farming businesses health and safety response plans.

Is connectivity a frequent or ongoing concern for health and safety on your property?	2022
Yes	51.4%
No	48.6%

Table 6.1.4 If connectivity is, or isn't, a frequent or ongoing concern for health and safety on their property

Analysing responses in relation to mobile coverage, those who reported that connectivity was a frequent or ongoing concern for health and safety on their property had also experienced their mobile coverage declining in the last 12 months at 43% compared to 22% who were not concerned (table 6.1.5).

In the last 12 months has your mobile phone coverage:			
Is connectivity a frequent or ongoing concern for health and safety on your property?	Declined	Not changed	Improved
No	21.9%	71.8%	6.3%
Yes	42.8%	50.5%	6.8%
Average	32.0%	61.5%	6.5%

Table 6.1.5 Mobile connectivity in the last 12 months and concern about connectivity and health and safety on the respondents property

6.1.3 Working alone on the farm with no connectivity

On the question of whether anyone works alone on the farm with no connectivity, around 2 in 3 respondents seem to regularly work alone without connectivity, with only 32.3% indicating they did not (table 6.1.6). While there is technology that allows basic communication in a serious emergency, such as Personal Locator Beacons, these are primitive calls for help. They are of no use for issues that regularly occur such as vehicle breakdowns or getting stuck, reporting lateness or monitoring weather or the movement of other staff or family members.

Do you and/or your employees regularly work alone with no connectivity? If so, how many people on your farm need to do this (including yourself)?	2022
1	17.0%
2	22.1%
3	13.8%
4	6.9%
5 or more	7.9%
We don't work alone without connectivity	32.3%

Table 6.1.6 Working alone without connectivity and how many on their property do regularly

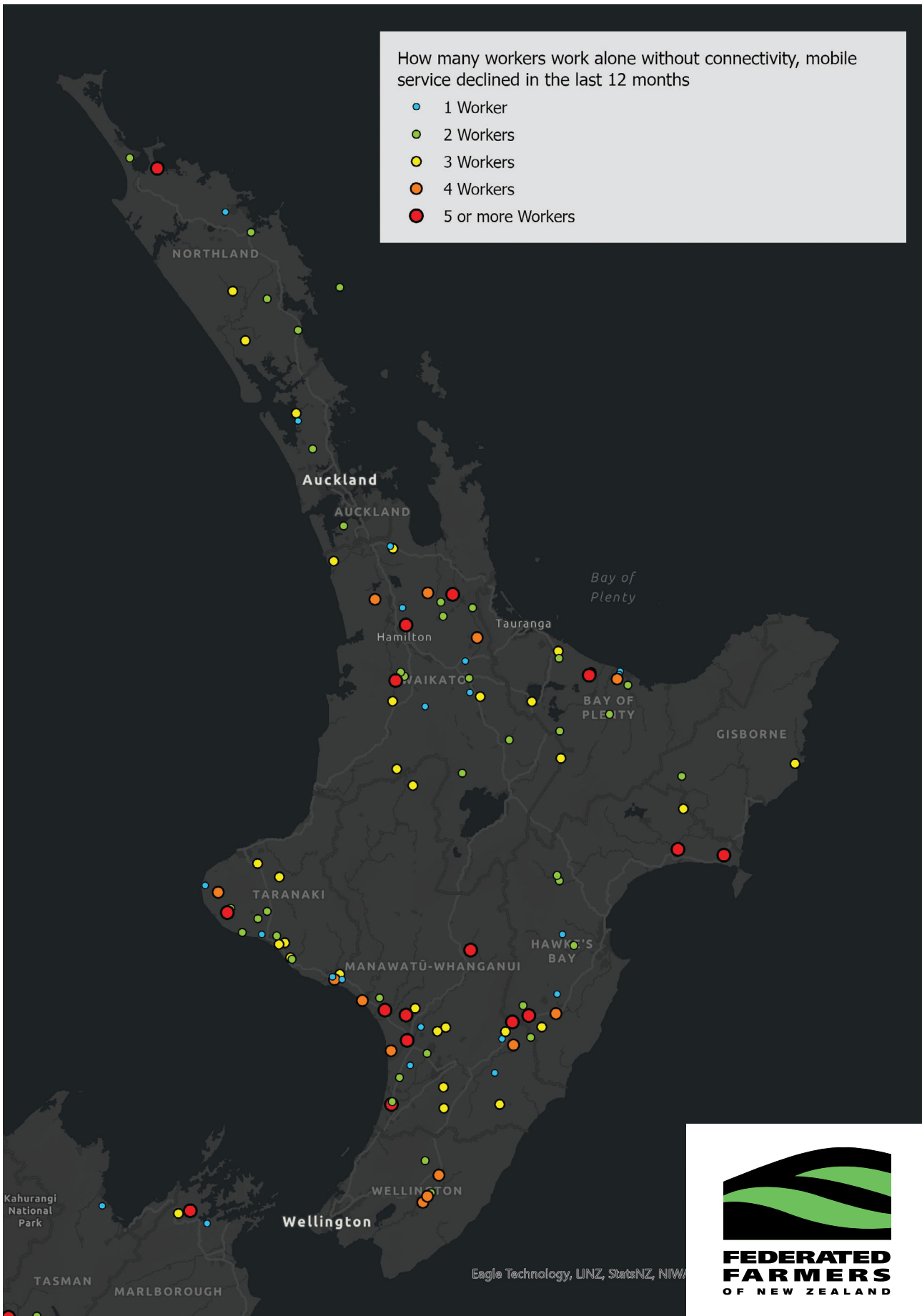
Analysing responses in relation to whether the farm has a landline connection, those that work alone without connectivity were more likely to have a landline to the farmhouse compared to those that do not (68.3% and 54.1% respectively).

Analysing responses in relation to mobile service performance over the last 12 months, those who worked alone with no connectivity had also experienced declining mobile coverage in the last 12 months (table 6.1.7). This increases the greater the number of employees working alone. 30.2% those with 1 worker regularly working alone without connectivity experienced declining mobile connectivity compared to 50.6% of those with 5 workers or more regularly working alone without connectivity. Only 24.0% of those who do not work alone without connectivity experienced declining mobile service over the last 12 months. While some farming businesses use alternative communication such as two-way radios, these have high overhead costs and still have serious limitations with coverage and usability (such as not internet capable).

In the last 12 months has your mobile phone coverage:			
Do you and/or your employees regularly work alone with no connectivity? If so, how many people on your farm need to do this (including yourself)?	Declined	Not changed	Improved
1	30.2%	65.4%	4%
2	33.8%	59.1%	7%
3	40.2%	48.5%	11%
4	40.8%	56.3%	3%
5 or more	50.6%	43.4%	6%
We don't work alone without connectivity	24.0%	69.9%	6%
Average	32.0%	61.5%	7%

Table 6.1.7 Mobile connectivity in the last 12 months and regularly working alone

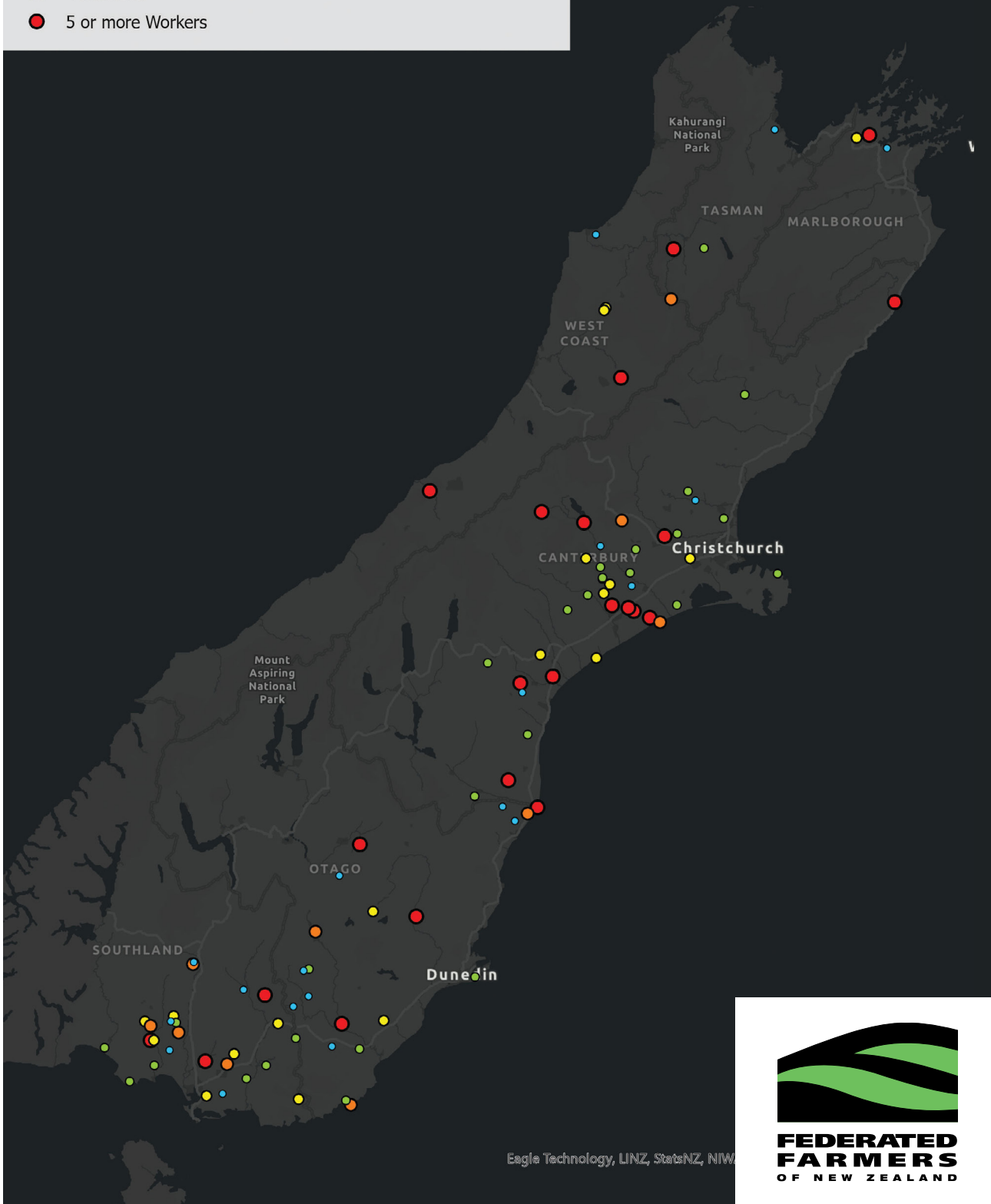
Analysing responses by location and in relation to where mobile service is declining, there are several clusters of significance in Waikato, Bay of Plenty, Taranaki, Hawkes Bay, Manawatu-Whanganui, Canterbury, Otago and Southland (maps 6.1.1 and 6.1.2).



Map 6.1.1: Lone workers with mobile service declined in the last 12 months – North Island

How many workers work alone without connectivity, mobile service declined in the last 12 months

- 1 Worker
- 2 Workers
- 3 Workers
- 4 Workers
- 5 or more Workers



Eagle Technology, LINZ, StatsNZ, NIWA



Map 6.1.2 Lone workers with mobile service declined in the last 12 months – South Island

6.1.4 Uptake of health and safety technology

Anticipating that poor connectivity would be an issue for some farmers when health and safety events occur, we were interested in understanding what technologies had been implemented on farms to overcome connectivity challenges.

On the question of whether steps had been taken to use technology to support health and safety on farm, nearly half of farmers responded that they have (table 6.1.8).

Have you taken steps to use technology to overcome connectivity to support health and safety on your property?	2022
Yes	49.0%
No	51.0%

Table 6.1.8 Use technology to improve connectivity for health and safety reasons

On the question of the types of technology that have been implemented on farms, personal locator beacons are the most commonly used technology at 25.7%, followed closely by short wave radios at 22.1% (table 6.1.9). These both have significant disadvantages over communication like cell phones.

Personal Locator Beacons commonly transmit nothing but an emergency signal and activate emergency responses immediately, meaning they are only used in the most serious situations. Short wave radios have high overhead costs, large physical bulk to carry, limited reception and battery life.

What have you implemented?	2022
Cellphone booster	8.9%
Personal locator beacon	25.7%
Radio repeater	6.4%
Satellite communicator (eg: ZOLEO, inReach)	2.1%
Satellite phone	0.4%
Short wave radio	22.1%

Table 6.1.9 Health and safety connectivity technology used on farm

On the question of why farmers had not taken steps to implement health and safety technology options, there is a clear education and awareness gap with farmers either not knowing what is available or not being able to find what they need (table 6.1.10).

Many farms continue to rely on the systems that have been in place long before connectivity was available. These include traditional methods such as leaving physical messages about what plans are, agreements about being home at a certain time or describing locations and tasks in the morning before going out to work. These systems have serious shortcomings in an emergency and are incredibly inefficient if plans change or people are unexpectedly delayed but not in danger. If a farmer with no connectivity rolls a vehicle first thing in the morning and are trapped, in some instances no one will come to look for them until they were expected home at dinner that night.

What are some of the reasons for that?	2022
Can't get what I need	5.0%
Haven't found what I need	10.8%
Too expensive to buy	6.5%
Too expensive to operate	1.1%
Unsure what is available	38.0%
What is available won't work on my farm	8.2%

Table 6.1.10 Reasons why health and safety technology has not been used on farm

6.2 Wellbeing

Farmer or rural community mental health and wellbeing has always been a key concern because of the nature and location of the jobs. Due to the farming lifestyle and living where you work, the job can often consume those on the farm.

There is always another task to do, staff to look after and animals on the farm. Farmers will often do everything they can before giving themselves the breaks they need and seeking any help for stress. Another factor is the tendency for farmers to feel uncomfortable speaking about their mental health or focusing on their own wellbeing. Likewise, there is often isolation with working on farms, where the nearest 'neighbour' could be kilometres away and the nearest town with services potentially an hour or more drive away.

This all ties into broader concerns for the mental health and wellbeing of rural communities and those that work in the agricultural sector. Poor connectivity risks increasing the struggle for rural people to seek help or advice, to join social groups or take up support services. To have access to assistance off the farm is made all the more difficult by potentially long travel times, and an inability to take time away from what needs to be done on the farm.

COVID was an opportunity to highlight the availability, accessibility, and understanding of services to help farmers with their mental health and wellbeing. More recently, the decline of available in-person activities, support, and social opportunities has had an impact on mental health and wellbeing. Similarly, the stress of policy developments, emerging regulatory requirements, increasing frequency of adverse events, and perception of public opinion seems to have intensified to a point where many rural people are either leaving the industry or selling their farm.

Connectivity is an obvious alternative to overcoming the barriers to getting the support needed. This includes making use of online support services, participating in meetings with other people, staying in contact with friends and loved ones, or even making friends with others in similar situations.

For example, from a family point of view, improved connectivity provides support for pregnant women on-farm or working mothers to access online maternity services, join maternity or working-mum groups, significantly improving the mental health and wellbeing of the women on farm and their families as a whole.

6.2.1 Travelling off-farm for health appointments

Travelling to attend a GP or physio appointment was for the majority of respondents (93.1%) a shorter trip of less than two hours (table 6.2.1) compared to the distance needed to travel for specialist health care (table 6.2.2) with nearly 41% needing to spend more than two hours off-farm and 9.2% more than four hours.

To attend a GP or physio healthcare appointment, would you, those in your household or employees on farm need to travel off farm (round journey):	
	2022
Less than an hour	59.3%
1-2 hours	33.8%
2-3 hours	5.0%
3-4 hours	1.2%
More than 4 hours	0.8%

Table 6.2.1 Time off farm for respondents, household and employees to attend a GP or physio healthcare appointment

To attend a specialist healthcare appointment, how long would you, those in your household or employees on farm need to travel off farm (round journey):	
Less than an hour	17.71%
1-2 hours	41.23%
2-3 hours	19.93%
3-4 hours	11.89%
More than 4 hours	9.24%

6.2.2 Time off farm for respondents, household and employees to attend specialist healthcare appointments

Analysis of responses by internet connection type shows that those who needed to spend more time off-farm to travel to specialist appointments were more likely to have better internet connection types (wireless broadband and satellite broadband) than those who had to travel less than an hour to their appointments (copper line dial-up and copper line broadband)(table 6.2.3).

	copper line broadband adsl/vdsl	copper line dial up	fibre optic	mobile broadband	satellite broadband	wireless broadband
Less than an hour	21.9%	2.0%	2.0%	6.1%	17.9%	50.0%
1-2 hours	19.4%	1.5%	1.5%	7.5%	17.2%	52.9%
2-3 hours	17.2%	0.4%	1.3%	7.9%	20.7%	52.4%
3-4 hours	18.2%	0.7%	0.0%	2.9%	20.4%	57.7%
More than 4 hours	20.2%	1.0%	1.0%	4.8%	23.1%	50.0%

Table 6.2.3 Time off farm for respondents, household and employees to attend a specialist healthcare appointment by their current internet connection

The analysis of responses by internet connection download speeds established that those with longer travel times also tended to enjoy faster internet connections with 51.7% having speeds below 20Mbps and 16.1% below 5Mbps. This compares to those with an hour round trip of 55.4% for under 20Mbps and 18.6% for under 5Mbps (table 6.2.4).



To attend a specialist healthcare appointment, would you, those in your household or employees on farm need to travel off farm (round journey):	Less than an hour	1-2 hours	2-3 hours	3-4 hours	More than 4 hours
0-5 Mbps	18.6%	15.1%	16.0%	10.2%	16.1%
6-10Mbps	16.4%	17.0%	17.6%	16.1%	17.2%
11-15Mbps	13.0%	13.9%	8.5%	8.5%	11.5%
16-20Mbps	7.3%	10.2%	15.4%	15.3%	6.9%
Under 20Mbps	55.4%	56.2%	57.4%	50.0%	51.7%
21-40Mbps	20.9%	26.0%	22.3%	31.4%	31.0%
41-60Mbps	9.0%	6.6%	8.0%	12.7%	6.9%
61-80Mbps	5.1%	3.4%	4.8%	1.7%	1.1%
81-100Mbps	4.0%	2.7%	3.7%	1.7%	4.6%
Greater than 100Mbps	5.6%	5.1%	3.7%	2.5%	4.6%

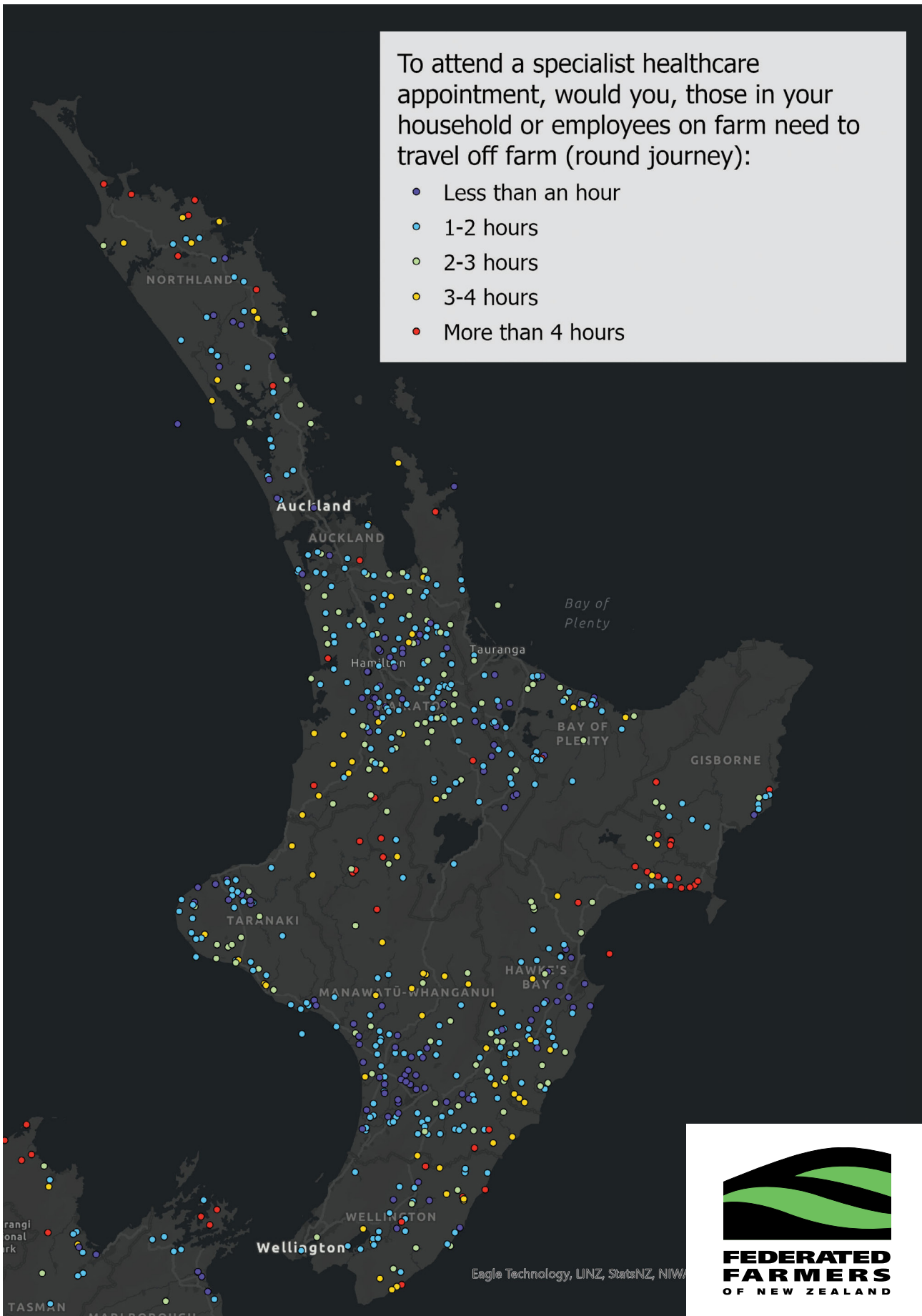
Table 6.2.4 Time off farm for respondents, household and employees to attend a specialist healthcare appointment by their current internet download speed

For those with these long travel times, it would appear that connectivity would generally be able to support the use of telehealth appointments as an alternative to in-person appointments, where appropriate. Telehealth services should reduce the travel burden for these families and be beneficial to health outcomes by potentially improving appointment attendance and having issues seen to sooner.

A focus on responses by location highlights those locations involving travel times of three hours or more to attend a GP or specialist appointment, and for whom telehealth services would prove the most beneficial (maps 6.2.1 and 6.2.2).

To attend a specialist healthcare appointment, would you, those in your household or employees on farm need to travel off farm (round journey):

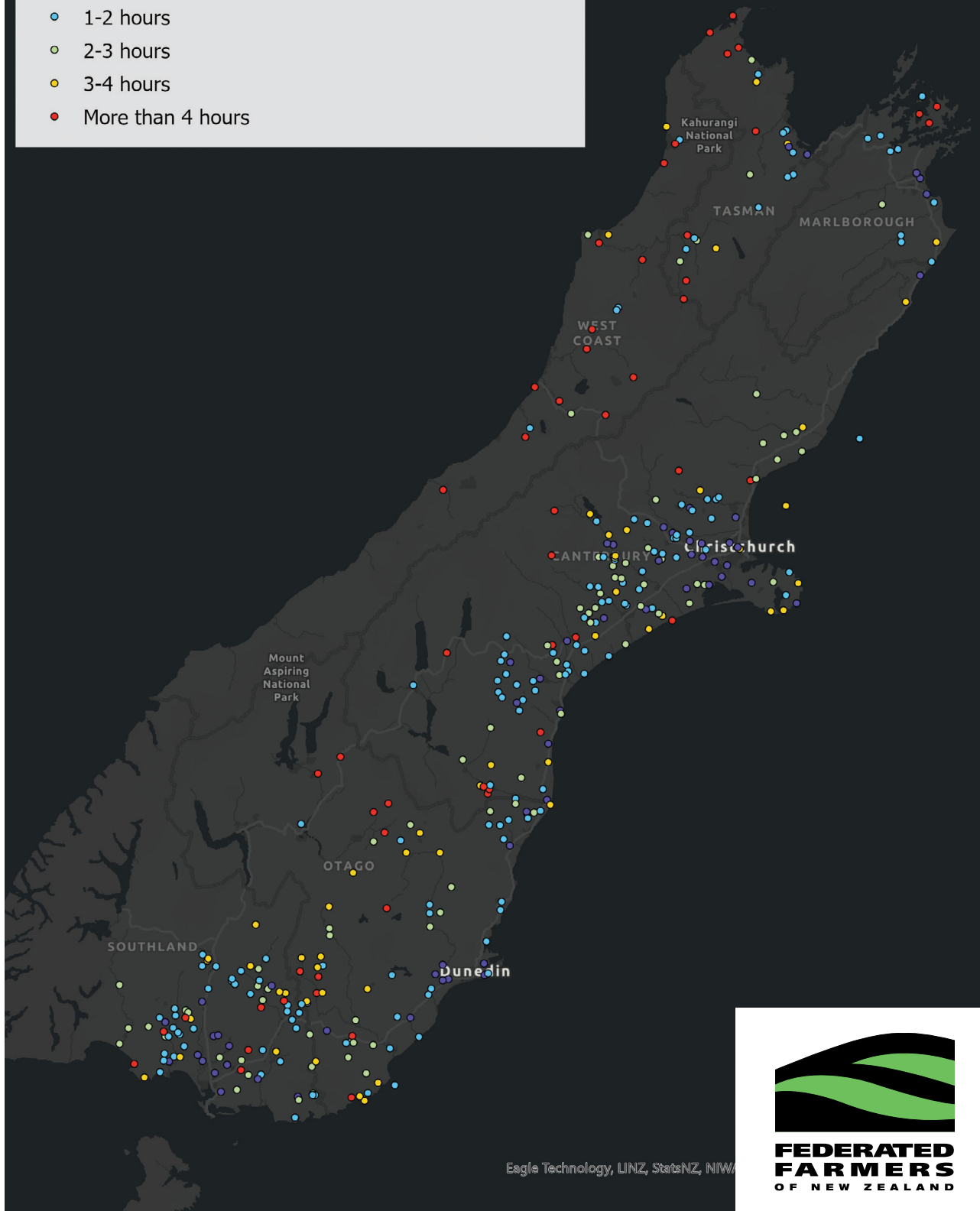
- Less than an hour
- 1-2 hours
- 2-3 hours
- 3-4 hours
- More than 4 hours



Map 6.2.1 Travel time for attending specialist healthcare – North Island

To attend a specialist healthcare appointment, would you, those in your household or employees on farm need to travel off farm (round journey):

- Less than an hour
- 1-2 hours
- 2-3 hours
- 3-4 hours
- More than 4 hours



Map 6.2.2 Travel time for attending specialist healthcare – South Island

6.2.2 Connectivity and wellbeing

Almost 1 in 4 respondents indicated that their connectivity (or lack-there-of) has an impact on their mental health and wellbeing (table 6.2.5). Our analysis of respondents rating their landline service showed that those with poor landline connections were more likely to indicate that their connectivity (or lack-there-of) has an impact on their mental wellbeing at 37%. This is much higher than those with average, good and excellent landline connections (22%, 17% and 16% respectively).

Does your connectivity (or lack-there-of) have an impact on your mental health and wellbeing?	2022
No	55.2%
Not sure	22.2%
Yes	22.6%

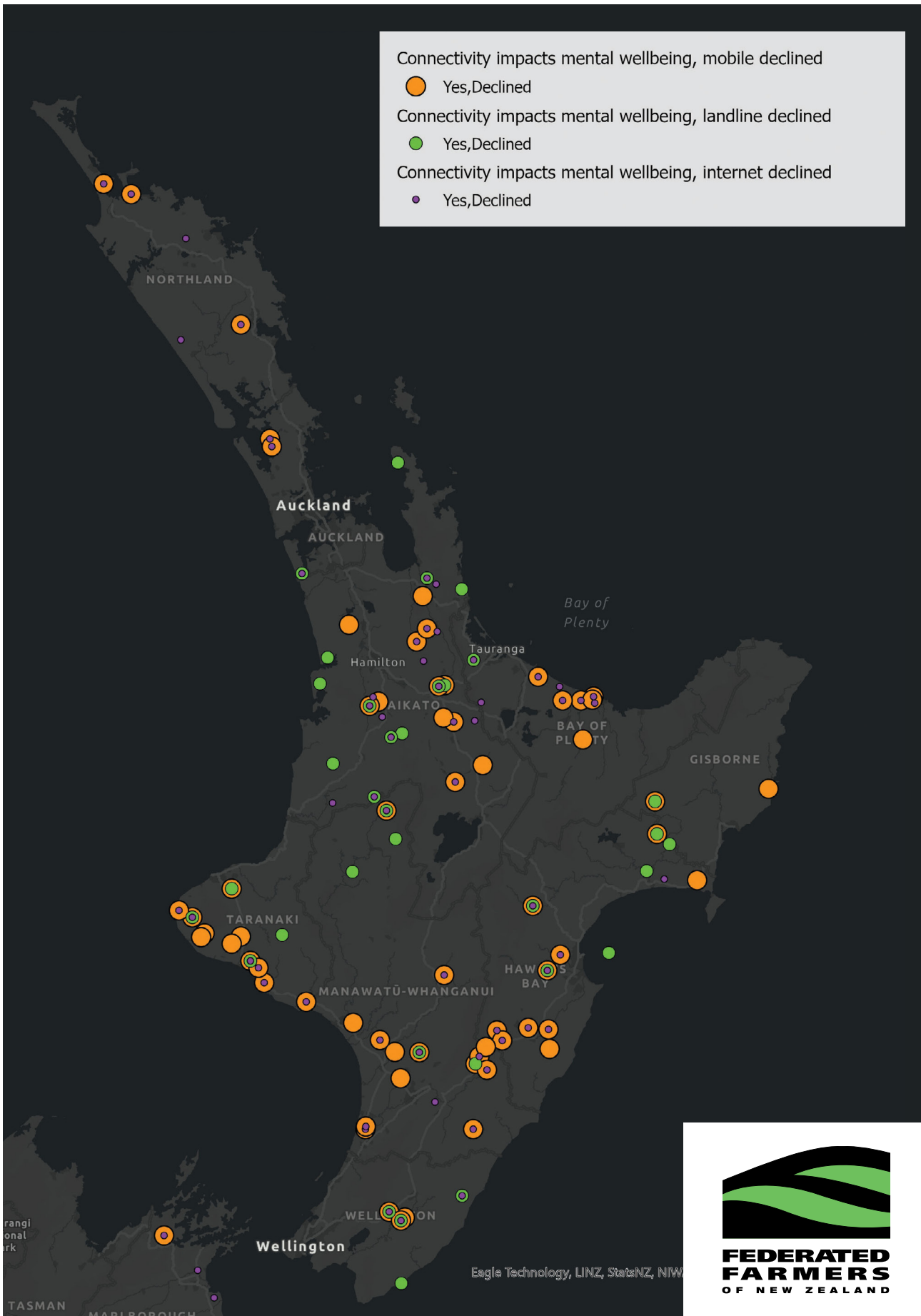
Table 6.2.5 Connectivity (or lack-there-of) and the impact on respondents mental health and wellbeing

We also analysed responses by mobile service performance over the last 12 months. This showed that 49.6% of those who indicated their connectivity (or lack-there-of) has an impact on their mental health and wellbeing also indicated their mobile coverage had declined in the last 12 months. This compares to only 24.2% who did not feel their connectivity (or lack-there-of) has an impact on their mental health and wellbeing (table 6.2.6).

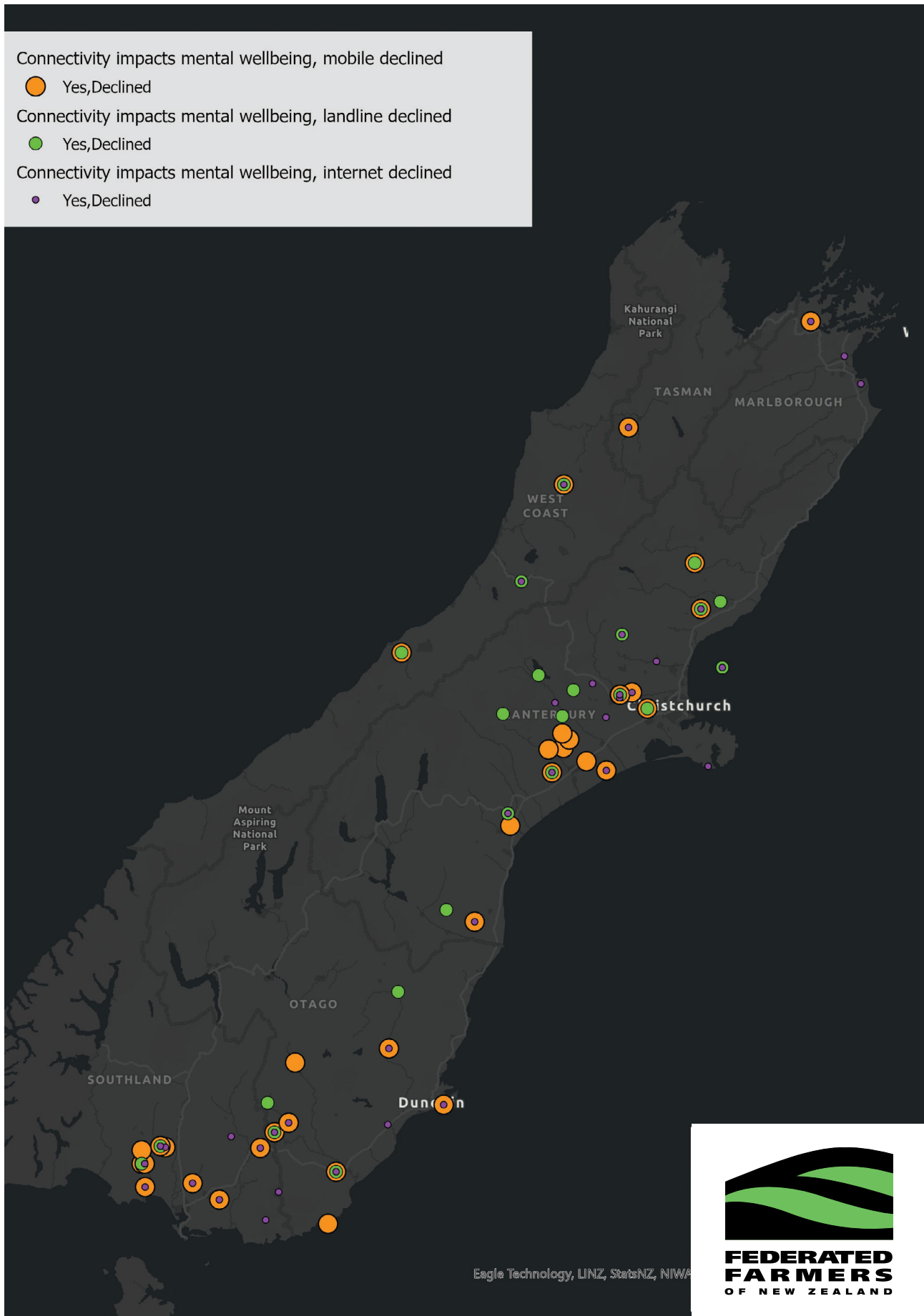
In the last 12 months has your mobile phone coverage:			
Does your connectivity (or lack-there-of) have an impact on your mental health and wellbeing?	Declined	Not changed	Improved
No	24.2%	68.4%	7.3%
Not sure	33.6%	58.9%	7.5%
Yes	49.6%	47.5%	3.0%
Average	32.0%	61.5%	6.5%

Table 6.2.6 Mobile connectivity in the last 12 months and connectivity's impact on respondents mental health and wellbeing

When analysing responses by location, there are obvious clusters of respondents that indicated connectivity (or lack-there-of) was having an impact on their mental health and wellbeing. Many of the locations seem to be in parts of the country that are either remote or where difficult terrain would limit the connectivity options available to them (maps 6.2.3 and 6.2.4)



Map 6.2.3 Connectivity (or lack-there-of) impact on mental health and wellbeing – North Island



Map 6.2.4 Connectivity (or lack-there-of) impact on mental health and wellbeing – South Island

On the question of whether better connectivity would lead to greater use of online opportunities, 41.2% of farmers indicated they would use better connectivity to make greater use of services, opportunities and to improve their mental health and wellbeing (table 6.2.7).

If you had better connectivity, would you utilise more online opportunities to connect with different activities and services to improve your mental health and wellbeing?	2022
I already utilise my connectivity	21.6%
No I wouldn't - I prefer in-person	37.2%
Yes I would	41.2%

Table 6.2.7 The desire or current use of respondents' connectivity to improve mental health and wellbeing

We again analysed responses by mobile service performance and this showed that 39.6% who would use their connectivity to improve their mental health and wellbeing also reported their mobile service declined (table 6.2.8). This compares to only 28.8% who already use their connectivity and 25.3% who would not use online services as they prefer in-person contact. It was interesting to see that 10.7% of those who responded that they already use their connectivity to improve their mental health and wellbeing also reported an improvement in their mobile coverage in the last 12 months.

In the last 12 months has your mobile phone coverage:			
If you had better connectivity, would you utilise more online opportunities to connect with different activities and services to improve your mental health and wellbeing?	Declined	Not changed	Improved
I already utilise my connectivity	28.8%	60.5%	10.7%
No I wouldn't - I prefer in-person contact	25.3%	67.7%	7.0%
Yes I would	39.6%	56.4%	4.0%
Average	32.0%	61.5%	6.5%

Table 6.2.8 Mobile connectivity in the last 12 months and utilising connectivity to improve respondents mental health and wellbeing

Appendix 1 – Full list of Internet Service Providers

Who is your internet service provider?	%	Count
2degrees	0.87%	10
2talk	0.09%	1
Accelerate Wireless	0.35%	4
Amuri	0.70%	8
AoNet Broadband	3.40%	39
Blast Broadband	0.17%	2
Connecta	0.17%	2
Eol	0.09%	1
Evolution Networks	0.61%	7
Ezykonect	0.78%	9
Full Flavour Ltd	0.26%	3
Gecko Broadband	1.05%	12
Get Wireless	0.26%	2
Gisborne.net.nz	2.44%	27
Gravity Internet	0.26%	3
Inspire	6.02%	70
Kai Tel	0.09%	1
Keryx	0.17%	1
Kiwi Internet and IT	0.44%	1
Lightwire	5.23%	60
martinborough.net.nz	0.09%	1
Mercury	0.09%	1
NetSpeed	3.31%	38
Orcon	0.17%	2
other	2.62%	34
Primo	2.18%	25
RexNetworks	0.09%	1
Rural wireless	0.17%	1
Scorch	0.61%	7

Who is your internet service provider?	%	Count
Slingshot	0.96%	9
Spark / Skinny	26.42%	303
Starlink	5.32%	61
TPNET.NZ	0.44%	5
Trustpower	0.35%	3
Uber Group	0.96%	11
Ultimate Broadband / UBB	2.27%	26
Unifone	1.22%	14
Unwired	0.09%	1
VelocityNet	0.78%	9
Verifast	0.09%	1
Vetta	0.09%	1
Vocus	0.09%	1
Vodafone / Farmside	19.88%	228
Voyager	0.09%	1
Wanna Internet	0.09%	1
WheroNet	0.09%	1
Wifi Connect	0.09%	1
Wireless Dynamics	1.05%	12
Wireless Nation	1.05%	12
wireless web	0.09%	1
WIZwireless	2.09%	24
Yonder Wireless	0.26%	3
yrless	2.88%	33
Zelan	0.09%	1
Mercury bundled (Trustpower and mercury)	0.44%	4
2 degrees bundled (Vocus, Slingshot, Orcon, 2Talk, and 2degrees)	2.18%	23
WISPAs bundled (excludes Lightwire)	39.15%	439

Appendix 1 Table: Full list of internet service providers

0800
327
646 | **FED**
FARM
.ORG.NZ