

TIAKINA TE TAI AO OUR SUSTAINABILITY MONITORING REPORT

JUNE 2020

*Manaaki taiao,
Manaaki tangata,
Haere whakamua*

*Care for the environment,
care for people,
go forward*

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FOREWORD

Aotearoa New Zealand and the world is at a turning point. We need to move rapidly to decarbonise transport, while making sure we have safe, inclusive and effective transport options. This is a complex challenge and at Waka Kotahi we are pushing ourselves to think differently about it. We are committed to leading alongside our partners and finding creative solutions together.



We are moving at pace on our sustainability journey and the actions outlined in Toitū Te Taiao, our Sustainability Action Plan, are well underway. As we undertake this journey, we need to know whether we're on the right track. This report - Tiakina Te Taiao - is the baseline to understand where we are now and help us to make informed decisions going forward. It's an important first step to make sure that what we're doing is worthwhile and will achieve the outcomes we're all seeking for a sustainable Aotearoa New Zealand.

I'd like to look back and say we really made a difference - that we played our part by giving people safe and healthy travel options and built a better future for the next generations by caring more for people, places and the planet.

Welcome to Tiakina Te Taiao - our first sustainability monitoring report.

Nicole Rosie
Chief Executive

***Tuia ki te rangi,
Bind the domain of the sky,
Tuia ki te whenua,
Bind the domain of the land,
Tuia ki te moana,
Bind the domain of the ocean,
Tuia ki te here tangata,
Interlaced by threads of
human love and compassion,
Ka rongo te pō,
Let peace abound
throughout the night,
Ka rongo te ao,
And the light of day,
Tīhei mauri ora!
Behold the breath of life!***

EXECUTIVE SUMMARY

Waka Kotahi NZ Transport Agency is pleased to present Tiakina Te Taiao, our first sustainability monitoring report. Tiakina Te Taiao translates to 'protecting the environment' and reflects the commitment we have made to monitoring and reporting our progress towards a low carbon, safe and healthy land transport system.

Tiakina Te Taiao is a companion document to Toitū Te Taiao - Our Sustainability Action Plan, which was released in April 2020 and supports Arataki, our ten-year plan. Our goal is to create a sustainable transport system across all modes to better manage urban growth, reduce harms to people and the environment, and introduce improvements offered by new technology. Toitū Te Taiao supports this by setting out the actions we will take to tackle climate change, improve public health and create a sustainable land transport system.

Land transport contributes around one fifth of greenhouse gas emissions in New Zealand. The greatest emissions are from the light vehicle fleet, even though heavy vehicles emit more for each kilometre they travel. Nationally, total rural emissions are similar to total urban emissions, although in Wellington and Auckland urban emissions are greater.

Waka Kotahi and its' partners have increased walking and cycling infrastructure, which has led to more cycle trips into central city areas like Auckland, Wellington and Christchurch. Despite the increasing use of public transport, access to and use of public transport is generally low and three quarters of trips in Aotearoa New Zealand occur in private fossil-fuelled vehicles. Keeping Cities Moving is our plan to improve travel choice and reduce car dependency, and ultimately also reduce emissions and improve public health.

Transport system impacts on people and the environment frequently occur in urban areas. Emissions from individual vehicles have reduced over time, but this gain has been largely offset by an increase in vehicle travel. Road traffic noise affects many New Zealanders who live or work near busy roads.

TIAKINA TE TAIAO SNAPSHOT

- » **Greenhouse gas (CO₂) emissions** from road transport **increased to 11,700 kilotonnes** in 2018 and 55% of the emissions were from urban areas.
- » More people using public transport contributes to the environmental and safety outcomes we seek. **26% of people** in urban areas live near a **frequent public transport service**
- » Electric vehicles are an important part of a sustainable future and reducing range anxiety encourages uptake. **96% of the state highway network is now within 75 kilometres of an electric vehicle** public charging station.

Around one fifth of the state highway network passes through areas with biodiversity values and this is an opportunity for Waka Kotahi to support high value indigenous biodiversity. Going forward we will develop measures to track the transport sector impact on biodiversity and water quality.

Waka Kotahi plans to improve resource and energy use. We will implement contract provisions and set up systems and processes to collect resource efficiency data, including materials and energy used, waste generated and embedded carbon.

We are committed to improving our corporate sustainability and have plans in place to reduce our emissions, particularly from business travel. We are also making good progress in transitioning our vehicle fleet to electric vehicles, and are looking to rationalise the size of our fleet.

Tiakina Te Taiao establishes our baseline and starts us on the path of measuring progress against the outcomes set out in Toitū Te Taiao. Going forward we will set targets, build on the measures we have and undertake research to better understand and lessen our impacts. We plan to report our progress each year, and this report is an important first step in tracking our sustainability journey.

TIAKINA TE TAIAO SNAPSHOT

- » Air and noise emissions impact adversely on peoples' health. NO₂ concentrations are generally below World Health Organisation (WHO) guidelines, but around **38,000 people are exposed to high levels of traffic noise** in New Zealand.
- » Active travel improves public health and reduces emissions. **12% to 26% of trips** in urban areas are by **walking and cycling**.
- » Using resources more efficiently preserves them for future generations and reduces impacts on the environment. **2.2% of materials used in state highway maintenance contracts in 2019 were recycled**.
- » Waka Kotahi **corporate emissions increased to 5,004 tonnes of CO₂** in 2019, 87% of which were from flights.

ABOUT THIS REPORT

*This report, **Tiakina Te Taiao**, is a companion document to **Toitū Te Taiao** that sets out the Transport Agency's commitment to environmental sustainability and public health in the land transport sector.*

As we see it, there are four big challenges facing the land transport system and Aotearoa New Zealand; reducing land transport greenhouse gas emissions, improving public health, reducing environmental harm and reducing our own corporate emissions. These challenges are a call to action.

Toitū Te Taiao builds on existing good practise and identifies where Waka Kotahi can make step changes to move beyond compliance towards a sustainable land transport system. The work is wide ranging across Waka Kotahi and is relevant to all parts of the business. To tackle the four challenges, Toitū Te Taiao has a work programme comprising six workstreams.

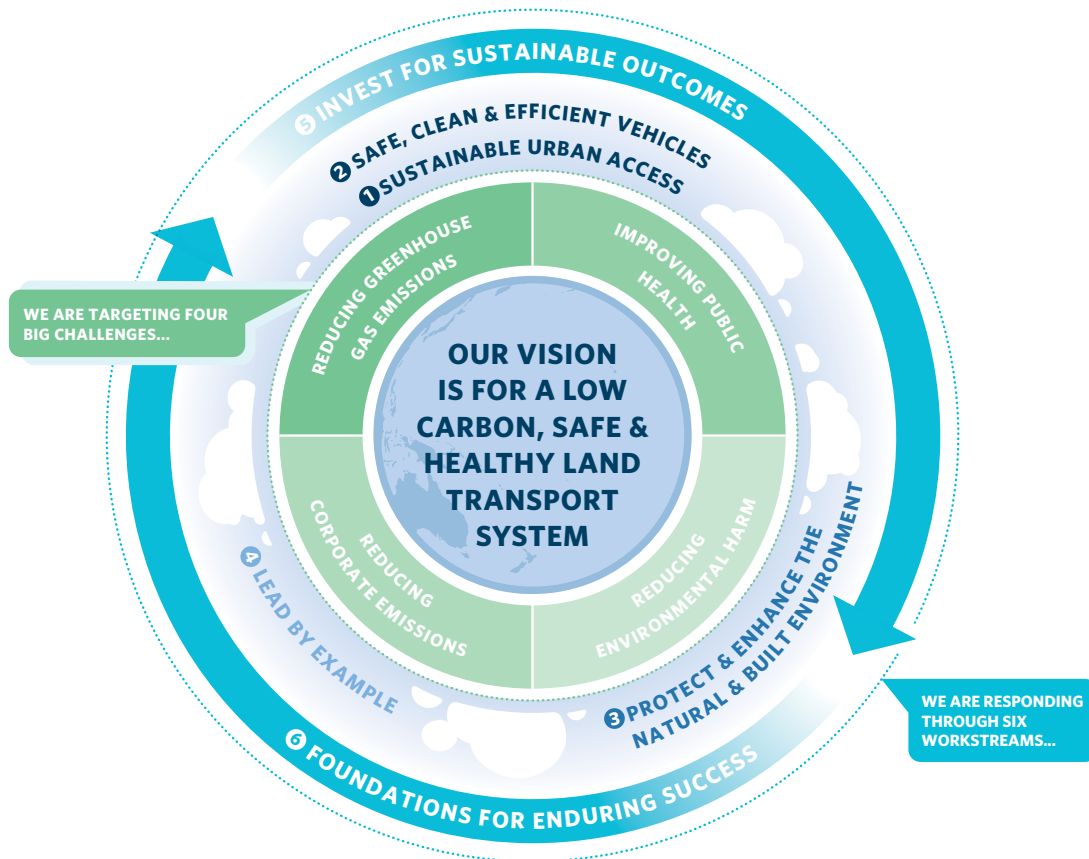
Workstreams one to four focus on the system changes required, while workstreams five and six are cross cutting. Tiakina Te Taiao sits within workstream six, Foundations for Enduring Success.

***Ko te pae tawhiti whāia
kia tata, ko te pae tata
whakamaua kia tina***

***Seek out the distant
horizons, while cherishing
those you attain***



TOITŪ TE TAIAO AT A GLANCE



1 SUSTAINABLE URBAN ACCESS

Using our planning and investment levers to reduce emissions and improve public health through interventions that:

- Avoid or reduce our reliance on travel by car
- Shift people to shared/active or low carbon modes

2 SAFE, CLEAN AND EFFICIENT VEHICLES

Using our regulatory lever to reduce emissions and improve public health through interventions that:

- Improve vehicle fleet efficiency

3 PROTECT AND ENHANCE THE NATURAL AND BUILT ENVIRONMENT

Using our planning, infrastructure management and procurement levers for system-wide environmentally and socially responsible practice.

4 LEAD BY EXAMPLE

Reducing business emissions and modelling sustainable behaviours, internally and externally.

5 INVEST FOR SUSTAINABLE OUTCOMES

Re-calibrating Waka Kotahi planning and investment settings for sustainable outcomes.

6 FOUNDATIONS FOR ENDURING SUCCESS

Establishing the building blocks for enduring success and continuous improvement.

PURPOSE OF THIS REPORT

The purpose of Tiakina Te Taiao is to help Waka Kotahi understand the progress it is making towards achieving the Toitū Te Taiao vision of a low carbon, safe and healthy land transport system by 2050. Measuring and monitoring progress regularly is an essential part of our commitment to caring more for people, places and the planet.

This first report focuses on the four challenges identified in Toitū Te Taiao and establishes our baseline for measuring future progress. It brings together data held by both Waka Kotahi and other agencies, providing a reference point to work from. We have included trend information where possible and summarised the actions we will take to improve our sustainability datasets in future reports.

This is part of a wider work programme Waka Kotahi is undertaking to make sustainable land transport information more easily accessible. Online access and tools are being developed, providing another layer of information to inform decision-making.



WAKA KOTAHI OUTCOMES TO 2050

The diagram below shows our desired outcomes to 2050 in Toitū Te Taiao, which are the initial focus of Tiakina Te Taiao.

REDUCING GREENHOUSE GAS EMISSIONS

- Net zero land transport GHG gas emissions by 2050

IMPROVING PUBLIC HEALTH

- No harm from land transport air and noise emissions
- Land transport supports physically active and healthy travel options

REDUCING ENVIRONMENTAL HARM

- The land transport network is managed to support and enhance indigenous biodiversity
- Water bodies are protected from adverse effects of land transport stormwater run-off
- We use resources and energy sustainably

REDUCING CORPORATE EMISSIONS

- Waka Kotahi is carbon neutral

REPORT LIMITATIONS

Building our baseline

This inaugural report uses 2018 (calendar year) as the baseline¹. Where possible we have included more recent data and, for one or two measures, data from earlier years is provided because underlying research is required to update information. This will be resolved over time, through the Tiakina Te Taiao work programme, as we build the monitoring framework and collect more data.

Data availability

This report discusses the measures Waka Kotahi has data for right now. We already hold information about land transport and its effects on the environment. This includes information about road transport greenhouse gas emissions, the impact of road transport on public health and environmental monitoring data collected from transport projects. We also have some information about resource efficiency and biodiversity, but not at a national level.

The availability and quality of data about Waka Kotahi environmental assets (e.g. noise walls, stormwater treatment systems) and environmental attributes (e.g. low noise pavements, low energy lighting) is variable. Several actions are planned to address this.

¹ Unless specified, all data is by calendar year.

GREENHOUSE GAS EMISSIONS CHALLENGE

Climate change is impacting our planet. Aotearoa New Zealand has signed up to the United Nations Paris Agreement which brings nations together to combat climate change and adapt to its effects. While land transport is part of the problem, it is also part of the solution.

OUR BASELINE

New Zealanders travelled 48.79 billion kilometres on the road network in 2018, emitting a total of **11,700 kilotonnes (kt) of CO₂** during the year. This was a 7 percent increase from 2017.

Limitations

Total emissions are calculated from the vehicle fleet and the use of the road network. This is a different method to the Ministry for the Environment greenhouse gas inventory so the numbers are not directly comparable. This is being reconciled over time. Note also that emissions from energy and materials used in construction and maintenance of road infrastructure are covered under the resource efficiency part of this report.

Mehemea kāore he whakakitenga, ka ngaro ai te iwi

Without vision and foresight, the people will be lost

EMISSIONS

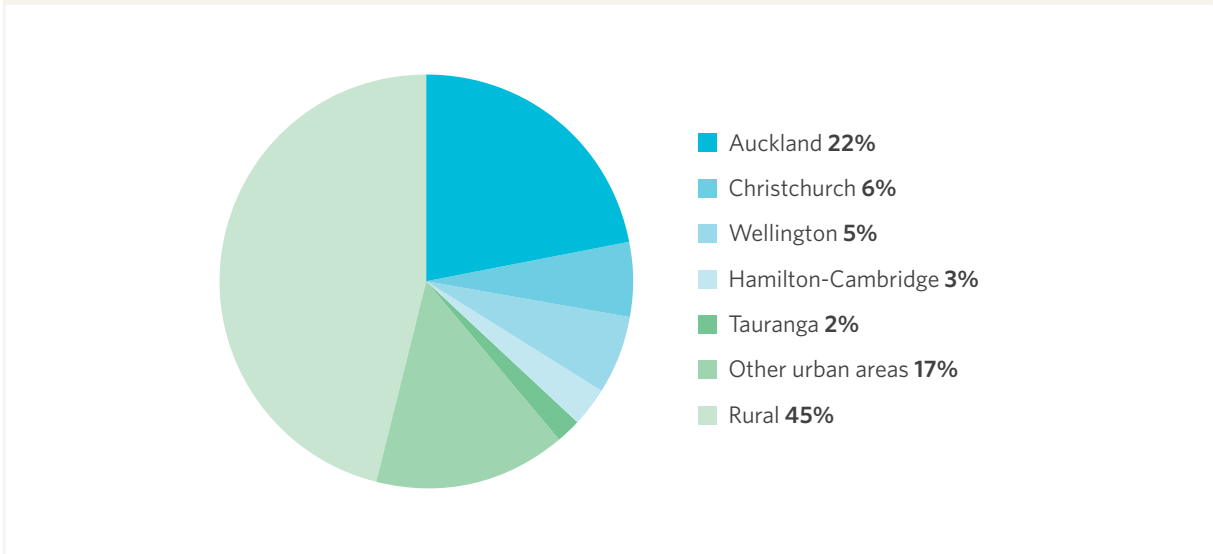
By global standards, Aotearoa New Zealand is a small emitter of greenhouse gases, but our per capita emissions are amongst the highest in the world (MFE and Stats NZ, 2019). In 2018, nearly a fifth of our overall emissions were from transport, with over 90 percent of this coming from road transport. This doubled between 1990 and 2018, largely due to a significant increase in travel. (MoT, 2019)²

Nationally, urban areas contribute around half of our land transport emissions. These emissions are concentrated in the largest urban centres of Auckland, Wellington and Christchurch where a large part of the population lives and where a large portion of economic activity occurs. Transport emissions in the Auckland and Wellington regions are particularly dominated by urban travel.

Rural travel accounts for the remainder of the emissions. and includes a combination of freight, local travel and regional travel. Total emissions from Canterbury and Waikato are high compared to other regions (aside from Auckland), although these emissions are dominated by rural travel. Emissions in the remaining regions tend to arise from rural rather than urban travel.

² Over time emissions will slowly decouple from the amount of travel as EVs become a greater proportion of the fleet.

Figure 1: Source of road transport related CO₂ emissions in Aotearoa New Zealand (source: Waka Kotahi)



Light vehicles are the largest source of emissions nationally, contributing between 60 to 80 percent of the emissions in each region. However, heavy vehicles contribute proportionally higher emissions as they travel less than 10 percent of the total distance travelled by all road vehicles in Aotearoa New Zealand.

Petrol vehicles make up nearly 80 percent of the fleet and contribute just over half of CO₂ emissions overall. Despite being only 20 percent of the fleet, diesel vehicles contribute disproportionality at around 47 percent of the total CO₂ emissions.

Figure 2: Annual CO₂ emissions (kilotonnes) in rural and urban areas compared to total vehicle kilometres travelled (VKT) in 2018 (source: Waka Kotahi)

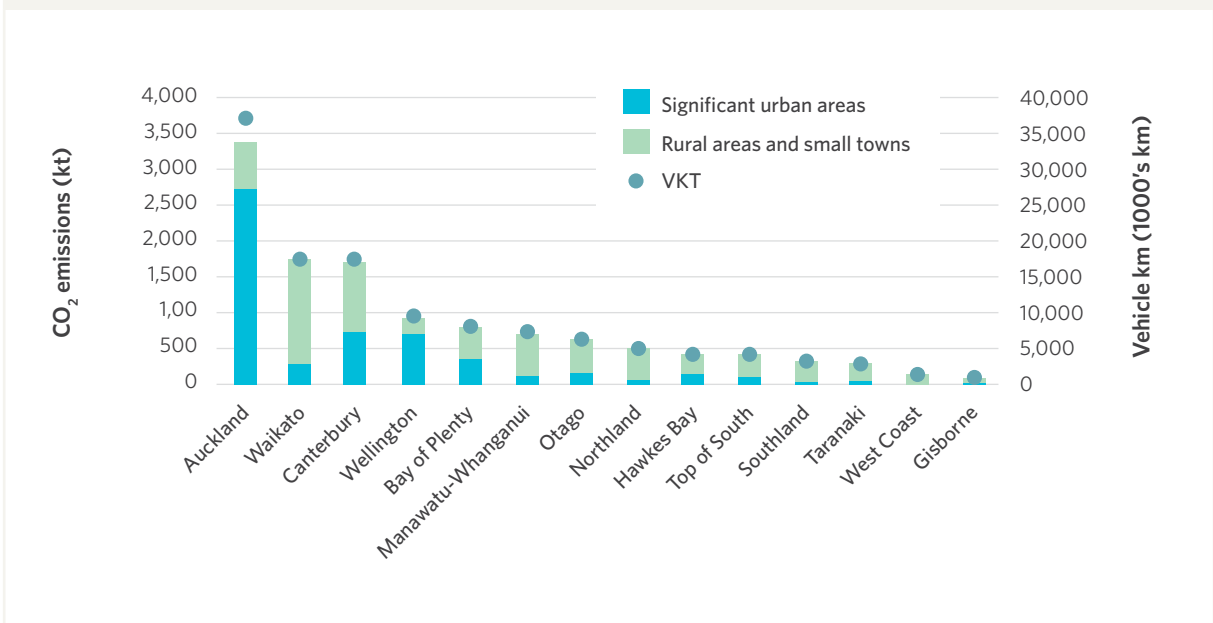
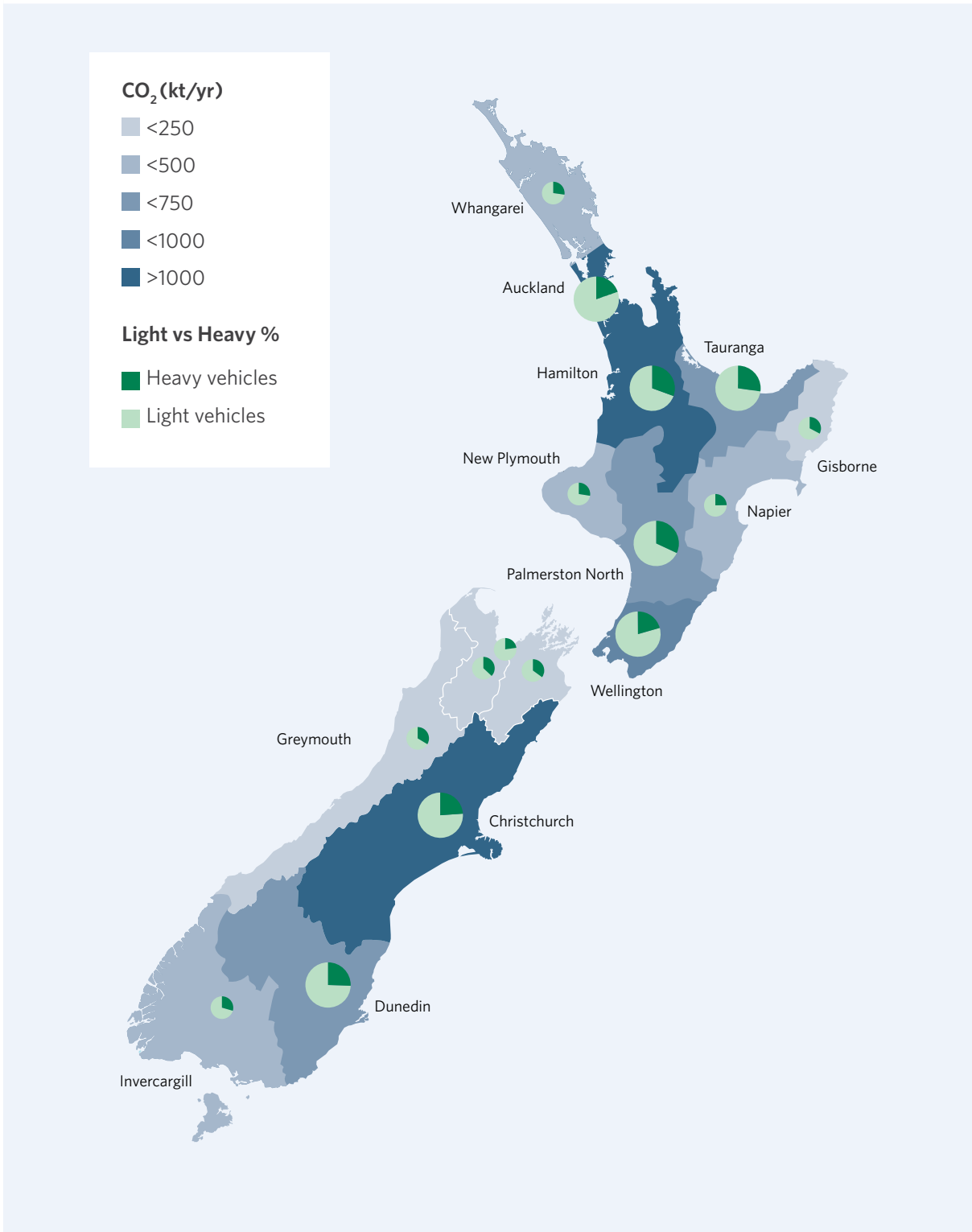


Figure 3: CO₂ Emissions (kt/yr) and proportion from light and heavy vehicles by region in 2018
 (source: Waka Kotahi)



SUSTAINABLE URBAN ACCESS

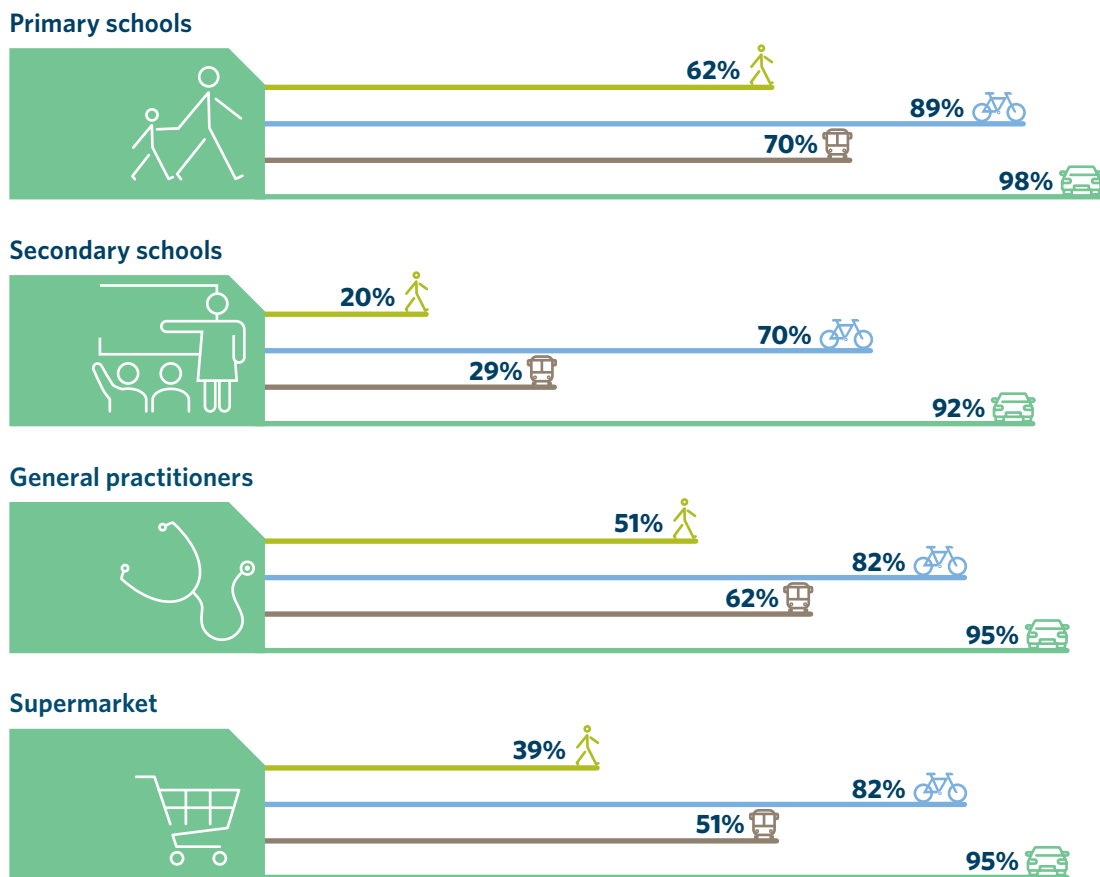
Creating a sustainable land transport system in Aotearoa New Zealand is critical for tackling greenhouse gas emissions. In Toitū Te Taiao, we use the globally recognised framework of Avoid-Shift-Improve to guide how we will do this. Waka Kotahi has a role in each of these components through our planning, investment and regulatory levers and by partnering and influencing.

When urban areas are designed to integrate a range of quality transport options multiple positive outcomes can be achieved, including safer roads, cleaner streets, less greenhouse gas emissions and improved public health. Waka Kotahi is committed to delivering the Keeping Cities Moving plan that aims to take an integrated approach towards shaping urban form, making shared and active modes more attractive and influencing travel demand.

Urban form - avoiding or reducing the need to travel

Urban form - the shape and density of cities and towns - has a significant impact on transport emissions. Compact urban forms have a lower emissions footprint than more sprawling urban forms (OECD, 2020). They enable shorter travel distances that are easier to walk or cycle. Most local destinations in Aotearoa New Zealand are accessible within 15 minutes travel by vehicle, but these destinations are not as easily accessed using other transport options.

Figure 4: Proportion of people in Aotearoa New Zealand within 15 minutes of a destination by mode (2019) (source: Waka Kotahi)



Another indicator of the quality of urban form is the percentage of people living within easy access of fast and frequent public transport services. In March 2019, 26 percent of people living in metropolitan areas in Aotearoa New Zealand had access to a nearby public transport service that ran at least every fifteen minutes during the weekday morning peak, although a much lower proportion had access to services that were this frequent throughout the day. People living in these areas are more likely to use public transport to travel to work, compared with people living outside these areas. There was no change from 2018 and 2019.

Figure 5: Population with access to frequent public transport services in Auckland, Wellington and Christchurch in 2017/2018 and 2018/2019 (source: Waka Kotahi)

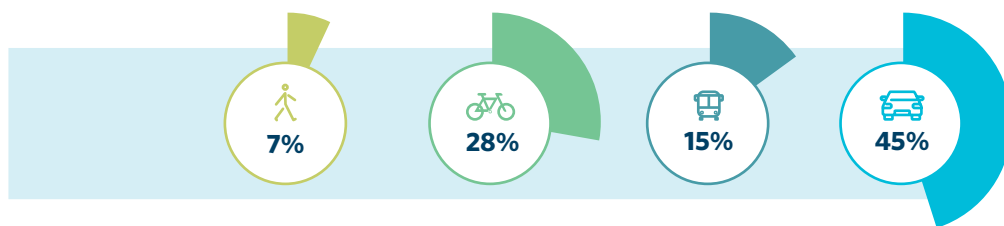


18–30% of people in Auckland, Wellington and Christchurch had access to frequent public transport services during weekday morning peaks in 2018/19

Mode shift - encouraging a move to other forms of transport

Despite the recent growth in public transport, walking and cycling in many urban areas, private vehicle travel is also increasing. Shared and active transport modes do not yet account for a significant proportion of total journeys and Aotearoa New Zealand remains a very car dependent country. We have amongst the highest rate of car ownership in the OECD at 0.8 light vehicles per capita.

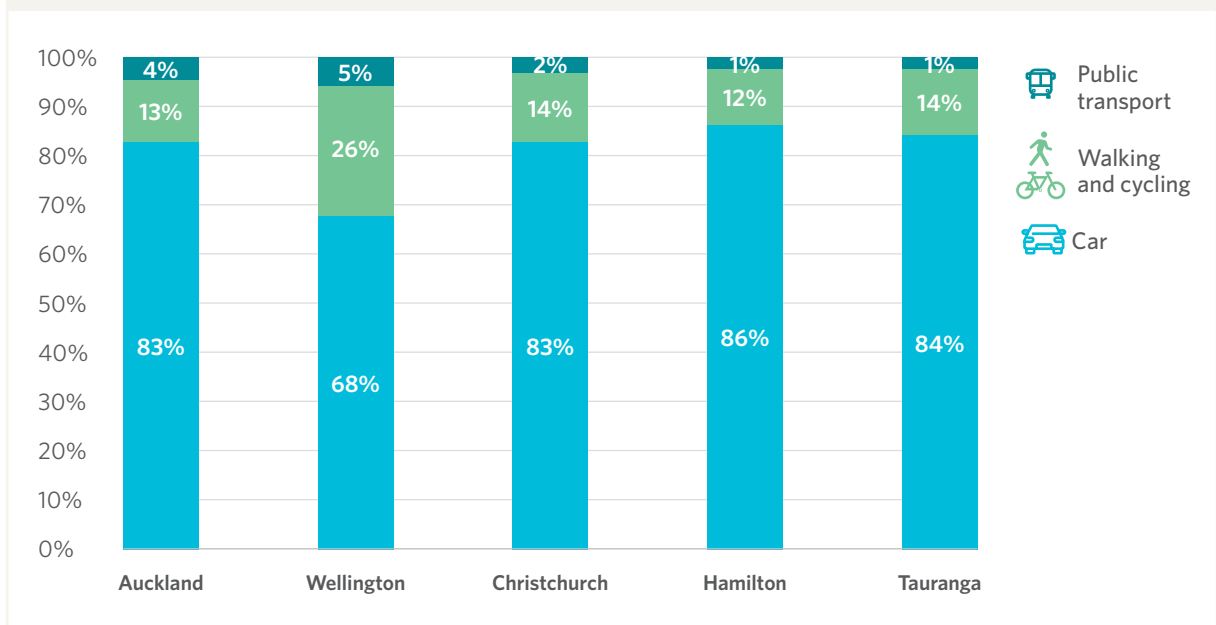
Figure 6: Proportion of jobs within 45 minutes of home (by mode) (April 2019) (source: Waka Kotahi)



The proportion of trips made by public transport, walking and cycling varies between different cities due in part to geography but also different urban planning and transport policies that have been introduced over time. Apart from Wellington, over 80 percent of all trips in our biggest cities are made in a private car.

Reducing emissions requires a substantial shift from travel by car (especially fossil-fuelled cars), to travel by shared or active modes.

Figure 7: Proportion of trips by mode (2015-2018) (source: Ministry of Transport)



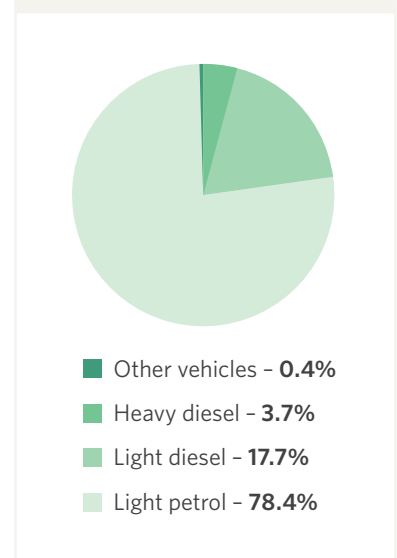
VEHICLES

While urban planning and mode shift are important for reducing greenhouse gas emissions, it is also critical that the national vehicle fleet is decarbonised.

A strong reliance on travel by car and high vehicle ownership is reflected in the size of Aotearoa New Zealand’s vehicle fleet. By the end of 2018 there were 4.3 million vehicles in the fleet (MoT, 2019). A large proportion of the diesel vehicles are light vehicles however heavy vehicles contribute disproportionality higher emissions (producing around a quarter of the emissions nationally). There are few options for moving to low carbon heavy vehicles with the current technologies that are available, but we are working with our partners to improve the public transport bus fleet and are exploring opportunities to work with the freight sector to move to safe, efficient and clean freight vehicles.

Aotearoa New Zealand also had over 11,000 electric and hybrid vehicles at the end of 2018 and now has more than 21,000. Electric vehicles make up less than 1 percent of the fleet and currently have little overall impact on reducing fleet emissions.

Figure 8: Proportion of vehicles by fuel type in 2018. (source: Ministry of Transport)



MAKING SUSTAINABILITY A REALITY



Charging the EV fleet

Waka Kotahi is supporting the uptake of electric vehicles (EVs) by working with key partners to develop a public charging infrastructure for light vehicles.

To encourage New Zealanders to make the switch from fossil fuelled to low emission transport options, in May 2016, the Electric Vehicles Programme was introduced. The programme included an initiative to develop and roll-out a public charging infrastructure.

As part of this programme, Waka Kotahi worked with local and central government agencies, energy companies, technology providers and the motor industry develop national guidance for charging operators. This has led to the development of a resilient network of chargers that are smart, plug-type standardised, and remotely monitored by the operator and/or energy supplier.

Despite having good coverage across the state highway network, we were conscious that range anxiety was a factor for people driving EVs or thinking about making the switch. So, we led the development of EVRoam.

EVRoam is a cloud-based database that pulls real time information about EV sites and pushes this out to a wide range of customer-facing websites, apps and maps such as our Transport Agency Journey Planner. The database gives drivers surety about the charging network, such as where they can find safe, reliable stations. It also helps charging operators promote their sites.

We believe this is a world first. No other country has developed a single source of truth about charging infrastructure availability, supported by government and developed with the goodwill of energy suppliers and charging operators. And all designed to encourage the uptake of EVs!

96%
of the State Highway
network was within
75km of an EV
charging station by
the end of 2019

NEXT STEPS FOR TACKLING THE GREENHOUSE GAS CHALLENGE

Keeping Cities Moving is our plan to improve travel choice and reduce car dependency, and ultimately also reduce emissions. It focuses on urban form, making shared and active modes more attractive, and influencing travel demand and travel choices. Toitū Te Taiao supports this with actions to use our planning and investment levers to rethink how cities manage growth and transport modes, to work towards a low carbon future. It also supports actions to work with others so New Zealanders can make the switch to low carbon transport options. Tiakina Te Taiao will monitor progress against these actions.



TOITŪ TE TAIAO

ACHIEVING
OUR OUTCOMES

- Define a strategic position on urban form and transport for low carbon and safe accessibility.
- Define the urban form and mode shift contribution to reducing emissions.
- Support investigation of social leasing of safe and clean vehicles for low income households.
- Explore opportunities to reduce in-service fleet emissions
- Partner to decarbonise the public transport bus fleet
- Build consumer knowledge and confidence to purchase and use EVs
- Gear up to administer the Government's clean car reforms when approved



TIAKINA TE TAIAO

MEASURING
OUR PROGRESS

- Improve GIS models for estimating greenhouse gas emissions from road transport
- Develop measure for CO₂ emissions by journey purpose
- Revise measure and target for public EV charging

PUBLIC HEALTH CHALLENGE

How Waka Kotahi shapes and invests in the land transport system has a critical role in public health outcomes. It affects the levels of air pollution and noise that people are exposed to and their ability to be active on a daily basis.

Greenhouse gas emissions and public health outcomes are closely connected. When there is reduced reliance on private vehicles, increased public transport use, walking and cycling, we reduce greenhouse gas emissions. We also benefit by having cleaner air, quieter and safer streets and improved wellbeing and health.

OUR BASELINE

Noise

38,000 people were assessed as exposed to high levels of road traffic noise in 2017.

Air quality

Nitrogen dioxide (NO₂) emissions from the road transport system increased by 6 percent from 2017 to 2018 and PM_{2.5} emissions reduced by 3 percent.

- **NO₂: 7.3 kt/yr in 2018**
- **PM_{2.5}: 1.7 kt/yr in 2018**

Cycling

Cycling trips into the central business districts of Auckland, Wellington and Christchurch grew by 14 percent between 2015 and 2019, with **6,238 trips** taken in 2019.

Limitations

Noise: High noise levels are road traffic noise levels above 64dB L_{Aeq} (24hr). Health impacts are known to occur above these levels.

Walking and cycling: These cycle counts are from local council cordon counts and are not from continuous data. To generate this data, councils counted cyclists traveling into the Central Business District (CBD) for one weekday and one weekend day in March, from 2015–2019.

He waka eke noa

*A canoe we are
all in together*

NOISE AND AIR QUALITY

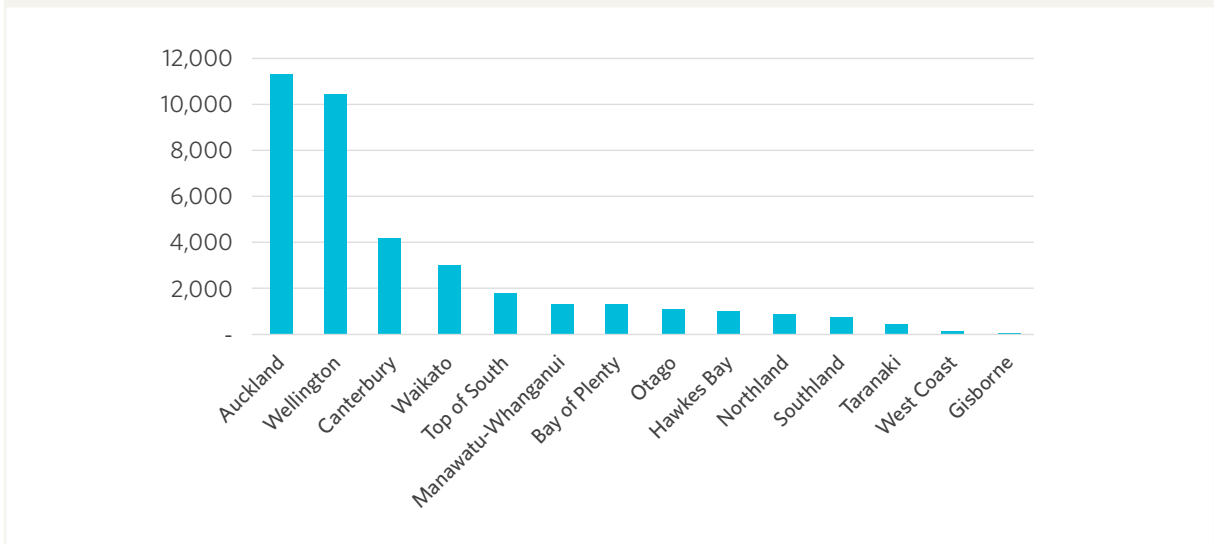
Road traffic is one of the biggest causes of community noise in most cities and land transport can be a significant contributor to local air pollution. Exposure to high noise levels and air pollution is linked to both short and long-term health conditions.

Waka Kotahi has a range of policies, guidance, specifications and tools in place for assessing and managing road transport related noise, vibration and air emissions. We also administer rules for vehicle noise and air emissions and manage compliance to confirm that vehicle regulations are met (i.e. entry certification, warrant and certificate of fitness).

Noise

Road transport noise and vibration can come both from construction and maintenance activities and from normal use of the road. Exposure to road traffic noise, which occurs continuously over a long period, is more likely to cause health impacts than most short-term construction and maintenance activities.

Figure 9: Number of people exposed to high (>64 dB L_{Aeq}(24hr)) road traffic noise in 2017 (source: Waka Kotahi)

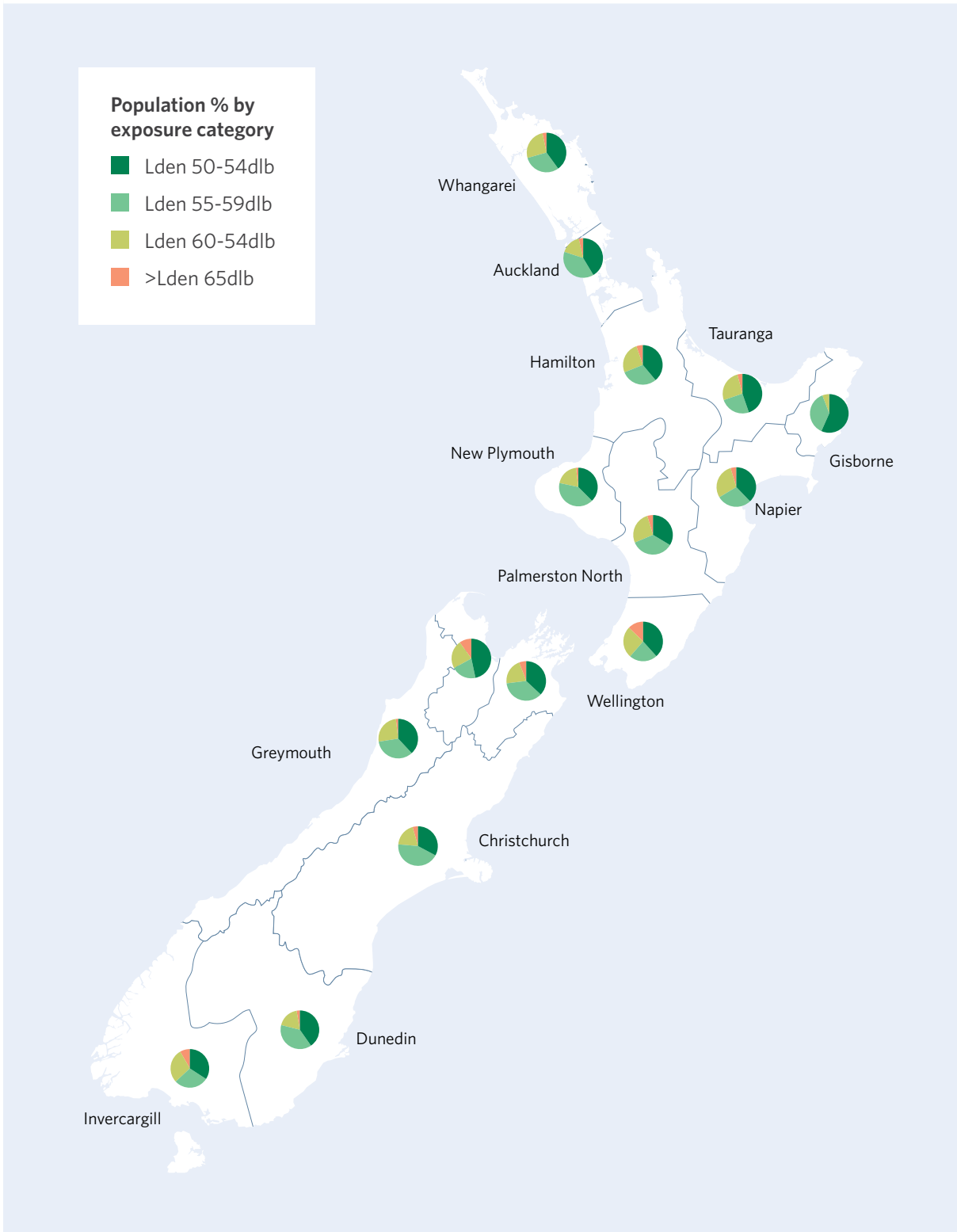


Approximately 38,000 people are exposed to traffic noise levels above 64dB L_{Aeq} (24hr)³ from state highways and local arterial roads in Aotearoa New Zealand. Auckland, Wellington and Christchurch have the greatest number of people experiencing these noise levels, followed by Hamilton. More than 500,000 people are exposed to potentially unhealthy noise levels if we apply health-based criteria from the World Health Organisation (WHO).

Waka Kotahi has commissioned research on the social costs of land transport noise which will give us a more accurate view of this issue. In addition, the proposed noise remediation programme signalled in Toitū Te Taiao for the state highway network will benefit people who are exposed to high noise levels from state highways.

3 This is guidance we use to protect people from land transport noise from new transport infrastructure in Aotearoa New Zealand (refer to NZS 6806). In this report noise levels are presented as an average noise level over a 24-hour period (dB L_{Aeq} 24hr) and as the 'day-evening-night' noise level (dB Lden). The average noise level is commonly used for road-traffic noise in Aotearoa New Zealand and is relatively straightforward to calculate. Internationally the Lden is usually used for road traffic noise, it is more difficult to calculate but is more representative of the impact of noise on people's wellbeing.

Figure 10: Proportion of people exposed to different road traffic noise levels in Aotearoa New Zealand in 2017 (source: Waka Kotahi)



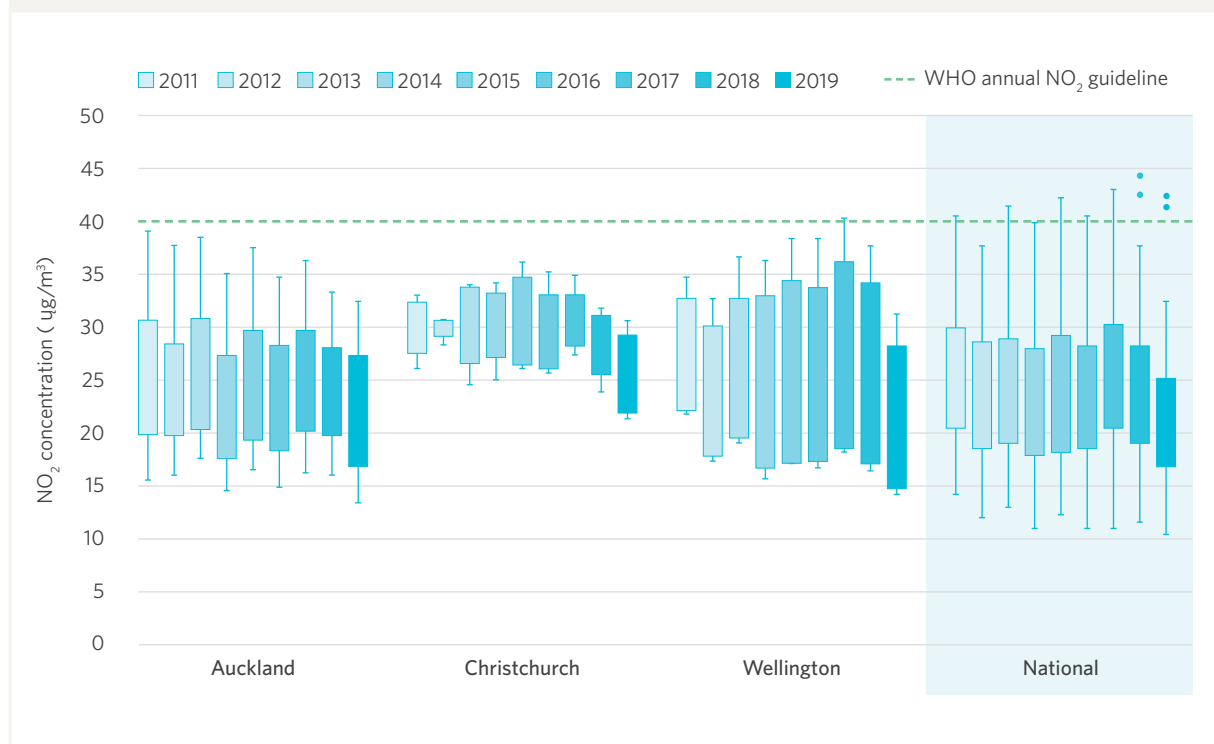
Air quality

Air pollution from road transport includes vehicle emissions, construction and maintenance activity emissions, and road dust. The main concern in Aotearoa New Zealand is fine particles and oxides of nitrogen emitted from vehicles (mainly tailpipe emissions) in urban areas. Air pollution tends to be higher along busy or congested roads, which can be made worse when wintertime inversions trap pollutants close to the ground.

Young children, older people and people with existing health conditions are more vulnerable to the health effects of air pollution. Transport related fine particles are estimated to shorten the lives of around 250 New Zealanders each year (Kuschel, 2012)⁴.

The highest emissions are in larger urban areas, as is the case for greenhouse gas emissions. Vehicle emissions make up about 40 percent of total NO₂ emissions and around 9 percent of PM_{2.5}⁵ emissions throughout the year. Domestic home heating is the largest source of fine particle emissions, particularly during wintertime, but land transport is a larger contributor in Auckland (around a third of annual PM_{2.5} emissions).

Figure 11: Annual average nitrogen dioxide concentrations (source: Waka Kotahi)

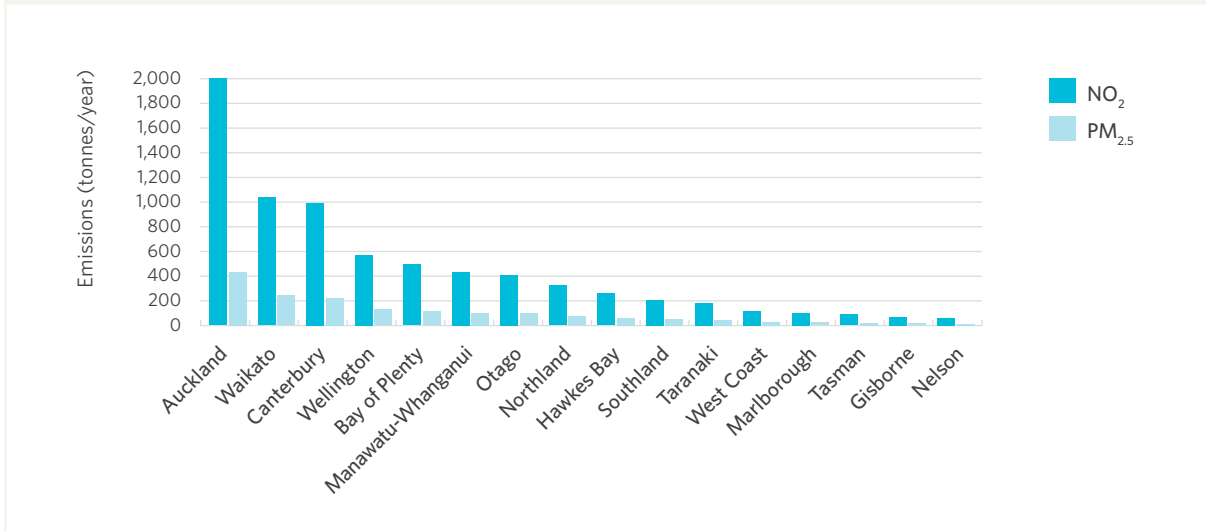


NO₂ concentrations have reduced slightly over time and are usually below WHO annual air quality guidelines. Emissions coming from individual vehicles have reduced as vehicle engine technology and fuels have improved but the benefits of these improvements have been largely offset by increases in total vehicle travel.

4 Waka Kotahi, in collaboration with the Ministry for the Environment and the Ministry of Transport is contributing towards updating HAPINZ (Health and Air Pollution in NZ), which will provide updated health statistics and estimated costs from air pollution in NZ.

5 Fine particles are particles that less than 2.5 micrometres in diameter. They can come from both tailpipe and non-tailpipe (brake and tyre wear, road surface wear) sources.

Figure 12: Total emissions of PM_{2.5} and NO₂ from vehicles in Aotearoa New Zealand (2018)
(source: Waka Kotahi)



Over time, total NO₂ and PM_{2.5} tailpipe emissions will reduce as the vehicle fleet becomes cleaner but emissions of particles from brake and tyre wear of all vehicles, including EVs, will continue to be an issue unless we reduce vehicle travel. This impacts local air quality and water quality, when fine particles settle onto the ground and run off into waterways. It reinforces the benefits of shifting to other transport options, such as public transport, walking and cycling.

In rural settings, dust from unsealed roads is the primary air quality issue. While the numbers of people living or working along these roads is low, the impacts can be significant. Less than 2 percent of vehicle travel is on the 31,500 km of unsealed roads in Aotearoa New Zealand but heavy vehicles in some areas, particularly near rural lifestyle blocks, create adverse impacts. We are supporting our local government partners with targeted funding assistance to reduce the impacts of unsealed road dust in some regions.

ACTIVE TRANSPORT

Enabling more people to safely use active modes of transport, such as walking and cycling, contributes to better public health outcomes through increased physical activity (WHO, 2018).

Waka Kotahi is committed to improving public health by providing safe spaces for people to walk and cycle. Investing in a range of reliable transport options, like active alternatives, ensures people have travel choices when they want to get to work, catch up with whānau and friends, connect with their community and access services.

The Urban Cycleways Programme accelerated delivery of cycling networks in our main urban centres and incentivised our partners to increase their investment in cycling and walking projects. The investment also supports community education and promotion of walking and cycling. Since 2015, over 320 kilometres of cycling infrastructure has been built as part of this programme.

Figure 13: Total kilometres of cycle ways in Aotearoa New Zealand (2018) (source: Waka Kotahi)

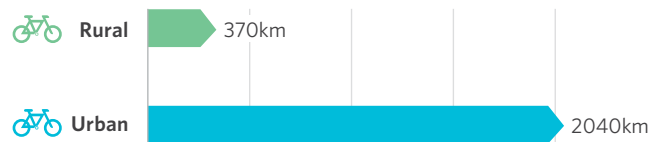
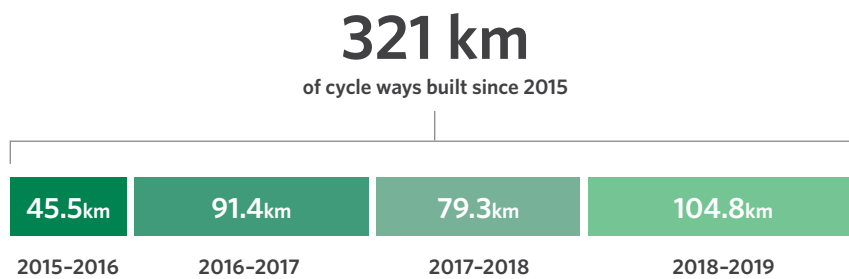


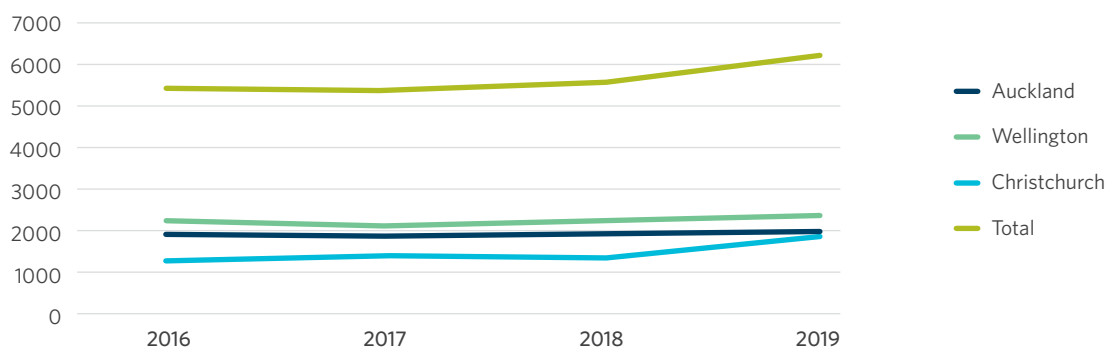
Figure 14: Kilometres of cycle paths built from 2015–2019 (financial years), as part of the Urban Cycleways Programme



Councils use annual cycle cordon counts to monitor the outcome of this investment and track cycle activity. Between 2015 and 2019, there was an average 14 percent growth in morning peak cycle trips into Auckland, Wellington and Christchurch central areas.

Continuous cycle counts give a much better indication of trends and by 2019 there were over 260 permanent-continuous cycle count sites in Aotearoa New Zealand. We are working with District and Regional Councils to develop a National Active Mode Counter Database to collate cycle and pedestrian counts into one central hub. From this we will be able to establish a national baseline for walking and cycling use, measure progress and analyse trends at a regional and national level.

Figure 15: Number of morning peak cycle trips (cordon counts) into Auckland, Wellington and Christchurch central business areas (source: Auckland Council, Christchurch City Council and Wellington City Council)



MAKING SUSTAINABILITY A REALITY



Reducing road noise

Low noise road surfaces and noise walls reduce the impacts of road transport noise on communities. At higher speeds road traffic noise is mainly from tyres moving along the road surface⁶, even though noise from individual vehicles can be annoying.

The Transport Agency's state-of-the-art road research centre in Christchurch, the Canterbury Accelerated Pavement Testing Indoor Facility (CAPTIF), tests 20 years of road surface wear in a matter of months and is delivering benefits for more than just average road surface life.

Our internationally recognised pavement and noise research programme is showing promising results that will deliver multiple outcomes: improving public health by reducing noise, being more environmentally sustainable by reducing waste and the need for virgin materials and creating more value for money. A small chip epoxy-modified porous asphalt (called EPA7) recently developed by CAPTIF has produced consistently quieter results and is being investigated further.

Across the state highway network in Auckland, Hamilton, Wellington and Christchurch we are now using a long-life low noise surface using epoxy-modified asphalt. CAPTIF tests suggest that this can extend the average life of porous asphalt surfacing from 8 years to 40 years, reducing ongoing maintenance and material costs.

Separating the source of transport noise from sensitive activities and mitigating noise effects will continue to be important for reducing impacts over the long term. The types of innovations like those being developed at CAPTIF show the types of win-win outcomes that are possible.

1,007 km
of low noise surface
on state highways
This represents 9%
of the state highway
network

⁶ While electric vehicles have little or no engine noise, they do cause road surface noise. Therefore, even when we have more electric vehicles in the future, this is unlikely to reduce traffic noise from roads.

NEXT STEPS FOR TACKLING THE PUBLIC HEALTH CHALLENGE

The focus over the coming year will be to improve walking and cycling measures and to better understand the health benefits and costs from the land transport system. This will help inform decision making on mode shift plans and other sustainable urban transport interventions.



TOITŪ TE TAIAO

ACHIEVING
OUR OUTCOMES

- Deliver the noise remediation programme (as funding allows)
- Define a strategic position on urban form and transport for low carbon and safe accessibility.
- Define the urban form and mode shift contribution to reducing emissions.
- Explore opportunities to reduce in-service fleet emissions
- Build consumer knowledge and confidence to purchase and use EVs



TIAKINA TE TAIAO

MEASURING
OUR PROGRESS

- Improve GIS models for estimating emissions and exposure to land transport air and noise emissions
- Improve walking and cycling measures
- Support research on health impacts and social costs of land transport noise and air emissions
- Develop methods for assessing health benefits of active modes
- Develop measures for health benefits of active modes
- Encourage Approved Organisations to collect walking and cycling data

ENVIRONMENTAL HARM CHALLENGE

The national road network is 94,000 kilometres long, of which 11,000 kilometres are state highways. This presents a unique opportunity to shape the land transport system to support positive outcomes for both the natural and built environment.

OUR BASELINE

Resource efficiency

Recycled materials made up 2.2 percent of the materials, or **15,000 tonnes**, used in our maintenance contracts, in 2019.

Compliance

Waka Kotahi complied with **93 percent** of its' environmental consent conditions in the first quarter of 2020.

Limitations

Resource efficiency: Includes recycled materials used in resurfacing and rehabilitation maintenance projects. National information on recycled materials used in capital projects is not yet available.

Compliance: The percentage above includes both compliant conditions and conditions that have not yet been actioned. It excludes administrative permit conditions. This is the first time we have reported against environmental consent conditions alone. We were not able to retrospectively get equivalent data for previous years and have therefore reported the position as of the end of March 2020.

Biodiversity and water: We are not able to nationally report on biodiversity and water measures currently.

*Te toto o te tangata,
he kai, te oranga o te
tangata, he whenua
me te wai*

*While food provides
the blood in our
veins, our health is
drawn from the land
and water*

BIODIVERSITY

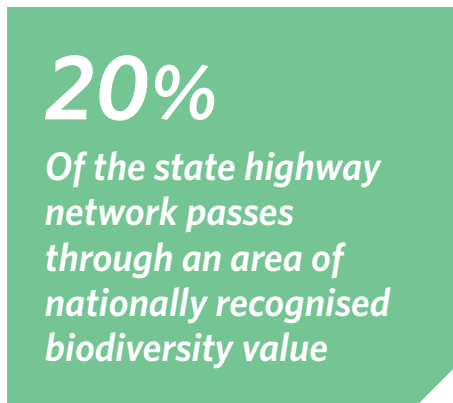
Biodiversity is fundamental to life. In Te Ao Māori (a Māori world view) people, plants and animals are all descendants of Ranginui (the sky father), and Papatūānuku (the earth mother) and their children, which means humans are intrinsically linked with biodiversity. Aotearoa New Zealand is also considered a ‘biodiversity hotspot’ with over 52,000 indigenous species only found here.

The land transport system traverses many sensitive habitats, so Waka Kotahi has a role in supporting high value biodiversity. The linear transport corridor network interacts with biodiversity intimately. More than 2,100 kilometres or 19.5 percent of the state highway network adjoins or passes through biodiversity areas (including terrestrial and wetland areas) identified on national databases.

Waka Kotahi infrastructure activities potentially affect biodiversity, with around 70 percent of ‘active’⁷ capital projects in 2019 having some level of impact on biodiversity values (e.g. by removing or damaging vegetation in areas of biodiversity significance and altering streams and wetlands).

Land transport corridors can assist biodiversity though harbouring indigenous species in highly developed landscapes and connecting otherwise isolated natural areas.

Existing and new road corridors can be managed to protect or enhance biodiversity values by undertaking activities such as weed control, reintroducing uncommon species of plants, providing new habitats (e.g. vegetation planting), restoring existing important biodiversity values and allowing for connectivity for important species. For example, many native freshwater fish need to travel between fresh water and the sea to complete their lifecycles. State highway structures can impede this movement in natural waterways but with appropriate design or by retrofitting existing culverts we can help fish to pass through.



⁷ Projects that had consents granted in 2019 (or prior) and were not yet operational, and construction may be underway.

MAKING SUSTAINABILITY A REALITY



Abseilers supporting conservation efforts as part of the Kaikōura response

Protecting our threatened species

Biodiversity is at the heart of our identity in Aotearoa New Zealand. It is the backbone of our economy, lifestyle and culture. Māori are interconnected with the natural environment. As kaitiaki, Māori have a unique and important role in the protection, management, conservation, enhancement and restoration of indigenous biodiversity. This role is flowing into the way we protect biodiversity, at Waka Kotahi.

The scale of damage to State Highway 1 and the parallel rail network, from the Kaikōura Earthquake was unprecedented. Despite the scale of the subsequent recovery operation, even the smallest of impacted species, were carefully considered in the response.

The Ōhau Rock Daisy, a species of Marlborough rock daisy, is only found growing at Ōhau Point, north of Kaikōura, but the population was decimated by the 7.8 magnitude earthquake. A collaboration between the Department of Conservation and the North Canterbury Technology and Infrastructure Recovery Group (NCTIR) has saved the species and supported the regeneration of the area.

Efforts to save this species involved abseilers scaling the cliff face and retrieving seeds from six of the remaining plants that were then germinated by a Nelson based native plant nursery.

Almost four years on the propagated rock daisy plants have a new home. Some have been successfully transplanted to one of many stopping areas created along this roading corridor while some have been replanted back on the Ōhau Point cliffs.

Water quality

Water quality is an important issue for Aotearoa New Zealand and poor water quality can have both short- or long-term effects on aquatic biodiversity, public health and recreation.

In Aotearoa New Zealand, the most significant transport related contaminants for water quality are sediment, hydrocarbons and metals (MFE & Stats NZ, 2019). Potential sources include surface water pollution from road surface run-off or spray, accidental spillage, ground water pollution from soakaways discharge, disturbance of contaminated land and working in stream beds. Erosion from construction activities, as well as stockpiling of materials, can cause sediment discharge to surface water.

Waka Kotahi manages impacts in different ways depending on the activity. During construction we put erosion and sediment control measures in place. Methods used to manage road contaminant discharges during operation can include stormwater swales, engineered wetlands and more traditional stormwater treatment systems. Their effectiveness (and therefore risk to water quality) depends on the initial design and ongoing regular maintenance.

We commissioned work to look at the risk to aquatic biodiversity posed by stormwater runoff from road transport and urban sources. This showed that while transport is a known local contributor to poor water quality, pollution from other sources can often be more significant. In every region and nationally the estimated risk from discharges to streams from urban areas is greater than from transport (Semadeni-Davies & Moores, 2020)⁸.

Of the streams that are downstream of a state highway, roughly one sixth (17 percent) of the total length of the streams is in the highest-risk category due to both transport and urban sources. However, less than two percent (1.5 percent) of that total length is in the highest risk category due to a state highway alone.

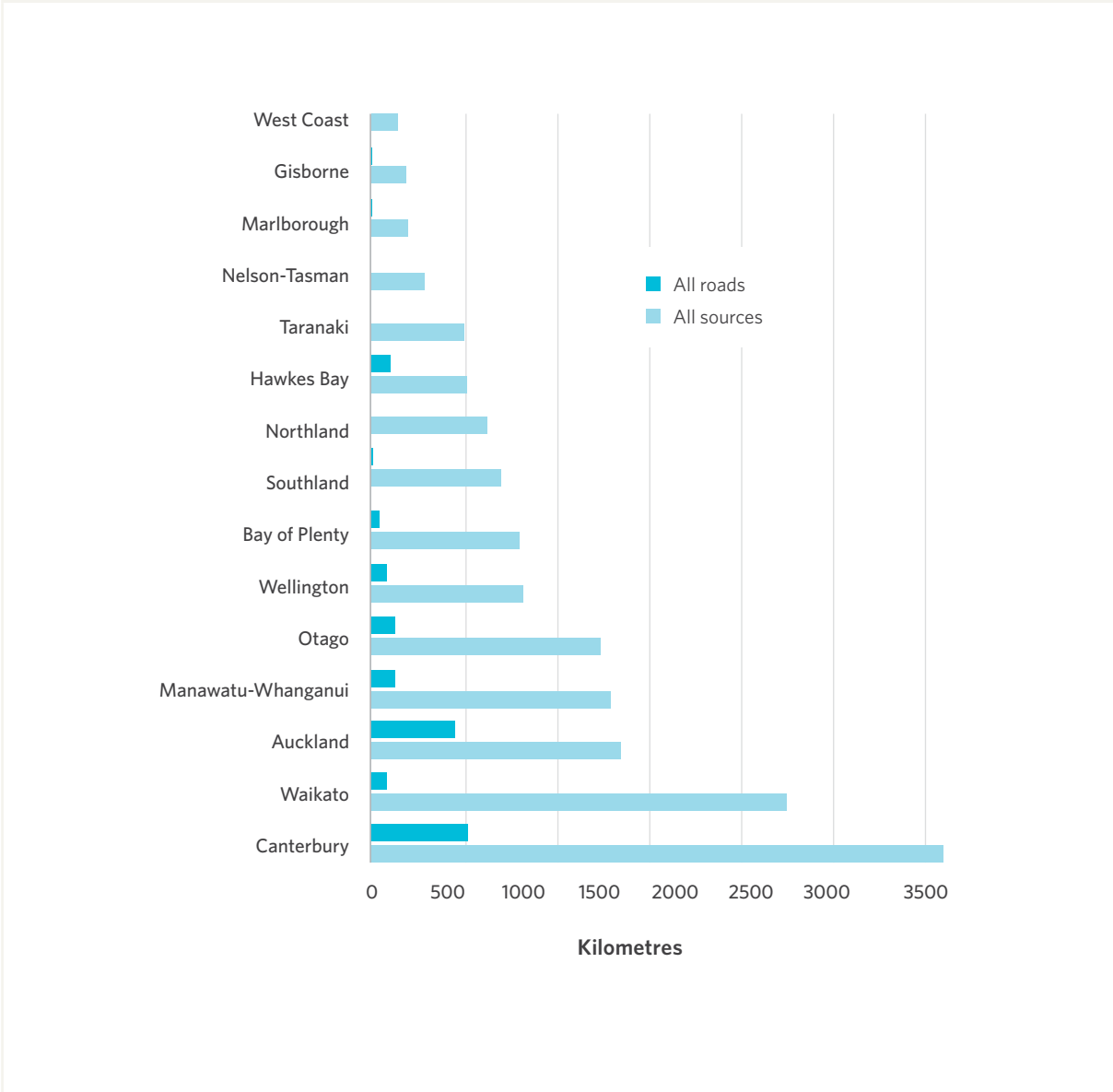
The risk of poor water quality associated with runoff from the state highway network is far greater in the larger urban centres (for example Auckland and Christchurch). This is due to the higher density of the roading network and greater vehicle numbers.

If possible, we will capture actual stormwater treatment infrastructure in future updates⁹ and use this information to screen potential water quality impacts from new projects/major interventions and prioritise collecting information about the impact and effectiveness of treatment systems.

⁸ Relative risk was evaluated using estimated zinc and copper loads in stormwater runoff together with the sensitivity of the receiving environment (i.e. Macroinvertebrate Community Index for streams, or the amount of sediment trapping in coastal reaches). It does not include risk from construction or maintenance of the transport network.

⁹ In the NIWA model, roads in urban centres were assumed to be drained via catch pits, while road runoff in rural areas was assumed to infiltrate soils. Stormwater treatment is often better than this and the risk is likely to be lower.

Figure 16: Comparison of the length of streams that are at high risk from all upstream water pollution sources and from road transport pollution sources alone (source: Waka Kotahi)



RESOURCE EFFICIENCY

Using resources in efficient and sustainable ways can reduce environmental impacts, relieve demand for virgin materials, reduce waste and reduce costs.

The land transport system is heavily resource dependent with virgin materials, fossil fuels and energy all being consumed in large quantities.

In 2019, at least 15,000 tonnes of recycled material was used in maintenance projects, which was about 2.2 percent of the total materials used in paving and surfacing that year. Over the last three years between 2 and 3 percent of total materials used for maintenance and renewal projects came from recycled sources. This includes recycled materials from asphalt pavements, melter slag and marginal aggregate materials.

Carbon footprints have been undertaken for some Waka Kotahi construction and maintenance projects. These identified the most significant carbon emissions sources to be fuel (mainly diesel), concrete (and cement), steel and aggregate (AECOM, 2020). Carbon emission estimates from eight construction projects ranged between 102 to 209,264 tonnes of carbon dioxide equivalent (CO₂-e) and from two maintenance projects annual emissions were 137 and 388 tonnes CO₂-e per annum. The largest emissions from one project was about 2 percent of annual operational emissions.

Moving forward we will use a range of measures for resource efficiency, including total materials (and embodied carbon), energy used (and consequent CO₂ emissions) and total waste generated from construction, maintenance and operations. We will also look at calculating embedded carbon in the materials we use.

These resource efficiency measures will help to show how we are tracking towards our priorities of reducing emissions and waste, supporting the transition to a low carbon, safe and healthy land transport system.

KAITIAKITANGA

We recognise that Māori have a responsibility and obligation of care for their communities and environments. Our environment encapsulates people, places and planet.

When making decisions about environmental management, Waka Kotahi proactively respects Māori interest and the principles of Te Tiriti o Waitangi. This is essential under relevant legislation, including the Resource Management Act 1991, and we recognise Te Ao Māori, a Māori world view, has a wider lens that we are incorporating into what we do. Te Ara Kotahi - Our Māori Strategy articulates Mātauranga Māori (Māori Knowledge) as a priority for Waka Kotahi where we recognise and provide for cultural heritage, identity, values and Mātauranga Māori in our work, enhancing the land transport system.

We actively explore opportunities to partner with Māori so that we integrate cultural narratives within land transport project interpretation and design, celebrating our unique cultural identity in Aotearoa New Zealand. Currently we do not have a measure for how we respond to cultural heritage, identity, values or Mātauranga Māori and so, in connection with the Leadership and Culture Pou of Te Ara Kotahi, we will develop measures that monitor Māori responsiveness, including Mātaurangi Māori.

MAKING SUSTAINABILITY A REALITY

Lighting up the future

Changing how we work, using different or fewer resources and considering the history of an area has positive outcomes for people, places and planet.

Auckland's Harbour Bridge is more than just a transport connection. It is a vital transport link for business both in Auckland and further north, is an icon for the city, directly supports local tourism activities on the structure and utility services including water and gas.

In December 2018, work commenced on replacing 118 light poles on the 'clip-on' section of the Harbour Bridge. The light poles were initially installed when the 'clip-on' section was fitted in 1969 but they were designed to match the character of the original 1959 structure. Over their five decades of use, the light poles had been battered by the elements and traffic vibration.

The replacement poles were designed with both the history of Auckland and resource efficiency in mind. They are a similar shape to the 1959 design, respecting the architectural character of the Harbour Bridge, but have been galvanised to wear better. The original High-Pressure Sodium bulbs have been replaced with energy efficient LED bulbs that use 40 percent less power, contain no harmful substances, reduce light pollution in the night sky and are brighter on the road itself, helping create a safer road for users.

One final lighting extra has been added to create a colourful vista in the night sky. Coloured LED lights have been strategically placed across the Harbour Bridge to create a spectacle across the Waitemata Harbour.

Image: Auckland Harbour Bridge



ENVIRONMENTAL COMPLIANCE

Waka Kotahi activities come under a variety of planning and environmental requirements through the Resource Management Act 1991 (RMA) and other environmental legislation. We actively manage environmental compliance with these requirements to meet our statutory obligations.

Legislative compliance is a bottom line for Waka Kotahi. We obtain legal authorisations from regulatory authorities for activities that impact on the natural and built environment, culture, heritage and the conservation estate. A cloud-based environmental compliance management system (CS-VUE) is used to capture and manage compliance information for these authorisations. This system enables Waka Kotahi to maintain an overview of consent requirements across projects.

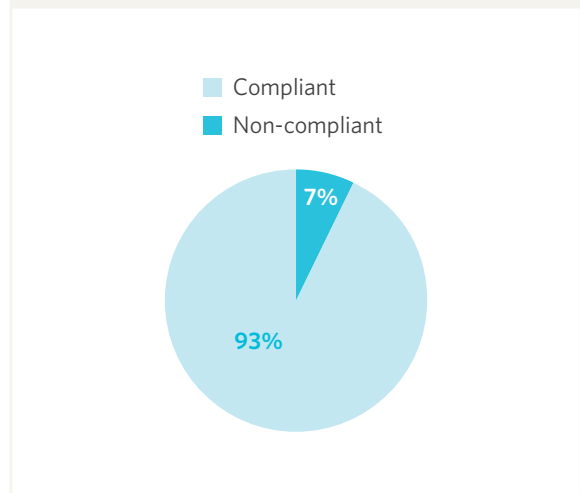
Currently the system data shows we are 93 percent compliant with conditions that relate to the environment.¹⁰

We are currently working through a process to better capture and report potential and actual breaches of environmental legislation, and environmental risks and incidents. This will help us get a better overview of how well we are managing our environmental performance.

We have been using sustainability rating tools in large capital projects to measure progress against a range of outcomes since 2016 and will continue to expand the use of these tools as another way to improve our environmental performance¹¹.

The Land Transport Management Act and the Resource Management Act are amongst a range of laws relevant for the relationship between Waka Kotahi and Māori and the principles of the Treaty of Waitangi. Our responsiveness to this legislation will form a component of the Kaitiakitanga measures.

Figure 17: Compliance with conditions that related to the environment as at 31 March 2020 (source: Waka Kotahi)



¹⁰ The remaining 7% of conditions were not yet signed off or verified as formal breaches at the time the information was retrieved. Our project managers continue to work with external suppliers and partners to improve the timeliness of information recorded in CS-VUE.

¹¹ Waka Kotahi formally adopted the Greenroads rating scheme in 2015. Since then nine projects have been working towards Greenroads certification. One project (Mingha Bluff) achieved this in 2019 and three more projects are expected to follow in 2020/21. The Greenroads tool has enabled Waka Kotahi to demonstrate its commitment to sustainability best practice and improving environmental outcomes on its projects.

MAKING SUSTAINABILITY A REALITY

Te Ao Māori

In Te Ao Māori (the Māori world view) all living and non-living things are connected. This holistic approach considers our environment (people, places and planet) as one integrated system.

Our purpose at Waka Kotahi is to provide one integrated land transport system and we are working to ensure Māori knowledge and a Māori worldview is embedded meaningfully in our activities to enhance the delivery of the land transport system.

The 4.8km Rangiriri section of the Waikato Expressway project has moved State Highway 1 away from the Rangiriri Pā site and allowed a collective partnership to honour and respect the spiritual, historical, ancestral and cultural significance of the area.

The Pā site was the scene of the 1863 Battle of Rangiriri and starting point of the Waikato Land Wars. The site was significantly damaged in 1965 by an upgrade to State Highway 1.

Project partners, including Waikato-Tainui and Waka Kotahi, created a symbolic reinterpretation of the site, that is easily accessed by anyone travelling the area, ensuring the spiritual, historical, ancestral and cultural significance of the area can be shared with future generations.

The roading infrastructure and surrounding environment also reflects the history of the area through bridge barrier designs, extensive native plantings and the naming of a connector road after the architect of Rangiriri Pā, Pene Te Wharepū.

By partnering, several cultural and environmental opportunities have been achieved; creation of a new cycleway and walkway, introduction of safety improvements, stormwater treatment for specific wetlands and a cultural connection for Waikato-Tainui iwi who undertake maintenance of the site.

Image: Artists Impression of Rangiriri Pā



NEXT STEPS FOR TACKLING THE ENVIRONMENTAL HARM CHALLENGE

While we do a lot to support biodiversity across our projects, we are conscious we do not yet have a good national view on overall outcomes, and we plan to fill this gap. We also plan to significantly improve how we use resources and energy and need to have the right information to guide on the best approach. Therefore, environmental measures are a particular area of focus for Tiakina Te Taiao going forward.



TOITŪ TE TAIAO

ACHIEVING
OUR OUTCOMES

- Review our Environmental and Social Responsibility (ESR) Policy and Standard for a step-change in sector environmental and social responsibility practice
- Leverage procurement for a step-change in sector environmental and social responsibility practice
- Develop a resource efficiency and waste minimisation policy
- Develop an integrated national asset management system for data capture, analysis, management and monitoring of environmental assets
- Improve performance monitoring, audit, compliance and incident management functions



TIAKINA TE TAIAO

MEASURING
OUR PROGRESS

- Develop Māori responsiveness measures with Te Ara Kotahi work programme
- Develop measures for biodiversity (including fish passage), water (impacts, mitigation), and environmental incidents and breaches
- Collate an inventory of environmental assets
- Implement contract provisions and capture data on resource and energy efficiency, incidents, compliance and biodiversity management
- Develop effective data storage, management and retrieval systems and processes to enable a national view of relevant data
- Increase range of measures for wider outcomes, e.g. cultural heritage, landscape and urban design

CORPORATE SUSTAINABILITY

The public sector is taking active steps to reduce greenhouse gas emissions, improve energy efficiency and reduce waste. We are striving to lead the way in this important area.

OUR BASELINE

Total travel emissions

Waka Kotahi carbon emissions from all travel was **5,004 tonnes of CO₂-equivalent** in 2019, an increase of 2.3 percent from 2018.

Flights

Waka Kotahi carbon emissions from air travel was **4,360 tonnes of CO₂-equivalent** in 2019, an increase of 1.7 percent from 2018.

Fuel use

Waka Kotahi carbon emissions from fuel use was **491 tonnes of CO₂-equivalent** in 2019, an increase of 1.3 percent from 2018.

Number of vehicles

Waka Kotahi had **164 fleet vehicles** in 2019, an increase of 12% from 2018.

Limitations

The data and collection method is subject to final verification through Toitū Envirocare. Verified data from July 2019 onwards will form the Waka Kotahi 2019/20 financial year baseline

*I orea te tuatara
ka patu ki waho
A problem is solved
by continuing to
find solutions*

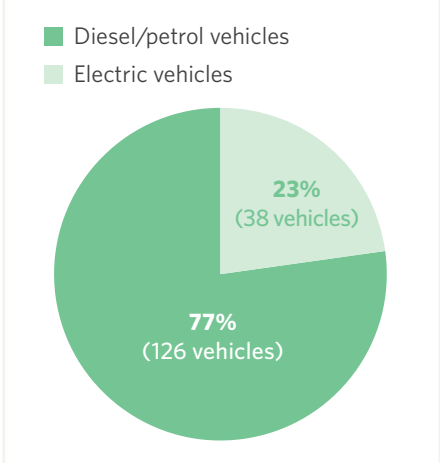
WAKA KOTAHİ CORPORATE SUSTAINABILITY

Corporate sustainability is how an organisation incorporates ethical, cultural, social, economic and environmental responsibilities into their day to day operations. Our initial focus through Toitū Te Taiao is on greenhouse gas emissions from business travel, although we are working on understanding emissions from other sources.

Waka Kotahi operates throughout Aotearoa New Zealand and business travel is a normal part of our activities. Flights are nearly 90 percent of the total emissions, with domestic flights being the largest portion of this. However, with COVID-19 we have adapted to new ways of working and this has given us a glimpse of what is possible. We want to build on what we have learned and lock in a durable shift in working patterns and travel behaviour.

Waka Kotahi is working towards carbon certification reporting in line with Ministry for the Environment guidance.

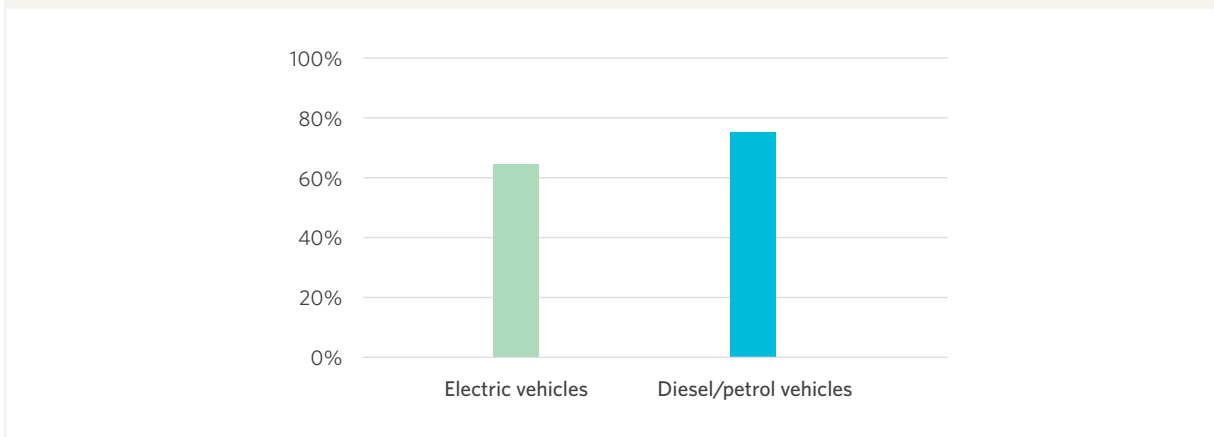
Figure 18: Proportion of vehicle fleet at Waka Kotahi that are electric in 2019 (source: Waka Kotahi). Excludes E-bikes, of which Waka Kotahi has many for staff use



The emissions estimates will be independently verified on an annual basis. This means we can be confident in our results and can compare them with other organisations.

Waka Kotahi is in the process of transitioning its' corporate vehicle fleet to be fully electric, where practical, by 2025. We are on our way to achieving this and have, at 23 percent (of 164 vehicles in total), the second highest proportion of battery electric vehicles in the public sector. We are also looking to reduce the size of our fleet over the longer term.

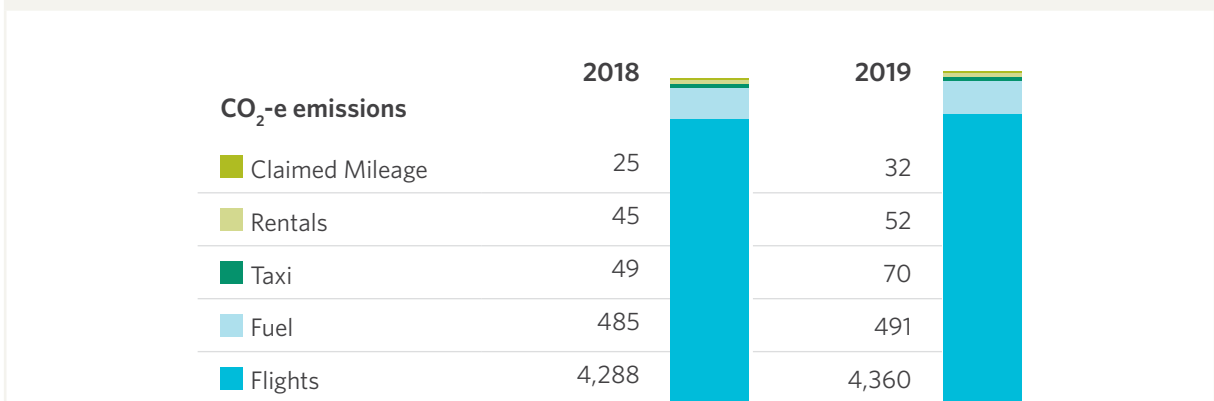
Figure 19: Utilisation of pool vehicles in the fleet (proportion of workdays used in 2019)
(source: Waka Kotahi)



On average we still use the pool electric vehicles less than our other pool vehicles. Electric vehicles are used more by office-based staff, whereas many of the petrol/diesel vehicles are dedicated to staff members who need to travel long distances and to remote locations for their work.

We have worked on initiatives to encourage the shift to electric vehicles at Waka Kotahi including an EV roadshow in our offices during November 2019. This allowed staff to become more familiar with the EVs and understand EV charging. We also provide E-bikes for staff use.

Figure 20: Waka Kotahi corporate emissions (source: Waka Kotahi)



CO₂-e emissions from travel increased by 2.3 percent between 2018 and 2019. Flights were the main cause of this increase. Emissions from fuel use also increased by 1.3 percent between 2018 and 2019. At the same time our vehicle fleet size increased by over 10 percent and the distance we travelled increased by 16 percent (from 2,108,239 km to 2,451,266 km), which means our average emissions from fuel use per vehicle decreased.

NEXT STEPS FOR TACKLING THE CORPORATE SUSTAINABILITY CHALLENGE

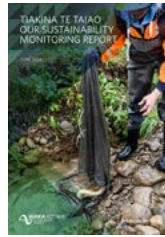
Over the coming year we will focus on measuring and reducing our carbon footprint, including setting targets and improving our data collection.



TOITŪ TE TAI AO

ACHIEVING OUR OUTCOMES

- Robustly measure and verify our carbon footprint and set reduction targets
- Reduce our corporate travel emissions



TIAKINA TE TAI AO

MEASURING OUR PROGRESS

- Improving data integrity through the Toitū-Envirocare Carbon Reduce programme
- Broaden measures to include paper use, waste to landfill and electricity use

THE WAY FORWARD

We are setting up a programme of work to build on the information we have now. We will set targets and ensure we have an enduring sustainability monitoring framework to support ongoing reporting and performance improvements.

Tiakina Te Taiao gives us a baseline against which to benchmark progress on our sustainability journey.

Looking ahead, we will build on what we have now, establish baselines, set targets and fill the gaps. We are developing an online platform that will provide data and additional resources (such as mapping and case studies) throughout the year so the most recent information is available. This will be another tool to help Waka Kotahi make decisions, prioritise actions and identify whether additional interventions are needed. It will also be accessible to our stakeholders.

Our monitoring will show us how the interventions we have committed to are resulting in a low carbon, safe and healthy land transport system for Aotearoa New Zealand.

Ehara taku toa i te toa takitahi, engari he toa takitini

Our strength does not come from ourselves alone but as a collective

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