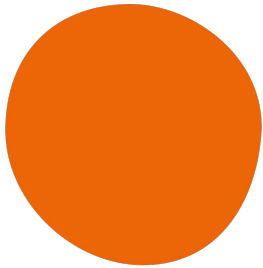


# COVID-19 Population Report.

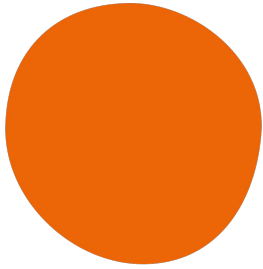
How we are behaving as a population from before COVID-19 through to last week.

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As of May 18th



**EMBARGO UNTIL:**  
**20th May 2020 @ 12pm**



# How is our population data produced?

Data Ventures is working together with the major telecommunication companies in New Zealand.

Using the aggregated and anonymised mobile data<sup>[1]</sup> provided to us, along with Stats NZ expertise, Data Ventures has created population estimates of residents and visitors in New Zealand every hour down to suburb level (*read more in the footnotes*).

## Improvements in this version of the report.

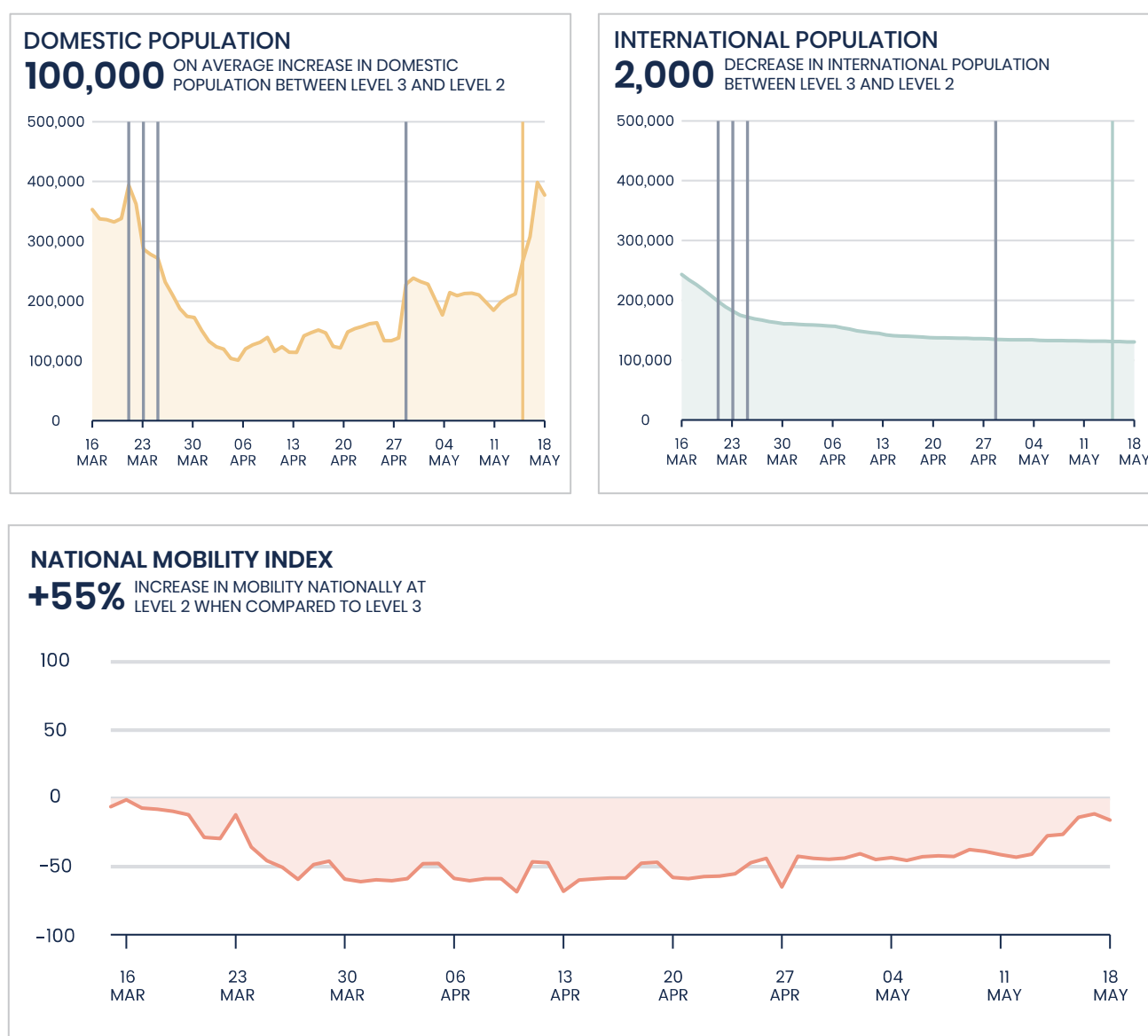
We have made a number of enhancements to our model in this week's report. These have corrected data that caused some locations to have lower, or higher counts than what was actually present. The primary change involved how our telecommunication partners estimate where a device is located when it is not in use/turned off.

# POPULATION – A VIEW OF THE WHOLE NATIONAL

As our population reacts to the environment of Alert Level 2, there is evidence of large increases in movement around New Zealand. Because of that, it's now worth looking at our country as a whole. To do that we have highlight international and domestic population numbers, as well as our national mobility index<sup>[4]</sup> as we continue through COVID-19 Alert levels.

To help explain what the numbers mean below, we describe domestic population as someone who is outside of their local tourism region. These regions are areas defined by Regional Tourism Organisations.

It's important we look at domestic population through the increase of travel by New Zealanders. Used correctly, it can be an indicator of domestic tourism and business travel - indicators that aspects of our economy may be reviving.



**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

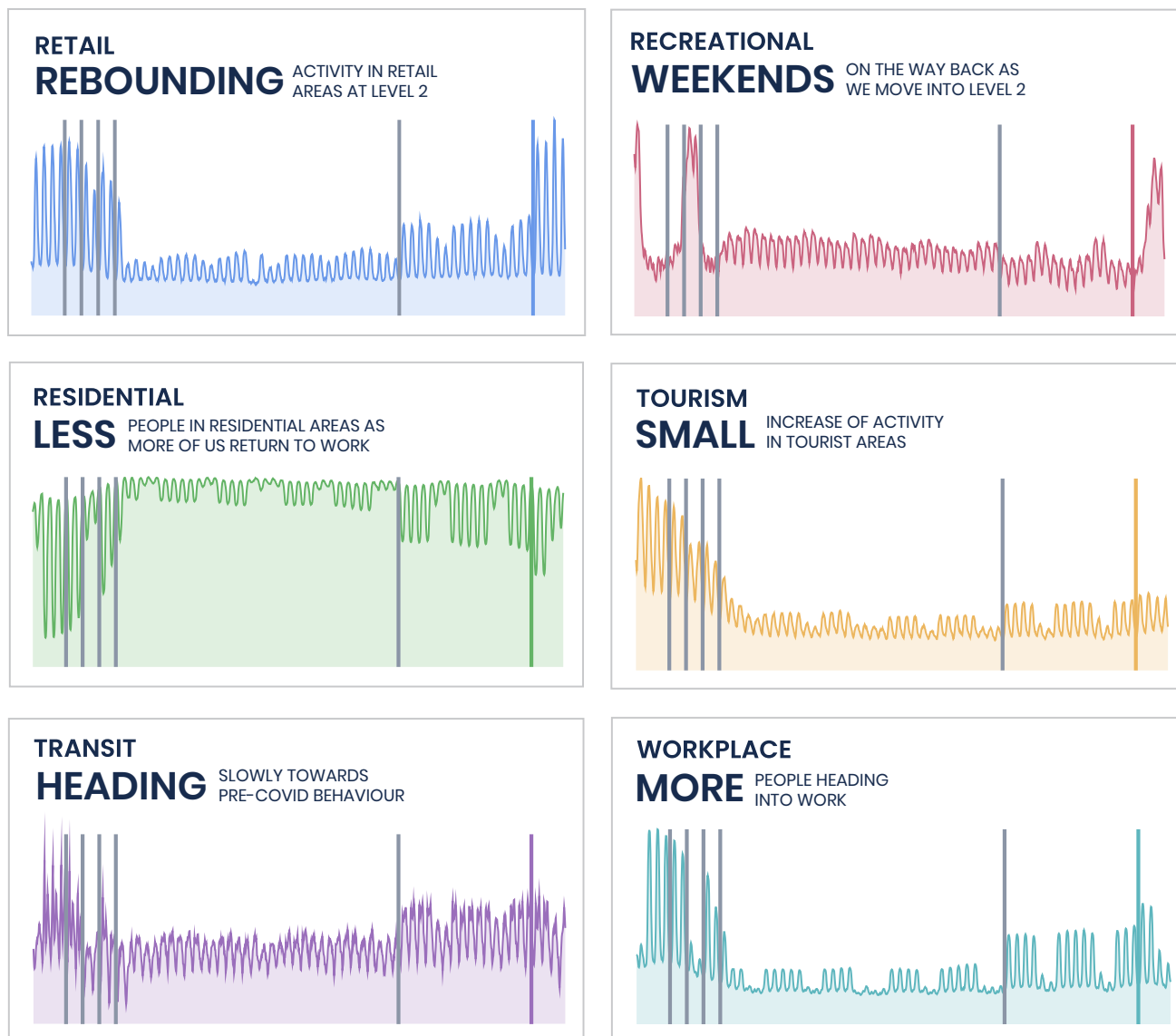
**Uses of these insights:** This report demonstrates the fall, and rise of domestic and international numbers in New Zealand. Domestic represents the number of population that gone outside their usual Regional Tourism boundaries: <https://rtnz.org.nz/destinations>. The report can be used to monitor the recovery of tourism and regional travel in New Zealand.

# OUR POPULATION – SIX WAYS – AVERAGE POPULATION

As we all settle into what is a new set of habits, it's important we understand what these new habits look like.

On this page of the report we have sampled average hourly representations of population estimates in New Zealand around six key areas across COVID-19 in New Zealand. We have used the population patterns previous to COVID-19 to identify these areas. Refer to our notes<sup>[2]</sup> at the end of this report to understand a bit more detail of what each areas/behaviours of New Zealand these graphs represent.

Percentages below represent the difference of average midday (12pm) peak population counts in lockdown



**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

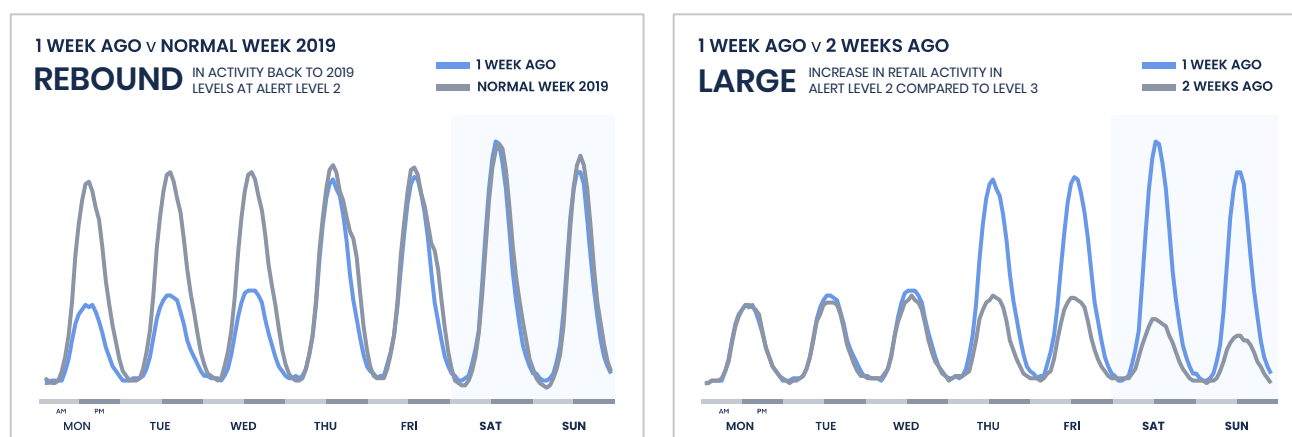
**Uses of these insights:** Observe the populations pattern prior to COVID-19 up until a few days ago to look at COVID-19 in a macro view. We will highlight any announcements and decisions along the way with lines and add to the key above.

# OUR POPULATION – SIX WAYS – BEFORE AND NOW

By looking at hourly population counts<sup>[1]</sup> across the country, we can get a good idea of how behaviour has changed in response to COVID-19. The data presented here uses hourly population counts for six types of areas<sup>[2]</sup> in New Zealand - retail, transit, residential, tourism, workplace and recreational.

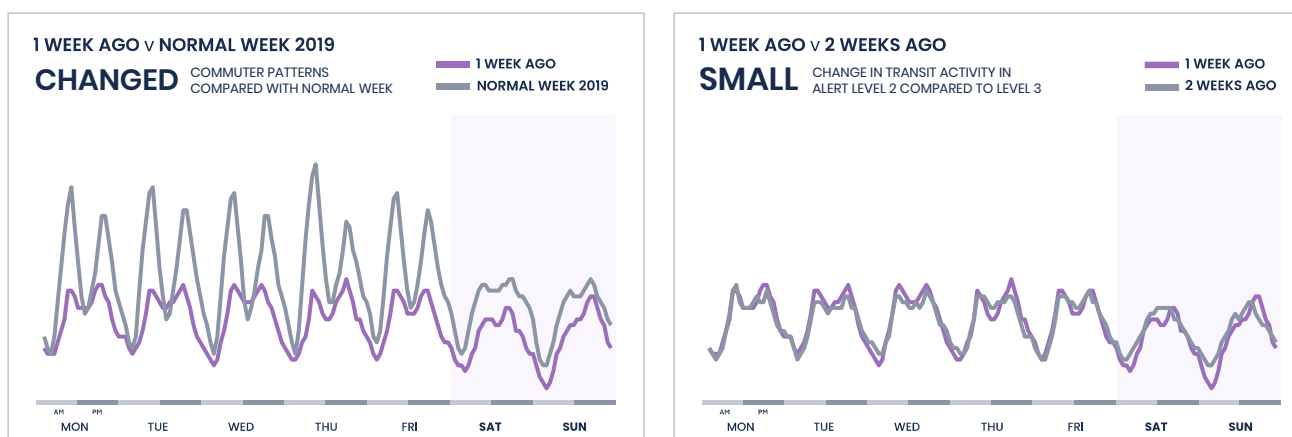
In this part of the report, we cover off three periods: A normal week in 2019<sup>[3]</sup>, two weeks ago, and one week ago. We have broken out the comparisons into one comparing last week to a normal week in 2019 to see what change happened compared to last year, and the other comparing what has happened over the last two weeks. From doing this, these are the insights we have discovered.

## RETAIL



As New Zealand somewhat relaxed its control measures moving into Alert Level 2, Kiwi's wasted little time in getting back to their favourite malls and retail venues. Mobility in retail areas bounded back to 2019 levels, almost immediately after we moved into Level 2. The first Saturday in Level 2 showed the highest activity since lockdown began, and it will be interesting to see if this trend continues. As we venture back into malls, it's important to remain vigilant and cautious, so that we don't undo the more than 6 weeks of effort in squashing the curve.

## TRANSIT



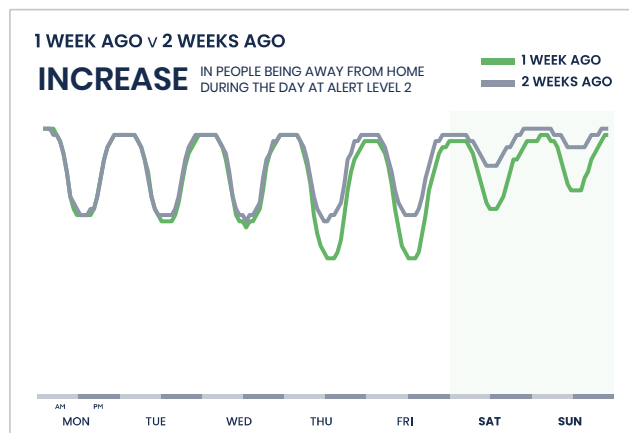
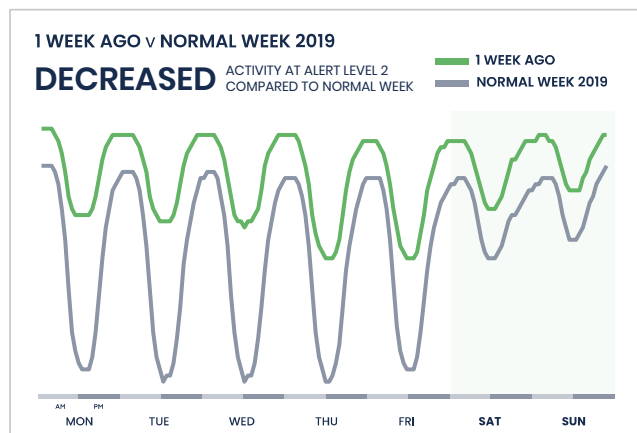
As we moved to Alert Level 2, transit zones showed little change in commuter patterns. While this may seem counter-intuitive, the relatively large increase in transit activity observed through Level 3 may mean that people were already driving about, perhaps as a form of getting out there, without the risk of social interaction.

It will be interesting to see how our transit patterns evolve as we spend more time in Level 2, and more workplaces and businesses reopen, as economic activity increases across New Zealand.



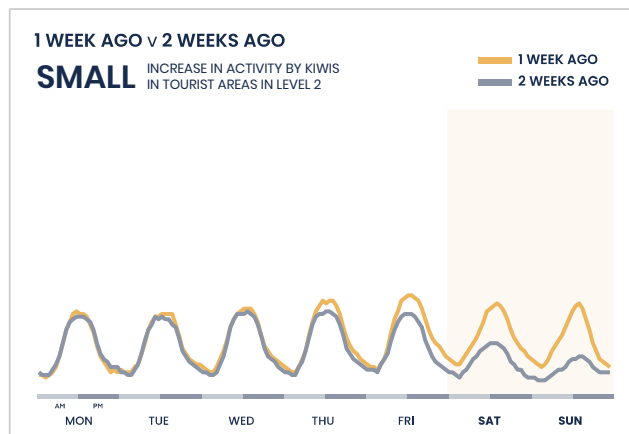
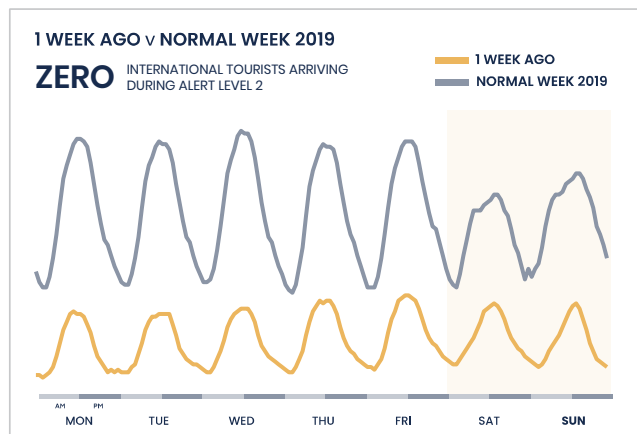
# OUR POPULATION – SIX WAYS – BEFORE AND NOW (continued.)

## RESIDENTIAL



Residential areas show that a lot of New Zealanders are still staying home, when comparing to a normal week in 2019. Comparing the last two weeks we see an decrease in day time population in residential areas from Thursday onwards, as Kiwis begin to relax into Level 2, some returning to work, and engaging in weekend activities. The expected increase in mobility at Level 2 is already evident in the trends, however we are unsure if the higher number of people at home are working from home, or unemployment is becoming evident.

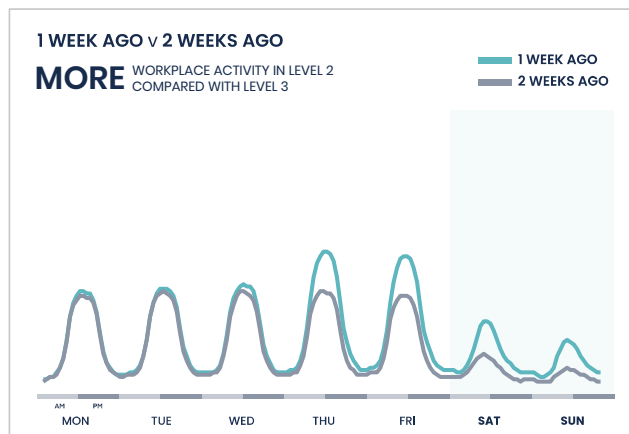
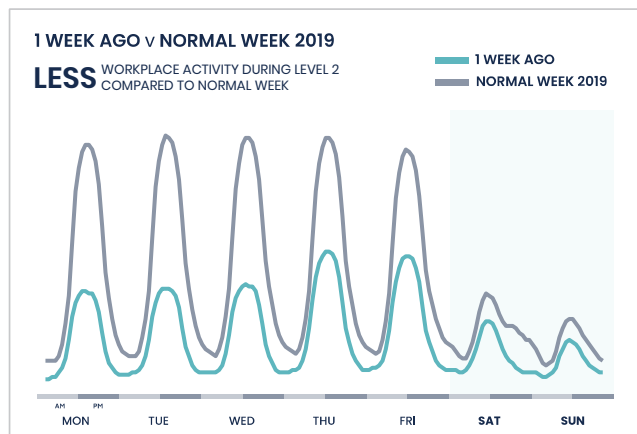
## TOURISM



The population of domestic and international tourist areas remain low compared with a similar period in 2019. As New Zealand relaxed into Alert Level 2, an increase in activity across tourist areas is observed. While there is a small increase in mobility on Thursday and Friday (the first two days at Level 2), the increase across the first weekend at Level 2 is more pronounced. With good weather across much of New Zealand welcoming us into Level 2 Kiwis took the opportunity to stretch their legs and head out of their bubbles. However the low mobility when comparing to last year shows that we are being cautious even as we relax.

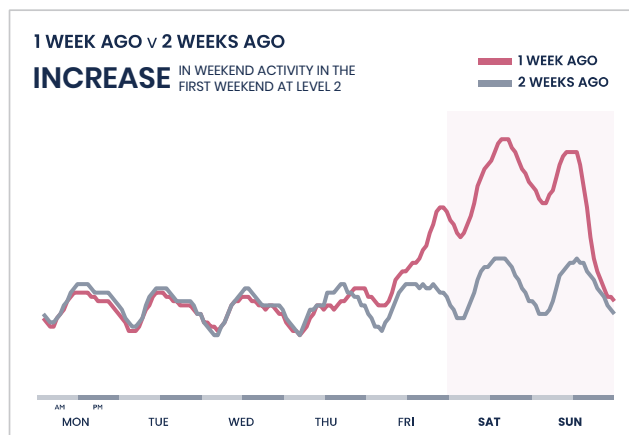
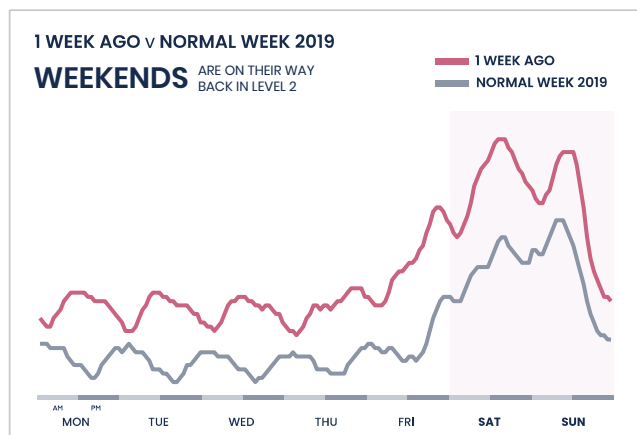
# OUR POPULATION – SIX WAYS – BEFORE AND NOW (continued.)

## WORKPLACE



Work patterns remain an almost mirror image of the residential patterns, as more people returned to areas of work during the day, as we moved to Alert Level 2. Mobility in areas of work remain lower than a normal week in 2019, but is higher than during Level 3. Kiwis are carefully returning to their workplaces, indicating that the wheels of the economic engine may be gathering momentum. Increases in workplace mobility appears to be less emphatic, when compared to retail and recreation.

## RECREATIONAL



Due to improvements through our collaborations with data providers, accuracy in the patterns of recreational activity have improved. These improvements highlight that during Alert Level 3, activity patterns were reverse of what is observed during a normal week in 2019. This is because as more people are home during the day, they are able to go out for walks and take short recreational breaks throughout the day.

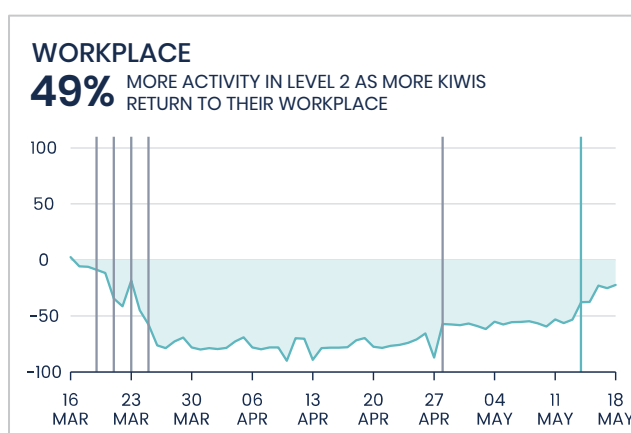
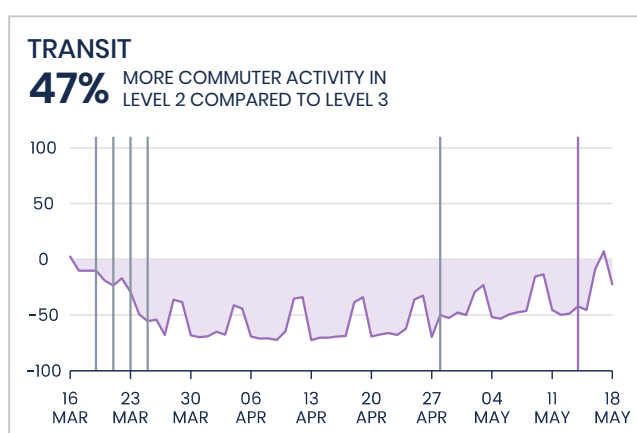
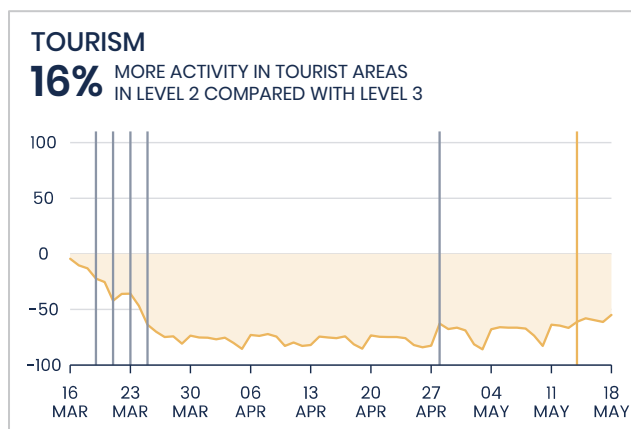
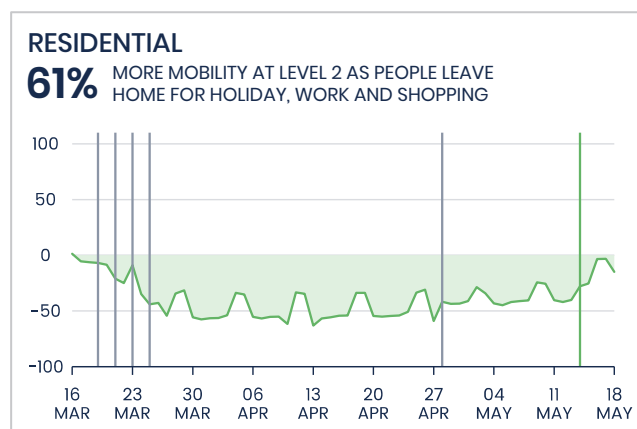
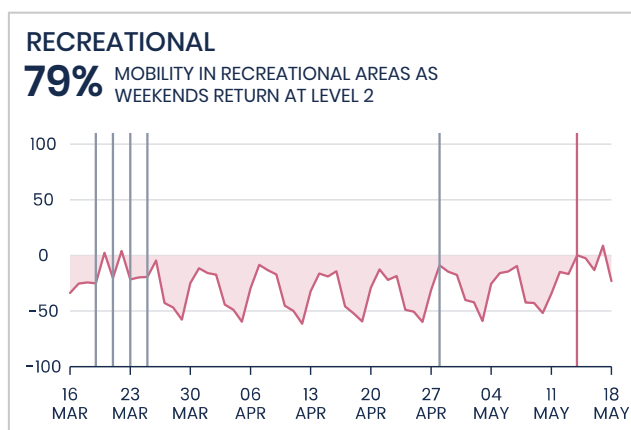
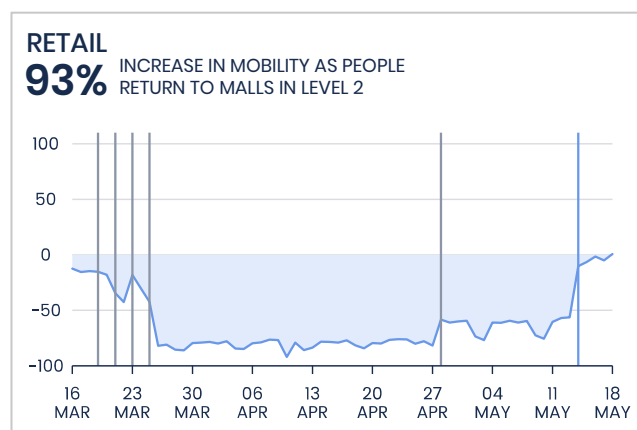
The first weekend of Alert Level 2 showed an surge in recreational activity, even surpassing a typical weekend in 2019. This is unsurprising, as Kiwis celebrated the relative freedom of Level 2 by engaging in recreational activities that have been out of reach for the past 6 weeks. As we enjoy a step towards a return to normal, maintaining vigilance and good practice is important to ensure that New Zealand has the best chance of keeping COVID-19 to a minimum.

**Uses of these insights:** The comparison to a normal week in 2019 can be used to offset other datasets designed prior to COVID-19. The figures contained in this report could be used to make adjustments to previously known datasets values. For the two week comparison, it allows you to measure a sentiment of change over a shorter period.



# OUR POPULATION – SIX WAYS – MOBILITY IN COVID-19

On this page of the report is our mobility index for the population in New Zealand around six key areas<sup>[2]</sup> over COVID-19. Our mobility measure<sup>[4]</sup> is created using the difference between maximum and minimum population estimates in areas of New Zealand over a day. This allows us to get an idea of mobility between each day of 2020 in this report compared to similar days from 2019.

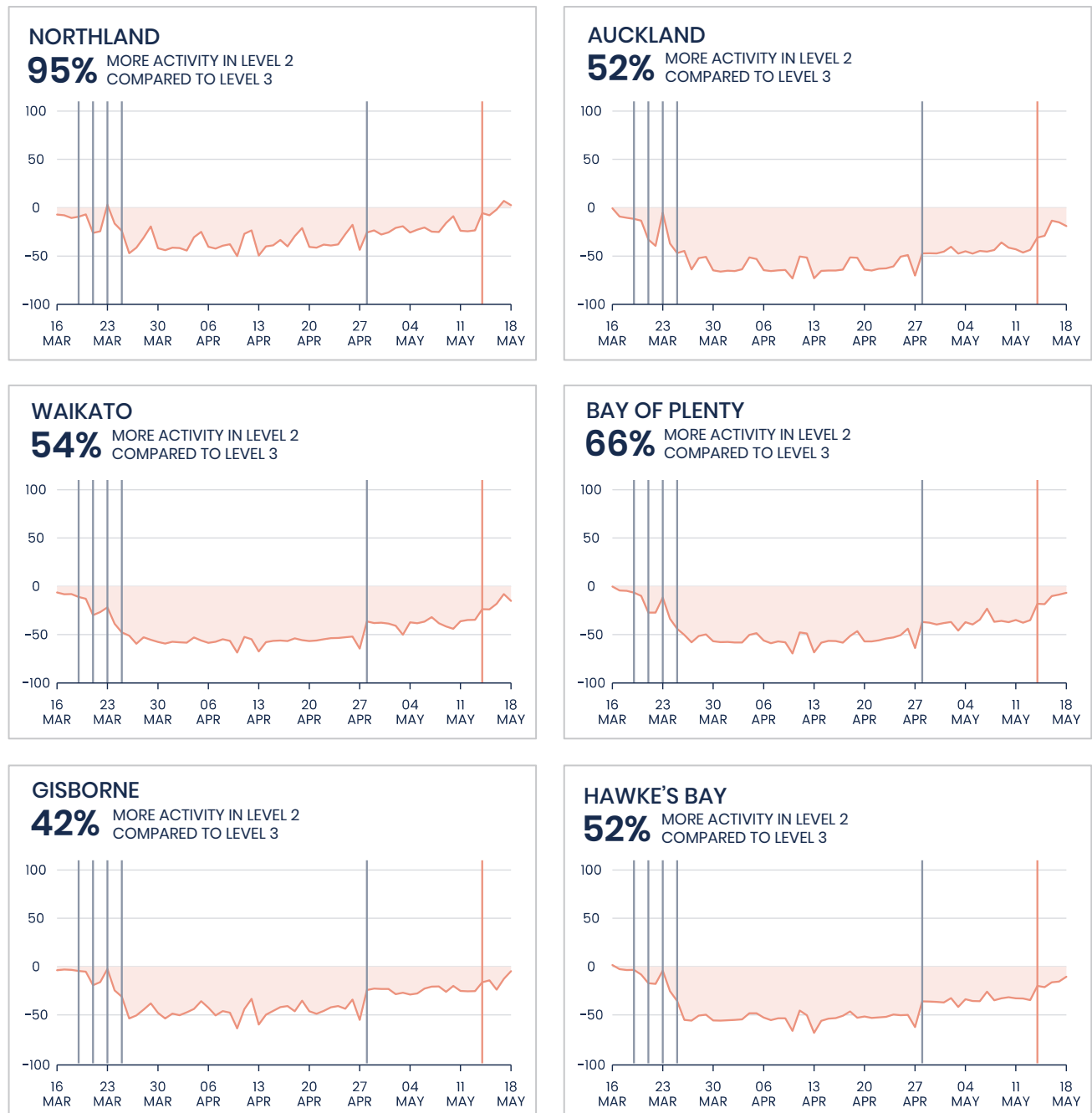


**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

**Uses of these insights:** Observe the populations pattern prior to COVID-19 up until a few days ago to look at COVID-19 in a macro view. We will highlight any announcements and decisions along the way with lines and add to the key above.

# THE CHANGE OF POPULATION MOBILITY ACROSS REGIONS BEFORE AND DURING COVID-19

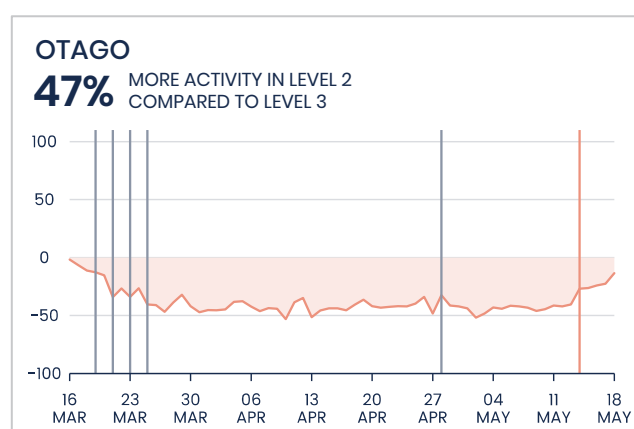
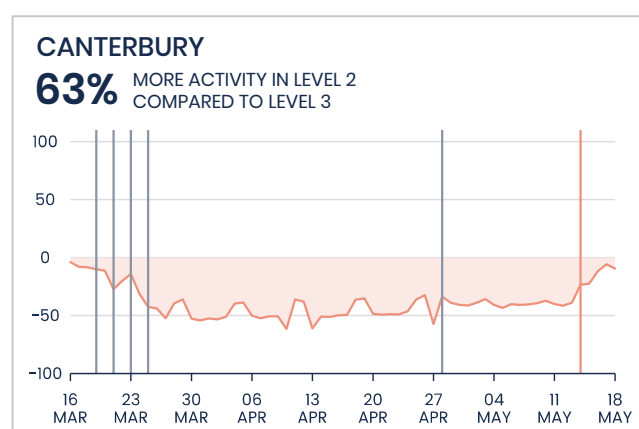
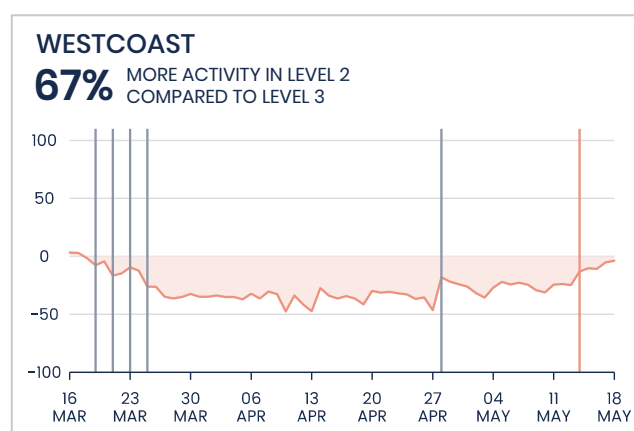
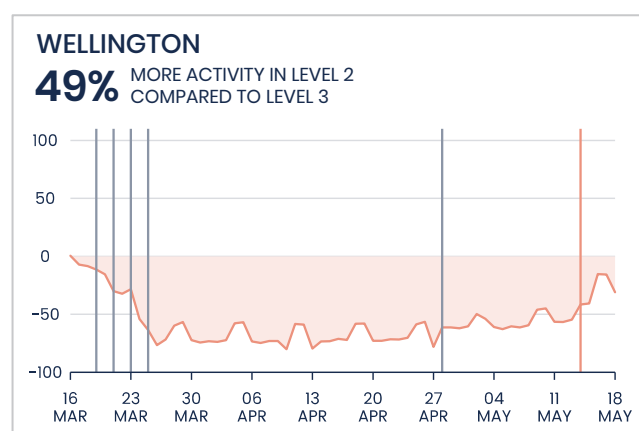
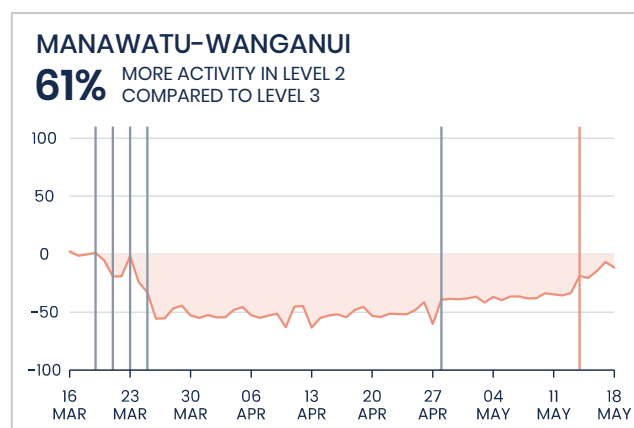
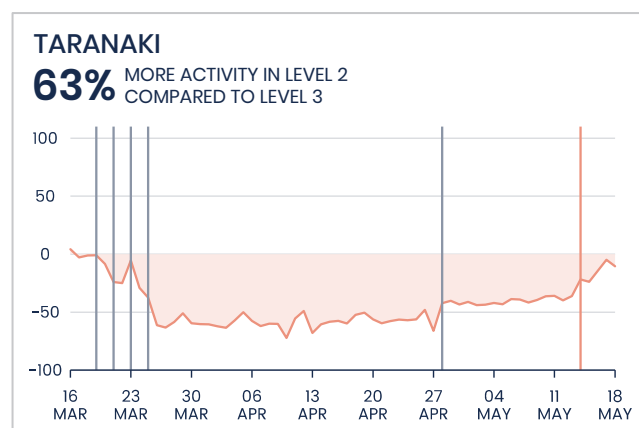
On this page of the report we have our mobility index<sup>[4]</sup> represented daily across the regions of New Zealand. As per the previous page, mobility is worked out in a similar way but over regions rather than types of areas of New Zealand. Order of list as per [regional council classifications](#).



**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

**Uses of these insights:** Observe the populations pattern prior to COVID-19 up until a few days ago to look at COVID-19 in a macro view. We will highlight any announcements and decisions along the way with lines and add to the key above.

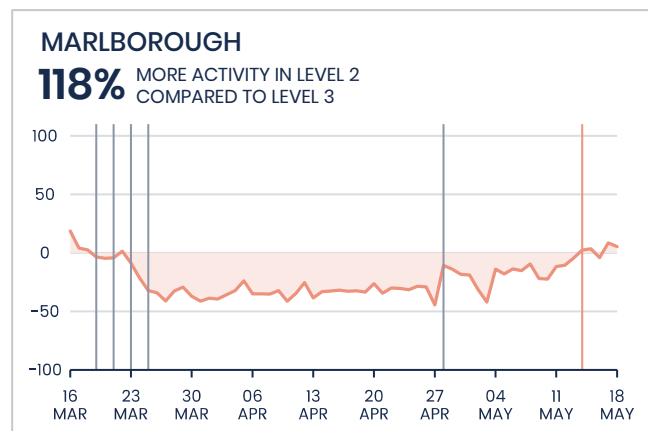
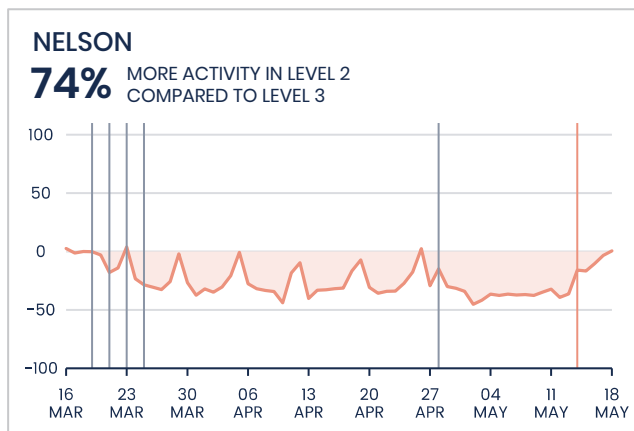
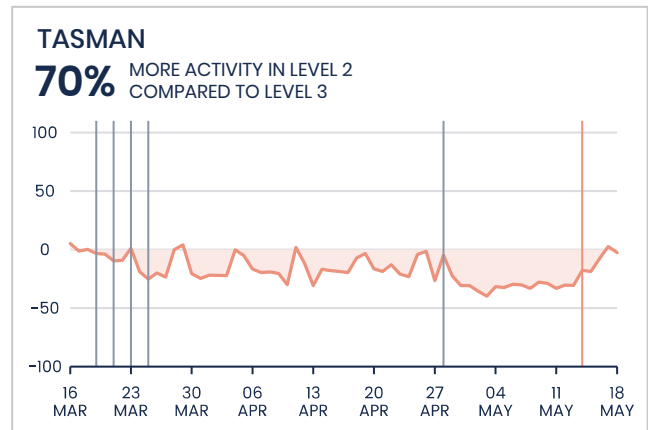
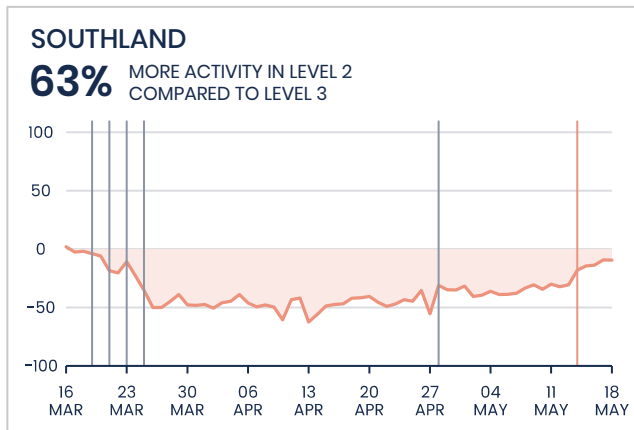
# THE CHANGE OF POPULATION MOBILITY ACROSS REGIONS BEFORE AND DURING COVID-19 (continued.)



**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

**Uses of these insights:** Observe the populations pattern prior to COVID-19 up until a few days ago to look at COVID-19 in a macro view. We will highlight any announcements and decisions along the way with lines and add to the key above.

# THE CHANGE OF POPULATION MOBILITY ACROSS REGIONS BEFORE AND DURING COVID-19 (continued.)



**NOTE:** The vertical lines represent COVID-19 Alert Levels as they progressed, starting at the first line when NZ borders closed through Level 2, Level 3, Level 4, Level 3 and now to Level 2 (coloured).

**Uses of these insights:** Observe the populations pattern prior to COVID-19 up until a few days ago to look at COVID-19 in a macro view. We will highlight any announcements and decisions along the way with lines and add to the key above.

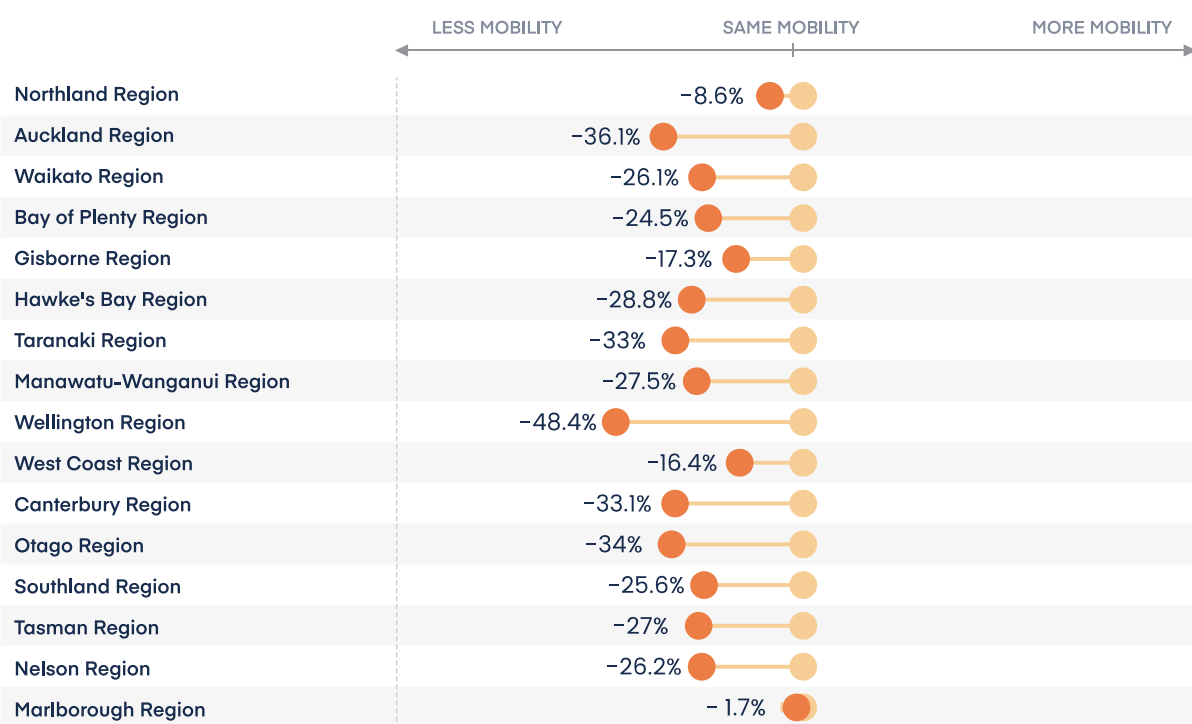
# THE CHANGE OF POPULATION MOBILITY ACROSS REGIONS LAST WEEK COMPARED TO BEFORE COVID-19

The purpose of this comparison is to see how we are tracking in changes of mobility<sup>[4]</sup> against returning to our baseline of a normal week in 2019. We may never achieve this, but it's important to measure the lasting impact of COVID-19. Order of list as per [regional council classifications](#).

## 1 WEEK AGO v NORMAL WEEK 2019

### DECREASED MOBILITY ACROSS NEW ZEALAND

● 1 WEEK AGO  
● NORMAL WEEK 2019

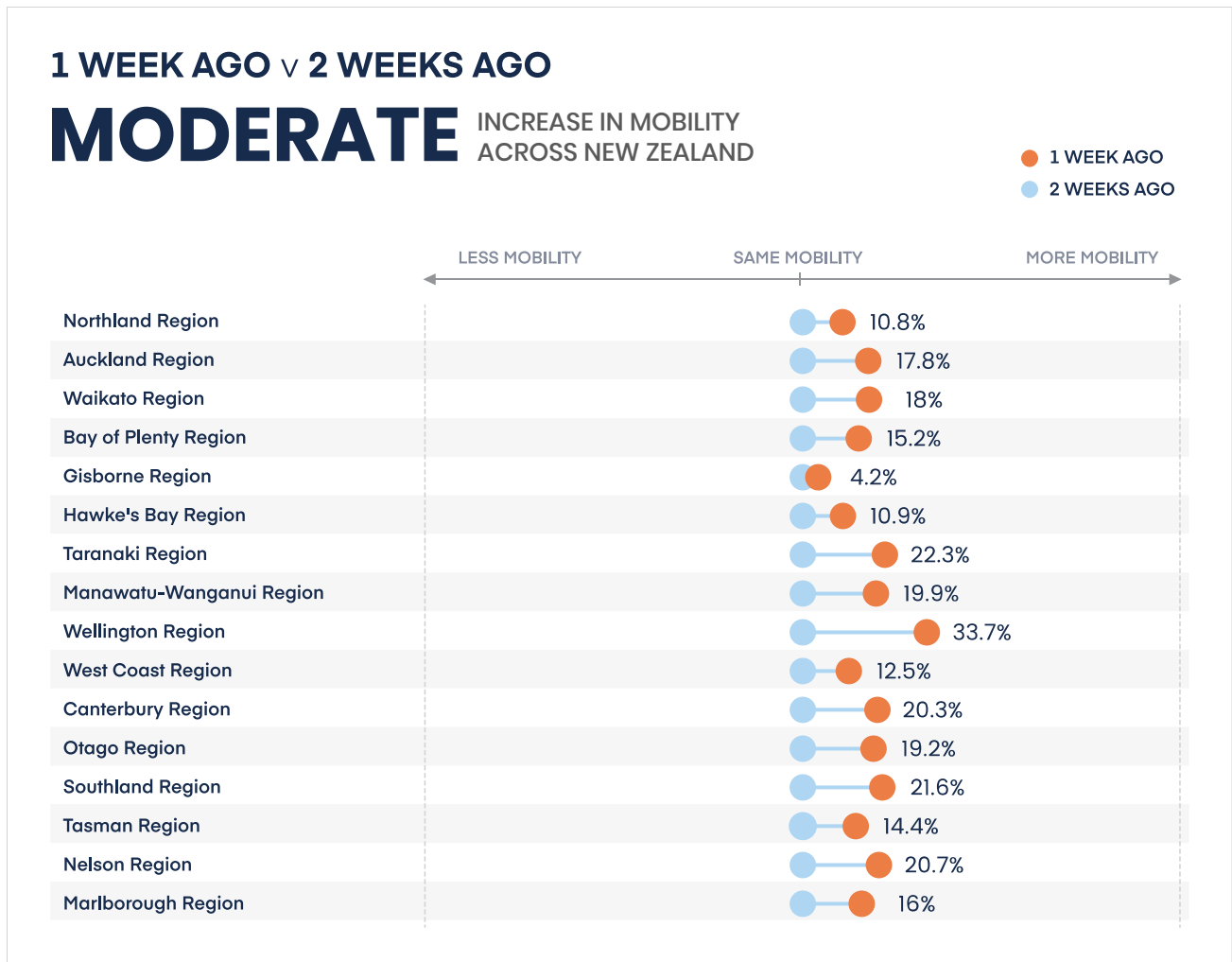


When comparing to last year, overall activity remains lower at Alert Level 2, all across the country. While we've seen significantly increased activity in specific sectors (e.g. retail and weekend recreation) at Level 2, the overall change in mobility is moderate. This is reinforced when looking at regional mobility, compared to a normal week in 2019, with all regions showing decreased mobility.

**Uses of this insight:** It can be used to offset other datasets designed prior to COVID-19. The figures contained in this report could be used to weight/deweight previously known datasets values.

# THE CHANGE OF POPULATION MOBILITY ACROSS REGIONS ACROSS THE LAST TWO WEEKS

The purpose of this comparison is to see how we are tracking in changes of mobility<sup>[4]</sup> in our progress throughout COVID-19 and its various Alert Levels (1 through to 4). As Alert Levels are escalated/de-escalated, this is a good figure to understand the impacts to New Zealand's population and their behaviour.



As New Zealand moved to Alert Level 2, with relaxing control measures, activity increased across the board, with Wellington leading the way. While mobility is still lower than pre-COVID, Kiwis are more mobile than they were during Level 3.

This is largely driven by increases in people returning to retail areas, weekend recreation, and more workplace activity. It's important to remember, as we return to these activities, that we must maintain the good habits we picked up through lockdown and Level 3 to make sure we don't see any flare ups of COVID-19 cases.

**Uses of this insight:** Understand the impact of announcements from the Prime Minister and Dr Bloomfield around our progress of COVID-19. A change in mobility can mean not just negative, but also positive indicators on the population.

# FOOTNOTES

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**Disclaimer:** The data in this report is provisional and should be regarded as an early, indicative estimate of population counts, not official statistics. Any statements made in this are purely opinion based on our observation of trends/figures.

All summarised figures/data produced to create these insights are available in our github repository: <https://github.com/dataventuresnz/mobility-index/>

1. Find out more here around how we produce our data:
  - a. <https://www.stats.govt.nz/assets/Uploads/Privacy-impact-assessments/Privacy-Impact-Assessment-for-Population-Density/Population-density-Privacy-impact-assessment.pdf>
  - b. <https://www.stuff.co.nz/technology/116246988/new-stats-nz-start-up-sells-location-data-to-government-agencies-eager-to-understand-population-movements>
  - c. <https://www.tvnz.co.nz/one-news/new-zealand/data-cellphone-towers-used-help-government-make-infrastructure-decisions>
2. Each classification represented in the six graphs are determined by analysing a sample of suburbs of New Zealand and categorising them according to specific population behaviours. In the instance for each of the classifications, we use a selection of areas based on:
  - a. Recreational: where people are typically going for the weekends, usually beach areas, lakes, tramping/biking spots.
  - b. Residential: where people are typically staying in the evening, and through to the morning which is where they generally live.
  - c. Retail: where people are coming together in times of when a mall/shopping district is normally operating.
  - d. Tourism: where international tourists are usually visiting during daylight hours.
  - e. Transit: where people are crossing over, either a suburb with a train or major bus station, a motorway/highway intersection or interchange. It is usually suburbs that demonstrate congestion at expected times of the week.
  - f. Workplace: where people are generally during the day for 9-5 hours.

For a technical overview of SA2's and their types, a spreadsheet can be found inside our repository: <https://github.com/dataventuresnz/mobility-index/>

3. A normal week in 2019 is created from a rolling average using four weeks from the same period in 2019, and averaging the count across each hour.
4. The methodology for constructing the mobility index is available through our GitHub written in R code at <https://github.com/dataventuresnz/mobility-index>





# DATA VENTURES

Unique trusted data

Interested in knowing more?

We can work with our wide range of data providers to help you towards any recovery strategy for COVID-19 and beyond.

[dataventures@stats.govt.nz](mailto:dataventures@stats.govt.nz)

[www.dataventures.nz](http://www.dataventures.nz)