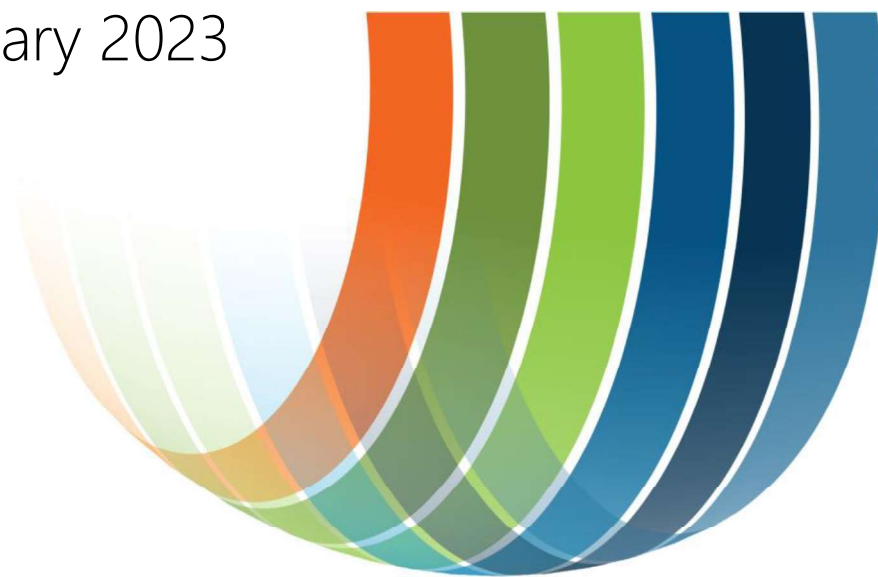# Kaipara District population projections

For Kaipara District Council

February 2023

Infometrics
Economics put simply

Authorship

This report has been prepared by Senior Economist Nick Brunsdon.

Email:

nick.brunsdon@infometrics.co.nz

Table of Contents

Executive summary

Introduction

Infometrics has been commissioned by Kaipara District Council (KDC) to produce projections of population and households to support the Long Term Plan and other planning processes. This report explores the projections, which are accompanied by additional data tables and an online dashboard.

Our approach

Our key point of difference for our population projections is that our employment forecasts inform part of projected net migration. First, we forecast employment in each territorial authority, considering local historical trends and national industry forecasts. Then, we project population following a traditional cohort component projection approach, in which the starting population is broken up into age and gender cohorts. Each cohort is analysed and projected separately – considering the probabilities of different life events for each cohort in each five-year period. We compare the employment forecasts with labour force projections, to identify which parts of the country are in greatest need of labour, which informs our net migration projections. We refined our projections with local insights – sharing our draft projections with KDC staff and refining the projections based on their feedback.

Short-medium term employment growth, long-term flattening

Employment in Kaipara district grew from 6,400 in 2000 to 8,500 in 2020, and rose throughout the pandemic to reach 9,000 in 2022. Over the past decade, the construction industry drove more than half of Kaipara's employment growth. Manufacturing and professional services also made considerable contributions to employment growth.

Employment in Kaipara is forecast to grow steadily until the mid-2030s. From the 2030s onwards, employment starts to decline in livestock farming and connected industries such as meat and dairy product manufacturing. This means that while other industries in the district are still expected to grow, such as service-based industries driven by population growth, overall employment starts to flatten out. Employment just reaches 10,000 in 2039 and holds at around that level thereafter.

International net migration to recovery slowly

International net migration rose to record highs in the 2010s, and a further record high in 2021 as expat New Zealanders rushed home ahead of the COVID-19 border restrictions. This was followed by a sharp fall in net migration while the border was closed. A highly competitive global market for labour is expected to constrain our future net migration gain, meaning a slow recovery back to its long-term level of 30,000 per annum later in this decade.

Distribution of regional net migration shifts

The distribution of net migration within New Zealand has shifted considerably between the 2010s and 2020s, away from cities and into provincial and rural areas. This trend has benefited Kaipara district greatly, particularly around Mangawhai, Kaiwaka and Maungaturoto nearest Auckland. High housing costs and greater uptake of employment is expected to underpin steady net migration flows into Kaipara into the future, particularly concentrated in Mangahwhai, Kaiwaka and Maungaturoto.

Drivers of population growth shift over time

Natural increase, the difference between births and deaths, is a key driver of population growth in Kaipara. Natural increase is currently positive but expected to turn negative in the 2040s, with a growing number of deaths outpacing a steady number of births. Easing natural increase will translate to a slower rate of population growth and a greater reliance on net migration.

Population reaches 35,700 in 2054

Kaipara District's population is projected to grow steadily in the medium scenario, reaching 35,700 in 2054. This amounts to an additional 8,500 residents between 2022 and 2054. Kaipara's strong historical growth, particularly in the past ten years, increased the districts population by 9,400 between 1996 and 2022.

Under the high scenario, the population reaches 42,200 in 2054, and 29,800 under the low scenario.

Growth led by the 65+ age group

The 65-years-and-older age group has been Kaipara's fastest growing in the past two decades, growing 5.1% per annum on average between 2003 and 2018. It will continue to be the fastest growing age group, projected to grow 3.8% per annum between 2018 and 2033 under the medium scenario. After 2033, the last of the baby boomer generation will have joined this age group, but it will continue to be the fastest growing at 1.2% per annum thereafter.

Average age races ahead of New Zealand

The average age of Kaipara's population was 35 years in 1996, the same as New Zealand's. Up to 2022, Kaipara's average age has grown to 44 years, ahead of 39 years nationally. By 2054, Kaipara's average age is projected to be 50 years, compared to 44 years nationally, under the medium scenario.

Household growth comes off recent highs

Household growth in Kaipara reached a peak of 4.7% in 2020 and 5.0% in 2021, driven by strong population growth. Household growth eased to 3.0% in 2022 and is projected to ease further in the coming years as population growth settles to more moderate levels. In the medium scenario, households are projected to grow at 1.6% per annum between 2022 and 2030, 0.9% between 2030 and 2040, and 0.4% between 2040 and 2054.

Households total 15,000 in 2054

The number of households in the Kaipara District is estimated to have risen from 7,100 in 2001 to 11,300 in 2022. Under the medium scenario, households are projected to grow to 15,000 in 2054. Under the high scenario, households total 17,300 in 2054. Under the low scenario, households peak at 12,700 in the early 2040s, and ease to 12,400 in 2054. Family households are the most common household type in Kaipara. Most of the families include couples, with or without children.

Rating units to rise to 18,800 in 2054

Districtwide rating units are projected to rise from 15,250 in 2022 to 18,800 in 2054 under the medium scenario, 16,600 under the low scenario, and 21,000 under the high scenario.

Sub-district projections informed by local insights

We have produced projections at a sub-district level, informed by input from Kaipara District Council on how the district's growth is likely to be accommodated in future. Sub-district growth considers the draft district plan, spatial plans, and known private plan changes. More generally, the sub-district projections reflect observed historical patterns, such as the Mangawhai area's growth being driven more as a satellite of Auckland rather than by the underlying economic drivers of Kaipara District.

The sub-district projections are produced for Statistical Area 2 (SA2) areas defined by Stats NZ, which do differ slightly to urban or suburb boundaries in common usage.

Strongest population growth in Mangawhai

Population growth is projected to be strongest in the three Mangawhai SA2s over the medium and long term, although growth slows down in Mangawhai SA2 in the long term as capacity for growth dries up. Relatively strong growth is also expected in nearby Maungaturoto and Kaiwaka. Mangawhai, Maungaturoto and Kaiwaka all benefit from their proximity to Auckland, with expected further growth in commuting as transport connectivity is further improved. Dargaville is projected to experience slow growth, which could be shared with Maungaru SA2 if the Dargaville Racecourse private plan change goes ahead.

Household growth concentrated in Mangawhai

Sub-district household growth mirrors sub-district population growth, with the strongest household growth expected across the Mangawhai area, again with a sharp slowdown in Mangawhai SA2 over the longer term. Household growth slows down overall across the district in the 2034-2054 period, leading to slower growth in nearly all SA2s in this period compared to 2024-2034. Ruawai-Matakohe and Otamatea are expected to experience a slight decline in the number of households due to softer rural employment, although there will still be more households in 2054 than in 2024.

Introduction

Infometrics has been commissioned by Kaipara District Council (KDC) to produce projections of population and households to support the Long Term Plan and other planning processes. This report explores these projections – explaining the methodology, analysing historical trends, and detailing the projections at a district and sub-district level.

This report is accompanied by our online Population Projections product which provides a user-friendly interface for exploring the projections, and a pivot table spreadsheet which provides a highly detailed and flexible tool for extracting the projections for further analysis.

Our approach

Consideration of each life stage and cohort

Our population projection approach follows a traditional cohort component projection approach, in which the starting population is broken up into age and gender cohorts. Each cohort is analysed and projected separately – considering the probabilities of different life events for each cohort in each five-year period. The life events include fertility, mortality, migration, household formation, and labour force participation. We also consider how these probabilities have changed over time and how they may change in future – for example, how labour force participation has risen among older age groups as life expectancy has extended over time.

Employment forecasts drive net migration

Our key point of difference for our population projections is that our employment forecasts inform projected net migration. We consider employment growth and labour force participation to assess labour force shortfalls in each region, which indicates how net migration will be distributed within the country. Consequently, these population projections are essentially informed by the economic prospects of the district.

Districtwide first, then sub-district

We project population at a districtwide scale first, in consideration of demographic processes and employment growth. Then, we project population at a Statistical Area 2 (SA2) or sub-district scale taking into account the capacity for household growth in each SA2 area and historical trends.

Our projection approach is described in greater detail in Appendix 1 – our approach in detail.

Economy

Short-medium term employment growth, long term flattening

Employment in Kaipara district grew from 6,400 in 2000 to 8,500 in 2020, and rose throughout the pandemic to reach 9,000 in 2022 (Graph 1). Over the past decade, the construction industry drove more than half of Kaipara's employment growth. Manufacturing and professional services also made considerable contributions to employment growth.

Employment in Kaipara is forecast to grow steadily until the mid-2030s. From the 2030s onwards, employment starts to decline in livestock farming and connected industries such as meat and dairy product manufacturing. Some growth is expected in other parts of agriculture such as horticulture, on the back of investment in water storage. Overall, agriculture employment is expected to soften while other industries in the district are still expected to grow, such as service-based industries driven by population growth. Softening employment in livestock farming and related industries drives slower overall employment growth. Employment just reaches 10,000 in 2039 and holds around that level thereafter.

Our forecasts for employment are driven by a combination of historic trends and our forecasts for the future. This includes assumptions around environmental regulation and of further adoption of automation technology, which will adversely affect employment in industries such as manufacturing. Over time, national environmental regulations for greenhouse gas emissions and freshwater are expected drive a reduction in the extent and intensity of livestock farming, which has a flow through effect on agriculture employment and in turn manufacturing employment as fewer livestock will need processing. In addition, high carbon pricing is encouraging expansion in forestry, which comes at the expense of livestock farming and requires a lower level of employment.

Graph 1

Kaipara District Employment
Infometrics forecast
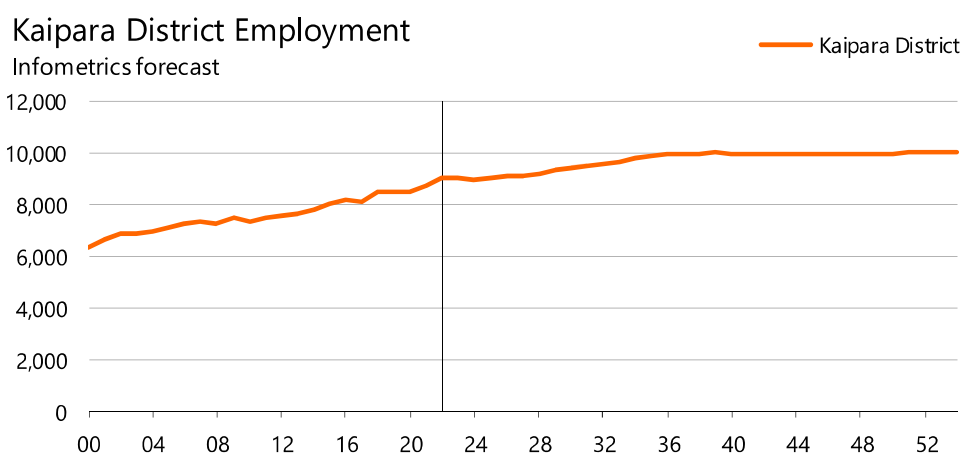
Employment growth in Kaipara averaged 1.5% per year over 2000-2020, just behind the national average of 1.9% (Graph 2). From 2022 to 2040, employment in Kaipara is forecast to grow 0.6% per year, slightly behind national growth of 0.9%. Employment in Kaipara is forecast to decline slightly in 2024 as rising interest rates and building costs discourage residential construction activity, and construction industry employment contracts. Construction is the second largest industry in Kaipara as of 2021, so a decline in construction industry employment dents overall employment. Agriculture and manufacturing are the largest and third largest industries in Kaipara respectively, so decline in these industries from 2030 onwards also dents overall employment. Employment in Kaipara is forecast to stay flat over the 2040 to 2054 period.

Graph 2

Employment growth
Annual % change, Infometrics forecast
Kaipara District
New Zealand
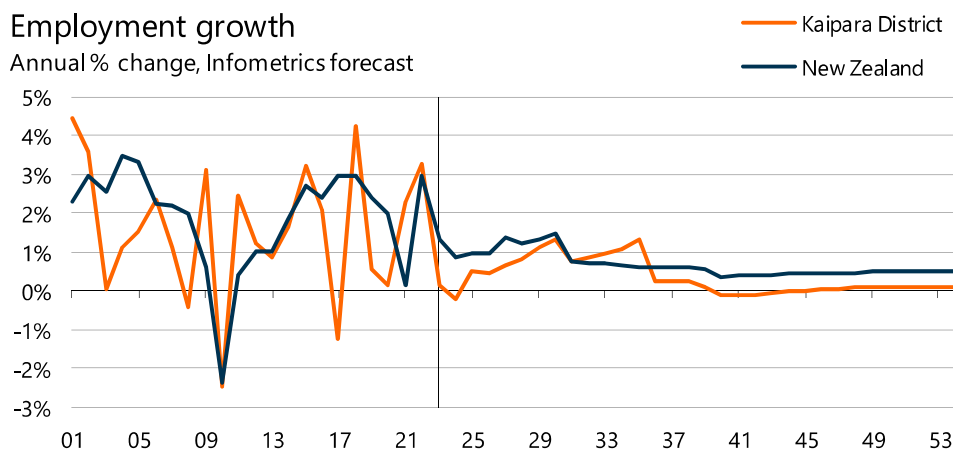
Population

International net migration to recover slowly

International net migration rose to record highs in the 2010s, and a further record high in 2021 as expat New Zealanders rushed home ahead of the COVID-19 border restrictions (Graph 3). This was followed by a sharp fall in net migration while the border was closed.

Despite a progressive loosening of migration settings as New Zealand's international border reopened in 2022, a highly competitive global market for labour is expected to limit migration inflows, at the same time as an elevated number of New Zealanders are leaving. Net migration is forecast to trend back to its long-term level of 30,000 per annum later in this decade.

This net migration projection reflects that under our forecast of steady employment growth and an ageing population, we expect sustained positive net migration over the long term. Although New Zealand does not currently have a long-term immigration strategy, we expect that labour market pressures will persuade future governments to enable sustained, moderate net migration flows through favourable migration settings. However, we do not expect net migration to return to the highs observed in the past decade, given the highly competitive global market for migrants, as many countries face an ageing population.

Graph 3

International net migration to New Zealand
Stats NZ estimates, Infometrics forecast
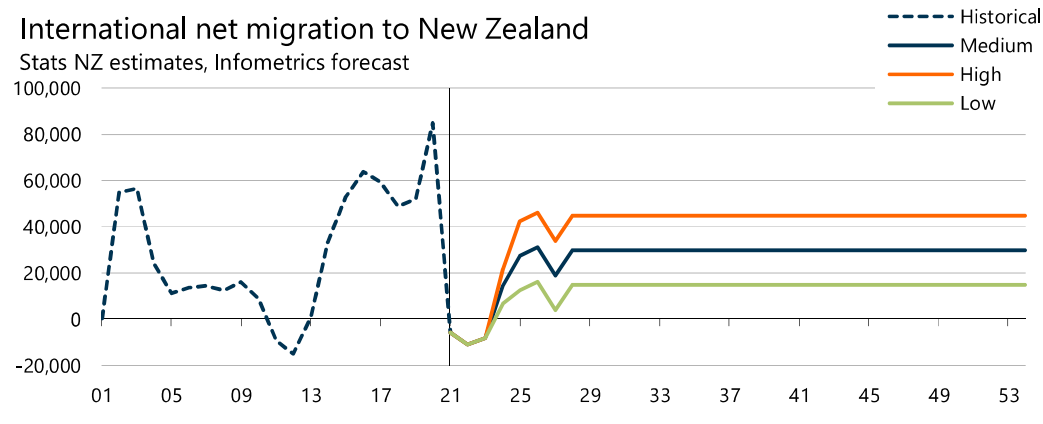
Distribution of regional net migration shifts

Over the 1990s and 2000s, periods of high international net migration largely translated to periods of high net migration into New Zealand's metropolitan centres. For example, when international net migration peaked (at the time) in 2003 at 51,500pa, metro centres took 86% of the country's net migration, and rural areas continued to experience net outflows (Graph 4**Error! Reference source not found.**). However, by the 2010s, the distribution of population across our metropolitan, provincial and rural areas fundamentally changed. Between 2014 and 2020, 57% of net international migration went to the metro centres, allowing provincial and rural areas to make substantial net

migration gains and therefore arrest population decline which dated back to the economic reforms of the 1980s. This change was driven by a combination of factors – extremely strong net migration volumes which exceeded housing capacity in the metropolitan centres, rising unaffordability of housing which has pushed commuters further out from cities, and emphasis on regional migration in work visa rules. Improved internet connectivity and greater options for remote working have likely aided this change too. These changes have had a significant effect on Kaipara, being located on the edge of Auckland.

Graph 4

Net migration by territorial authority type

Stats NZ, Infometrics

■ Rural ■ Metro ■ Provincial
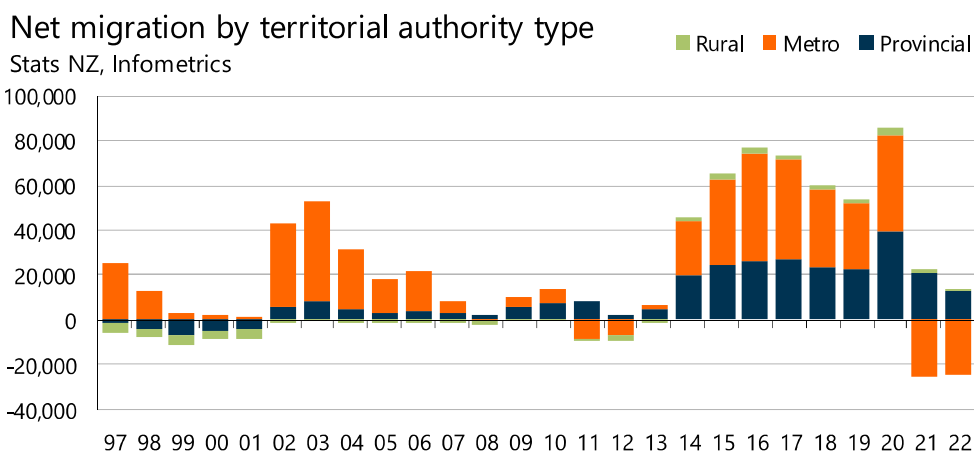
Drivers of population growth shift over time

Shifts in international net migration have been the most noteworthy driver of population growth in the past decade nationally, owing to the relative volatility of migration (Graph 5). However, this belies the long-term ageing of New Zealand's population which is closing the gap between births and deaths, known as natural increase. Births are projected to remain broadly steady in numeric terms, at or above 300,000 per five-year period, with a growing population offsetting a declining fertility rate. Deaths are projected to grow steadily as burgeoning older age groups outpace decreasing mortality rates. As natural population growth decreases, with deaths growing faster than births, population growth will slow and become increasingly dependent on net migration. Nationally, deaths are projected to outnumber births in the 2050s, at which point New Zealand's population will be entirely reliant on net migration to avoid decline.

Graph 5

Drivers of population change in New Zealand
Total 5yrs ending, Infometrics medium projection

Legend: Births, Deaths, Net migration
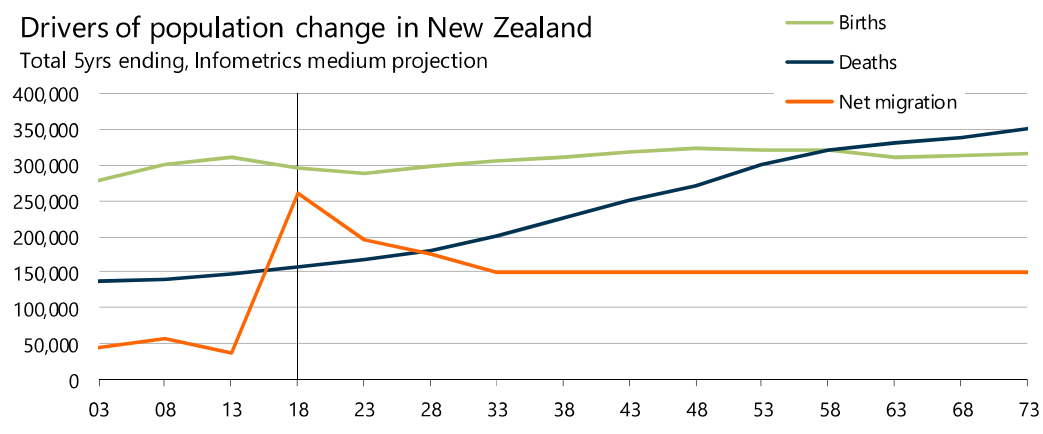
Natural population increase in Kaipara is projected to turn negative in the 2040s, with a growing number of deaths outpacing the steady numbers of births (Graph 6). Net migration to Kaipara District has steadily increased over the past two decades, particularly as the Mangawhai area has grown. Net migration into Kaipara is projected to peak in the five years to 2023, reflecting the surge of international net migration to New Zealand in 2020, and the district's success in attracting domestic migrants during the pandemic. Net migration into Kaipara is projected to stabilise at around 1,500 every five years, for the remainder of the projection period. This level reflects the need for migrant workers to replace retiring workers across the district, as well as the ongoing popularity of Mangawhai in attracting domestic migration from fast-growing Auckland.

Graph 6

Kaipara district population drivers
Total five years ending, Stats NZ estimate, Infometrics projection

Legend: Births, Deaths, Net migration
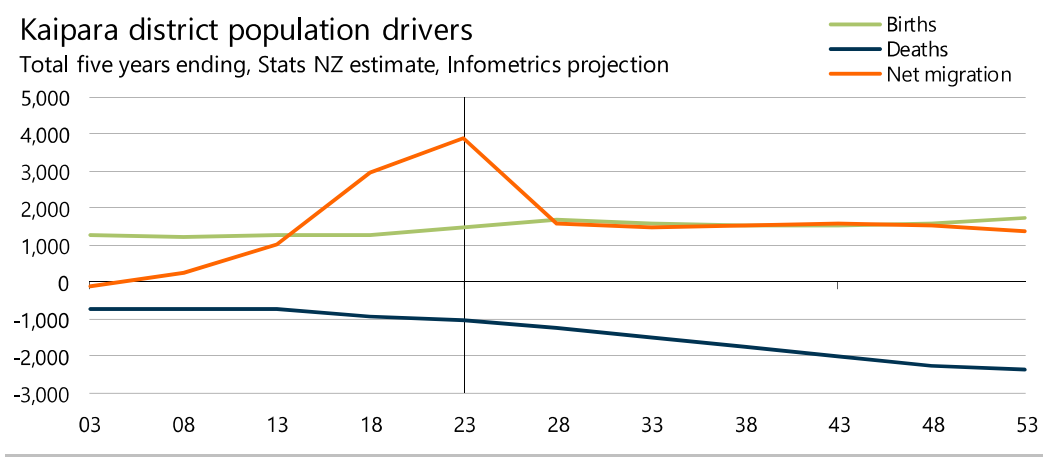
Population growth is front loaded

Kaipara's population growth has risen steadily over the past 25 years, peaking at over 4% per annum in 2020 and 2021, and easing back to 2.6% in 2022. The district's exceptionally strong growth in 2020 was driven by expats returning to New Zealand ahead of the COVID-19 border closures. Strong growth in 2021 reflected a burst of migration to commuter areas as working from home practices reached widespread adoption.

Kaipara's population is projected to grow 3.0% in the year to June 2023 across all three scenarios. Under the medium scenario, Kaipara's population growth averages 1.5% per annum over 2022 to 2030, compared to 0.9% in the low scenario, and 2.1% in the high scenario. The rate of population growth eases over time across all three scenarios, remaining positive throughout the projection period in the high and medium scenario, and dipping negative from 2042 onwards under the low scenario.

Under the medium scenario, Kaipara's population grows faster than the national average throughout the 2020s, and from the early 2030s onwards it grows at a similar rate to the national population. New Zealand will experience the same characteristic slow-down as Kaipara, which reflects the gradual softening in natural increase over time.

Graph 7
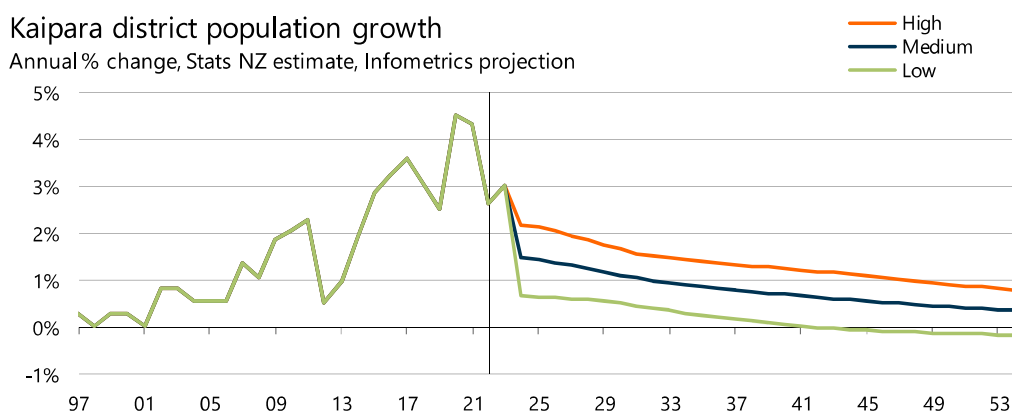
Kaipara district population growth
Annual % change, Stats NZ estimate, Infometrics projection

Population reaches 35,700 in 2054

Kaipara District's population is projected to grow steadily in the medium scenario, reaching 35,700 in 2054 (Graph 8). This amounts to an additional 8,500 residents between 2022 and 2054. Kaipara's strong historical growth, particularly in the past ten years, increased the district's population by 9,400 between 1996 and 2022.

Under the high scenario, Kaipara's population grows steadily throughout the projection period, reaching 42,200 in 2054. The high scenario represents an increase of 15,000 residents between 2022 and 2054.

Under the low scenario, Kaipara's population peaks at 29,800 in 2041, easing slightly thereafter to arrive at 29,400 in 2054. The low scenario represents an increase of 2,200 residents between 2022 and 2054.

Graph 8
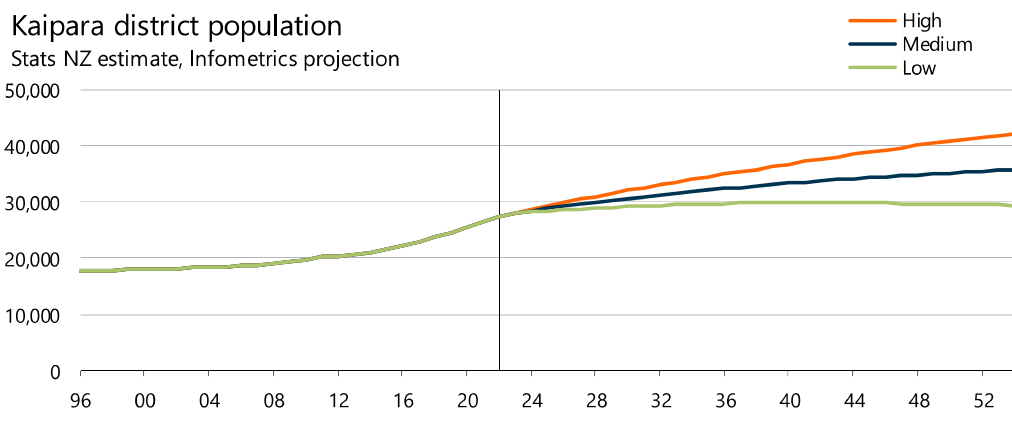
Kaipara district population
Stats NZ estimate, Infometrics projection

Growth led by the 65+ age group

The 65-years-and-older age group has been Kaipara's fastest growing in the past two decades, growing 5.1% per annum on average between 2003 and 2018 (Graph 9). It will continue to be the fastest growing age group, projected to grow 3.8% per annum between 2018 and 2033 under the medium scenario. This growth is driven by attracting further migrants aged 65 years and older, and the last of the baby boomer generation transitioning from the 30-64 age group into the 65 years and older age group by 2030. Growth in the 65-years and older age group is expected to slow down after 2033, but it will continue to be the fastest growing age group in Kaipara, growing at 1.2% per annum.

The population under the age of 65 is also projected to grow in Kaipara, albeit at a much slower rate than the 65 years and older group. The 0-14 year old population is projected to grow from 5,200 in 2023 to 5,500 in 2053. The 15-29 year old population is projected to grow from 3,700 to 4,300. The 30-64 year old population is projected to grow from 12,200 to 13,100.

Graph 9

Kaipara district population by age
Stats NZ estimates, Infometrics medium projection
% of total population
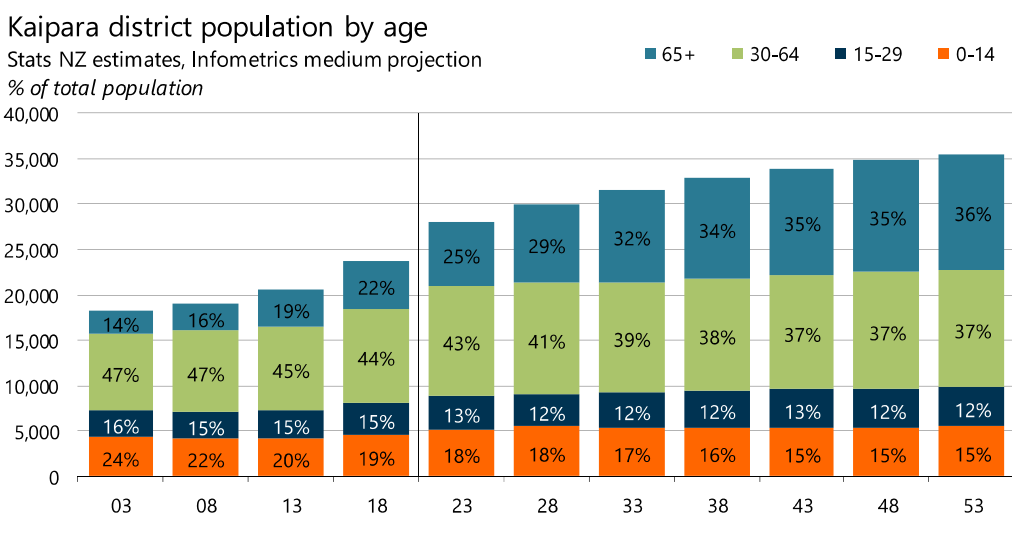
65+ age group nearly a third of population

The population aged 65 years and older is projected to grow from 25% of Kaipara's population in 2023 to 32% in 2033, and 36% in 2053 (Graph 9). Over this period, the 30-64 year old population will ease back from 43% to 37%, almost equal in size to the 65+ population by 2053. By contrast, the under 30 population is projected to decline as a share of the population. The 0-14 year old population is projected to ease from 18% in 2023 to 15% in 2053, and the 15-29 year old population from 13% to 12%.

Average age races ahead of New Zealand

In 1996, Kaipara's average age of 35 years was the same as the national average (Graph 10). Since then, a net migration loss in young age groups, and net migrant gain in older age groups, has pushed the average age higher and faster than New Zealand overall. As of 2022, the average age in Kaipara was 44 years, compared to 39 years nationally. The average age in Kaipara and New Zealand is projected to continue growing over the next years, although the gap will persist. In the medium scenario, Kaipara's average age is projected to be 50 years in 2054, compared to 44 years nationally.

Graph 10

Average age comparison
Stats NZ estimate, Infometrics projection

Kaipara district
New Zealand
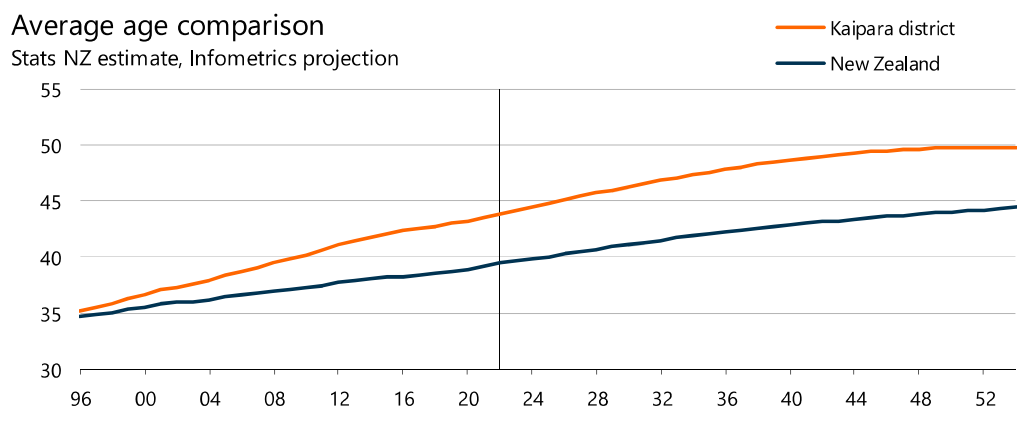
Population becoming more diverse

Kaipara's population is projected to become more diverse over time, with growth across all major ethnic groups and an increase in people identifying with multiple ethnic groups. As of 2018, 84.1% of Kaipara's population identified with European ethnicity, 24.9% with Māori, 3.8% with Pacific and 2.9% with Asian (Graph 11). Between 2018 and 2043, the strongest growth is expected in the Pacific ethnic group, growing by 131%, and Asian, growing by 106%. The Māori population is projected to grow 80% and European by 50%.

Note that as people can identify with more than one ethnicity, the population by ethnic group is greater than the total population, and percentages add up to more than 100%.

Graph 11

Kaipara district population by ethnic group
Infometrics medium projection, % of population

Legend: ■ Asian ■ Pacific ■ Māori ■ European

	18	23	28	33	38	43
Māori	24.9%	25.3%	26.5%	27.6%	29.3%	31.3%
European	84.1%	85.4%	86.1%	86.9%	87.1%	87.8%
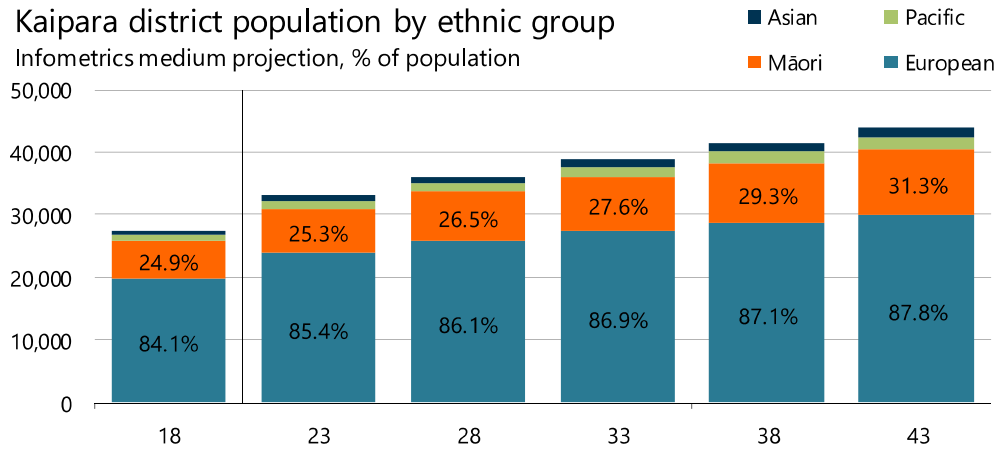
Households

Household projections are theoretical

A household is a grouping of individuals and/or families living in the same dwelling and sharing facilities with each other. The number of households and average household size are estimated based on projected changes in the sex and age structure of the population (such as a growing older-age population) and trends in household formation (such as women deferring childbirth). These trends provide a theoretical estimate of the number of households. However, the actual number of households will depend on a sufficient number of dwellings being available. If fewer dwellings are made available, for example due to lower levels of new dwelling construction, then fewer households will be able to form, and the average household size may be higher. As a practical example, we might expect a couple with one child to form their own single-family household, consisting of three occupants. However, if the couple is unable to obtain suitable dwelling, they may move in with one of their sets of parents, forming a multi-family household with five occupants.

Average household size stays around 2.35

Kaipara's average household size has eased over the past 20 years, from 2.49 in 2001 to 2.39 in 2022 (Graph 12). As Kaipara has aged, an increasing number of older persons have formed couple-without-children or one-person households. At the same time, lower fertility means that even families with children are becoming smaller.

In the medium scenario, Kaipara's average household size is projected to ease a little further, to 2.35 in the mid-2030's, and remain around 2.35 for the remainder of the projection period.

Graph 12

Average household size
Infometrics medium projection
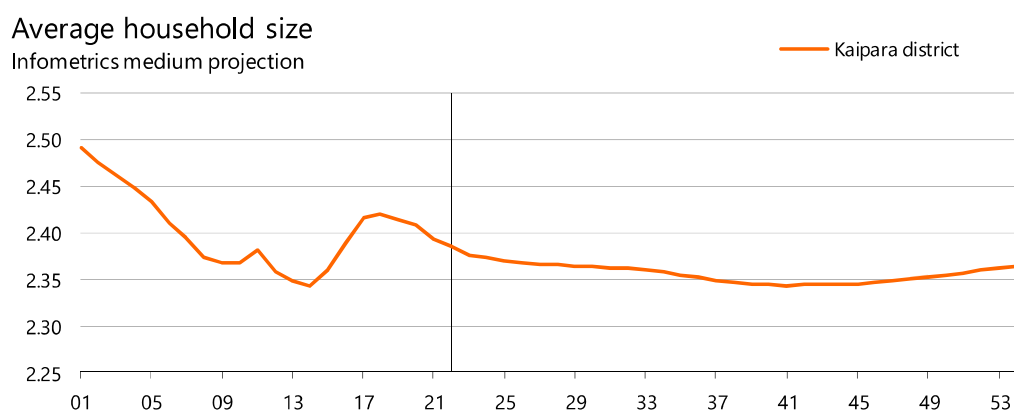
The declining average household size projected for the 2020s means that the number of households in Kaipara is projected to grow slightly faster than the population. Household growth will be increased by the existing population forming smaller households, as well as households formed through population growth. Thereafter, the

steady average household size means that household growth will mirror population growth.

Household growth comes off recent highs

Household growth in Kaipara reached a peak of 4.7% in 2020 and 5.0% in 2021, driven by strong population growth (Graph 13). Household growth eased to 3.0% in 2022 and is projected to ease further in the coming years as population growth settles to more moderate levels. In the medium scenario, households are projected to grow at 1.6% per annum between 2022 and 2030, 0.9% between 2030 and 2040, and 0.4% between 2040 and 2054. Under the low scenario, household growth mirrors population growth and turns slightly negative in the 2040s. Under the high scenario, household growth is projected to remain above 1% per annum until the mid-2040s.

Graph 13

Kaipara district household growth
Annual % change, Infometrics projection
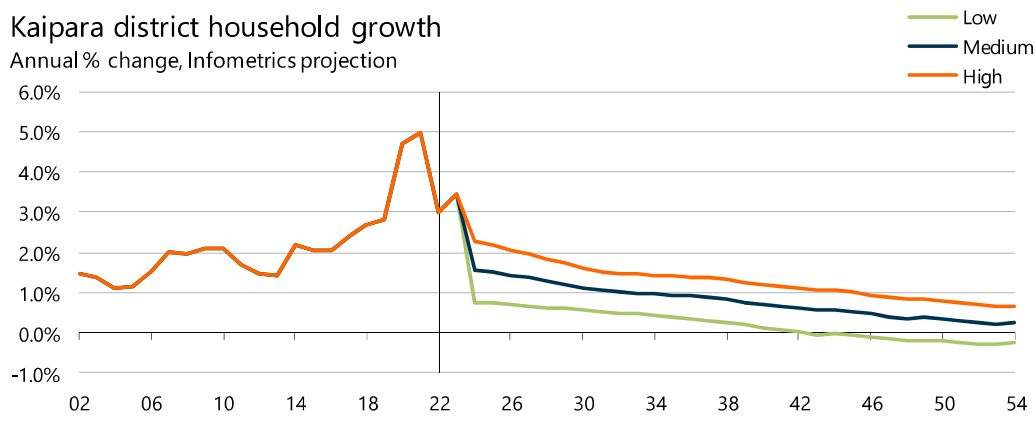
Households total 15,000 in 2054

The number of households in Kaipara District is estimated to have risen from 7,100 in 2001 to 11,300 in 2022. Under the medium scenario, households are projected to grow to 15,000 in 2054 (Graph 14). Under the high scenario, households total 17,300 in 2054. Under the low scenario, households peak at 12,700 in the early 2040s, and ease to 12,400 in 2054.

Graph 14

Kaipara district households
Infometrics projection

Legend: Low / Medium / High

(Graph showing households projection from 2001 to 2053, values ranging 0 to 20,000)

Family households most common

Family households are the most common household type, accounting for 70% of households in Kaipara in 2018, and projected to account for 70% of households in 2053 (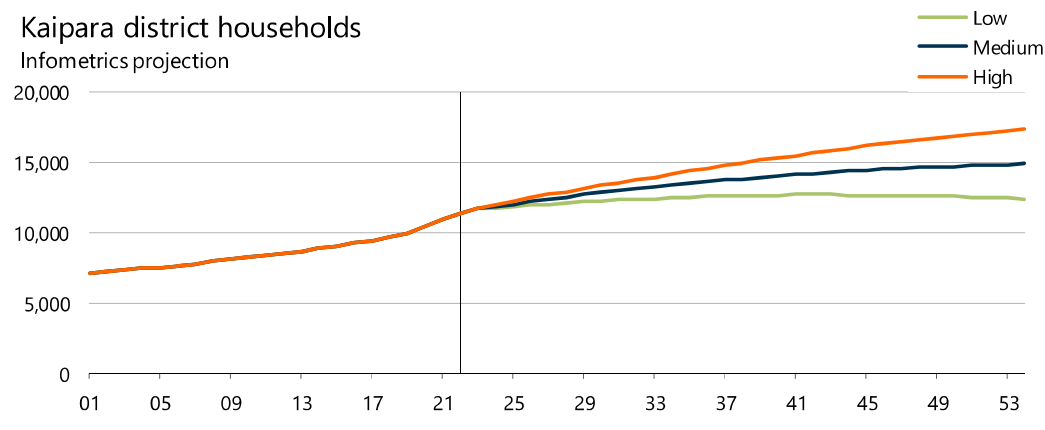Graph 15). Family households include couples living with or without children, and one-parent families. One-person households are the second most common household type, accounting for 26% of Kaipara households in 2018. This type of household often includes older persons living alone, such as widows or widowers. Other multi-person households (colloquially known as flatting), are projected to remain steady in percentage terms over time, accounting for around 3% of Kaipara households.

Graph 15

Kaipara district households by type
Infometrics medium projection

Legend: Other multiperson household / One-person household / Family household

Year	Family household	One-person household
18	70%	26%
23	70%	26%
28	69%	26%
33	69%	25%
38	69%	25%
43	69%	24%
48	69%	24%
53	70%	24%
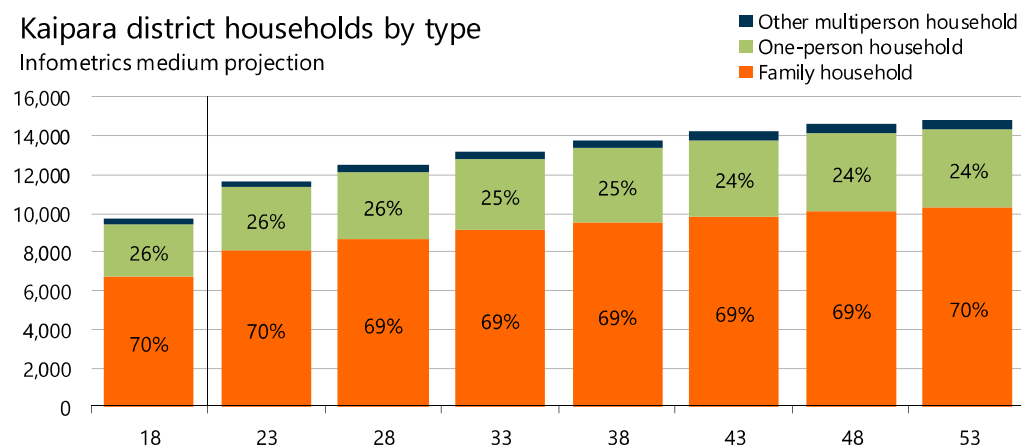
Couples are most common family type

Couples are the most common family household type, including two-parent families and couples without children (Graph 16). Couples without children are projected to be the fastest growing family type in the 2020s, as the district continues to attract pre-retirees and retirees. From the 2030s onwards, growth in couples without children slows down, and growth in one or two parent families picks up.

Graph 16

Kaipara district region family households
Infometrics medium projection

Legend:
- One parent family
- Two parent family
- Couple without children family
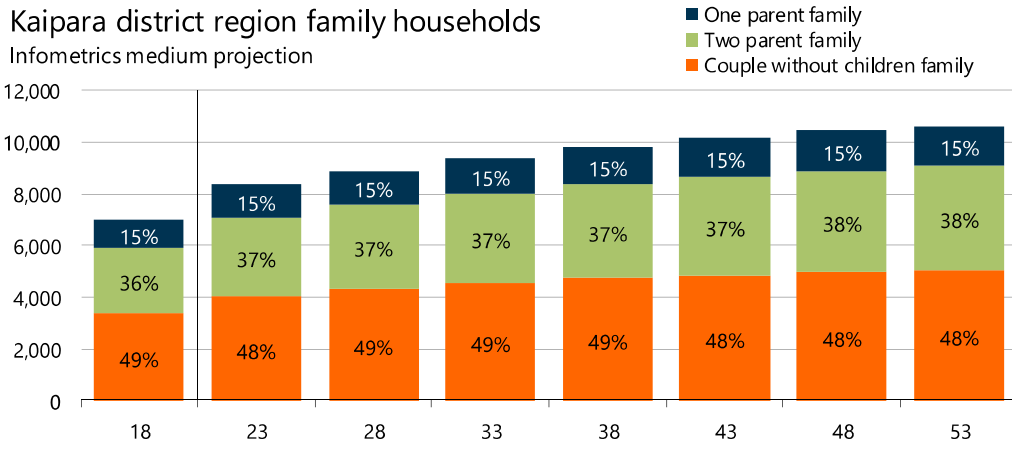
Note that family households referred to above can consist of multiple families, therefore the number of families in Graph 16 is slightly higher than the number of family households in Graph 15. For example, consider a young couple with children that live with their older parents. They form a single household together, but there are two distinct family units within the household.

Rating units

Understanding dwelling growth

Understanding dwelling growth is somewhat challenging in Kaipara, given the prevalence of unoccupied holiday houses in areas like Mangawhai and Kaipara Coastal, and the ability for these unoccupied dwellings to become occupied without an official record. Dwellings are recorded at the Census, but inconsistencies in classification between the 2013 and 2018 Census make it unclear how unoccupied dwellings grew in this period. In between Census years, we can compare household growth estimates to dwelling consents, to infer how unoccupied dwellings have grown. At a districtwide level, occupied households grew substantially faster than new dwelling consents between 2019 and 2022 (Graph 17), which suggests that the strong growth in households was accommodated by formerly unoccupied holiday houses becoming permanently occupied residences. In practical terms, this could reflect holiday house owners choosing to spend more time in their holiday house during COVID-19 lockdowns, and then choosing to move there permanently – perhaps working remotely or retiring.

Graph 17

Kaipara district dwellings
Infometrics household estimate, Stats NZ consents

Legend: Occupied households; New dwelling consents
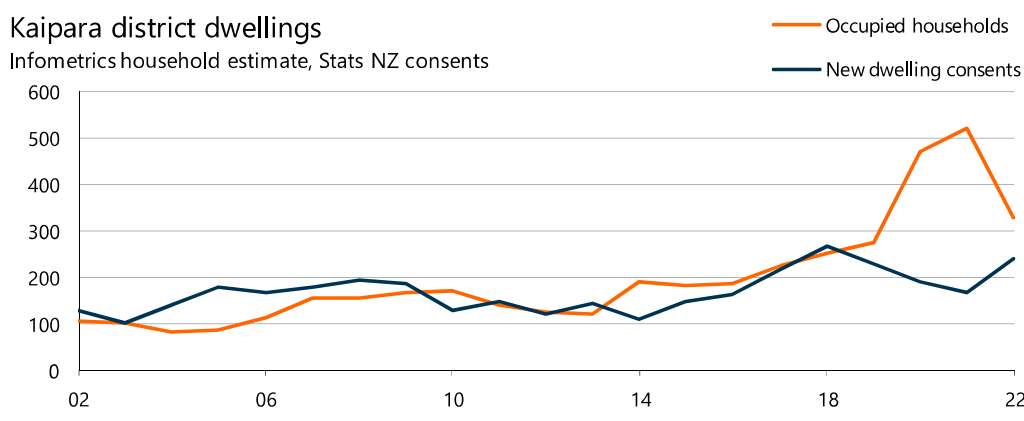
Projecting rating units

For the purposes of developing rating unit projections, we have assumed that there is no further net growth in unoccupied dwellings in Kaipara. This is based on the strong trend of holiday houses being converted to permanent occupation, and inconclusive evidence of holiday house growth or decline between 2013 and 2018. The 2023 Census should provide a clearer picture of any trends.

Our rating unit projection is based on projected household growth (for residential rating units) and employment growth (for non-residential rating units). This approach is described further in Appendix 1 – our approach in detail.

Rating units rise to 18,800 in 2054

As of 2022, there were 15,250 rating units across Kaipara District. This is set to rise to 18,800 in 2054 under the medium scenario, 16,600 under the low scenario, and 21,000 under the high scenario (Graph 18). A full projection for each rating district is provided in the accompanying tables.

Graph 18

Kaipara district rating units
Districtwide rating units, Infometrics projection
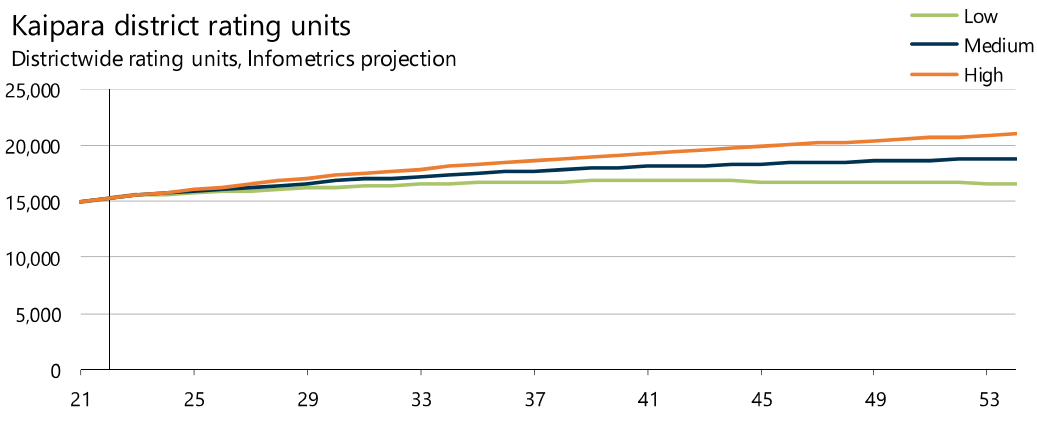
Sub-district projections

Sub-district projections informed by local insights

We have produced projections at a sub-district level, informed by input from Kaipara District Council on how growth is likely to be accommodated in the district in future. These sub-district projections consider the draft district plan, spatial plans, and known private plan changes. More generally, the sub-district projections reflect observed historical patterns, such as the Mangawhai area's growth being driven more as a satellite of Auckland rather than by the underlying economic drivers of Kaipara District.

The sub-district projections are produced for Statistical Area 2 (SA2) areas defined by Stats NZ. It is important to note that these areas are defined at a point in time, and may not take into account urban expansion. For example, the proposed Dargaville racecourse development is not located in Dargaville SA2, instead it is nearby in the Maungaru SA2 which covers a large rural area neighbouring Dargaville. Similarly, the Mangawhai Central development, which is urban in nature, is located in the Mangawhai Rural SA2.

Our SA2 projections use the same cohort component demographic approach as used for the districtwide projections. This takes into account the age structure of the current population and modelling demographic processes that will affect that population over time. The outputs for SA2 include projections of population by age, households by type, dwellings, and rating units.

Sub-district population and employment

Dargaville has historically been a hub for employment in Kaipara, and over the past decade has experienced faster growth in employment than population (Graph 19). The gap between population and employment in Dargaville has narrowed over time, which may reflect greater commuting from nearby Kaipara Coastal and Maungaru SA2 into Dargaville for work.

Graph 19

Dargaville SA2 employment and population
Stats NZ and Infometrics estimates

Population
Employment
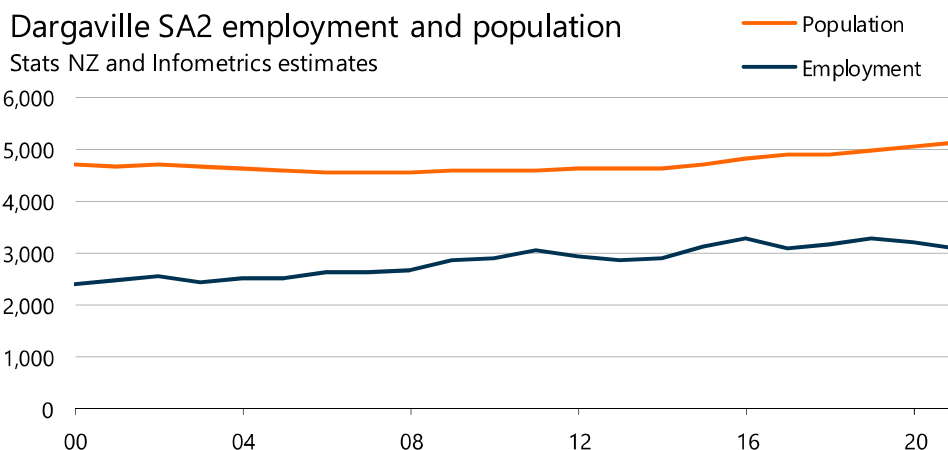
By contrast, Mangawhai's growth has been predominantly population-driven, with population growing much faster than employment (Graph 20). This reflects that Mangawhai's growth is driven more by being a satellite of Auckland than local job opportunities.

Graph 20
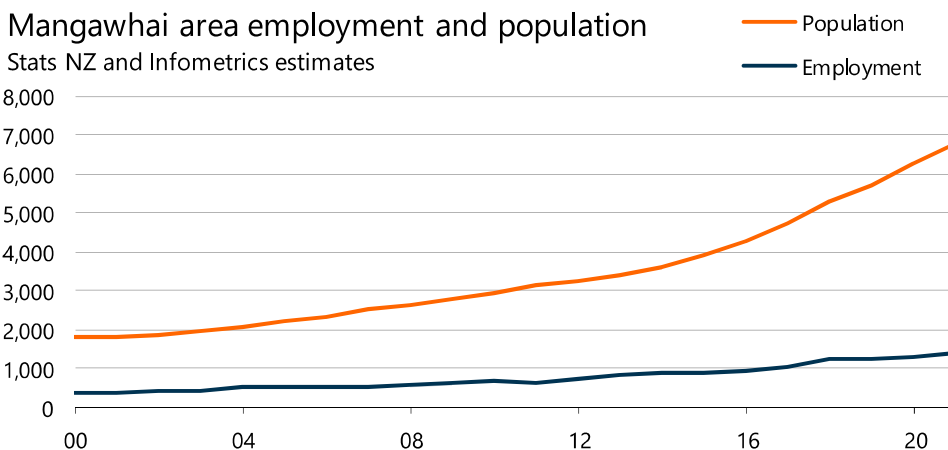
Mangawhai area employment and population
Stats NZ and Infometrics estimates

Population
Employment

Strongest population growth in Mangawhai

Population growth is projected to be strongest in the Mangawhai (including the three Mangawhai SA2) over the medium and long term, with moderate growth across the rest of the district, and slow growth in Dargaville (Graph 21). Mangawhai's population overtook Dargaville's in 2018, and is expected to have nearly double the population of Dargaville by the end of the projection period.

Graph 21

Kaipara sub-district population
Stats NZ and Infometrics medium projection
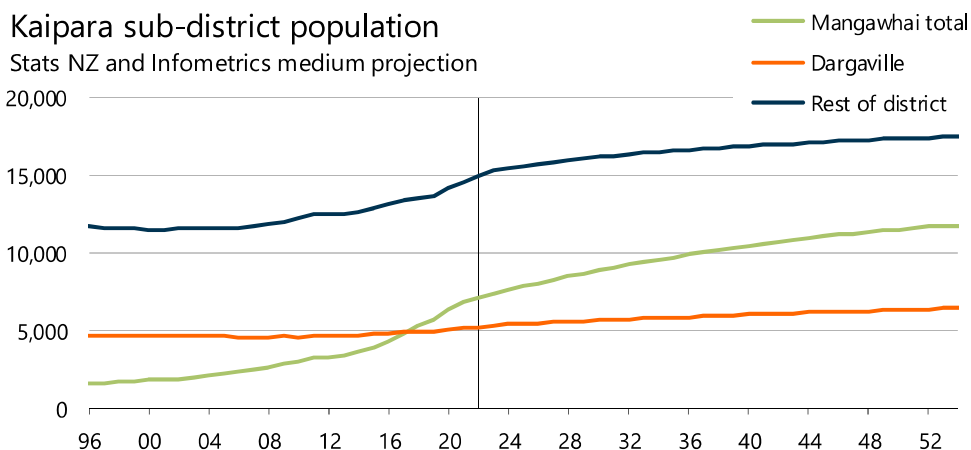
Within Mangawhai, growth is projected to slow down in Mangawhai SA2 in the long term as capacity for growth dries up, with growth becoming more focused on Mangawhai Rural (Graph 22). Mangawhai Rural SA2 includes the area in between Mangawhai Heads and Mangawhai town, which is expected to include urban-natured development. Under the medium scenario, the population in Mangawhai Rural SA2 is projected to almost double between 2022 and 2054, growing 2.9% per annum (Table 1).

Graph 22

Mangawhai population
Stats NZ and Infometrics medium projection

Table 1

Sub-district population growth

Infometrics medium projection

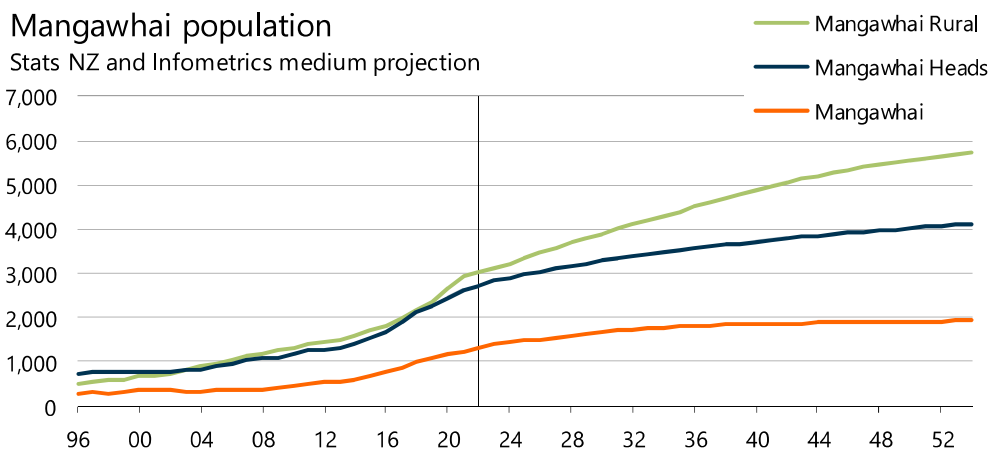| SA2 area	Population		Annual growth	
	2022	2054	2024-2034	2034-2054
Kaipara Coastal	4,201	4,764	0.5%	0.4%
Maungaru	1,936	2,077	0.3%	0.0%
Dargaville	5,214	6,420	0.8%	1.0%
Ruawai-Matakohe	2,765	3,020	0.4%	0.2%
Otamatea	1,946	2,178	0.6%	0.2%
Maungaturoto	1,447	1,903	1.1%	1.3%
Kaiwaka	2,656	3,559	1.2%	1.3%
Mangawhai Rural	3,024	5,727	2.9%	2.9%
Mangawhai Heads	2,713	4,116	1.8%	1.7%
Mangawhai	1,297	1,931	2.2%	0.8%
Kaipara District	**27,200**	**35,696**	**1.1%**	**0.6%**

Relatively strong growth is also expected in nearby Maungaturoto and Kaiwaka (Graph 23). Mangawhai, Maungaturoto and Kaiwaka all benefit from their proximity to Auckland, with expected further growth in commuting as transport connectivity is further improved. Potential industrial development in Maungaturoto and Kaiwaka is also expected to support population growth in these two centres. Dargaville features solid growth in the near term, underpinned by employment opportunities in the town and surrounding rural area. Some of Dargaville's growth may be shared with Maungaru SA2 I if the Dargaville Racecourse private plan change goes ahead, but we have assumed all of Dargaville's urban growth will be in Dargaville SA2.

Graph 23
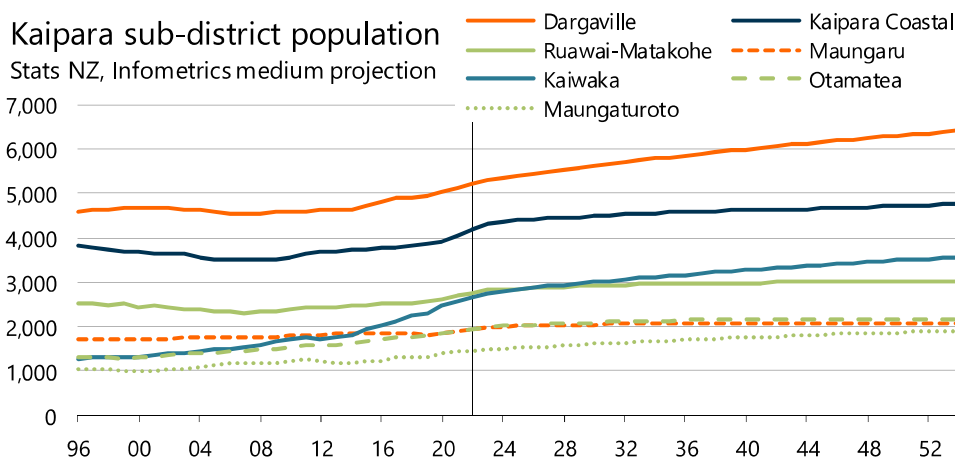
Kaipara sub-district population
Stats NZ, Infometrics medium projection

Household growth concentrated in Mangawhai

Sub-district household growth mirrors sub-district population growth, with the strongest household growth expected across the Mangawhai area, again with a sharp slowdown in Mangawhai SA2 over the longer term (Table 2). Household growth slows down overall across the district in the 2034-2054 period, leading to slower growth in nearly all SA2s in this period compared to 2024-2034. Ruawai-Matakohe and Otamatea are expected to experience a slight decline in the number of households due to softer rural employment, although there will still be more households in 2054 than in 2024.

Table 2

Sub-district household growth

Infometrics medium projection

SA2 area	Households		Annual growth	
	2022	2054	2024-2034	2034-2054
Kaipara Coastal	1,726	1,851	0.3%	0.0%
Maungaru	784	783	0.3%	-0.3%
Dargaville	2,100	2,499	0.6%	0.4%
Ruawai-Matakohe	1,145	1,165	0.4%	-0.2%
Otamatea	821	875	0.6%	-0.2%
Maungaturoto	557	750	1.2%	0.6%
Kaiwaka	1,058	1,427	1.4%	0.5%
Mangawhai Rural	1,313	2,732	3.3%	1.7%
Mangawhai Heads	1,204	1,913	1.9%	1.1%
Mangawhai	573	868	2.2%	0.5%
Kaipara District	**11,282**	**14,862**	**1.2%**	**0.5%**

Appendix 1 – our approach in detail

This appendix expands on the brief methodology described earlier in *Our approach*, explaining our approach to each facet of the projection, including key assumptions that we have made.

Employment forecast

Infometrics forecasts regional employment through a combination of three models. Our macro-economic model provides forecasts of national employment on an annual basis up to 2027. Our general equilibrium model forecasts national employment by industry over the long-term. Finally, our regional forecasting model breaks these forecasts down to industries in each region.

Macro-economic model

Infometrics maintains a macroeconomic forecasting model that underpins our five-year forecasts of activity across the national economy. Our model accounts for the relationships between different sectors of the economy and their responsiveness to one another. These include the labour market, households, businesses, government, the international trade sector, and financial markets.

In times of economic upheaval, we refine the output from the model based on expert input from our forecasting team, their knowledge of rapidly changing trends in the economy, and the insights we gain from our interactions with central government, Councils, Economic Development Agencies, and private sector clients.

Overseeing the forecasting process and model is Gareth Kiernan, who has been forecasting the New Zealand economy for more than 20 years. The framework provides quarterly forecasts of GDP, employment, unemployment, and a range of other macroeconomic indicators up to 2027.

General equilibrium

Infometrics general equilibrium (GE) model enables us to produce long term national forecasts of employment by 55 industries. To obtain projections for a 30-year horizon requires an approach that is based on structural issues such as technological change, industry productivity, demographics, evolving demand for different consumer goods and services, and New Zealand's international competitiveness. The model presents a picture or scenario of the economy for the target years (in our case 2030 and 2050) based on plausible assumptions of economic factors including international commodity prices, population growth, carbon price, automation, changes in energy efficiency, and substitution between four energy types (coal, oil, gas and electricity). Some of the key macro-economic assumptions used in the ESSAM model are shown in Table 3.

Long term forecasts should ideally be presented as scenarios given the uncertainty of the future. In this project we will present a central scenario which is based on a central view of a range of factors that can influence employment outcomes over the long term.

Infometrics GE model is maintained by one of New Zealand's foremost econometricians, Dr Adolf Stroombergen.

Table 3. ESSAM macro-economic assumptions and outputs

Indicator	2025-2030	2030-2050
Growth rates		
Population	1.0%pa	1.0% pa
Labour force	0.7%pa	0.46%pa
GDP	2.9%pa	1.7%pa*
World trade	2.7%pa	2.5%pa
Public investment	3.0%pa	2.5%pa
Government consumption	2.1%pa	1.7%pa
Investment in dwellings	2.0%pa	1.0%pa
Real prices		
Oil price	US$110/bbl in 2030	US$110/bbl in 2050
Carbon price	NZ$100/tonne CO_2 in 2030	NZ$200/tonne CO_2 in 2050

 * These are model results, not input assumptions.

Regional Forecasting Model

The Regional Forecasting Model (RFM) is an econometric model which breaks national employment forecasts to detailed industry and regional level. It draws on Infometrics 20-year quarterly time series of employment by detailed industry by territorial authority. The model uses a mix of top-down and bottom-up approaches. It simultaneously provides forecasts for all industries in all territorial authorities that are constrained to be consistent with Infometrics macroeconomic forecasts for the national economy in the medium term and the outputs of the GE model in the long term.

A number of sub-models which use a bottom-up approach feed into the Regional Forecasting Model. We build sub-models for industries that we have detailed insights into, and we forecast drivers of employment in those industries. Currently we use four industry sub-models.

Construction sub-model

The construction sub-model provides forecasts of employment in each of the 24 construction sub-industries in each territorial authority. It is an econometric model which is largely driven by Infometrics forecasts of work put in place (WPIP) which are presented to clients via our Regional Construction Outlook product. Our WPIP forecasts are driven by population growth, household formation, and large construction projects which have been signalled. Employment is assumed to respond in a lagged manner to changes in WPIP. The length and magnitude of those lagged responses differs across industries.

Education sub-model

The education sub-model provides forecasts of employment for the following sub-industries: early childhood education, primary education, secondary education, tertiary and vocational education. The model develops a relationship between age cohorts and

demand for services from each sub-industry and draws on our age-specific population forecasts to estimate the demand for services from each sub-industry. For example, the size of the population of 0- to 4-year-olds drives the demand for early childhood education. In some cases, we assume that student to staff ratios will keep falling and these have also been incorporated into our estimates for long-term demand. We then estimate the speed at which employment will converge to long-term demand. The model accounts for trends in international education which are driven by different factors compared to domestic education.

Healthcare sub-model

The healthcare sub-model disaggregates into healthcare industries (hospitals, dental services, etc) and social service industries (aged care, childcare). We use regional population projections to estimate long-term demand for these services. Where relevant, we combine these regional population projections with estimates of demand for healthcare services by age group. For example, demand for hospital workers incorporates data on the number of hospital bed days by age group.

Retail and hospitality sub-model

The retail and hospitality sub-model disaggregates into retail industries and hospitality industries (accommodation and food services). Forecasting is a two-stage process. First, we forecast regional retail and hospitality sales, taking into account the different components of sales: local spending, domestic tourism and international tourism. This allows us to account for the regional variations in the impact of COVID, which include lower international tourism but higher amounts of local spending and domestic tourism. Second, we use econometric models to forecast the impact of retail and hospitality sales on employment.

Other industries

For industries with no sub-model the RFM draws on historic trends, patterns and relationships, and projects these into the future. RFM draws on a 20-year quarterly time series of employment by 500 industries in each territorial authority. It creates multiple forecast models for every territorial authority and industry combination and, using machine learning techniques, selects and applies the model which has proven to have best predictive ability. Using these techniques, it produces forecasts of employment across 500 industries for each territorial authority over the long term.

Population projection

Population base

As a rule, the appropriate population to use for Council Long Term Planning (LTP) purposes is the estimated resident population (ERP). This represents all individuals who permanently reside in an area and could be considered a 'maximum' population because a percentage of these individuals are likely to be away at any given point in time.

Consequently, we use the Stats NZ 2022 Estimated Resident Population (ERP) as the basis for the population projections. This estimate is produced by Stats NZ with the most recent available Census (2018) data, and births, deaths and migration that have been recorded since.

Given that the majority of population projection parameters from Stats NZ are published for five-year intervals, our projection model also operates at five-year intervals, from 2018 to 2058. We then make use of a cubic-spine statistical process to interpolate population to single years. We make adjustments to reflect the fact that with data up to 2021 currently available, we have data for three out of five years in the 2018 to 2023 period. We repeat this process every year to account for Stats NZ's annual publication and revision of subnational population estimates.

Fertility

Stats NZ projects regional, age-specific fertility rates for five-year age groups, which we apply to our estimates of population by age and gender cohorts, in order to estimate the number of births in each five-year period. Throughout the projection period, we adopt Stats NZ's assumed gender ratio of 105.5 males per 100 females born – this is based on the historic average ratio at a national level. This phenomenon is commonly observed around the world, and is understood to be a function of slightly higher miscarriage rates for female babies, rather than of selective abortion.

Mortality

Projected age- and gender-specific mortality rates by region or territorial authority, as calculated by Stats NZ, are applied to accurately project the number of deaths. These rates vary over time to reflect observed trends such as extended life expectancy.

Migration

We build up our projection of net migration in two stages. First, we consider overall volumes of international net migration to New Zealand. This contributes to the total pool of net migrants – international and internal – which we apportion to each territorial authority.

International net migration volumes

The population projections draw on Infometrics' short- and long-term international migration forecasts (Graph 3).

Regional distribution of migration

Migration is apportioned to territorial authorities using a mix of two approaches. Firstly, historical migration trends are applied to forecast the volume of non-employment-driven migration, such as people moving at retirement. Secondly, forecast labour market shortfalls are used to forecast the volume of employment-driven migration, such as people moving to take up employment opportunities. Employment-driven migration is also adjusted somewhat to account for commuting patterns between districts.

For non-employment-driven migration, we apply the age and gender profile of Stats NZ's subnational net migration projections. For employment-driven migration, we apply a bespoke age and gender profile, based on Stats NZ's projection with adjustment made around older age groups and groups with net negative migration. Analysis of net migration by age reveals that migration flows of persons aged 80 years and older are relatively unresponsive to economic conditions, as this group is generally not involved in the labour market and migration is driven by non-economic factors such as moving closer to family or healthcare. Therefore, we only model employment-driven migration

in age groups up to the age of 79 years. We do model migration of children (0-14 years of age) as being responsive to the employment market as this is evident in historic data, which reflects families moving in pursuit of employment opportunities for the parents. For areas which receive additional employment-driven migration, we assume that this is concentrated in age-gender groups with positive migration flows, as we expect a strong labour market would accentuate positive regional labour flows and not extend negative flows.

Labour Market Shortfalls

Labour market shortfalls exist when employers' requirement for labour exceeds the number of workers available at current wage rates. When labour market shortfalls exist in an area, additional labour (and hence population) is attracted to that area.

Infometrics estimates future labour market shortfalls by separately considering the projected supply of labour and the projected demand for labour (as measured by employment) and comparing these two factors.

As the starting point for estimating labour supply, Infometrics makes use of Stats NZ's published population projections by 5-year age group and gender.

Labour force participation rates (LFPRs) by age and gender are projected based on Stats NZ's national labour force projections. In addition, historical LFPRs for each region are analysed to identify their deviation from the national average. This deviation is applied to the national LFPR by age, to project regional LFPR by age. Historical averages for the unemployment rate in each region are analysed and projected forward. Projected LFPR by age is applied to the Stats NZ population projection, and the projected unemployment rate is applied to this, in order to estimate labour supply.

This projection is undertaken for each region or territorial authority, enabling the balance between labour supply and demand (as measured by employment) to be assessed within each area. In periods of insufficient labour supply within a territorial authority or broader regional labour market to meet projected labour demand, the area is projected to receive additional migration.

This additional migration is apportioned to regions or territorial authorities based on their respective share of the national labour market shortfall. At the same time, however, additional migration may be constrained by the Infometrics international net migration forecast, meaning that a particular region may not necessarily receive sufficient inward migration to entirely eliminate its labour market shortfall.

Similarly, the projected LFPR and unemployment rates are applied to the additional migration, reflecting the fact that it is rarely possible to import only workers – instead these workers often come with family members, who may not necessarily be economically active. Examples in this regard might include stay-at-home parents, children and aged dependents. Furthermore, in some instances, migrants may not immediately gain employment following their move.

Sub-district population

We project sub-district population by considering the current population in each SA2 area, historical trends in each SA2, overall growth of the district, and the development capacity in each SA2 area. This process is carried out through a full cohort-component model for each SA2 area. Stats NZ generally designs SA2 areas to have a population of 1,000 to 3,000, with the geographic size varying depending on population density.

Household projection

The number of households at SA2 or district level is projected by applying household formation, or Living Arrangement Type Rates (LATR) to the projected population. Stats NZ projects LATR to 2043 from the 2018 Census figures for each territorial authority. These rates reflect localised differences based on local population composition. For example, some non-European ethnic groups exhibit a greater propensity to form multi-generational households, leading to larger household sizes. These projected rates also consider trends such as delayed childbearing, growing numbers of childless couples, decreased rates of single parenting, and improvements in life expectancy which enable older individuals to live independently for longer periods. This means that the LATR used in the projections follow a trend up to 2043, and then remain constant at 2043 rates up to 2073.

Applying LATR to the population provides an estimate of the number of people in each living arrangement type; this is then translated into the number of households based on expected family structures – for example, couple households consisting of two individuals. For other multi-person households, we follow the standard Stats NZ assumptions, and assume 2.6 persons per household. Projected population figures are accordingly divided by the number of households to project average household size.

The projected household size calculated in these projections varies somewhat from the 2018 Census measures. This is because Census counts are randomly rounded to the nearest multiple of 3, or supressed entirely, so as to ensure confidentiality of Census respondents. Census outputs such as average household size are however based on actual data, meaning that it is impossible for third parties to precisely replicate these outputs. Projection outputs can also vary from Census measures due to short-term changes such as increased housing occupancy in response to increasing housing costs.

Rating unit projection

Rating units are projected following the same approach used for Kaipara District rating unit projections in 2021[1]. This approach uses base rating units as of June 2021 and June 2022, provided by Kaipara District Council from their rating information database. The approach broadly involved mapping rating districts to SA2 areas, and growing residential rating units based on projected growth in households. Non-residential rating units were projected based on the districtwide employment growth forecast, and each SA2s 2021 share of districtwide employment.

---

[1] Infometrics (2021). *Rating unit projection methodology*. Prepared for Kaipara District Council