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# **2014 Review of Demographic and Labour Force Projections for the Bay of Plenty Region for the Period 2013 - 2063**

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### Preamble

1. This Report provides detailed projections for the SmartGrowth region for the period 2013-2063. It updates the previous SmartGrowth projections. In contrast to past SmartGrowth projections, this Report includes projections for all Territorial Local Authority (TLA) areas in the Bay of Plenty Region: Western Bay of Plenty, Tauranga City, and Rotorua, Whakatane, Kawerau and Opotiki Districts.
2. The Report and its underlying findings follow an extensive period of consultation by the SmartGrowth Implementation Management Group (SGIMG) with researchers at the National Institute of Demographic and Economic Analysis at the University of Waikato (NIDEA), followed by further extensive consultation with key stakeholders, members of the public, elected members, and general feedback sought by SGIMG.
3. The Report covers Usually Resident population projections by five-year age groups and sex, Household and Dwelling projections, and Labour Force projections. Projections of employment by broad industry classification (retail, agriculture, industry, education and services), broad age group and sex will be provided as a stand-alone document.
4. The population projections are of two types: *baseline* (deterministic) projections, which project a single 'medium case' scenario; and *stochastic* projections, which are based on running the projection 10,000 times, each time randomising the underlying assumptions, in the process generating upper and lower projection intervals (intervals which indicate the chance of future population numbers being above or below the stated value). Stochastic projections generate intervals with corresponding probabilities that the projected population falls below the interval, within the interval, or above the interval. The sum of these three probabilities is 100%. The Household and Dwelling, and Labour Force and Employment projections are based on the baseline population projections.

### Baseline Projections

5. The deterministic baseline projections for both Western Bay of Plenty and Tauranga City are entirely consistent with those developed by Statistics New Zealand (SNZ) to 2031. In each case they are lower than the high variant and slightly higher than the medium variant. Both baseline projections are notably lower in 2031 than the Population Studies Centre (PSC) (2001-base) series.
6. The baseline projections for Rotorua and Whakatane districts are almost identical to SNZ's medium variant out to 2031, and those for Kawerau and Opotiki slightly lower at the beginning of the projection period, with minimal difference at 2031. The trajectories for

Rotorua and Whakatane districts decline significantly after 2031, while for Kawerau and Opotiki the decline projected by SNZ continues in the NIDEA projection.

### **Western Bay of Plenty – Baseline and Stochastic Projections**

7. The population of the Western Bay of Plenty is projected to grow from 46,110 in 2013 to around 57,546 in 2033 (24.8 per cent), and to 60,682 in 2063 (+2.6 per cent). The majority of the growth will occur during the period to 2033, with the trajectory virtually flat from 2038.
8. The seemingly abrupt slowing of growth reflects a shift from natural increase to natural decline, beginning around 2034. Net migration is projected to remain positive across the period, averaging 467 per annum between 2013 and 2033, and 334 per annum between 2034 and 2063.
9. Sitting behind the shift to natural decline is, as elsewhere, the structural ageing of the population. By 2033 almost one-third of Western Bay of Plenty's population will be aged 65+ years, up from 19.5 per cent in 2013. By 2063 that proportion is projected to reach 41.1 per cent. The ratio of those aged 65+ years to those aged 0-14 years will increase from just above 100 (elderly per 100 children) in 2013 to 392 elderly per 100 children by 2063.
10. These trends will see growth at 65+ years account for 85.8 per cent of all growth in the Western Bay of Plenty 2013-2033. Those aged 15-39 years will contribute 2.6 per cent, and those aged 40-64 years, 19.1 per cent; together these age groups will offset a minor decline (863 persons) at 0-14 years. Between 2034 and 2063, numbers at both 0-14 and 15-39 years will decline, while growth at 40-64 and 65+ years will fully offset that decline, the greatest contribution coming from the 65+ population. The contribution to growth at 85+ years will be significant, numbers increasing by 651 between 2013 and 2033, and 1,564 between 2034 and 2063, accounting for almost half of all growth in the latter period.
11. Stochastic projections for Western Bay of Plenty generate a median projection that is almost identical to the deterministic projection: 57,516 in 2033 and 60,608 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 60,764 or a 25 per cent chance that the population could be below 54,390, and in 2063, above 70,233 or below 52,140. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 65,576 or a 5 per cent chance of the population being below 50,199, and in 2063, above 86,176 or below 42,030. Of note regarding these confidence levels is, that the interim projection (made prior to taking account of stakeholder views) fell inside the 90 per cent projection interval.





## Tauranga City – Baseline and Stochastic Projections

12. The population of Tauranga City is projected to grow from 117,280 in 2013 to around 161,646 in 2033 (+37.8 per cent), and to 196,014 in 2063 (+14.3 per cent). As was the case for the Western Bay of Plenty, the majority of the growth occurs prior to 2033.
13. Again the slowing of growth reflects the shift from natural increase to natural decline, beginning for Tauranga City around 2039. Net migration is projected to remain relatively high and positive at all observations, but declines slightly across the period, averaging 1,755 per annum between 2013 and 2033, and 1,628 per annum between 2034 and 2063.
14. By 2033 over one-third of Tauranga City's population will be aged 65+ years, up from 19.5 per cent in 2013. By 2063 that proportion is projected to reach around 42.7 per cent—Tauranga City slightly older but ageing slightly more slowly than Western Bay of Plenty. The ratio of those aged 65+ years to those aged 0-14 years will increase from just below 100 elderly per 100 children in 2013 to 349 elderly per 100 children by 2063.
15. Between 2013 and 2033, growth at 65+ years will account for 71.8 per cent of all growth in Tauranga City. Those aged 15-39 years will contribute 4.4 per cent, and those aged 40-64 years, 23.8 per cent; together these age groups will offset a minor decline (4 persons) at 0-14 years. Between 2034 and 2063, all age groups are projected to grow, but the proportion of growth emanating from the 65+ year population will increase to 84.4 per cent. The contribution to growth at 85+ years is significant, numbers increasing by 958 between 2013 and 2033, and 7,201 between 2034 and 2063, accounting for 21 per cent of growth in the latter period.
16. Stochastic projections for Tauranga City generate a median projection that is almost identical to the deterministic projection: 161,565 in 2033 and 195,852 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 169,715 or a 25 per cent chance that the population could be below 154,311, and in 2063, above 216,152 or below 177,382. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 180,333 or a 5 per cent chance of the population being below 144,557, and in 2063, above 247,709 or below 154,198. As for the Western Bay of Plenty District, the interim projection (made prior to taking account of stakeholder views) for Tauranga City fell inside the 90 per cent projection interval.





## Rotorua District – Baseline and Stochastic Projections

17. The population of Rotorua District is projected to grow very slightly from 68,590 in 2013 to 69,127 by 2033 (0.8 per cent over 2013), and then decline to around 52,702 in 2063 (-22.4 per cent). The projected peak occurs in 2026 at 69,601 persons.
18. The onset of decline reflects both an accelerated shift from natural increase to natural decline, beginning around 2039, and negative net migration across the entire period. Net migration is projected to average -385 per annum between 2013 and 2033, and -411 per annum between 2034 and 2063. Importantly, the methodology explains that these numbers are not 'forced' as occurs when a numerical assumption is applied, but instead arise out of applying historical average net migration *rates* by single year of age, and sex.
19. Rotorua is the Bay of Plenty's structurally youngest TLA, but it is ageing more rapidly than its counterparts. By 2033 just on one-quarter of Rotorua's population will be aged 65+ years, up from 13.4 per cent in 2013. By 2063 that proportion is projected to reach 39.4 per cent. This is a very rapid rate of structural ageing and is driven primarily by migration loss of young adults, who are also the primary reproductive age group. The trends will see Rotorua's age structure shift from youngest in 2013 to second-youngest by 2063. Reflecting these trends, the ratio of those aged 65+ years to those aged 0-14 years will increase from 58 elderly per 100 children in 2013 to 347 elderly per 100 children by 2063.
20. Between 2013 and 2033, numbers aged 0-14 and 15-39 years are projected to decline quite significantly (4,700 and 5,219 respectively). By contrast, growth at 40-64 and 65+ years is equally significant (2,531 and 7,924 respectively) resulting in the small net gain (537 persons, 0.8 per cent). The situation is projected to deteriorate between 2034 and 2063, with the growth at 65+ years reducing in number and unable to offset the decline occurring in all other age groups. The contribution to growth at 85+ years is again remarkable, with numbers increasing by 130 between 2013 and 2033 and 1,312 between 2034 and 2063, and accounting for 24.2 per cent of all growth in the period 2013-2033. This 'older-old' growth thus comes earlier for Rotorua than for Western Bay of Plenty and Tauranga City.
21. Stochastic projections for Rotorua generate a median projection that is almost identical to the deterministic projection: 69,110 in 2033 and 52,669 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 71,264 or a 25 per cent chance that the population could be below 66,996, and in 2063, above 57,199 or below 48,447. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 74,360 or a 5 per cent chance of the population being below 64,115, and in 2063, above 64,103 or below 43,044. The interim projection fell inside the 90 per cent projection interval.



## Whakatane District – Baseline and Stochastic Projections

22. The population of the Whakatane District is projected to remain approximately stable until around 2033, albeit experiencing both minor growth and decline until 2029 and numbering approximately 33,408 in 2033; the population will then decline more rapidly to around 22,507 by 2063 (-30.1 per cent).
23. The decline reflects both an accelerated shift from natural increase to natural decline, beginning around 2036, and negative net migration across the entire period. Net migration is projected to average -167 per annum between 2013 and 2033, and -243 per annum between 2034 and 2063. Again a reminder that these numbers are not 'forced', but arise out of applying historical average net migration rates by single year of age, and sex.
24. By 2033 over one-third of Whakatane's population will be aged 65+ years, up from 15.5 per cent in 2013. By 2063 that proportion is projected to reach 45.4 per cent. This is an even greater rate of structural ageing than for Rotorua, again driven primarily by the net migration loss of prime reproductive age adults, but also by initial gains at older ages. These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 69 elderly per 100 children in 2013 to 372 elderly per 100 children by 2063—Whakatane, like Rotorua, is ageing much faster than both Tauranga City and Western Bay of Plenty.
25. Between 2013 and 2033, numbers aged below 65 years are projected to decline significantly. Growth at 65+ years is equally significant (5,918 persons) but will fail to offset the overall decline (-822 persons). As for Rotorua, the situation is projected to deteriorate between 2034 and 2063, with all age groups declining, even at 65+ years. For Whakatane, the contribution to growth at 85+ years is significantly lower than for Western Bay, Tauranga City and Rotorua. Numbers increase by 63 between 2013 and 2033 and 539 between 2034 and 2063, accounting for 7.7 per cent of growth in the period 2013-2033 and just 4.9 per cent between 2034 and 2063.
26. Stochastic projections for Whakatane generate a median projection that is almost identical to the deterministic projection: 33,393 in 2033 and 22,246 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 34,838 or a 25 per cent chance that the population could be below 32,008, and in 2063, above 26,607 or below 22,066. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 36,436 or a 5 per cent chance of the population being below 30,548, and in 2063, above 30,242 or below 19,305. The interim projection fell inside the 90 per cent projection interval.



## Kawerau District – Baseline and Stochastic Projections

27. The population of Kawerau District is projected to undergo a steady decline, from 6,710 in 2013 to 5,542 by 2033 (-17.4 per cent) and then more rapidly to around 3,155 by 2063 (-40.2 per cent over 2033)
28. As for both Rotorua and Whakatane, the decline reflects an accelerated shift from natural increase to natural decline, for Kawerau beginning around 2031, and negative net migration across the entire period which reduces as the stock population declines. Net migration is projected to average -82 per annum between 2013 and 2033, and -33 per annum between 2034 and 2063.
29. By 2033 almost 30 per cent of Kawerau's population will be aged 65+ years, up from 17.7 per cent in 2013. By 2063 that proportion is projected to reach 67.1 per cent. This is an extreme rate of structural ageing, driven primarily by the compounding effect of net migration loss of prime reproductive age adults. Reflecting these trends, the ratio of those aged 65+ years to those aged 0-14 years will increase from 76 elderly per 100 children in 2013 to 1,726 elderly per 100 children by 2063—Kawerau undergoing the most rapid structural ageing of the BOP TLA's.
30. Between 2013 and 2033, numbers aged 0-14 and 15-39 years are projected to decline significantly. Growth at 40-64 and 65+ years (470 and 460 persons respectively) is also significant but will fail to offset the overall decline (-1,168 persons). Again the situation is projected to deteriorate between 2034 and 2063, with all age groups (except at 65+ years) declining. For Kawerau, there is very little increase in the 85+ year old population, numbers increasing by 8 between 2013 and 2033 and 90 between 2034 and 2063.
31. Stochastic projections for Kawerau generate a median projection that is almost identical to the deterministic projection: 5,559 in 2033 and 3,151 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 5,901 or a 25 per cent chance that the population could be below 5,197, and in 2063, above 3,694 or below 2,685. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 6,452 or a 5 per cent chance of the population being below 4,750, and in 2063, above 4,632 or below 2,145. The interim projection fell inside the 90 per cent projection interval.



## Opotiki District – Baseline and Stochastic Projections

32. The population of the Opotiki District is projected to undergo steady decline, from 8,580 in 2013 to 7,395 by 2033 (-13.8 per cent) and then decline more rapidly to around 4,897 by 2063 (-29.6 per cent over 2033).
33. As elsewhere, the decline reflects both a shift from natural increase to natural decline, albeit for Opotiki slightly delayed until 2049, and negative net migration across the entire period, again reducing in magnitude as the stock population declines. Net migration is projected to average -116 per annum between 2013 and 2033, and -88 per annum between 2034 and 2063.
34. By 2033 around 22.2 per cent of Opotiki's population will be aged 65+ years, up from 17.5 per cent in 2013. By 2063 that proportion is projected to reach 33.8 per cent, which, while significant, will make it the Bay of Plenty Region's youngest age structure. These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 76 elderly per 100 children in 2013 to 269 elderly per 100 children by 2063—Opotiki undergoing the second-slowest structural ageing of the BOP TLA's.
35. Between 2013 and 2033, numbers below 65+ years of age are projected to decline significantly. Growth at 65+ years (141 persons) is significant but will fail to offset the overall decline (-1,185 persons). The situation is projected to deteriorate between 2034 and 2063, with numbers at 65+ years increasing only fractionally (+16) and again failing to offset the overall decline of 2,497. At 85+ years the situation stands in marked contrast to the Bay of Plenty's five other TLAs: for Opotiki, numbers are projected to grow by just 14 between 2013 and 2033, and to then decline (by 19) between 2043 and 2063. There is thus no contribution to growth from this demographic.
36. Stochastic projections for Opotiki generate a median projection that is almost identical to the deterministic projection: 7,359 in 2033 and 4,890 in 2063. The 50 per cent projection interval (within which 50 per cent of the stochastic projection scenarios fall) indicates a 25 per cent chance that the population in 2033 could be above 7,821 or a 25 per cent chance that the population could be below 6,983, and in 2063, above 5,695 or below 4,199. The 90 per cent projection interval (within which 90 per cent of the stochastic projections scenarios fit) indicates a 5 per cent chance of the 2033 population being above 8,458 or a 5 per cent chance of the population being below 6,444, and in 2063, above 7,046 or below 3,387.



## Population Share

37. The baseline trends suggest that Tauranga City will increase its share of the region's population from just below 42 per cent in 2013 to almost 58 per cent in 2063. In 2033 Tauranga City will account for almost half (48.3 per cent) of the region's population. Also gaining in population share will be Western Bay of Plenty, increasing from 16.4 to 17.8 per cent. By contrast, Rotorua District is likely to see a significant reduction in share, from just on one-quarter in 2013 to 15.5 per cent in 2063 (20.7 per cent in 2033). Whakatane, Kawerau and Opotiki also lose population share—Whakatane from 12.2 to 6.6 per cent, Kawerau from 2.4 to 0.9 per cent, and Opotiki from 3.0 to 1.4 per cent.

## Household Projections

38. All the household projections use the deterministic baseline projections as their base population and adopted the current Statistics New Zealand methodology for household projections (the propensity method)
39. For the Western Bay of Plenty it is projected that between 2013 and 2063 the number of couple without children families will increase by 85 per cent (6,300 families) however the number of two parent families will decrease by around 7 per cent (300 families). For sole parent families the projected change is a gain of 520 families (26 per cent) while for the district overall the number of families is projected to increase by 46 per cent (6,550 families). In terms of households the Western Bay is projected to gain around 10,700 households (an increase of 59 per cent) with single person households showing particularly strong growth of over 100 per cent (4300 households).
40. Overall for Tauranga the number of families is projected to increase by 80 per cent (27,000 families). There is projected strong growth in the number of couple without children families (24,000 families or 139 per cent) with weaker growth in sole parent (2,623 families or 42 per cent) and two parent families (1,129 families or 10 per cent). Tauranga being the only area to see a projected increase (albeit small) in two parent families in the region. Single person households show projected growth of 163 per cent (20,000) while overall household numbers grow by a projected 100 per cent (47,000 households).
41. In Rotorua District the household projections indicate that the total number of families will decline by approximately 15 per cent (3,000 families) with a major decline in the number of two parent families (3,200 families or 48 per cent) and a lesser decline in the number of sole parent families of about 27 per cent (1,290 families). Only couple without children families are projected to show an increase in the projection period, of around 20 per cent (1,600 families). For households in total there is a modest projected increase of 1-2 per cent (350 households) with single person households being the only household type to exhibit growth (3,400 households or 52 per cent).



42. Whakatane District exhibits projected declines in two parent (60 per cent or 2,000 families) and one parent families (39 per cent or 910 families) however couple without child families experience some growth, around 2 per cent (95 families). The modest growth in couple without child families is insufficient to offset declines in other categories leading to a project fall in total family numbers of 2,800 (28 per cent). Single person households are the only form of household to grow (by 28 per cent or 890 households) however the projected total number of households declines by 1,900 (15 per cent).
43. The projections indicate that Kawerau District may experience the largest percentage decline in family numbers (43 per cent or 830 families ) with couple without child families being the only category in which any growth is projected to occur (5 per cent or 40 families). The other family categories, one parent and two parent families, show declines of 68 per cent (410 families) and 81 per cent (460 families) respectively. Again with the total number of households Kawerau shows the largest percentage decline (31 per cent or 790 households) with only single person households exhibiting any growth (1-2 per cent or 10 households).
44. Projected declines occur across all family categories in Opotiki District with couple without children families showing a decline of 17 per cent (170 families), two parent families a 51 per cent (380 families) decline and single parent families a 38 per cent (270 families) decline. Consequently total family numbers decline by some 33 per cent (810 families). Opotiki District household number are also projected to decline by approximate 27 per cent (920 households) with no category of household experiencing growth, declines in the number of family households (33 per cent or 770 households) being the predominant factor in this.
45. Virtually all growth in the Bay of Plenty Region, across all household and family types occurs in Tauranga city and the surrounding Western Bay of Plenty district. Taking the region as a whole the number of families is projected to increase by nearly a third (27,000) with the majority of this growth coming from couple without children families (82 per cent or 32,000 families). Partly offsetting the growth in couple without children families is a decline of 5,200 (19 per cent) in the number of two parent families. Sole parent family number remain relatively stable with a small increase of 1 to 2 per cent (261 families) being projected. Turning to changes in the number of households there is a projected increase of around 55,000 (50 per cent) with particularly strong growth in the number of single person households, an increase of 28,000 or 102 per cent.



## Labour Force Projections

46. All labour force projections use the deterministic baseline projections as their base population.
47. Using the most optimistic scenario (Scenario Four), where the labour force participation of both women and the older population continues to increase till 2033, labour force participation over the projection period (2013-2063) is projected to;
- Increase by 46 percent (11,000 people) in the Western Bay of Plenty
  - Increase by 69 percent (41,000 people) in Tauranga City
  - Decrease by 19 percent (7,000 people) in Rotorua District
  - Decrease by 33 percent (5,700 people) in Whakatane District
  - Decrease by 54 percent (1,500 people) in Kawerau District
  - Decrease by 32 percent (1,300 people) in Opotiki District
48. Under Scenario Four the labour force of the Bay of Plenty Region is projected to grow by 26 percent (37,000 people) with that growth being concentrated in Tauranga City and the Western Bay of Plenty district.
49. Turning to the most pessimistic scenario (Scenario One), where labour force participation rates remain at 2013 levels throughout the projection period, labour force participation over the projection period (2013-2063) is projected to;
- Increase by 20 percent (5,000 people) in the Western Bay of Plenty
  - Increase by 36 percent (21,000 people) in Tauranga City
  - Decrease by 33 percent (12,000 people) in Rotorua District
  - Decrease by 46 percent (8,000 people) in Whakatane District
  - Decrease by 68 percent (1,900 people) in Kawerau District
  - Decrease by 44 percent (1,800 people) in Opotiki District

For Scenario One the labour force of the Bay of Plenty Region is projected to grow by 1.7 percent (2,500 people) with that growth, as in Scenario Four, being concentrated in Tauranga City and the Western Bay of Plenty district.





## 1. Introduction

This Report provides detailed projections for the SmartGrowth region for the period 2013-2063. It updates the previous SmartGrowth projections (Bedford 2006). In contrast to past SmartGrowth projections, this Report includes projections for all Territorial Local Authority (TLA) areas in the Bay of Plenty Region: Western Bay of Plenty, Tauranga City, and Rotorua, Whakatane, Kawerau and Opotiki Districts.

The Report and its underlying findings follow an extensive period of consultation by the SmartGrowth Implementation Management Group (SGIMG) with researchers at the National Institute of Demographic and Economic Analysis at the University of Waikato (NIDEA), followed by further extensive consultation with key stakeholders, members of the public, elected members, and general feedback sought by SGIMG. There has been a further concerted effort on behalf of the SGIMG to obtain an integrated subregional/regional picture extending to the Waikato, via ensuring the projection assumptions are consistent both across the Bay of Plenty region and with those to be used for the Future Proof (Waikato) region's projections.

### Background

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In early 2011, the SmartGrowth Implementation Management Group (SGIMG) approached the National Institute of Demographic and Economic Analysis (NIDEA) at the University of Waikato with a request to provide new detailed population, household and labour force projections for the Western Bay of Plenty (WBOP) subregion comprising the Tauranga City Council and Western Bay of Plenty District Council areas. Subsequent discussions were held with the SmartGrowth Partners at the SmartGrowth Implementation Management Group (SGIMG) level in regard to the importance of a) obtaining an integrated subregional/regional picture in terms of the Western Bay of Plenty and the Bay of Plenty, and b) obtaining an inter-regional/regional picture between the Bay of Plenty and Waikato regions by using consistent methodology and agreed assumptions. As a further result of these discussions NIDEA was requested to extend the projections to the wider BOP to include the TLAs of Rotorua, Opotiki, Whakatane and Kawerau.

One unique situation arising over the consultation period and having a significant impact on the project methodology requires special mention. In February 2011, just days before the 2011 Census was to be held, severe earthquakes shattered Christchurch City—Statistics New Zealand's Census headquarters. The Census was subsequently postponed, and not run until March 2013. This delay has had a major impact on the development of the baseline population on which to develop the new projections, and would ordinarily have been provided directly by Statistics New Zealand (SNZ) in the form of the June 2013 Estimated Resident Population (ERP), based on the 2013 Census. Because these data will not be available until later in 2013, considerable deliberation was given to this issue,



and the resulting rationale for the choice—and development—of the baseline population is detailed in the methodology section (see also Appendix A).

## Scope and Structure

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The Bay of Plenty region is comprised of six territorial authority areas: Tauranga City, Western Bay of Plenty District, Rotorua District, Whakatane District, Opotiki District, and Kawerau District. While a small part of Rotorua District is not located in the region (the four area units of 538841 Golden Springs, 538842 Reporoa, 538850 Ngakuru, 538861 Arahiwi) for the purposes of the forecasting project the whole of the district has been included. A small part of the Taupo District is also located in the Bay of Plenty region (the one area unit of 41342 Rangitaiki) and this has been excluded from the project. Initially it was proposed to combine the output for Whakatane and Kawerau, but for a number of reasons identified during the consultation and research process it was decided to present them individually.

The Report covers Usually Resident Population projections by five-year age groups and sex, Household/Dwelling projections, and Labour Force projections. (Projections of employment by broad industry classification (retail, agriculture, industry, education and services), by broad age group and sex are provided as a stand-alone document.)

The population projections are of two types: *baseline* projections, which project a ‘medium case’ scenario drawing on past fertility, mortality and migration trends (1991-2013) that have been calibrated to take account of both fluctuations in these trends, expert judgement and stakeholder feedback; and *stochastic* projections, which run the projection 10,000 times, each time randomising the underlying assumptions. The stochastic projections provide an indication of both variability and probability, the 90 per cent projection interval for example indicating that there is only a 5 per cent chance of being above the upper bound and a 5 per cent chance that the future population will be below the lower bound.

The Household and Dwelling projections and Labour Force and Employment projections are based on the baseline population projections. All projections are presented for the period 2013 to 2063, in annual increments for the period 2013 to 2033, and in five-year increments for the period 2031 to 2063. Where appropriate the data are presented by single year for the entire period.

The Report is structured as follows. This introduction is preceded by an Executive Summary and followed by a detailed Methodology (Chapter 2). The projections are presented in three substantive chapters: Population Projections (Chapter 3), Household Projections (Chapter 4) and Labour Force Projections (Chapter 5). The projections are presented on a district-by-district basis for each of the six city/district council areas in the region; and on a regional basis by collating the city/district level information into a regional picture. Each section includes commentary on why the trends are



unfolding as indicated. The findings are briefly summarised in Chapter 6, which includes a commentary of key trends and determinants that may influence population change in New Zealand and the Bay of Plenty region up to and beyond 2061. By way of reducing the complexity of the research output and improving readership, the more detailed background material is provided in a separate Appendix. It should also be noted that a comprehensive Background Paper: *Bay of Plenty Region and its Territorial Authorities Demographic Profile 1986-2031*, was provided to SGIMG.

All tables and graphs will also be provided to SmartGrowth in Microsoft Excel format.

## **Project Team**

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The NIDEA project team is comprised of:

### **Dr. Michael P. Cameron - BMS (Hons) Waikato PhD Waikato**

Michael Cameron is an expert in population projection methodology and has been involved in many previous projects for territorial local authorities in New Zealand. Michael undertook the population baseline and stochastic projections and provided commentary on the findings.

### **Professor Natalie Jackson - BSocSci MSocSci (Hons) Waikato, PhD Australian National University**

Natalie Jackson is a demographer with a high level of expertise in local government demography across New Zealand and Australia. Natalie contributed to the development of the projection assumptions, the analysis, its interpretation and the preparation and delivery of reports.

### **Dr. Bill Cochrane - MSocSci Waikato PhD Waikato**

Bill Cochrane is highly experienced in consultancy projects providing population projection and labour market analysis services to government and non-government organisations. He contributed to the development of household and labour force projections, and the development of appropriate economic and social scenarios in the second stage of the project.

### **Dr. Veronique Gibbons - MSci London PhD Auckland**

Veronique Gibbons is the Research Development Manager for NIDEA. Her expertise is in health research and project management. She managed the project and project team.

Two NIDEA Research Officers also contributed to the project:

**Shefali Pawar and Rachael McMillan.**



## 2. Methodology

### **Data Source**

The data used in the formulation of these projections was sourced from Statistics New Zealand (SNZ). This includes national and subnational data from the five-yearly Census of Population and Dwellings (1991, 1996, 2001, 2006, and 2013), national and subnational period life tables, national and subnational vital statistics data, the SNZ subnational population projections series, and the reported assumptions underlying those projections.

The following methodologies are utilised in this report. Discussion responding to key matters arising and questions raised at Stakeholder meetings is included at Appendix A.

### **The Cohort Component Model**

The most common methodology for population projections is the cohort component model. This is the methodology used by SNZ, who is the major supplier of data on current and projected population size, growth and structure for New Zealand regions and districts. In recent years new methodologies have been developed for population projections, such as stochastic and microsimulation approaches (see e.g. Dharmalingam and Pool 2006; Cameron and Poot 2011).

This report follows the methodology developed by Cameron et al. (2008), with extensions based on stochastic methods employed by Cameron and Poot (2010; 2011).

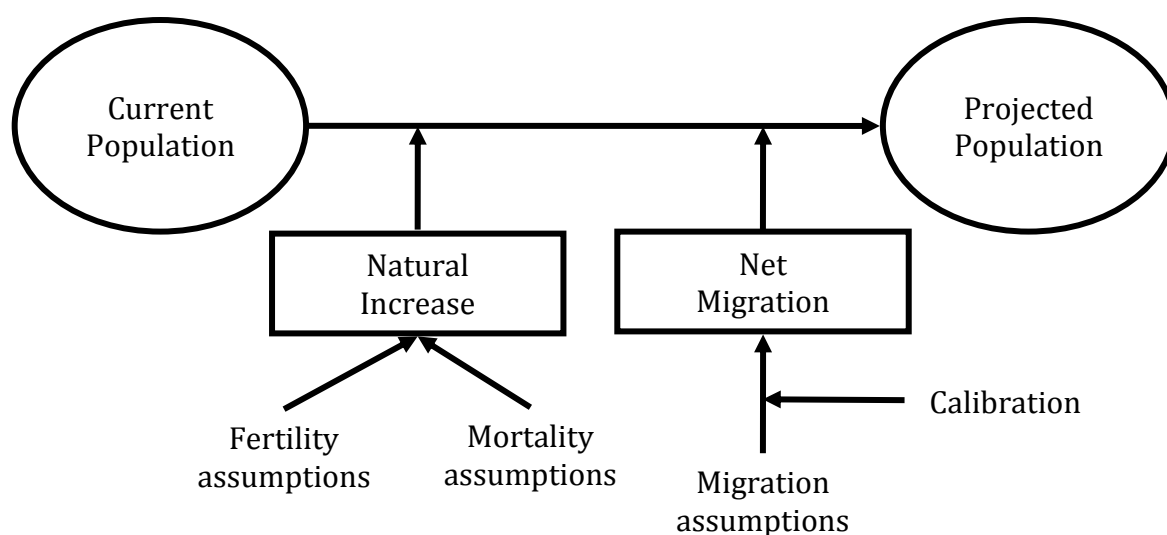
Figure 1 describes the general approach that was used in developing these population projections. The current population (base population) is first defined, and then assumptions are made about demographic changes to this population, using the cohort component model. This is a stock-flow model that is based on the following fundamental “accounting identity” of population growth:

$$\begin{aligned} & \text{usually resident population in area } i \text{ at the } \textit{end} \text{ of year } t \\ &= \text{usually resident population in area } i \text{ at the } \textit{beginning} \text{ of year } t \\ &+ \text{births to mothers residing in area } i \text{ during year } t \\ &- \text{deaths of residents of area } i \text{ during year } t \\ &+ \text{inward migration from other regions and from overseas into region } i \text{ during year } t \\ &- \text{outward migration of residents from area } i \text{ to other regions or to overseas during year } t \end{aligned}$$

All components are by single year of age and sex.



**Figure 2.1: The Stakeholder-Informed Cohort Component Model**



Starting with a given base year population (see below), the population twelve months later is then calculated using the equation above. This defines the base population of the following year. This procedure is repeated for each year through to the end of the projection period (the projection horizon), and separately for each sex. Separate assumptions are used for each of the demographic “drivers”. Births are derived by multiplying age specific fertility rates by the numbers of women of childbearing age (13-49). Deaths are derived by multiplying age- and sex-specific mortality rates by the numbers of people of each age and sex.<sup>1</sup> Age- and sex-specific net migration is initially derived by multiplying age- and sex-specific net migration rates by the numbers of people of each age and sex. The procedure for deriving estimates of net migration is a key departure from the method employed by SNZ and involves calibration based on end-user information and additional local data, where available. The method for deriving these estimates is described in detail below.

Demographic change assumptions, when applied to the current population, allow the calculation of possible future populations. Such calculations are referred to as population *projections* rather than population *forecasts*, because they depend on sets of assumptions and no explicit assessment is made of the relative likelihood of the assumptions being correct in the future. Varying the assumptions across projections simply permits a sensitivity analysis that provides a relatively broad range of possible outcomes.

<sup>1</sup> However, instead of mortality rates the current methodology employs sex- and age-specific survivorship rates, which are simply the complement of mortality rates.

## ***Base Population***

The base population used for the projections were the Estimated Resident Population (ERP) at 30 June 2013, obtained from SNZ. This estimated population is only reported by SNZ in 5-year age groups, so the single-year age groups necessary for the population projection model were derived by interpolating the Estimated Resident Population at 30 June for each TLA using the Census Usually-Resident Population counts by single-year-of-age from the 2013 Census of Population and Dwellings. Separate interpolations were undertaken for each sex.

One important caveat with regard to the June 2013 ERP must be noted. Although the June 2013 ERP was released by SNZ shortly after the 2013 census data began to be released in December, the June 2013 ERP remained 2006-based. To understand the rationale for this approach, it is important to understand that Usually Resident population data are missing adjustments for census night undercount, and for people temporarily overseas on census night. Thus the ERP is the best available data for use as a base population. The following points, prepared by SNZ, describe the differences between each 'level' of data (see also Appendix A):

- **Census Night Population** counts, which count people where they were on census night and include visitors from both overseas and elsewhere in New Zealand
- **Usually Resident Population** (URP) counts, which reassign visitors to their usual residence but do not yet include an adjustment for census night undercount or people temporarily overseas on census night, and
- **Estimated Resident Population** (ERP) counts, which include the adjustments for census night undercount and those temporarily overseas. The ERP also includes births, deaths and migration occurring between census night and the date of the subsequent ERP.

## ***Fertility and Mortality Assumptions***

The fertility and mortality assumptions used in the projections were based on the subnational 'medium' fertility and mortality assumptions used by SNZ in their 2006-base population projections. Having considered alternative time series for fertility and mortality, we believe that the assumptions used by SNZ with respect to fertility and mortality in their subnational population projections are adequate for our purposes. As SNZ uses past fertility and mortality (survivorship) rates based on the official deaths and births statistics to develop their projections, the SNZ assumptions represent an appropriate starting point.

Age-specific fertility rates by single-year-of-age (of the mother) were derived by first interpolating the five-year subnational age-specific fertility rate using the national-level age-specific fertility rate profile by single-year-of-age. The resulting profiles were then scaled to match the projected total fertility rate for each TLA. The total fertility rate for each TLA was assumed to follow the SNZ



projections to 2031 then remain invariant after 2031. Sex at birth was assumed to follow a constant pattern similar to past trends, with 105.5 males for every 100 females at birth.

Age-specific survivorship rates by single-year-of-age and sex were derived by first interpolating the survivorship rates from the subnational abridged life tables for each TLA using the national life tables by single-year-of-age. The resulting profiles were then scaled to match the projected life expectancy at birth for each TLA. Life expectancy at birth for each TLA was assumed to follow the SNZ projections to 2031 then remain invariant after 2031. In order to ensure that populations at the highest age do not increase in an unconstrained manner, survivorship at age 100+ was progressively reduced at a rate of 2.77 per cent each year to 2031. This ensures that mortality follows a pattern of rectangularisation consistent with trends in old-age mortality.

### ***Migration Assumptions***

For subnational projections, the projection methodology employed by SNZ involves the estimation of net migration for each territorial authority in each year. SNZ prepare three projections, based on 'low', 'medium', and 'high' levels of net migration. The total net migration assumed by SNZ in their 2006-base population projections for each TLA in the Bay of Plenty region under each of these scenarios is presented in Appendix B.

Importantly, SNZ bases their projections of net migration on series of 'known' net migration. 'Known' net migration requires that the data is able to specify both the origin (within New Zealand or overseas) and destination (within New Zealand or overseas) of the migrant. Since not all migration is 'known', known net migration is systematically lower than estimated net migration.<sup>2</sup> Crucially, the impact of this is that areas with net in-migration will be systematically under-projected, while areas with net out-migration will be systematically over-projected, as demonstrated in Cameron and Poot (2011).

The SNZ methodology also requires the specification of an overall net migration profile by age and sex. This profile specifies the proportion of net migration that is assumed to occur among people of each age and sex, although the profile is allowed to change and therefore is also projected forward. In developing their net migration profile, SNZ uses census-based estimates of net migration as well as information provided by local authorities on proposed developments in their districts/cities that are likely to have an impact on population movement and change, and data from arrival and departure cards on people leaving or entering the country for twelve months or more. The net migration profile is then used along with the projected total net migration of each territorial authority in deriving the projections.

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<sup>2</sup> Estimated net migration is the difference between the net change in population (such as between Censuses), and natural increase (which is itself the difference between births and deaths). The composition of population change for the Bay of Plenty, including natural increase and the 'known' and 'unknown' proportions of estimated net migration, are outlined in Jackson et al. (2013).





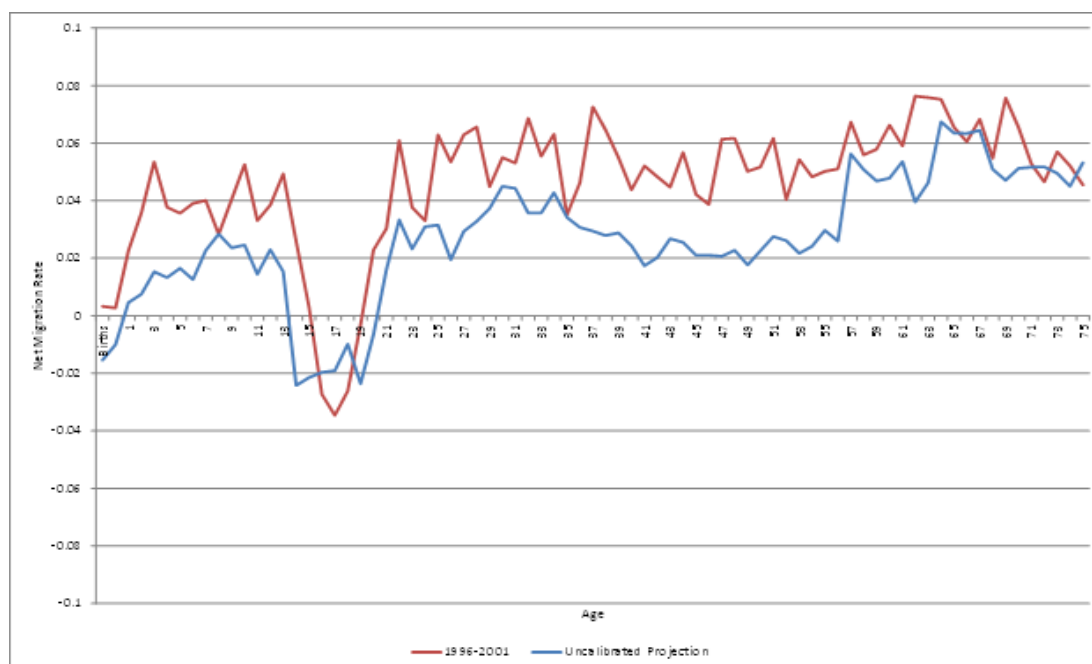
We adopt a substantially different methodology to that employed by SNZ. The key difference is that rather than estimating a single net migration figure and applying that figure to a net migration profile, we estimate sex- and age-specific net migration *rates* which are then applied to the actual profile of population in each territorial authority. These rates can then be applied in a similar way to fertility and survivorship rates in projecting the future population (see Cameron and Poot 2010; 2011).

The basic estimation of the net migration rates is as follows. First, we used SNZ data for the period 1991-2013 on Census night Usually-Resident Population counts, reported sex-specific births, to estimate residual net inter-censal population change (excluding deaths). These ex-mortality residuals represent the inter-censal population change that is accounted for by mortality (deaths) and net migration, both of which can be estimated as population-level rates.

The ex-mortality residuals were converted to estimates of annual rates using log-log regression. This method explicitly recognises that each age-sex-specific population group will experience five (or seven) different age-sex-specific migration rates *exactly once* during each inter-censal period. To ensure that enough degrees of freedom were available for the estimation, and that the base populations were large enough for estimation, the population of each sex aged 75 and over was combined and only one rate was estimated for that group. Otherwise age-sex-specific rates were estimated for every sex at single-years-of-age.

The estimated rates represent the proportion of the population at the end of each year that had either died or migrated during the year. To convert these rates to net migration rates, age-specific mortality rates obtained from the national-level life tables were added to them, to remove the effect of mortality. As an illustration, Figure 2.2 presents the net migration rate profile for Tauranga City females for the 1996-2001 inter-censal period, and the corresponding uncalibrated projection of the net migration profile.

**Figure 2.2: Net Migration Profile and Projection of Net Migration Profile for Tauranga City Females, 1996-2001**



This procedure resulted in a series of four inter-censal (but annualised) net migration rates for each sex- and age-specific population group, which were projected forward to 2061, using simple exponential smoothing.<sup>3</sup> Net migration is then projected by multiplying the age-sex-specific population at the beginning of each year by the age-sex-specific net migration rate.

Under this method, the projected net migration reflects a combination of the projected net migration rates which vary over time, and the structure of the territorial-authority-level populations which also vary over time.

### ***Validation and Calibration***

The final stage of developing population projections is validation and calibration. Validation involves running the projections model to ensure that it is behaving as expected, with base populations, fertility, survivorship and net migration assumptions being correctly applied. This step is usually straightforward.

Calibration is necessary in models using net migration rates because of the possibility that rates cause the projected population to diverge substantially from past trends. This is particularly an issue for these projections, where the net migration projection is based on only four inter-censal periods. Calibration involves modifying the net migration profile to more closely match either past population data trends, or expected future trends. It is at this stage that end-user input is useful, in helping to determine the appropriate calibration of the model.

<sup>3</sup> For the exponential smoothing,  $\alpha$  was set equal to 0.1.

The process of calibration was undertaken using a combination of expert judgement and stakeholder engagement. An interim set of projections was first developed, calibrating based on a weighted average of the population growth rate between 1991 and 2013, and the population growth rate between 2006 and 2013. Then, a survey was undertaken among key stakeholders at several end-user workshops, where stakeholders were asked for each TLA:

*Considering what you know about past trends and what you expect about future trends in each of the following territorial authority areas in the Bay of Plenty, which period would you expect future population growth (between now and 2031) in that area to be most like?*

The options presented were each of the four previous inter-censal periods (i.e. 1991-1996, 1996-2001, 2001-2006, and 2006-2013). In total, seventeen responses were received to the survey, some during the end-user workshops, and some via email following the workshops. Not all respondents provided information for all of the TLAs. The results of the survey are summarised in Table 2.1 below. The final calibration was based on a Bayesian inference approach, where the 'prior' calibration was the expert judgement from the interim projections. This prior calibration was then refined by incorporating the views of the stakeholders, who overwhelmingly felt the calibration should be more heavily weighted to the more recent periods. In combination with expert judgement this step obtained the posterior calibration (see bottom of Table 2.1).

**Table 2.1: Calibration for the Final Projections**

<i>Prior Distribution (Original Calibration)</i>						
	Western BOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki
1991-1996	0.125	0.125	0.125	0.125	0.125	0.125
1996-2001	0.125	0.125	0.125	0.125	0.125	0.125
2001-2006	0.125	0.125	0.125	0.125	0.125	0.125
2006-2013	0.625	0.625	0.625	0.625	0.625	0.625
<i>Survey Results</i>						
	Western BOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki
1991-1996	-	-	0.143	0.143	0.200	0.200
1996-2001	0.231	0.091	0.143	0.143	-	-
2001-2006	0.385	0.455	-	0.143	0.200	0.400
2006-2013	0.385	0.455	0.714	0.571	0.600	0.400
<i>Posterior Distribution</i>						
	Western BOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki
1991-1996	0.000	0.000	0.037	0.043	0.059	0.077
1996-2001	0.091	0.032	0.037	0.043	0.000	0.000
2001-2006	0.152	0.161	0.000	0.043	0.059	0.154
2006-2013	0.758	0.806	0.926	0.870	0.882	0.769



## ***Stochastic Population Projections***

Stochastic (or probabilistic) population projections are the 'gold standard' in population projection methodology (Keilman et al. 2002; Lutz et al. 1998). Stochastic projections involve projecting the population not once, but many times, varying the parameter estimates (mortality, fertility, migration) each time. The result is a distribution of projected future populations, rather than a single deterministic path. The advantage of stochastic projections is that they allow the variability of population projections to be made readily apparent to the end-user.

Following Cameron and Poot (2010; 2011), a stochastic population projection method was employed for in this project. First, the calibrated 'deterministic' population projection was developed using the methods described earlier in this section. Second, each age- and gender-specific rate (fertility, mortality/survivorship, and net migration) was multiplied by a shift factor which is probabilistic. The percentage change in each of the rates is given by  $k$ , whereby  $k$  is drawn independently from a separate distribution for fertility, mortality/survivorship and migration. The entire deterministic path of fertility, mortality and net migration rates over the 2006-2031 projection period was shifted by the corresponding factors. In this way, if all multipliers were set to zero this would result in the deterministic projection and the multiplier is varied around zero to increase or decrease each rate.

Following Cameron and Poot (2010; 2011), distributional assumptions for each multiplier were based on observed data from 1950 to 2009. The fertility multiplier was assumed normally distributed with a mean zero and standard deviation of 1.25 (giving a range of about  $\pm 5\%$  of the mean fertility rates). The survivorship multiplier was assumed normally distributed with mean zero and a standard deviation of 0.5 (i.e. giving a range of  $\pm 2\%$  of the mean mortality rates). The net migration multiplier was assumed normally distributed with mean zero and a standard deviation of 12.5 (i.e. giving a range of  $\pm 50\%$  of the mean net migration rates. In all cases, the assumed variability is similar or somewhat less than that observed over the periods since 1950 and since 1991.

Given the distributional assumption for each multiplier, a random draw was taken independently from each distribution of the multipliers (fertility, survivorship, and net migration) for each run of the stochastic projections.<sup>4</sup> In total, the projections were run 10,000 times by repeatedly drawing, at random, different combinations of fertility, mortality, and net migration multipliers (assumptions). The resulting projections are presented in terms of the median projection, and both a 50% projection interval (all projections falling between the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the projections) and a 90% projection interval (all projections falling between the 5<sup>th</sup> and 95<sup>th</sup>

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<sup>4</sup> For each territorial and local authority, the same random draw (same random seed) was applied in each run of the projections.



percentiles of the projections). Further information on how these intervals and percentiles should be interpreted is included in Chapter 3.

### ***Household/Dwelling Projection Assumptions***

The Household/Dwelling projections were derived from the baseline population projections by employing additional assumptions projections regarding the rates of people living in different living arrangements (e.g. couples without children, couples with children, etc.), the average number of families per household, and the average number of people per multi-person household (see Cameron et al. 2007). The numbers of households are then derived from the number of people in each living arrangement type. The projection assumptions were informed by data from the 2001, 2006 and 2013 Censuses, and by the SNZ (2010) definition of a household as:

*“either one person who usually resides alone, or two or more people who usually reside together and share facilities in a private dwelling.”*

Hence it reasonable to conclude that the number of private dwellings is equal to the number of households.

### ***Labour Force Participation Assumptions***

The Labour Force projections were obtained by applying age- and sex-specific assumptions about future trends in labour force participation rates (LFPR) to the projected baseline populations (see Cameron et al. 2007).<sup>5</sup> Following Bryant et al. (2004), we initially assumed that age- and sex-specific participation rates increase in a linear fashion to 2021 before stabilising. This initial assumption was varied following stakeholder engagement (see Chapter 5 for detailed scenarios).

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<sup>5</sup> The labour force participation rate is the proportion of the working age population who are either employed (part- or full-time) or unemployed and actively seeking work. The working age population is typically defined as either all those aged 15 and over, or all of those aged between 15 and 64 years inclusive.



### 3. Population Projections

This Section begins with a comparative overview of the baseline projection output for each TLA, accompanied by the high, medium and low projections developed by SNZ to 2031 (2012). For Western Bay of Plenty and Tauranga City only, the 2001-based projections undertaken by Bedford in 2006 are also included (Figure 3.1).<sup>6</sup> For the purposes of comparison with the SNZ data, these graphs necessarily use the same 5-year periodicity followed by SNZ and Bedford, but reference 2013 instead of 2011 to accommodate the beginning of the NIDEA 2014 Series (the remaining data in this Report follow the SmartGrowth period specifications (2013, 2018, 2023 etc.)).

Figure 3.1 shows that NIDEA's baseline projections for both Western Bay of Plenty and Tauranga City are entirely consistent with those developed by SNZ to 2031. In each case they are lower than the high variant and slightly higher than the medium variant. Both baseline projections are notably lower than Bedford's (2001-base) series (see Appendix C for underlying data).

The baseline projections for Rotorua and Whakatane districts (Figure 3.2) are almost identical to SNZ's medium variant, and those for Kawerau and Opotiki slightly lower at the beginning of the projection period, with minimal difference at 2031. The trajectories for Rotorua and Whakatane districts decline significantly after 2031, while for Kawerau and Opotiki the decline projected by SNZ continues.

It should be noted that the SNZ data points for 2013 are in fact for 2011, as no equivalent data are available for 2013. Thus the NIDEA projections begin from slightly lower baseline populations, consistent with recent trends in the Estimated Resident Population for these TLAs and illustrated in more detail further below.

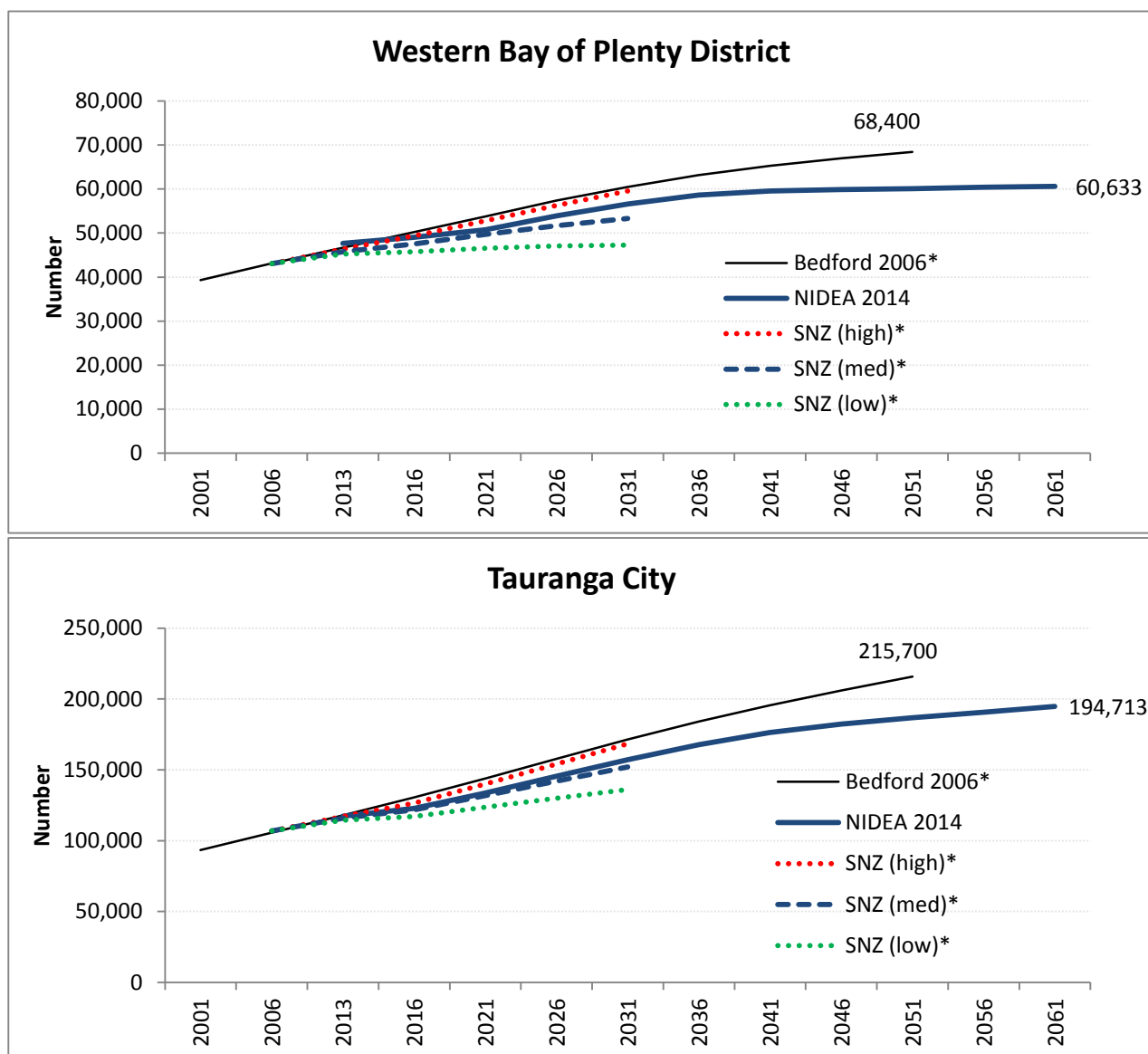
As a general rule, the explanation for most of the projections in this report being slightly above those of SNZ is that SNZ's migration assumptions are (as explained in the methodology) based on the application of a constant number of migrants across the projection period, while the NIDEA projections utilise age-specific migration rates. The key outcome is that the SNZ methodology results in the constant number of migrants becoming a smaller proportion of growing populations, and a larger proportion of declining populations as time goes on, while the NIDEA methodology allows the migration rate to keep pace with the changing population size.

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<sup>6</sup> Projections were not undertaken in 2006 by the PSC for the remaining Territorial Authorities



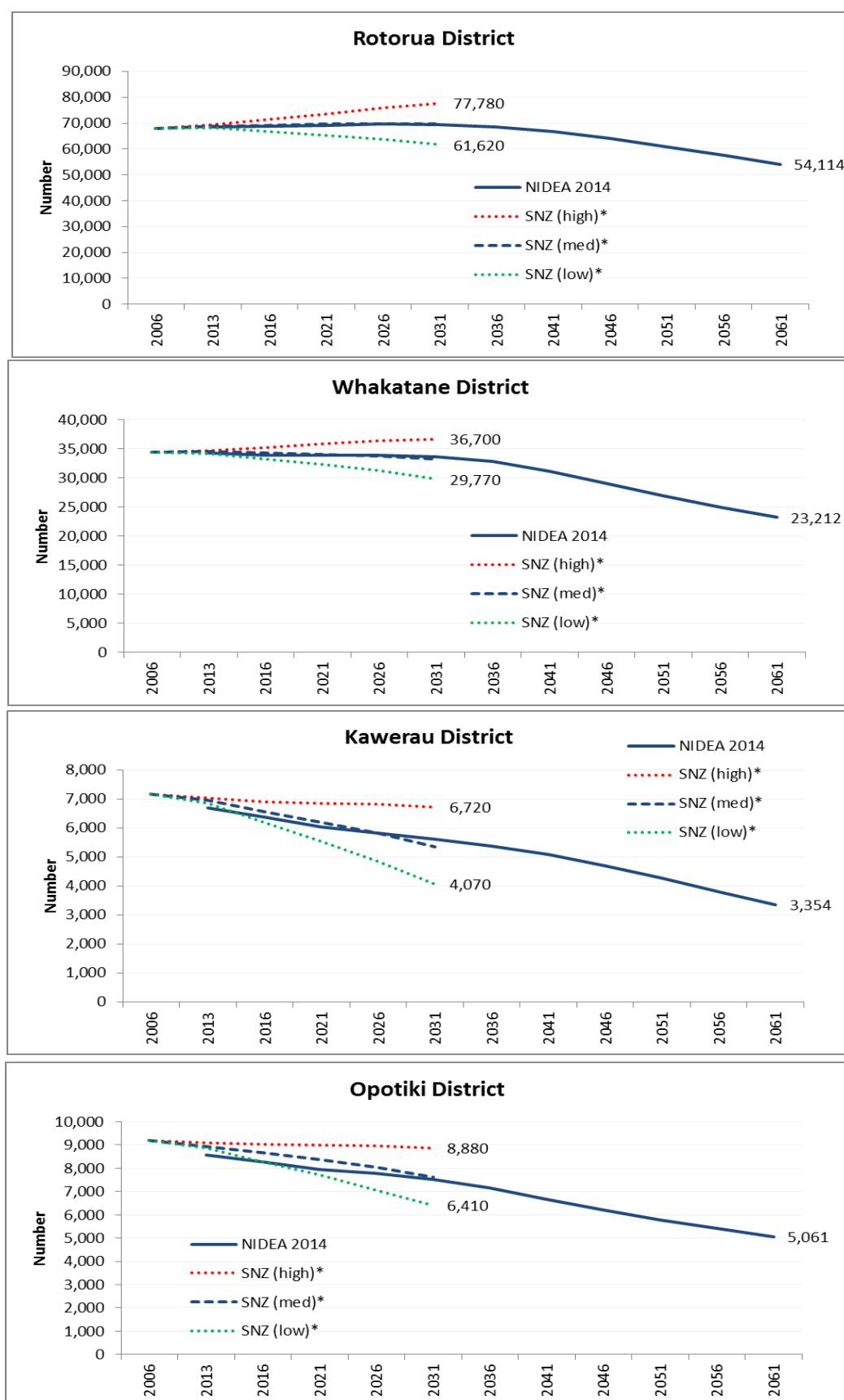
**Figure 3.1: Baseline Projections by Territorial Local Authority and Comparison with PSC (2006) and Statistics New Zealand (2012) Subnational Projections by Projection Variant, Western Bay of Plenty and Tauranga City**



Notes: \* The 2013 value is for 2011 (no equivalent SNZ or PSC data are available for 2013)



**Figure 3.2: Baseline Projections by Territorial Local Authority and Comparison with Statistics New Zealand (2012) Subnational Projections by Projection Variant, Rotorua, Whakatane, Kawerau and Opotiki Districts**



Notes: \* The 2013 value for SNZ is for 2011 (no equivalent data are available for 2013)

Table 3.1 turns to the NIDEA projections only and provides a summary of projected baseline numbers and growth rates. The period 2013-2033 sees Western Bay of Plenty and Tauranga City grow by 24.8 and 37.8 per cent respectively, and Rotorua by 0.8 per cent, while the remaining TLAs decline. For Rotorua the decline begins around 2026, while for Whakatane initial decline to 2019 is followed by a temporary resumption of growth to 2026, then a return to decline. For both Kawerau and Opotiki, decline is continuous from 2013, albeit reducing in terms of the rate of decline during the middle of the projection period.

**Table 3.1: Projected Baseline Numbers and Annual Growth Rates by Territorial Local Authority 2013-2063**

	Western Bay of Plenty	Tauranga City	Rotorua District	Whakatane District	Kawerau District	Opotiki District	Western Bay of Plenty	Tauranga City	Rotorua District	Whakatane District	Kawerau District	Opotiki District
2013	46,110	117,280	68,590	34,230	6,710	8,580	<b>Growth Rate (Annual)</b>					
2014	46,627	118,989	68,614	34,096	6,580	8,459	1.1	1.5	0.0	-0.4	-1.9	-1.4
2015	47,163	120,823	68,668	33,992	6,470	8,356	1.1	1.5	0.1	-0.3	-1.7	-1.2
2016	47,716	122,757	68,739	33,922	6,376	8,263	1.2	1.6	0.1	-0.2	-1.5	-1.1
2017	48,281	124,765	68,822	33,870	6,292	8,177	1.2	1.6	0.1	-0.2	-1.3	-1.0
2018	48,865	126,872	68,922	33,843	6,220	8,107	1.2	1.7	0.1	-0.1	-1.1	-0.9
2019	49,481	129,082	69,036	33,838	6,157	8,048	1.3	1.7	0.2	0.0	-1.0	-0.7
2020	50,116	131,344	69,146	33,843	6,101	7,997	1.3	1.8	0.2	0.0	-0.9	-0.6
2021	50,757	133,655	69,260	33,862	6,050	7,953	1.3	1.8	0.2	0.1	-0.8	-0.6
2022	51,395	136,021	69,365	33,884	6,001	7,914	1.3	1.8	0.2	0.1	-0.8	-0.5
2023	52,032	138,414	69,453	33,906	5,956	7,878	1.2	1.8	0.1	0.1	-0.7	-0.5
2024	52,653	140,811	69,522	33,929	5,911	7,845	1.2	1.7	0.1	0.1	-0.8	-0.4
2025	53,267	143,203	69,573	33,940	5,867	7,812	1.2	1.7	0.1	0.0	-0.7	-0.4
2026	53,871	145,572	69,601	33,933	5,826	7,775	1.1	1.7	0.0	0.0	-0.7	-0.5
2027	54,458	147,893	69,599	33,912	5,786	7,738	1.1	1.6	0.0	-0.1	-0.7	-0.5
2028	55,024	150,207	69,578	33,874	5,747	7,694	1.0	1.6	0.0	-0.1	-0.7	-0.6
2029	55,570	152,535	69,533	33,815	5,707	7,648	1.0	1.6	-0.1	-0.2	-0.7	-0.6
2030	56,103	154,856	69,468	33,739	5,669	7,595	1.0	1.5	-0.1	-0.2	-0.7	-0.7
2031	56,615	157,162	69,385	33,649	5,628	7,533	0.9	1.5	-0.1	-0.3	-0.7	-0.8
2032	57,101	159,443	69,272	33,545	5,586	7,467	0.9	1.5	-0.2	-0.3	-0.7	-0.9
2033	57,546	161,646	69,127	33,408	5,542	7,395	0.8	1.4	-0.2	-0.4	-0.8	-1.0
							<b>Growth Rate (Annual Average)</b>					
2038	59,121	171,524	67,888	32,198	5,274	6,953	0.5	1.2	-0.4	-0.7	-1.0	-1.2
2043	59,722	178,894	65,675	30,345	4,935	6,462	0.2	0.9	-0.7	-1.2	-1.3	-1.4
2048	59,955	184,301	62,872	28,239	4,541	6,020	0.1	0.6	-0.9	-1.4	-1.6	-1.4
2053	60,217	188,214	59,652	26,149	4,090	5,638	0.1	0.4	-1.0	-1.5	-2.0	-1.3
2058	60,520	192,396	56,231	24,271	3,636	5,284	0.1	0.4	-1.1	-1.4	-2.2	-1.3
2063	60,682	196,014	52,702	22,507	3,155	4,897	0.1	0.4	-1.3	-1.5	-2.6	-1.5
<b>Projected Change (%) 2013-2033 and 2034-2063</b>												
2013-2033	24.8	37.8	0.8	-2.4	-17.4	-13.8						
2034-2063	2.7	6.1	-1.8	-3.6	-4.8	-6.0						



To explain these outcomes, the baseline projections are now presented for each TLA in turn. ERP numbers for the period 1986-2013 drawn from SNZ are included on the opening graphs. The role of population ageing and diminishing natural increase (the excess of births over deaths) in explaining each of the trajectories is highlighted. On the one hand, the prime reproductive age population is in most cases reducing, and, on the other, the 65+ year population is increasing. These trends are ushering in a shift to natural decline (where deaths exceed births) which is entirely natural and emerging across the country (as elsewhere). Where local populations also experience net migration loss of young adults and/or net gain of retirees, the components interact to accelerate the end of growth/onset of depopulation.

Each section concludes with an outline of the stochastic projections for the TLA. As explained above, these data represent 10,000 runs of the projection by repeatedly drawing at random, different combinations of the fertility, mortality, and net migration assumptions. The resulting projections are presented in terms of the median projection, and both a 50 per cent projection interval (all projections falling between the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the projections) and a 90 per cent projection interval (all projections falling between the 5<sup>th</sup> and 95<sup>th</sup> percentiles of the projections). As a general rule of thumb, the individual stochastic projection parameters are interpreted as follows:

### **Median projection interval**

- The median (50<sup>th</sup> percentile) projection indicates a 50 per cent chance that the future population will be lower than the given value, and a 50 per cent chance it will be higher

### **50 per cent projection interval**

- The 25<sup>th</sup> percentile projection indicates a 25 per cent chance that the future population will be lower than the given value, and a 75 per cent chance it will be higher
- The 75<sup>th</sup> percentile projection indicates a 75 per cent chance that the future population will be lower than the given value, and a 25 per cent chance it will be higher

### **90 per cent projection interval**

- The 5<sup>th</sup> percentile projection indicates a 5 per cent chance that the future population will be lower than the given value, and a 95 per cent chance it will be higher
- The 95<sup>th</sup> percentile projection indicates a 95 per cent chance that the future population will be lower than the given value, and a 5 per cent chance it will be higher

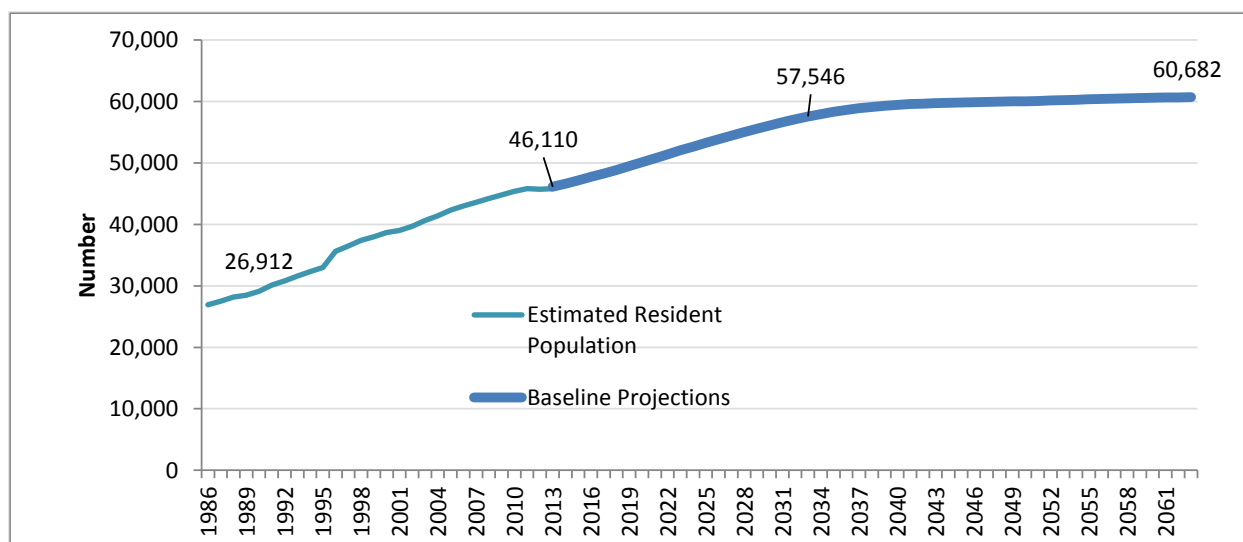
It is conventional to interpret the median projection as indicating the middle of the range of possible scenarios, with the 50 per cent projection interval denoting the likely bounds of probability under medium economic conditions, and the 90 per cent projection interval denoting the extremes, for example under very strong (95<sup>th</sup> percentile) or very weak (5<sup>th</sup> percentile) economic conditions.



## Western Bay of Plenty

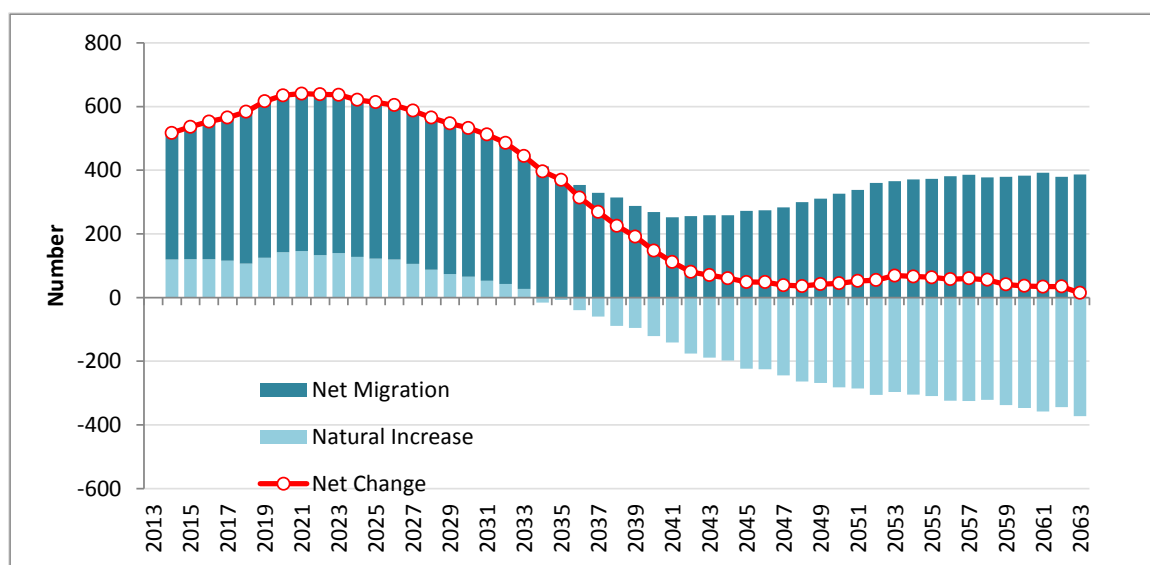
As indicated in Table 3.1 (Section 3: *Population Projections*) the population of the Western Bay of Plenty is projected to grow from 46,110 in 2013 to around 57,546 in 2033 (24.8 per cent), and to 60,682 in 2063 (a further 2.6 per cent). Figure 3.3 indicates that the majority of the growth will occur during the period to 2033, with the trajectory virtually flat from 2038.

**Figure 3.3: Estimated Resident Population and Projected Baseline Population, Western Bay of Plenty**



The seemingly abrupt slowing of growth can be seen from Figure 3.4 to reflect the shift from natural increase to natural decline, beginning for Western Bay of Plenty around 2034 (see Table 3.2). By contrast, net migration is projected to remain positive across the period, averaging 467 per annum between 2013 and 2033, and 334 per annum between 2034 and 2063.

**Figure 3.4: Projected Components of Change (Baseline Projections), Western Bay of Plenty**



**Table 3.2: Projected Components of Change (Baseline Projections), Western Bay of Plenty**

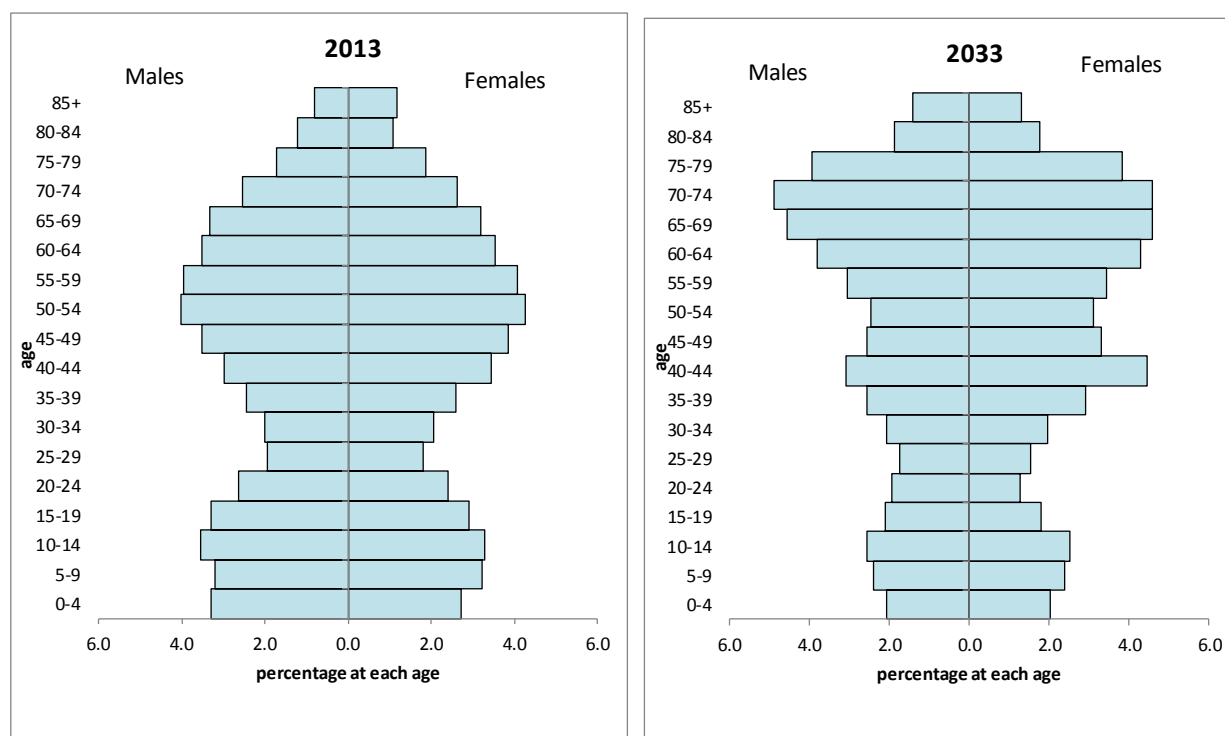
<b>WBOP</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>	<b>Net Migration</b>	<b>Net Change</b>
	<b>Annual (Number)</b>				
2013					
2014	494	375	119	398	517
2015	497	376	121	415	536
2016	497	376	121	432	553
2017	502	386	116	449	565
2018	511	404	107	477	584
2019	519	394	125	491	616
2020	527	385	142	493	635
2021	527	381	146	495	641
2022	520	387	133	505	638
2023	517	378	140	497	637
2024	520	392	128	493	621
2025	518	396	122	492	614
2026	511	392	119	485	605
2027	500	395	106	481	587
2028	493	405	87	478	565
2029	490	417	73	473	547
2030	483	418	65	468	533
2031	473	420	53	459	512
2032	463	421	43	443	486
2033	456	429	28	417	445
	<b>5-Year Totals</b>				
2034-2038	2204	2416	-213	1788	1575
2039-2043	2127	2849	-722	1323	601
2044-2048	2088	3242	-1154	1387	233
2049-2053	2055	3494	-1439	1701	262
2054-2058	1999	3583	-1584	1888	303
2059-2063	1911	3670	-1759	1920	162

Sitting behind the shift to natural decline is, as elsewhere, the structural ageing of the population, depicted in Figure 3.5. By 2033 almost one-third of Western Bay's population will be aged 65+ years, up from 19.5 per cent in 2013. By 2063 that proportion is projected to reach 41.1 per cent.

The data in Table 3.3 also show the ratio of those aged 65+ years to those aged 0-14 years increasing from just above 1.0 in 2013 (100 elderly per 100 children) to more than 2 in 2033, and almost four (392 elderly per 100 children) by 2063.



**Figure 3.5: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Western Bay of Plenty**



**Table 3.3: Projected Baseline Numbers and Change by Broad Age Group, Western Bay of Plenty**

Western Bay of Plenty	Percentage by Broad Age Group		
	2013	2033	2063
0-14	8,880	8,017	6,360
15-39	11,100	11,398	9,349
40-64	17,120	19,307	20,026
65+	9,010	18,824	24,946
Total	46,110	57,546	60,682
85+	910	1,561	3,126
Elderly:Children (Ratio)	1.01	2.35	3.92

Table 3.4 confirms that the majority of the Western Bay of Plenty's growth will occur at older ages (see also Appendix D.1). Between 2013 and 2033, growth at 65+ years will account for 85.8 per cent of all growth. Those aged 15-39 years will contribute 2.6 per cent, and those aged 40-64 years, 19.1 per cent; together these age groups will offset a minor decline (863 persons) at 0-14 years. Between 2034 and 2063, numbers at both 0-14 and 15-39 years will decline, while growth at 40-64 and 65+ years will fully offset that decline, the greatest contribution coming from the 65+ population. Particularly notable is the contribution to growth at 85+ years, numbers increasing by 651 between 2013 and 2033, and 1,564 between 2034 and 2063, accounting for almost half of all growth in the latter period.





**Table 3.4: Projected (Baseline) Contribution to Change by Broad Age Group, Western Bay of Plenty**

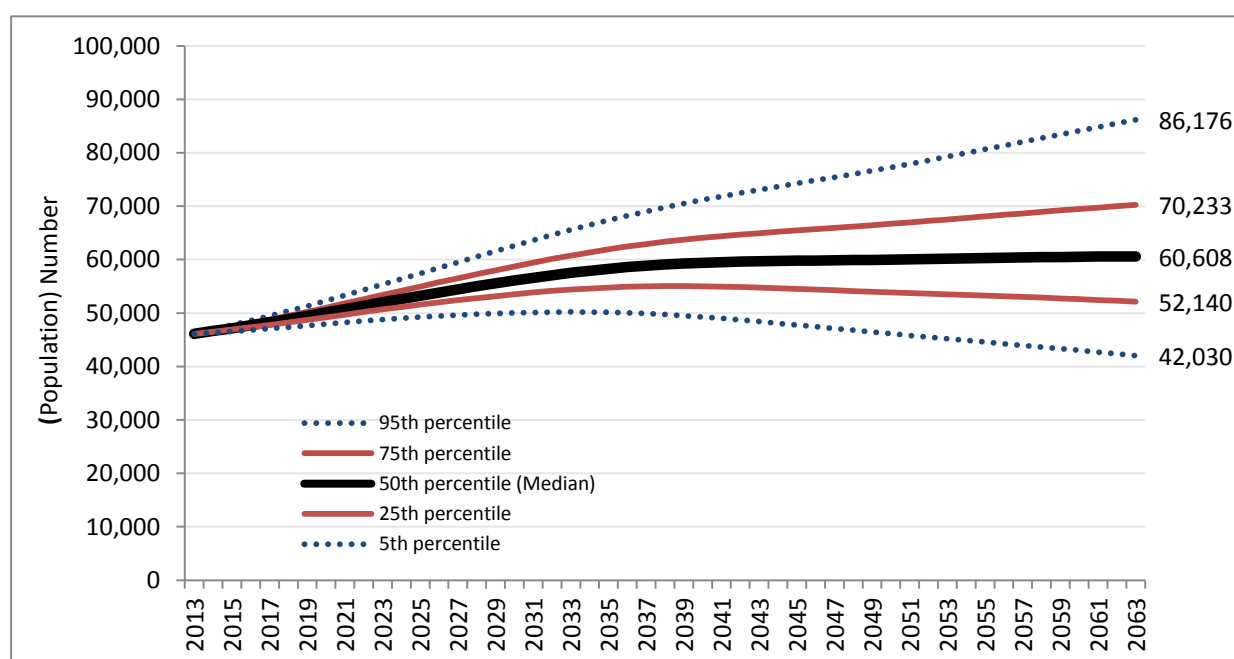
Western Bay of Plenty	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-863	-9.7	-1,656	-20.7	-2,520	-28.4	-7.5	-52.8	-17.3
15-39	298	2.7	-2,049	-18.0	-1,751	-15.8	2.6	-65.3	-12.0
40-64	2,187	12.8	720	3.7	2,906	17.0	19.1	22.9	19.9
65+	9,814	108.9	6,122	32.5	15,936	176.9	85.8	195.2	109.4
Total	11,436	24.8	3,136	5.5	14,572	31.6	100.0	100.0	100.0
85+	651	71.6	1,564	100.2	2,216	243.5	5.7	49.9	15.2

**Stochastic Projections:** Figure 3.6 presents the stochastic projection results for Western Bay of Plenty District (see Appendix E.1 for data). The median projections are 57,516 in 2033 and 60,608 in 2063, almost identical to the deterministic projection presented above (57,546 and 60,682 respectively). As could be expected, the uncertainty around the projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 54,390 and 60,764 in 2033, and between 52,140 and 70,233 in 2063. This interval extends between 5 per cent lower and 6 per cent higher than the median in 2033, and between 14 per cent lower and 16 per cent higher than the median in 2063.

The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 50,199 and 65,576 in 2033, and between 42,030 and 86,176 in 2063. This interval extends between 13 per cent lower and 14 per cent higher than the median in 2033, and between 31 per cent lower and 42 per cent higher than the median in 2063.

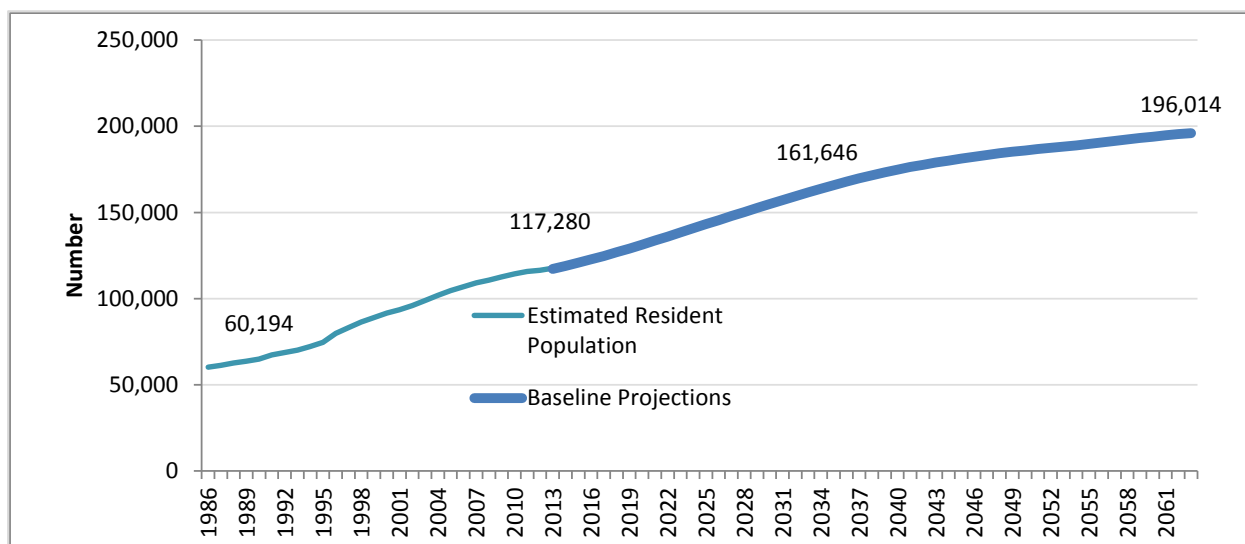
**Figure 3.6: Stochastic Projections, Western Bay of Plenty**



## Tauranga City

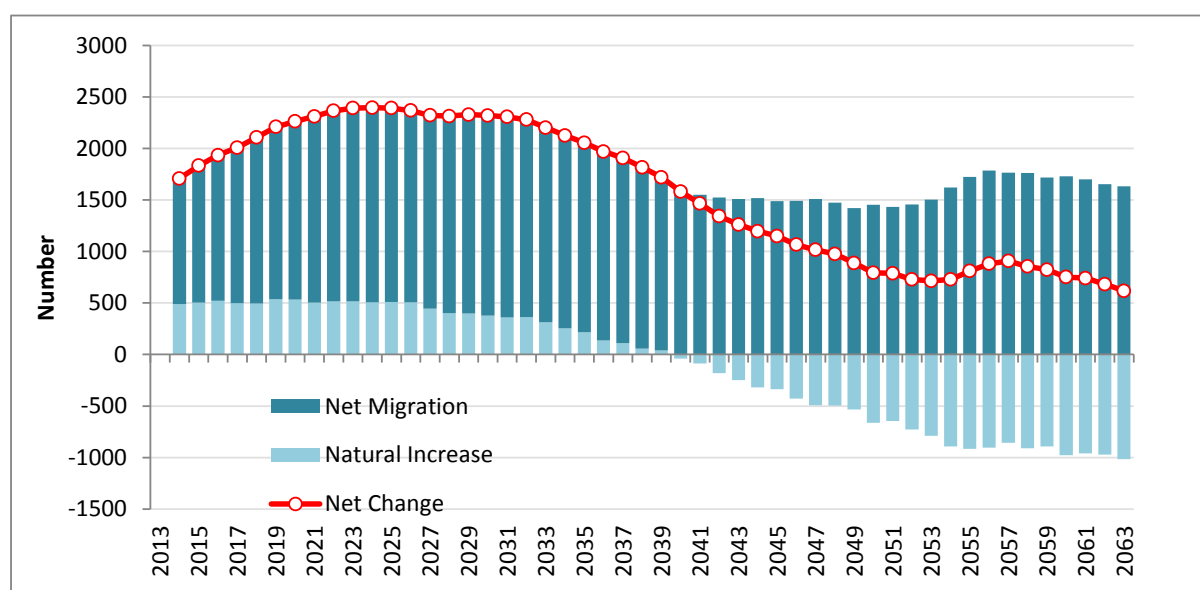
The population of Tauranga City is projected to grow from 117,280 in 2013 to around 161,646 in 2033 (37.8 per cent), and to 196,014 in 2063 (a further 14.3 per cent) (Figure 3.7, Table 3.1, Section 3: *Population Projections*). As was the case for the Western Bay of Plenty, the majority of the growth occurs prior to 2033.

**Figure 3.7: Estimated Resident Population and Projected Baseline Population, Tauranga City**



Again the slowing of growth reflects the shift from natural increase to natural decline, beginning for Tauranga City around 2039 (Figure 3.8, see also Table 3.5). Net migration is projected to remain relatively high and positive at all observations, but declines slightly across the period, averaging 1,755 per annum between 2013 and 2033, and 1,628 per annum between 2034 and 2063.

**Figure 3.8: Projected Components of Change (Baseline Projections), Tauranga City**



**Table 3.5: Projected Components of Change (Baseline Projections), Tauranga City**

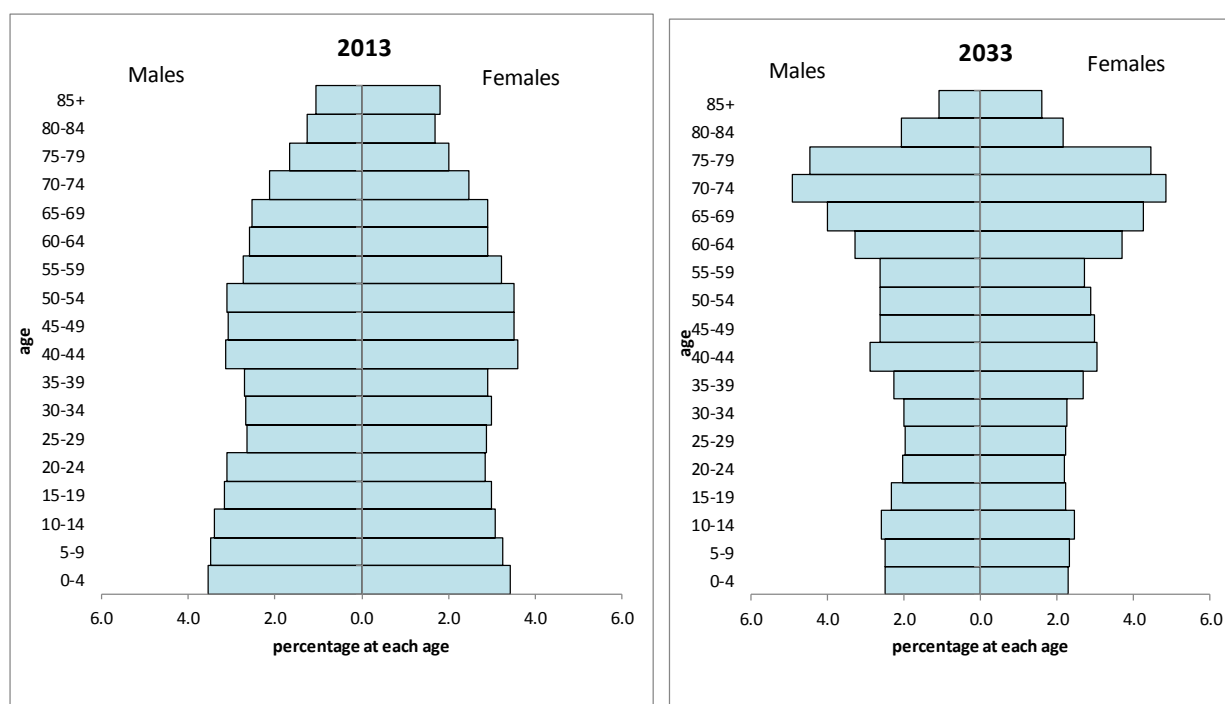
<b>Tauranga City</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>	<b>Net Migration</b>	<b>Net Change</b>
	<b>Annual (Number)</b>				
2013					
2014	1607	1118	489	1220	1709
2015	1606	1102	504	1329	1833
2016	1604	1083	521	1413	1935
2017	1614	1116	497	1510	2008
2018	1619	1126	494	1614	2108
2019	1621	1086	535	1674	2209
2020	1624	1092	532	1730	2263
2021	1617	1112	505	1806	2311
2022	1614	1100	515	1851	2366
2023	1612	1094	517	1875	2393
2024	1614	1106	508	1889	2397
2025	1617	1108	509	1884	2392
2026	1612	1104	508	1861	2369
2027	1610	1166	444	1877	2321
2028	1611	1210	401	1913	2314
2029	1612	1213	399	1929	2329
2030	1614	1236	379	1942	2321
2031	1613	1254	359	1947	2306
2032	1618	1255	363	1918	2281
2033	1626	1312	313	1889	2203
	<b>5-Year Totals</b>				
2034-2038	8205	7428	777	9101	9878
2039-2043	8306	8822	-516	7886	7370
2044-2048	8279	10353	-2074	7481	5407
2049-2053	8183	11540	-3357	7271	3913
2054-2058	8176	12655	-4478	8660	4182
2059-2063	8221	13041	-4820	8437	3617

By 2033 over one-third of Tauranga City's population will be aged 65+ years, up from 19.5 per cent in 2013 (Figure 3.9 and Table 3.6). By 2063 that proportion is projected to reach around 42.7 per cent—Tauranga City slightly older, but ageing a little more slowly, than Western Bay of Plenty.

Table 3.6 also shows the ratio of those aged 65+ years to those aged 0-14 years increasing from just below 1.0 in 2013 to 2.31 in 2033, and 3.49 (349 elderly per 100 children) by 2063. Despite being structurally older than the Western Bay of Plenty in terms of percentage aged 65+ years, Tauranga City has a slightly lower ratio of elderly to children. This is because Tauranga City in 2063 has a higher proportion aged 0-14 years.



**Figure 3.9: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Tauranga City**



**Table 3.6: Projected Baseline Numbers and Change by Broad Age Group, Tauranga City**

Tauranga City				Percentage by Broad Age Group		
	2013	2033	2063	2013	2033	2063
0-14	23,670	23,666	24,019	20.2	14.6	12.3
15-39	33,900	35,857	36,648	28.9	22.2	18.7
40-64	36,830	47,397	51,628	31.4	29.3	26.3
65+	22,880	54,725	83,718	19.5	33.9	42.7
Total	117,280	161,646	196,014	100.0	100.0	100.0
85+	3,370	4,328	11,528	2.9	2.7	5.9
Elderly:Children (Ratio)	0.97	2.31	3.49			

Table 3.7 confirms that the majority of Tauranga City's future growth will occur at older ages (see also Appendix D.2). Between 2013 and 2033, growth at 65+ years will account for 71.8 per cent of all growth. Those aged 15-39 years will contribute 4.4 per cent, and those aged 40-64 years, 23.8 per cent; together these age groups will offset a minor decline (4 persons) at 0-14 years. Between 2034 and 2063, all age groups are projected to grow, but the proportion of growth emanating from the 65+ year population will increase to 84.4 per cent. Noteworthy again is the contribution to growth at 85+ years, numbers increasing by 958 between 2013 and 2033, and 7,201 between 2034 and 2063, accounting for 21 per cent of growth in the latter period.



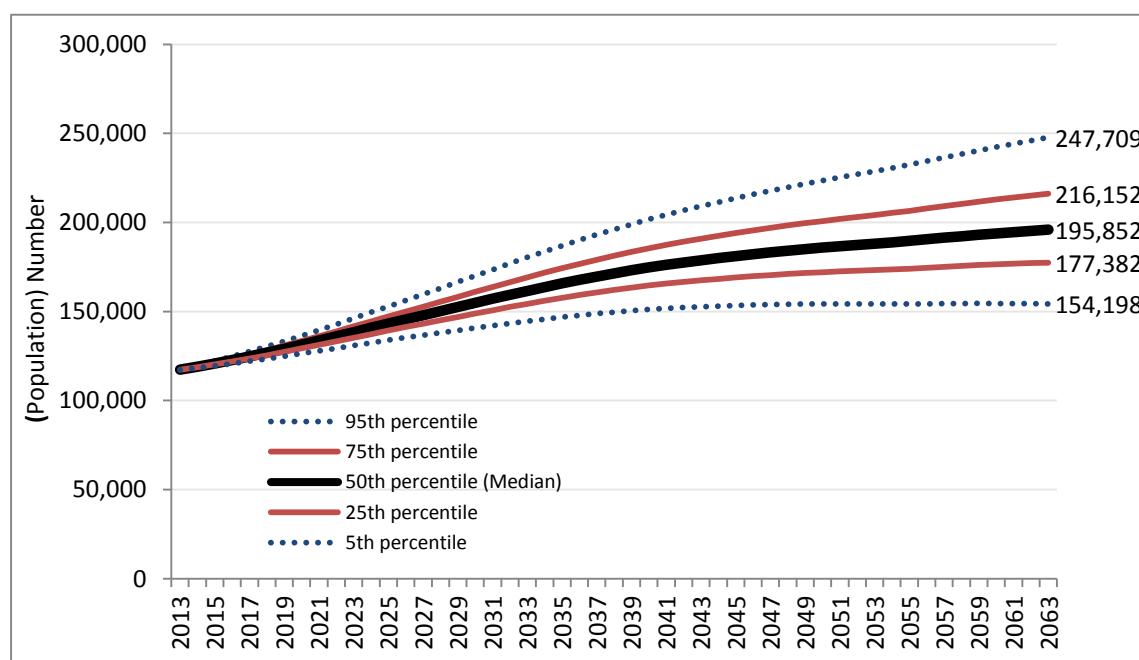
**Table 3.7: Projected (Baseline) Contribution to Change by Broad Age Group, Tauranga City**

Tauranga City	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-4	-0.0	353	1.5	349	1.5	0.0	1.0	0.4
15-39	1,957	5.8	791	2.2	2,748	8.1	4.4	2.3	3.5
40-64	10,567	28.7	4,231	8.9	14,798	40.2	23.8	12.3	18.8
65+	31,845	139.2	28,993	53.0	60,838	265.9	71.8	84.4	77.3
Total	44,366	37.8	34,368	21.3	78,734	67.1	100.0	100.0	100.0
85+	958	28.4	7,201	166.4	8,158	242.1	2.2	21.0	10.4

**Stochastic Projections:** Figure 3.10 presents the stochastic projection results for Tauranga City (Appendix E.2 for data). The median projections are 161,565 in 2033 and 195,852 in 2063, almost identical to the deterministic projection presented above (161,646 and 196,014 respectively). As could be expected, the uncertainty around this median projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 154,311 and 169,715 in 2033, and between 177,382 and 216,152 in 2063. This interval extends between 5 per cent lower and 5 per cent higher than the median in 2033, and between 9 per cent lower and 10 per cent higher than the median in 2063.

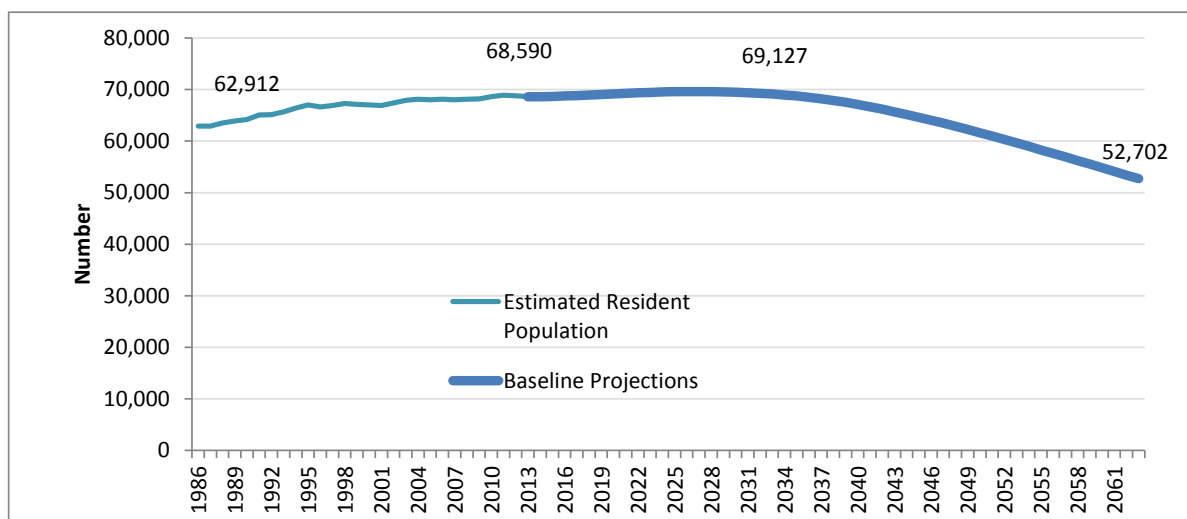
The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 144,557 and 180,333 in 2033, and between 154,198 and 247,709 in 2063. This interval extends between 11 per cent lower and 12 per cent higher than the median in 2033, and between 21 per cent lower and 27 per cent higher than the median in 2063.

**Figure 3.10: Stochastic Projections, Tauranga City**

## Rotorua District

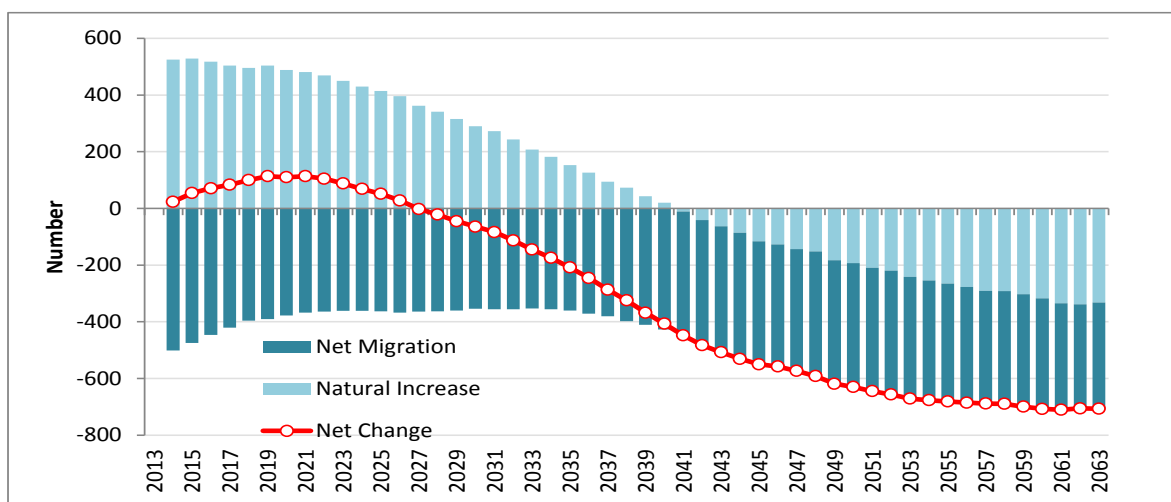
The population of Rotorua District is projected to grow very slightly from 68,590 in 2013 to 69,127 by 2033 (0.8 per cent over 2013), and then decline to around 52,702 in 2063 (-22.4 per cent) (Figure 3.11, see also Table 3.1, Section 3: *Population Projections*). The projected peak occurs in 2026 at 69,601 persons.

**Figure 3.11: Estimated Resident Population and Projected Baseline Population, Rotorua District**



The onset of decline reflects both an accelerated shift from natural increase to natural decline, beginning around 2039, and negative net migration across the entire period (Figure 3.12, see also Table 3.8). Net migration is projected to average -385 per annum between 2013 and 2033, and -411 per annum between 2034 and 2063. It should be recalled from the methodology that these numbers are not 'forced' as occurs when a numerical assumption is applied, but instead arise out of applying historical average net migration *rates* by single year of age, and sex.

**Figure 3.12: Projected Components of Change (Baseline Projections), Rotorua District**



**Table 3.8: Projected Components of Change (Baseline Projections), Rotorua District**

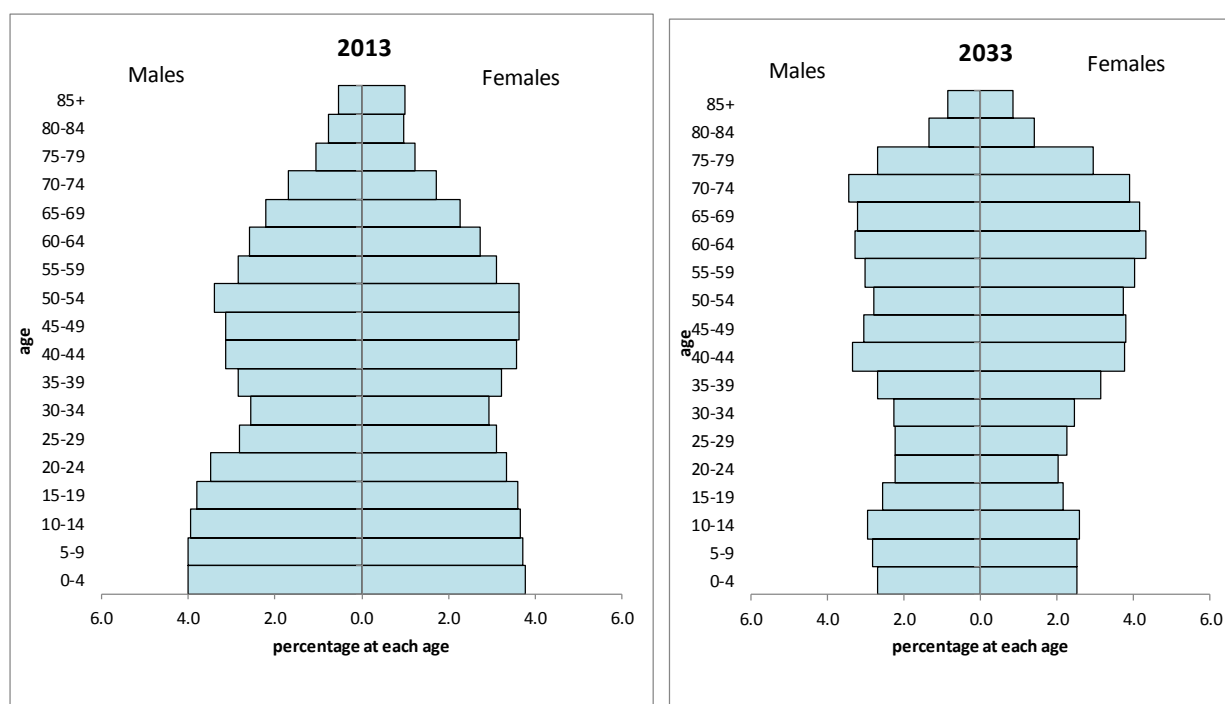
<b>Rotorua DC</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>	<b>Net Migration</b>	<b>Net Change</b>
	<b>Annual (Number)</b>				
2013					
2014	1044	519	525	-502	24
2015	1033	504	529	-475	54
2016	1017	500	517	-446	71
2017	1008	505	504	-420	83
2018	998	502	496	-396	100
2019	990	486	504	-391	114
2020	982	494	488	-378	110
2021	964	483	481	-367	114
2022	946	477	469	-364	105
2023	927	477	450	-361	88
2024	912	482	430	-361	69
2025	895	480	415	-363	51
2026	872	476	396	-368	28
2027	852	490	362	-364	-2
2028	832	491	341	-363	-21
2029	813	498	315	-360	-45
2030	793	503	290	-354	-64
2031	770	497	272	-356	-84
2032	751	508	243	-356	-113
2033	734	526	207	-353	-145
	<b>5-Year Totals</b>				
2034-2038	3424	2797	627	-1866	-1239
2039-2043	3094	3146	-52	-2161	-2213
2044-2048	2816	3442	-626	-2177	-2803
2049-2053	2563	3609	-1046	-2174	-3221
2054-2058	2323	3701	-1378	-2042	-3421
2059-2063	2089	3713	-1624	-1905	-3529

By 2033 just on one-quarter of Rotorua's population will be aged 65+ years, up from 13.4 per cent in 2013 (Figure 3.13 and Table 3.9). By 2063 that proportion is projected to reach 39.4 per cent. This is a very rapid rate of structural ageing and is driven primarily by migration loss of young adults, who are also the primary reproductive age group. The trends will see Rotorua's age structure shift from youngest in 2013 to second-youngest by 2063.

These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 0.58 (58 elderly per 100 children) in 2013 to 1.54 in 2033, and 3.47 (347 elderly per 100 children) by 2063—Rotorua relatively young, but ageing much faster than both Tauranga City and Western Bay of Plenty.



**Figure 3.13: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Rotorua District**



**Table 3.9: Projected Baseline Numbers and Change by Broad Age Group, Rotorua District**

Rotorua DC				Percentage by Broad Age Group		
	2013	2033	2063	2013	2033	2063
0-14	15,840	11,140	5,969	23.1	16.1	11.3
15-39	21,760	16,541	9,275	31.7	23.9	17.6
40-64	21,780	24,311	16,717	31.8	35.2	31.7
65+	9,210	17,134	20,741	13.4	24.8	39.4
Total	68,590	69,127	52,702	100.0	100.0	100.0
85+	1,060	1,190	2,502	1.5	1.7	4.7
Elderly:Children (Ratio)	0.58	1.54	3.47			

Table 3.10 confirms these trends (see also Appendix D.3). Between 2013 and 2033, numbers aged 0-14 and 15-39 years are projected to decline quite significantly (4,700 and 5,219 respectively). By contrast, growth at 40-64 and 65+ years is equally significant (2,531 and 7,924 respectively) resulting in a small net gain (537 persons, 0.8 per cent). The situation is projected to deteriorate between 2034 and 2063, with the growth at 65+ years reducing in number and unable to offset the decline occurring in all other age groups. As for the foregoing TLAs the contribution to growth at 85+ years is again remarkable, with numbers increasing by 130 between 2013 and 2033 and 1,312 between 2034 and 2063, and accounting for 24.2 per cent of all growth in the period 2013-2033. This 'older-old' growth thus comes earlier for Rotorua than for Western Bay of Plenty and Tauranga.





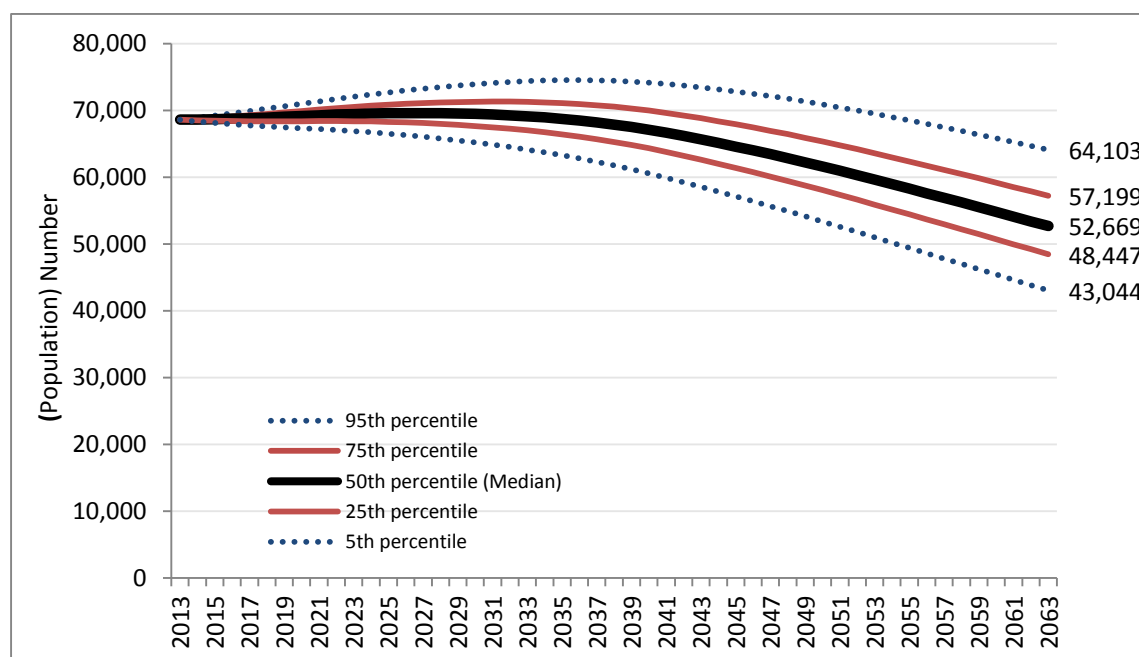
**Table 3.10: Projected (Baseline) Contribution to Change by Broad Age Group, Rotorua District**

Rotorua DC	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-4,700	-29.7	-5,171	-46.4	-9,871	-62.3	-875.7	-31.5	-62.1
15-39	-5,219	-24.0	-7,266	-43.9	-12,485	-57.4	-972.3	-44.2	-78.6
40-64	2,531	11.6	-7,594	-31.2	-5,063	-23.2	471.6	-46.2	-31.9
65+	7,924	86.0	3,607	21.0	11,531	125.2	1476.4	22.0	72.6
Total	537	0.8	-16,425	-23.8	-15,888	-23.2	100.0	-100.0	-100.0
85+	130	12.2	1,312	110.3	1,442	136.0	24.2	8.0	9.1

**Stochastic Projections:** Figure 3.14 presents the stochastic projection results for Rotorua District (Appendix E.3 for data). The median projections are 69,110 in 2033 and 52,669 in 2063, almost identical to the deterministic projection presented above (69,127 and 52,702 respectively). As could be expected, the uncertainty around this median projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 66,996 and 71,264 in 2033, and between 48,447 and 57,199 in 2063. This interval extends between 3 per cent lower and 3 per cent higher than the median in 2033, and between 8 per cent lower and 9 per cent higher than the median in 2063.

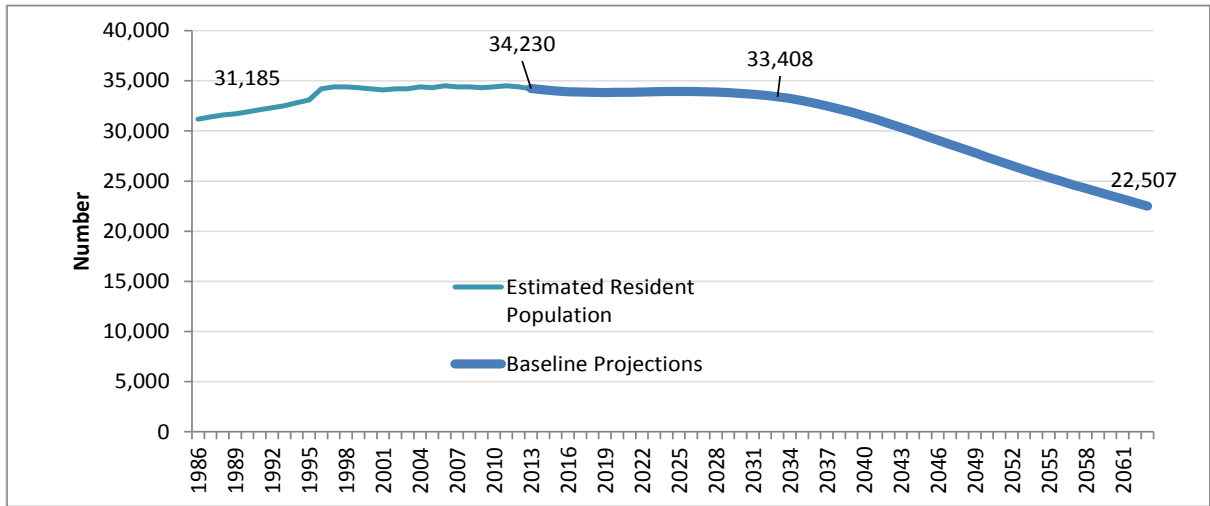
The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 64,115 and 74,360 in 2033, and between 43,044 and 64,103 in 2063. This interval extends between 7 per cent lower and 8 per cent higher than the median in 2033, and between 18 per cent lower and 22 per cent higher than the median in 2063.

**Figure 3.14: Stochastic Projections, Rotorua District**

# Whakatane District

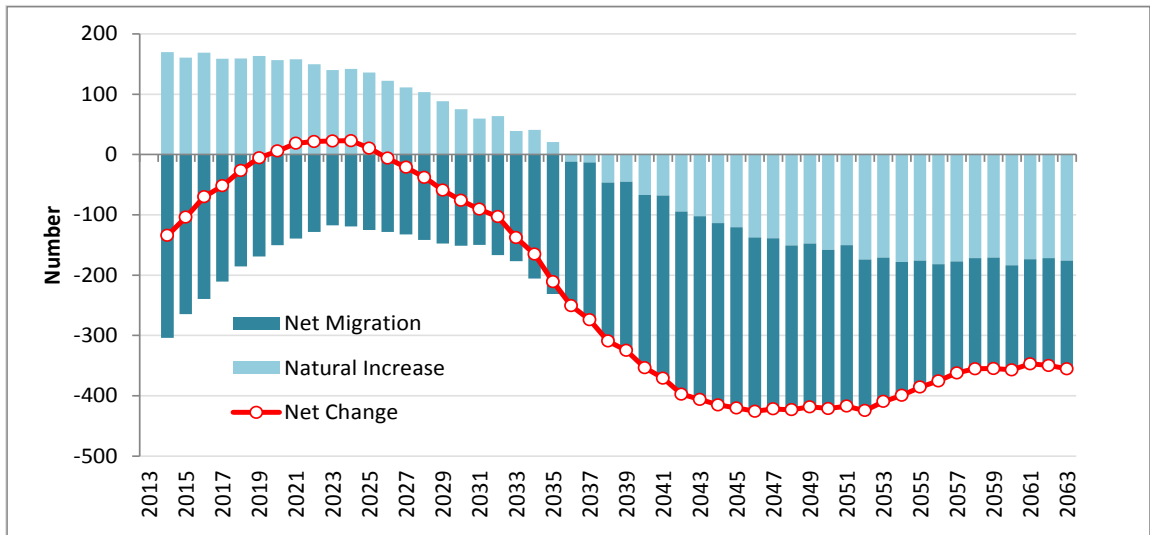
The population of the Whakatane District is projected to remain approximately stable until around 2033, albeit experiencing both minor growth and decline until 2029 and falling to approximately 33,408 in 2033. The population will then decline more rapidly to around 22,507 by 2063 (-30.1 per cent over 2033) (Figure 3.15, see also Table 3.1, Section 3: *Population Projections*).

**Figure 3.15: Estimated Resident Population and Projected Baseline Population, Whakatane District**



The decline reflects both an accelerated shift from natural increase to natural decline, beginning around 2036, and negative net migration across the entire period (Figure 3.16, see also Table 3.11). Net migration is projected to average -167 per annum between 2013 and 2033, and -243 per annum between 2034 and 2063. Again a reminder that these numbers are not ‘forced’, but arise out of applying historical average net migration rates by single year of age, and sex.

**Figure 3.16: Projected Components of Change (Baseline Projections), Whakatane District**



**Table 3.11: Projected Components of Change (Baseline Projections), Whakatane District**

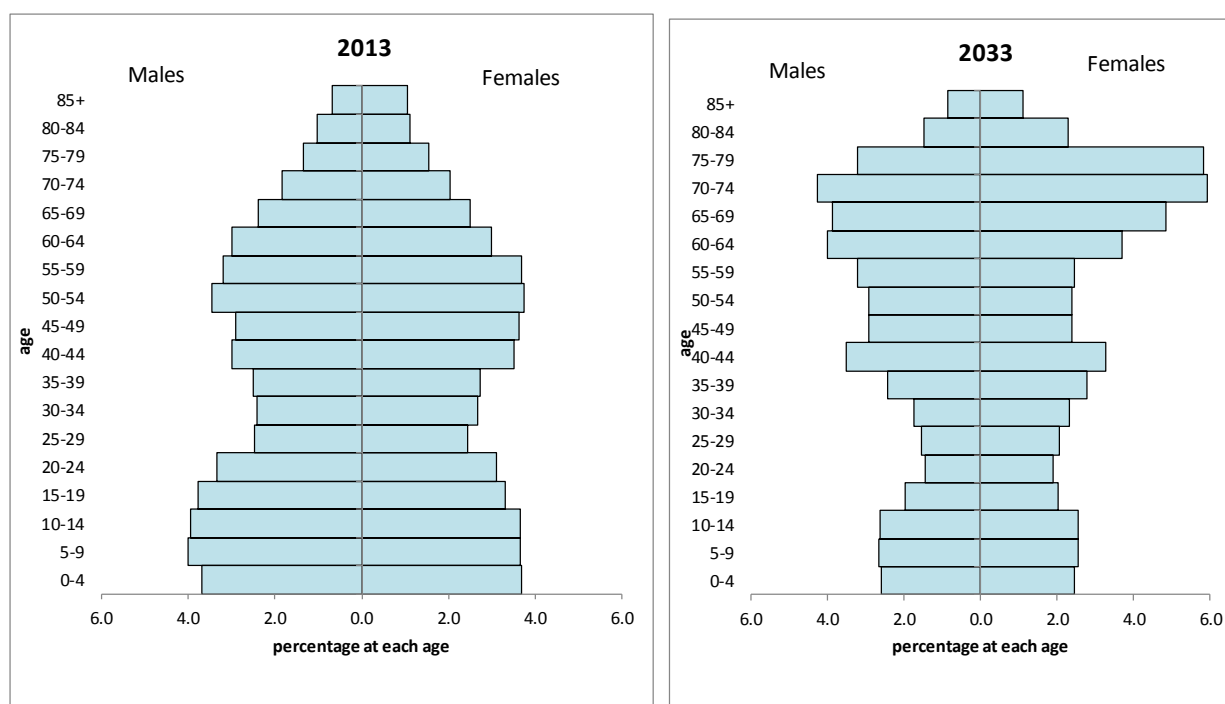
Whakatane DC	Births	Deaths	Natural Increase	Net Migration	Net Change
	<b>Annual (Number)</b>				
2013					
2014	474	304	170	-304	-134
2015	467	306	161	-265	-104
2016	460	291	169	-239	-70
2017	458	299	159	-211	-52
2018	454	295	159	-186	-26
2019	450	287	164	-169	-6
2020	447	290	156	-150	6
2021	440	282	158	-139	19
2022	434	284	150	-128	21
2023	426	286	140	-118	23
2024	419	277	142	-119	23
2025	412	276	136	-125	11
2026	404	281	122	-129	-6
2027	394	283	111	-132	-21
2028	385	282	104	-142	-38
2029	376	288	88	-147	-59
2030	369	293	75	-151	-76
2031	358	299	59	-150	-91
2032	349	285	64	-167	-103
2033	340	301	39	-177	-138
	<b>5-Year Totals</b>				
2034-2038	1585	1595	-10	-1200	-1210
2039-2043	1429	1806	-377	-1475	-1852
2044-2048	1293	1954	-661	-1444	-2106
2049-2053	1171	1972	-801	-1289	-2090
2054-2058	1062	1947	-884	-994	-1878
2059-2063	958	1834	-876	-888	-1764

By 2033 over one-third of Whakatane's population will be aged 65+ years, up from 15.5 per cent in 2013 (Figure 3.17 and Table 3.12). By 2063 that proportion is projected to reach 45.4 per cent. This is an even greater rate of structural ageing than for Rotorua, again driven primarily by the net migration loss of prime reproductive age adults, but also by initial gains at older ages.

These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 0.69 (69 elderly per 100 children) in 2013 to 2.18 in 2033, and 3.72 (372 elderly per 100 children) by 2063—Whakatane, like Rotorua, ageing much faster than both Tauranga City and Western Bay of Plenty.



**Figure 3.17: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Whakatane District**



**Table 3.12: Projected Baseline Numbers and Change by Broad Age Group, Whakatane District**

Whakatane DC				Percentage by Broad Age Group		
	2013	2033	2063	2013	2033	2063
0-14	7,740	5,155	2,745	22.6	15.4	12.2
15-39	9,840	6,751	3,590	28.7	20.2	15.9
40-64	11,330	10,264	5,962	33.1	30.7	26.5
65+	5,320	11,238	10,210	15.5	33.6	45.4
Total	34,230	33,408	22,507	100.0	100.0	100.0
85+	590	653	1,192	1.7	2.0	5.3
Elderly:Children (Ratio)	0.69	2.18	3.72			

Table 3.13 confirms these trends (see also Appendix D.4). Between 2013 and 2033, numbers aged below 65 years are projected to decline significantly. Growth at 65+ years is equally significant (5,918 persons) but will fail to offset the overall decline (-822 persons). As for Rotorua, the situation is projected to deteriorate between 2034 and 2063, with all age groups declining, even at 65+ years. For Whakatane, the contribution to growth at 85+ years is significantly lower than for Western Bay of Plenty, Tauranga City and Rotorua. Numbers increase by 63 between 2013 and 2033 and 539 between 2034 and 2063, accounting for 7.7 per cent of growth in the period 2013-2033 and just 4.9 per cent between 2034 and 2063.



**Table 3.13: Projected (Baseline) Contribution to Change by Broad Age Group, Whakatane District**

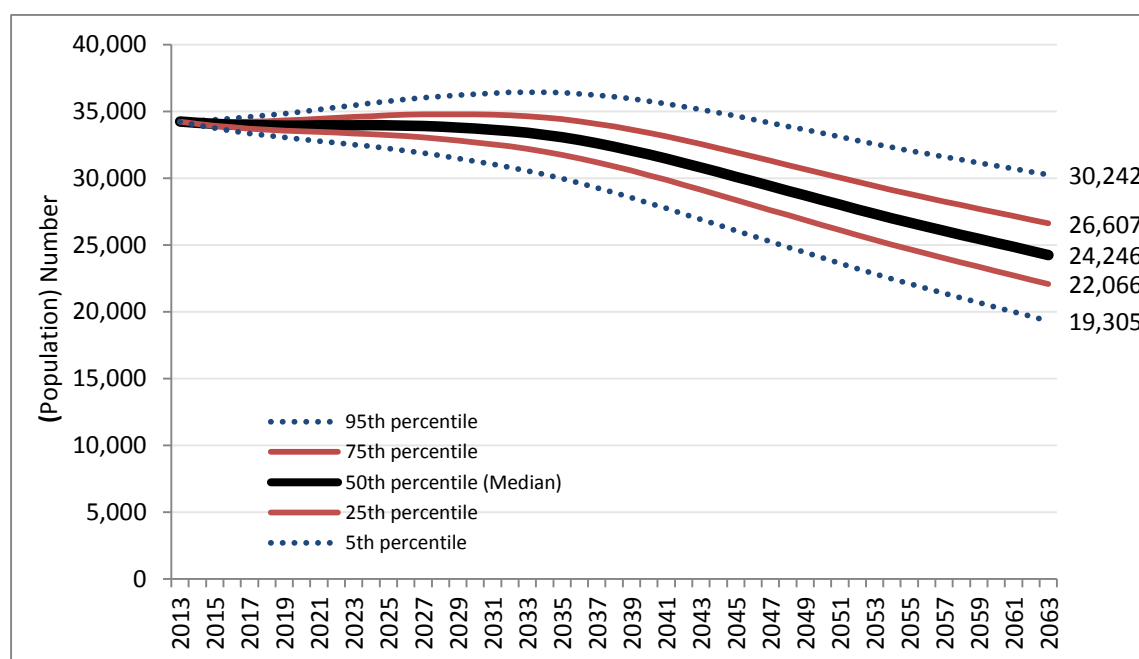
Whakatane DC	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-2,585	-33.4	-2,409	-46.7	-4,995	-64.5	-314.3	-22.1	-42.6
15-39	-3,089	-31.4	-3,161	-46.8	-6,250	-63.5	-375.6	-29.0	-53.3
40-64	-1,066	-9.4	-4,302	-41.9	-5,368	-47.4	-129.6	-39.5	-45.8
65+	5,918	111.2	-1,028	-9.2	4,890	91.9	719.6	-9.4	41.7
Total	-822	-2.4	-10,901	-32.6	-11,723	-34.2	-100.0	-100.0	-100.0
85+	63	10.7	539	82.5	602	102.0	7.7	4.9	5.1

**Stochastic Projections:** Figure 3.18 presents the stochastic projection results for Whakatane District (see Appendix E.4 for data). The median projections are 33,393 in 2033 and 22,246 in 2063, almost identical to the deterministic projection presented above (33,408 and 22,507 respectively). As could be expected, the uncertainty around the projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 32,008 and 34,838 in 2033, and between 22,066 and 26,607 in 2063. This interval extends between 4 per cent lower and 4 per cent higher than the median in 2033, and between 9 per cent lower and 10 per cent higher than the median in 2063.

The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 30,548 and 36,436 in 2033, and between 19,305 and 30,242 in 2063. This interval extends between 9 per cent lower and 9 per cent higher than the median in 2033, and between 20 per cent lower and 25 per cent higher than the median in 2063.

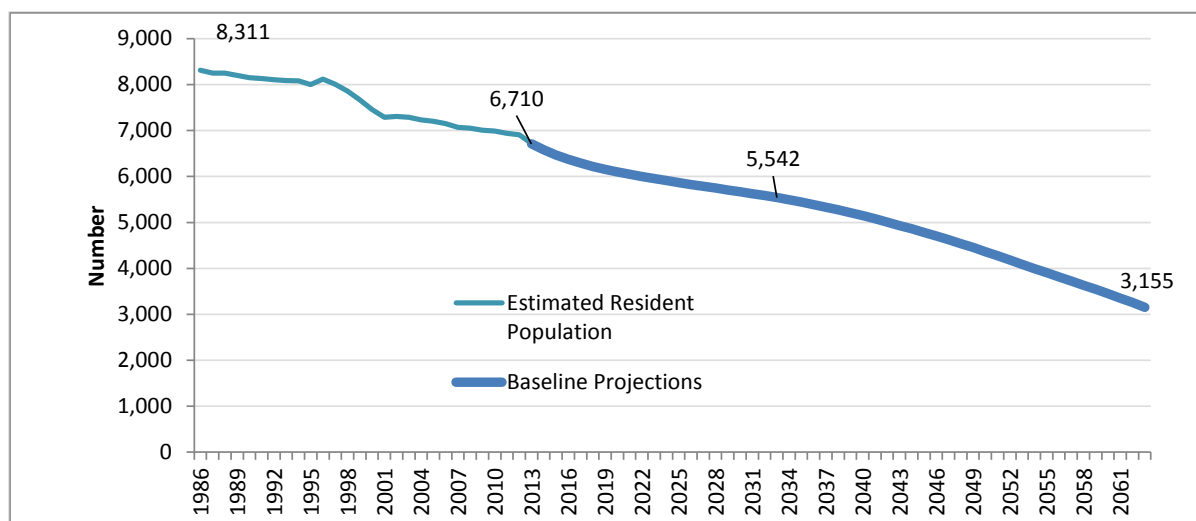
**Figure 3.18: Stochastic Projections, Whakatane District**



## Kawerau District

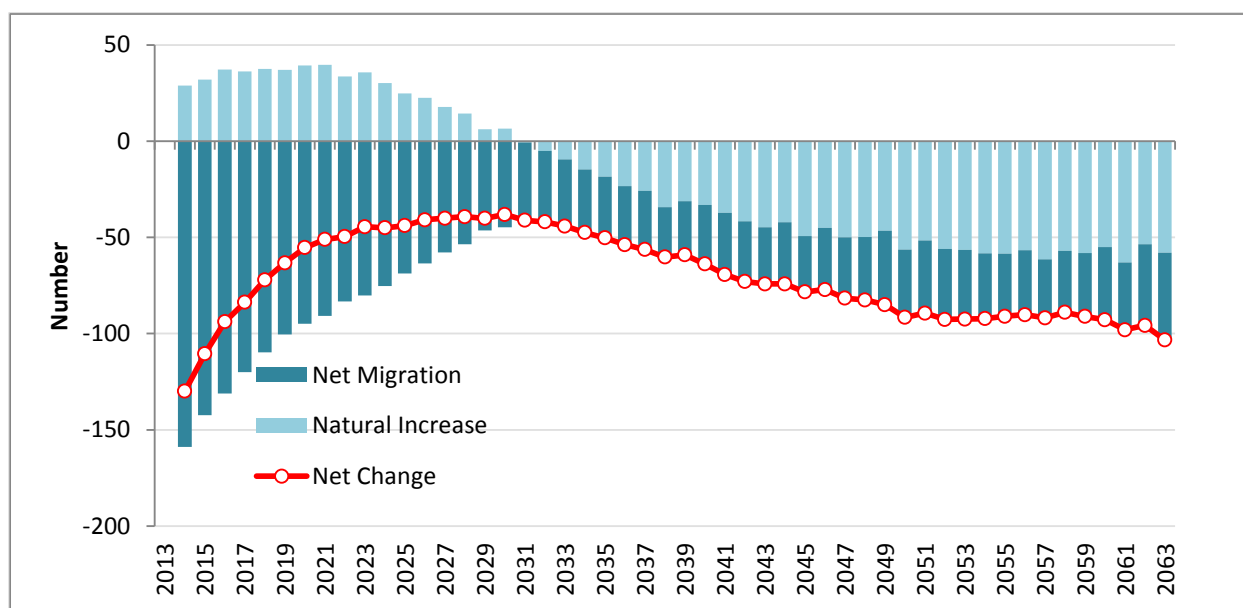
The population of Kawerau District is projected to undergo a steady decline, from 6,710 in 2013 to 5,542 by 2033 (-17.4 per cent) and then more rapidly to around 3,155 by 2063 (-40.2 per cent over 2033) (Figure 3.19).

**Figure 3.19: Estimated Resident Population and Projected Baseline Population, Kawerau District**



As for both Rotorua and Whakatane, the decline reflects an accelerated shift from natural increase to natural decline, for Kawerau beginning around 2031, and negative net migration across the entire period (Figure 3.20, see also Table 3.14)—reducing as the stock population declines. Net migration is projected to average -82 per annum between 2013 and 2033, and -33 per annum between 2034 and 2063.

**Figure 3.20: Projected Components of Change (Baseline Projections), Kawerau District**



**Table 3.14: Projected Components of Change (Baseline Projections), Kawerau District**

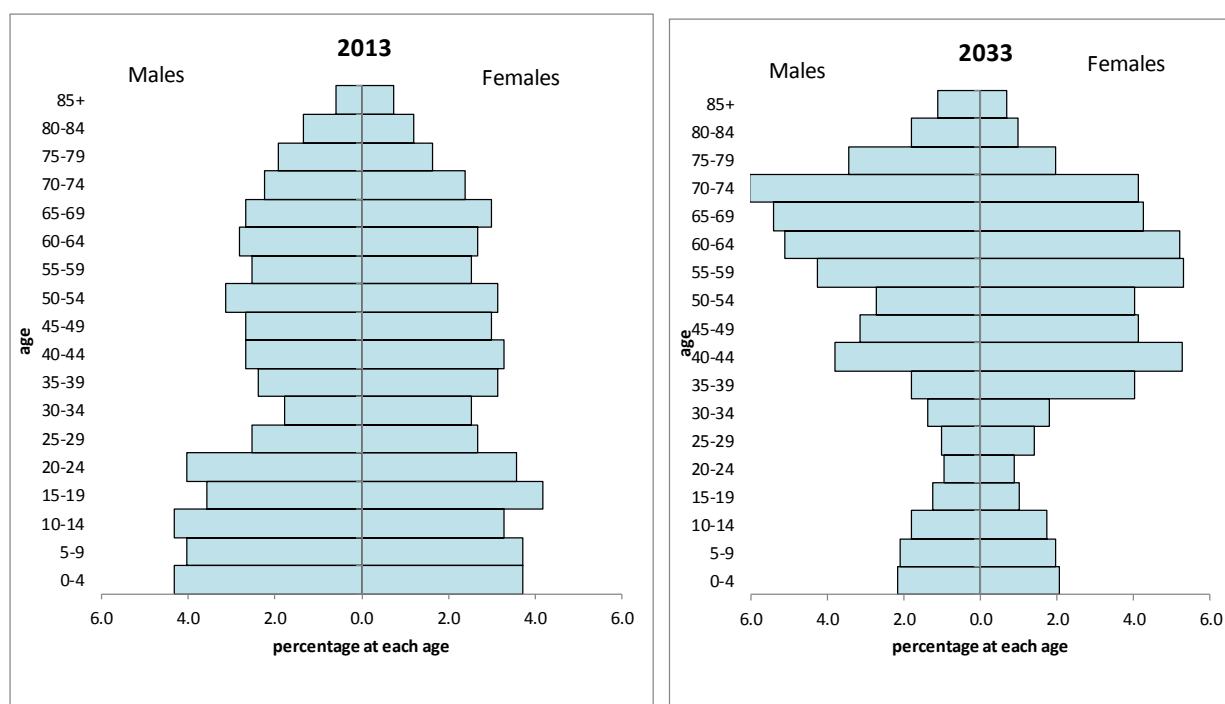
<b>Kawerau DC</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>	<b>Net Migration</b>	<b>Net Change</b>
	<b>Annual (Number)</b>				
2013					
2014	111	82	29	-159	-130
2015	110	78	32	-142	-110
2016	108	71	37	-131	-94
2017	108	71	36	-120	-84
2018	105	68	38	-110	-72
2019	103	66	37	-100	-63
2020	102	62	39	-95	-55
2021	99	59	40	-91	-51
2022	96	62	34	-83	-50
2023	92	56	36	-80	-44
2024	88	58	30	-75	-45
2025	85	60	25	-69	-44
2026	80	58	23	-63	-41
2027	75	58	18	-58	-40
2028	70	56	14	-54	-39
2029	65	59	6	-46	-40
2030	60	54	7	-45	-38
2031	56	56	-1	-40	-41
2032	51	56	-5	-37	-42
2033	47	56	-9	-35	-44
	<b>5-Year Totals</b>				
2034-2038	188	304	-116	-152	-268
2039-2043	139	326	-188	-151	-339
2044-2048	111	348	-236	-157	-394
2049-2053	91	358	-267	-184	-451
2054-2058	73	364	-292	-162	-454
2059-2063	55	343	-288	-193	-481

By 2033 almost 30 per cent of Kawerau's population will be aged 65+ years, up from 17.7 per cent in 2013 (Figure 3.21 and Table 3.15). By 2063 that proportion is projected to reach 67.1 per cent. This is an extreme rate of structural ageing, driven primarily by the net migration loss of prime reproductive age adults. By 2063 Kawerau will have the BOP's oldest age structure.

These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 0.76 (76 elderly per 100 children) in 2013 to 2.63 in 2033, and 17.26 (1,726 elderly per 100 children) by 2063—Kawerau undergoing the most rapid structural ageing of the BOP TLA's.



**Figure 3.21: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Kawerau District**



**Table 3.15: Projected Baseline Numbers and Change by Broad Age Group, Kawerau District**

Kawerau DC				Percentage by Broad Age Group		
	2013	2033	2063	2013	2033	2063
0-14	1,570	653	123	23.4	11.8	3.9
15-39	2,040	859	173	30.4	15.5	5.5
40-64	1,910	2,380	742	28.5	42.9	23.5
65+	1,190	1,650	2,118	17.7	29.8	67.1
Total	6,710	5,542	3,155	100.0	100.0	100.0
85+	90	98	189	1.3	1.8	6.0
Elderly:Children (Ratio)	0.76	2.53	17.26			

Table 3.16 confirms these trends (see also Appendix D.5). Between 2013 and 2033, numbers aged 0-14 and 15-39 years are projected to decline significantly. Growth at 40-64 and 65+ years (470 and 460 persons respectively) is also significant but will fail to offset the overall decline (-1,168 persons). Again the situation is projected to deteriorate between 2034 and 2063, with all age groups except at 65+ years declining. For Kawerau, by contrast with Western Bay of Plenty, Tauranga, Rotorua and Whakatane, there is very little increase in the 85+ year old population, numbers increasing by 8 between 2013 and 2033 and 90 between 2034 and 2063. As elsewhere, the greatest contribution to growth is observed in the latter part of the projection.





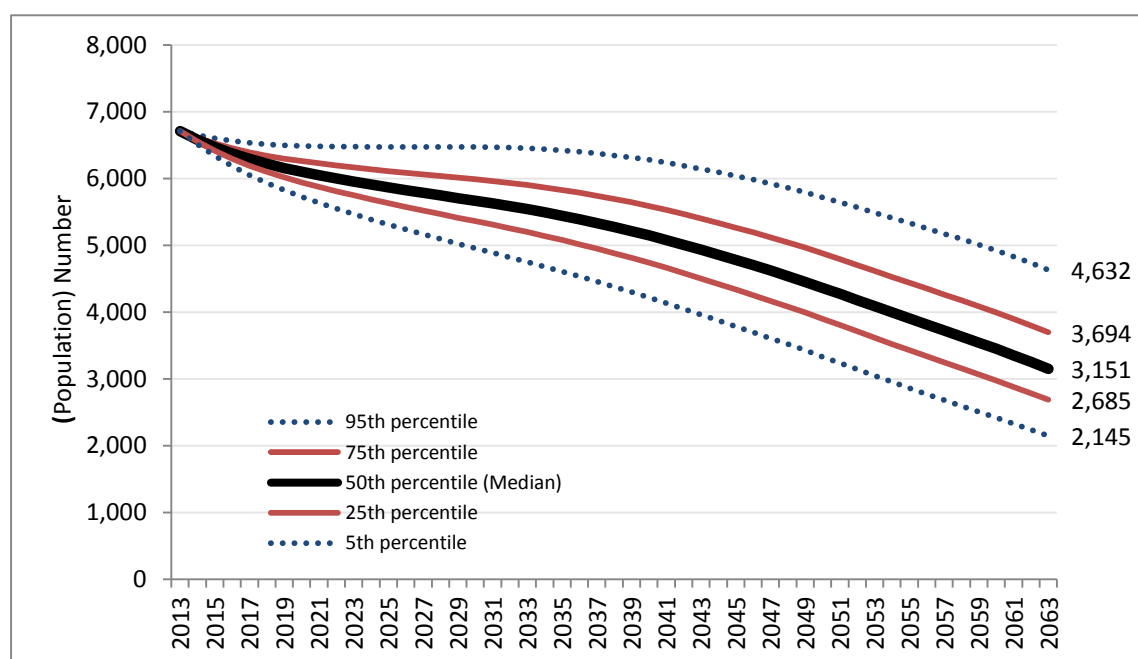
**Table 3.16: Projected (Baseline) Contribution to Change by Broad Age Group, Kawerau District**

Kawerau DC	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-917	-58.4	-530	-81.2	-1,447	-92.2	-78.5	-22.2	-40.7
15-39	-1,181	-57.9	-686	-79.9	-1,867	-91.5	-101.1	-28.7	-52.5
40-64	470	24.6	-1,638	-68.8	-1,168	-61.2	40.3	-68.6	-32.9
65+	460	38.7	468	28.4	928	78.0	39.4	19.6	26.1
Total	-1,168	-17.4	-2,387	-43.1	-3,555	-53.0	-100.0	-100.0	-100.0
85+	8	9.3	90	91.7	99	109.5	0.7	3.8	2.8

**Stochastic Projections:** Figure 3.22 presents the stochastic projection results for Kawerau District (see Appendix E.5 for data). The median projections are 5,559 in 2033 and 3,151 in 2063, which are almost identical to the deterministic projection presented above (5,542 and 3,155 respectively). As could be expected, the uncertainty around this median projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 5,197 and 5,901 in 2033, and between 2,685 and 3,694 in 2063. This interval extends between 6 per cent lower and 7 per cent higher than the median in 2033, and between 15 per cent lower and 17 per cent higher than the median in 2063.

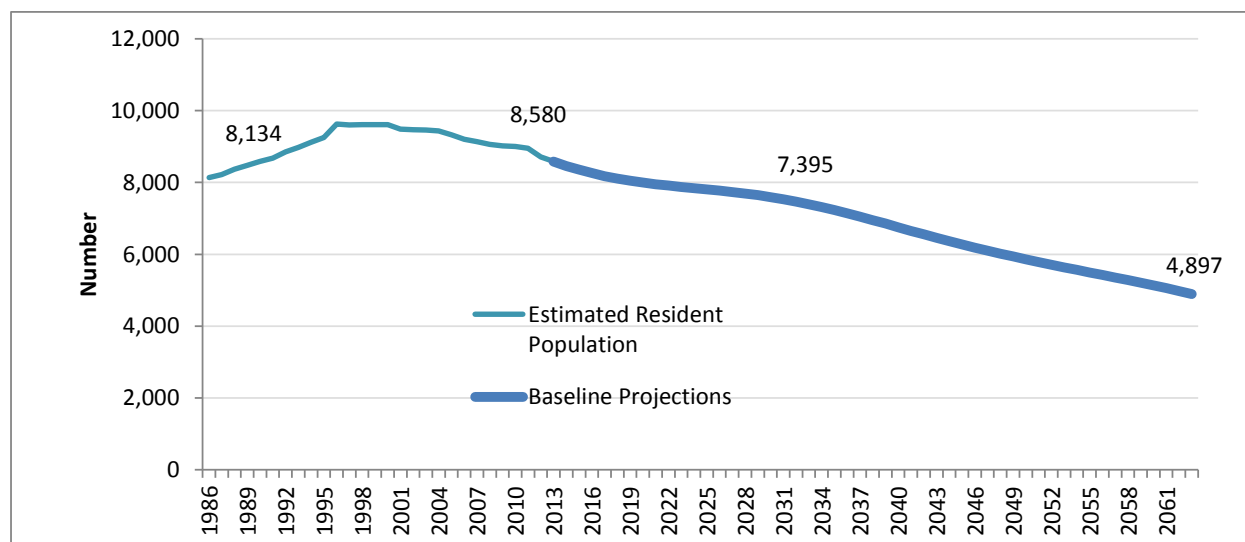
The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 4,750 and 6,452 in 2033, and between 2,145 and 4,632 in 2063. This interval extends between 14 per cent lower and 16 per cent higher than the median in 2033, and between 32 per cent lower and 47 per cent higher than the median in 2063.

**Figure 3.22: Stochastic Projections, Kawerau District**

## Opotiki District

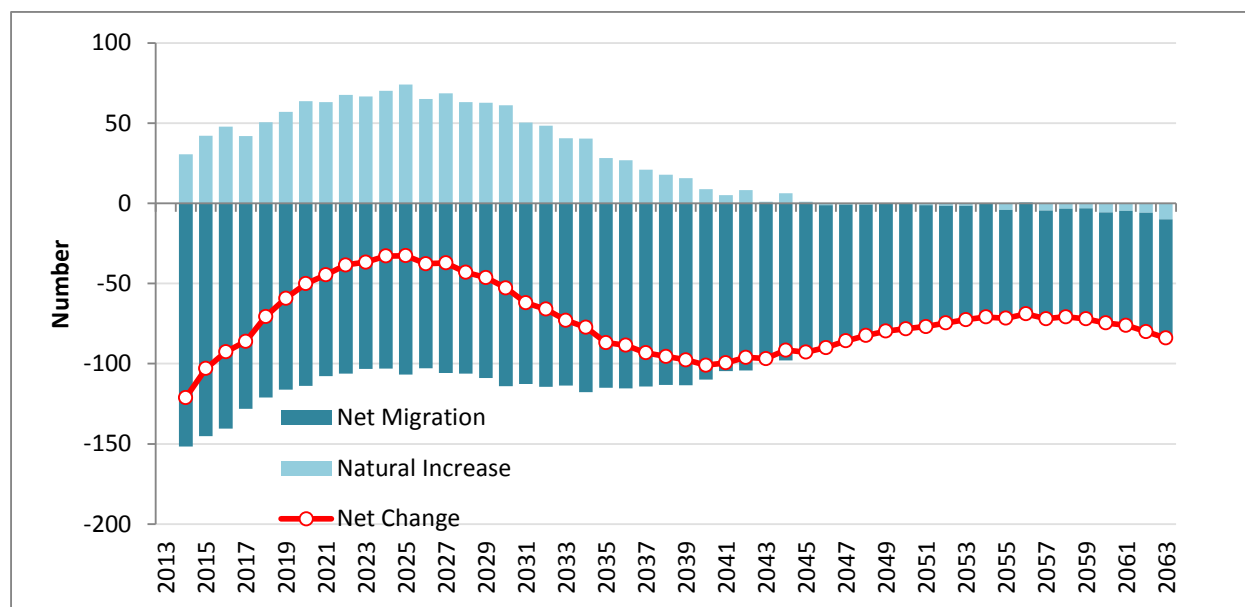
The population of the Opotiki District is projected to undergo steady decline, from 8,580 in 2013 to 7,395 by 2033 (-13.8 per cent) and then decline more rapidly to around 4,897 by 2063 (-29.6 per cent over 2033) (Figure 3.23).

**Figure 3.23: Estimated Resident Population and Projected Baseline Population, Opotiki District**



As elsewhere, the decline reflects both a shift from natural increase to natural decline, albeit for Opotiki slightly delayed until 2049, and negative net migration across the entire period (Figure 3.24, see also Table 3.17)—again reducing in magnitude as the stock population declines. Net migration is projected to average -116 per annum between 2013 and 2033, and -88 per annum between 2034 and 2063.

**Figure 3.24: Projected Components of Change (Baseline Projections), Opotiki District**



**Table 3.17: Projected Components of Change (Baseline Projections), Opotiki District**

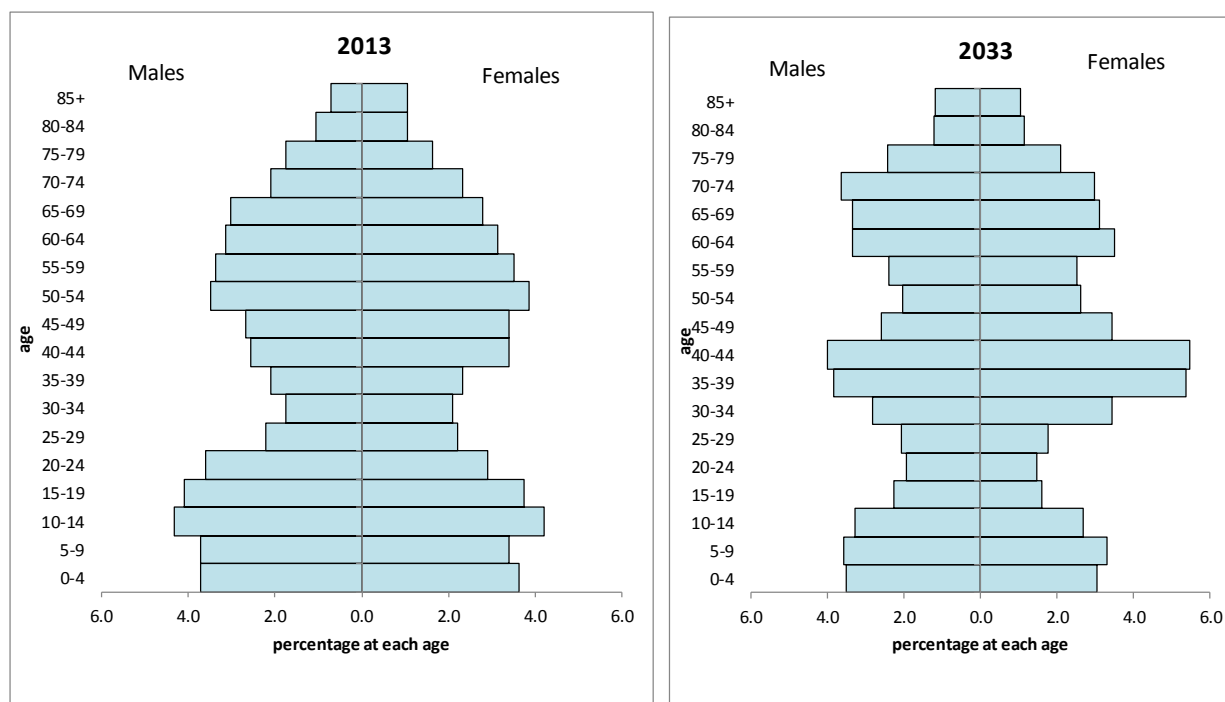
<b>Opotiki DC</b>	<b>Births</b>	<b>Deaths</b>	<b>Natural Increase</b>	<b>Net Migration</b>	<b>Net Change</b>
	<b>Annual (Number)</b>				
2013					
2014	126	95	31	-152	-121
2015	127	85	42	-145	-103
2016	128	80	48	-140	-93
2017	130	88	42	-128	-86
2018	133	83	51	-121	-71
2019	136	79	57	-116	-59
2020	138	74	64	-114	-50
2021	137	74	63	-108	-45
2022	137	69	68	-106	-38
2023	137	70	67	-103	-37
2024	136	66	70	-103	-33
2025	134	60	74	-107	-33
2026	130	65	65	-103	-38
2027	126	57	69	-106	-37
2028	122	59	63	-106	-43
2029	118	55	63	-109	-46
2030	113	52	61	-114	-53
2031	107	56	51	-113	-62
2032	102	53	48	-114	-66
2033	97	56	41	-114	-73
	<b>5-Year Totals</b>				
2034-2038	419	285	134	-576	-441
2039-2043	347	308	39	-530	-491
2044-2048	313	309	5	-447	-442
2049-2053	294	298	-4	-378	-382
2054-2058	271	282	-11	-343	-354
2059-2063	237	267	-29	-357	-387

By 2033 around 22.2 per cent of Opotiki's population will be aged 65+ years, up from 17.5 per cent in 2013 (Figure 3.24 and Table 3.18). By 2063 that proportion is projected to reach 33.8 per cent, which, while significant, will make it the Bay of Plenty Region's youngest age structure.

These data show the ratio of those aged 65+ years to those aged 0-14 years increasing from 0.76 (76 elderly per 100 children) in 2013 to 1.15 in 2033 (115 elderly per 100 children), and 2.69 (269 elderly per 100 children) by 2063—Opotiki undergoing the second-slowest structural ageing of the BOP TLA's.



**Figure 3.25: Age-Sex Structure (Percentage At Each Age) 2013 and 2033, Opotiki District**



**Table 3.18: Projected Baseline Numbers and Change by Broad Age Group, Opotiki District**

Opotiki DC				Percentage by Broad Age Group		
	2013	2033	2063	2013	2033	2063
0-14	1,970	1,433	616	23.0	19.4	12.6
15-39	2,320	1,962	948	27.0	26.5	19.4
40-64	2,790	2,358	1,676	32.5	31.9	34.2
65+	1,500	1,641	1,657	17.5	22.2	33.8
Total	8,580	7,395	4,897	100.0	100.0	100.0
85+	150	164	145	1.7	2.2	3.0
Elderly:Children (Ratio)	0.76	1.15	2.69			

Table 3.19 confirms these trends (see also Appendix D.6). Between 2013 and 2033, numbers below 65+ years of age are projected to decline significantly. Growth at 65+ years (141 persons) is significant but will fail to offset the overall decline (-1,185 persons). The situation is projected to deteriorate between 2034 and 2063, with numbers at 65+ years increasing only fractionally (+16) and again failing to offset the overall decline of 2,497. At 85+ years the situation stands in marked contrast to the Bay of Plenty's five other TLAs: for Opotiki, numbers are projected to grow by just 14 between 2013 and 2033, and to then decline (by 19) between 2043 and 2063. There is thus no contribution to growth from this demographic.



**Table 3.19: Projected (Baseline) Contribution to Change by Broad Age Group, Opotiki District**

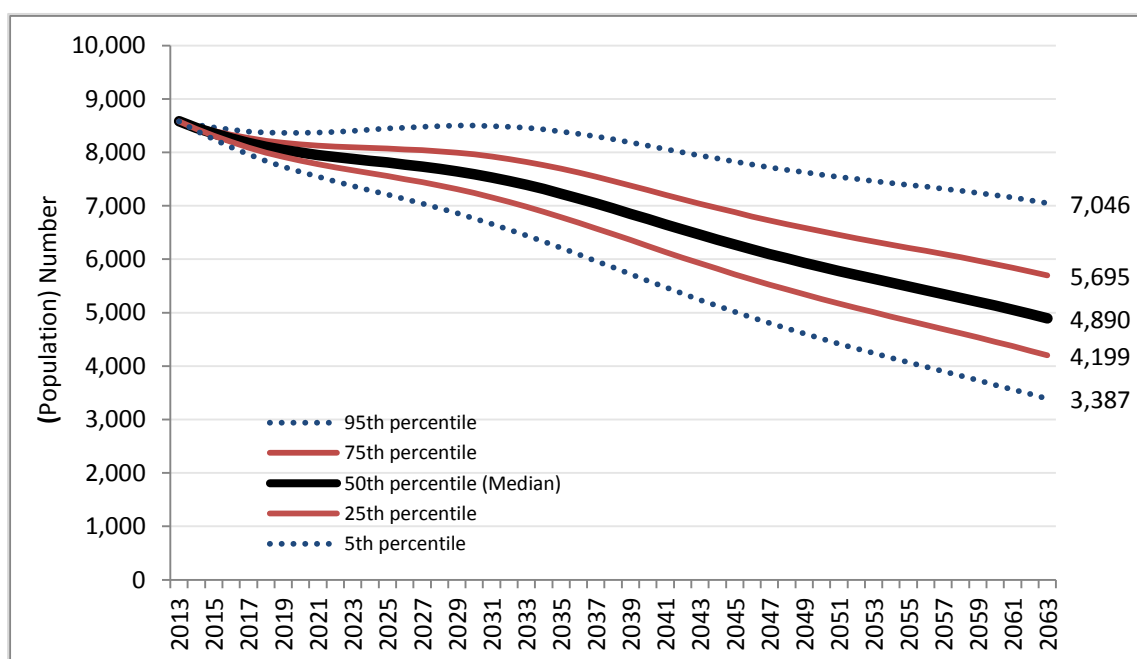
Opotiki DC	2013-2033		2034-2063		Total 2013-2063		Contribution to Change (%)		
	Change (N)	Change (%)	Change (N)	Change (%)	Change (N)	Change (%)	2013-2033	2034-2063	2013-2063
0-14	-537	-27.3	-817	-57.0	-1,354	-68.7	-45.3	-32.7	-36.8
15-39	-358	-15.4	-1,014	-51.7	-1,372	-59.1	-30.2	-40.6	-37.3
40-64	-432	-15.5	-682	-28.9	-1,114	-39.9	-36.5	-27.3	-30.2
65+	141	9.4	16	0.9	157	10.5	11.9	0.6	4.3
Total	-1,185	-13.8	-2,497	-33.8	-3,683	-42.9	-100.0	-100.0	-100.0
85+	14	9.1	-19	-11.5	-5	-3.4	1.1	-0.8	-0.1

**Stochastic Projections:** Figure 3.26 presents the stochastic projection results for Opotiki District (see Appendix E.6 for data). The median projections are 7,359 in 2033 and 4,890 in 2063, almost identical to the deterministic projections presented above (7,395 and 4,897 respectively). As could be expected, the uncertainty around this median projection increases over time.

The 50 per cent projection interval (the range within which 50 per cent of all of the stochastic projections scenarios fit) extends between 6,983 and 7,821 in 2033, and between 4,199 and 5,695 in 2063. This interval extends between 5 per cent lower and 6 per cent higher than the median in 2033, and between 14 per cent lower and 16 per cent higher than the median in 2063.

The 90 per cent projection interval (the range within which 90 per cent of all of the stochastic projections scenarios fit) extends between 6,444 and 8,458 in 2033, and between 3,387 and 7,046 in 2063. This interval extends between 13 per cent lower and 14 per cent higher than the median in 2033, and between 31 per cent lower and 44 per cent higher than the median in 2063.

**Figure 3.26: Stochastic Projections, Opotiki District**

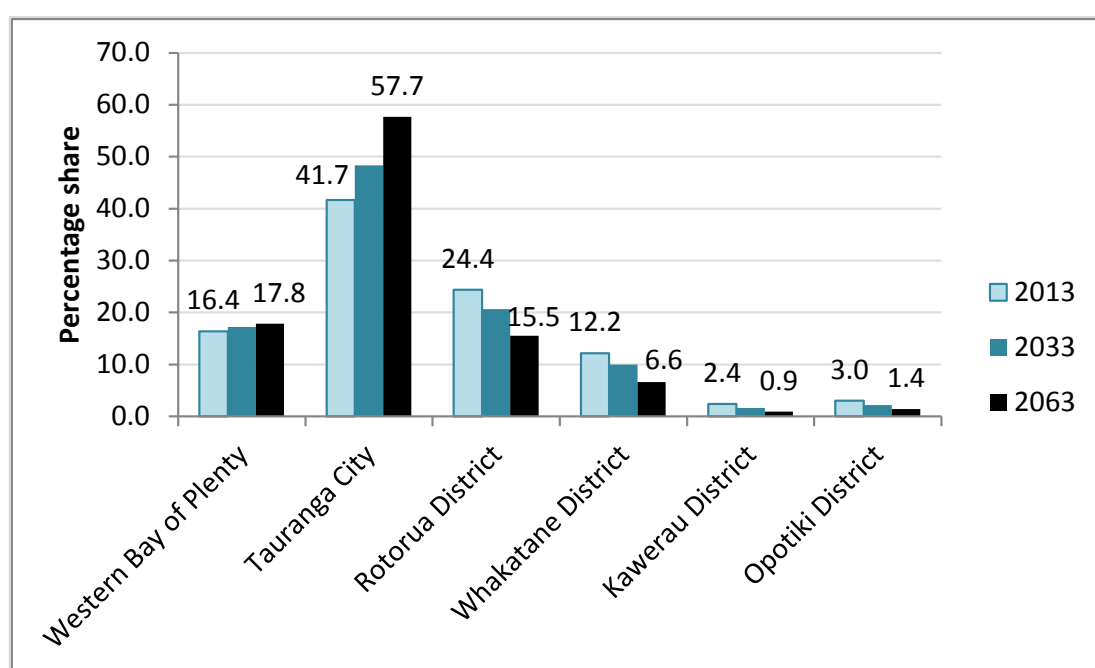


## Projected Population Shares - Summary

The data presented in Section 3 clearly indicates significant changes ahead in population share. This is clear from Figure 3.27, which shows Tauranga City increasing its share of the region's population from just below 42 per cent in 2013 to almost 58 per cent in 2063. In 2033 Tauranga City will account for almost half (48.3 per cent) of the region's population.

Also gaining in population share will be Western Bay of Plenty, increasing from 16.4 to 17.8 per cent. By contrast, Rotorua District is likely to see a significant reduction in share, from just on one-quarter in 2013 to 15.5 per cent in 2063 (20.7 per cent in 2033). Whakatane, Kawerau and Opotiki also lose population share—Whakatane from 12.2 to 6.6 per cent, Kawerau from 2.4 to 0.9 per cent, and Opotiki from 3.0 to 1.4 per cent.

**Figure 3.27: Percentage Share of Total Bay of Plenty Population by TLA, 2013, 2033, 2063**

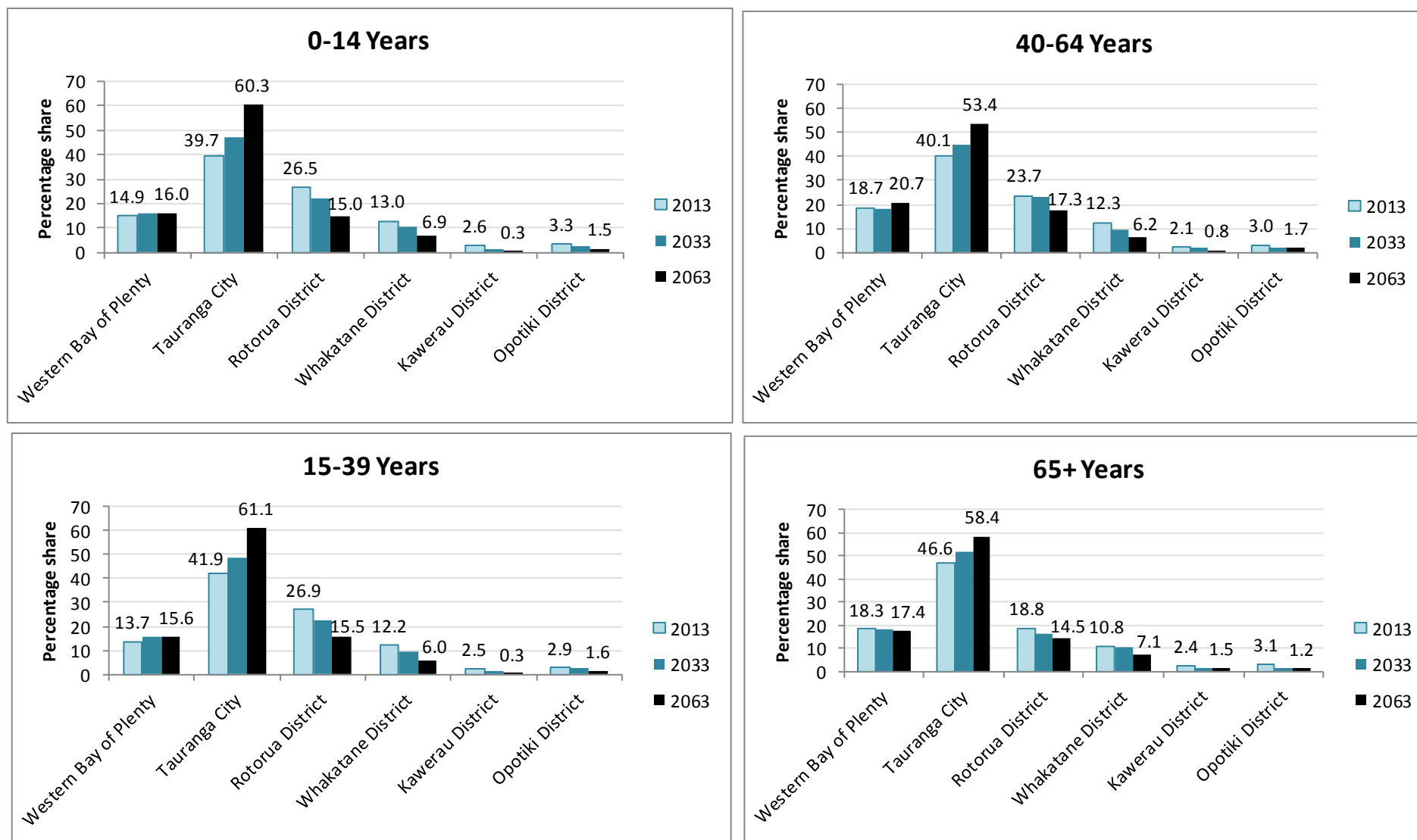


As indicated above, these changes will also be played out by age (Figure 3.28, Table 3.20). Tauranga City will dramatically increase its share of all age groups, while even Western Bay of Plenty will initially experience loss at 40-64 years (2013-2033) and at 65+ years across both periods.

By 2033 Tauranga is projected to account for 47.3 per cent of the region's 0-14 year olds (Table 3.20), and by 2063, for 60.3 per cent, up from 39.7 per cent in 2013. Western Bay of Plenty will also gain at these ages, while all other TLA's will lose share. The picture is very similar at 15-39 years. At 40-64 years, Tauranga City increases its share across both periods, while Western Bay loses share across the 2013-2033 period before regaining it between 2034 and 2063. By contrast, Kawerau initially gains, but then loses. At 65+ years, all gains across both periods go to Tauranga City.



Figure 3.28: Percentage Share of Total Bay of Plenty Age Group by TLA, 2013, 2033, 2063



**Table 3.20: Percentage Share of Total Bay of Plenty Age Group by TLA, 2013, 2033, 2063**

	Number			Percentage Share		
	2013	2033	2063	2013	2033	2063
<b>Western Bay of Plenty</b>						
0-14	8,880	8,017	6,360	14.9	16.0	16.0
15-39	11,100	11,398	9,349	13.7	15.5	15.6
40-64	17,120	19,307	20,026	18.7	18.2	20.7
65+	9,010	18,824	24,946	18.3	17.9	17.4
<b>Tauranga City</b>						
0-14	23,670	23,666	24,019	39.7	47.3	60.3
15-39	33,900	35,857	36,648	41.9	48.9	61.1
40-64	36,830	47,397	51,628	40.1	44.7	53.4
65+	22,880	54,725	83,718	46.6	52.0	58.4
<b>Rotorua District</b>						
0-14	15,840	11,140	5,969	26.5	22.3	15.0
15-39	21,760	16,541	9,275	26.9	22.5	15.5
40-64	21,780	24,311	16,717	23.7	22.9	17.3
65+	9,210	17,134	20,741	18.8	16.3	14.5
<b>Whakatane District</b>						
0-14	7,740	5,155	2,745	13.0	10.3	6.9
15-39	9,840	6,751	3,590	12.2	9.2	6.0
40-64	11,330	10,264	5,962	12.3	9.7	6.2
65+	5,320	11,238	10,210	10.8	10.7	7.1
<b>Kawerau District</b>						
0-14	1,570	653	123	2.6	1.3	0.3
15-39	2,040	859	173	2.5	1.2	0.3
40-64	1,910	2,380	742	2.1	2.2	0.8
65+	1,190	1,650	2,118	2.4	1.6	1.5
<b>Opotiki District</b>						
0-14	1,970	1,433	616	3.3	2.9	1.5
15-39	2,320	1,962	948	2.9	2.7	1.6
40-64	2,790	2,358	1,676	3.0	2.2	1.7
65+	1,500	1,641	1,657	3.1	1.6	1.2
<b>Bay of Plenty Region (Summed)</b>						
0-14	59,670	50,064	39,833	100.0	100.0	100.0
15-39	80,960	73,368	59,983	100.0	100.0	100.0
40-64	91,760	106,017	96,752	100.0	100.0	100.0
65+	49,110	105,214	143,390	100.0	100.0	100.0
Total	281,500	334,662	339,957	...	...	...





Finally, Table 3.21 provides an overall comparative summary of key indicators: percentage growth or decline between 2013-2033 and 2034-2063, percentage aged 65+ and 85+ years in 2013, 2033 and 2063, and approximate year of onset of natural decline.

Continuing but slowing growth for Western Bay of Plenty and Tauranga City across both periods, and modest growth for Rotorua to 2033, stands out from the shift to decline for Rotorua after 2033, and the steady and deepening decline for Whakatane, Kawerau and Opotiki.

In 2013, Rotorua stands out as having the structurally youngest population, with just 13.4 per cent aged 65+ years (lower also than the national average of 14.2 per cent) (SNZ 2013); Western Bay of Plenty and Tauranga City have the equally-oldest proportions, at 19.5 per cent. The picture at 85+ years is similar, except that Tauranga City has the somewhat greatest proportion aged 85+ years (2.9 per cent), well above the national average of 1.7 per cent.

Structural ageing is projected to be rapid, with all having proportions aged 65+ years in 2033 above the SNZ projected national average of 21.3 per cent (for 2013). The trends will see Kawerau begin natural decline around 2031, Western Bay of Plenty and Whakatane around 2034, Tauranga City and Rotorua around 2039, and Opotiki around 2049. After those dates, growth will slow dramatically for Western Bay of Plenty and Tauranga City, and decline will accelerate for Rotorua, Whakatane, Kawerau and Opotiki.



Table 3.21: Summary Indicators by TLA, 2013, 2033, 2063

	Growth (%)	Decline (%)	65+ Years (%)	85+ Years (%)	Natural Decline
<b>Western Bay of Plenty</b>					
2013	...	...	19.5	2.0	
2033	24.8	...	32.7	2.7	2034
2063	5.5	...	41.1	5.2	
<b>Tauranga City</b>					
2013	...	...	19.5	2.9	
2033	37.8	...	33.9	2.7	2039
2063	21.3	...	42.7	5.9	
<b>Rotorua District</b>					
2013	...	...	13.4	1.5	
2033	0.8	...	24.8	1.7	2039
2063	...	-23.8	39.4	4.7	
<b>Whakatane District</b>					
2013	...	...	15.5	1.7	
2033	...	-2.4	33.6	2.0	2034
2063	...	-32.6	45.4	5.3	
<b>Kawerau District</b>					
2013	...	...	17.7	1.3	
2033	...	-17.4	29.8	1.8	2031
2063	...	-43.1	67.1	6.0	
<b>Opotiki District</b>					
2013	...	...	17.5	1.7	
2033	...	-13.8	22.2	2.2	2049
2063	...	-33.8	33.8	3.0	

## 4. Household and Dwelling Projections<sup>7</sup>

This section covers the projection of the number of households (and by inference, occupied private dwellings) by household type for the period 2013-2063 based on the baseline deterministic projections for each territorial authority. The method used is the same as that currently employed by SNZ (the propensity method).

In the propensity method, living arrangement type rates (or propensities) are applied to population projections to give projections of the population in different living arrangement types. These projections are subsequently aggregated to give projections of families (by broad family type) and households (by broad household type). The calculations are as follows;

### The number of couple without children-families

$$= \frac{\text{male partners in couple without children families} + \text{female partners in couple without children families}}{2}$$

### The number of two-parent families

$$= \frac{\text{male partners/parents two – parent families} + \text{female partners/parents two – parent families}}{2}$$

### The number of one-parent families

$$= \text{male parents in one – parent families} + \text{female parents in one – parent families}$$

### The number of family households

$$= \text{number of families} \div \text{average number of families per family household.}$$

### The number of one-person households

$$= \text{number of people in one – person households.}$$

### The number of other multi-person households

$$= \frac{\text{number of people in other multi – person households}}{\text{average number of people per other multi – person household}}$$

Supporting assumptions are required to allow the projection of the number of family households (average number of families per family household) and the number of other multi-person

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<sup>7</sup> Statistics New Zealand define a household as “either one person usually living alone, or two or more people usually living together and sharing facilities (e.g. eating facilities, cooking facilities, bathroom and toilet facilities, a living area), in a private dwelling.” Hence the number of households in private dwellings may be taken as equivalent to the number of occupied private dwellings.



households (average number of people per other multi-person household). SNZ in its 2010 update of the Subnational Family and Household Projections assumed that the average number of families per family household and the average number of people per other multi-person household were assumed to remain constant at 2006 levels. We adopt those assumptions here (see Tables 4.1 and 4.2).

**Table 4.1: Average Number of Families per Family Household 2006**

Year	Western Bay					
	of Plenty	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki
2006	1.03	1.03	1.05	1.05	1.06	1.05

**Table 4.2: Average Number of People per Other Multi-Person Household<sup>8</sup>**

Year	Western Bay					
	of Plenty	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki
2006	2.91	2.75	2.47	2.41	2.41	1.54

Tables 4.3 – 4.8 report the household projections for the Bay of Plenty and its constituent territorial authorities.

**Table 4.3: Western Bay of Plenty District Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
2013	7,502	4,642	1,967	14,111	13,700	4,144	300	18,144
2018	8,764	4,616	2,089	15,469	15,019	4,720	323	20,062
2023	9,967	4,653	2,214	16,835	16,344	5,403	343	22,090
2028	10,966	4,754	2,377	18,096	17,569	6,109	363	24,041
2033	11,746	4,821	2,522	19,089	18,533	6,869	380	25,782
2038	12,187	4,897	2,599	19,683	19,110	7,474	382	26,966
2043	12,534	4,795	2,606	19,935	19,355	7,837	390	27,581
2048	12,858	4,660	2,581	20,100	19,514	8,025	390	27,929
2053	13,224	4,545	2,550	20,319	19,727	8,120	393	28,239
2058	13,608	4,443	2,518	20,569	19,970	8,192	389	28,551
2063	13,840	4,334	2,487	20,661	20,060	8,429	387	28,876

<sup>8</sup> Due to the small number of households involved the calculation of the average number of people per other multi-person household in Kawerau was unreliable. Hence it was set here to be equal to the surrounding Whakatane district.



**Table 4.4: Tauranga City Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	16,985	10,910	6,272	34,166	33,171	12,280	1,700	47,152
<b>2018</b>	20,201	11,170	6,642	38,013	36,906	13,954	1,796	52,657
<b>2023</b>	23,944	11,371	7,034	42,349	41,115	16,381	1,878	59,374
<b>2028</b>	27,685	11,508	7,498	46,691	45,331	19,298	1,997	66,626
<b>2033</b>	31,289	11,461	7,924	50,675	49,199	22,476	2,121	73,796
<b>2038</b>	34,000	11,669	8,225	53,894	52,324	25,283	2,169	79,776
<b>2043</b>	35,846	11,787	8,424	56,058	54,425	27,563	2,204	84,192
<b>2048</b>	37,123	11,891	8,606	57,620	55,942	29,147	2,236	87,325
<b>2053</b>	38,130	11,982	8,734	58,845	57,131	30,222	2,260	89,613
<b>2058</b>	39,465	12,032	8,824	60,321	58,564	31,178	2,292	92,034
<b>2063</b>	40,612	12,039	8,895	61,546	59,753	32,266	2,313	94,332

**Table 4.5: Rotorua District Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	7,913	6,797	4,710	19,420	18,495	6,591	800	25,887
<b>2018</b>	8,844	6,687	4,838	20,369	19,399	7,267	821	27,487
<b>2023</b>	9,677	6,465	4,886	21,029	20,028	8,134	818	28,979
<b>2028</b>	10,327	6,147	4,908	21,381	20,363	9,068	816	30,247
<b>2033</b>	10,815	5,751	4,852	21,417	20,397	9,940	814	31,151
<b>2038</b>	11,032	5,467	4,680	21,180	20,171	10,435	787	31,393
<b>2043</b>	11,036	5,056	4,454	20,546	19,568	10,717	756	31,041
<b>2048</b>	10,865	4,631	4,208	19,704	18,766	10,747	721	30,234
<b>2053</b>	10,501	4,255	3,937	18,694	17,804	10,598	674	29,076
<b>2058</b>	10,012	3,906	3,671	17,589	16,751	10,341	624	27,716
<b>2063</b>	9,464	3,565	3,419	16,448	15,665	9,998	579	26,241



**Table 4.6: Whakatane Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	4,314	3,315	2,357	9,986	9,510	3,178	300	12,988
<b>2018</b>	4,858	3,115	2,366	10,339	9,847	3,545	298	13,689
<b>2023</b>	5,328	2,924	2,382	10,634	10,127	4,065	286	14,478
<b>2028</b>	5,642	2,724	2,386	10,753	10,241	4,621	278	15,140
<b>2033</b>	5,781	2,479	2,352	10,612	10,107	5,111	270	15,487
<b>2038</b>	5,684	2,297	2,246	10,227	9,740	5,253	252	15,246
<b>2043</b>	5,497	2,054	2,072	9,624	9,165	5,143	234	14,542
<b>2048</b>	5,250	1,826	1,898	8,975	8,547	4,875	216	13,639
<b>2053</b>	4,993	1,634	1,731	8,358	7,960	4,528	198	12,685
<b>2058</b>	4,726	1,472	1,576	7,774	7,404	4,251	182	11,836
<b>2063</b>	4,409	1,333	1,445	7,187	6,844	4,067	168	11,080

**Table 4.7: Kawerau District Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	775	564	602	1,941	1,832	699	40	2,571
<b>2018</b>	820	558	640	2,017	1,903	733	43	2,679
<b>2023</b>	891	512	634	2,037	1,922	790	44	2,756
<b>2028</b>	974	446	600	2,020	1,906	837	45	2,788
<b>2033</b>	1,056	384	538	1,978	1,866	888	43	2,796
<b>2038</b>	1,098	337	470	1,904	1,796	919	42	2,758
<b>2043</b>	1,114	270	407	1,792	1,691	931	42	2,664
<b>2048</b>	1,085	206	347	1,639	1,546	924	38	2,509
<b>2053</b>	1,020	167	278	1,465	1,382	867	31	2,280
<b>2058</b>	933	141	225	1,300	1,226	772	27	2,026
<b>2063</b>	815	107	190	1,112	1,049	709	23	1,781



**Table 4.8: Opotiki District Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	1,009	740	697	2,447	2,330	930	100	3,360
<b>2018</b>	1,024	706	723	2,454	2,337	959	104	3,399
<b>2023</b>	1,008	704	761	2,473	2,356	981	100	3,437
<b>2028</b>	975	703	775	2,453	2,337	987	93	3,416
<b>2033</b>	939	673	757	2,370	2,257	993	88	3,338
<b>2038</b>	925	625	692	2,241	2,134	971	82	3,188
<b>2043</b>	936	551	610	2,097	1,997	945	82	3,024
<b>2048</b>	937	478	554	1,968	1,875	940	78	2,892
<b>2053</b>	927	430	513	1,870	1,781	907	74	2,762
<b>2058</b>	895	397	477	1,769	1,685	864	69	2,618
<b>2063</b>	841	363	430	1,634	1,557	820	66	2,442

**Table 4.9: Bay of Plenty Region Household Projection 2013-2063**

Year	Families				Households			
	Couple without children	Two-parent families	One-parent families	Total families	Family households	One-person households	Other multi-person households	Total
<b>2013</b>	38,499	26,968	16,605	82,072	79,039	27,822	3,240	110,101
<b>2018</b>	44,512	26,852	17,297	88,662	85,411	31,178	3,385	119,973
<b>2023</b>	50,815	26,629	17,913	95,357	91,892	35,754	3,469	131,115
<b>2028</b>	56,569	26,281	18,545	101,395	97,746	40,919	3,592	142,257
<b>2033</b>	61,627	25,569	18,944	106,140	102,358	46,276	3,716	152,351
<b>2038</b>	64,926	25,292	18,912	109,129	105,276	50,336	3,714	159,327
<b>2043</b>	66,964	24,514	18,574	110,052	106,201	53,136	3,707	163,044
<b>2048</b>	68,119	23,694	18,195	110,007	106,191	54,658	3,680	164,528
<b>2053</b>	68,795	23,013	17,743	109,551	105,785	55,241	3,629	164,656
<b>2058</b>	69,639	22,392	17,290	109,321	105,599	55,598	3,583	164,780
<b>2063</b>	69,981	21,742	16,866	108,588	104,928	56,289	3,536	164,752



From these data, several broad trends are apparent. Taking the Bay of Plenty as a whole there is a marked increase in couple without children families reflecting declining fertility, an ageing population and a mild convergence of male and female life expectancy (SNZ 2010, p 13). The effects of population ageing are also apparent in the increasing numbers of one person households—although this increase may be affected over time depending on trends in life expectancy at older ages. The numbers of two parent families decline for much the same reasons, as well as declining in minor part due to relative increases in the prevalence of single parent families.

In terms of sub regional patterns there is a dichotomy between the continuing but slowing growth in the number of family households and households in the Western Bay of Plenty and Tauranga City and that experienced throughout the rest of the region. This is particularly pronounced in the two parent families' category where Tauranga City is the only area to experience growth throughout the projection period (though the decline in the Western Bay of Plenty is small). A comparison of projected population numbers and projected household numbers is given at Appendix G.





## 5. Labour Force Projections

The labour force is comprised of members of the working age population (15 years or more)<sup>9</sup> who are either employed (part-time or full-time) or unemployed and actively seeking work. The labour force participation (LFP) rate thus measures the proportion of the population aged 15+ years that is in the labour force. The following projections are based on labour force participation rates.

To provide additional context for the Bay of Plenty we begin with Table 5.1, which gives the age-specific LFP rates and also Employment to Population rates, as recorded in the Census 2001 and 2013, and the percentage change over this 13 year period. Comparative data for New Zealand is also included. Note that in Table 5.1, the Employment: Population rate measures the proportion of each broad age group that is employed in either part-time or full-time employment. That is, the denominator is not the labour force as described above, but the population of each age *per se*.

The section then provides four scenarios projecting the labour force for the region, at territorial local authority level, for the period 2013-2063. All labour force projections proceed by applying a set of projected age and sex specific labour force participation rates to a projected population, in this case the baseline deterministic projections for each territorial local authority. Mathematically this can be stated, for each area, as;

$$LF_{it} = LFPR_{it} \times PPop_{it}$$

Where  $LF_{it}$  is the labour force at time  $t$  for age group  $i$ ,  $LFPR_{it}$  the projected labour force participation rate at time  $t$  for age group  $i$  and  $PPop_{it}$  the projected population at time  $t$  for age group  $i$ . The projected age and gender specific labour force participation rates are chosen on the basis of the four scenarios outlined below.

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<sup>9</sup> The total usually resident, non-institutionalised, civilian population of New Zealand aged 15 years and over.



**Table 5.1: Age Specific Labour Force Participation Rates and Employment: Population Rates for the BOP Region 2001 – 2013**

		15-24 years			25-44 years			45-64 years			65-74 years			75+ years			Total, 15+ years		
		2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)
Bay of Plenty Region	Employed Full-time	8,661	8,172	-5.6	36,180	33,279	-8.0	28,809	40,698	+41.3	1,446	4,422	+205.8	162	366	+125.9	75,258	86,937	+15.5
	Employed Part-time	5,589	5,529	-1.1	10,002	8,550	-14.5	8,058	10,677	+32.5	1,383	3,555	+157.0	462	1,038	+124.7	25,494	29,349	+15.1
	Unemployed	3,891	4,200	+7.9	4,701	4,119	-12.4	2,028	3,012	+48.5	66	189	+186.4	9	15	+66.7	10,695	11,535	+7.9
	Not in the Labour Force (LF)	8,976	11,406	+27.1	12,294	10,836	-11.9	13,101	12,558	-4.1	15,192	17,100	+12.6	13,656	18,426	+34.9	63,219	70,326	+11.2
	Work and LF Status Unidentifiable	999	2,289	+129.1	2,568	3,939	+53.4	1,902	3,891	+104.6	573	1,119	+95.3	378	633	+67.5	6,420	11,871	+84.9
	Working Age Population	28,122	31,590	+12.3	65,745	60,714	-7.7	53,886	70,836	+31.5	18,657	26,385	+41.4	14,667	20,484	+39.7	181,077	210,009	+16.0
	LF Participation Rate (%)	66.9	61.1	-8.7	80.5	80.9	+0.5	74.8	81.2	+8.6	16.0	32.3	+101.9	4.4	7.1	+61.4	63.8	64.5	+1.1
	Employment Rate (%)*	52.5	46.8	-11.0	73.1	73.7	+0.8	70.9	76.7	+8.2	15.6	31.6	+101.8	4.4	7.1	+62.0	57.7	58.7	+1.7

		15-24 years			25-44 years			45-64 years			65-74 years			75+ years			Total, 15+ years		
		2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)	2001	2013	Change 2001-2013 (%)
New Zealand	Employed Full-time	168,987	163,488	-3.3	666,324	653,241	-2.0	469,383	655,680	+39.7	20,892	63,486	+203.9	2,532	5,169	+104.1	1,328,118	1,541,064	+16.0
	Employed Part-time	102,054	107,586	+5.4	153,984	136,791	-11.2	116,604	154,701	+32.7	19,827	47,382	+139.0	6,678	13,479	+101.8	399,147	459,939	+15.2
	Unemployed	56,409	61,302	+8.7	57,609	53,307	-7.5	25,080	36,339	+44.9	723	2,091	+189.2	90	174	+93.3	139,911	153,213	+9.5
	Not in the Labour Force (LF)	163,275	219,513	+34.4	195,627	186,201	-4.8	187,863	198,477	+5.6	197,535	219,477	+11.1	189,606	234,438	+23.6	933,906	1,058,106	+13.3
	Work and LF Status Unidentifiable	14,343	34,551	+140.9	35,715	58,428	+63.6	25,857	49,788	+92.6	7,194	13,698	+90.4	5,340	7,638	+43.0	88,449	164,103	+85.5
	Working Age Population	505,068	586,446	+16.1	1,109,259	1,087,959	-1.9	824,787	1,094,979	+32.8	246,171	346,134	+40.6	204,252	260,898	+27.7	2,889,537	3,376,416	+16.8
	LF Participation Rate (%)	66.7	60.2	-9.7	81.8	81.9	+0.2	76.5	81.0	+5.9	17.3	34.0	+95.9	4.7	7.4	+59.0	66.7	67.1	+0.6
	Employment Rate (%)*	55.2	49.1	-11.1	76.4	76.7	+0.4	73.3	77.5	+5.7	17.0	33.4	+95.7	4.6	7.4	+59.0	61.7	62.3	+1.0

\* It should be noted that the Employment Rate is based on the total working age population aged 15 years or more (denominator for the Employment Rate calculation is the working age population of each age group and not the Labour Force)



## Labour Force Scenario One

Scenario One assumes that 2013 labour force participation rates apply throughout the projection period. Essentially this serves as the baseline or business as usual scenario. The 2013 participation rates are shown in Table 5.2.

**Table 5.2: Scenario 1 Labour Force Projection 2013-2063**

Area	WBOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki	Bay of Plenty
<b>2013</b>	24464	59118	36100	17351	2851	3997	143881
<b>2018</b>	26051	63826	36986	17363	2861	3968	151055
<b>2023</b>	27356	68097	37314	17047	2812	3879	156505
<b>2028</b>	28368	71642	36999	16398	2689	3744	159840
<b>2033</b>	29055	74245	36130	15515	2529	3574	161048
<b>2038</b>	29566	76019	34843	14531	2334	3392	160685
<b>2043</b>	30006	77628	33185	13590	2107	3255	159771
<b>2048</b>	30425	78971	31289	12684	1877	3094	158340
<b>2053</b>	30515	79942	29088	11694	1564	2883	155686
<b>2058</b>	30037	80353	26582	10542	1222	2576	151312
<b>2063</b>	29310	80466	24042	9402	921	2250	146391
<b>% Change 2013-2063</b>	<b>19.8</b>	<b>36.1</b>	<b>-33.4</b>	<b>-45.8</b>	<b>-67.7</b>	<b>-43.7</b>	<b>1.7</b>

Under Scenario One, Rotorua, Whakatane, Kawerau and Opotiki experience marked declines in the size of their labour forces over the projection period. The projected labour forces of Kawerau and Opotiki decline almost continuously 2013-2063, while those of Rotorua (2013-2023) and Whakatane (2013-2018) experience initial increases before declining rapidly.

Tauranga City (particularly) and the Western Bay of Plenty experience significant labour force growth. It should be noted that for the Western Bay of Plenty projected decline in the labour force begins around 2053 however the decline 2053-2063 is not sufficient to offset the projected increase 2013-2053 resulting in an increase in the labour force for the period as a whole.

Similarly for the Bay of Plenty region in aggregate the labour force is projected to increase modestly over the 2013-2063 period. However the labour force is projected to peak around 2033 before declining for the rest of the period as initially strong labour force growth in Tauranga City and the Western Bay of Plenty slows or ceases.



## Labour Force Scenario Two

Scenario Two (Table 5.3) assumes that the labour force participation of prime age women increases over a twenty year period (2013-2033) so that half of the age specific 2013 gender gap in labour force participation is closed i.e. if the difference in labour force participation rates between the genders in a particular age group was six percentage points in 2013 this scenario assumes that the gap would have closed to three percentage points by 2033. For the period 2034 to 2063 labour force participation rates are held constant at 2033 levels. If the female labour force participation rate was higher than the male labour force participation rate in any age group the higher figure was used. This ensured that the labour force participation rate of females did not fall in any age group over the course of the projection. This was similar in intent to Bryant et al (2004), who considered this issue at the national level.

**Table 5.3: Scenario 2 Labour Force Projection 2013-2063**

Area	WBOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki	Bay of Plenty
<b>2013</b>	24464	59118	36100	17353	2850	4000	143885
<b>2018</b>	26350	64579	37319	17525	2889	4001	152663
<b>2023</b>	28035	69776	38011	17392	2865	3949	160028
<b>2028</b>	29484	74389	38073	16936	2763	3842	165487
<b>2033</b>	30588	78111	37571	16220	2628	3690	168808
<b>2038</b>	31113	80021	36267	15180	2419	3492	168492
<b>2043</b>	31561	81713	34570	14177	2184	3347	167552
<b>2048</b>	32020	83169	32623	13219	1953	3186	166170
<b>2053</b>	32210	84268	30373	12201	1638	2987	163677
<b>2058</b>	31791	84759	27809	11030	1280	2681	159350
<b>2063</b>	31053	84899	25176	9863	965	2345	154301
<b>% Change 2013-2063</b>	<b>26.9</b>	<b>43.6</b>	<b>-30.3</b>	<b>-43.2</b>	<b>-66.1</b>	<b>-41.4</b>	<b>7.2</b>

As would be expected, increases in female labour force participation rates have a generally positive effect on the size of the labour force. However, at least on the assumptions entailed in this scenario, the positive effect of increased female labour force participation is small with the position of territorial local authorities experiencing large declines under Scenario One being little improved. While the projected labour forces in this scenario are larger than those under Scenario One, the overall pattern of change in the size of the labour force remains.



## Labour Force Scenario Three

Scenario Three (Table 5.4) assumes that current increases in labour force participation rates amongst older workers continue out to 2033 before stabilising. Essentially this scenario assumes that over the twenty year period 2013-2033 the labour force participation rate profile of those older than the age group in which peak labour force participation occurs ages by five years i.e. in 2033 the labour force participation rates of 50-54 year olds will be equal to the participation rates of 45-49 year olds in 2013. In instances where this would result in a fall in the age-specific participation rate the higher (previous) rate is used.

**Table 5.4: Scenario 3 Labour Force Projection 2013-2063**

Area	WBOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki	Bay of Plenty
<b>2013</b>	24464	59118	36100	17348	2851	3997	143878
<b>2018</b>	26662	65420	37623	17752	2935	4053	154445
<b>2023</b>	28850	72167	38822	18012	2977	4059	164887
<b>2028</b>	30974	79075	39615	18038	2970	4024	174696
<b>2033</b>	32761	85484	39932	17758	2939	3926	182800
<b>2038</b>	33302	88179	38845	16688	2775	3724	183513
<b>2043</b>	33678	89987	37208	15565	2542	3534	182514
<b>2048</b>	34102	91831	35237	14531	2287	3370	181358
<b>2053</b>	34551	93523	33065	13546	2003	3195	179883
<b>2058</b>	34574	94819	30651	12482	1658	2952	177136
<b>2063</b>	33938	95097	27933	11227	1275	2609	172079
<b>% Change 2013-2063</b>	<b>38.7</b>	<b>60.9</b>	<b>-22.6</b>	<b>-35.3</b>	<b>-55.3</b>	<b>-34.7</b>	<b>19.6</b>

Changes in the age-specific profile of labour force participation in this scenario have a considerably greater impact on the size of the labour force than do the gender-specific changes in Scenario Two. However, while the projected labour forces are larger, and consequently the declines smaller, the overall pattern is unchanged. Kawerau and Opotiki experience declines throughout the period 2013-2063 while Rotorua, Western Bay of Plenty and Whakatane grow initially before declining leaving Tauranga City as the only area to have projected labour force growth across the whole period.



## Labour Force Scenario Four

Scenario Four (Table 5.5) combines the assumptions of Scenario Two and Scenario Three. That is, it assumes both rising labour force participation, by workers aged 25 – 54 and in the older population out to 2033, after which the participation rates stabilise. For males the labour force participation rate is assumed to rise over the twenty year period 2013-2033 so that the labour force participation rate profile of those older than the age group in which peak labour force participation occurs ages by five years (as in Scenario Three). For the female population the 2033 labour force participation rates are those used in Scenario Three aged by five years for those older than the age group in which peak labour force participation occurs.

**Table 5.5: Scenario 4 Labour Force Projection 2013-2063**

Area	WBOP	Tauranga	Rotorua	Whakatane	Kawerau	Opotiki	Bay of Plenty
<b>2013</b>	24464	59118	36100	17353	2850	4000	143885
<b>2018</b>	26863	65952	37853	17851	2947	4072	155538
<b>2023</b>	29075	72734	39060	18082	2982	4080	166013
<b>2028</b>	31009	78997	39610	17950	2933	4026	174525
<b>2033</b>	34276	89609	41334	18480	3014	4061	190774
<b>2038</b>	34845	92521	40247	17381	2844	3833	191671
<b>2043</b>	35227	94462	38589	16188	2595	3619	190680
<b>2048</b>	35654	96369	36575	15088	2323	3450	189459
<b>2053</b>	36146	98173	34347	14053	2053	3277	188049
<b>2058</b>	36270	99638	31882	12965	1710	3044	185509
<b>2063</b>	35685	100010	29105	11701	1314	2704	180519
<b>% Change 2013-2063</b>	<b>45.9</b>	<b>69.2</b>	<b>-19.4</b>	<b>-32.6</b>	<b>-53.9</b>	<b>-32.4</b>	<b>25.5</b>

While the overall size of the projected labour force is greater under this scenario than any of the other scenarios, the same general pattern is evident. Kawerau and Opotiki experience declines throughout the projection period, Rotorua, Western Bay of Plenty and Whakatane grow initially before declining. This leaves Tauranga City as the only area to have projected labour force growth 2013-2063 though the projected beginning of labour force decline in the Western Bay of Plenty is delayed to almost the end of the projection period.

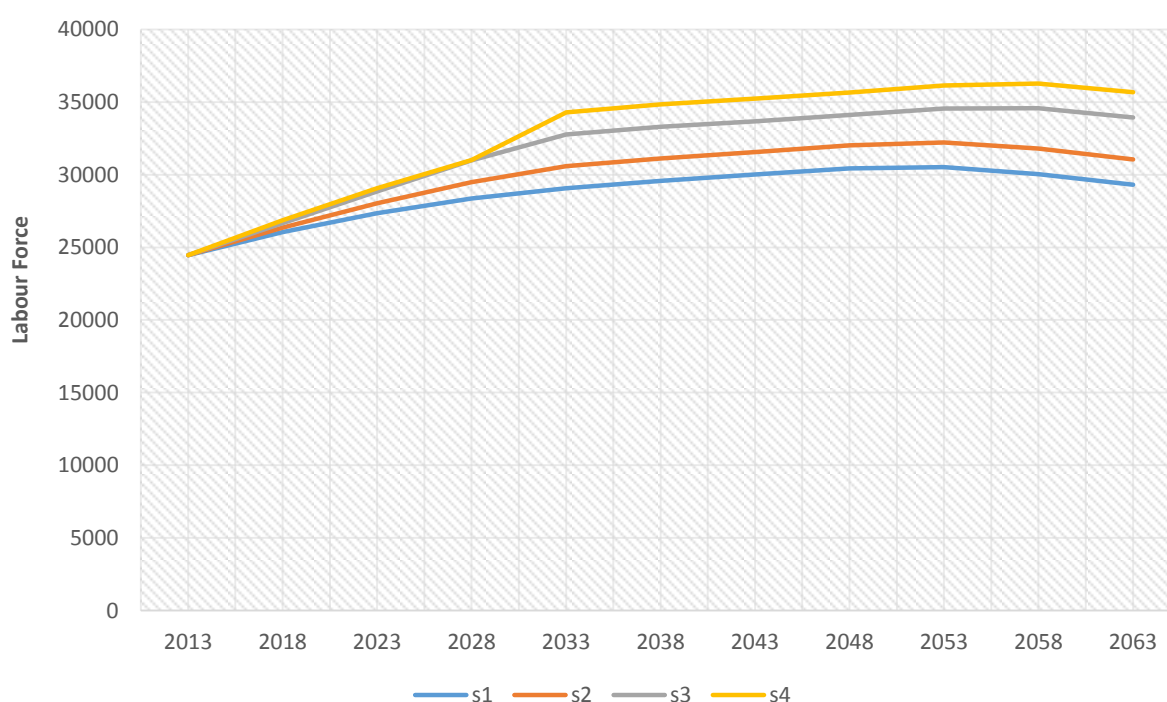


## Labour Force Projections – General Comment

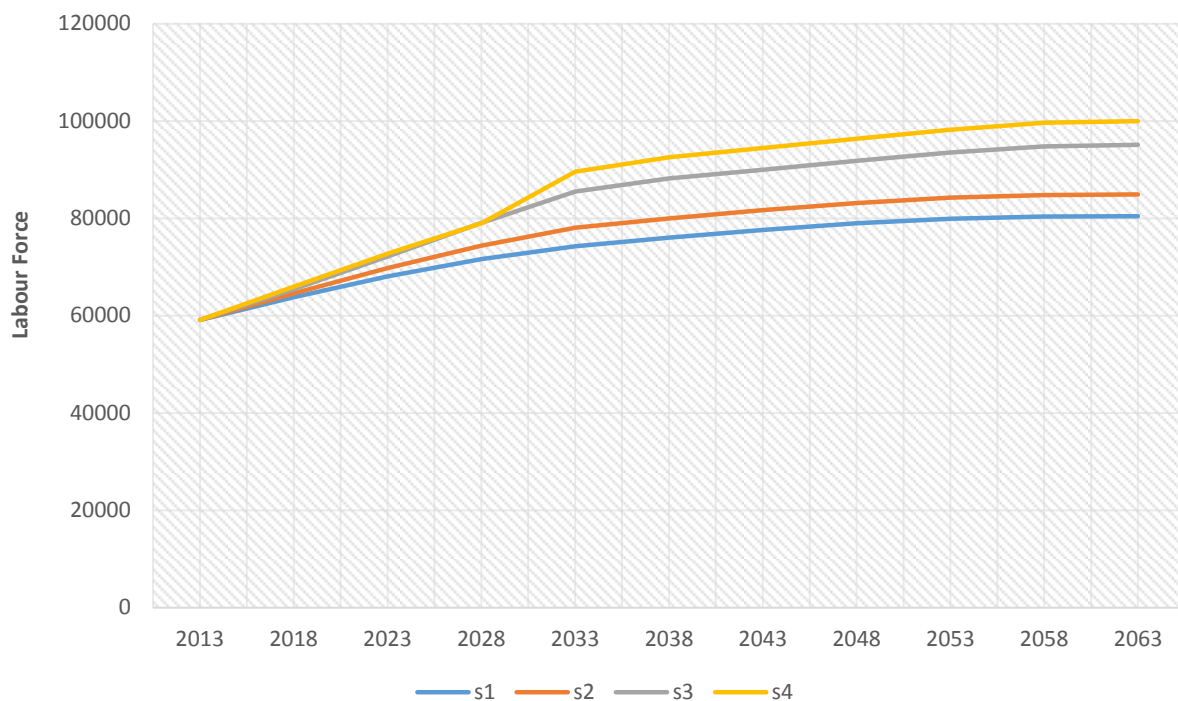
The scenarios used to project the labour forces of the region seek to capture some of the drivers of changing labour force participation rates, namely changes in sex- and age-specific participation rates. The scenarios are based either on historical patterns, plausible behavioural responses to various policy shocks or a combination of the two. For instance there has been a long pattern of increases in female labour force participation rates over several decades (see Thévenon, 2013) and considerable responsiveness of labour force participation to changes in superannuation (Hurnard, 2005). What these projections cannot do, however, is offer much of a guide in the case of some large persistent shock that lies outside contemporary experience.

What can be drawn from the labour force projections is that for changes in sex- and age-specific labour force participation rates of the order of magnitude envisaged in these scenarios, the primary effect is on the size of the projected labour force rather than the pattern of development of a TLA's labour force. The pattern of development of each TLAs labour force under the four scenarios is shown in the Figures 5.1 - 5.7.

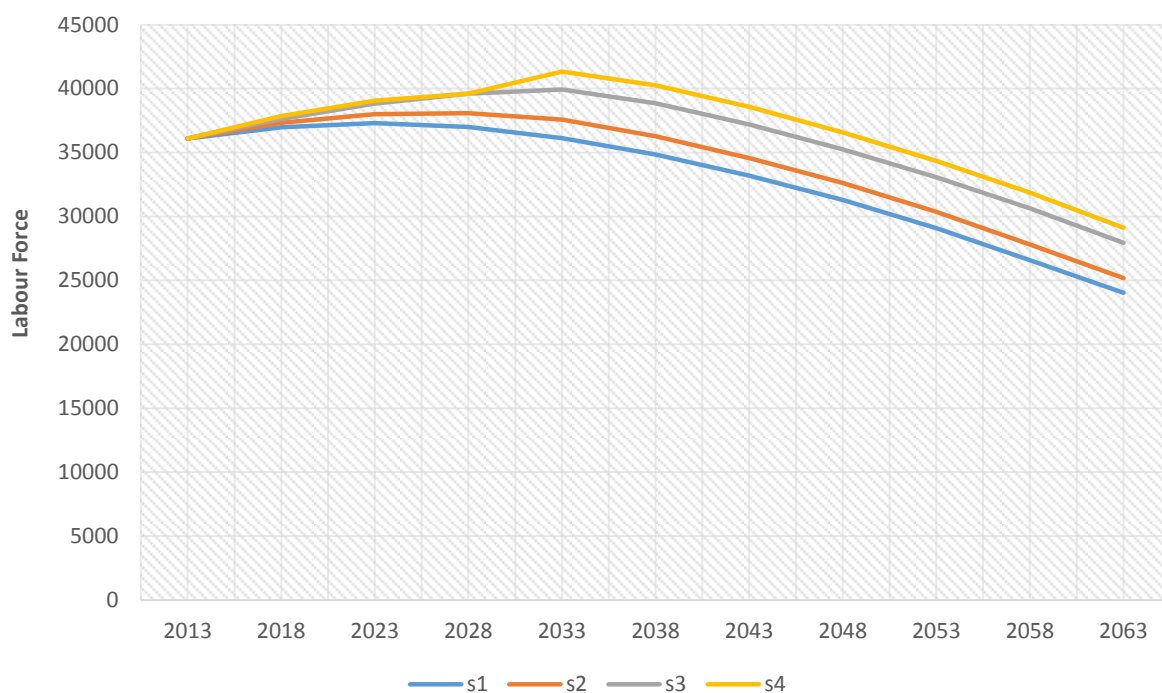
**Figure 5.1: Western Bay of Plenty Labour Force Projections 2013-2063 (Scenarios 1-4)**



**Figure 5.2: Tauranga Labour Force Projections 2013-2063 (Scenarios 1-4)**

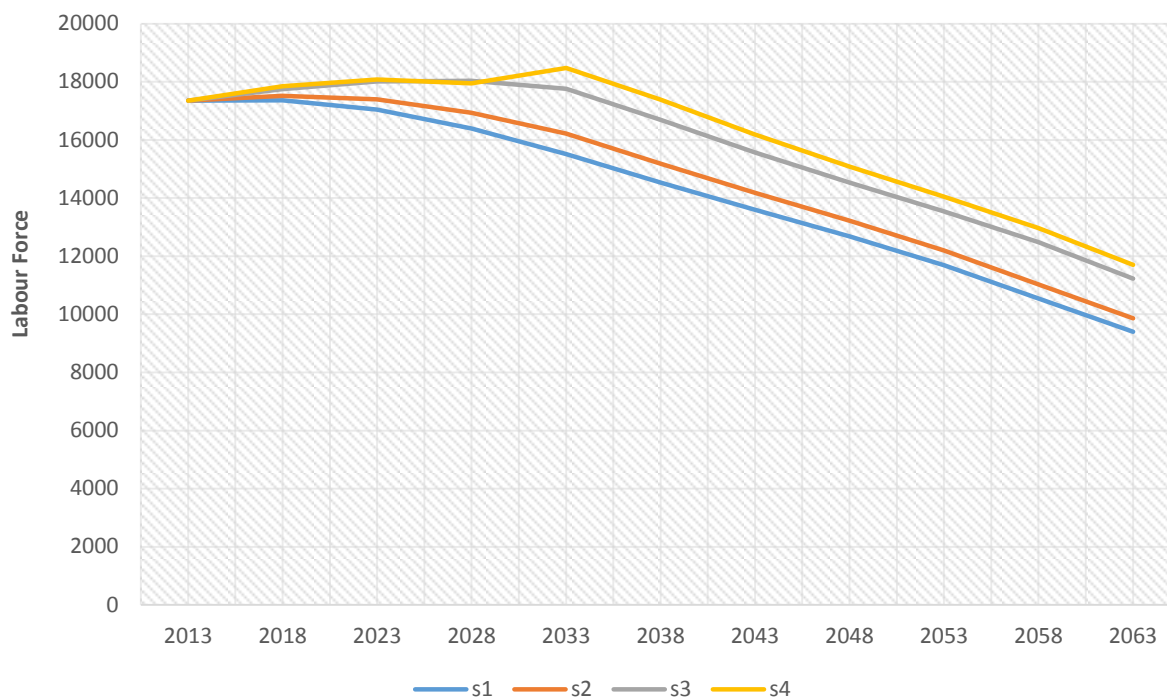


**Figure 5.3: Rotorua Labour Force Projections 2013-2063 (Scenarios 1-4)**

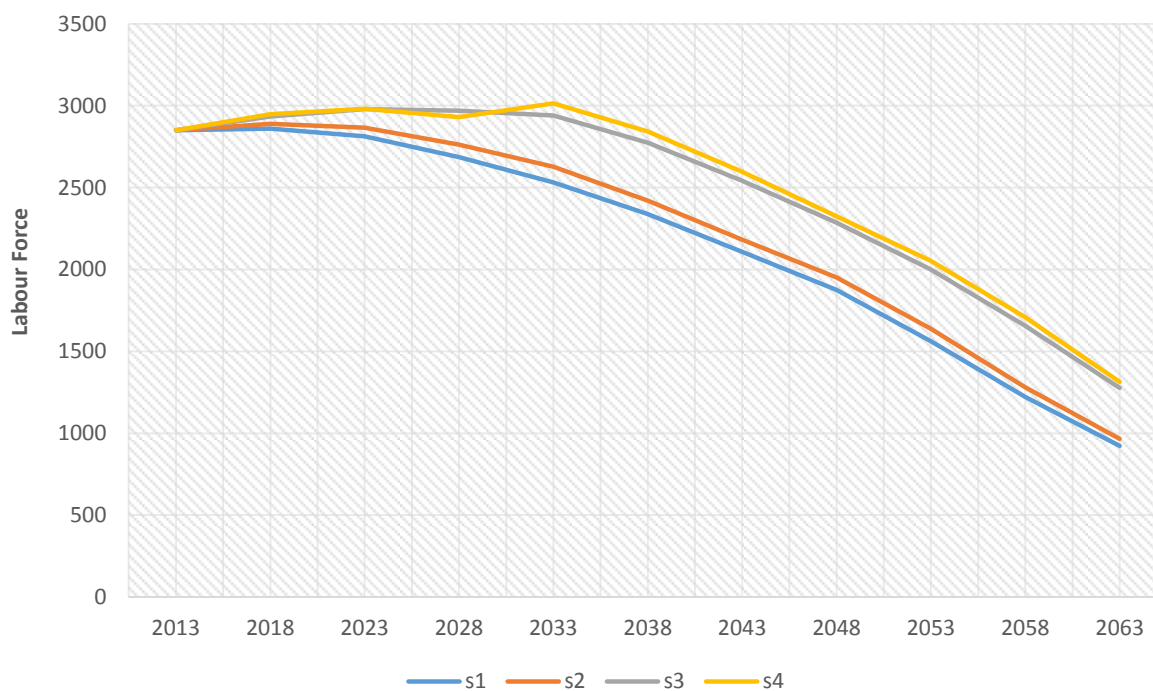




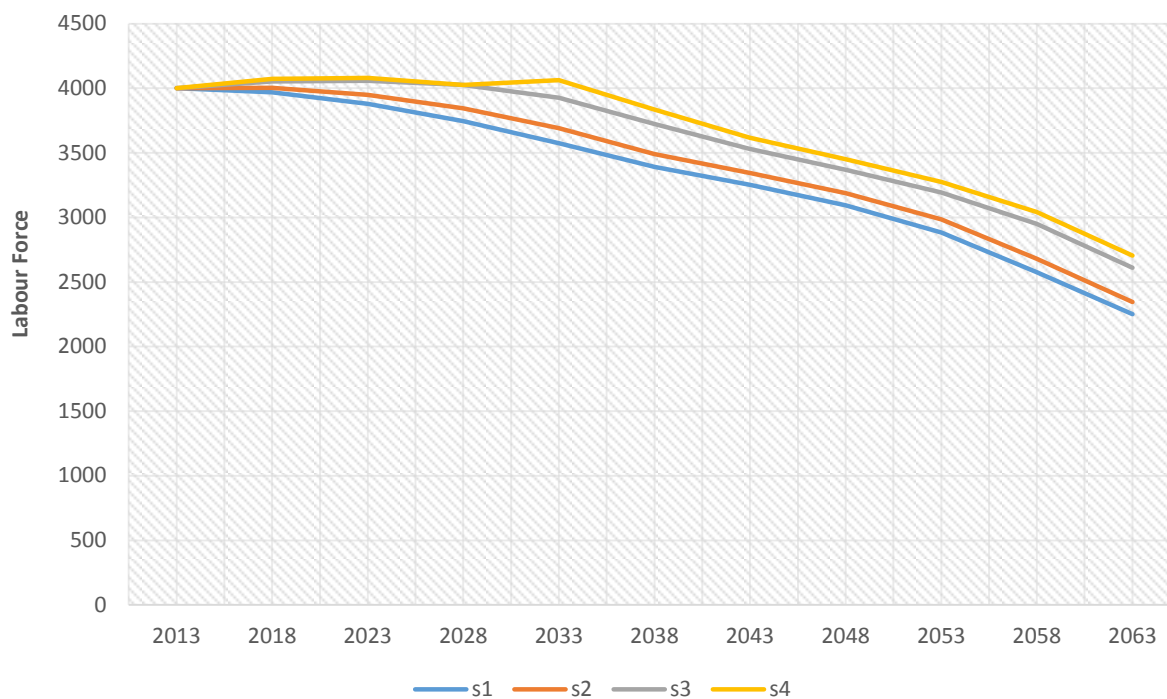
**Figure 5.4: Whakatane Labour Force Projections 2013-2063 (Scenarios 1-4)**



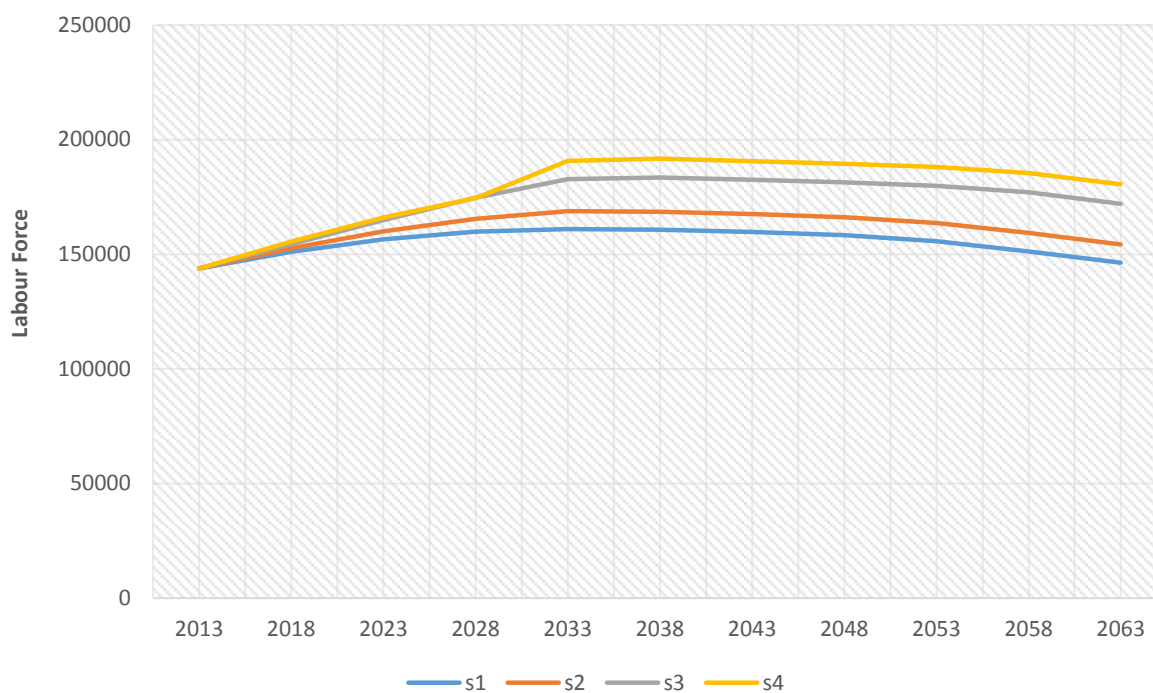
**Figure 5.5: Kawerau Labour Force Projections 2013-2063 (Scenarios 1-4)**



**Figure 5.6: Opotiki Labour Force Projections 2013-2063 (Scenarios 1-4)**



**Figure 5.7: Bay of Plenty Labour Force Projections 2013-2063 (Scenarios 1-4)**



## 6. Key Trends and Determinants Affecting Future Population Change

Across the next several decades, New Zealand will face significant demographic challenges—and opportunities, some in common with other countries, such as population ageing and the end of growth/onset of depopulation in many subnational areas, and some unique, such as the disproportionate concentration of the nation's population in one region (Auckland), the relative youthfulness of the Anglo-Settler countries' largest indigenous population (Māori), and a rapidly changing ethnic composition generated by globally high per capita net international migration gains—assuming these continue. These intertwining factors are considered below under five broad headings: Global Demographic Forces; Population Ageing; Regional Diversity; Workforce Ageing, and Population (Ethnic) Composition, with comment on their implications for the foregoing projections.

With 17.6 per cent aged 65+ years in 2013, the Bay of Plenty has the 7<sup>th</sup> oldest age structure of New Zealand's 16 Regions (Marlborough being the oldest and Auckland the youngest). The disparity reflects both disproportionate net migration loss at young adult ages, which removes some of the region's reproductive (births) potential, and disproportionate gains at older/retiree ages, across all of the region's six TLAs. As this Report has identified, all six TLAs have either older-than average age structures, or are experiencing faster than average (national) rates of ageing.

By 2033, only Rotorua and Opotiki are projected to have less than 40 per cent aged 65+ years, while Kawerau will have in excess of 65 per cent. Whakatane, Kawerau and Opotiki will have experienced continued decline and be considerably smaller in size, with Rotorua on the cusp of sustained decline. Western Bay of Plenty and Tauranga will still be growing, but very slowly, as the majority of growth will be at 65+ years – and in Tauranga's case, increasingly at 85+ years.

As the trends outlined below unfold, all TLAs and the region in general will experience increasing competition from other regions (and countries) for their young. If young people leave in greater proportions than assumed in the projections, and/or greater proportions of older people move in, the region's structural ageing – and that of its TLAs – will accelerate, as will depopulation in those TLAs in which it is projected.

A reduction in both net migration loss at younger ages and net migration gain at older ages would slow these projected outcomes, as would a rise in the birth rate, but for most TLAs of the Bay of Plenty will only delay the shift to the end of growth/onset of depopulation, which is already common at subnational level across both New Zealand and New Zealand's counterpart countries (and nationally across much of Europe, and Japan), and is foreshadowed in global demographic trends.



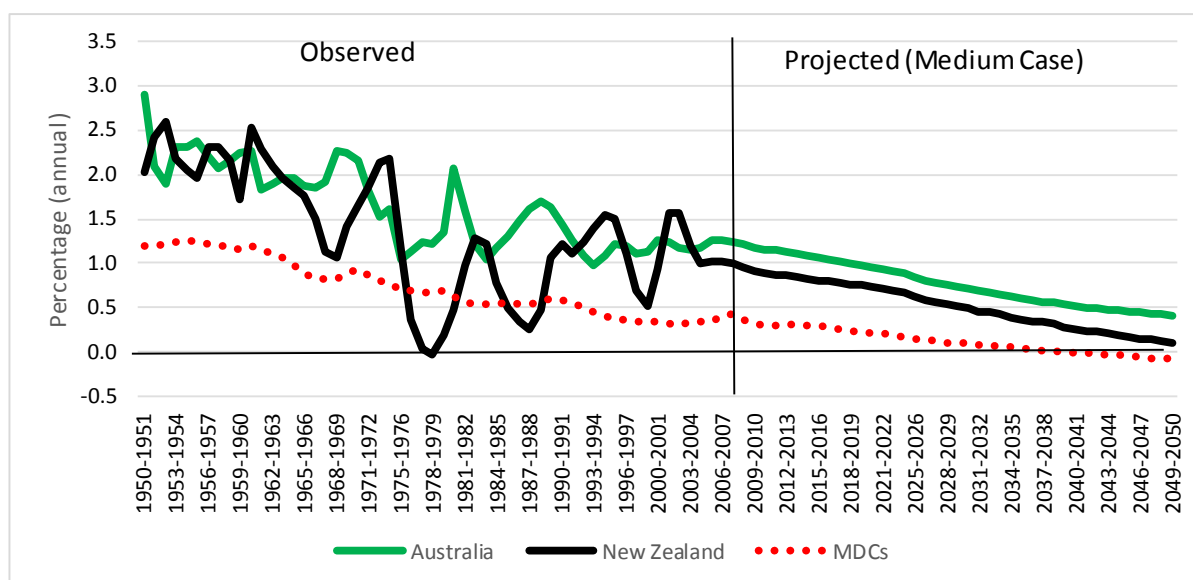
## Global Context

Between 2011 and 2031, the 58 More Developed Countries (MDCs) enumerated by the United States Census Bureau's International Database are projected to grow by less than 5.0 per cent, with the aggregate annual growth rate negative by 2040 (United States Census Bureau) – see Figure 6.1. At 65+ years, growth will be approximately 49 per cent, adding around 100 million 65+ year olds to the current 200 million at these ages. All other age groups 0-64 years are projected to decline by around 41 million (-3.9 per cent).

Developing countries are also beginning or are well into the structural ageing process, with the currently-largest, China, expected to reach the end of natural growth in 2026. Accounting for over 20 per cent of the global population, China's shift to natural decline will have a marked impact on the global growth rate, which at just over 1.0 per cent per annum at present is now half of what it was in the 1980s, and is expected to be below 0.5 per cent per annum by mid-century (United States Census Bureau). The global fertility rate is now around 2.4 births per woman, also below half of what it was in the 1950s (5.4 births per woman), and only marginally above the replacement level fertility rate of 2.1 births per women (Wilson 2001). Globally, population growth is projected to end around the end of the present century (Lutz, Sanderson and Scherbov 2004; Reher 2007).

Observed and projected trends for New Zealand, Australia and the MDCs are depicted in Figure 6.1.

**Figure 6.1: Observed and Projected Annual Growth Rates, New Zealand, Australia, and the More Developed Countries, 1950-2050.**



Source: United States Census Bureau International Database



**Implications for the projections:** The global trends provide both New Zealand and the Bay of Plenty with a salutary warning. As well as indicating that significant growth is unlikely as time proceeds, the diminishing pool of youth in the other 57 OECD countries is the pool within which New Zealand competes for many of its skilled migrants. Increasing competition for these migrants (United Nations 2000) - within and between countries, regions and industries - will make it increasingly difficult for New Zealand (and the Bay of Plenty) to achieve its desired migration targets. Attention is increasingly turning to the developing countries where there is still – and will remain for the foreseeable future - a significant excess supply of young people. However, attracting them to, and retaining them in New Zealand/Bay of Plenty will require more attention to settlement issues, including where migrants might most usefully settle, and education and equity in terms of the recognition of equivalent qualifications. As one of the youngest of the developed countries, those migrants who New Zealand attracts and trains will be of ever-greater interest to our structurally older counterparts – as will young New Zealanders themselves, including young people from the Bay of Plenty.

## Population Ageing

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With one of the highest birth rates in the developed world, New Zealand has a relatively youthful population, with 14.2 per cent aged 65+ years in 2013 compared to 16.8 per cent average for the 58 More Developed Countries referred to above. However as elsewhere, New Zealand's population is also ageing numerically, as more people live longer, and structurally, as declining birth rates cause the increased numbers of elderly to also increase as a proportion. The number of New Zealanders aged 65+ years is projected to more than double by 2031, from around 615,000 at present to 1.2 million, and to 1.5 million by 2061, while the proportion aged 65+ years will increase from its present 14.2 per cent to around 21 per cent by 2031, and 26 per cent by 2061<sup>10</sup>. These trends mean that while the New Zealand population will continue to grow for the foreseeable future, reaching around 520,000 by 2031 (+18 per cent over 2011), two-thirds of that growth will be at 65+ years.

**Implications for the projections:** The trends for the Bay of Plenty described in this Report are entirely consistent with national picture, and indicate that there will be little departure from them; if anything, the Bay of Plenty may gain more at older ages from other New Zealand regions than indicated by the projections, if the historical rates of net inflow at older ages increases.

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<sup>10</sup> All projections referred to here are based on Statistics New Zealand (2012) medium case (50th percentile) assumptions. At national level these are: an international net migration gain of 12,000 per year from 2015 and then remaining constant; the Total Fertility Rate falling to 1.9 births per woman by 2036 and then remaining constant; and life expectancy at birth increasing by 2061 to 88.1 and 90.5 years for males and females respectively.



## ***Demographic Drivers***

As has been outlined in this Report, population ageing is unfolding at markedly different rates across New Zealand. This diversity is caused by different mixes in the drivers of population ageing: birth rates, longevity (survivorship) and migration (e.g., Jackson 2007):

- Declining birth rates decrease the proportion of the population that is young and concomitantly increase the proportion at older ages (known as structural ageing).
- More people living longer adds to the numbers at older ages (numerical ageing), and in the process further swells the proportion at those age (structural ageing is accelerated).
- When an area experiences net migration loss, which occurs mainly at 20-39 years, it removes both the young people themselves and their reproductive potential, further pushing up the median age (structural ageing is further accelerated).
- Where an area experiences net migration gains at retiree ages, both the numbers and proportions at those ages are further augmented, further accelerating structural ageing.

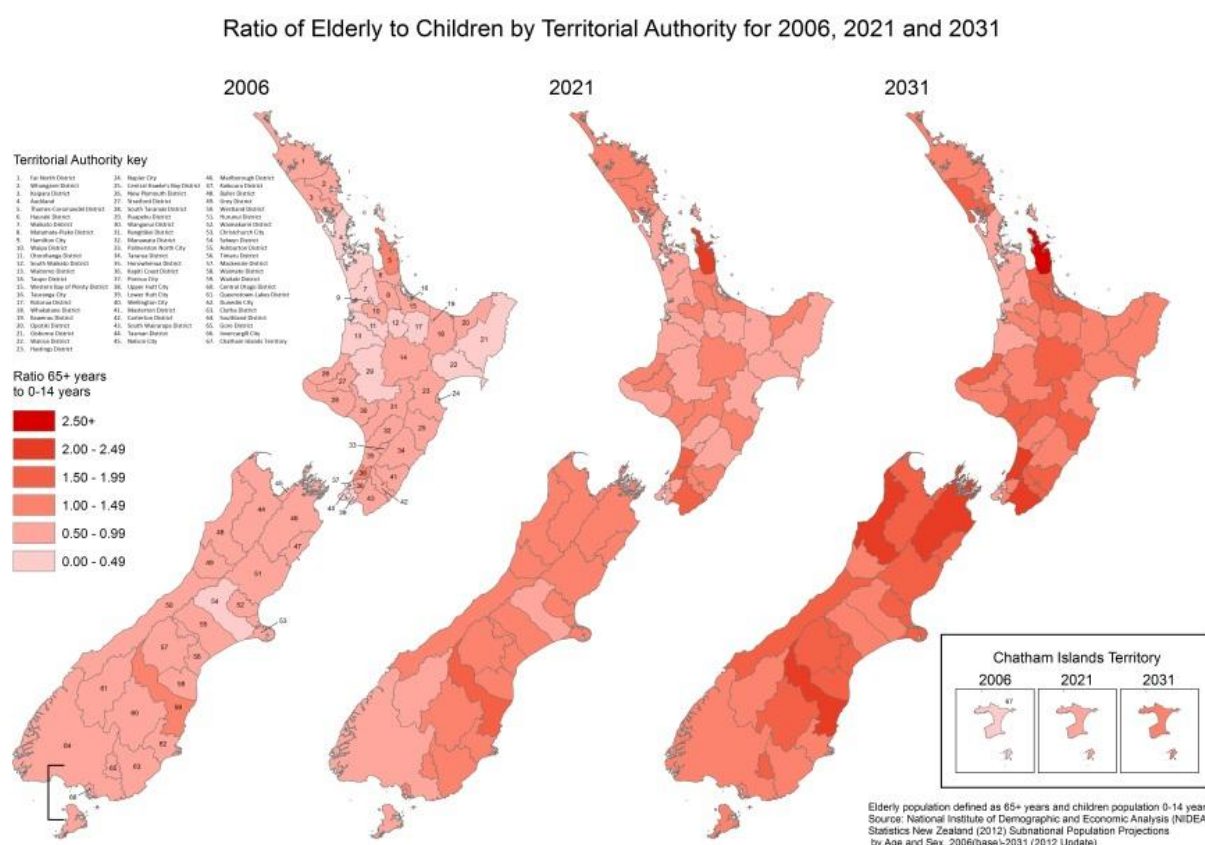
The overall outcome of these processes is an incremental—and in some cases rapid—shift to more elderly than children, more deaths than births (natural decline), and to the end of growth and onset of what is expected to be permanent population decline, something not seen in modern populations until its recent onset in Japan and much of Europe.

Figure 6.2 provides a national overview of the first of these trends (more elderly than children) for New Zealand at TLA level. In 1996, no TLA had more elderly than children. By 2006 that had become three TLAs (4.5 per cent); by 2021 it is projected to be the case for 41 TLAs (61.2 per cent); and by 2031, for 61 TLAs (91.0) per cent. Supporting these projections, the June 2013 Estimated Resident Population data indicate that 15 TLAs (22 per cent) now have more elderly than children. Among them is Western Bay of Plenty; by 2033 all six Bay of Plenty TLAs will be in this situation.





**Figure 6.2: Ratio of Elderly (65+ years) to Children (0-14 years), 2006, 2021 and 2031**



**Implications for the projections:** The shift to more elderly than children in the Bay of Plenty Region shown in this Report is entirely consistent with national trends, either already in existence (such as in the Western Bay of Plenty), or projected to occur between 2013 and 2033, again indicating that there is likely to be little departure from the projected situation.

### ***Diminishing Role of Natural Increase***

Despite New Zealand's reputation as a country of high international immigration, the primary driver of growth remains natural increase (the difference between births and deaths), and this is the case even for the peak international migration destination of Auckland. However as population ageing progresses, natural increase will diminish, becoming negative in 16 TLAs (23 per cent) by 2031 (compared with just one at present). Kawerau will join this group around 2031 with the remaining Bay of Plenty TLAs entering natural decline across the following two decades. In regions where there is net migration loss of people of reproductive age and net gain at older ages, as is the case for all Bay of Plenty TLAs, natural increase will decline quite rapidly. Nationally, only two TLAs, Selwyn and Auckland, are expected to see a growth in natural increase across the period.

**Implications for the projections:** The trends described in this Report are consistent with the national picture at TLA level and thus unlikely to differ markedly from the projected situation. However, the contribution to natural increase by Māori is somewhat greater in absolute terms than for the European-origin population, despite the latter's larger size (Jackson et al 2013: 59-60). If young Māori became less likely to leave the region, their higher than average birth rates and earlier age at childbearing would assist in keeping natural increase relatively high for a longer period.

### ***Increasing Role of Migration***

Although regionally differing birth rates and life expectancy are involved, New Zealand's subnational diversity is primarily driven by differences in migration trends and patterns. Where net migration is negative, the loss is mostly concentrated at the key reproductive ages, 20-39 years; this removes both the young people and their reproductive potential, and accelerates structural ageing. Between 2011 and 2031, 33 TLAs (49 per cent) are projected to experienced net migration loss, among them Rotorua, Whakatane, Kawerau and Opotiki. By contrast, net migration gains at retiree ages are projected to continue for many coastal sun-belt areas, such as Northland, the Bay of Plenty (particularly Western Bay of Plenty and Tauranga), Kapiti Coast and Marlborough. Gains at these ages add to the increased numbers deriving from longer life expectancy, and further increase the proportions at older ages. In some cases, such as Rotorua, the joint effects of migration loss at younger ages and gains at older ages (from both increased longevity and migration) will accelerate the shift to natural decline, at the same time as the population initially grows.

**Implications for the projections:** As natural increase declines, it is likely that the New Zealand Government will increase both its migration targets and its activities in attracting international migrants. Any increase in international migration could see an increase in ethnic diversity for the Bay of Plenty Region. However as structural ageing increases, migrants will increasingly replace natural increase (i.e., offset natural decline), rather than greatly augment and grow the population.

### ***Changing family size and structure***

Declining birth rates and an increasing age at childbearing over the past half-century have seen New Zealand's average family size decline from four to two children. Between 1981 and 2013 the proportion of New Zealand women with three or more children fell from 29 to 17 per cent. By 2013, 44 per cent of women of reproductive age had no children, up from 39 per cent in 1981, and the proportion with just one child rose from 11 to 15 per cent. This means that in 2013, more than half of New Zealand women of reproductive age had on average less than half a child. At the same time, New Zealand's fertility rate remains one of the highest in the developed world, and is held up by a





small increase in the proportion having two children, and by Māori fertility rates which are slightly higher and occur at somewhat younger ages than for non-Māori (peak ages 23 and 31 years respectively). Accompanying these trends, and contrary to popular opinion, teenage fertility is today less than half its 1970s levels, with less than 3 per cent of teenage girls having a child.

New Zealand's household structure has changed as a result of these trends, with two-parent households declining (from 37 to 27 per cent), sole parent households plateauing, and households without children (both couple-only and single-person) increasing across the period 1986 to 2013.

In the Bay of Plenty Region there has been an overall increase in single person households; however this is primarily due to an increase in men living alone at ages 40-64. The increase is not due—as many might expect—to an increase in widow/widower-hood: at older ages there has been a notable decline in single person households at ages 65-84, in part reflecting a decreasing gender gap in life expectancy which is seeing more older couples living together for longer. This factor is also plausibly due in part to a decline in women aged 65-74 living alone, from 77 per cent in 2001 to 69 per cent in 2013, while there has been a small increase in men of this age living alone, from 26 to 29 per cent. There has also been a decline for men under 40 living alone, suggesting an increase in other household type arrangements.

### **Implications for the projections:**

Changing family size and structure (*per se*) do not have implications for the underlying population projections, but may have a bearing on the household projections in terms of subtle changes in distribution. For example if life expectancy continues to increase at a greater rate for men than women (than allowed for in the underlying baseline projections), it is plausible that single person households will not increase to the same extent as popularly conceptualised. At national level, the slowing and reduction of growth in single person households at older ages has been observable since 2001, but further data are required before making definitive pronouncements on this situation. The older ages at which people are now partnering and having children is also (theoretically) associated with a stabilising of the 'two parent' and 'single parent' household types, as indicated in the projections.



## Regional Diversity

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### *Ageing-Driven Growth*

Between 2011 and 2031, the trends will see the majority of growth in 56 (84 per cent) of New Zealand's 67 Territorial Local Authority areas (TLAs) occur at 65+ years, including all six Bay of Plenty TLAs. In 33 TLAs (nationally), that growth will offset decline in most other age groups (as will be the case for Rotorua), but in 23 TLAs it will be insufficient to prevent overall decline (as will be the case for Whakatane, Kawerau and Opotiki).

Nationally only 17 TLAs (25 per cent) are projected to see growth at 0-14 years (notably none of the Bay of Plenty TLAs are among these), and 23 (34 per cent) at 15-39 years, among them Western Bay of Plenty and Tauranga City. In all other TLAs (including Rotorua, Whakatane, Kawerau and Opotiki), numbers at these ages are projected to decline. At Regional Council level, only Auckland is projected to see an increase in numbers aged less than 39 years.

**Implications for the projections:** The trends projected in this Report are consistent with national trends at TLA level. One factor that could make a difference for the Bay of Plenty would be the expansion of the University of Waikato and/or Bay of Plenty Polytechnic campuses. Such developments would plausibly see greater retention of some young adults seeking higher education. However the situation of Hamilton suggests that young educated people move away once they have completed their studies, the city typically experiencing a net migration loss at 20-24 years of age.

### *Geographic Mal-Distribution of the Population*

While Auckland currently accounts for one-third of New Zealand's population, the region's share of annual growth is projected to increase from just over 50 per cent between 2006 and 2013 to two-thirds by 2031, taking Auckland's share of the national population to 38 per cent. Of the remaining Regional Council areas, only Canterbury is projected to see an increase in population share, driven largely by the rebuild of Christchurch and related immigration. Other regions will also continue to grow, but at a decelerating rate. Data from the 2013 Census supports these projections, showing that between 2006 and 2013, Auckland and 11 of New Zealand's 12 cities accounted for 75 per cent of growth, with the remaining growth spread thinly across 30 Districts, while 20 Districts failed to grow or declined. Only five Districts each gained more than 2 per cent of growth.

**Implications for the projections:** The spatial changes in projected population share indicated in this Report for the Bay of Plenty and its TLAs, i.e., an increasing concentration of both the total population, and all broad age groups, in Tauranga City, are consistent with the national picture of



concentrating growth in large urban areas. It is not possible to comment on the extent to which the Bay of Plenty, and Tauranga City particularly, could see an increase in share of the national population, but the overall trends suggest that any increase would most likely be at older ages.

### ***The Subnational Ending of Population Growth***

The different rates of natural increase, migration and population ageing across the country are ushering in the permanent end of growth for many regions—a trend which has to be understood in the broader context of global population ageing noted above. Between 2011 and 2031, 23 TLAs (34 per cent) are projected to experience absolute decline, among them Whakatane, Kawerau and Opotiki. This is a similar proportion to that for the period 1996-2011.

Supporting the proposition, Figure 6.3 provides a snapshot of observed changes in the Usually Resident Population (URP) at Census Area Unit (CAU) level for the two periods 2001-2006 and 2006-2013. The usually resident population of New Zealand increased by 5.3 per cent over the seven year period 2006-2013. However the pattern of change was not distributed evenly. Almost one-third of CAUs with a population of over 10 residents declined in number across the period (affecting 613 of the total 1,869 CAUs). This is a notable increase from the 475 CAUs (25.4 per cent) which recorded a decline in population over the previous inter-censal period (2001-2006).

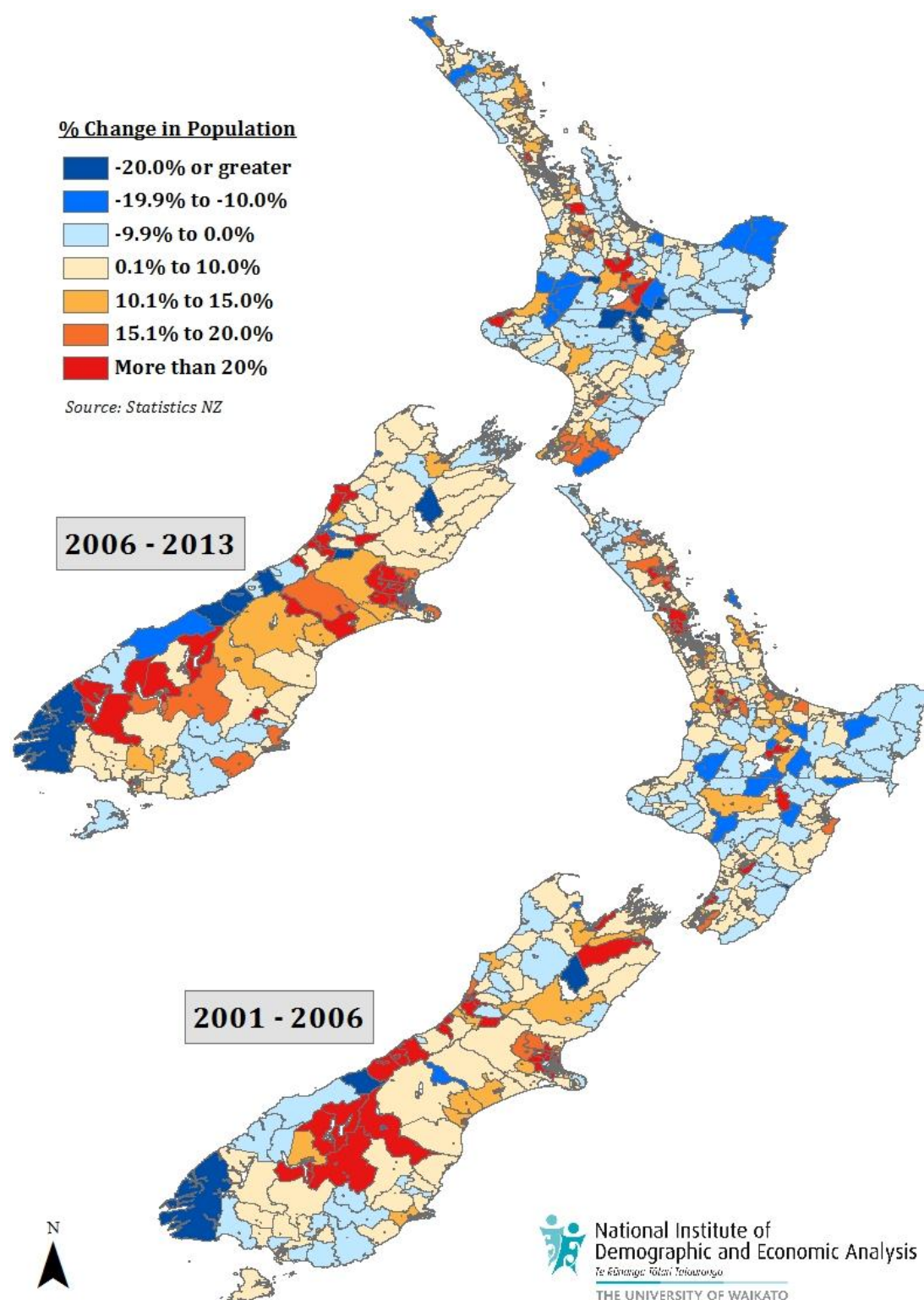
In keeping with the national picture, the Census Usually Resident Population of the BOP Region grew by 4.0 per cent between 2006 and 2013, a little lower than the ERP growth of 4.8 per cent—the discrepancy likely to reduce when the 2013 Census-based ERP data are released (see Section 1.2 of Jackson, Rarere and Pawar 2013 - *Bay of Plenty Region and Districts Demographic Profile*). At the same time, over two-fifths (52 CAUs, 44.1 per cent) of the region's 127 CAUs declined in size, and as also occurred nationally, the decline was more widespread than between 2001 and 2006, when 33 of the region's CAUs declined (28.0 per cent). These trends resulted in Kawerau, Opotiki, Rotorua and Whakatane experiencing decline between 2006 and 2013, whereas between 2001 and 2006 only Kawerau and Opotiki had declined.

This increase in the number/proportion of BOP CAUs recording a decline in population numbers between 2006 and 2013 compared to the previous period is most significant for Rotorua district, where 25 CAUs (64 per cent) declined in size between 2006 and 2013, compared to 15 (38 per cent) between 2001 and 2006, Whakatane (12 CAUs compared to eight; 63 cf. 42 per cent), and Tauranga City (five CAUs compared to two; 14 cf. 6 per cent). For Opotiki the situation was essentially a continuation of the previous trend (4 of the 5 CAUs declining in both periods).



**Implications for the projections:** The observed trends at CAU level for the Bay of Plenty and its TLAs across the 2001-2006 and 2006-2013 periods are consistent with those occurring nationally and support the projected declines presented in this Report.

**Figure 6.3: Percentage Change in the Usually Resident Population of Census Area Units (CAU), 2001-2006 and 2006-2013: Total New Zealand**



## Workforce Ageing

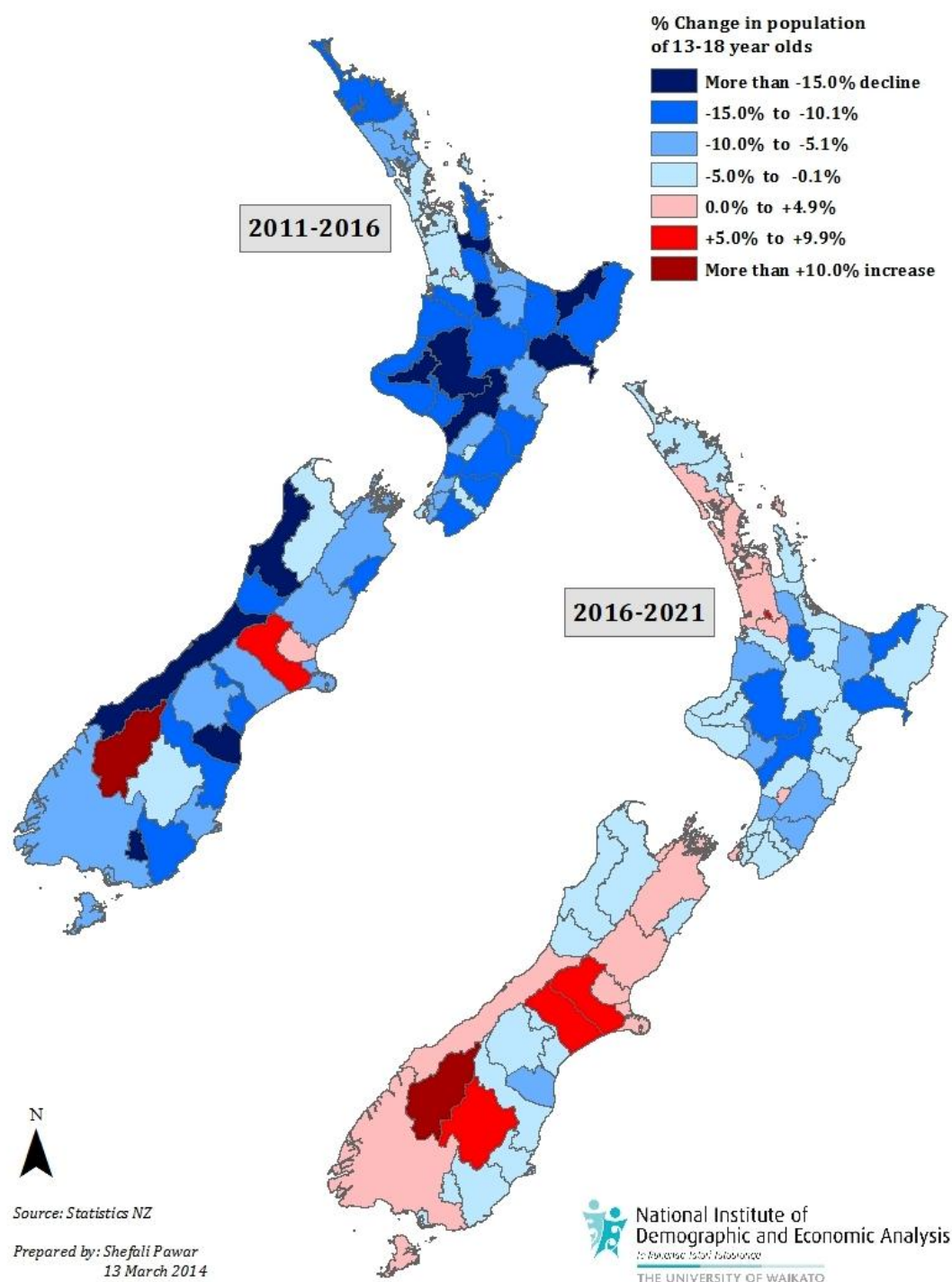
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### *Age structural transitions*

The trends are also generating significant oscillations in the numbers (and proportions) in each age group, and these have significant implications for a broad range of factors, among them the size and age structure of the labour force, the delivery of services, and related policy development. For example, while the number of New Zealanders aged 65+ years will grow at an accelerating annual rate until the late 2020s, the annual increment will then begin to reduce. At the other end of the age spectrum, New Zealand is facing a decline of some 20,000 school-leavers over the present five year period (2011-2016), and a further 8,000 the following five years, the legacy of falling birth rates during the 1990s. Around 2021, school-leaver numbers will again surge, albeit only temporarily, as a recently born baby blip reaches those ages. In the interim, this extended cohort will work its way through New Zealand's schooling system, generating waves and troughs as it passes through each age group (Figure 6.4). However as Figure 6.4 indicates, the resurgence will be geographically patchy, and none of the Bay of Plenty TLAs are expected to see a return to growth at these ages.



**Figure 6.4: Projected Change (%) at 13-18 years by TLA, 2011-2016 and 2016-2021**



### ***Workforce Ageing and Participation Rates***

These demographic trends are causing New Zealand's workforce to age quite rapidly. The prime working age population aged 15-64 years has recently peaked at 66 per cent of the population and is projected to shrink to 60 per cent by 2031 and 58 per cent by 2061. The ratio of those in the





general population at labour market entry age (15-24 years) to those in the main retirement zone (55-64 years) has fallen from 18 per ten in 1996 to 13 per ten today. The trend is even more profound in the employed workforce, which by 2013 had just six people at entry age (15-24 years) for every ten in the retirement zone (55+ years), down from 16 per ten in 1996.

Notably, these low ratios are occurring despite a trebling of labour force participation at 65+ years across the period 1986-2011. In 2011 New Zealanders recorded the second highest employment to population rates in the OECD at 55-64 years and 4<sup>th</sup> highest at 65-69 years. The Bay of Plenty Region is part of this trend, with the employment rate (employment to population) for those aged 60-69 years increasing from 34.8 per cent in 2001 to 54.7 per cent in 2013, almost 70 per cent of that employment in 2013 being full-time employment (up from 65 per cent in 2001). Employment rates are lower at 70-79 years, but have nevertheless doubled since 2001, and those at 80+ years have increased by 50 per cent.

The declining labour force entry: exit ratios are particularly pronounced in key industries. Here we use a ratio of those aged 15-29: 55+ years to allow for the gaining of appropriate qualification levels in some industries/occupations. In 2013, New Zealand's single-largest industry at 3-digit level (School Education) had just four people at entry age (15-29 years) for every ten in the retirement zone, down from eleven per ten in 1996; and the second-largest industry, Government Administration, just six per ten, down from 19 per ten in 1996.

For the Bay of Plenty, School Education was similarly the region's single largest industry, with just four people at entry age (15-29 years) for every ten in the retirement zone (55+ years), down from 11 per ten in 1996. The region's four next-largest industries, Community Care Services, Hospitals and Nursing Homes, Other Health Services, and Horticulture, all have similarly low ratios (4:10, 5:10, 4:10 and 5:10 in 2013 respectively). The low entry: exit ratios in the health industry can only escalate as demand for health services increases, especially in the Bay of Plenty with its older than average population. For the region's all-important Horticulture industry the low ratios raise significant questions about succession and who will buy these properties.

**Implications for the projections:** Labour force participation at 60+ years in both New Zealand and the Bay of Plenty is already relatively high in global terms, suggesting that employment rates at these ages are unlikely to undergo further dramatic increase. The declining ratio of labour market entrants to exits may on the other hand see a decline in unemployment rates, especially at younger ages; however unemployment rates (and thus those currently unemployed) are included in labour force projections. These trends suggest that in numerical terms the future workforce of the Bay of Plenty and its TLAs is unlikely to greatly exceed that indicated in Scenarios 3 and 4 of Chapter 5.



## Population Composition and Contribution to Growth by Ethnicity

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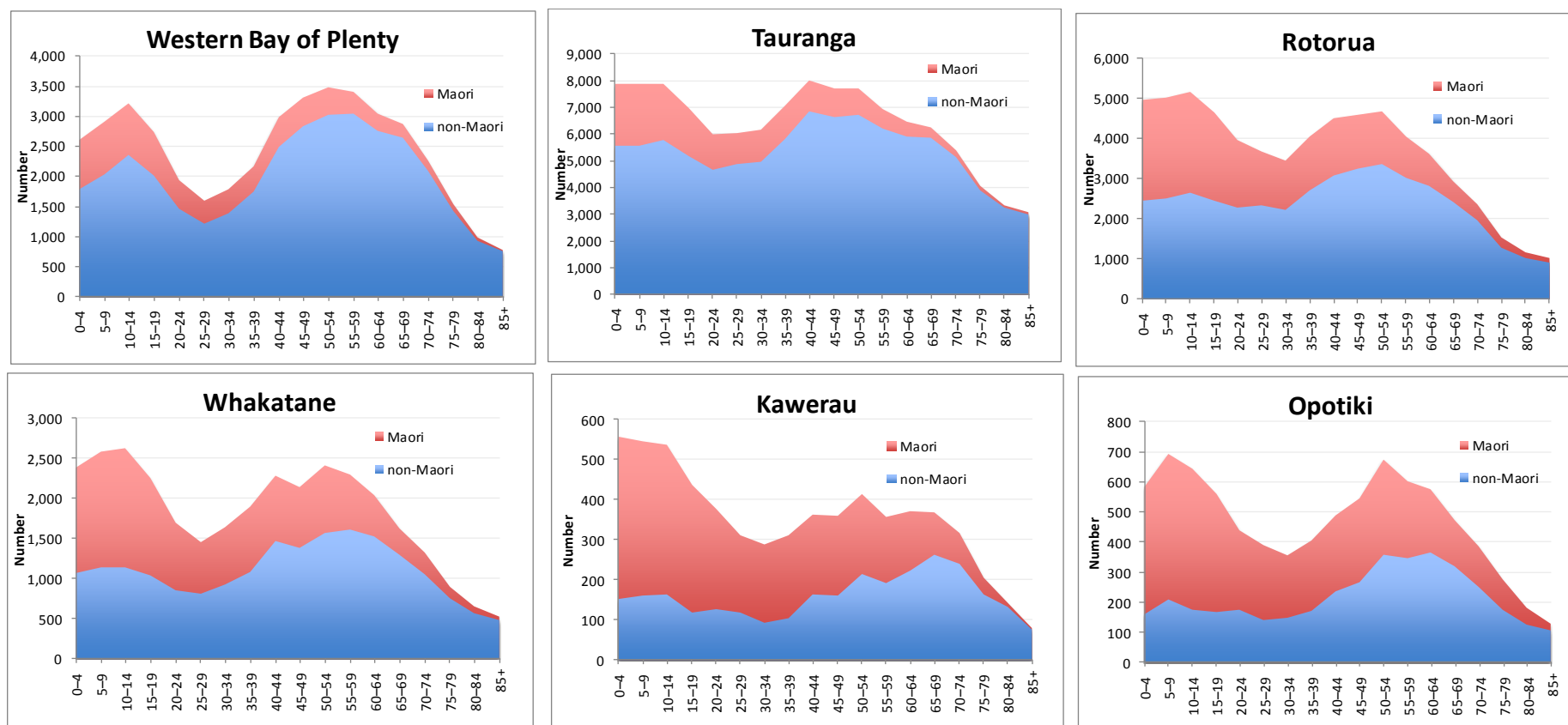
New Zealand is rapidly transitioning from a predominantly European-origin population to a multi-ethnic society, although this trend differs markedly by region. In 1996, the European-origin population accounted for approximately 75 per cent of the national population; by 2026 it is projected to account for 62 per cent, and for just above half of all children (0-14 years), down from 65 per cent in 1996. Māori are projected to remain at around 14-15 per cent share of the population, due to the impact of international migration which will see the proportion of people born in the Pacific Islands increase by 2026 to around 14 per cent, and Asian to around 9 per cent, up from 6.0 and 5.0 per cent respectively in 1996. However because of marked differences in the age structure of each population, the share at younger ages is significantly greater for the Māori and Pacific island populations. The 2013 Census indicated a median age of 41 years for the European-origin population and just 24 and 22 years respectively for the Māori and Pacific Island populations (Statistics New Zealand 2014, Table 6). People of Asian origin fall somewhere between these extremes, with a median age of 31 years. These differences disproportionately expose each population to different life course 'risks', such as seeking education, beginning family formation, and entering the labour market for the younger populations. They also present New Zealand – and the Bay of Plenty particularly - with a unique opportunity as the older European-origin population disproportionately retires. Over the next two decades, young Māori and Pacific adults will together account for around one-third of the nation's labour market entrants, and young people of Asian-origin will swell that to almost half. **NB.** All data and percentages given here pertain to Statistics New Zealand's 'multiple ethnic count' method of enumeration, which means that many people are counted more than once. A more detailed analysis and implications are outlined for the Bay of Plenty and its TLAs in the background paper to this Report (*Bay of Plenty Region and its Territorial Authorities Demographic Profile 1986-2031* (Jackson, Rarere and Pawar 2013)).

The potential demographic dividend arising from the relatively youthful Māori age structure is considerable for the Bay of Plenty and its TLAs, with their somewhat greater than average proportions of Māori. In 2013, 25.7 per cent of the Bay of Plenty Region's population was of Māori origin, compared with 14.1 per cent nationally. Focusing just on Māori/non-Māori data, Figure 6.5 provides an overview of the impact of the youthful Māori age structure on the overall population structures of each of the Bay of Plenty Region's TLAs, and Table 6.1 shows the percentage of each age group in each TLA that is Māori. As indicated in Jackson et al. (2013), these differences mean that the demography of the Māori population (higher fertility, younger age at childbearing, and lower life expectancy) have a sizeable impact on the total projections provided in this Report, particularly for the Rotorua, Whakatane, Kawerau and Opotiki Districts.





**Figure 6.4: Share (Number) of each age group that is Māori or non-Māori\*, by Territorial Authority Area (Bay of Plenty Region), Census Usually Resident Population, 2013**



Source: NIDEA/Statistics New Zealand (2014) Age Group and Sex by Territorial Authority Area, 2006 and 2013

Note: Statistics New Zealand Multi-ethnic method of enumeration



**Figure 6.1: Percentage of each age group that is Māori, by Territorial Authority Area (Bay of Plenty Region), Usually Resident Population, 2006 and 2013**

	Western Bay of Plenty		Tauranga City		Rotorua		Whakatane		Kawerau		Opotiki		Bay of Plenty Total	
	2006	2013	2006	2013	2006	2013	2006	2013	2006	2013	2006	2013	2006	2013
0–4 Years	28.2	31.5	30.2	29.3	51.1	50.5	54.5	55.5	78.3	72.6	71.4	72.3	42.6	41.2
5–9 Years	26.3	29.6	28.4	29.1	49.0	49.8	55.9	56.0	77.1	70.3	72.9	69.8	41.0	40.8
10–14 Years	23.5	26.7	25.4	26.3	45.9	48.6	54.1	56.7	78.0	69.3	68.2	73.1	38.8	38.9
15–19 Years	23.4	26.1	24.2	25.6	45.9	47.0	50.4	54.1	73.3	73.3	66.8	70.2	36.6	37.7
20–24 Years	29.8	24.3	22.7	22.0	43.2	42.5	50.5	49.8	75.0	66.7	65.5	59.9	35.0	33.6
25–29 Years	25.6	23.5	21.5	19.3	40.6	36.5	47.1	44.3	70.2	62.5	61.5	63.8	33.4	29.5
30–34 Years	19.6	22.4	18.0	18.8	36.0	35.6	43.5	43.9	67.4	67.7	63.0	58.0	29.1	28.8
35–39 Years	16.5	19.3	14.8	17.1	32.8	32.7	38.9	43.0	55.7	66.3	55.8	58.1	25.2	26.7
40–44 Years	13.9	16.6	14.2	14.3	29.7	31.3	37.0	35.8	52.9	54.5	53.6	51.5	23.3	23.2
45–49 Years	12.8	14.0	12.9	13.3	28.4	28.6	34.4	35.9	57.6	55.0	46.6	51.1	21.8	21.8
50–54 Years	11.8	12.8	10.6	12.8	24.6	27.8	30.3	35.0	49.2	47.8	42.7	47.3	18.9	21.2
55–59 Years	9.1	10.7	8.1	10.6	20.4	25.0	26.4	29.9	42.2	46.2	37.8	42.6	15.6	18.3
60–64 Years	8.6	9.8	6.4	8.5	17.9	21.9	21.4	25.3	34.7	39.5	32.0	36.5	12.9	15.6
65–69 Years	8.9	7.6	5.8	5.8	18.0	17.3	22.6	20.4	28.6	28.5	35.9	32.3	12.4	11.6
70–74 Years	6.2	7.2	4.2	5.0	15.7	16.2	20.0	20.9	15.4	24.5	38.5	34.9	10.2	10.8
75–79 Years	6.2	7.0	2.7	4.1	12.1	15.5	14.0	16.7	10.0	20.3	30.4	35.9	7.2	9.4
80–84 Years	4.1	4.9	2.1	2.9	9.4	10.8	8.8	14.4	10.7	8.3	18.5	30.0	4.9	6.7
85 Years And Over	4.3	3.4	1.4	1.8	5.6	8.7	4.6	8.1	5.9	7.4	16.2	18.6	3.4	4.4
Total All Ages	16.5	17.3	16.0	16.3	34.5	34.3	39.7	39.9	58.5	54.6	54.4	53.6	26.3	25.7

Source: NIDEA/Statistics New Zealand (2014) Census Usually Resident Population by Territorial Authority Area and Age Group, 2006 and 2013



Reflecting these age structural differences alongside regionally differing trends in migration, Māori are projected to account for over one-quarter of the growth of the Bay of Plenty Region 2011-2021, the European-origin population for one-half, the Asian-origin population for 14.7 per cent, and the Pacific Island population 9.5 per cent (Jackson et al. 2013). These contributions differ significantly at TLA level. As noted above, natural increase (births minus deaths) for Māori in the Bay of Plenty is already greater in absolute terms than for the European-origin population, and this difference is projected to increase (Jackson et al 2013: 59-60).

**Implications for the projections:** As structural population unfolds, the Bay of Plenty and its TLAs will have some advantages over many other regions because of their relatively high proportions of Māori. Strong affiliation to whanau and turangawaewae may see young Māori less desirous of moving than non-Māori. Employment opportunities opening up with the ageing and retirement of the disproportionately older European-origin population could see young Māori encouraged to remain in the region and thus reduce the negative age-specific migration rates underlying the population projections.



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