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# Western Australia small area population projections

## Methods & assumptions

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This paper explains the process of producing the Western Australia (WA) projected enrolled population at 24 March 2028 by Statistical Area Level 1 (SA1).

### 1. Projection Method

The method employed for projecting the population for WA was the cohort-component method, widely accepted as the best way of producing population projections by age and sex. Annual fertility rates, mortality rates, internal migration, and overseas migration by age and sex were applied to the base population to produce a projected population, which then became the base population for projecting the next year and so on. This cycle was repeated until the projection horizon was reached.

For each SA1 in WA, total population aged 18 years and over was projected using average historical growth from 2016 to 2021. The projected SA1 enrolment counts were proportionally constrained to the projected total WA enrolment count.

Complete process:

1. State projections. The total WA population at 30 June 2023 to 30 June 2028 was projected by single year of age and sex, from a base (observed) population at 30 June 2022.
2. Greater Capital City Statistical Area (GCCSA) projections. The total population of both GCCSAs in WA at 30 June 2023 to 30 June 2028 was projected by single year of age and sex, from a base (observed) population 30 June 2022, and constrained to the state level.
3. Statistical Area Level 2 (SA2) projections. The total over-18 population of all SA2s in WA at 30 June 2023 to 30 June 2028 was projected by single year of age and sex, from a base (observed) population 30 June 2022, and constrained to the GCCSA level.
4. Projected population at the roll count date, 9 August 2023, and the enrolment projection date, 24 March 2028, was calculated by linear interpolation between the projected populations at 30 June 2022 and 30 June 2028.
5. The share of WA SA1 over-18 population by SA2 over-18 population at 30 June 2023 and 30 June 2028 was estimated by extrapolating the average change between 30 June 2016 and 30 June 2022 up to 30 June 2026, before being held constant for 30 June 2027 and 30 June 2028. This was then applied to the projected SA2 over-18 population at 24 March 2028.
6. The enrolled population at 24 March 2028, by SA1, was calculated by applying a ratio to the total over-18 population. The ratio assumed no change over the projection timeframe and was the enrolled population at 9 August 2023 divided by the projected over-18 population at 9 August 2023 for each SA1. The enrolled population at 24 March 2028 was then constrained to the total projected WA electors at 24 March 2028 which was calculated by applying the same enrolment ratio calculation at the state level.

The base population for the WA cohort-component projections was preliminary estimated resident population (ERP) by age and sex as at 30 June 2021, as released by the ABS in [National, state and territory population](#) on 14 September 2023. The base population for SA1 projections was final ERP by age and sex as at 30 June 2021, as updated by the ABS in [Regional population by age and sex, 2022](#) on 28 September 2023.

## 2. Assumptions at the State level

Assumptions for the state-level projection were based on both recently observed and long-term trends for given components of population change. Assumptions for the components of natural increase (births and deaths) were taken from previously published *National, state and territory population* data. Assumptions for both net internal and overseas migration were developed by combining observed, forecasted, and extrapolated data for the timeframe from June 30 2022 to June 30 2028 to reflect the impacts of the COVID-19 pandemic and subsequent ongoing recovery period. To project future migration outcomes, the annual pre-pandemic ten-year weighted average from 1 July 2009 to 30 June 2019 was calculated<sup>1</sup>. The first two years after 30 June 2022 represented a weighted share of national Net Overseas Migration (NOM) for WA. The national NOM figure used was 375,000 for July 1 2022 to 30 June 2023, and 300,000 for 1 July 2023 to 30 June 2024. The difference between the 30 June 2022 data and the long-term trend was then calculated and the difference progressively added over July 1 2024 to June 30 2026, with an additional one-half of the difference each year, to simulate a return to long-term trends in both internal and overseas migration<sup>2</sup>. The annual long-term trend was then held constant for the time July 1 2026 to 30 June 2028.

Table 1: Assumed components for Western Australia, 2023-2028

Population component	Year ending 30 June					
	2023	2024	2025	2026	2027	2028
<b>Fertility – total fertility rate<sup>A</sup></b>	1.75	1.73	1.72	1.70	1.68	1.68
<b>Mortality – Standardised Death Rate</b>	5.0	5.0	4.9	4.9	4.8	4.7
<b>Net interstate migration – persons<sup>B</sup></b>	-120	-2,000	-3,880	-5,770	-5,770	-5,770
<b>Net overseas migration – persons<sup>B</sup></b>	39,200	31,360	27,170	22,980	22,980	22,980

<sup>A</sup> Rounded to the nearest hundredth.

<sup>B</sup> Rounded to the nearest ten.

## 3. Assumptions at the Greater Capital City Statistical Area level

A similar process was used for determining migration assumptions at the GCCSA level, with a weighted time period of 1 July 2012 to 30 June 2019 considered, selected for the most recently available data as well as to remove years affected by the Covid-19 pandemic<sup>3</sup>. Total internal and overseas movements up to 30 June 2022 were used from [Regional population, 2021-22 financial year](#) data published on 31 August 2023.

<sup>1</sup> This involves giving increasingly greater weight to the years closer to the projection base year.

<sup>2</sup> For Overseas Migration, this incorporates suppressed movements due to the pandemic and then record net gain during the ongoing recovery period. This is guided by research from Treasury's Centre of Population (Centre for Population, 2022; The Australian Government the Treasury, 2023a; The Australian Government the Treasury, 2023b). This is revised from previous estimates that forecasted internal and overseas migration wouldn't return to long-term trends until the end of the 2024-25 Financial Year (Centre for Population, 2022; Charles-Edwards et al., 2021).

<sup>3</sup> Regional Internal Migration Estimates (RIME) and Regional Overseas Migration Estimates (ROME) data has only been published below the state-level starting from the 2011-12 Financial Year, while Net Internal Migration (NIM) and Net Overseas Migration data goes back to 1971. RIME at the GCCSA level does not add up to NIM at the state level, as RIME also considers inter-GCCSA movements that aren't captured by inter-state movements in NIM.

Table 2: Assumed components for Greater Perth, 2023-2028

Population component	Year ending 30 June					
	2023	2024	2025	2026	2027	2028
<b>Fertility – total fertility rate<sup>A</sup></b>	1.71	1.69	1.67	1.65	1.63	1.63
<b>Mortality – Standardised Death Rate</b>	5.0	4.9	4.8	4.8	4.7	4.7
<b>Regional Internal Migration Estimates – persons<sup>B</sup></b>	-2,730	2,010	6,760	11,500	11,500	11,500
<b>Regional Overseas Migration Estimates – persons<sup>B</sup></b>	35,230	28,180	24,420	20,650	20,650	20,650

<sup>A</sup> Rounded to the nearest hundredth.

<sup>B</sup> Rounded to the nearest ten.

Table 3: Assumed components for Rest of Western Australia, 2023-2028

Population component	Year ending 30 June					
	2023	2024	2025	2026	2027	2028
<b>Fertility – total fertility rate<sup>A</sup></b>	2.02	2.00	1.98	1.96	1.94	1.93
<b>Mortality – Standardised Death Rate</b>	5.6	5.6	5.5	5.5	5.4	5.4
<b>Regional Internal Migration Estimates – persons<sup>B</sup></b>	-5,600	-3,990	-2,370	-760	-760	-760
<b>Regional Overseas Migration Estimates – persons<sup>B</sup></b>	3,970	3,180	2,750	2,330	2,330	2,330

<sup>A</sup> Rounded to the nearest hundredth.

<sup>B</sup> Rounded to the nearest ten.

#### 4. Assumptions at the Statistical Area Level 2 and below

Migration profiles at the SA2 level were based on internal and overseas migration data by age and sex from 1 July 2021 to 30 June 2022. This data was selected as the best going forward due to the high level of aggregation, with only the total over-18 population at each geographical level being required, and the data being the most recently available.

SA1 population assumptions were average annual historical growth in the share of total over-18 population of corresponding SA2 population from 30 June 2016 to 30 June 2022, extrapolated to 30 June 2026 and then assumed constant to 30 June 2028.

The ratio of enrolled population to total over-18 population at 9 August 2023 was assumed to be constant up to 24 March 2028, except for some outliers. The adjustments to these include both areas with declining populations and rapidly growing areas having high ratios, which the ABS has interpreted as a lag in the updating roll address. Other areas were adjusted to account for population declines, which could be influenced by SA2-level data from the Covid-19 being carried forward through the projection horizon.

#### 5. Data and method quality

The relationship between the roll count and the projected population at 24 March 2028 maintained a consistent relationship across the projection horizon. However, other quality issues may persist as they are unable to be isolated and so cannot be accounted for. As such, anomalous SA1s could be subject to further adjustments.

Other SA1s with anomalous ratios of roll count to population can be explained. These include areas with

- Prisons
- Secondary and tertiary student accommodation
- Perth CBD and inner-city areas with a lower proportion of Australian citizens
- Areas with recorded enrolments but no or little ERP prior to 9 August 2023

We (ABS) have made some adjustments to the ratio of enrolled population to total over-18 population in order to calculate the projected enrolled persons at 24 March 2028. These adjustments reflect a trend of high growth areas having low ratios and areas with declining populations having high ratios. We have interpreted this as lag of updating roll address. The adjustments in detail are:

- Decreased ratio for areas with population decline and an unusually high original ratio (i.e., greater than 1.0).
- Caps on unreasonable population growth and decline, particularly in inner cities and outer suburbs.
- Enrolment ratios above greater than 1.0 have been reset to 1.0.

## 6. Geography

SA1 boundaries are from the [Australian Statistical Geography Standard \(ASGS\): Edition 3 – Main Structure and Greater Capital City Statistical Areas, July 2021](#) (ABS cat. no. 1270.0.55.001), as used for the 2021 Census.

## 7. Disclaimer

It is important to recognise that the projection results in this report reflect the assumptions made about future fertility, mortality and migration trends. While these assumptions are formulated on the basis of an objective assessment of historical demographic trends and their likely future dynamics, there can be no certainty that they will be realised.

The ABS takes responsibility for the method employed, however in accordance with ABS policy regarding small area population projections, the assumptions used are the final responsibility of the client, and the projections are not official ABS population statistics.

The projections may be referred to as "...projections prepared by the ABS according to assumptions reflecting prevailing trends agreed to by the Australian Electoral Commission".

No liability will be accepted by the ABS for any damages arising from decisions or actions based upon this population projection consultancy service.

## 8. References

The Australian Government the Treasury, Centre for Population, 2023a, *2022-23 Budget: Australia's Future Population*.

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Charles-Edwards, E., Wilson, T., Bernard, A., Wohland, P., 2021, 'How will COVID-19 impact Australia's future population? A scenario approach', *Applied Geography*, vol.134