Arizona State and County Population Projections, 2022-2060:

Low and High Series Input Data

The Office of Economic Opportunity has produced two companion population projections series to provide lower and higher alternatives to the results published in December 2022 (Medium Series). There is inherent uncertainty in projected data, and our stakeholders have asked for a way to take this into consideration. Because our projections are created from a deterministic model rather than a probabilistic model, we create two different scenarios to act as a lower and upper bound to the projected values.

We use the same starting data for the base and launch years as the Medium Series but adjust the trends of each component of population change going forward. Compared with the Medium Series, the Low Series reflects a combination of higher mortality, lower fertility, and lower net migration. The High Series reflects a combination of lower mortality, higher fertility, and higher net migration.

Fertility

Medium: Current fertility rates are held constant for all years.

Low: Fertility rates for the combined group of Non-Hispanic White and Non-Hispanic Other (reference group) are held constant for all years. If the current total fertility rate (TFR) of a race group exceeds that of the reference group, the fertility rates linearly approach those of the reference group in 2060.

High: There has been a strong decreasing trend in fertility since 2007. Given the strength of that trend, a reversal of it is unlikely to reach the highs experienced near the peak. We assume that, at best, fertility reaches the average TFR from 2010-2019. At the state level, we calculated the difference between the base year TFR and the 2010-2019 average TFR for each race group. The gain in TFR is applied to each county's base TFR by race to produce the 2060 target TFR. Fertility rates then linearly approach the 2060 target.

Mortality

Medium: Life expectancy by sex and race approaches target values that are a combination of the Social Security Administration's (SSA) medium projection of life expectancy for 2060 and the 2060 projected life expectancy from the 2017 Census Bureau National Projections.

Low: The SSA produces low, medium, and high projections of life expectancy. For OEO's Low Series, we replace the SSA's medium projected life expectancy for 2060 with its low projected

life expectancy for 2060. Rates for 2023-2024 are smoothed into the long-term trend by subtracting the difference between the high and medium rates from the low rates.

High: For OEO's High Series, we replace the SSA's medium projected life expectancy for 2060 with its high projected life expectancy for 2060. We assume that the difference between the White life expectancies and the Black and Native American groups by sex are the same as in the Medium series. Rates for 2023-2024 are smoothed into the long-term trend by taking a weighted average of the medium rates and the originally projected high rates. For 2023, the weights are 80%/20%, and for 2024 they are 60%/40% of the medium and high rates, respectively.

Table 1. Summary of State Level Life Expectancies by Series

State Level Life Expectancies 2060	Estimated Life Expectancy in 2060 Low		Estimated Life Expectancy in 2060 Medium		Estimated Life Expectancy in 2060 High	
Race/Ethnicity	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
White Non-Hispanic (NH)	76.24	81.19	79.04	84.49	82.54	87.29
Black NH	73.04	78.66	77.57	83.94	81.07	86.74
Native American NH	70.33	75.57	74.86	80.85	78.36	83.65
Asian NH	84.47	87.86	87.27	91.16	90.77	93.96
Other NH	76.24	81.19	79.04	84.49	82.54	87.29
All Hispanic	77.74	83.03	80.38	85.91	83.67	88.36

Migration

Medium: Total net migration and foreign migration are first estimated separately using historical data. Domestic migration is created as a residual, i.e., Total Net Migration – Foreign Migration = Domestic Migration. Adjustments for a few counties were made based on feedback from partner agencies.

Foreign Migration

Low: Using data from the Census Bureau's Population Estimates Program (PEP), we calculated Arizona's average share of U.S. net foreign migration from 2010-2021. We applied this average to the projected U.S. net foreign migration from the 2017 Census Bureau National Projections.

High: We calculated the difference between the Medium Series foreign migration and the Low Series foreign migration. This difference was added to the medium series values to produce the high series values.

Total Net Migration

Implied migration since 1980 has exhibited a wide range of values, often with no clear patterns when considering every county especially in short-term increments. For this reason, we chose simple logic to create a low and high "band" of net migration for each area. We start with calculating the standard deviation of net migration for each county since 1980. Then we either add or subtract that value from the medium series net migration to produce the low and high series assumptions. These calculations often resulted in a band that was far too wide, with trends that are unlikely to occur in the projections horizon. It made more sense to use half of one standard deviation ($\frac{1}{2}SD$) as a starting point. In many smaller counties, $\frac{1}{2}SD$ still produced an unreasonably wide band. When this happened, we defaulted to either adding or subtracting the mean net migration experienced by that geography since 1980.

Low: We begin by subtracting $\frac{1}{2}SD$ of historical net migration from the Medium Series net migration value starting in 2025. If $\frac{1}{2}SD$ is larger than the Medium Series value, we subtract the mean historical net migration instead. Net migration for 2023-2028 were subjected to smoothing to blend short-term migration into long-term trends. Smoothing was unique to each county and mostly guided by either a polynomial or linear fit.

High: We begin by adding $\frac{1}{2}SD$ of historical net migration to the Medium Series net migration value starting in 2025. If $\frac{1}{2}SD$ is larger than the Medium Series value, we add the mean historical net migration instead. Net migration for 2023-2028 were subjected to smoothing to blend short-term migration into long-term trends. Smoothing was unique to each county and mostly guided by either a polynomial or linear fit.