New Mexico Population Projections Methodology Statement

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The current projections highlight expected changes based on recent trends. Future trends may be different due to the cyclical nature of migration (i.e. oil drilling) and due to policy changes that directly aim to impact migration or other components of population change. If you need additional projection information, please contact Dr. Jacqueline Miller, as these may be available.

Projections Methodology

The University of New Mexico Geospatial and Population Studies (GPS) releases periodic July 1 population projections for New Mexico and its 33 counties. These projections are used by several state agencies and private entities for research and planning purposes. UNM-GPS uses a top-down approach for producing population projections in which the state's population is projected followed by the county projections. The county projections are then adjusted to sum to the state totals for all age and sex combinations. County-level projections were first projected using an extrapolation method, with county age and sex distributions determined using Cohort Change Ratios.

State Level Projections Methodology

For the state level projections, GPS uses a standard cohort component method based on the demographic balancing equation: $Pop_t = Pop_{t-1} + Births – Deaths + Net\ Migration$. The 2023-2050 five-year interval projections begin with GPS's 2022 population estimates produced in July 2023 (*"Launch Population*") and add in births, deaths and migration.

Fertility

Using birth data from NM's Department of Health and GPS's annual population estimates, we calculated age-specific fertility rates for each year from 2010 to 2019, then projected fertility through 2023, ignoring the fertility patterns during the COVID-19 pandemic, as there are known anomalies in fertility patterns during this period. In each projection year, the number of expected births for the female population ages 15 to 44 was calculated using these age-specific fertility rates. Fertility rates were held constant throughout the projection series.

Mortality

The number of expected deaths is subtracted from the population using 3-year average life tables calculated from 2009-2011 death counts provided by New Mexico Department of Health and

population data from the 2010 Census. We chose to use the 2010 lifetable rather than the 2020 lifetable to prevent mortality rates from being excessively high due to COVID.

Migration

Net migration is calculated based on recent historical trends. Because migration patterns differed significantly between the 2000s and the 2010s, we opted to combine these two patterns to better reflect periods of both in and out migration. Due to differences in available data, the approach to calculating migration rates was different for the two decades.

For the 2010s, implied net migration was estimated by calculating the difference between the 2020 blended-base single-year of age estimates and an aged-and-survived population estimated. The aged-and-survived population estimate was calculated by adding births and deaths from April 1, 2010 to April 1, 2020 to the 2010 Census estimates base population. This provided a total number of net migrants across the decade for each 2010 age (i.e. net number of 27-year-olds in 2010 who migrated between age 27 and 37). Ten-year migration rates were then calculated as a percentage of the 2010 population, and adjustments were made to enable single-year population projections.

For the 2000s, migration is the age-specific migration from 2000 to 2010 from published net migration rates[1]. Rates were distributed across single-year of ages such that the single-year estimated migration reflects the average migration experienced by someone of age *x* at any time during the decade. For example, 12-year-olds in 2002 would have experienced the 2010 20 to 24-year-olds migration rate. Those age 12 in 2009 would have experienced the 2010 10 to 14-year-old migration rate. The relevant migration rate for each single year of age for all years of the decade were then averaged to get a value for the average migration rate experienced by people of age x across the decade.

Single year migration rates from 2000-2010 and 2010 to 2020 were then averaged and used in the projection model. These rates were held constant throughout the projection series.

County Projections Methodology

Projections for longer time periods and smaller populations are more prone to error. In a review of small-area projections, Wilson and colleagues[2] noted that averaging several methods or using a composite method could reduce the overall mean error more than any single method. The composite method in which methods for each geography are selected based on the population size and direction of change can reduce overall mean errors[3]. This method was found to reduce error slightly more than the averaging method, perhaps because prior knowledge of the estimated geographies was taken into account when selecting the method. To improve our county-level estimates for New Mexico, we use a composite method that selects either a *Hamilton-Perry*

[1] Egan-Robertson, David, Katherine J. Curtis, Richelle L. Winkler, Kenneth M. Johnson, and Caitlin Bourbeau, Age-Specific Net Migration Estimates for US Counties, 1950-2020. Applied Population Laboratory, University of Wisconsin - Madison, 2023 (Beta Release). Web. [October 2023.] https://netmigration.wisc.edu/.

[2] Wilson, T., Grossman, I., Alexander, M., Rees, P., and Temple, J. (2022). Methods for small area population forecasts: State-of-the-art and Research needs. *Population Research and Policy Review, 41*, 865-898.

[3] Rayer, S. & Smith, S.K. (2010). Factors affecting the accuracy of subcounty population forecasts, *Journal of Planning Education and Research, 30*(2), 147-161. DOI: 10.1177/0739456X10380056

Cohort Change Ratio Model, *Exponential Curve Extrapolation Model, Linear Trend Extrapolation Method* or an average of several methods depending on characteristics of each tract and the county in which it resides.

For most counties, an extrapolation model was selected. Past research suggests that linear extrapolation performs better for growing populations while exponential extrapolation methods are preferred for declining populations.[2] Thus, we select the extrapolation method for each county based on the direction of its change between the 2010 and 2020 censuses. Five counties had projections that were either too large or too small when using the extrapolation method. Most of these counties have unique characteristics such as a large percentage of the population that lives in group quarters (i.e. prisons, military facilities, dorms). Consequently, these concerns were considered in selecting the final county model.

Once the final model for a county was selected, the county populations were controlled to the projected state totals so that the counties sum match the state population. This process involves proportionally adjusting the estimates in nested geographies so that their sum matches that of the parent geography. Because some counties in New Mexico are growing while others are declining in population, we used the *plus-minus method.*[4] This method provides a negative and positive adjustment factor that helps prevent excessive gains or losses in population, that are common when a single adjustment is used for subpopulations with varying directions of change.

The age and sex distribution of each county was calculated using Hamilton-Perry Cohort Change Ratios, that were then controlled to the established county totals and the age-sex totals at the state-level.

Suggested citation:

UNM Geospatial & Population Studies. (2024). NM Population Projections, 2023 – 2050.

[4] Judson and Popoff, 2004, as cited in Smith, S.K., Tayman, J., and Swanson, D.A. (2013). Special Adjustments. In K.C. Land (Eds.), *A practitioner's Guide to State and Local Population Projections* (pp. 251 – 285). Springer. DOI: 10.1007/978-94-007-7551-0