MINNESOTA STATE DEMOGRAPHIC CENTER
DEPARTMENT OF ADMINISTRATION

Long-Term Population Projections for Minnesota

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About the Minnesota State Demographic Center

The Minnesota State Demographic Center, a division of Community Services within the Minnesota Department of Administration, is the main provider of demographic data and analysis for the state of Minnesota. Many of the Center's tasks are set forth in Minnesota State Statute 4A.02, which begins:

The State Demographer shall: (1) continuously gather and develop demographic data relevant to the state; (2) design and test methods of research and data collection; and (3) periodically prepare population projections for the state and designated regions and periodically prepare projections for each count or other political subdivision of the state as necessary to carry out the purposes of this section; (4) review, comment on, and prepare analysis of population estimates and projections made by state agencies, political subdivisions, other states, federal agencies, or nongovernmental persons, institutions, or commissions; (5) serve as the state liaison with the United States Bureau of the Census, coordinate state and federal demographic activities to the fullest extent possible, and aid the legislature in preparing a census data plan and form for each decennial census; (6) compile an annual study of population estimates on the basis of county, regional, or other political or geographical subdivisions as necessary to carry out the purposes of this section and section 4A.03; (7) by January 1 of each year, issue a report to the Legislature containing an analysis of the demographic implications of the annual population study and population projections;…

The Center independently produces a variety of projections, including long-term projections for Minnesota by age, gender, race and ethnicity, and labor force participation. Furthermore, the State Demographic Center analyzes and distributes data from the federal and state government and other sources to monitor key trends, especially in the areas of economics, education, fertility, workforce, health, immigration, income, and poverty. State Demography staff are often called upon to inform policymaking and planning efforts at the State Capitol, state agencies, and beyond. Our data assists policymakers, state and local governments, businesses, nonprofits, the media, and all Minnesotans in understanding demographic trends in order to make informed decisions.

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Purpose

This analysis was created to fulfill the expectations of Minnesota State Statute 4A.02. This statute mandates (3) the periodic preparation of population projections for the state and designated regions and (7) the issuing of a report to the Legislature containing an analysis of the demographic implications of the annual population study and population projections. The dataset that this document accompanies serves as the annual population projections for the State of Minnesota and fulfills the requirements of Minnesota State Statute 4A.03. Statute 4A.03 mandates that each state agency use these data for (1) the approval of state or federal grants, (2) issuance of bonds, or (3) releasing a general plan.

A *projection* (as opposed to a *forecast*) is a conditional calculation showing what the future population would be if a particular set of assumptions were to hold true (George, Smith, Swanson, & Tayman, 2004). Population projections involve both the precise and accurate recording of the multifaceted demographic changes and the impetus that links these processes between time periods. Projections based on past trends and relationships have the ability to advance our understanding of the dynamics of population growth and encourage informed decision-making. The multidisciplinary impact of population projections fortifies them in modern demographic analysis.

Introduction

The first edition of Minnesota population projections was published in 1975 (Office of the State Demographer, 1975). In compliance with Minnesota statutes, an assessment of these projections will be made annually and a new edition of projections will be issued when the assumptions made in the previous edition no longer hold true (Office of the Revisor of Statutes, 2018). Local area population projections in Minnesota serve as the primary data input for a variety of planning and investment decisions in both the public and private sectors. These data can help answer questions about characteristics of Minnesota's future, such as school enrollment (Swanson, Hough, Rodriguez, & Clemans, 1998), housing (Mason, 1996), welfare expenditures (Opitz & Nelson, 1996), and infrastructure (Tayman, Parrott, & Carnevale, 1994). Changes in the composition and size of a population have varied implications – from social and economic to environmental and political. Because of the implications, population projections are often the foundation for producing other datasets like households or labor force participation projections (e.g., households or labor force participation) (George, Smith, Swanson, & Tayman, 2004).

In 2017, the U.S. Census Bureau published an updated population projection for the United States as the third set of projections based on the 2010 Census (U.S. Census Bureau, Population Projections Program, 2018). These files were removed, reportedly due to an error in the assumptions for infant mortality rates (U.S. Census Bureau, 2017). When the error was corrected and the files replaced in late 2018, the dataset was compared to the previous set of national projections. While the growth attributable to

natural change (births minus deaths) has increased by nine percent (or 63,000), the rate of net-international migration (the difference between arrivals from other countries and current residents leaving the United States for other countries) has decreased by a staggering 23 percent (or 323,000). The result is tamped-down total population growth—from 2.1 million to 1.8 million new U.S. residents on average annually from 2018 to 2060 (***Table 3***).

Table 4: Annual average projections of the components of population change for the United States, 2018-2060

	Total Change	Natural Change	Vital Events		Net-Migration
			Births	Deaths	Total
2014 Vintage	2,096,977	693,977	4,290,488	3,596,558	1,402,977
2017 Vintage	1,836,605	756,814	4,224,372	3,467,605	1,079,791
Difference	-12%	9%	-2%	-4%	-23%

Source: U.S. Census Bureau, Population Projections, Vintage 2014; Vintage 2017

Similar to previous datasets, this 2017 population projections series uses the cohort-component method and historical trends in births, deaths, and international migration. New in this iteration is the inclusion of separate mortality assumptions for native (individuals born in the United States) and foreign-born (individuals born outside of the United States). Because of this, the 2017 projections are assumed to more accurately account for the effects of international migration on the population of the United States (U.S. Census Bureau, Population Projections Program, 2018).

Table 5: Cumulative estimates of the components of population change, April 1, 2010 to July 1, 2018

	Total Change	Natural Increase	Vital Events		Net Migration		
			Births	Deaths	Total	Intl.	Domestic
Northeast Region	792,649	1,234,219	5,204,239	3,970,020	-425,095	1,786,346	-2,211,441
Midwest Region	1,379,001	1,833,582	6,835,841	5,002,259	-441,750	1,065,306	-1,507,056
D3 - Illinois	-90,492	428,467	1,294,578	866,111	-519,943	241,894	-761,837
D3 - Indiana	207,817	184,780	685,293	500,513	25,243	80,287	-55,044
D4 - Iowa	109,273	83,182	320,992	237,810	26,463	48,288	-21,825
D4 - Kansas	58,379	109,563	320,372	210,809	-50,988	45,473	-96,461
D3 - Michigan	111,798	166,054	933,558	767,504	-53,152	189,665	-242,817
D4 - Minnesota	307,254	228,289	570,171	341,882	81,671	107,830	-26,159
D4 - Missouri	137,500	139,750	617,794	478,044	-331	59,677	-60,008
D4 - Nebraska	102,963	85,715	216,048	130,333	17,767	33,765	-15,998

D4 - N. Dakota	87,501	36,744	87,442	50,698	49,192	13,264	35,928
D3 - Ohio	152,685	191,951	1,138,227	946,276	-35,269	169,396	-204,665
D4 - S. Dakota	68,037	38,522	99,830	61,308	29,312	16,801	12,511
D3 - Wisconsin	126,286	140,565	551,536	410,971	-11,715	58,966	-70,681
South Region	10,190,903	4,038,394	12,520,210	8,481,816	6,117,386	3,082,344	3,035,042
West Region	6,046,776	3,608,764	7,954,290	4,345,526	2,443,829	1,760,374	683,455

Source: U.S. Census Bureau, Population Estimates Program, Vintage 2018

Over the last eight years, the Midwest Region has received the fewest net-international migrants of any of the four regions (***Table 6***). The Midwest region has also experienced persistent loss of residents to other states. Though Minnesota appears to be growing more rapidly than other Midwestern states, this positive trend is due, in large part, to strong international migration (***Table 7***). Because Minnesota's population change is so heavily reliant on international migration patterns, a reduction in national assumptions will have direct implications for the state's outlook.

Due to Minnesota's heavy reliance on international migrants for continued population growth and the changes in assumptions made for the national projections, it was determined that the population projections for Minnesota—and the sub-state geographies within—would require a revision. This paper describes the detailed methods and assumptions involved in creating population projections for Minnesota and 102 various local areas contained within.

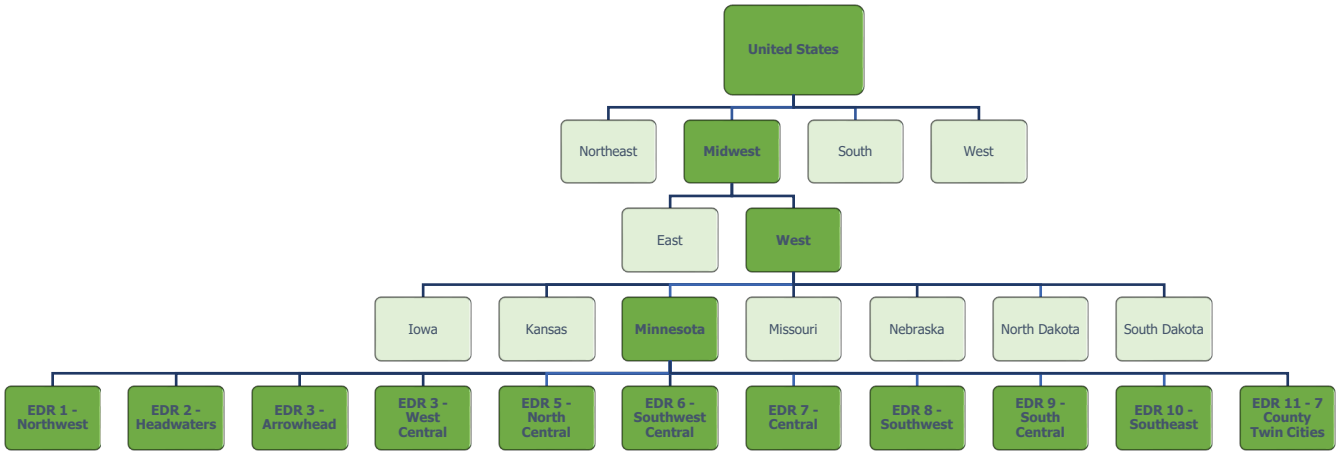
The population range is wide. The 2018 population size of these geographies ranges from 3,308 residents in Traverse County to 3,099,007 residents of the seven-county Twin Cities metro (U.S. Census Bureau, Population Estimates Program, Vintage 2018). However, these nested geographies, explained in the next section, define and determine the spatial units for which planning decisions—and hence forecasts—are made. This edition, in the 43rd year of state statute compliance, presents a set of "general utility" projections of the resident population of Minnesota arranged and aggregated to service the planning and decision-making needs of most State agencies, the Legislature, and the Executive Office.

Geographical Organization

This analysis includes calculations for 115 sub-national geographies, including four (4) regions, two (2) divisions, seven (7) states, eleven (11) Economic Development Regions (EDRs), four (4) sub-regions of the EDRs, and 87 counties. **Figure 1** and **Figure 2** provide visual representations of the various levels of geographical hierarchy relied upon in this analysis. This analysis relies upon the nesting of the population of a smaller "child" geography expressed as a proportion of the population of its larger, "parent" geography (Swanson & Beck, 1994). The sum of all child geographies represents 100 percent of any one parent geography. For example, all regions (Northeast, Midwest, South, and West) were

calculated as a share of their parent geography (United States). Although Minnesota is part of the Midwest Region—and not of any other regions—the anticipated shares for all four regions were calculated together to maintain appropriately shifting proportions into the future. The same is true of both divisions of the Midwest Region, though Minnesota only resides in the western division.

Figure 6: Geographical hierarchy of the United States and sub-national geographies through the economic development regions of Minnesota



Source: U.S. Census Bureau, Geography Division; Minnesota Department of Employment and Economic Development

Figure 2: Geographical organization of Minnesota's economic development regions and counties

EDR 1 - Northwest	EDR 2 - Headwaters	EDR 3 - Arrowhead	EDR 4 - West Central	EDR 5 - North Central	EDR 6 - Southwest Central	EDR 7 - Central	EDR 8 - Southwest	EDR 9 - South Central	EDR 10 - Southeast	EDR 11 - 7 County Twin Cities
• Kittson • Marshall • Norman • Pennington • Polk • Red Lake • Roseau	• Beltrami • Clearwater • Hubbard • Lake of the Woods • Mahnomen	• Aitkin • Carlton • Cook • Itasca • Koochiching • Lake • Saint Louis	• Becker • Clay • Douglas • Grant • Otter Tail • Pope • Stevens • Traverse • Wilkin	• Cass • Crow Wing • Morrison • Todd • Wadena	• **Southwest Central** • Kandiyohi • McLeod • Meeker • Renville • **Upper Minnesota Valley** • Big Stone • Chippewa • Lac qui Parle • Swift • Yellow Medicine	• **East Central** • Chisago • Isanti • Kanabec • Mille Lacs • Pine • **Central** • Benton • Sherburne • Stearns • Wright	• Cottonwood • Jackson • Lincoln • Lyon • Murray • Nobles • Pipestone • Redwood • Rock	• Blue Earth • Brown • Faribault • Le Sueur • Martin • Nicollet • Sibley • Waseca • Watonwan	• Dodge • Fillmore • Freeborn • Goodhue • Houston • Mower • Olmsted • Rice • Steele • Wabasha • Winona	• Anoka • Carver • Dakota • Hennepin • Ramsey • Scott • Washington

Source: Minnesota Department of Employment and Economic Development

Figure 3: Minnesota Economic Development Regions

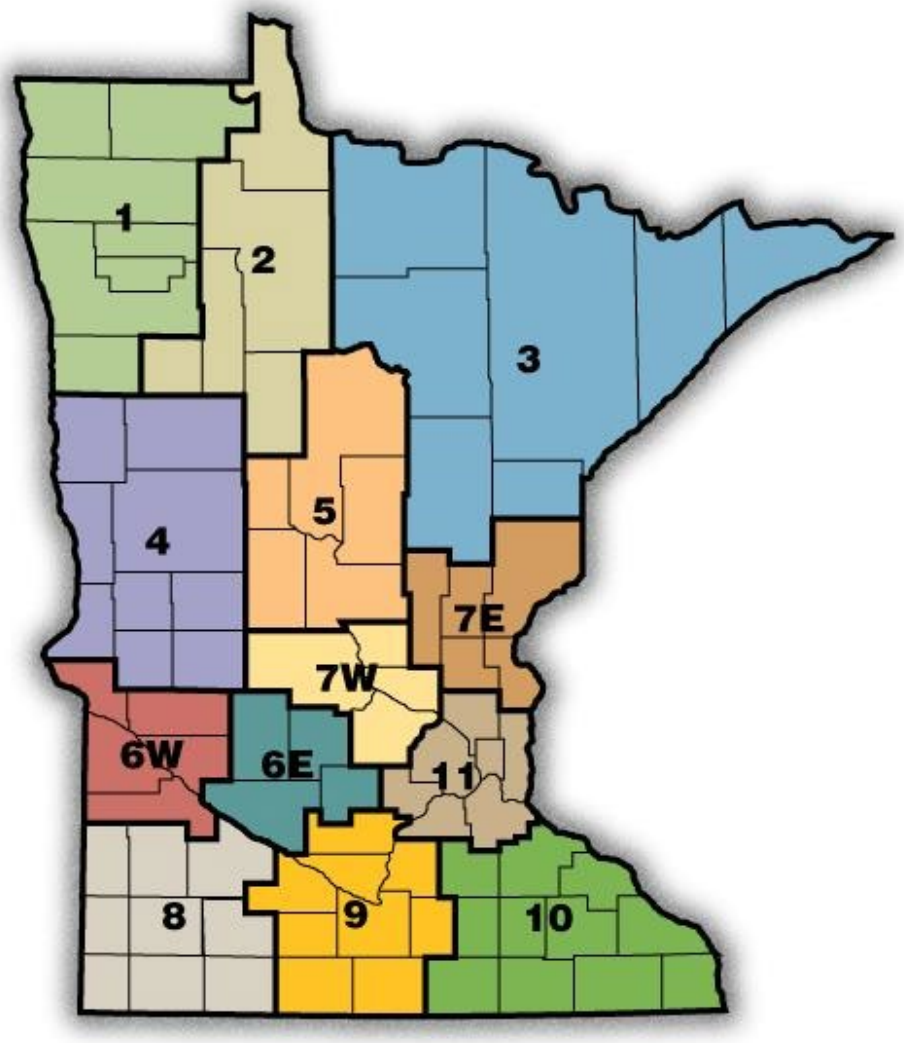
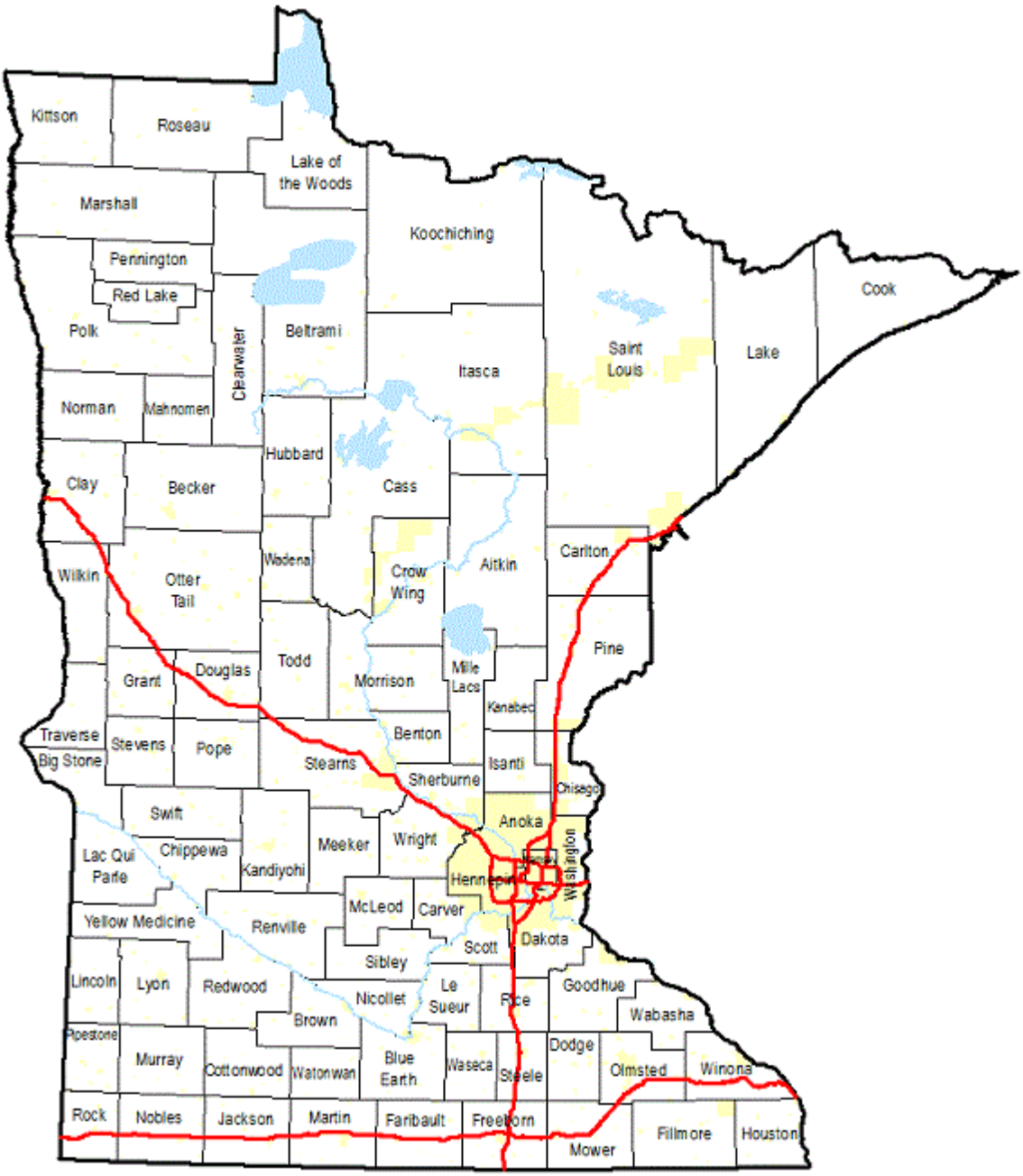


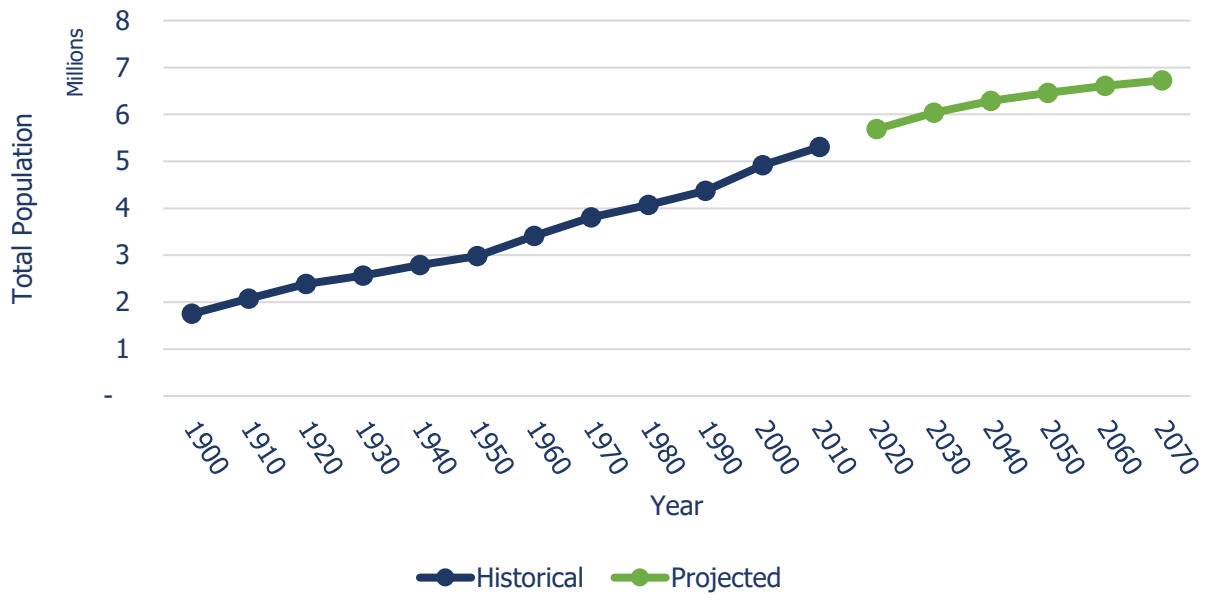
Figure 4: Minnesota Counties



Key Findings

Statewide Population Growth

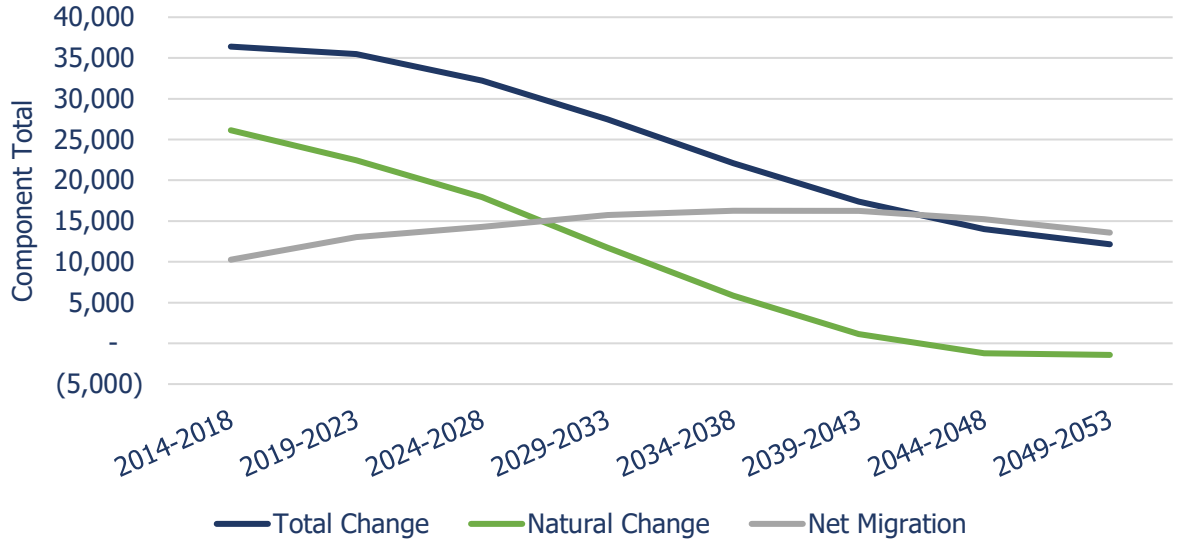
Figure 5: Minnesota population 1900 to 2010 and projected 2010 to 2070



Source: U.S. Census Bureau; Minnesota State Demographic Center

Between 2010 and 2018, Minnesota added 307,254 new residents, accounting for more than 35 percent of the total growth of Division 4 (***Table 2***). Though Missouri currently has the largest population in this division, its share has been declining in recent years, while Minnesota's share has been increasing. In line with this trend, the results of this analysis anticipate Minnesotans outnumbering Missourians by 2040. Statewide, Minnesota is anticipated to gain 1.1 million new residents between 2018 and 2070 (***Figure 5***)—compared to 1.2 million in our previous set of projections. This slower rate of growth can be most generally attributed to changing assumptions for the impact of the various components of change—most importantly, declining rates of international migration.

Figure 6: Average annual components of population change 2014-2018 and projected 2019-2053



Source: U.S. Census Bureau, Population Estimates Program, Vintage 2017; Minnesota State Demographic Center

Like most developed countries, fertility in the United States has fallen in recent decades. In 1960, the average American woman was expected to have 3.6 births in her lifetime. In 2017, the number was 1.8 births per woman nationwide and 1.9 births per woman in Minnesota. Sustained over a long time, and without factoring in migration, any fertility below 2.1 births per woman will eventually lead to population decline.

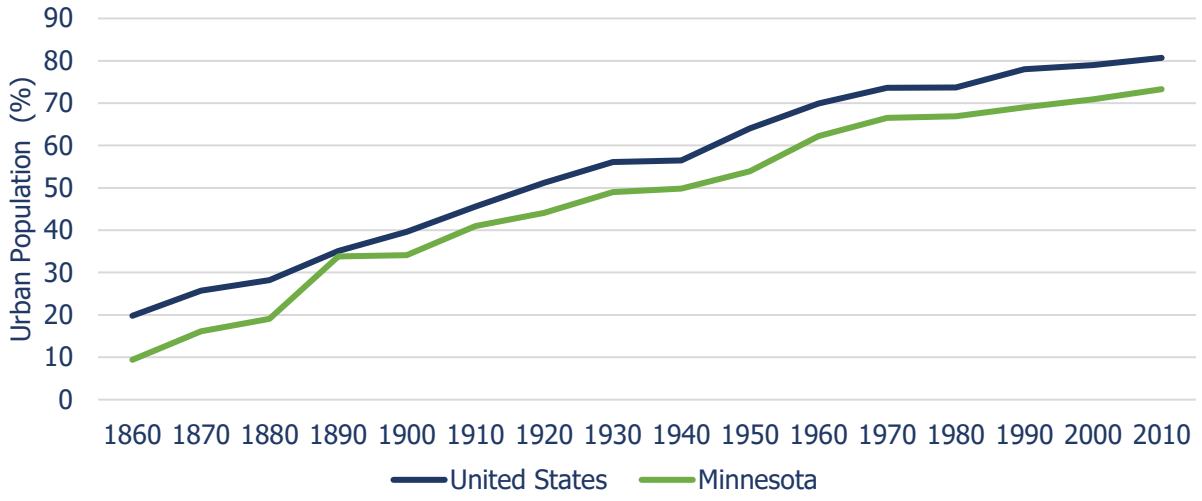
Currently, Minnesota has around 70,000 births and 41,000 deaths each year. On average in the last seven years, our net natural change—calculated by subtracting deaths from births—is around 29,000 new individuals per year. Though births are projected to remain relatively constant throughout this series, as our population ages, increasing numbers of deaths will push Minnesota to a state of natural decrease—where deaths outnumber births—around 2040 (***Figure 6***).

Cumulatively between 2010 and 2018, Minnesota has attracted 107,830 international migrants and lost 26,159 residents to other states for a net migration figure of 81,671. Due to more recent trends of net in-migration of residents from other states, this dataset anticipates a small but steady increase in net migrants. As discussed in a previous section of this paper (***Table 2***), Minnesota's population growth has historically relied heavily on high rates of international migrants. Should our assumed rate of migration decrease further, our overall statewide change could begin to decline.

Urbanization

Minnesota and the United States have seen a centuries-long trend toward greater urbanization (***Figure 7***). Families left farms for opportunities in cities and factories during the industrial revolution of the late 19th- and early 20th-centuries. The 1920 census was the first to record more Americans living in the city than in the country. The pace of urbanization did not let up as new immigrant communities joined native-born people seeking education, economic opportunities, and amenities in American cities. By the 2010 census, more than 80 percent of residents lived in an urban area[1]. This trend continues today. In fact, rural counties nationwide experienced net population loss between 2010 and 2016 while the number of urban residents continued to grow (United States Department of Agriculture, 2018).

Figure 7: Urban population as percent of total population in United States and Minnesota, 1860 to 2010



Source: U.S. Census Bureau, Decennial Census

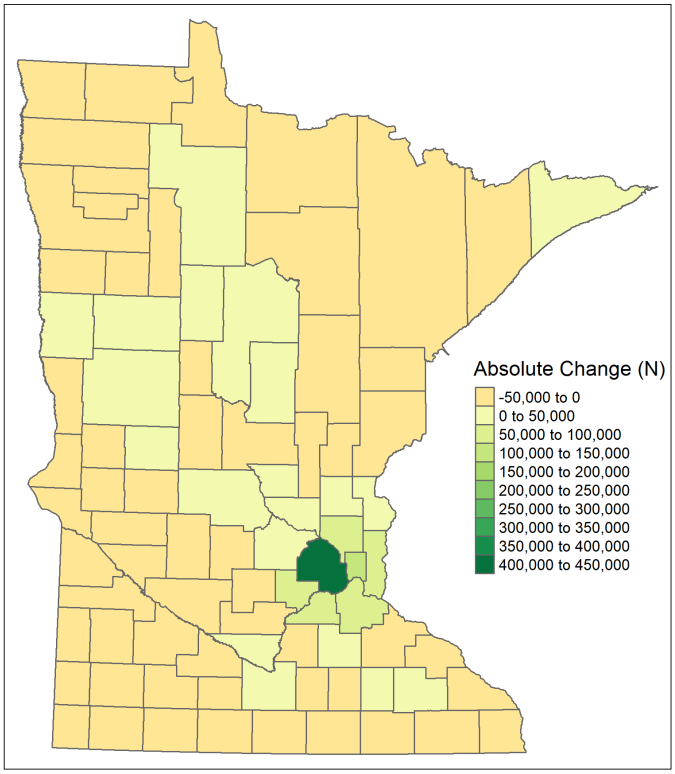
Although Minnesota prides itself as an agricultural state, it has not escaped these population trends, and urbanization will continue in the coming decades. Overall, Minnesota is projected to gain nearly 900,000 residents between 2018 and 2053. However, this population growth is not evenly distributed across the

[1] In Minnesota, the seven-county Twin Cities metropolitan region is commonly considered the "urban" part of the state while Greater Minnesota (including the 80 other counties) is considered "rural." These colloquial definitions differ from the way the U.S. Census Bureau uses these terms. The Census Bureau uses the term "urbanized area" to describe any area with a population greater than or equal to 50,000, and the term "urban cluster" to describe any incorporated place outside of an urbanized area that has at least 2,500 residents (Ratcliffe, Burd, Holder, & Fields, 2016). All other places are deemed "rural." Under this definition, some parts of Greater Minnesota are considered "urban."

state. The seven-county metro region is projected to gain about 924,000 residents, while Greater Minnesota[2] will shrink by approximately 27,000 residents during this time.

More than two-thirds of Minnesota's 87 counties are projected to decline in population[3] (***Figure 8***). The five counties with the largest declines in population by 2053 are Saint Louis (-28,238), Winona (-8,960), McLeod (-8,425), Freeborn (-7,078), and Martin (-6,541). Most shrinking counties are clustered in six Economic Development Regions (EDRs). The Arrowhead region (EDR 3) in the Northeast corner of the state will experience the greatest loss at -48,642 residents. It is followed by EDR 6 in central Minnesota (-39,865), EDR 8 in the southwest (-28,955), EDR 9 in the south central (-20,349), EDR 1 in the northwest (-14,701), and EDR 5 in the north central (-7,861). Combined, these Economic Development Regions are projected to lose over 160,000 residents by 2053.

Figure 8: Absolute population change by county, 2018 to 2053



[2] Greater Minnesota includes the 80 counties outside of the 7-county metro and includes a number of growing metro areas.

[3] This analysis uses the concepts of both absolute and relative change to determine both the shape and scale of demographic change for many different geographies. Absolute change refers to the simple difference in population over two periods of time. Relative change expresses the absolute change as a percentage of the population in the earlier point in time.

The seven metropolitan counties comprise the seven fastest growing counties in the state. Hennepin County is projected to maintain its ranking as the most populated county in 2053, with an increase of 414,458 residents. Next is Ramsey County (+149,141), followed by the Counties of Dakota (+82,690), Scott (+77,448), Anoka (+72,199), Washington (+71,314), and Carver (+56,876).

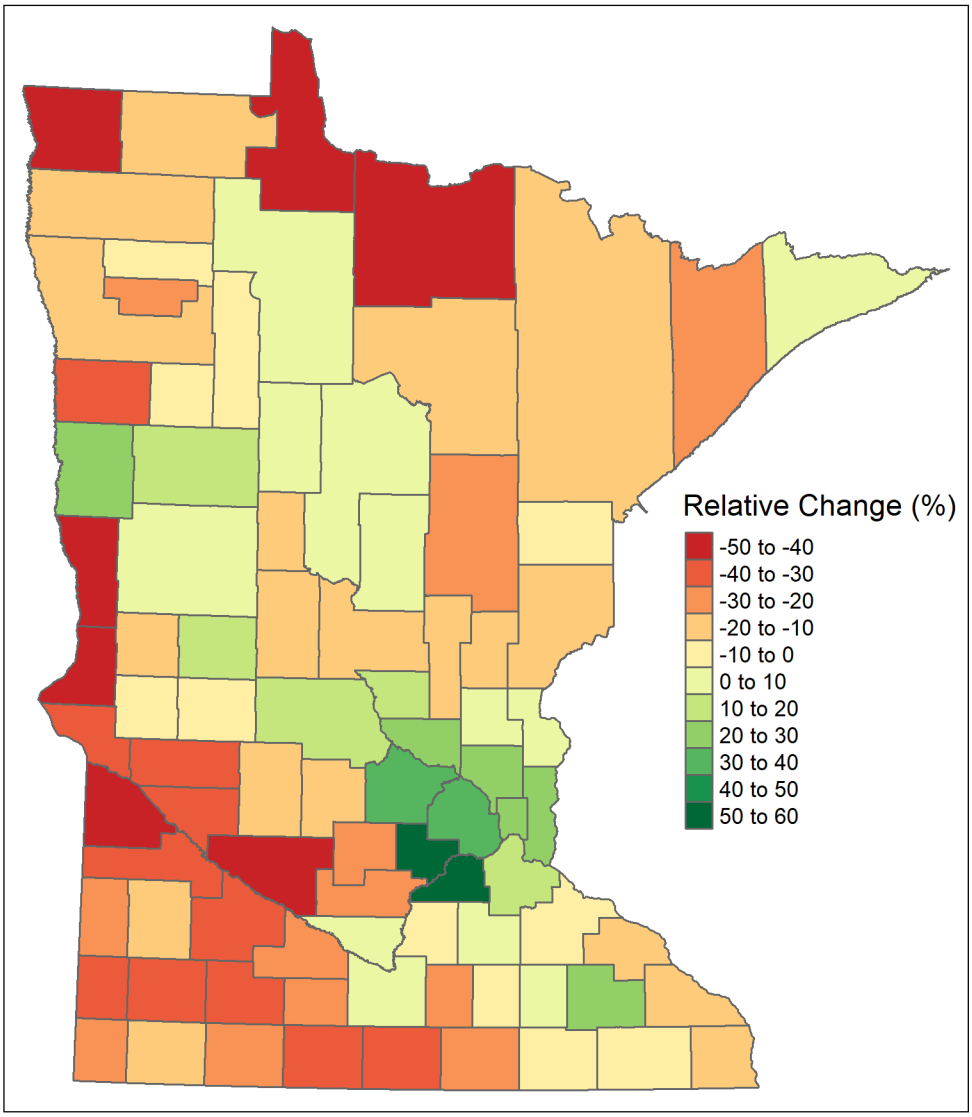
Some counties outside the metropolitan area will also see population increases. Specifically, the counties along the Interstate 94 corridor toward the Fargo-Moorhead metropolitan area (Wright, Sherburne, Stearns, Benton, Douglas, Otter Tail, Becker, and Clay Counties) will all grow. Additionally, the counties near Mankato (Nicollet and Blue Earth Counties) and Rochester (Olmsted and Dodge Counties) will increase, possibly due to educational and economic opportunities in those areas. Several other counties in the vicinity of the Twin Cities metro (Rice, Isanti, Chisago Counties) will also increase. Finally, several counties that are rich in natural amenities—like lakes—are projected to grow, including those between Brainerd and Bemidji (Beltrami, Hubbard, Cass, and Crow Wing Counties) and one along the north shore of Lake Superior (Clay County).

When discussing population change over time it is important to consider the magnitude of this change relative to the current population size. Relative change is a crude way to assess how the absolute change in population will "feel" to the current residents and institutions of that county. For instance, adding 100 students to a school with 200 students (50 percent increase) will cause a greater strain on that school's staff and resources than if these same students were added to a school with 1,000 students (10 percent increase). Similarly, removing 1,000 residents from a community of 3,000 (33 percent decrease) will mean a greater hit to the customer base of local businesses than removing the same number from a community of 30,000 (3 percent decrease).

The map in ***Figure 9*** shows relative population change by county/EDR in Minnesota. Although Hennepin and Ramsey Counties will add the greatest number of residents in the coming decades, these counties will only grow approximately 30 percent over current population through 2053. By contrast, Carver and Scott Counties in the southwest metro are each projected to grow by over 50 percent. The other counties in the metro region will also see considerable growth (27.5 percent in Washington County, 20.4 percent in Anoka County, 19.4 percent in Dakota County).

Outside the seven-county metro region, the adjacent Wright and Sherburne Counties will both grow by nearly 30 percent. Olmsted County (containing Rochester) and Clay County (containing Moorhead) will grow by 24.2 percent and 28.7 percent respectively. The other counties that will experience double digit growth fall along the Interstate 94 corridor: Stearns (17.4 percent), Becker (13.9 percent), Douglas (13.4 percent), and Benton (12.7 percent) Counties. Twelve other counties in Greater Minnesota are anticipated to grow less than 10 percent over current population by 2053.

Figure 9: Relative population change by county, 2018 to 2053

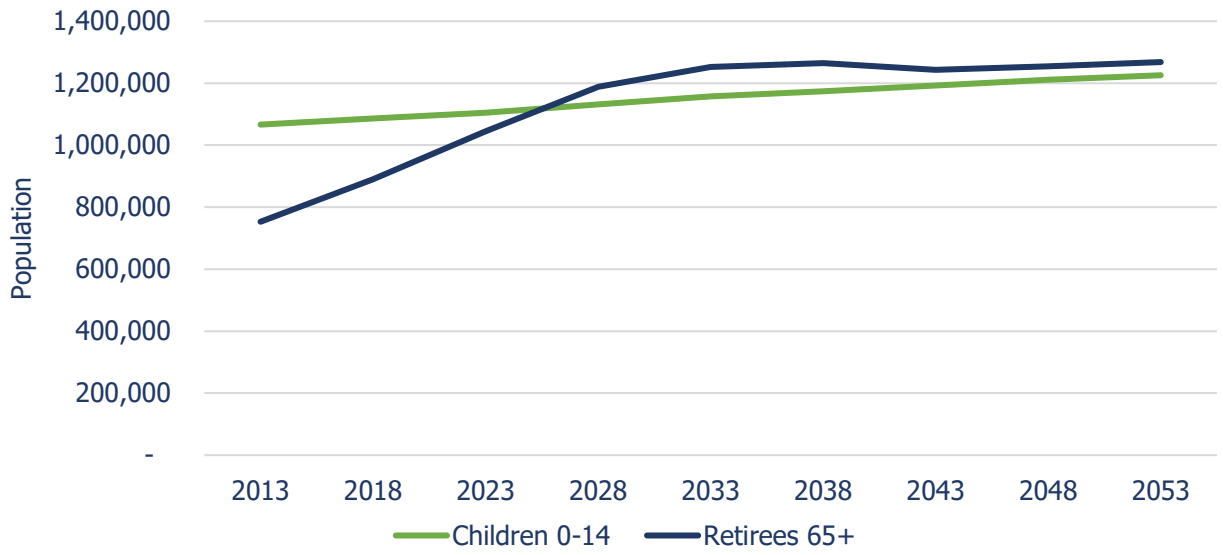


Of the 60 Minnesota counties that will decline in population in coming decades, 13 are projected to lose more than one-third of current residents. Counties with the largest relative declines include Lake of the Woods (-49.1 percent), Kittson (-42.3 percent), and Koochiching (-41.2 percent) Counties in the far north; Lac qui Parle (-46.7 percent), Traverse (-44.9 percent), and Wilkin (-40.5 percent) Counties in the far west; and Renville County (-43.5 percent) in south central Minnesota. Most of these counties have fewer than 10,000 residents today, so even small (in absolute terms) changes in population can produce large relative decreases.

Aging

Longer life spans and fewer births are two demographic forces that have reshaped populations of modern developed countries like the United States during the last century. As more Americans live to old age and fewer babies are born, the population on average becomes older. Continuing this trend, Minnesota's population will continue to grow older over the next several decades.

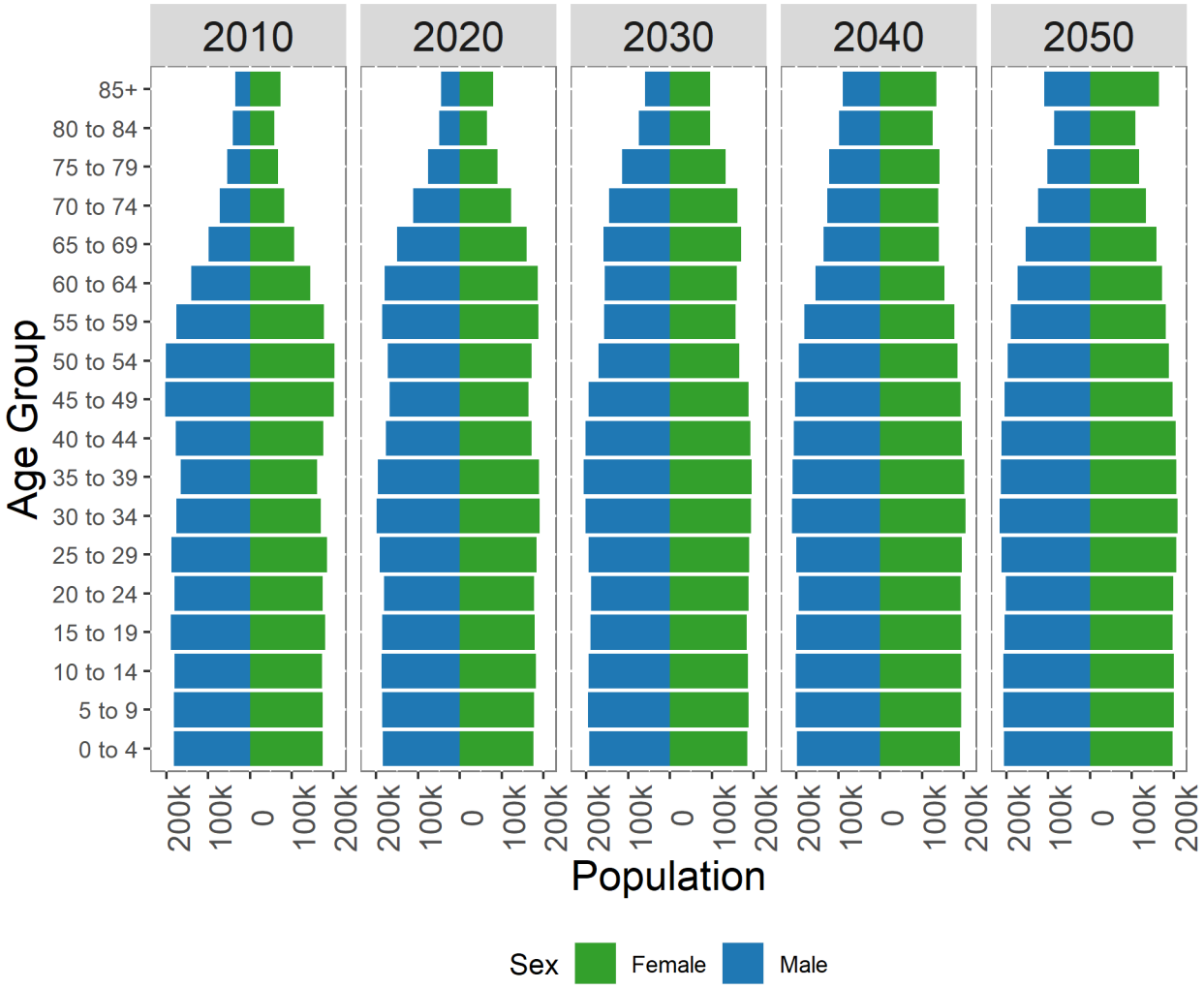
Figure 10: Minnesota's dependent populations, 2013 to 2053



Source: U.S. Census Bureau, Population Estimates Program, Vintage 2018; Minnesota State Demographic Center

Children aged 0 to 14 in this projection are ultimately determined by the number of women of childbearing age (15-44) predicted in any given year. This is known as the Child-Woman Ratio (CWR), discussed in the Cohort Change Ratios portion of the Methods section. Statewide the CWR does narrowly fluctuate. But, at any given year in this dataset there are around three women for every child in Minnesota. Both the number of children and the number of women of childbearing age are predicted to increase through 2053. In fact, nearly all age cohorts—other than 55 to 59 and 60 to 64—are projected to increase between 2018 and 2053.

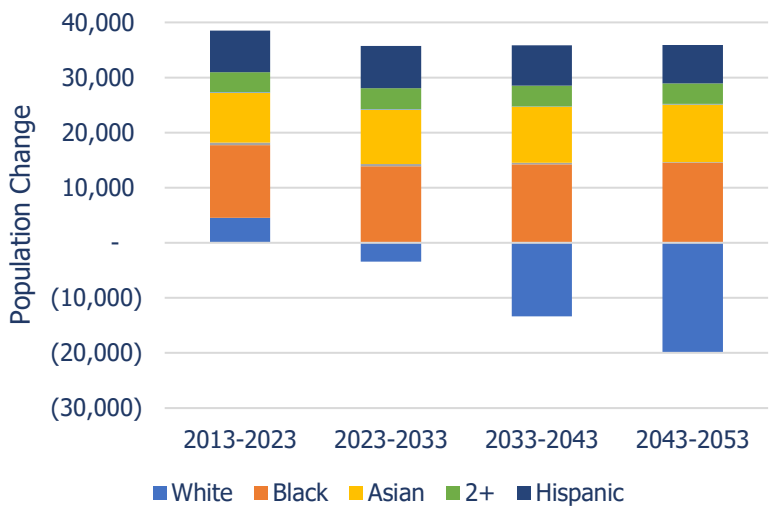
Figure 11: Population pyramids for Minnesota, 2010 to 2050



Minnesota's oldest residents—those aged 85 and above—are expected to more than double in the next 35 years—from the current 120,000 to over 270,000 (***Figure 11***). Due to a longer life expectancy (Oeppen & Vaupel, 2002), females are likely to outnumber males by more than 50 percent in 2053. In just the next decade, children aged 0 to 14 will be outnumbered by retirees aged 65 and above for the first time in Minnesota's history (***Figure 10***). This milestone will cause government expenditures to continue the shift away from education and toward healthcare and other support services for an aging population (Gillaspy & McMurry, 2011). In total, Minnesotans of retirement age and above numbered 889,511 in 2018—an increase of 136,492 in the short half-decade since 2013. This number is expected to roll over 1.26 million in the next 20 years.

Racial and Ethnic Diversification

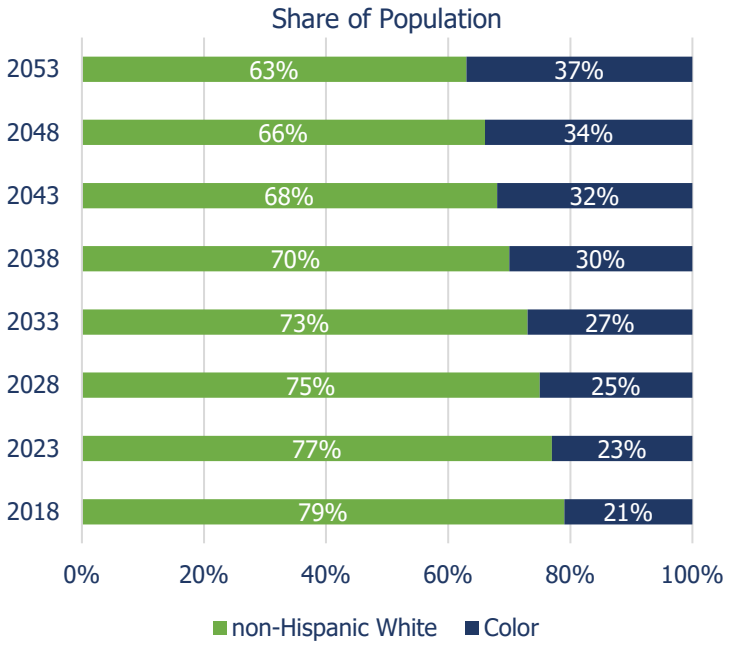
Figure 12: Average annual projected population change per decade, by race



The youngest generation of Americans is already the most racially and ethnically diverse yet (Fry & Parker, 2018). Even with the diminished flow of immigrants into the U.S. (Pew Research Center, 2015), the racial and ethnic diversity of Minnesota is expected to increase in future years. Today's 6- to 21-year-olds are projected to become majority non-White in 2026 (when they will be ages 14 to 29), according to Census Bureau projections.

While Minnesota's total population is currently 79 percent non-Hispanic White, the racial and ethnic make-up of our population is changing rapidly (***Figure 12***). Between 2013 and 2018, the non-Hispanic White population grew by less than one percent, while minority populations grew by 18 percent—adding more than 167,000 people in just five years. These projections indicate that statewide, Minnesota's non-Hispanic White population will begin declining within the next decade. Conversely, populations of Color are expected to swell by more than one million residents between 2018 and 2053—exceeding one-third of the total population (***Figure 13***). **Virtually all of the net population growth in the coming decades will be from populations of Color.**

Figure 13: Share of the population among non-Hispanic Whites and populations of Color in Minnesota, 2018 to 2053



Race projections were not possible for every individual county. This is because many counties do not have enough people of Color to make precise projections. Instead, racial composition projections were made for all 11 Economic

Development Regions (EDRs). Counties where the population of Color was large enough to determine reliable trends were Anoka, Beltrami, Carver, Dakota, Hennepin, Nobles, Olmsted, Ramsey, Scott, Saint Louis, and Washington. The following maps combine county and EDR-level data. In EDRs where only one county was large enough for an independent projection, the projection for the rest of the EDR is equal to the total EDR projection minus the independent county.

This dataset contains projections for people of Hispanic or Latin(x) heritage separately. Then, for all people who do not identify as Hispanic or Latin(x), separate projections are made by racial group, including White alone, Black or African American alone, American Indian or Alaska Native alone, Asian alone, Native Hawaiian and other Pacific Islander alone, and those who identify as some other race or two or more races. Below, we discuss regional variation in the population changes of Minnesota's four largest racial and ethnic groups: residents who identify as White, Black, Asian, and Hispanic or Latin(x). For brevity, we use the term "White" to refer to people who identify solely as White alone and not Hispanic or Latin(x). The same applies for Black or African American alone and not Hispanic or Latin(x) and also Asian alone and not Hispanic or Latin(x).

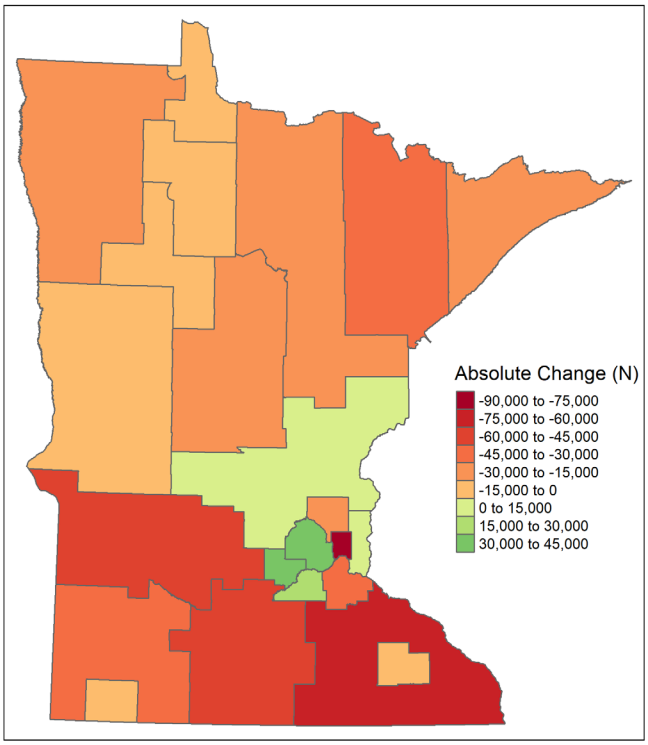
White Population

Statewide, the White population is projected to decline by nearly 350,000 (-8 percent) between 2018 and 2053. The map in ***Figure 7*** shows how the size of the White population is changing in different counties or regions. In the metropolitan area, the number of White residents will increase somewhat in Hennepin, Carver, Scott, and Washington Counties. The number of White residents will decrease in Ramsey, Anoka, and Dakota Counties. Combined, the seven metropolitan counties will lose over 30,000 White residents. This means that more than 90 percent of the statewide decline in White residents by 2053 will occur in Greater Minnesota.

Economic Development Region 7 (north of the Twin Cities metro) is the only region in Greater Minnesota that will experience an increase in the White population in coming decades. By contrast, EDR 10 in southeastern Minnesota (not including Olmsted County) will lose over 60 thousand White residents. EDRs 6 (west central) and EDR 9 (south central) will lose 53,610 and 45,466 White residents respectively. All other regions and counties in Minnesota will also see declines in the White population.

Despite these decreases in the White population across the state, White residents will continue to be the majority race group in Minnesota by 2053. In the seven-county metro region, White residents will constitute 55 percent of the total population. In Greater Minnesota, more than 75 percent of the population will still identify as White. There are only two counties where White residents are projected to become a minority by 2053: Ramsey (37 percent) and Nobles (21 percent).

Figure 8: Absolute change in White population by county or EDR, 2018 to 2053



Considering that White residents are the majority race group in Greater Minnesota, and that Greater Minnesota's population will decline in coming decades, it is not surprising that the number of White residents in these areas is projected to decrease. This factor alone does not mean that racial or ethnic diversity will increase, unless populations of Color in these areas are growing (or simply not declining as quickly as the White population) during the same time.

The map in ***Figure 9*** shows the relative change in White residents as a share of the population in each region or county. Here, the actual number of White residents in an area is related to the proportion of the total population that identifies as White. For instance, if White residents constituted 90 percent of the population in 2018 and 60 percent of the population in 2053, that would correspond to a 33 percent decrease. It is important to consider the relative change in racial composition along with the absolute change in population size because it shows how the racial and ethnic makeup of these areas is changing, even as the total population sizes may be growing or shrinking.

Figure 10: Relative change in White population by county or EDR, 2018 to 2053

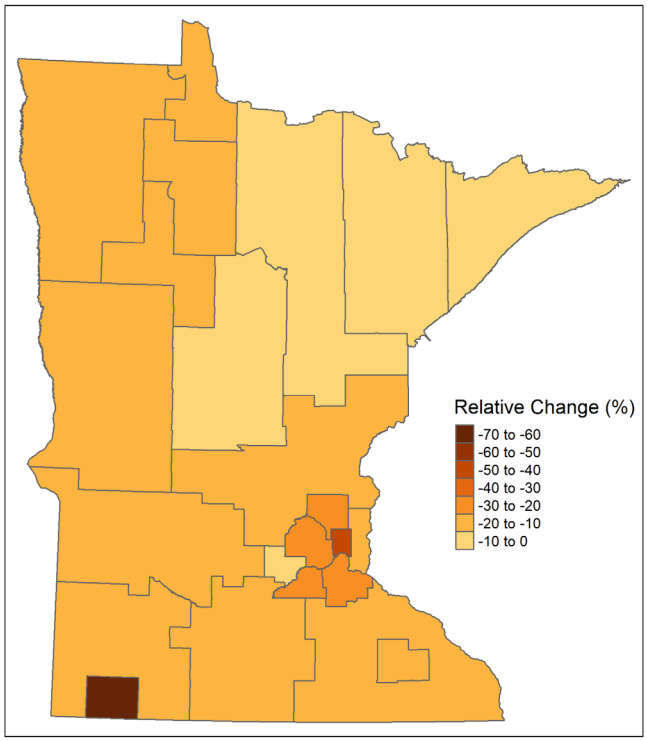


Figure 11 shows that in every part of the state White residents will make up a smaller share of the population in 2053 than they currently do. In other words, communities of Color will increase their presence in every corner of Minnesota in the coming decades. This is true even in areas where the number of White residents is projected to increase. For example, the White population in Hennepin County is expected to grow 43,898 (from 864,551 to 908,449) between 2018 and 2053. During the same time, the population of people of Color will grow by 370,560 (from 394,877 to 765,437). As a result, the share of Hennepin County residents who are White will fall from 69 percent to 54 percent (a 21 percent decrease). Typically, the share of White residents will fall 20 to 30 percent in the Twin Cities metro region and 10 to 20 percent in Greater Minnesota.

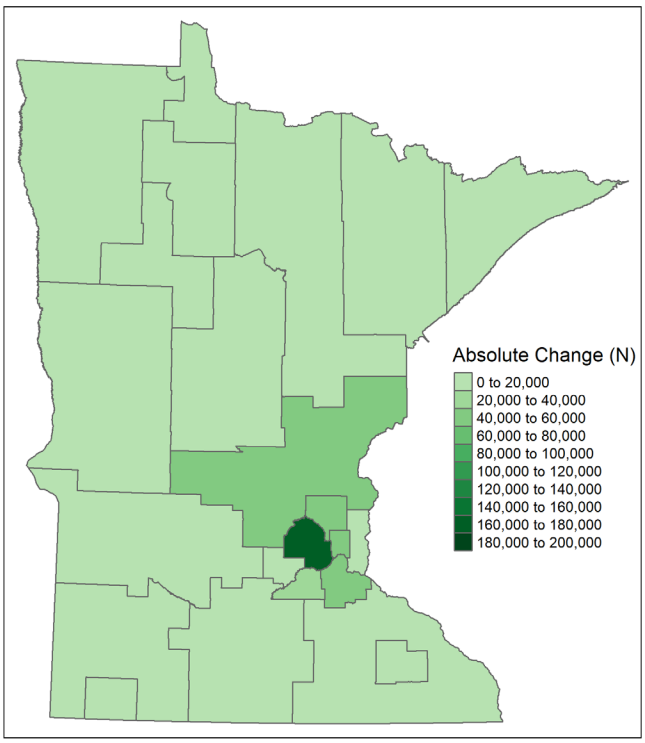
Nobles County in southern Minnesota is a unique case. By 2053, the number of White residents in this county will decline 8,700 (from 12,761 to 4,061). During the same time, the population of people of Color will grow by 6,200 (from 9,163 to 15,363). This will cause the White population to decrease as a share of the population from 58 percent to 21 percent (a 64 percent decline).

Black or African American Population

The number of non-Hispanic Black Minnesotans is projected to increase by nearly half a million by 2053, which will more than double the current population size. Black Minnesotans will increase in every part of the state, though these increases will not be evenly spread. The map in ***Figure 12*** shows that most of

this increase will be concentrated in the Twin Cities metropolitan region. In fact, three out of every four new Black Minnesotans by 2053 will live in one of the seven metro counties. Among these, Hennepin County will experience the largest share of that increase. Hennepin County's Black population will grow from 167,695 to 342,904 by 2053, accounting for more than one-third of the state's new Black residents over these decades. Anoka, Dakota, and Ramsey Counties will each see an approximate 50 thousand person increase in their Black population. Scott and Washington Counties' Black population will grow by approximately 20 thousand. Carver County will experience the smallest increase of Black residents in the metro region, adding fewer than seven thousand.

Figure 13: Absolute change in Black population by county or EDR, 2018 to 2053

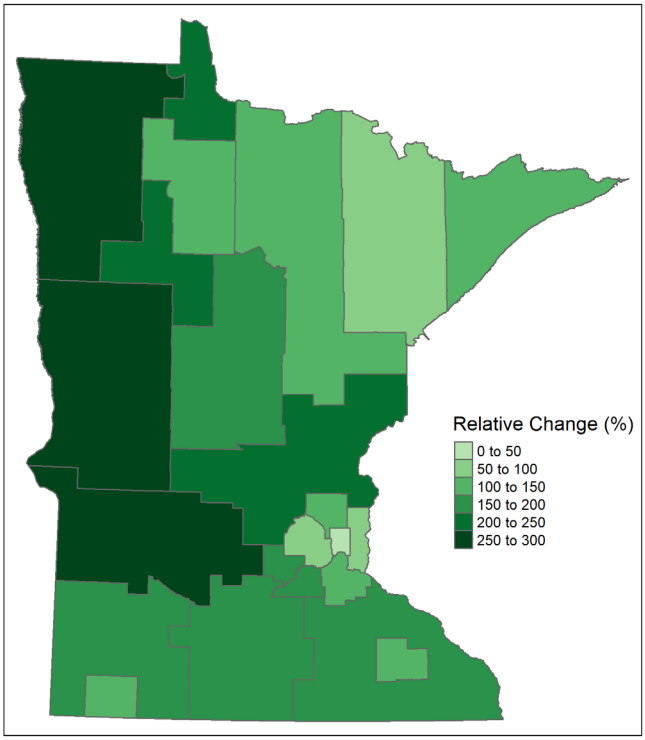


Economic Development Region 7, just north of the Twin Cities metro, will gain nearly 50 thousand Black residents by 2053, which is the largest increase in Greater Minnesota. The projections for all other counties and regions indicate growth under 20,000. The smallest growth will occur in EDR 2 in northern Minnesota, which is projected to gain fewer than one thousand Black residents.

Black residents will continue to be a minority population across Minnesota despite these increases. In 2053, 13 percent of the state's population (7 percent in Greater Minnesota, 17 percent in the metro) is projected to identify as Black.

Even though the absolute increases in the Black population in Greater Minnesota counties or regions are small, these can equal large increases in the relative share of Black residents among the total population of these areas. For instance, EDR 1 in the northwest corner is projected to gain only 2,399 Black residents through 2053. However, this modest increase represents a tripling of the local Black population. This growth, combined with declines among White residents, will result in the Black population in EDR 1 growing from 1.4 percent of the population in 2018 to 5.1 percent of the population by 2053—a 260 percent relative increase. Similar dynamics are occurring in EDRs 2 and 6 along Minnesota's western border.

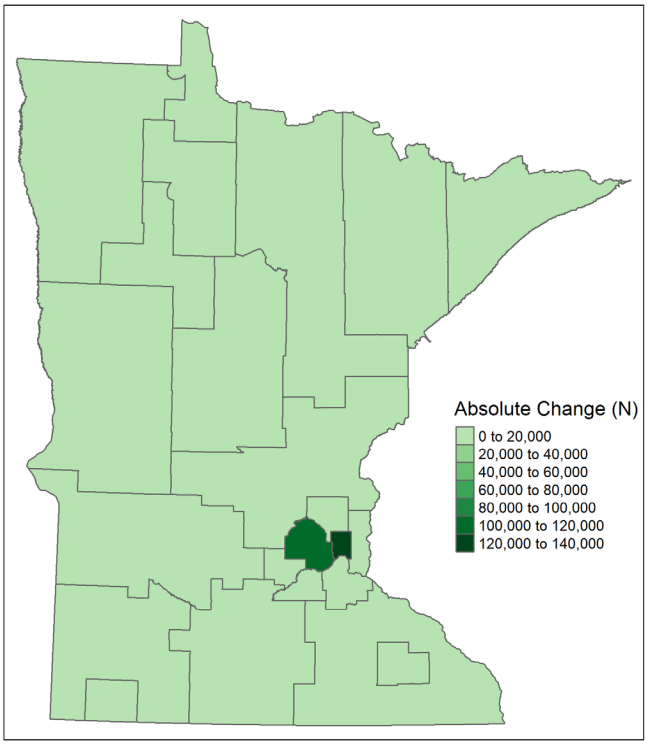
Figure 14: Relative change in Non-Hispanic Black population by county/EDR, 2018 to 2053



By contrast, the large absolute increases of Black residents in the Twin Cities metro do not yield as dramatic alterations in the race/ethnic composition of these local communities. Black residents in Hennepin County are projected to grow from 13 percent of the population in 2018 to 20 percent in 2053—a 54 percent relative increase.

Asian Population

Figure 15: Absolute change in Asian population by county or EDR, 2018 to 2053



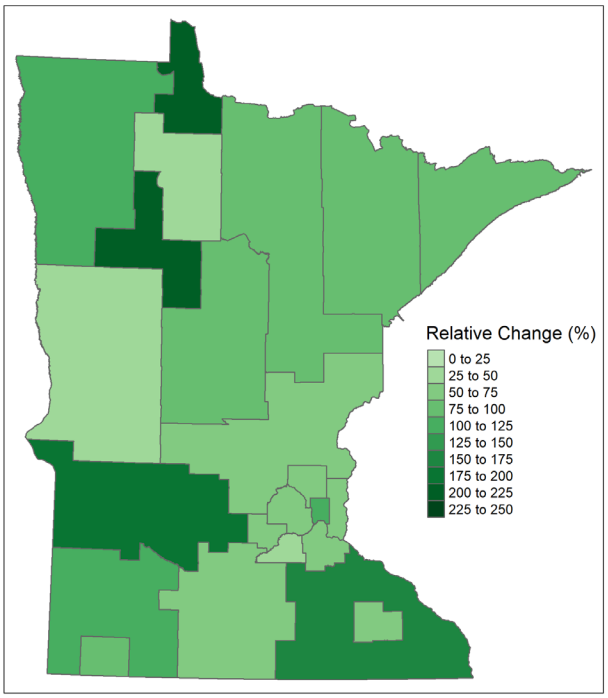
The number of Asian Minnesotans is projected to increase by approximately 350,000 by 2053, which will more than double the size of this population over current levels. Nearly 90 percent of all new Asian Minnesotans in the coming decades will reside in the seven county metro region, with fully 70 percent making their homes in Hennepin and Ramsey Counties. Ramsey County will see the single largest increase in size of the Asian population, growing from 83,399 to 212,967. Hennepin County will see a similar increase from 94,088 to 212,538.

This concentration of Asian residents in Hennepin and Ramsey counties continues historical trends involving the Hmong people (Minnesota Historical Society, 2019). The Hmong are a distinct ethnic group whose members can trace their heritage to ancient China, though in the 19th century many migrated to the area of modern-day Laos, Thailand, Myanmar, and Viet Nam. During the 1960s and early 1970s, many Hmong soldiers partnered with the United States to combat communism. After American troops withdrew from Viet Nam, thousands of Hmong became refugees who were persecuted by the ruling communist government. The first Hmong family arrived in Minnesota in 1975. Today, approximately 66,000 Hmong people live in the state, and the Twin Cities metro contains the largest Hmong population in the country. However, other Asian groups besides the Hmong will also contribute to the increase of Asian residents in coming decades. The other counties in the metro region will each experience more modest increases, ranging from 5,021 in Carver County to 18,615 in Dakota County.

In Greater Minnesota, the Asian population is not projected to increase by more than 20 thousand in any single county or region. The largest increases will occur in the southeast corner of the state, including nearly 10 thousand in Olmsted County and another nine thousand in the rest of the surrounding region. The region north of the Twin Cities metro (EDR 7) is projected to gain 6,985 Asian residents. Every other part of the state will see increases that fall below two thousand people.

In 2053, Asian residents will make up approximately 10 percent of Minnesota's population. Despite large relative gains in some parts of Greater Minnesota, they will only constitute three percent of the non-metro population. In the seven county metro region, Asian residents will represent 14 percent of the population. The map in Figure 15 shows the relative increase in the Asian population as a share of the total population in Minnesota's various counties and regions.

Figure 19: Relative change in Asian population by county and EDR, 2018 to 2053



Currently, Asian Minnesotans constitute 15 percent of the population in Ramsey County, which is the highest concentration of any part of the state. By 2053, growth in the Asian community combined with decreases among White residents will result in growth to over 30 percent of Ramsey County's residents—a doubling over the current level. In fact, by 2053, there will be nearly as many Asian residents as White residents in Ramsey County (212,967 and 256,750 respectively). Even though Hennepin County will gain approximately the same number of Asian residents as Ramsey County during this time period, the Asian population in Hennepin County will only increase from seven percent of the population in 2018 to 13 percent in 2053. The smaller relative gain in Hennepin County is due to the larger total population size and higher growth rates of other race groups. The Asian population will

increase by approximately half as a share of the total population in the other metropolitan counties. Asian residents will constitute approximately 10 percent of the population in Anoka, Dakota, Scott, and Washington Counties and approximately five percent of the population in Carver County by 2053.

Even though the number of Asian residents added to communities in Greater Minnesota will be somewhat small, these modest increases combined with declining White populations can produce large relative increases in Asian residents as a share of the local population. For example, EDR 6 in west central Minnesota is expected to gain only 1,361 Asian residents through 2053. However, this will be enough to triple the relative size of the local Asian population from 0.7 percent to 2.1 percent. Similarly, Clearwater, Hubbard, Lake of the Woods, and Mahnomen Counties in northern Minnesota (which make up most of EDR 2, minus Beltrami County) will gain fewer than 500 Asian residents between them. This will triple the relative share of the Asian population in these counties from 0.6 percent to 1.8 percent.

Hispanic or Latin(x) Population of Any Race

Minnesota is projected to add a quarter million Hispanic or Latin(x) residents by 2053, representing an 83 percent increase over the current number. The map in ***Figure 20*** shows the distribution of these population increases in different counties and regions. Compared to residents who identify as Black or Asian, new Hispanic or Latin(x) residents will disperse somewhat more evenly across the state. Approximately two-thirds of new Hispanic or Latin(x) residents will reside in the Twin Cities metro, while one-third will live in Greater Minnesota.

In the metropolitan region, Hennepin County will gain approximately 47 thousand Hispanic or Latin(x) residents—the largest increase in the state. Dakota County will gain approximately 35 thousand Hispanic or Latin(x) residents, while Anoka and Ramsey Counties will each gain around 25 thousand. Scott and Washington Counties can expect to add roughly 15 thousand new Hispanic or Latin(x) residents by 2053. Carver County will see the smallest growth in Hispanic or Latin(x) population (+4,404) among the metropolitan counties.

Figure 20: Absolute change in Hispanic or Latin(x) population by county or EDR, 2018 to 2053

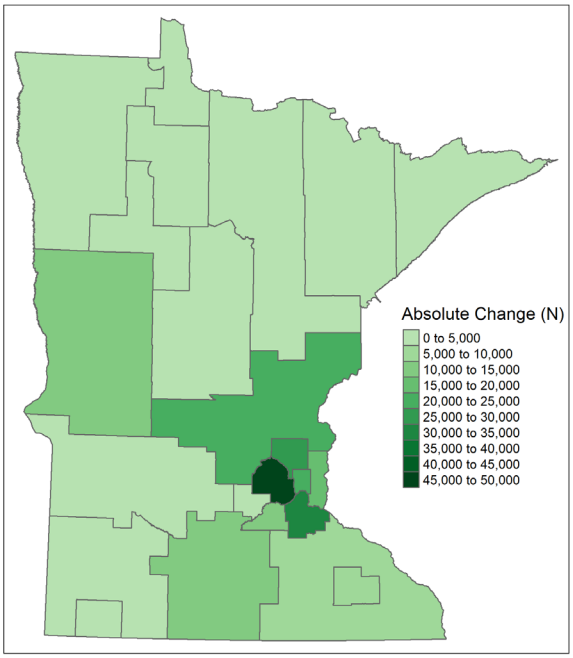
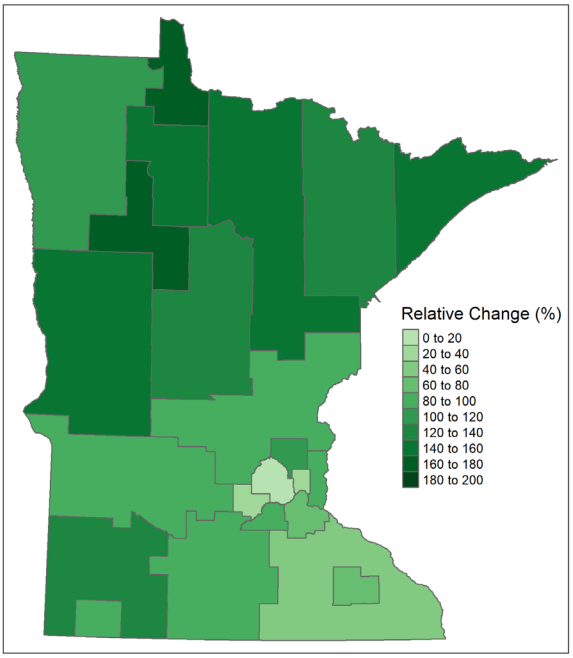


Figure 21: Relative change in Hispanic or Latin(x) population by county or EDR, 2018 to 2053



In Greater Minnesota, EDR 7 north of the metro is projected to gain over 21,000 Hispanic or Latin(x) residents. EDRs 4 and 9 along the western and southern borders respectively are each set to gain approximately 12 thousand Hispanic or Latin(x) residents. In all other parts of the state, the increases in

Hispanic or Latin(x) population will fall below 10 thousand, though it will not be fewer than two thousand in any region.

Summary

All populations are shaped by three fundamental forces: births, deaths, and migration. The combination of these forces will cause Minnesota's population to increase by over one million residents between 2018 and 2070. At the same time, the composition of the state's population will continue to change, following trends of urbanization, aging, and racial and ethnic diversification that have been at work for generations.

Nearly all of the growth in Minnesota in coming decades will occur in the seven counties that make up the Twin Cities metropolitan area. Greater Minnesota is projected to experience a net population loss during this time. However, there are pockets of Greater Minnesota that will see some increase, particularly in areas with high-infrastructure (e.g., along the Interstate 94 corridor and near Rochester's Medical Destination Center) and in some areas known for outdoor recreation, such as the Brainerd Lakes region and along the north shore of Lake Superior. Metropolitan regions across the state will have need to orient toward that growth, and toward the addition of in-migrants, while remote communities in Greater Minnesota can anticipate the continuation of population residents of these areas age.

The fastest growing age group in Minnesota over the coming decades will be those aged 65 and older. As more people live to an advanced age and fewer children are born, the age structure of the state will become increasingly top-heavy. Within the next decade, the number of retirees will be greater than the number of children aged 0 to 14 for the first time in Minnesota's history. An aging population presents both opportunities and challenges. Older Minnesotans will have more time to engage with and serve their families and communities than their own grandparents did, and the state can benefit from the collective wisdom and experience they have to offer. At the same time, if extended years of life are not matched with extended years of vitality, costs for end-of-life care and treatment could rise substantially. It will be important to take steps to protect the health and well-being of older Minnesotans.

The majority of Minnesota's residents identify as non-Hispanic White. This will continue to be true at least through the middle of this century. However, populations of Color are projected to grow in absolute and relative terms across the state while non-Hispanic White populations will decrease. Minnesota regularly ranks among the very best in overall measures of quality of life—low poverty rate, highly educated, high labor force participation—however our populations of Color (African American, Asian, and Hispanic or Latin(x)) and American Indian residents continue to experience poorer health and disproportionately higher rates of illness and death (Minnesota Department of Health, 2015).

Communities of Color are driving our state's population growth and, as such, addressing these disparities will become imperative for the prosperity and quality of life for all Minnesotans.

Future immigration patterns will undoubtedly have a significant impact on the racial and ethnic diversity in Minnesota. These comparisons reflect current assumptions of conservative rates of international immigration set by the U.S. Census Bureau (discussed in earlier sections). Further reductions in the rate or number of international migrants coming to Minnesota could cause a net loss of total population.

Data and Methods

Sources

Within the Population Estimates Program 2018 Vintage, July 1 estimates from 2010 through 2018 served as the empirical foundation for this analysis. The following data tables were incorporated:

I. PEP_2018_PEPANNRES
   - annual estimates of the resident population

II. PEP_2018_PEPSR6H
   - annual estimates of the resident population by sex, race, and Hispanic origin for the United States, States, and Counties

III. PEP_2018_PEPAGESEX
   - annual estimates of the resident population for selected age groups by sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipios

National projections (U.S. Census Bureau, 2017) were incorporated into the analysis as the original parent population beginning in 2018 and continuing through 2060.

I. V17_Table 1
   a. Projected population size and births, deaths, and migration

The continuation of the national population total from 2061 through 2070 is discussed in the Methods section of this paper.

Methods

The Minnesota State Demographic Center currently produces demographic projections datasets for various levels of geography. Various datasets include age, sex, and race. Age and sex data are included together, while race data are separate, and updates or revisions to any of these datasets means the totals will no longer align. This is problematic for data users and requires enough work to keep one researcher busy until data inputs are no longer valid.

Although there are many different methods by which historical values can be modeled, the strategy for this set of population projections was to develop a straightforward method that is consistent across all geographic and demographic characteristics. For example, the sum of the county total population equals the total state population, and the sum of a particular race group within the Economic Development Regions equals the total of that particular race group statewide.

This consistency is not generated automatically. The balancing equations for child geographies initially produce uncontrolled figures. Therefore, the final annual projections must be adjusted using a process called controlling—or raking. This formula is expressed as:

$$Rake = \left(\frac{Control\ Total}{\Sigma(Uncontrolled\ Values)}\right)$$

the output of which represents the final version of a projected value.

The methods used to create this series of Minnesota population projections rely on three different formulas. Cohort-component created the total population projection for Minnesota by five-year age cohort and sex. The shift-share method was used to establish (in order):

1. all total population projections
2. race projections for all EDRs and the counties of Anoka, Beltrami, Carver, Dakota, Hennepin, Nobles, Olmsted, Ramsey, Saint Louis, Scott, and Washington
    - White race alone, not Hispanic or Latin(x)
    - Black or African American race alone, not Hispanic or Latin(x)
    - American Indian or Alaska Native race alone, not Hispanic or Latin(x)
    - Asian race alone, not Hispanic or Latin(x)
    - Native Hawaiian and other Pacific Islander race alone, not Hispanic or Latin(x)
    - Two or more races, not Hispanic or Latin(x)
    - Hispanic or Latin(x) of any race or combination of races
3. projections by sex for all 87 counties

Cohort change ratios and child-woman ratios of the Hamilton-Perry Method created the projections by age and sex for all 87 counties. As mentioned previously, the raking method was applied to all values before final consideration. This ensures that, in a top-down approach to developing these projections, the “child” geographies consistently conform to the previously established control values of the “parent” geography.

Cohort-Component

The first of the three methods used to create these projections is the *cohort-component method*. This is an approach to demographic projections that accounts for age distribution in a given population. It consists of segmenting the population into different subgroups that may be differentially exposed to the natural components of change—births and deaths—by separately calculating the changes over time in each group (Preston, Hueveline, & Guilliot, 2001). This method is widely accepted among professional demographers.

A base population of July 1, 2018 was used because 2018 is the most recent year for which corresponding vital statistics are available from the Minnesota Department of Health. First, components of natural increase were calculated and applied as a projection. Next, for each subsequent year, the population of a given age group was advanced one year of age and the new age categories were updated using the projected survival rates for that year from the life tables created. A new birth cohort was then added to form the population under one year of age by applying the projected age-specific fertility rates to the average female population aged 15 to 44 years and updating the new cohort to the effects of mortality.

The assumptions for the components of change were based on a time-series analysis of historical trends. The next section provides details about the methods used to project fertility rates, mortality rates, and levels of net-migration.

Births

Births were projected using fertility rates by five-year age cohorts among women of childbearing age. Age-specific fertility rates were used from 2017 and the birth sex ratio was controlled to 1.05 males per one female.

Deaths

Deaths were projected using survival rates by five-year age cohort. Data from 2017 was used as the base as, again, this was the most recent available from the Department of Health. For 2017, survival rates were calculated within a Minnesota life table.

Shift-Share Method

The second of the methods used to create these projections is the *Shift-Share Method*. In this method, the population of a smaller “child” geography is expressed as a proportion of the population of its larger, “parent” geography (Swanson & Beck, 1994).

The shift-share method of ratio extrapolations is expressed as:

$$P_{it} = P_{jt}\left[\left(\frac{P_{il}}{P_{jl}}\right) + \left(\frac{z}{y}\right) * \left(\left(\frac{P_{il}}{P_{jl}}\right) - \left(\frac{P_{ib}}{P_{jb}}\right)\right)\right]$$

where,

i is the child geography,
j is the parent geography,
z is the number of years in the projection horizon,
y is the number of years in the base period, and
b, l, and t refer to the base, launch, and target years, respectively.

While simple trend extrapolation methods can suffer from several shortcomings, there exists no empirical evidence showing that more complex or sophisticated methods consistently produce more accurate forecasts (George, Smith, Swanson, & Tayman, 2004).

Cohort Change Ratios

The Hamilton-Perry Method (1962) proposes Cohort-Change Ratios (CCRs) as a variant of the Cohort-Component Method introduced by Cannan (1895), re-used by Bowley (1924), and independently developed by Whelpton (1928). Instead of specific rates for the components of population change, projections from the Hamilton-Perry Method are based on CCRs and Child-Woman Ratios (CWR) (Baker, Swanson, Tayman, & Lucky, 2017).

Given the availability of age data at the county level, five-year age cohorts were established starting with birth until age five (ages 0-4) and extending to the final, open-ended cohort of all residents ages 85 and above. Cohort Change Ratios are calculated by dividing the population aged x in year t by the population aged x-5 in year t-5 calculated separately for males and females, where t is 2018 and t-5 is 2013. The CCRs are applied to each age, gender group in year t to provide projections by age and gender in the year t+5 (i.e., 2023). Launch year ratios are held constant throughout the projection's horizon, limited here to 2053.

Given the nature of CCRs, children younger than age five are projected using Child-Woman Ratios from the launch year—2018, in this dataset. Similarly, projections of the oldest age group differ slightly from the projections of the other age groups. The population aged 80 years and older in the launch year (2018) provide the basis of the projection for the population aged 85 years and older in 2023.

The following formulas represent the application of the Hamilton-Perry framework:

$$P^{n}_{x+5,g,t+5} = CCR^{n}_{x,g,t} \times P^{n}_{x,g,t} \qquad \text{(Ages 5-84)}$$
$$P^{4}_{0,g,t+5} = CWR^{4}_{0,g,t} \times FP^{44}_{15,t+5} \qquad \text{(Ages 0-4)}$$
$$P_{85+,g,t+5} = CCR_{80+,g,t} \times P_{80+.g,t} \qquad \text{(Ages 85+)}$$

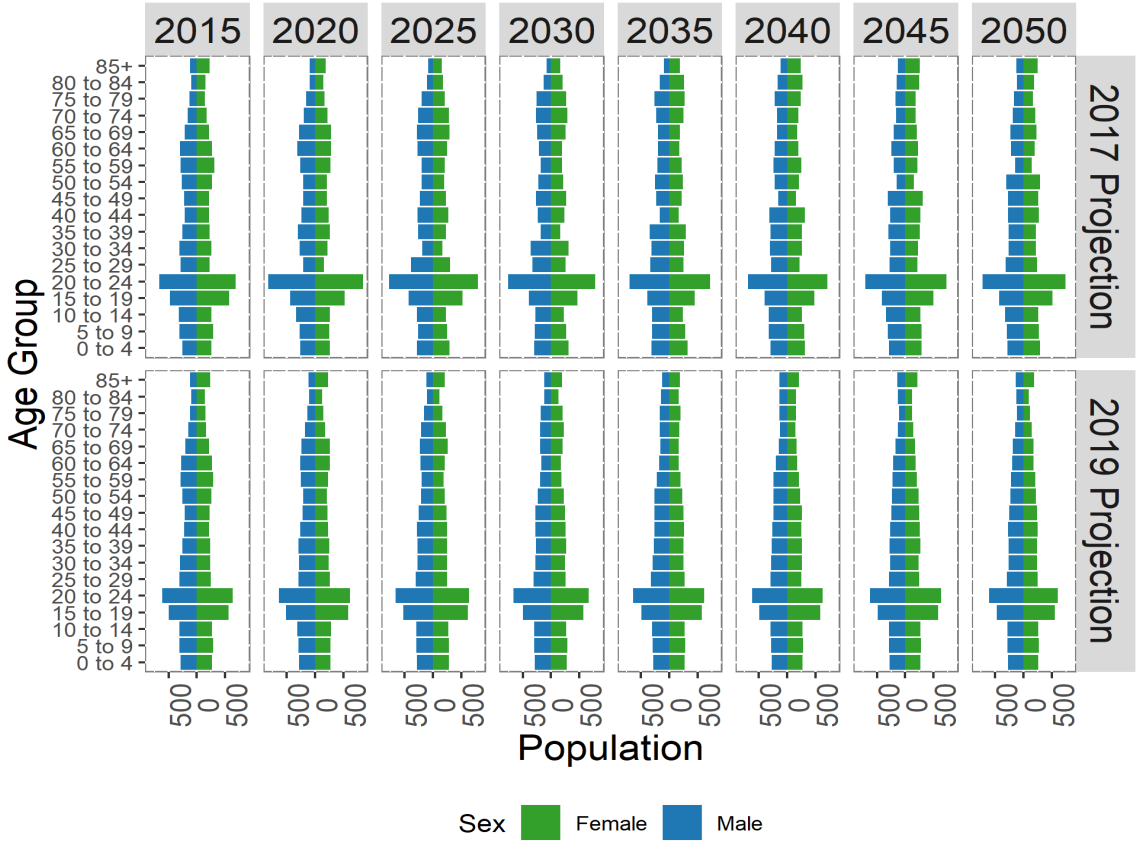
where,

n is the width of the age group,
x is the beginning of the age group,
g is gender,
t is the launch year,
P is the population,
CCR is the Cohort Change Ratio,
CWR is the Child-Woman Ratio, and
FP is the female population.

Unlike the Cohort-Component model, the Hamilton-Perry method does not require adjustments for special populations, such as college students or other group quarters populations (Smith, Tayman, & Swanson, 2013). Cohort change ratios naturally account for changes in mortality and migration and the ratios can handle special populations or unique age structures, all without adjustments to the basic model—functions that the Cohort-Component method would require special adjustments to accomplish (Baker, Swanson, Tayman, & Lucky, 2017). While this is a great advantage to be able to quickly, conservatively, and accurately predict a future population, it is also a particularly unfortunate element of this method to not have predicted components of population change for geographies within Minnesota.

The population pyramids in ***Figure 16*** and ***Figure 17*** illustrate the advantage of the Hamilton-Perry method for counties with special circumstances. Stevens County (***Figure 18***) has a large college-aged population due to the University of Minnesota's Morris campus. Many of these young adults reside in "group quarters" (a generic term that can include educational, correctional, and medical facilities). Under the cohort-component method, the number of people residing in group quarters is assumed to be stable year-to-year. However, since estimates of the group quarters population is only updated with each decennial census, these figures become less accurate over time. The cohort-component method also assumes that the group quarters population will not contribute to demographic change (i.e., aging, births, and deaths) for that county. That is the reason why the cohort aged 25-to-29 in 2020 under the 2017 projections is so small: only the 20-to-24-year-olds who were *not* living in college housing in 2015 were projected to remain in the population. This cohort remains smaller than cohorts ahead of and behind it through 2050, which impacts fertility and mortality projections for the county. The current projections, using the Hamilton-Perry method, do not rely on these same assumptions about populations residing in group quarters. Accordingly, the bottom pyramids on ***Figure 19*** display a more feasible age distribution for Stevens County through 2050.

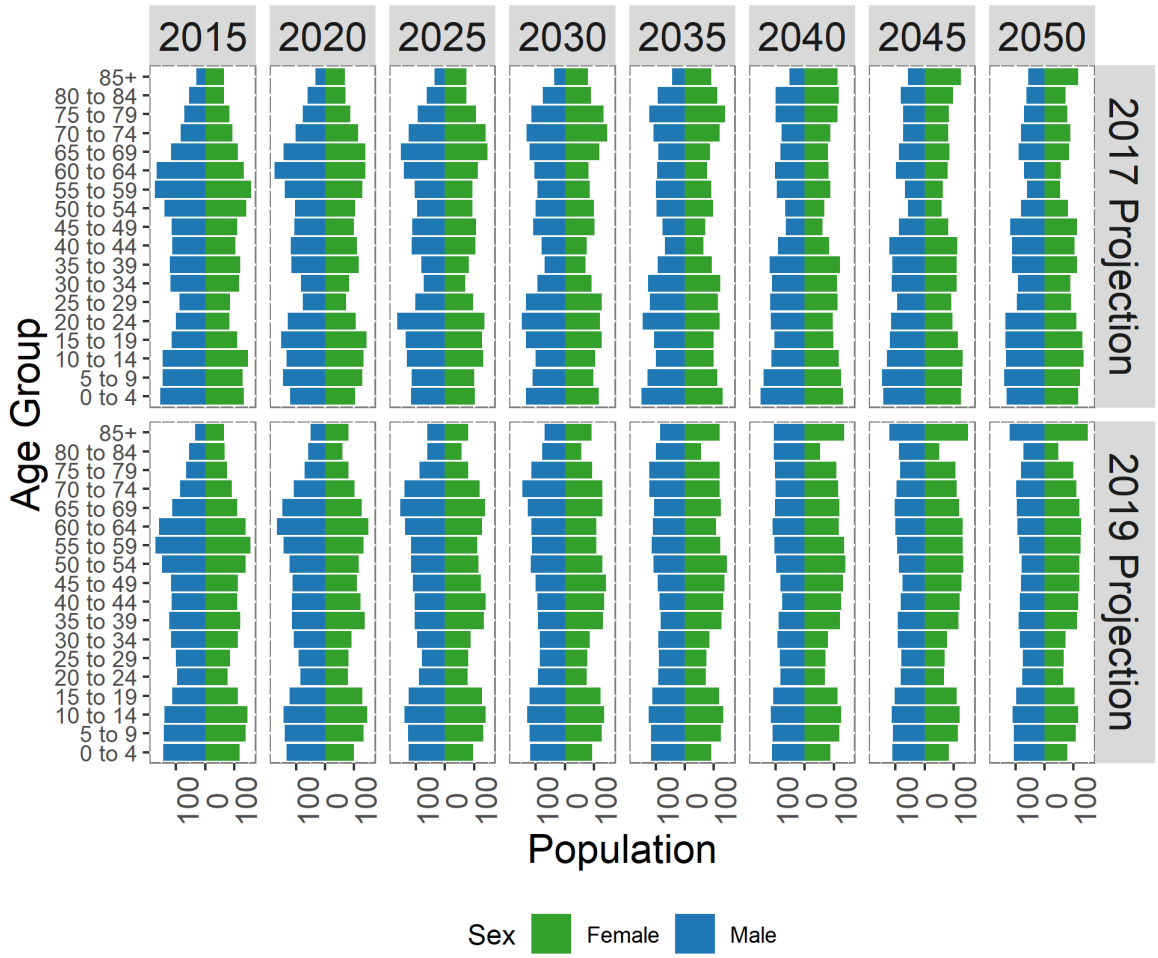
Figure 20: Population pyramids for Stevens County, 2015 to 2050



Source: Minnesota State Demographic Center

Red Lake County (***Figure 21***) has a unique age structure. This remote county in northwestern Minnesota is the third smallest in the state by population size. Like many rural areas, young adults tend to migrate away from Red Lake County to seek education and employment, producing a small population aged 20 to 29. This trend, combined with increasing longevity and falling fertility, results in a "top heavy" age pyramid with more retirees than children.

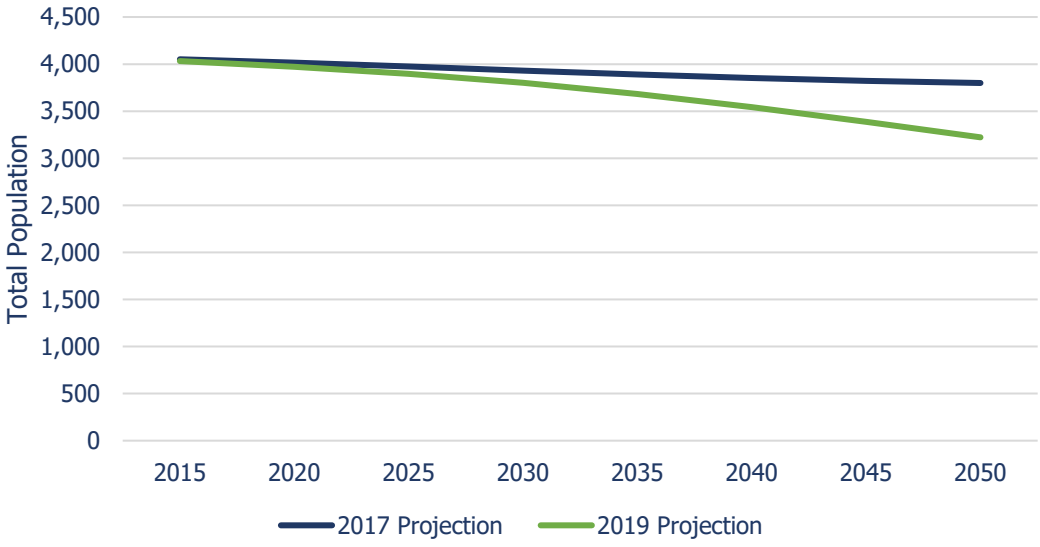
Figure 22: Population pyramids for Red Lake County, 2015 to 2050



Source: Minnesota State Demographic Center

In previously published projections using the cohort-component method, the cohorts younger than age 20 in 2015 simply age through the population over successive years. By 2030, this assumption results in a surplus of young adults—an unexpected reversal of previous trends. As they enter their fertile years, these large young adult cohorts are projected to give birth to increasingly large cohorts of young children. This results in an age pyramid by 2050 that is uncharacteristically young for such a remote county. By contrast, the Hamilton-Perry method used in current projections maintains the assumption that young adults will continue to migrate out of Red Lake County in the coming decades. The difference between these methods impacts projections of the total population size (***Figure 23***). In previously published data sets, Red Lake County was projected to shrink by about 6 percent by 2050, while in the current data set it is projected to shrink by 20 percent.

Figure 24: Total population projections for Red Lake County, 2015 to 2050



Source: Minnesota State Demographic Center

Net-Migration

Historic net-migration rates were observed from 1990 to 2018 using the following formula:

$$P_{x+1} = P_x + (B - D) + M$$

where,

P_x is the total population in any given year,
B is births occurring during P_x,
D is deaths occurring during P_x, and
M is net-migration during P_x.

By solving for M, the following formula is left as a residual:

$$M = P_{x+1} - (P_x + (B - D))$$

The residual—or M—was considered as net-migration for the given year. This process was continued through the projection time frame where the difference between the product of the cohort-component and the desired state level population achieved from the *Shift-Share Method*. If more people than expected were observed, there was assumed to be net-in-migration. Conversely, though not observed throughout this horizon, fewer people than expected would have created an assumption for net-out-migration.

Potential for Error

Population projections involve both the precise and accurate recording of the multifaceted demographic changes and the impetus that links these processes between time periods. Projections based on past trends and relationships have the ability to advance our understanding of the dynamics of population growth and encourage informed decision-making. The multidisciplinary impact of population projections fortifies them in modern demographic analysis. A *projection* (as opposed to a *forecast*) is a conditional calculation showing what the future population would be if a particular set of assumptions were to hold true (George, Smith, Swanson, & Tayman, 2004). Because a projection does not try to predict whether those assumptions will or will not hold true, it can be incorrect only when a mathematical error is made in its calculation. Nevertheless, it is important to understand and acknowledge the potential sources of error.

One of the potential sources of error may come from the assumptions made about the various base populations. This dataset utilizes the Population Estimates, Vintage 2018 from the U.S. Census Bureau as a base population for each of the 102 geographies projected. It is well known that the further estimates are from the most recent census year, the less accurate they are likely to be. Because of this, the base population may be inaccurate.

This analysis relies most heavily on the accuracy of the national projections and the various assumptions about the components of change contained within. Also, significantly influential is the share of each child geography to its parent. Any of these predicted shares could change in an unexpected way, thereby introducing error into the projected values.

Fertility and mortality rates are quite slow to change but each of these components could potentially change in a pattern other than what is assumed by this model. Additionally, future migration trends could shift depending upon economic trends, immigration law changes, climate change, and many other factors.

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