MAINE POPULATION OUTLOOK
2018 to 2028

APRIL 2021

Office of the State Economist

Maine Department of Administrative and Financial Services

Executive Summary

The Office of the State Economist has prepared updated population projections covering the state, counties, and cities and towns. For cities and towns, projections cover total population only; for the state and counties, projections include five-year age and sex cohorts.

Demographics are a key element of understanding the functions of an economy. They can tell us about the makeup of the labor force, what the demand for a new product might be, or about where to start a new business. In 2020, understanding demographics and population dynamics has been critical to epidemiological and public health efforts as our state, nation, and globe have battled the COVID-19 pandemic. For example, data about our population have allowed public health officials to better understand infection rates and develop vaccine distribution plans. Similarly, looking ahead to what the population might be like in the future can help us develop plans and policies now.

These projections are an update to those issued in December 2018. Although they cover different years, they replace the previous set of projections, which are now considered outdated and should no longer be used. Projections are based on a continuation of recent historical trends. As new and revised data are released, these trends can change, making it important to update projections on a regular basis. Near-term projections are likely to be more accurate than projections of the distant future as trends tend to change more significantly the further out we look.

The new projections reflect recent increases in net migration and a slightly modified methodology for calculating birth rates. The base year for these projections is 2018. *Note that all data used in this analysis precede the COVID-19 pandemic. Therefore, the impacts of the pandemic are not included or considered in these projections. Additionally, these projections precede the release of 2020 decennial census data. Please interpret results with caution.*

Results
Maine's population is projected to increase from 1,341,160 in 2018 to 1,355,924 in 2023, and further increase to 1,368,838 in 2028. Eleven counties are projected to see population increases from 2018 to 2028.

Statewide

Maine's total population is projected to increase 1.1% from 2018 to 2023 and a further 1.0% from 2023 to 2028. Over the ten-year period, Maine's population is projected to increase 2.1%.

Maine Statewide Population				
	2018 (historical)	**2023**	**2028**	**2018-2028**
Total Population	1,341,160	1,355,924	1,368,838	
Five-Year Percent Change				
Percent Change		1.1%	1.0%	2.1%

Maine's prime working-age population (age 20-64) is projected to decrease by 7.8% from 2018 to 2028, as the Baby Boom generation continues to age out of the cohort. In 2018, this generation was between 54-72 years old. In 2028, the youngest baby boomers will be 64 years old, while the oldest among them will be 82 years old. If just the young working-age population (20-39) is considered, this group will decline by only 4.5% from 2018 to 2028. Meanwhile, the age 65 and older cohort is expected to see growth of 44.6% from 2018 to 2028 as the youngest baby boomers age into this cohort.

Maine Statewide Population by Age				
	2018 (historical)	2023	2028	2018–2028
Age 0-19 years	284,015	262,656	249,789	
Age 20-39 years	314,772	310,383	300,720	
Age 40-64 years	466,374	438,938	419,118	
Age 65+ years	275,999	343,946	399,211	
Five-year Percent Change				
Percent Change 0-19		-7.5%	-4.9%	-12.1%
Percent Change 20-39		-1.4%	-3.1%	-4.5%
Percent Change 40-64		-5.9%	-4.5%	-10.1%
Percent Change 65+		24.6%	16.1%	44.6%

Counties

Eleven counties are expected to gain population in both the initial five-year period and cumulatively from 2018-2028. From 2018-2028, York County is projected to see the greatest population growth, 8.3%, ahead of Waldo, 6.8%. Five counties are projected to decline from 2018-2028, with the largest losses expected in Piscataquis (-6.8%).

Maine County Total Population				Five-year Percent Change			
	2018 (historical)	2023	2028		2018-2023	2023-2028	2018-2028
Androscoggin	107,679	108,473	109,074	Androscoggin	0.7%	0.6%	1.3%
Aroostook	67,327	66,551	65,761	Aroostook	-1.2%	-1.2%	-2.3%
Cumberland	294,065	294,659	295,597	Cumberland	0.2%	0.3%	0.5%
Franklin	30,055	30,494	31,116	Franklin	1.5%	2.0%	3.5%
Hancock	54,911	54,852	54,613	Hancock	-0.1%	-0.4%	-0.5%
Kennebec	122,301	123,805	125,161	Kennebec	1.2%	1.1%	2.3%
Knox	39,836	40,682	41,297	Knox	2.1%	1.5%	3.7%
Lincoln	34,366	34,947	35,320	Lincoln	1.7%	1.1%	2.8%
Oxford	57,790	57,418	57,104	Oxford	-0.6%	-0.5%	-1.2%
Penobscot	151,976	151,509	151,275	Penobscot	-0.3%	-0.2%	-0.5%
Piscataquis	16,830	16,190	15,689	Piscataquis	-3.8%	-3.1%	-6.8%
Sagadahoc	35,656	36,219	36,576	Sagadahoc	1.6%	1.0%	2.6%
Somerset	50,700	51,486	52,181	Somerset	1.6%	1.4%	2.9%
Waldo	39,867	41,313	42,595	Waldo	3.6%	3.1%	6.8%
Washington	31,511	31,902	32,084	Washington	1.2%	0.6%	1.8%
York	206,290	215,424	223,396	York	4.4%	3.7%	8.3%

Background

Population is a crucial component of understanding economic growth. As we have witnessed in the last year, an economy cannot function without its people. Looking to the future, understanding the process of older generations aging out of and newer generations aging into the workforce provides critical insight into who will be available to fill jobs, start new businesses, and consume the next generation of products and services.

Population projections provide an important gauge of the current outlook based on recent trends. They are updated periodically as new data are released. Trends change over time, and each new set of population projections replaces the previous set. These projections should be considered as just one piece of information to be used by policymakers, businesspeople, and residents making decisions about their future. Note that these projections are based on historical trends through 2018 and do not account for the effects of COVID-19 on migration, birth, or mortality rates. These projections also precede the release of 2020 decennial census population counts.

What are demographics?

Demographics are the characteristics that describe a population – not just the "how many" but also the "who." This includes more detailed information like how old a population is or what its racial and ethnic distribution is, for example. These descriptive characteristics such as age, sex, race, and ethnicity are all elements of the whole picture.

Maine's demographics are similar to those of Vermont and New Hampshire, but quite different from the nation as a whole. The chart below compares the demographics of Maine to its Northern New England neighbors (Vermont and New Hampshire), its Southern New England neighbors (Massachusetts, Connecticut, and Rhode Island) and the United States. Maine compares closely to the rest of Northern New England in its age structure and levels of diversity. There are more pronounced differences when comparing to Southern New England and the United States, which are home to younger and more diverse populations.
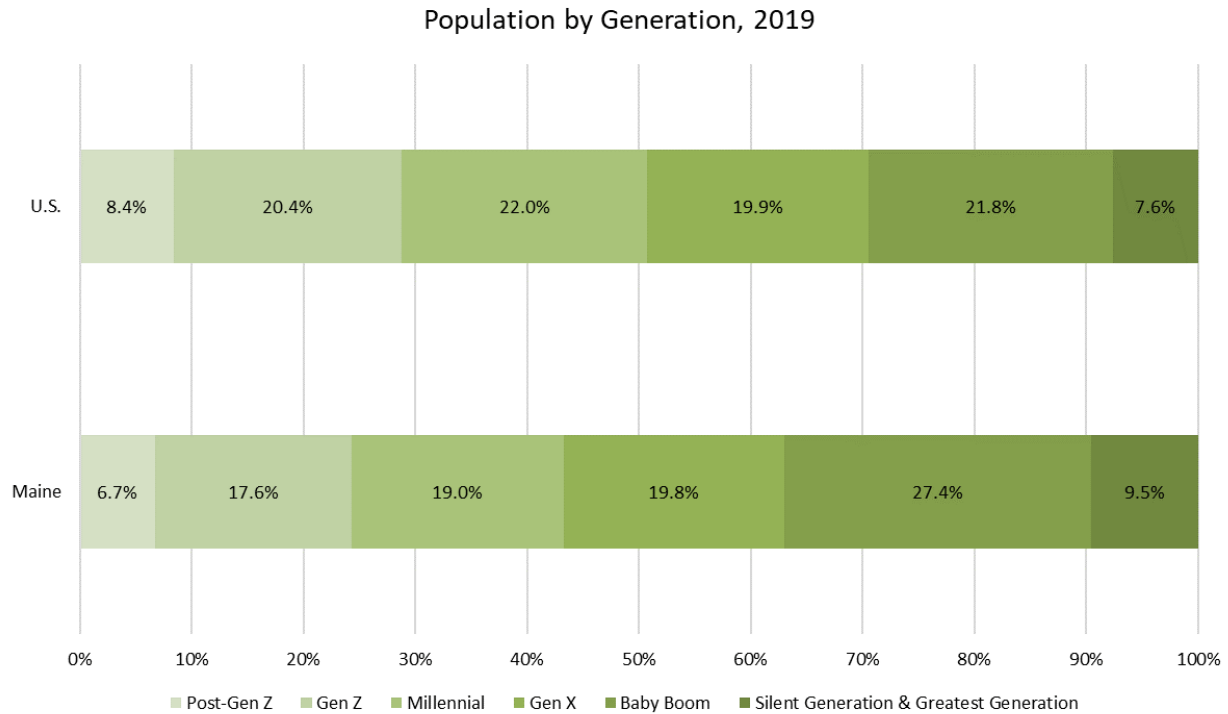
Figure 1. Demographics across regions

Characteristics of the Population (Percent), 2019
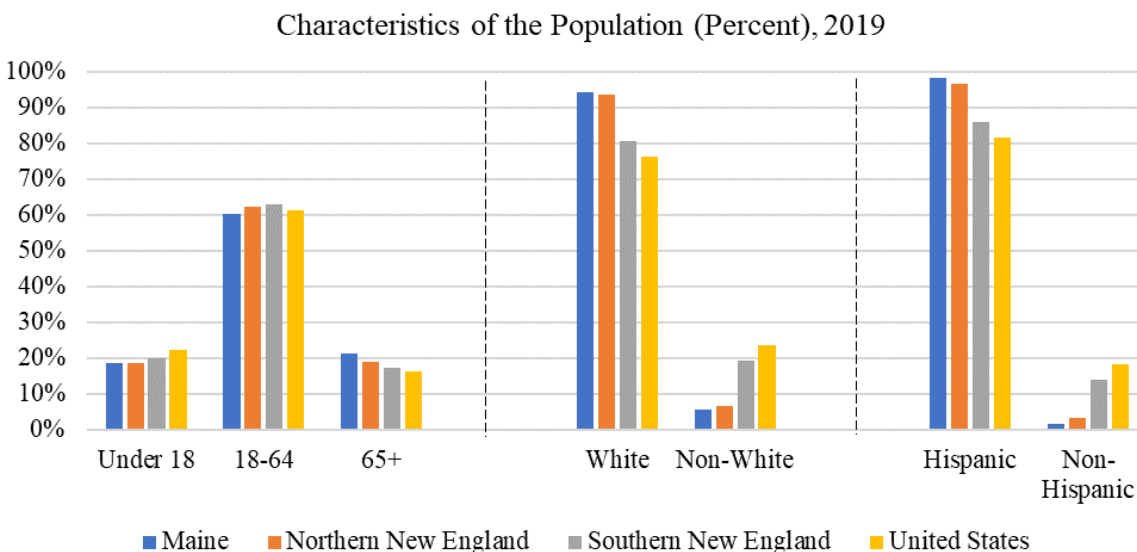
Maine's generational structure

As a percentage of the population, the Baby Boom generation is by far the largest in Maine, at 27.4 percent. In 2019 this generation ranged from 55 to 73 years old, but by the end of 2028 will be 64 to 82 years old as they fully age out of the traditional definition of the working age population (20-64 years old). Nationally, just 21.8 percent of the population is part of the Baby Boom generation, similar to the share of Millennials and slightly higher than Gen X and Gen Z.

Figure 2. Generational distribution in Maine and the U.S.

Population by Generation, 2019

	Post-Gen Z	Gen Z	Millennial	Gen X	Baby Boom	Silent Generation & Greatest Generation
U.S.	8.4%	20.4%	22.0%	19.9%	21.8%	7.6%
Maine	6.7%	17.6%	19.0%	19.8%	27.4%	9.5%

The size of the Baby Boom generation has significant implications for Maine's economy. One of the most prominent impacts is their participation in the labor force, which saw substantial increases from the late 1960s through 1990. During this time, multiple sources contributed to a surge in the labor force: Baby Boomers entered their prime working age years, and women entered the labor force at higher rates, with labor force participation of women growing from 37.8% in 1960 to 57.5% in 1990[1]. However, in the last decade, Baby Boomers have begun to retire from the labor force. With fewer workers in younger generations to fill their shoes, the labor force leveled out starting in 2005 and has declined in more recent years.

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[1] Source: U.S. Bureau of Labor Statistics, accessed through fred.stlouisfed.org (Series LNS11300002)

Figure 3. The Baby Boom Generation's Impact on Maine's Labor Force

Maine Civilian Labor Force
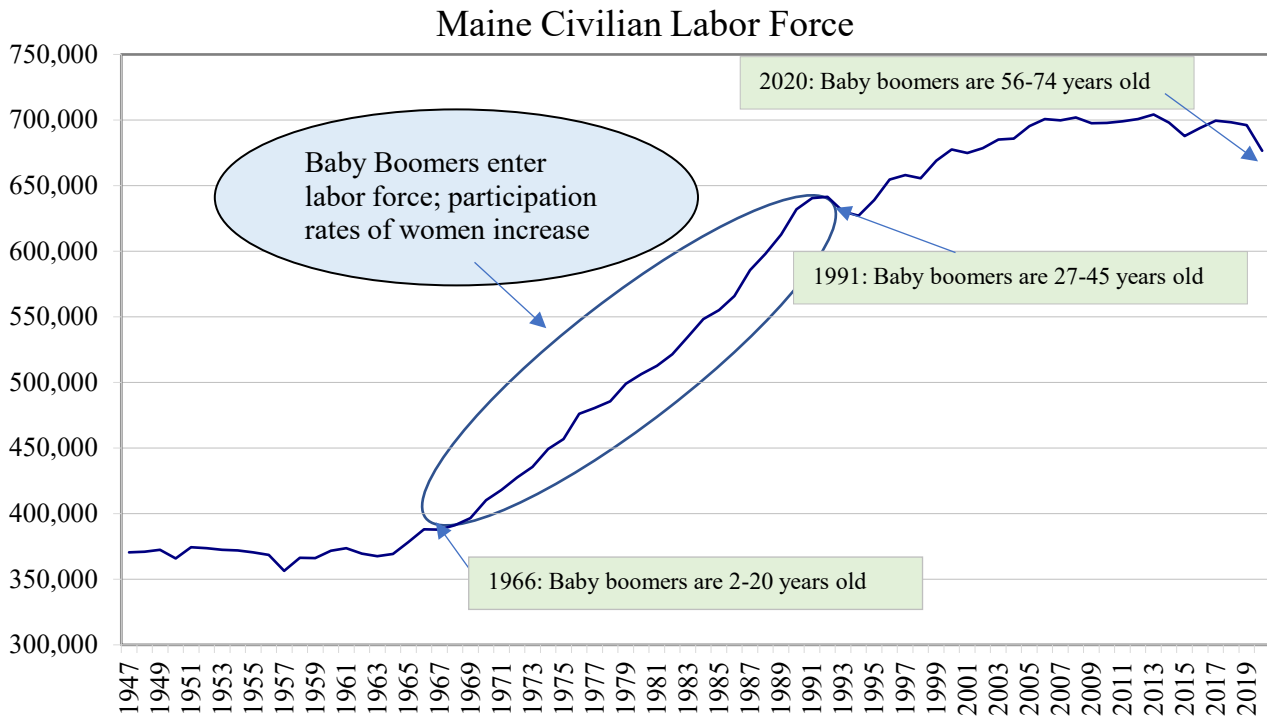
From 2018-2028, the further aging of this generation will continue to impact Maine's labor force as many continue to retire. However, since their successors make a smaller share of the population, labor constraints are likely to be felt in the coming years.

These dynamics are likely to impact future demographic trends within the state in two major ways: first, by increasing Maine's median age, and second, by leading to natural population decline. Due to the sheer size of the Baby Boom generation, the aging of the cohort will naturally raise Maine's median age. This trend has been happening nationwide. Along with this aging comes the second major impact, which is natural population decline. As Baby Boomers have aged out of their prime childbearing years, the number of deaths each year has begun to exceed the number of births each year. This is a reversal of what happened when Baby Boomers were in childbearing years, when births far outnumbered deaths.

In this case, Maine's population can only grow through in-migration. From 2016-2019 Maine has seen net domestic migration accelerate, with 6,613 new Mainers from other states in 2019. Strong in-migration in the past four years has contributed to improved population projections and will have a positive impact on Maine's economy in the future.

Components of population change

There are three components of population change: births, deaths, and net migration (domestic and international). In 2019, Maine had the largest percentage of the population aged 65+ of any state in the nation. As this cohort ages, the rate of total deaths per 1,000 population in Maine will naturally increase. Conversely, the birth rate per 1,000 population both nationally and in Maine has seen consistent decline in recent decades, though Maine's birth rate has been lower than the nation's for many years. This might be due to both the state's older population as well as its relatively homogenous population; the white non-Hispanic birth rate tends to be somewhat lower than other racial and ethnic groups.

Figure 4. Birth Rates in Maine and the U.S.
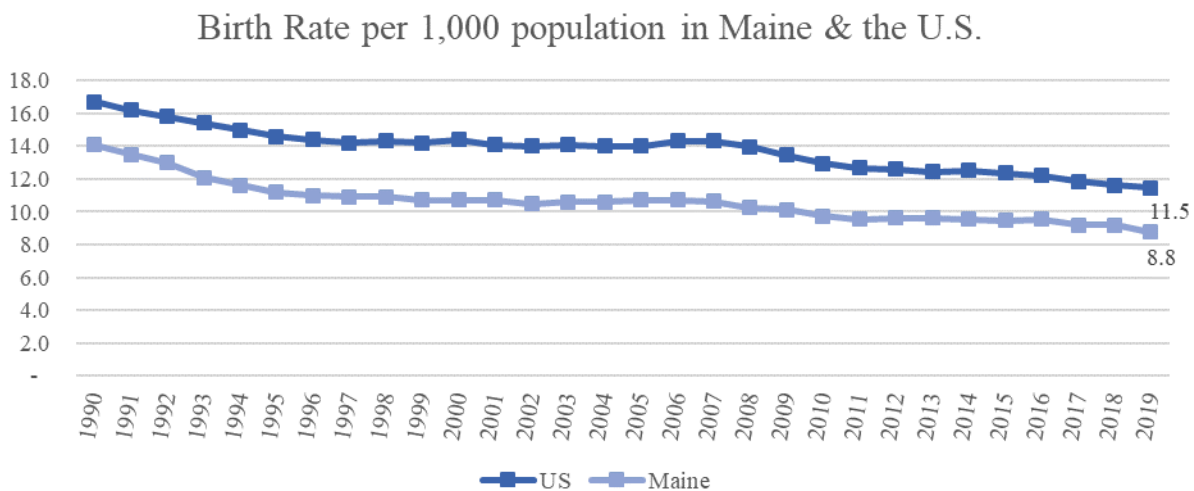
As previously mentioned, the combination of increasing deaths and decreasing births has led to natural population decline, meaning the state has had more deaths than births in recent years. Maine is one of four states that had natural population decline in 2019: West Virginia, New Hampshire and Vermont also had fewer births than deaths.

Despite a natural population decrease of 2,262, Maine's population managed to increase by over 5,000 people in 2019. Maine's population growth has accelerated in recent years as the final component of population has improved: net migration. Net migration is defined as the total number of people who moved to the state, either from other states (domestic in-migration) or other nations (international in-migration) minus the number of people who moved out of the state. Net migration has been ticking up since 2016. Where data for the first half of the decade showed net negative or neutral migration, the past four years have seen an accelerating influx of new residents to the state.

Overall, net migration has been the driving force of Maine's population growth in recent years. Its consistent and continued improvement since the previous set of projections has contributed to stronger growth projections in this update.

Figure 5. Components of Population Change in Maine, 2011-2019
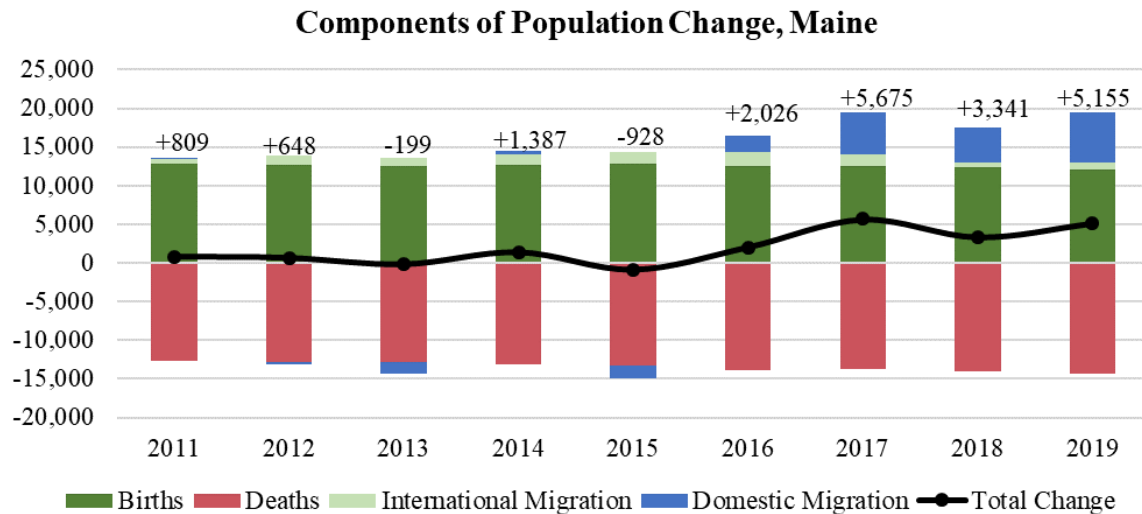
Implications

Population growth and the demographic composition of a region have myriad impacts on its economy. An influx of working-age population tends to lead to better job growth as businesses have a larger pool of qualified workers to draw from. However, disproportionate population growth can have negative effects on a region. For example, some parts of the state may grow too fast – that is to say, faster than their infrastructure capabilities allow. This may lead to lack of affordable housing, traffic congestion, and reduced quality of public services. At the same time, some areas may see their populations decline. These dynamics make a careful understanding of a region's population change critical to providing for its residents.

Maine's age structure poses challenges for the state. As many members of the Baby Boom generation retire from the workforce, there are fewer workers to fill their jobs. This can be problematic for business and job development. Additionally, these dynamics put stress on the state's old-age dependency ratio: this means that for each person aged 65+, there are increasingly fewer people of working age for them to depend on. We have begun to see the implications of this and will continue to in the future: shortages of nurses and critical healthcare workers, challenges for working-age children who are caregivers, and stress on pension and Social Security systems. The onset of COVID-19 in early 2020 brought these challenges to the forefront as Maine grappled not only with the public health implications of a large elderly population, but also with the impact to the labor force as many who were nearing retirement age decided to leave the labor force earlier than expected in order to protect their health.

For Maine to move forward with economic growth, it must continue to attract and embrace in-migration, both international and domestic, and welcome diverse populations. Currently, Maine is the least diverse state in the United States, with 94.4% of the population identifying as white alone. However, from 2010-2019, 96.4% of the state's 16,000+ population gain came from non-white populations. To be successful, Maine must not only welcome racially and ethnically diverse communities to the state, but also work consistently to make its economy more equitable and inclusive for these populations.

COVID-19: impacts and challenges for forecasting

It is important to note that all data used in this analysis precede the onset of COVID-19 by more than a year. Therefore, this projection does not consider any impacts that the pandemic may have had on Maine's population.

The pandemic has resulted in significant short-term changes to migration as well as birth and death rates. For example, the way labor markets interact with geographic boundaries has changed over the past year. The rapid and widespread implementation of remote work made it possible for many workers, particularly those in middle- and high-wage jobs, to work from anywhere. If this trend toward remote work continues in the long-term, it could usher in an era of counter-urbanization, which Maine could benefit from. Maine's lower population density may have been attractive to urban dwellers throughout the height of the pandemic, as it posed less risk than crowded city centers. While migration patterns generally change gradually over time, the COVID-19 pandemic could lead to a sudden, drastic change in migration patterns, however, it remains to be seen what the long-term effects are.

Projections

Total Population

The Office of the State Economist has prepared population projections for the state, counties, and cities/towns. Populations are projected for 2023 and 2028 and replace the previous set of projections issued in December 2018. County- and state-level projections are given for five-year age cohorts by sex. City- and town-level projections are only available for the total population.

It is important to note that the projections presented here are not exact. Any estimation errors in the data inputs, including recent population estimates, will be incorporated into this and future projections. The county-level model assumes that past birth, death, college enrollment, and migration rates within each cohort will persist into the foreseeable future. The model cannot account for unprecedented future events that may dramatically alter a county's demographic composition, such as a pandemic or changes in technologies, personal choices, or environmental conditions in the coming years that may alter migration behavior or birth and death rates. As such, population projections are more accurate for the near future than distant years and should be updated regularly.

Most importantly, note that the data used to create these projections precede the COVID-19 pandemic. Currently, data about the pandemic's short- and long-term impacts on births, deaths, and migration are unavailable. Results of this projection should not be interpreted as the impact of COVID-19.

The county projections are the basis for the state and town projections and thus are the first piece completed. The methodology used for the county projections is the cohort-component method. This widely-used methodology utilizes births, deaths, and migrations to advance each age-sex cohort through the projection period. It allows for specific survival and migration rates to be calculated for each age-sex cohort. Using this methodology provides a detailed projection of the county population. A more detailed description of the methodology is provided in the appendix to this report.

Statewide

Maine's total population is projected to increase 2.1% for the decade between 2018 and 2028, with 1.1% growth in the first half and 1.0% in the second. This projection forecasts Maine's population to be 1,368,838 in 2028. These projections reflect stronger net migration and a slightly modified birth rate methodology.

Table 1. Maine's Total Population and Projected Change

Maine Statewide Population				
	2018 (historical)	**2023**	**2028**	**2018-2028**
Total Population	1,341,160	1,355,924	1,368,838	
Five-Year Percent Change				
Percent Change		1.1%	1.0%	2.1%

Counties

Eleven of Maine's 16 counties are projected to see population increases from 2018-2023, with the same eleven expected to see further increase from 2023-2028.

York County is expected to see the largest gains over the ten-year period, 8.3%, followed by Waldo County at 6.8%. Conversely, Piscataquis County is projected to decline by 6.8%, the largest population decline of any county.

Again, these projections are based on recent historical trends: any major changes to migration rates or birth/mortality rates will be reflected in future revisions to the population projections.

Table 2. Population Projections by County

Maine County Total Population				Five-year Percent Change		
	2018 (historical)	2023	2028		2018-2023	2023-2028	2018-2028
Androscoggin	107,679	108,473	109,074	Androscoggin	0.7%	0.6%	1.3%
Aroostook	67,327	66,551	65,761	Aroostook	-1.2%	-1.2%	-2.3%
Cumberland	294,065	294,659	295,597	Cumberland	0.2%	0.3%	0.5%
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Hancock	54,911	54,852	54,613	Hancock	-0.1%	-0.4%	-0.5%
Kennebec	122,301	123,805	125,161	Kennebec	1.2%	1.1%	2.3%
Knox	39,836	40,682	41,297	Knox	2.1%	1.5%	3.7%
Lincoln	34,366	34,947	35,320	Lincoln	1.7%	1.1%	2.8%
Oxford	57,790	57,418	57,104	Oxford	-0.6%	-0.5%	-1.2%
Penobscot	151,976	151,509	151,275	Penobscot	-0.3%	-0.2%	-0.5%
Piscataquis	16,830	16,190	15,689	Piscataquis	-3.8%	-3.1%	-6.8%
Sagadahoc	35,656	36,219	36,576	Sagadahoc	1.6%	1.0%	2.6%
Somerset	50,700	51,486	52,181	Somerset	1.6%	1.4%	2.9%
Waldo	39,867	41,313	42,595	Waldo	3.6%	3.1%	6.8%
Washington	31,511	31,902	32,084	Washington	1.2%	0.6%	1.8%
York	206,290	215,424	223,396	York	4.4%	3.7%	8.3%

Population by Age

In the next ten years, the generational makeup of Maine's workforce will undergo significant change. In 2028, nearly all of the Baby Boom generation will have aged out of the traditionally defined working-age population (20-64 years old). At this point, Millennials and Gen Z will make up the majority of Maine's working-age population, as workers in Gen X begin to approach retirement age.

As Baby Boomers continue to age, the population pyramid will continue to appear top-heavy as the share of the population 65+ grows while the share of the population under age 18 contracts. Additionally, Maine's female-to-male ratio will gradually increase over time as women statistically live longer than men.

Figure 6. Population Pyramids for 2018 and 2028
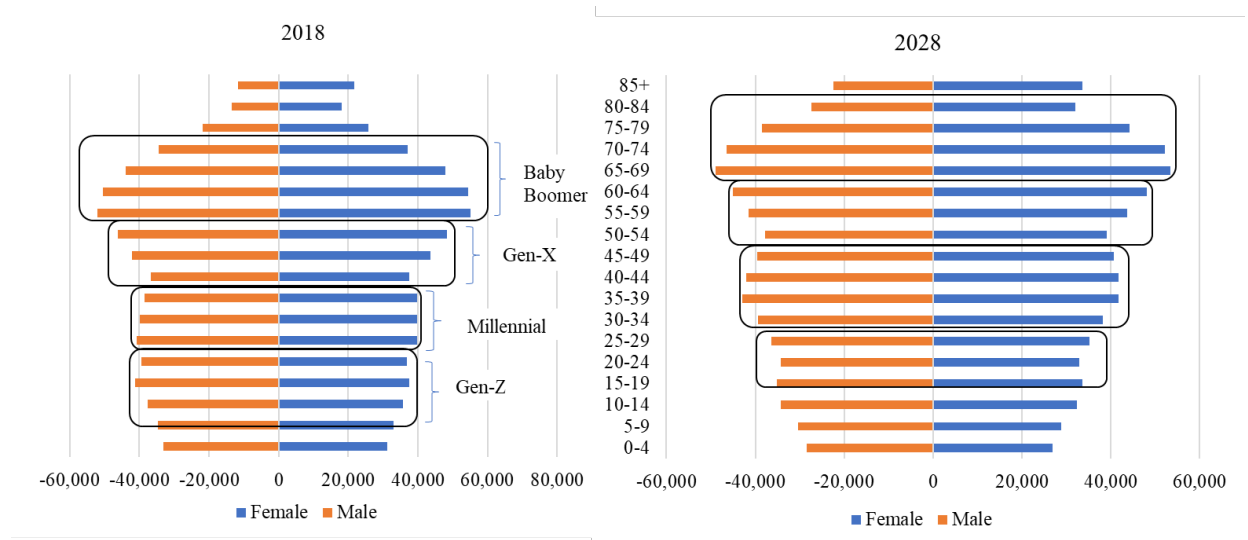
*Note: The years used to define Millennial, Gen Z, and Post-Gen Z are not universally agreed upon and are subject to substantial change. The years used in this analysis are based on the best information available at the time of writing, primarily from the Census Bureau and Pew Research Center.
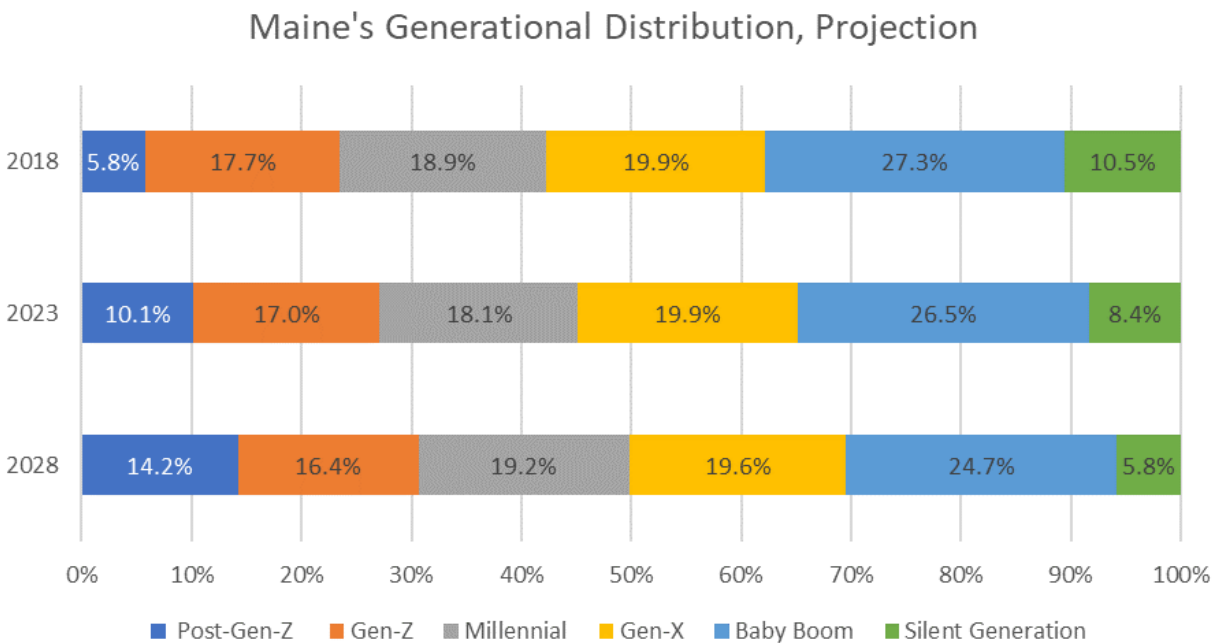
Maine's working-age population will continue to decline by 7.8% from 2018-2028, including the aging-out of Baby Boomers, who will be 64-82 years old in 2028. Both the young working-age (20-39) and older working-age (40-64) cohorts are also expected to decline during this period, by 4% and 10%, respectively. Conversely, Maine's 65+ population is expected to grow by 45% from 2018-2028.

Table 3. Projections for Population by Age Cohort

Maine Statewide Population by Age				
	2018 (historical)	**2023**	**2028**	**2018-2028**
Age 0-19 years	284,015	262,656	249,789	
Age 20-39 years	314,772	310,383	300,720	
Age 40-64 years	466,374	438,938	419,118	
Age 65+ years	275,999	343,946	399,211	
Five-Year Percent Change				
Percent change 0-19		-8%	-5%	-12%
Percent change 20-39		-1%	-3%	-4%
Percent change 40-64		-6%	-5%	-10%
Percent change 65+		25%	16%	45%

Over time, the aging of elder generations and the birth of new ones will continue to equalize the generational distribution in Maine. While the Baby Boom Generation made up about 27% of Maine's population in 2018, it will drop to just below 25% by 2028. The generation directly following Gen Z (in this analysis, defined as the 16-year period from 2013-2028) is projected to grow to around 14% of the population, while Gen Z will fall to about 16% by 2028.

Figure 4. Maine's Generational Distribution, 2018-2028

Maine's Generational Distribution, Projection

	Post-Gen-Z	Gen-Z	Millennial	Gen-X	Baby Boom	Silent Generation
2018	5.8%	17.7%	18.9%	19.9%	27.3%	10.5%
2023	10.1%	17.0%	18.1%	19.9%	26.5%	8.4%
2028	14.2%	16.4%	19.2%	19.6%	24.7%	5.8%

City and Town Population

City/town projections by necessity use a different, less robust methodology due to a lack of detailed source data. They are calculated by estimating a constant rate of growth for each town's share of their county population between 2014 and 2018 and then extrapolating this growth into the future. This is necessary to ensure the town totals within a county equal the total county projection, but this can create some counterintuitive results. Towns with historical population growth in counties that are projected to grow may have projected population declines if that town's share of the county population has been declining (that is, if the other towns in the county have been growing faster than the town in question). City/town projections should be used with caution, particularly in situations where the results seem unlikely.

Two-thirds of the cities and towns in Maine are projected to see population growth between 2018 and 2028. The growth rates in these 305 towns range from 0.1% to 25.6%. Sixteen towns are projected to see no change from 2018 to 2028. The remaining 201 cities and towns are projected to see declines ranging from -0.1% to -45.2%.

Most of the cities and towns projected to see growth are in counties that are also expected to see population growth. For example, all constituent towns in York and Lincoln counties are expected to grow from 2018 to 2028. Conversely, none of the towns in Piscataquis County are expected to see increases, a reflection of underlying demographics of the county, which has the oldest median age in the state.

Maine's five largest cities are projected to remain so in 2028. However, only Auburn is expected to see growth over the 10-year period. Even though Portland has seen recent growth and Cumberland County is projected to see growth from 2018 to 2028, Portland's share of Cumberland County has been shrinking, leading to the projected decline. However, as described earlier, city/town projections should be viewed with caution and used in conjunction with local knowledge, as the methodology used here is not as refined as that for the counties and the state.

Table 4. Projections for Maine's five largest cities

Population in Maine's Five Largest Cities				
	2018 (historical)	2023	2028	2018-2028
Portland	66,417	64,712	62,850	
Lewiston	35,944	35,689	35,346	
Bangor	31,997	31,900	31,740	
South Portland	25,606	25,165	24,756	
Auburn	23,196	23,654	24,048	
Five-Year Percent Change				
Portland		-2.6%	-2.9%	-5.4%
Lewiston		-0.7%	-1.0%	-1.7%
Bangor		-0.3%	-0.5%	-0.8%
South Portland		-1.7%	-1.6%	-3.3%
Auburn		2.0%	1.7%	3.7%

Conclusion

Maine's population continues to age more rapidly than the nation's population. However, recent acceleration in net migration, especially among working-age individuals and children, is reflected in the overall population growth for Maine in this set of projections despite a condition of natural population decline. These projections assume a continuation of the robust in-migration seen in recent years; for this to be achieved, the state must continue to attract new people and businesses to the state. Over time, Maine will need to attract younger residents to fill the shoes of its Baby Boomer retirees. Just as workers seek out employment opportunities, employers seek out markets that contain a diverse set of available workers. Both sides of this equation are necessary for our economy to thrive. However, simply attracting new people and businesses to the state is not enough to ensure the state's success in the future; Maine must also prioritize equitable access to economic opportunity for all. Maine's future growth will be driven by diversity as migration into the state increases, making demographic projections an even more important part of policy development.

Appendix: Methodology and Caveats

While this report focuses on the 10-year population projections (out to 2028), spreadsheets with projections out to 2038 are available for those needing longer projection periods. Use these out-year projections with caution as the further out the projections look, the less accurate they become.

Populations are projected for 2023 through 2038 in five-year intervals and are given for five-year age cohorts by sex for counties and the state while city and town projections are for total population only.

It is important to note that the projections presented here are not exact. Any estimation errors in the data inputs, including recent population estimates, will be incorporated into this and future projections. The county-level model assumes that past birth, death, college enrollment, and migration rates within each cohort will persist into the foreseeable future. The model cannot account for unprecedented future events, such as a pandemic or changes in technologies, personal choices, or environmental conditions, that may change migration behavior or birth and death rates. As such, population projections are more accurate for the near future than distant years and should be updated regularly. While they provide a forward-looking estimate of the population, they are not a prediction of future population.

Most importantly, note that the data used to create these projections precede the COVID-19 pandemic. Currently, data about the pandemic's short- and long-term impacts on births, deaths, and migration are unavailable. Results of these projections should not be interpreted as the impact of COVID-19. Additionally, these projections precede the release of 2020 decennial census data.

Methodology

The county projections are the basis for the state projections. The methodology used for the county projections is the cohort-component method. This widely-used methodology utilizes births, deaths, and migrations to advance each age-sex cohort through the projection period. It allows for specific survival and migration rates to be calculated for each age-sex cohort. Using this methodology provides a detailed projection of the county population.

As with any projections, these are only an estimate of one possible scenario. While the best data and methodology available at the time are used, there are many factors that could change the projections. These projections are based on past trends of birth, survival, college enrollment, and migration rates. The projections do not account for any future changes in these rates. In addition, life expectancy is held constant during the projection time period.

The population is divided into 18 age cohorts: 17 five-year cohorts, beginning with 0-4 and continuing through 80-84, and one open-ended cohort, 85+. When divided among males and females, this gives a total of 36 age-sex cohorts. Because the cohorts are in five-year intervals, it is necessary to advance the projections five years at a time. The population of 20-24 year-olds in

2018 will be 25-29 in 2023. These projections go out to 2038, for four projection data points (2023, 2028, 2033, and 2038).

There were several key inputs to the county projections: the number of births by the age of the mother for each year from 2008 to 2018; the number of deaths by age and sex for each year from 2008 to 2018; the population estimate by age and sex as of July 1 of each year from 2008 to 2018; college enrollment by age and sex for 2018; U.S. population projections for 2023, 2028, 2033, and 2038; and graduate degrees awarded for 2018. The births and deaths data came from the Office of Data, Research, and Vital Statistics in the Maine Department of Health and Human Services while the population estimates and national projections came from the U.S. Census Bureau. College enrollment and graduate degrees awarded came from the National Center for Education Statistics.

The first step in the process involved calculating the college population. This population is not subject to the same aging and migration patterns as the non-college population. As such, this population is essentially removed at the beginning of the process and then added back in after migration and aging has been completed for each cohort. Note that five counties (Knox, Lincoln, Oxford, Piscataquis, and Sagadahoc) do not have any significant in-person secondary education presence and so the college population for these counties is zero. Three counties have graduate student populations (Cumberland, Penobscot, and York).

The institution-based college enrollment figures from the National Center for Education Statistics are used to estimate the county-based college population in 2018. For the 2023, 2028, 2033, and 2038 college populations, shares of the 2018 U.S. population are calculated and then applied to the U.S. projections by age/sex cohort for 2023, 2028, 2033, and 2038.

The operational birth rate for females in each age cohort is calculated as the five-year average birth rate from 2014-2018, averaged between the current and the next age cohort. This averaging is done because the average female can expect to spend half of the next five years in her current age cohort and half of the next five years in the next age cohort. For example, the operational birth rate for 25-29 year-olds is the average of the 25-29 five-year rate and the 30-34 five-year rate.

Operational survival rates are calculated for each age-sex cohort. The average survival rate for each cohort is calculated as the average number of deaths from 2014 to 2018 divided by the 2016 cohort population and then subtracted from one. To get the five-year rate, the average survival rate is raised to the fifth power: mortality being a permanent condition, the probability of surviving more than one year compounds exponentially. As with the birth rates, survival rates are averaged across two subsequent age cohorts.

The oldest and youngest age cohorts are treated somewhat differently. For the youngest age cohort, 0-4 year-olds, the operational survival rate is simply the one-year survival rate raised to the 2.5 power. For the oldest age cohort, 85 and older, the operational survival rate is simply the five-year survival rate because there is no further age cohort for them to age into.

Migration is the most complicated element of the projections. Out-migration and in-migration are calculated separately and applied to different populations to obtain the migration rates.

The out-migration and in-migration rates use the 2018 5-year estimates of movers to and from counties produced by the U.S. Census Bureau as part of the American Community Survey. For each cohort, the total preliminary number of out-migrants is multiplied by five to get the number for five years, multiplied by the percentage of total outmigrants that were male/female, and divided by the estimated total number living in the county one year ago. This is the preliminary out-migration rate. The 2018 total population of each age cohort is multiplied by the preliminary out-migration rate to get the estimated number of out-migrants for each cohort.

For the outgoing college-age cohorts (20-24, 25-29, 30-34), a separate non-college outmigration rate is calculated using an estimate of first-year college students from outside of each county using enrollment data from the National Center for Education Statistics.

Adjustments are made to the 15-19, 75-79, 80-84, and 85+ age cohorts to account for the fact that the ages in the geographic mobility tables are not an exact match for the age cohorts used throughout the projections.

In-migration is calculated in a similar manner. For each age cohort, the number currently living in the county who were living abroad, moved from a different state, or moved from a different county from one year ago were summed to obtain the total preliminary number of in-migrants. This was then multiplied by the percent of female/male in-migrants and multiplied by five (for a five-year period) before being divided by the estimated total number currently living in the county. For the incoming college-age populations (18-19, 20-24, 25-29), a separate non-college in-migration rate is calculated.

Adjustments are again made to the 15-19, 75-79, 80-84, and 85+ age cohorts to account for differences in age groupings between data sets.

The migration rates operate on the concept of "at risk" populations. In each case, the population at risk of migrating is identified and used as the basis for migration rates. To calculate the population at-risk of migration, the number of in-migrants is subtracted from the 2018 cohort population and the number of outmigrants is added.

The survived population for 2023 is calculated by multiplying the 2018 population for each cohort by the corresponding operational survival rate. The number of stayers in the county is calculated by multiplying the survived population by one minus the outmigration rate. The number of outmigrants is calculated by subtracting the stayers in the county for 2018-2023 from the survived population for 2023.

Next the 2023 survived county population is subtracted from the 2023 cohort population from the U.S. Census Bureau's national population projections and then multiplied by the in-migration rate to get the number of in-migrants. This number is added to the stayers in county 2018-2023 to get the 2023 population. Keep in mind that this is the population of the next age cohort for 2023. People who were 20-24 in 2018 are 25-29 in 2023.

For the oldest cohort, the calculated population for the oldest and next-oldest age cohorts are added together. The 85+ cohort contains those who were 85+ in the previous period as well as those who were 80-84 and have aged into the 85+ cohort.

The youngest cohort, those born during the 5-year period, is more complicated to project. The population at risk of giving birth is calculated by adding the stayers in county 2018-2023 to the in-migrants and half of the deaths during the period. This figure is then multiplied by the operational birth rate to get the number of births to each age cohort of mothers. The births across all cohorts are summed and multiplied by the ten-year average percentage of the 0-4 population that is female/male to get the number of female/male births. Each of these are multiplied by the respective operational survival rates to get the 2023 0-4 cohort population. Note that migration is addressed through the mothers' movements.

State-level projections were obtained by adding together the county projections.

City and town population projections are calculated using two pieces of information: the recent historical growth of each town's share of its county's population and the county population projections.

The projections use linear regression analysis to estimate a constant rate of growth for each town's share of their county population between 2014 and 2018. This growth rate is then extrapolated into the future, using county population projections to project the population for each town in 2023, 2028, 2033, and 2038.

This method produces some results that may seem counterintuitive. For example, some towns may be projected to shrink between 2018 and 2023, even though they showed historical population growth and the county is expected to grow from 2018 to 2023. Keep in mind that the population projections for the town are based on changes in its share of the county's population. The town's share of the county population may be declining even though the town and the county have both been growing in population. The town population projections thus rest on the assumption (among many others, including those upon which the county population projections are based) that relative growth rates of towns in a given county will continue into the future.