

Coordinated Population Forecast



2022

Through

2072

**Crook
County**

Urban Growth
Boundaries (UGB)
& Area Outside UGBs

How to Read this Report

This report should be read with reference to the documents listed below, which are downloadable on the Forecast Program website (<https://www.pdx.edu/population-research/population-forecasts>).

- *Methods and Data for Developing Coordinated Population Forecasts*: Provides a detailed description and discussion of the forecast methods employed. This document also describes the assumptions that feed into these methods and determine the forecast output.
- *Forecast Tables*: Provides complete tables of population forecast numbers by county and all sub-areas within each county for each five-year interval of the forecast period (2022-2072).

Population Research Center (PRC) Project Staff

Cindy Chen, Population Forecast Program Manager

Ethan Sharygin, Director

Meisha Whyte, Graduate Research Assistant

Deborah Loftus, Accounting Technician

Charles Rynerson, Oregon State Data Center Coordinator

Huda Alkitkat, Population Estimates Program Manager

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[https://commons.wikimedia.org/wiki/File:Highway_27_\(Crook_County,_Oregon_scenic_images_\(croDA0093\).jpg](https://commons.wikimedia.org/wiki/File:Highway_27_(Crook_County,_Oregon_scenic_images_(croDA0093).jpg)

**Coordinated Population Forecast for Crook County, its Urban Growth
Boundaries (UGB), and Area Outside UGBs**

2022 – 2072

Prepared by

Population Research Center

College of Urban and Public Affairs

Portland State University

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1. Methodology

Counties were forecast using the cohort component method. Deaths and survival rates were projected based on historical trends (2000-2020) and based on the methodology published by Clark and Sharrow 2011¹. Mortality rates for the 85+ age group were further divided into 5-year age groups up to 100+ (i.e., 85-89, 90-94, 95-99, and 100+) using the proportion of each age group calculated from the single-year age group data in the 2010 decennial census. Age specific fertility rates were projected based on historical trends up to 2035 and held constant afterwards. The 2021 births data was not included in the projection model for two reasons: 1) the 2021 vital statistics were not finalized at the time of this report, and 2) due to uncertainties related to COVID-19 impacts on births and deaths, incorporating the 2021 births data into births and fertility rate projection may lead to errors such as underestimation. Nonetheless, the 2021 births and deaths numbers are included in Figures 3 and 4 to provide a more consistent visualization. Since the 2020 deaths data may be impacted by COVID-19, deaths were adjusted based on CDC's estimated excess deaths when forecasting future mortality rates to ensure these rates were not affected by short-term pandemic-related deaths.

Annual net migrants were calculated based on published data gathered from the IRS and the U.S. Census Bureau's American Community Survey (ACS) Public Use Microdata Sample (PUMS) and Population Estimates Program (PEP). Historical county level in-, out-, and net migration (domestic and foreign) were obtained from IRS and PEP (1991 – 2020). IRS provides domestic in- and out- while PEP provides domestic and foreign net. Age structures of gross migrants by direction (domestic in- and out- and foreign in-migration) were calculated for ACS Public Use Microdata Areas (PUMAs) which were used for migration to or from constituent counties. Future total net migrants were projected by applying an ARIMA model appropriate for each individual county.

The PRC estimate formed the baseline of the forecast for individual UGBs, with the difference in population between incorporated city and UGB boundaries estimated based on assignment of population in individual census blocks in each county into a UGB area and or city area, or balance of county. Populations in individual UGBs or in the balance of county were forecast by projections of individual components of the housing unit method of population estimation. Historical rates of population and housing unit change since 1990 were used to generate a weighted average annual rate of change. Jurisdiction-level vacancy rates and average household size were held constant from the 2020 decennial census. Population forecasts for sub-areas were then controlled by the county-level forecasts, e.g., sub-area populations were allocated using the county total (top-down approach), and the population summation of the sub-areas does not exceed the county population.

Forecast Program surveys were used to make adjustments to the baseline results for counties and UGB areas. Recent development and plans obtained from surveys were generally implemented in the first 5-10 years of the forecast, except where they indicate a change in long-run outlook. For the immediate period (2022-2030), the development rate derived from the surveys or received reports was applied before 2030. If no planned housing units were reported, recent development rate (2010-2020) or the overall county rate was used. For the later period (2030-2047), housing unit growth was based on either

¹ <https://csss.uw.edu/research/working-papers/contemporary-model-life-tables-developed-countries-application-model-based>

a weighted average or an extrapolation of historic trend (1990-2020). Assumptions were made for individual cities based on knowledge obtained from the general surveys, housing surveys, as well as documentations (e.g., housing needs assessment, comprehensive development plans) received from the cities.

Many uncertainties still remain in understanding the climate change impacts on migration. Thus, specific scenarios of climate change, political unrest, or other shocks were not reflected in the current forecast. The forecast program methodology is described in further detail in an accompanying report available on the Population Research Center's website.

2. County Overview

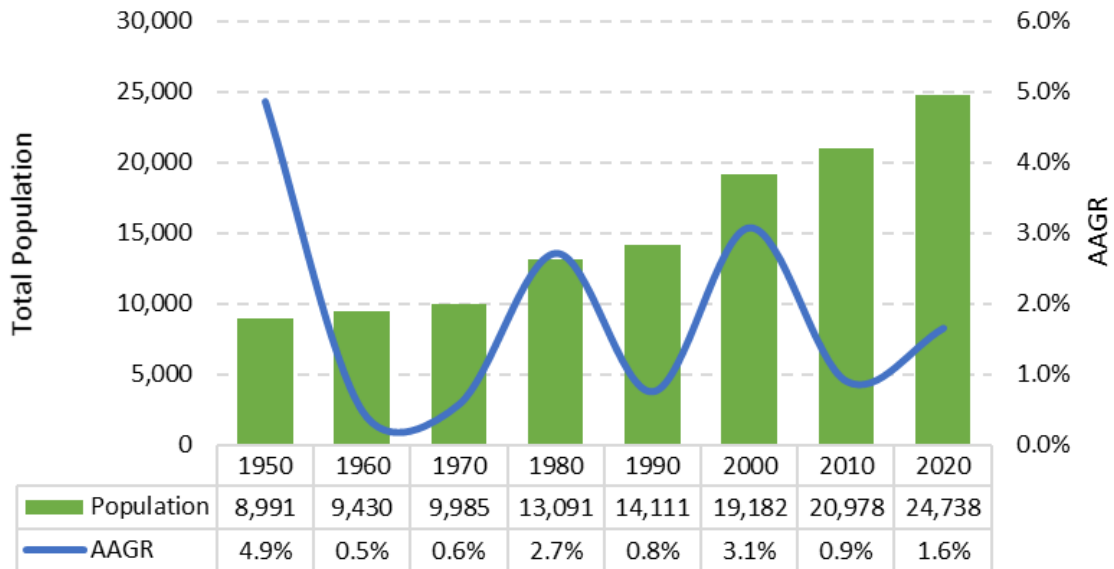
The total population for Crook County was reported as 24,738 in the 2020 census, which was an increase of 18% from the 2010 census. Prineville is the only incorporated city in the county and it is also the county seat. Prineville city has a population of 10,736 according to the 2020 census. General survey responses received from the county suggested the county is seeking new housing developments in the rural areas and currently has at least two rural subdivisions approved recently. Housing pressure in surrounding places such as Deschutes County, as well as housing for contractors are some of the factors that promote population growth in Crook County. However, restrictions on land use outside of city limit may hinder population growth inside the Prineville UGB but outside of its city limit.

3. Historical Trend and Population Forecast

3.1 County Population

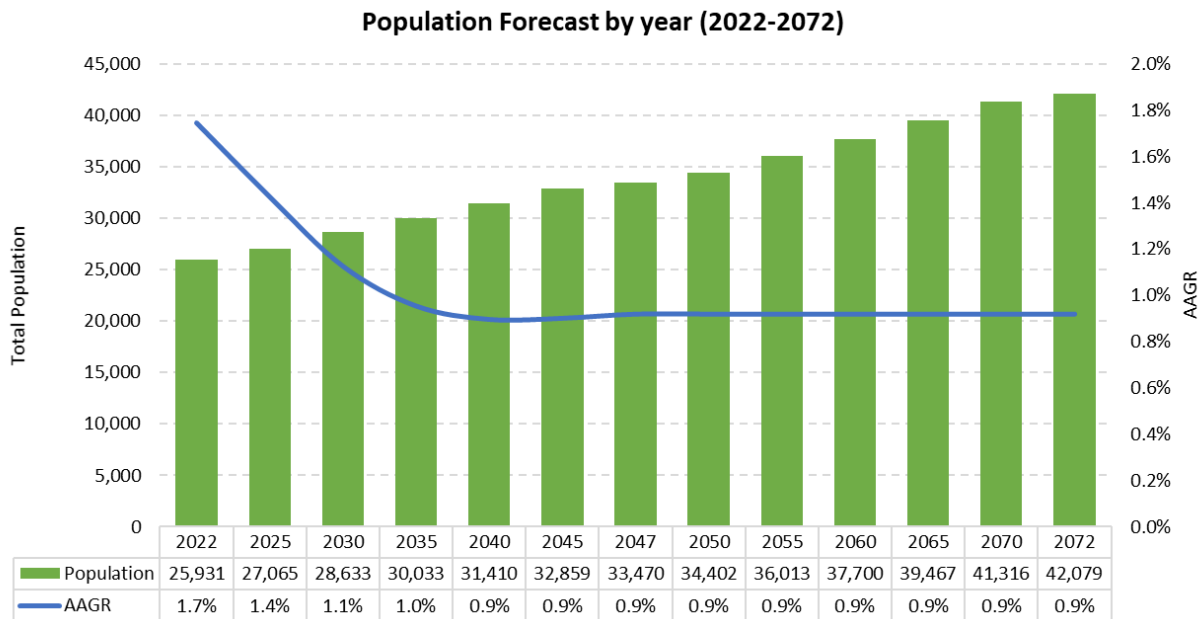
As illustrated in the Figure 1, in Crook County, the fastest population growth over the past 80 years occurred in the 1940s, which was reflected in the 1950 census. Between 1940 and 1950, the AAGR reached nearly 5%. In addition, the county experienced two growth peaks during the 1970s and 1990s. The population AAGR has dropped from 3.1% to 0.9% between the 2000 and 2010 censuses but showed signs of increase in the 2020 census. As shown in Figure 2, population forecasted at the beginning of the 50-year timeframe is expected to have a similar AAGR to the growth rate recorded in the 2020 census (i.e., 1.6%). Over time, the population growth slows down and eventually remain at around 0.9% AAGR. Total county population is projected to increase by 62% in the next 50 years.

Historical Census Population



Sources: US Census Bureau, 1950, 1960, 1970, 1980, 1990, 2000, 2010, and 2020 Decennial Census.

Figure 1. Historical total county population and AAGR, 1950-2020.



Sources: Forecasted by Population Research Center (PRC).

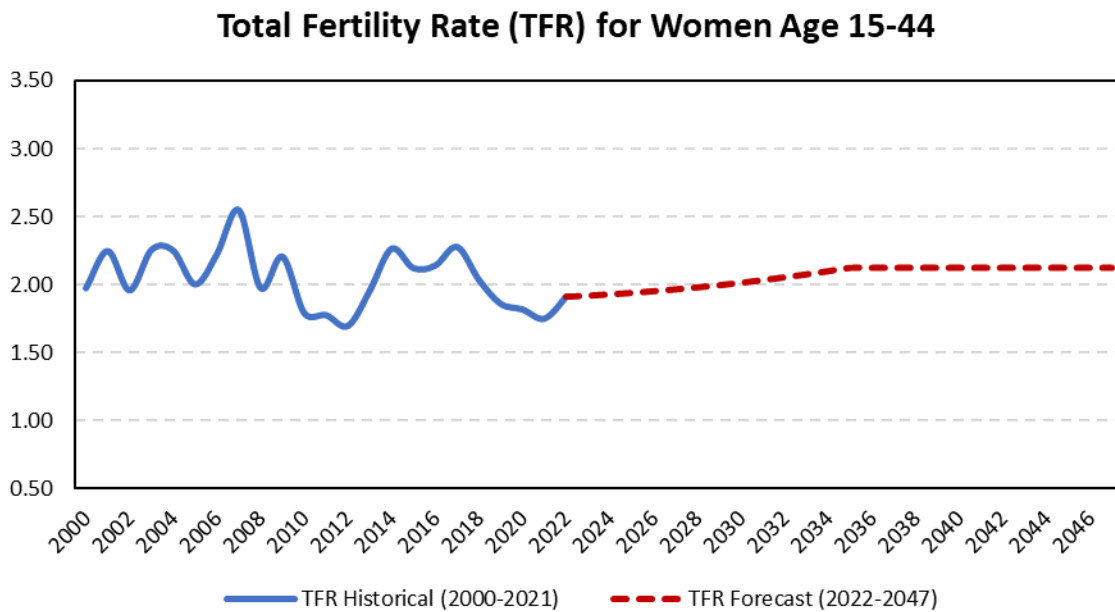
Figure 2. Forecasted total county population and AAGR, 2022-2072.

3.2 Births and Deaths

The total fertility rate (TFR) is shown in Figure 3. Crook County's TFR has experienced multiple high and low points since 2000. Compared to Oregon state, which experienced a TFR drop from 1.7 to 1.4 between 2014 and 2020, Crook County's TFR remained consistently above 2.0 during the same period. However, the TFR has declined since 2017. The projected TFR in the county remains around 2.0, which is similar to the average historic TFR over the last 20 years.

The actual number of births can follow a different trend than TFR if there are unusually high or low numbers of women of childbearing age in a given year. Figure 4 includes historical and projected births (and deaths) in the county. Annual births have experienced some declines since 2009 and been outnumbered by annual deaths since then. In the forecast, annual births are projected to increase over time, following a similar trend as annual deaths. However, annual deaths are still projected to outpace births throughout the forecast.

The increase in deaths shown in the 2021 OHA preliminary data may mainly be associated with excess deaths related to COVID-19. The impacts of COVID-19 was considered to be short-term in our forecast and the county annual deaths are expected to return to continue the pre-pandemic trend. Annual deaths are projected to reach a high point of over 450 in early 2040. Toward the end of the first 25 years of the 50-year forecast timeframe, annual deaths appear to show signs of decline. These dynamics are due to aging in the population, with the aging of the large baby boom cohort accounting for most of the increases in death counts during 2020-2040.

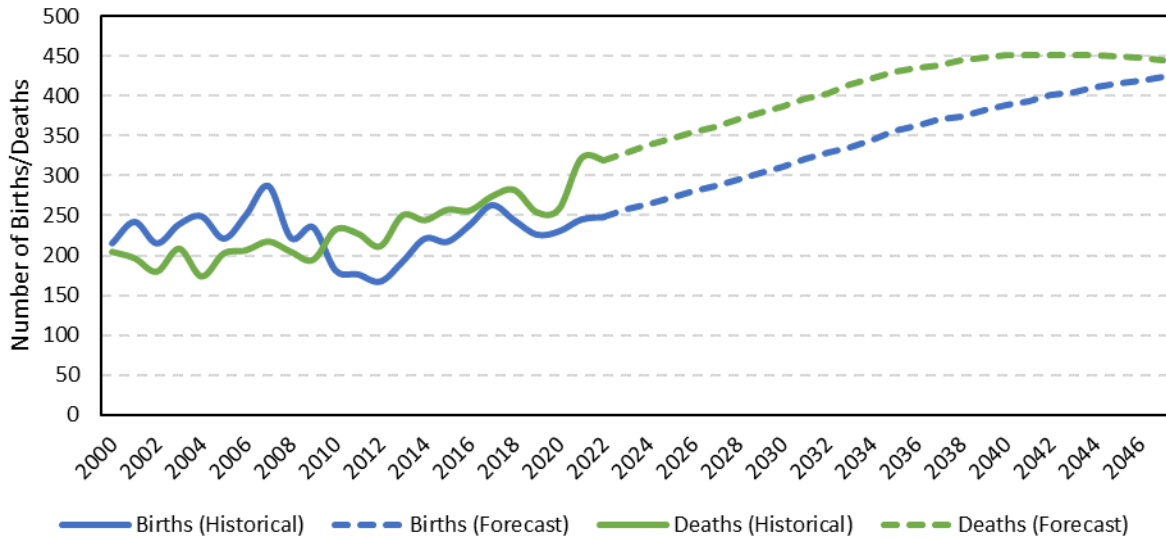


Note: OHA's vital statistics for 2021 are preliminary at the time of this report.

Sources: Oregon Health Authority (OHA), Center for Health Statistics. Calculations and forecast by Population Research Center (PRC).

Figure 3. Historical and projected total fertility rate (TFR), 2000-2047.

Historical and Forecast Annual Births and Deaths (2000-2047)



Note: OHA's vital statistics for 2021 are preliminary at the time of this report.

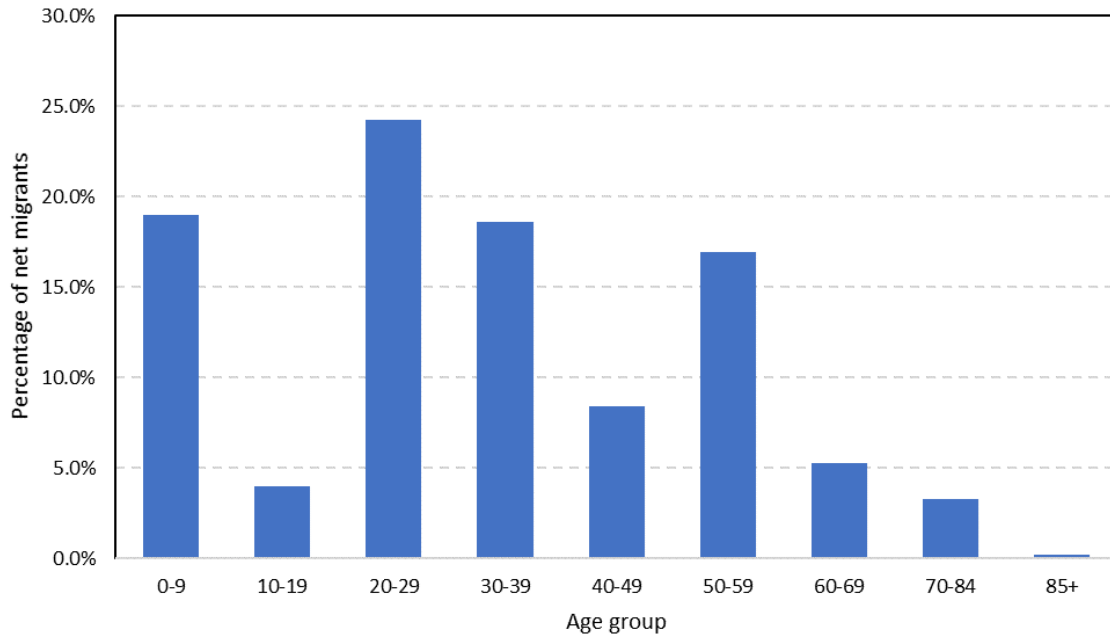
Sources: Oregon Health Authority (OHA), Center for Health Statistics. Calculations and forecast by Population Research Center (PRC).

Figure 4. Historical and projected annual births/deaths trend, 2000-2047.

3.3 Migration

Age-specific migration was estimated based on the 2006-2010, 2011-2015, and 2015-2019 5-year ACS. The age patterns were used from the ACS but controlled to the number of total migrants by direction (in or out) and domestic (inter-state or between counties in Oregon) or foreign. The overall net migrants for each county were adjusted for consistency with annual PRC population estimates. Figure 5 illustrates the percentage each 10-year age group accounts for among total county net migration calculated based on the 2015-2019 ACS migration flow. All age groups shown in Figure 5 indicated positive net migration and the 20-29 age group accounted for the highest proportion of net migration in the county. The oldest age groups accounted for only a small share of net migration, meaning the older population is very unlikely to move in or out of the county. The higher share of positive net migration in the 20-29 and 30-39 age groups can play a role in the increases in births shown in Figure 4.

Average Annual Net Migration Percentage by Broad Age Groups (2015-2019)

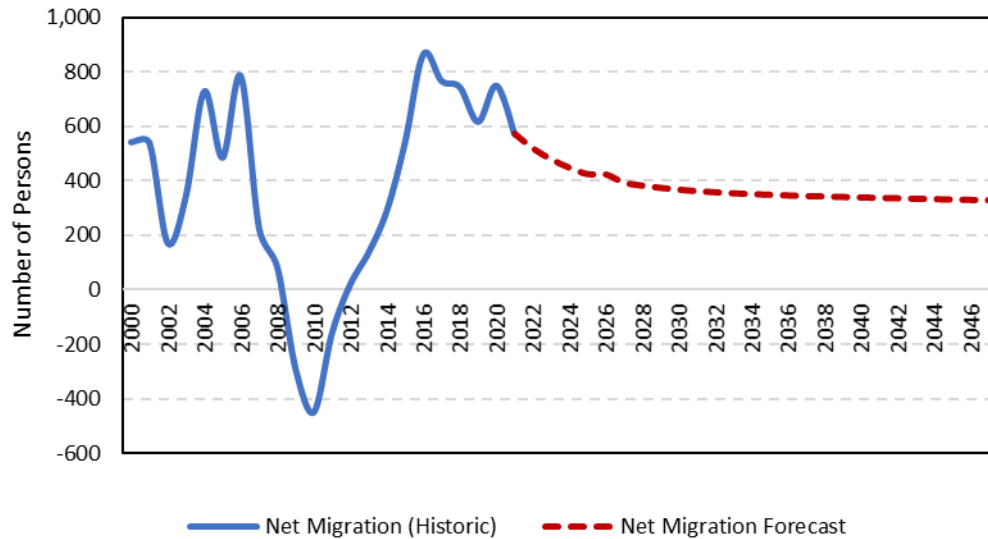


Sources: American Community Survey (ACS); Internal Revenue Services (IRS); US Census Bureau Population Estimated Program (PEP); Calculated by Population Research Center (PRC).

Figure 5. Percentage of net migrations by broad age groups in Crook County, 2015-2019.

As shown in Figure 6, the historic annual net migration in Crook County varied significantly between 2000 and 2020. County-wide net migration experienced some downturns in the late 2000s and early 2010s, which may be associated with the impacts of the economic recession during that period. The county experienced the highest number of net migrations in 2016, in which the annual net migration reached over 800. Annual net migration is projected to range between the upper 400s and lower 300s.

Annual Net Migration (2000-2047)

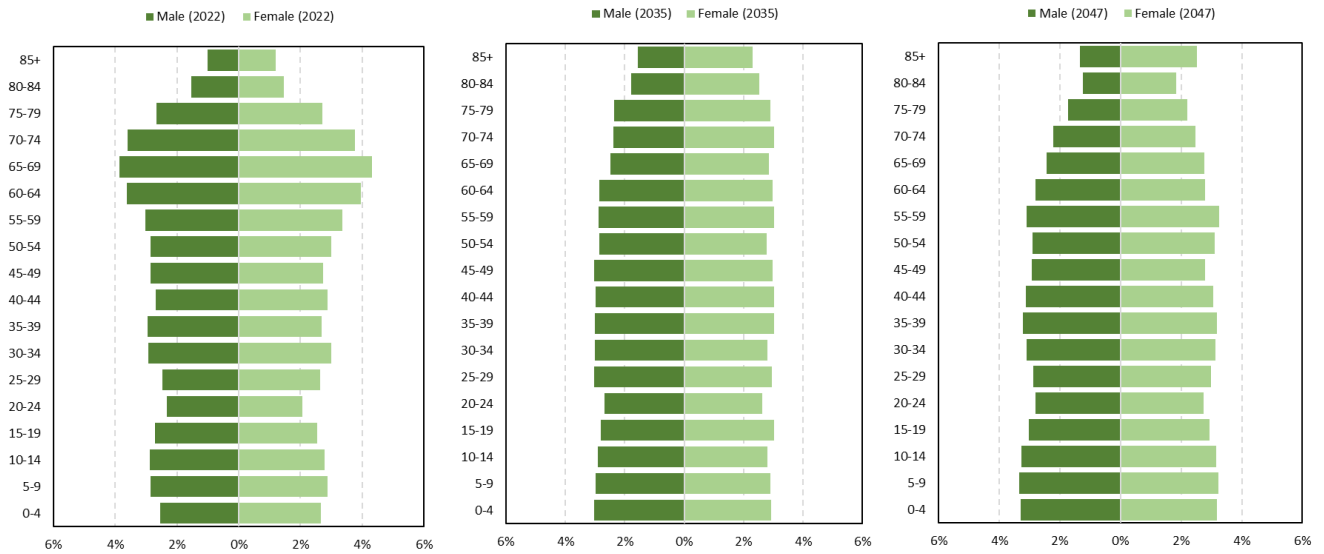
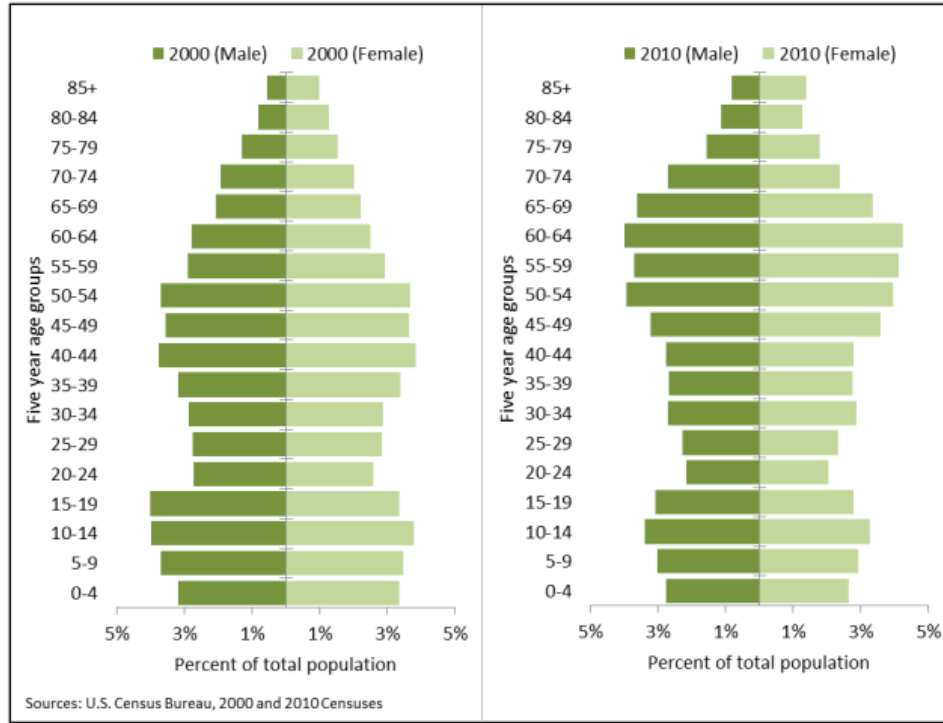


Sources: Internal Revenue Service (IRS) Tax Stats (1990-2020); American Community Survey (ACS); Population Estimates Program (PEP) 1990-2020. Calculations and forecast by Population Research Center (PRC).

Figure 6. Historical and projected total county net migration, 2000-2047.

3.4 Age Structure

As shown in Figure 7, the 2000 and 2010 censuses showed the population aging forward in the 10-year period. Population aged between 40 and 54 in 2000 aged forward to 2010 and accounted for the largest population share in the 2010 census. On the other hand, population between the ages of 10 and 19 accounted for the largest population share in 2000, but the same share was not reflected in the 20-29 age group in 2010, which implied that population in the 10-19 age group is less likely to move to Crook County. The 2035 and 2047 age pyramids indicate shifts in age structure. The county population is projected to become more evenly distributed across age groups in 2035 and 2047 compared to 2022. As shown in Figure 4, births in Crook County are projected to increase, which contribute to the increase of population share in population under 20.



Sources: Calculations and forecast by Population Research Center (PRC).

Figure 7. Population structure by age and sex, historical (2000 and 2010) and forecast (2022, 2035, and 2047).

3.5 Race/Ethnicity

Table 1 shows the race/ethnicity characteristics in the county from the 2010 and 2020 censuses. Race/ethnicity was not included as a component in the current forecast model but is provided in this report for reference. Between the two censuses, population identified as “Some Other Race alone” has the most relative gain compared to other race/ethnicity groups, followed by population of two or more races. Among non-Hispanic and non-White alone populations, population identified as “American Indian and Alaska Native alone” in the 2020 census was the only group that decreased. In the 2020 census, the Hispanic or Latino population continued to be the largest non-white alone population in the county.

Table 1. County population by race/ethnicity.

Hispanic or Latino and Race	2010		2020		Absolute Change	Relative Change
Total Population	20,978		24,738		3,760	17.9%
Hispanic or Latino (of any race)	1,463	7.0%	1,803	7.3%	340	23.2%
Not Hispanic or Latino	19,515	93.0%	22,935	92.7%	3,420	17.5%
White alone	18,758	89.4%	20,874	84.4%	2,116	11.3%
Black or African American alone	30	0.1%	78	0.3%	48	160.0%
American Indian and Alaska Native alone	273	1.3%	262	1.1%	-11	-4.0%
Asian alone	96	0.5%	114	0.5%	18	18.8%
Native Hawaiian and Other Pacific Islander alone	11	0.1%	23	0.1%	12	109.1%
Some Other Race alone	12	0.1%	102	0.4%	90	750.0%
Two or More Races	335	1.6%	1,482	6.0%	1,147	342.4%

Sources: US Census Bureau, 2010 and 2020 Decennial Census. Calculated by PRC.

3.6 Component of Change

The component of population changes up to 2072 is shown in Figure 8. The darker blue shade indicates the natural increase/decrease (births less than deaths, which is negative in the county because there are more deaths than births), while the lighter blue shade indicates the net migration. At the county level, natural decrease is projected to continue as net migration remains positive. Net migration is expected to remain in the 300s in most of the next 50 years, which is much higher than the numbers projected for natural decrease, and thus contribute to population growth. Net migration shown for 2020 reflects the average net migration between 2016 and 2020, which was higher than the forecasts since there were several high points of net migration during 2016-2020.

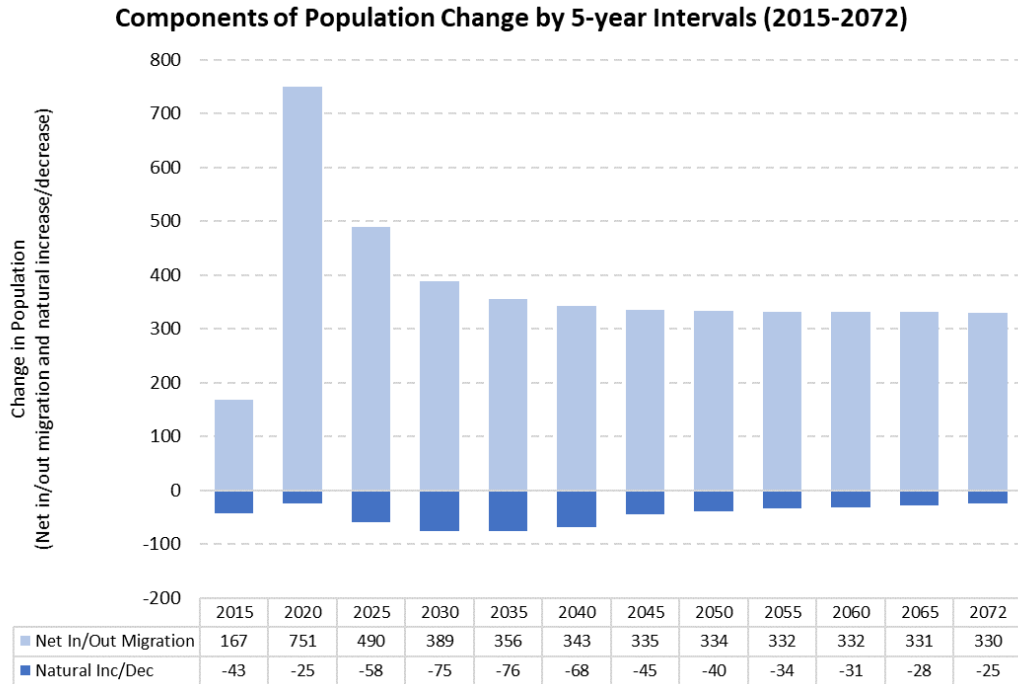


Figure 8. Historical and forecast components of population change, 2015-2072.

3.7 Sub-Area Population

Sub-area populations within and outside the urban growth boundaries (UGBs) are forecasted using the housing unit method, and then adjusted to be consistent with the county level forecast. As shown in Table 2, the only UGB in Crook County is Prineville. Between 2010 and 2020, the Prineville UGB had a population AAGR of 1.4%, which was lower than the population AAGR outside of its urban growth boundary. Nonetheless, Prineville still maintained as the more populated sub-area in the county. In the forecast, population inside the Prineville UGB is projected to grow faster than population outside of UGB. The Prineville UGB is projected to have a population of 217,652 by 2047, a 31% increase in 25 years. The Prineville population continues to growth in the later half of the forecast timeframe, achieving an AAGR of 1.3%. In contrast, population outside of Prineville is projected to grow at a slower pace, which implies that population may be more likely to move to the city than the rural areas.

Table 2. Historical and forecasted population and AAGR in Crook County and its sub-areas.

	Historical			Forecast				
	2010	2020	AAGR (2010-2020)	2022	2047	2072	AAGR (2022-2047)	AAGR (2047-2072)
Crook County	20,978	24,738	1.6%	25,931	33,470	42,079	1.0%	0.9%
Prineville	11,213	12,921	1.4%	13,447	17,652	24,417	1.1%	1.3%
Outside UGBs	9,765	11,817	1.9%	12,484	15,818	17,662	0.9%	0.4%

Sources: U.S. Census Bureau; Forecast by Population Research Center (PRC)

3.7.1 UGB Shares

As shown in Table 3, the Prineville UGB continues to be the more populated sub-area in the county. The population share of the Prineville UGB is projected to increase from 52% in 2022 to 58% in 2072. The area outside of the Prineville UGB is projected to account for a smaller share of population, even though the population is expected to grow in number. This is mainly because Prineville’s population increases at a faster pace than that of the outside-UGB sub-area, resulting in the city taking up more shares.

Table 3. Population forecast for larger sub-areas and their shares of county population.

	Population			Share of County Population		
	2022	2047	2072	2022	2047	2072
Crook County	25,931	33,470	42,079			
Prineville	13,447	17,652	24,417	51.9%	52.7%	58.0%
Outside UGBs	12,484	15,818	17,662	48.1%	47.3%	42.0%

Sources: Forecast by Population Research Center (PRC)

4. Glossary of Key Terms

Average Annual Growth Rate (AAGR): The average rate of growth over a specific period of time. The AAGR is calculated using natural logarithm of the end-year value and the starting-year value, divided by the number of years.

Cohort-Component Method: A method used to forecast future populations based on a baseline or starting population, and cumulative changes in births, deaths, and migration.

Coordinated population forecast: A population forecast prepared for the county and sub-county jurisdictions including urban growth boundary (UGB) areas and all non-UGB area in the balance of county.

Group quarters: The US Census Bureau defines group quarters as places where “people live or stay in a group living arrangement that is owned or managed by an organization providing housing and/or services for the residents”. Examples of a group quarter may include college dorms, skilled nursing facilities, groups homes, prison, etc.

Housing unit: A house, apartment, mobile home or trailer, group of rooms, or single room that is occupied or is intended for occupancy.

Housing-Unit Method: A method used to estimate current populations or forecast future populations based on changes in housing units, vacancy rates, the average numbers of persons per household (PPH), and group quarters population counts.

Persons per household (PPH): The average household size (i.e., the average number of persons per occupied housing unit).

Total Fertility Rate (TFR): The number of children a woman would have by the end of a defined childbearing age. In this report, child-bearing age is from 15 to 44.

5. Appendix A: General Survey for Oregon Forecast Program

Each year, the jurisdictions in the region that is to be forecast is surveyed. The following are transcripts of what was received from jurisdictions who responded to the OPFP survey.

County	Crook
Date Time	11.30.21
Jurisdiction	Crook County
Name and Title	Will Van Vactor, Community Development Director
Observations about Population (e.g. birth rates, aging, immigration, racial and ethnic change)	My department does not have that information available. Anecdotally, vacancy rates appear to be low. With year round construction at Facebook and Apple data centers, it appears our rental market is maxed out. Inside City limits new apartment complexes have been constructed and new ones are in the planning phase (the City can provide more info on those projects).
Observations about Housing (Vacancy rates, seasonal occupancy, demolitions, renovations)	Outside city limits planning house developments are relatively restricted. However, we have approved two rural subdivisions recently. One is known as Grandridge (TL 151600000800, I don't believe individual tax lot numbers have been assigned yet) and the other is known as Grandview (TL 1614 Nos 503, 2700, 548, 541, 547, 542, 546, 543, 544, 545, second phase has not been assigned). We also have had a new phase approved at Brasada Ranch and expect other destination resorts to come in with modifications and development plans in 2022 or 2023, but those are still hypothetical.
Planned Housing Developments or Group Quarters Facilities (including number of units, occupancy, and estimated year of completion)	My department does not track this information.
Economic Development (e.g. new employers or facilities, including number of jobs and est. year of completion)	I reached out to Economic Development of Central Oregon (EDCO) to get some rough estimates. I don't have specific business names. It sounds like in 2020/2021 we added new employers adding 72 jobs. And future projects/plans include adding another 370 or so jobs. The local Chamber and Downtown Association may have more specifics.
Infrastructure Projects (e.g. transportation and utilities)	No immediately planned projects. We are discussing preliminarily another road to access the Juniper Canyon area. We have a lot of rural residential lands up Juniper Canyon. However, construction, if it occurs, will be several years out.

Other Factors Promoting Population or Housing Growth	Based on my observations, I think housing pressure in Deschutes County and housing for contractors at Facebook and Apple are two factors promoting population and housing growth in Crook County.
Other Factors Hindering Population or Housing Growth	It appears to me that the cost of real estate as well as construction costs hinder housing growth. In that regard, a lack of construction workers limits a builders availability to construct new homes and drives up costs as well.
8a. Summary of current or proposed policies affection growth in your jurisdiction.	Growth outside city limits is limited by state policies. The County encourages growth where it is allowed, for example in rural residential exception areas and inside the UGB (but outside city limits). However, the cost of extending services to properties outside city limits but inside the UGB hinders development in that area.
8b. Findings related to growth or population change from studies conducted in you jurisdiction.	We haven't conducted a study recently.
8c. The effects of wildfires or other disasters in your jurisdiction on housing, employment/economics, and infrastructure.	N/A (fortunately)
8d. The effects of the COVID-19 pandemic and policy measure on employment and current and planned developments.	I'm relatively new to my position and wasn't around to see some of the initial impact. If anything, housing demand has increased. I'm not sure about impact on employment.
9. For representatives from counties only: we invite you to provide tax lot data if available. These may be sent via email to askprc@pdx.edu	
Comments?	I'm sorry I don't have concrete data to provide in response to your questions. We don't track some of the requested information. I did reach out to our GIS team regarding your request for address list, lot size, etc, but didn't receive a response. If we are able to provide that info, I will pass it along.

6. Appendix B: Detail Population Forecast Results

Age	2021	2022	2025	2030	2035	2040	2045	2047
0-4	864	858	872	927	1,024	1,103	1,168	1,184
5-9	930	897	844	838	890	984	1,060	1,089
10-14	991	1,008	994	900	897	951	1,047	1,082
15-19	874	945	1,063	1,084	993	992	1,050	1,087
20-24	754	743	831	1,059	1,077	983	980	997
25-29	989	940	874	934	1,161	1,180	1,087	1,069
30-34	1,120	1,162	1,141	996	1,060	1,291	1,314	1,274
35-39	1,059	1,100	1,192	1,238	1,097	1,165	1,399	1,439
40-44	1,077	1,089	1,122	1,273	1,321	1,183	1,253	1,367
45-49	1,048	1,047	1,132	1,235	1,388	1,438	1,304	1,285
50-54	1,292	1,268	1,196	1,251	1,357	1,513	1,568	1,497
55-59	1,785	1,657	1,478	1,363	1,424	1,535	1,695	1,766
60-64	2,269	2,222	2,055	1,643	1,540	1,608	1,723	1,789
65-69	2,644	2,660	2,386	2,121	1,736	1,643	1,714	1,786
70-74	2,489	2,428	2,566	2,316	2,076	1,723	1,639	1,621
75-79	1,633	1,844	2,095	2,315	2,104	1,893	1,584	1,554
80-84	1,006	1,043	1,250	1,678	1,862	1,691	1,520	1,374
85+	838	877	975	1,259	1,691	2,005	2,001	1,978

Source: PRC Estimates, 2021; Forecast by Population Research Center (PRC).

7. Appendix C: Comparison of Current and Previous Forecast

To provide a better understanding of the changes since the last round of forecast for the Region 1 counties, this section compares the current 2022 total county population forecast to the population forecast published by the Population Research Center in 2018.

