

The background features several large, overlapping geometric shapes. A large light gray triangle points downwards from the top left. Another large light gray triangle points upwards from the bottom right. In the top left corner, there are overlapping purple triangles of different shades. In the bottom left corner, there is a light gray triangle and a smaller dark purple triangle. Thin, light gray diagonal lines cross the background.

Small-area forecast

Appendix C

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The Denver Regional Council of Governments' small-area forecast projects how the region's anticipated growth will be distributed across its communities. DRCOG staff collaborate with the Colorado State Demography Office and local jurisdictions to take county-level growth projections and allocate them across more than 50,000 census blocks, using a predictive model that simulates household and employment location choices while accounting for real estate market dynamics and natural and regulatory constraints. The resulting forecasts support a range of planning efforts, including the [Regional Housing Needs Assessment](#), modeling of future travel demand, effects on the transportation network and vehicle emissions, and mobility and accessibility for people and freight.

Forecast summary

By 2050, the Denver region is projected to reach 4.1 million people, 1.8 million households and 2.8 million jobs — growth of 24%, 29% and 23%, respectively, from 2023. While regional and state growth rates continue to surpass national trends, the pace of growth is slowing significantly compared to the prior 30 years. From 1990 to 2023, the region's population grew 82%, households grew 83%, and jobs grew 98%. The slowdown is driven by lower birth rates, an aging population and slowing net migration. The 65-plus age group will see the largest proportional increase (66%), driving up retirement rates and increasing the need for growth in the number of households to sustain the labor force.



Regionwide forecast

Total forecast for the Denver region

The Denver region consists of the 10-county area covered by DRCOG: Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Denver, Douglas, Gilpin and Jefferson counties, as well as a portion of southwest Weld County.

By 2050, the Denver region could be home to 4.1 million people (excluding those housed in group quarters such as nursing homes or college dormitories), 1.8 million households and 2.8 million jobs, according to the State Demography Office (refer to Table 1).

Table 1: Denver region forecast, 2023-2050

Category	2023	2030	2040	2050	Change, 2023-2050	
					Count	Percentage
Population	3,322,000	3,570,000	3,910,000	4,131,000	809,000	24.0%
Households	1,355,000	1,484,000	1,640,000	1,754,000	399,000	29.0%
Jobs	2,249,000	2,411,000	2,620,000	2,758,000	509,000	23.0%

Source: Population by Single Year of Age, Jobs Forecast and Household Forecast, State Demography Office, Colorado Department of Local Affairs. Weld County portioning applied by DRCOG staff.

Growth deceleration

Growth in the region has recently slowed compared to the past 30 years, and the slowdown is expected to continue over the next 30 years. Table 2 illustrates that from 1990 to 2023, both absolute and percentage growth in population, households and jobs was larger than what is forecasted from 2023 to 2050, as outlined in Table 1.

Table 2: Denver region historical estimates, 1990-2023

Category	1990	2000	2010	2020	2023	Change, 1990-2023	
						Count	Percentage
Population	1,827,000	2,377,000	2,756,000	3,290,000	3,322,000	1,495,000	82.0%
Households	742,000	946,000	1,108,000	1,317,000	1,355,000	613,000	83.0%
Jobs	1,138,000	1,616,000	1,678,000	2,082,000	2,249,000	1,111,000	98.0%

Source: Population by Single Year of Age, Jobs Forecast and Household Forecast, State Demography Office, Colorado Department of Local Affairs. Weld County portioning applied by DRCOG staff.

Though state and regional growth rates continue to outpace the nation’s, the same demographic realities that are slowing national growth will also affect the Denver region. Contributors, as identified in the State Demography Office’s [2024 Population Summary report](#), include lower birth rates, an aging population and slowing net migration.

The region, along with the state, has experienced lower birth rates since 2007 — the peak birth year in U.S. history. This recent trend compounds over the course of the forecast period as smaller cohorts born after 2007 reach child-bearing age. An older population also means lower fertility overall, as well as a higher propensity to move away, decreasing net migration.

Table 3: Denver region population forecast by age, 2023-2050

Age range	2023	2030	2040	2050	Change, 2023-2050	
					Count	Percentage
Ages 0-17	715,300	699,600	735,300	762,100	46,800	6.5%
Ages 18-34	805,400	848,200	895,800	858,200	52,800	6.6%
Ages 35-64	1,307,000	1,413,000	1,563,000	1,693,000	386,000	29.5%
Ages 65-plus	494,300	609,200	715,400	817,900	323,600	65.5%
Ages 75-plus	192,500	276,200	375,000	424,500	232,000	120.5%

Small-area forecasting process

County control totals

DRCOG staff allocate the State Demography Office's household and job growth forecasts at the county level across census blocks. This includes the 10-county Denver region as previously described, as well as additional blocks in Weld County (east to the Morgan County border) and Elbert County (along its western border with Douglas County). This means the totals reflected in Tables 4 and 5 may not match totals reported elsewhere for the territory within the DRCOG boundary and the smaller Denver transportation management area designated for metropolitan planning organization purposes.

Generally, during the allocation process, the total growth across all blocks in a county equals the state-forecast county control totals. There are two exceptions. First, a small amount of household growth is reallocated between the counties to account for short-term residential development expectations and to keep forecasted housing vacancy rates in line with historical trends. Second, if the employment controls exceed DRCOG's estimates of employment capacity for a county, staff allocate the remaining amount of employment to the rest of the region.

Table 4: Household forecast by county in the DRCOG modeling area

County	2023	2030	2040	2050
Adams	187,700	211,100	244,400	276,900
Arapahoe	252,500	275,100	307,600	334,200
Boulder	133,700	142,500	152,700	157,300
Broomfield	31,400	39,040	45,910	51,250
Clear Creek	4,320	4,290	4,330	4,390
Denver	330,700	367,100	404,800	425,600
Douglas	144,200	159,900	177,100	186,700
Elbert	9,020	9,020	9,900	10,330
Gilpin	2,600	2,620	2,670	2,780
Jefferson	237,900	246,900	258,200	265,900
Weld	37,760	44,860	55,080	65,450

Note: Only a portion of Elbert and Weld counties are within the modeling area.
Source: Household Forecast, State Demography Office, Colorado Department of Local Affairs; Zonda; CoStar. Weld and Elbert county portioning factor applied by DRCOG staff.

Table 5: Job forecast by county in the DRCOG modeling area

County	2023	2030	2040	2050
Adams	299,400	337,700	370,200	395,800
Arapahoe	422,700	432,900	458,800	479,100
Boulder	254,800	271,800	298,000	318,500
Broomfield	51,580	57,590	67,060	74,800
Clear Creek	4,520	4,550	5,000	5,380
Denver	670,100	720,900	773,700	819,900
Douglas	188,400	216,700	260,900	262,000
Elbert	8,180	10,060	11,390	12,090
Gilpin	5,110	5,380	6,270	6,520
Jefferson	317,900	324,600	334,400	343,300
Weld	44,680	50,880	60,500	70,980

Note: Only a portion of Elbert and Weld counties are within the modeling area.
Source: Jobs Forecast, State Demography Office, Colorado Department of Local Affairs; Moody's. Weld and Elbert county portioning factor applied by DRCOG staff.

Predictive model

DRCOG staff rely on a predictive model, the open-source UrbanSim block model.

UrbanSim is a microsimulation model that represents the behavior of individual agents (households, businesses and developers) and their interactions in real estate markets. UrbanSim simulates annual changes, capturing the dynamics of household moves, housing choices (renting versus owning), firm location decisions and developer activities such as new construction or redevelopment. It incorporates land use policies, transportation plans and accessibility changes, which influence market conditions, prices and rents.

Key features of UrbanSim include:

- Agent-based modeling: Represents individual households, firms, jobs and their decisions.
- Spatial detail: Models land, blocks and real estate at fine-grained levels.
- Dynamic timeframe: Simulates annual changes, reflecting the evolving urban system and market mismatches.
- Real estate market focus: Emphasizes interactions between consumer and supplier choices and their effects on prices and vacancies.
- Discrete choice models: Uses models like multinomial logistic regression to simulate decision-making.

UrbanSim uses a dynamic, path-dependent approach, allowing it to closely mirror real-world urban development processes, including the gradual pace of housing additions and the cyclical nature of real estate markets.

Base data

All base data for DRCOG's customized instance of UrbanSim is in 2020 census blocks and was prepared by DRCOG staff.

- Block-level household data is from the 2020 U.S. Census.
- Block-level job data is from the Quarterly Census of Employment and Wages from the Colorado Department of Labor and Employment, with the number of jobs in a sector by block inflated proportionally by DRCOG staff to match the State Demography Office's job estimates by county.
- Disaggregate household data was synthesized using the Census Bureau's Public Use Microdata Sample and 2017-2021 American Community Survey five-year estimates.



Natural and regulatory constraints

DRCOG staff estimate and assign capacities for residential units and employment in each census block. The capacity estimates constrain the number of additional households and jobs that can be allocated to an area in UrbanSim simulations through 2050. DRCOG staff base the estimates on an analysis that considers:

- The size of the block.
- The portion of the block covered by water or floodplains.
- The portion of the block under ownership that could prevent development, such as protected open space, parks and schools.
- The amount and extent of different local zoning districts that cover the block.
- Local government feedback (refer to the [“Local government feedback” section](#)).

DRCOG staff annually request geospatial data from local governments, including local zoning data. Staff estimate local zoning district capacity for approximately 1,900 unique districts. Staff use the point-level housing and employment data DRCOG licenses, collects and compiles to identify current housing and employment levels, both within individual census blocks and apportioned to specific local zoning districts. Staff estimate residential unit and employment capacities for a given zoning district based on existing densities across all blocks. County-level estimates for aggregated zoning types, local zoning codes, local comprehensive plans and jurisdiction feedback are used to supplement DRCOG’s block-level estimates.

Scheduled development

The UrbanSim block model allows DRCOG staff to add known development projects in individual census blocks. This process allows for the placement of residential units and jobs during simulation without relying on the predictive location choice models or

exceeding the county control totals. Use cases for this model input include:

- Large master-planned communities, planned or in progress.
- Recent approvals, permitting or building activity.
- Other local knowledge about investments and commitments.
- Observable housing and employment development since the base year, using the point-level housing and employment data DRCOG licenses, collects and compiles.
- Development activity information available and maintained on jurisdiction websites.
- Other specific local government feedback.

Location choice models

UrbanSim assigns new buildings, households and jobs to blocks using location choice models, which estimate the probability of choosing an option based on the chooser's characteristics and the utility of the alternatives. In DRCOG's implementation, residential units, households and jobs are choosers, and blocks are alternatives, modeled using multinomial logistic regression. Each model type is stratified into subgroups to reflect differing preferences.

Residential unit location models

Residential unit location models are divided into four strata (single-family, multifamily, renter, owner). Key variables include:

- Proximity to jobs, transit, major roads and housing units.
- Mean home values, rents and household incomes.
- Median year built.
- Proximity to households with children.

Household location models

Household location models are divided into 10 strata (income levels, head of household age, presence of children). Key variables include:

- Proximity to jobs, transit and households with children.
- Mean rent, household income and residential density.
- Unit size and year built.

Employment location models

Employment location models are divided into six industry sectors. Key variables include:

- Proximity to jobs, transit, roads and healthcare jobs.
- Mean building values and rents.
- Residential density and area income.



Aging and demographics

DRCOG's implementation of UrbanSim enhances the model by allowing the simulated population to age, providing a more accurate understanding of the region's changing demographic characteristics. In the default version of UrbanSim, demographic changes can be modeled with age-segmented household control totals, which add new households headed only by growing age groups. For the Denver region, this typically results in the placement of new older-adult households, whereas in reality, new households are generally younger when they form or move to the region, and then they age in place.

To address this, DRCOG's implementation ages the simulated population each year and resynthesizes households to align the new household and person-level age characteristics to the existing disaggregate household data. In typical UrbanSim implementations, a synthetic population is created for the base year, and demographic changes are only reflected by creating or removing households. By resynthesizing the population annually and using updated population and household targets, DRCOG's approach accounts for how household characteristics evolve over time, such as changes in household size, income or number of workers as households age.

Local government feedback

DRCOG staff rely on extensive feedback from local government partners on preliminary model results to improve model inputs. The types of model input improvements staff use feedback to address include:

- Block-level adjustments to reduce or add housing or employment capacity.
- Zoning district-wide capacity adjustments.
- Improvements to scheduled development information.
- Addition of missing projects through scheduled development.

DRCOG staff invited local jurisdictions to provide feedback on the small-area forecast from January 20 through February 21, 2025, and 12 jurisdictions submitted 105 comments. To receive as much feedback as possible, DRCOG staff:

- Held a webinar to begin the feedback-gathering process, which included an overview of how the forecast was created and an explanation of how to give feedback.
- Held open office hours where local government staff could drop in and ask questions one-on-one with DRCOG staff.
- Collected feedback through an online webmap, via email and in one-on-one meetings with local jurisdictions.
- Held a second webinar to conclude the feedback process and demonstrate how the feedback was incorporated into an updated version of the forecast.

The collected feedback led to the adjustment of future capacities for 2,829 blocks and the addition of 169 scheduled developments, totaling 7,400 additional residential units. Input from DRCOG's member governments was vital to ensuring the accuracy of the regional model and datasets. By incorporating insights from local experts who understand local development plans and conditions, DRCOG staff were able create a forecast that better reflects the realities of the region.