COLORADO
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Colorado's Housing Shortfall: An Estimate and Review of Existing Studies

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Key Takeaways

- The housing shortfall for 2023 is estimated to be 106,000 units.
- The shortage peaked in 2019 at 140,000 units.
- Based on the latest population projections, 34,100 units would need to be added each year to maintain the existing shortage over the next ten years.
- Despite recent decreases in the housing shortfall, housing affordability reached a record low in 2023.

Introduction

Since 2000, Colorado's housing market has undergone significant transformation. Population growth has outpaced new housing development, resulting in supply constraints and escalating costs. Between 2000 and 2023, residential property values and rental rates increased at rates exceeding income growth, thereby exerting considerable financial strain on many residents. Multiple studies have highlighted how Colorado's housing supply has not kept pace with housing demand and is particularly deficient relative to other states. **Colorado's State Demography Office (SDO) estimates that 106,000 housing units were needed as of 2023 to overcome the housing shortfall. Additionally, SDO estimates that 34,100 units need to be built annually to maintain the housing shortage where it was in 2023, based on current SDO household projections.**

This research brief details how the housing shortage estimate was calculated and how it compares to other estimates. First, the brief reviews existing Colorado housing needs and shortage analyses and characterizes their approaches. It then details the estimation methods, assumptions, and data used by SDO to arrive at an estimate for 2023, the most recent year of population and housing data available from the American Community Survey. Finally, this research brief identifies how housing shortage research may be extended in the future.

A Review of Housing Needs and Shortfall Estimates

A variety of organizations have undertaken efforts to quantify Colorado's housing "shortfall", "deficit", "underproduction," or "unmet needs." These existing studies, summarized in Figure 1, differ based on the specific methodologies, data sets, and underlying assumptions used. These approaches can be broadly grouped into two categories: quantifying affordability gaps

and directly estimating housing deficits. The studies falling under these two categories are described below.

Figure 1. Summary of Colorado Housing Needs and Shortfall Estimates
(Sorted by Estimate Year and then Alphabetically by Source)

Source	Publication Year	Estimate (Housing Units)	Estimate Year	Methodological Approach	Region or Scope
Affordable Housing Transformational Task Force (AHTTF)	2022	225,000	Could not be identified at the time of publication	Could not be identified at the time of publication	Statewide
Up for Growth	2024	105,000	2022	Direct Housing Deficit: Missing Households + Vacancy	Statewide
Colorado State Demography Office (SDO)	2025	106,000	2023	Direct Housing Deficit: Missing Households + Vacancy	Statewide
Common Sense Institute (CSI)	2025	64,095 to 135,139	2023	Direct Housing Deficit: Vacancy	Denver Metro Area
Denver Regional Council of Governments (DRCOG)	2025	69,000	2023	Direct Housing Deficit: Missing Households + Homelessness + Vacancy	10-County DRCOG Region
National Low Income Housing Coalition (NLIHC)	2025	134,281	2023	Affordability Gaps (for Low-Income Renters)	Statewide (Rental Only)

Estimates of Affordability Gaps

Affordability gap analyses focus on households that are housing *cost-burdened*, meaning that a significant portion of a household's income goes toward housing costs. Most prominent is the annual study published by the National Low Income Housing Coalition (NLIHC, 2025). This study looks at *Extremely Low Income (ELI)* renter households, those with total household income of less than 30% of Area Median Income (AMI), and the number of available housing units that are affordable to these households. The affordability threshold used in this analysis is

Definitions of Key Terms

Cost-burdened household: A household where housing costs represent 30% or more of household income.

Extremely Low Income household: Households with total household income less than 30% of area median income.

housing costs would not exceed 30% of gross household income.

Based on the NLIHC analysis, for Colorado, the gap between the number of ELI households and the number of housing units which are affordable to these households is about 134,000.

Direct Estimates of Housing Deficit

Studies that directly estimate housing deficits seek to quantify the number of additional units needed to bring the current housing market to a state of equilibrium or "balance." Housing deficits can be measured using a variety of methods, ranging from simple to complex, as demonstrated in some of the examples below. These studies calculate housing shortages based on one or more of the following factors: housing production levels, balanced vacancy rates, “missing” households, and the impact of housing costs on missing households.

Housing production levels. In a 2021 study, the National Association of Realtors (NAR) calculated the United States housing deficit[1] by examining the net slowdown in housing production over the past 25 years (Rosen Consulting Group, 2021). Relative to earlier time periods, housing production has decelerated, and the NAR study arrives at their housing deficit number by calculating the number of housing units that would have been built had housing production maintained its prior elevated rate.

Balanced market vacancy rates. Another method for capturing the deficit directly examines current housing vacancy rates relative those in a “balanced” market. A balanced market is typically defined as one in which there is a supply of homes that could satisfy between four and six months of demand. The vacancy rate observed in a balanced market is one which accommodates enough vacant housing units to account for necessary turnover. Sales and rental prices tend to be more stable in a balanced market, as both parties to the rental or sales transaction have favorable conditions. This allows homebuyers and renters the ability to adequately shop the market for the right home at the right price, rather than accept “whatever is available” in a market with limited supply. Once a balanced market vacancy rate is established, the gap between the current market vacancy rate and the balanced rate determines the excess supply of units (in a soft market) or excess demand for units (in a tight market).

Missing households. An alternative direct estimate approach stems from the concept of “missing” households. Missing households are identified by taking a target “expected” number of households in a balanced housing market and subtracting out the actual observed number of households, with this gap representing those households which are “missing” due to the lack of housing supply. The deficit in the housing market is then simply the number of missing households. Studies such as Up for Growth (2024) and the DRCOG Regional Housing Needs Assessment (2024) both utilize this common headship rate, defined below, as a component of their missing household estimate, though both also include additional elements.

Both studies assume that the target headship rate should be similar to what was observed in the year 2000. This period was chosen as it reflects a housing market that multiple experts

[1] The 2021 NAR report does not provide an estimate for Colorado.

have argued possessed a better balance between supply and demand for housing. These studies estimate the state's missing households by first calculating the number of households that would have existed had headship rates remained as they were in 2000, and subtracting out the current number of households, with the difference being the "missing" amount. In determining the total number of missing units, both studies also apply an adjustment for the difference between the existing and a target vacancy rate reflective of a balanced market (as discussed in the previous section) to arrive at a total housing unit shortfall. For the year 2022, Up for Growth estimates a Colorado housing shortage of 105,000 units, while DRCOG estimates 44,000 units of housing underproduction for the Denver region alone.

What is a headship rate?

The "headship rate" refers to the share of adults in the population who head their own household. It is calculated as the number of households divided by the number of adults in a given population. A higher headship rate means more adults are living alone or with fewer other adults, while a lower rate may indicate more adults living together, such as in multigenerational households, with roommates, or multiple families "doubling up."

Interactions between headship rates and affordability. Another approach to calculating missing households stems from incorporating how socio-economic factors alter headship rates. Household formations are contingent upon several factors, including, but not limited to, migration, economic conditions, number of children, marriage rates, and housing affordability. Several studies, such as those by Freddie Mac (2018) and Brookings Institution (2024), have modeled how these factors impact headship rates and develop target headship rates by asking how headship rates would differ if housing were more affordable.

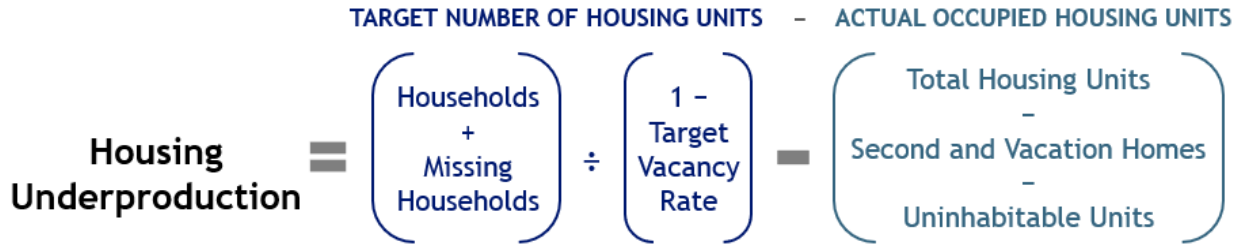
SDO's Housing Shortage Estimate

After reviewing housing needs and shortage methodologies, SDO arrived at a housing shortage estimate based on a methodology that accounts for a target balanced vacancy rate as well as a missing households approach, incorporating how headship rates have fallen in the past 25 years, consistent with multiple other studies. In addition, this study also calculates a future housing need estimate using population projections developed by SDO to estimate how many housing units would be needed to keep the housing shortage at its current level. Based on these methods, SDO estimates a housing shortage of **106,000 housing units** in 2023 and an additional **34,100 tenant housing units** (units that are not vacation or second homes) needed annually over the next ten years to keep up with population growth and hold the shortage constant.

SDO's methodology is largely consistent with the framework utilized in studies conducted by ECONorthwest & Denver Regional Council of Governments (2024) and Up for Growth (2024). In this methodology, missing households are estimated using the headship rates observed in the year 2000 as a target headship rate, when the housing market was more in balance and

headship rates were considerably higher.[2] In addition to examining headship rates, adjustments are made to incorporate a target vacancy rate as an additional measure of a healthy housing market. The combination of target headship rates and vacancy rates allow for the incorporation of both reduced household formation, through headship rates and missing households, and healthy housing turnover, via the vacancy rate. Figure 2 summarizes the general equation used to calculate Colorado's housing shortage.

Figure 2. Housing Underproduction Formula



Source: Adapted from Up for Growth (2024).

To calculate a housing shortage, six data points were required: the number of households, by age of head of household; a target vacancy rate; total housing units; second/vacation homes; uninhabitable units; and missing households. Each of the values used in this analysis for Colorado are shown in Figure 3.

Figure 3. Housing Shortage Formula Values

Data Input	Value	Source
Total Housing Units	2,638,093 units	2023 ACS
2nd and Vacation Homes	94,822 units	2023 ACS
Uninhabitable Homes	7,479 units	2023 ACS
Vacancy Rate	5%	Based on SDO analysis of market conditions; consistent with Up for Growth (2024)
Households	2,428,261 households	2023 ACS
Missing Households	81,829 missing households	SDO Calculations

Estimates of the number of households; total housing units; second/vacation homes; and uninhabitable units in this analysis are determined from the 2023 American Community Survey (ACS) data published by the U.S. Census Bureau, a nationally representative survey detailing

[2] The specific base year chosen affects both the result and underlying assumptions about changes in the composition of the population. In a separate analysis, SDO observed the impacts of changing the base year and found significant changes in the resulting shortfall estimate depending on the year selected. The year 2000 was selected as it predates much of the overbuilding cycle that characterized the early 2000s (a factor contributing to the housing crisis and Great Recession), and then the undersupply comprising much of the post-2008 period.

social, economic, and demographic characteristics of geographies in the US. A 5% target vacancy rate is incorporated to reflect a balanced market, consistent with other studies (e.g., Up for Growth 2024) and reflecting Colorado's unique market characteristics.

Consistent with other studies, SDO modeled estimates of missing households, by location and age, using headship rates observed in 2000 as a benchmark. As with previous studies (Up for Growth, 2024, ECONorthwest & Denver Regional Council of Governments, 2024), missing households are derived from households where the household head is between 18 and 44 years old, the prime years in which household formations occur. Headship rates were determined at the Metropolitan Statistical Area (MSA) level, for comparison between 2000 and 2023, and missing households were calculated for each Public Use Microdata Area and 5-year age group within the 18 to 44 age range.

Missing households are then calculated for each age group and location by subtracting the current number of existing households from the expected number of households given 2000 headship rates to arrive at an estimate of missing households for each group. If for any group there is found to be a negative number of missing households (indicating a relative surplus), this surplus was instead treated as zero, indicating that all demand had been met. This analysis did not allow for a surplus in one group to compensate for a shortage in another group, either across locations or age groups, as demand met in one group does not imply a lessening of demand in another. Finally, these individual shortfalls are aggregated to both the MSA and state level to generate estimates of total missing households. Using the most recent data available Colorado, we estimate the number of missing households at 81,829 as of 2023.

Combining each of these values together, an estimate of **106,000 housing units** needed for production as of 2023 is obtained. The analysis was then replicated for prior years in order to generate a time series for determining when the housing shortage peaked and the subsequent progress made in addressing this shortage. In 2019, the housing shortage was at its greatest, at which point an estimated 140,000 units were needed to overcome the housing shortage, as shown in Figure 4. Since then, population growth in Colorado has slowed while housing production subsequently increased. **Since 2020, 43,000 housing units have been built on average annually, a marked increase from the previous decade's housing production. These factors combined have allowed for the housing deficit to be cut by nearly 25% in a short amount of time between the peak shortfall in 2019 and 2023.**

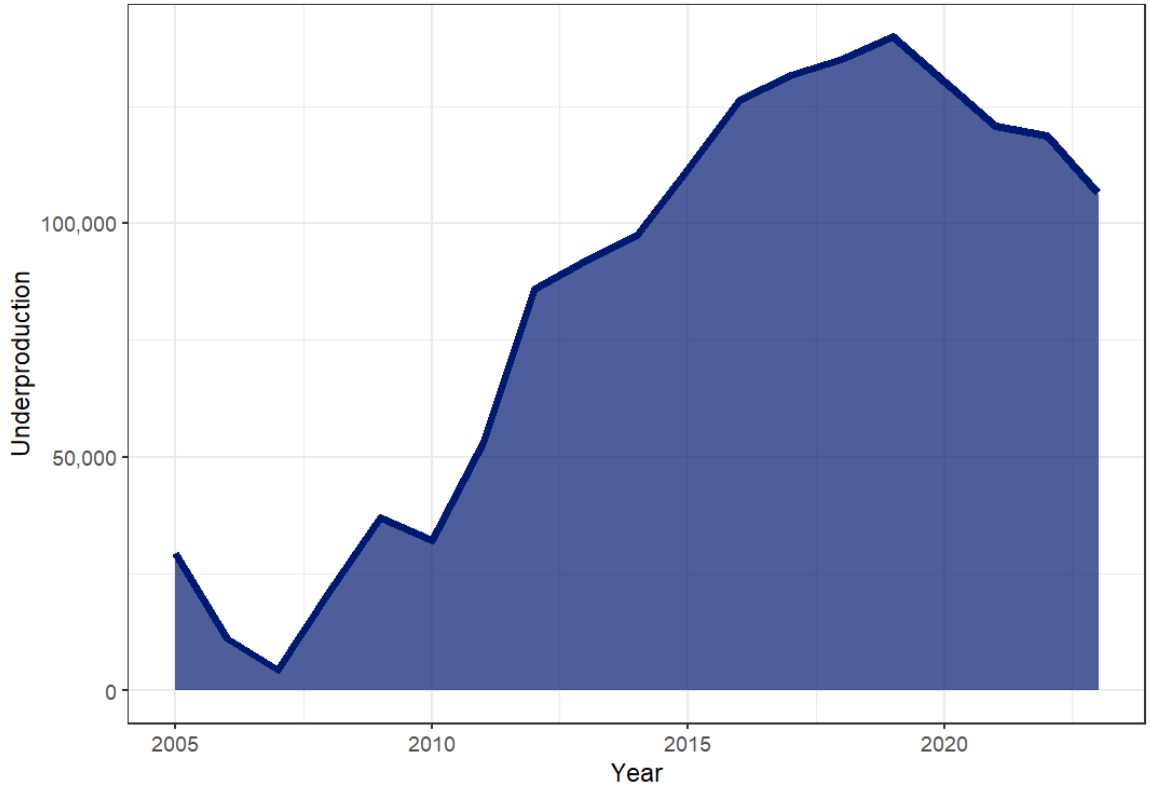
Accounting for Future Population Growth

While the 106,000 estimate is for those residing in the state as of 2023, it does not account for future household growth. Using SDO's latest population projections,[3] 2000 target headship rates, and an adjustment to allow for a 5% vacancy rate (to maintain a balanced vacancy

[3] State Demography Office vintage 2023 estimates.

rate), an additional **34,100 units** would be needed on average each year over the next ten years to maintain the housing shortage where it was in 2023.[4]

Figure 4: Changes in Colorado Historic Housing Underproduction



Source: Authors' calculations.

Other Housing Considerations

Homelessness in Colorado

Colorado's Homeless Management Information System (COHMIS 2025) estimates that **45,285 households** accessed homeless services in 2024. Analyses that utilize a missing households approach, such as this analysis, do not inherently capture the full population of those experiencing homelessness. The ACS is the primary data source used in this and other housing shortage studies. The ACS captures some portion of population experiencing homelessness living in group quarters, such as emergency and transitional shelters, and those who may temporarily or intermittently reside in traditional housing. However, individuals residing in non-traditional housing like vehicles, or living in public spaces (street homelessness), tend to be difficult to reach by the traditional survey means utilized by the ACS, and may therefore be excluded.

[4] Based on 2023 estimates of households totaling 2,342,884; 2033 projected households of 2,667,791; total increase of 324,907 during the ten-year period; and 16,245 additional units to maintain a 5% vacancy rate. These estimates are based on vintage 2023 SDO population estimates and projections.

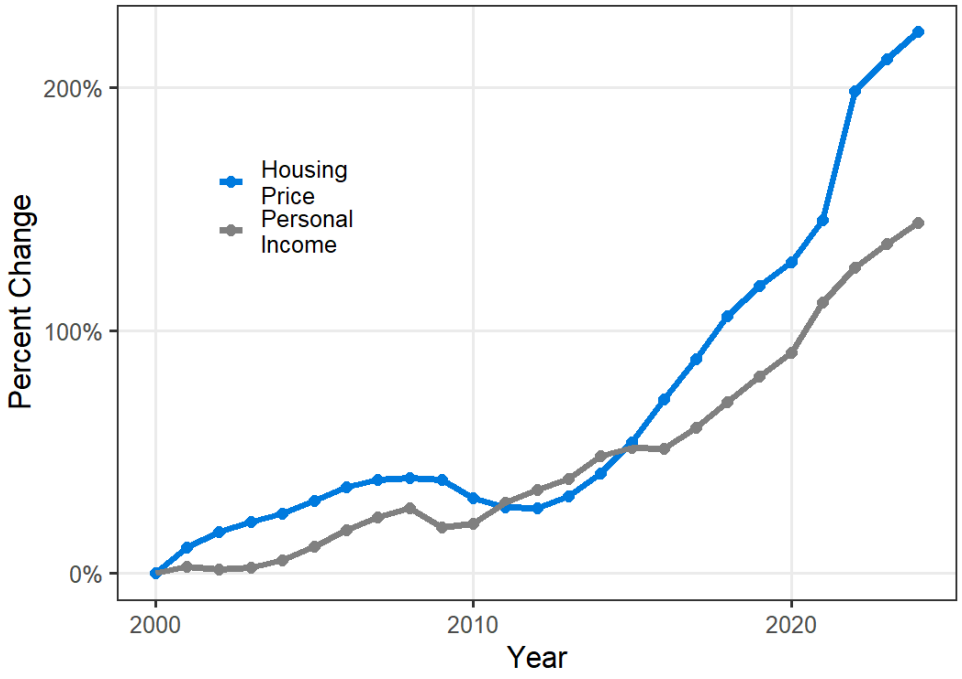
This analysis includes information on the population experiencing homelessness separately from the specific housing shortage estimate given that a portion of this population may be excluded from the 106,000 housing shortage estimates. Additionally, it is provided separately as housing policies for homeless populations may differ from those of other populations. For example, those experiencing chronic homelessness often lack not just housing but also supportive services to prevent future bouts of homelessness.

Changes in Housing Affordability

While the housing shortage estimate presented here applies a balanced vacancy and headship rate analysis, it does not estimate the housing units or type of housing needed to make housing more affordable. Housing affordability warrants consideration as housing costs pose significant financial challenges to homebuyers and renters. Similarly, elevated construction costs pose challenges to policy solutions aimed at building additional housing.

As shown in Figure 5, housing prices in Colorado have, historically, risen faster than incomes. Between 2000 and 2020, the average home price increased by 128%, while Colorado residents' per capita personal income only increased by 91%. This problem has become exacerbated in recent years. By 2023, home prices were up 223% above their 2000 values, while income only increased 144% during the same period, creating the largest gap to date in housing affordability when comparing data since 2000.

Figure 5: Percent change in Housing Price Index and Per Capita Personal Income Since 2000



Source: Federal Housing Finance Agency and U.S. Bureau of Economic Analysis with authors' calculations.

While falling interest rates offset these rising costs for a period, the recent rapid increase in the average mortgage interest rate has drastically increased mortgage payments, and thus

decreased affordability, for home buyers. These increased costs act as a barrier to home ownership for many. In addition, rents have also been rising quickly, outpacing personal income growth. Between 2000 and 2017, median rent in Colorado increased by 85%. By 2023, just 6 years later, nominal rent prices increased 164% above 2000 levels.

Beyond mortgage payments and rents, home insurance costs have risen considerably and in many areas of the state, property taxes have risen because of home price appreciation.

Conclusion and Directions for Future Research

The collective findings from analyses published to date indicate that Colorado confronts a substantial housing shortage and historically low housing affordability. Estimates of the statewide deficit range from 105,000 to over 225,000 units. The variance among these quantitative estimates underscores the importance of understanding methodological differences, as the foundational assumptions employed to define concepts such as "missing households" or a "balanced" vacancy rate can substantially influence shortfall estimates. Consequently, these assumptions shape both the scope and orientation of subsequent policy interventions.

While this analysis helps close some of the gaps in the existing research for housing needs in Colorado, many areas for further exploration and analysis remain. Further research is warranted to advance the understanding of Colorado’s housing needs. Additionally, ongoing analysis that continues to track progress to close housing gaps will serve as an important source of information for policymakers and stakeholders in their efforts to ensure that Colorado residents have access to housing.

Though not addressed specifically by SDO’s housing shortfall number, existing research demonstrates the need for housing targeting affordability specifically. Despite making substantial improvements in the state's housing deficit over the past five years, the gap between household income and housing costs are greater now than ever before, a phenomenon that is disproportionately impacting low-income households in Colorado (National Low Income Housing Coalition 2025). Future research should further breakdown housing shortages by AMI, as has been done in other studies.

Colorado has many distinct communities, ranging from urban and suburban, to rural communities spanning geographically diverse areas including plains, desert, and mountains, each with their own local populations, economies, and housing markets. To account for this, further regional analysis is recommended to reflect differences in shortages across the state. Additionally, given some of the specific factors affecting different areas of the state, more specific data points may be incorporated. For example, future research might analyze the impact of short-term rentals, second homes, and/or vacation homes on housing availability and affordability, and might include a detailed analysis of the specific characteristics—including unit size, type, and accessibility features—of the housing stock required to meet demand.

Finally, the approach utilized in this study does not control specifically for tenure (meaning whether a housing unit is owned or rented by the household within). Further analysis on the specific allocation and shortage of owner-occupied and rental housing units is also recommended.

Additional research on the housing needs of the state may shed greater light on the evolving and multi-faceted sources of housing pressures and may provide insights useful to policymakers for addressing the identified housing issues in Colorado.

References

Brookings Institution, Rajan, A., Tomeh, N., & Patel, E. (2024, November 26). *Make it count: Measuring our housing supply shortage | Brookings*. Brookings Institution. Retrieved July 1, 2025, from https://www.brookings.edu/articles/make-it-count-measuring-our-housing-supply-shortage/

Common Sense Institute Colorado. (2025, June 5). *Denver Metro Area Housing Affordability Report May 2025*. Colorado Housing Affordability Report- June 2025 Update. Retrieved June 6, 2025, from https://www.commonsenseinstituteus.org/colorado/research/housing-and-our-community/colorado-housing-affordability-report--june-2025-update

ECONorthwest & Denver Regional Council of Governments. (2024, July). *Regional Housing Needs Assessment*. Regional Housing Needs Assessment. Retrieved June 6, 2025, from https://www.drcog.org/growth-development/regional-housing-needs-assessment

National Association of Home Builders. (2025, January 29). *Cost to Construct a Home Rose Significantly Over Last Two Years*. National Association of Home Builders. Retrieved July 8, 2025, from https://www.nahb.org/blog/2025/01/cost-of-construction-survey-2024

National Low Income Housing Coalition. (2025, March). *The GAP: A Shortage of Affordable Homes*. The Gap A Shortage of Affordable Homes. Retrieved June 6, 2025, from https://nlihc.org/gap

Rosen Consulting Group. (2021). *Housing is Critical Infrastructure: Social and Economic Benefits of Building More Housing*. Housing is Critical Infrastructure: Social and Economic Benefits of Building More Housing. https://www.nar.realtor/sites/default/files/documents/Housing-is-Critical-Infrastructure-Social-and-Economic-Benefits-of-Building-More-Housing-6-15-2021.pdf

Up For Growth. (2024). *Housing Underproduction in the U.S.* Housing Underproduction in the U.S. Retrieved 6 6, 2025, from https://upforgrowth.org/apply-the-vision/housing-underproduction-reports/

Wellstone Collaborative Studies. (2022). *Affordable Housing Transformational Task Force Recommendation Report*. Affordable Housing Transformational Task Force Report. Retrieved June 6, 2025, from https://leg.colorado.gov/publications/affordable-housing-transformational-task-force-report

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