

# **American Housing Survey**

## **Components of Inventory Change and Rental Dynamics Analysis: Denver, 2004–2011**

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Office of Policy Development & Research**

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**Contract No. C-CHI-01030  
Order No. CHI-T0002  
Project No. 1053-002**

**May 2015**

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## ***Executive Summary***

Components of Inventory Change (CINCH) is a tool used by housing analysts to study how the housing inventory changes over time. One typically thinks of the housing stock as evolving through two mechanisms—the construction of new units and the demolition of old units. While new construction and losses through demolition and natural disasters are the primary means by which the housing stock changes, CINCH shows that there are other important engines of change.

This report describes how the housing stock in the Denver metropolitan area changed between 2004 and 2011, with particular emphasis on affordable rental housing. The study uses data from the American Housing Survey, which collected detailed information on housing units in Denver and on their occupants in both 2004 and 2011.

In 2004 the Denver metropolitan area contained 949,100 housing units, including vacant units. By 2011 the number of housing units had increased to 1,067,000. Part of this increase was due to a redefinition of the metropolitan area that added five counties. We estimate that the 2011 count of housing units for the metropolitan area as defined in 2004 would be 1,021,200. This represents an overall increase of 7.6 percent, which translates to an average annual increase of 1.1 percent over the 7-year period.

Between 2004 and 2011, only 4,600 units left the housing stock. Of these, 1,100 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 1,700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 1,900 units that left the housing stock either permanently or temporarily for “other” reasons, a category that encompasses a wide variety of situations. Demolitions and natural disasters accounted for 400 of the permanent losses, while mergers and conversions contributed another 600 permanent losses.

In the period between the 2004 and the 2011 AHS surveys, 109,300 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Denver, a factor that contributed 1,300 units. Finally, 400 new units were formed from the conversion or merger of 2004 units. We classified 1,900 units as recovered because these units had been in the housing stock at some point but were classified in 2004 as nonresidential. Finally, 400 units were added in other unclassified ways.

The Denver metropolitan area lost 0.5 percent of all 1998 housing units by 2011; additions between 1998 and 2011 represent 10.2 percent of the 2011 housing stock. Losses and additions varied across portions of the Denver housing market defined by the characteristics of the unit or its occupants. We observed the following patterns that were both atypical of the overall housing stock and statistically significant

- Units with 4 or more bedrooms experienced a low loss rate.

- The rate of addition was particularly high among seasonal units. Rates of addition were also high among units using wells and septic tanks.
- Small multifamily structures (2–4 units, 10–19 units, 1–3 stories) had lower-than-average rates of addition, while single-family attached units and units in multifamily buildings with 4 to 6 floors had higher-than-average rates of addition.
- Small units (4 rooms or 2 bedrooms) had low rates of addition, while one large unit category (9 rooms) experienced a high rate.
- New additions to the stock were underrepresented among units with severe physical problems.
- As separate groups, households in 2011 with Hispanic, White Hispanic, and old (75+) householders had low rates of addition, whereas those with Asian householders had a higher-than-average rate. The rate of addition was lower than average among households on public assistance.
- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those occupied by households earning less than \$30,000 and those with low rents (less than \$800 per month). The rate of addition was higher than normal among high-cost rentals (over \$1,250 per month).
- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. Among owner-occupied units, those occupied by lower income owners (\$15,000–\$49,999) and those with lower housing costs (\$350–\$599 and \$800–\$1,249) had lower rates of addition, while those occupied by high-income owners (\$100,000 or more) and those with high housing costs (\$1,250 per month or more) had higher-than-average rates of addition.

The 2004 rental stock in Denver was affordable. Of the 317,300 rental units in 2004, 151,200 were extremely low rent or very low rent units. In addition, 69,300 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 69.5 percent of the 2004 rental stock. The three highest rent categories comprised only 3 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2004 units compared to 10.4 percent. By 2011, 12.2 percent of the rental units in 2004 were no longer in the rental stock. The largest proportion of these losses was due to changes in tenure.

The rental stock in Denver was less affordable in 2011 than in 2004. Of the 401,600 rental units in 2011, 128,600 were extremely low rent or very low rent units. In addition, 42,500 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 42.6 percent of the 2011 rental stock. The three highest rent categories comprised 13.9 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—34.6 percent of all 2011 units compared to 8.7 percent.

# Components of Inventory Change and Rental Dynamics Analysis: Denver, 2004–2011

## 1. Introduction

This report describes how the housing stock in the Denver metropolitan area changed between 2004 and 2011, with particular emphasis on affordable rental housing. The study uses data from the American Housing Survey (AHS), which collected detailed information on housing units in Denver and on their occupants in both 2004 and 2011.<sup>1</sup>

As part of its Components of Inventory Change (CINCH) program, the U.S. Department of Housing and Urban Development (HUD) has funded, for a number of years, similar studies of metropolitan areas to document changes in the American housing stock. These studies have traditionally included an assessment of changes in the rental housing market called rental dynamics. This paper is one of 29 metropolitan CINCH studies based on the information provided by the 2011 AHS.<sup>2</sup>

CINCH reports present both forward-looking analysis (what happened to the 2004 units by 2011) and backward-looking analysis (where the 2011 units came from in terms of 2004).<sup>3</sup> This paper repeats the analysis contained in the most recent CINCH and rental dynamics studies, but its organization differs from that of previous reports.

- Section 2 discusses data and related issues that affect the CINCH and rental dynamics analysis for Denver.
- Section 3 explains the changes in the housing stock between 2004 and 2011 in terms of losses to the housing stock through demolitions or the other ways units can leave the housing stock and additions through new construction and other means.
- Section 4 looks at components of the housing stock that experienced losses or additions markedly different from the overall patterns of losses and additions.
- Section 5 breaks the rental housing stock into eight affordability categories and tracks what happened to units in each of those categories between 2004 and 2011.

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<sup>1</sup> Since 1973, the U.S. Department of Housing and Urban Development (HUD) and the Census Bureau have conducted an extensive survey of the American housing stock called the American Housing Survey (AHS). The AHS has two components: a national survey that, since 1985, has collected data every 2 years on the entire U.S. housing stock and a metropolitan component that, since 1985, has collected data at various times on the housing stock of 45 metropolitan areas. Both the national and metropolitan components use the same sample of housing units in successive surveys, making it possible to observe changes in units over time. The initial samples have been augmented in later years to account for units added by new construction or other means.

<sup>2</sup> HUD also funds CINCH studies of survey-to-survey changes in the national stock. At the national level, the Rental Dynamics studies are published separately. For a complete list of all CINCH studies, see <http://www.huduser.org/portal/datasets/cinch.html>.

<sup>3</sup> The forward-looking analysis was previously presented to HUD in December 2013. The data needed to produce the backward-looking analysis did not become available until after the allowed period of performance of the contract under which the previous report was completed.

- Section 6 summarizes the changes to the housing stock of the Denver metropolitan area between 2004 and 2011.

The paper concludes with two appendices that contain analyses and data found in the body of previous CINCH reports.

- Appendix A explains the CINCH and rental dynamics methodologies.
- Appendix B contains the detailed CINCH and rental dynamics tables found in previous reports.

National economic conditions shaped in important ways the changes observed in this report. The 2004–2011 period began during a vigorous expansion (November 2001 to December 2007), included the recent harsh recession (December 2007 to June 2009), and ended with a period of lackluster recovery.

## ***2. Special Issues: Denver***

Metropolitan areas are composed of counties or townships that are interrelated economically. The Office of Management and Budget periodically adjusts the composition of metropolitan areas as the economic relationships among counties change. In some cases, the AHS retains the metropolitan boundaries in effect when the original metropolitan sample was drawn; in other cases, the AHS will adjust the original sample to correspond to the new definition of the metropolitan area. A change in sample boundaries will affect the interpretation of CINCH analysis and its precision. The absolute sample size available to study changes between surveys determines how reliably the observed changes are measured.

### **Geography**

In 2004 the Denver metropolitan area contained 949,100 housing units, including vacant units. By 2011 the number of housing units had increased to 1,067,000. Part of this increase was due to a redefinition of the metropolitan area that added five counties (Broomfield, Clear Creek, Elbert, Gilpin, and Park). Using the American Community Survey (2011, 5-year data) at the county level, we estimate that the 2011 count of housing units for the metropolitan area as defined in 2004 would be 1,021,200. This represents an overall increase of 7.6 percent, which translates to an average annual increase of 1.1 percent over the 7-year period.

The change in the geographical definition of Denver affects the interpretation of the information presented in this report. Our analysis applies only to that portion of the metropolitan area that was common to the Denver metropolitan area as defined in both 2004 and 2011, but the application to the common area is not precise, as explained in Appendix A.

### **Sample size**

Both CINCH and rental dynamics require that, if a sample unit is in both the 2004 and 2011 housing stock, it must be interviewed in both surveys to be included in the analysis. Other

analytical requirements also limit effective sample size. There are 2,585 sample units that were common to the 2004 and 2011 AHS Denver surveys and satisfied all the analytical requirements.<sup>4</sup> Between 2004 and 2011, 23 sample units in the common area meeting the analytical requirements were lost to the stock; thus, the forward-looking analysis is based on a maximum of 2,608 sample units. Between 2004 and 2011, 287 sample units meeting the analytical requirements were added to the AHS survey to represent additions to the stock throughout the metropolitan area as defined in 2011; thus, the backward-looking analysis is based on a maximum of 2,872 sample units. In the forward-looking analysis, the average weight of a sample unit is approximately 372 units; in the backward-looking analysis, the average weight of a sample unit is approximately 364 units.

### ***Data reliability***

All CINCH analysis relies on two AHS variables: NOINT (why there was no interview), which, among other things, explains why a unit is temporarily or permanently out of the stock, and REUAD (why unit added), which explains why a sample unit entered the sample. Both variables require some detective work on the part of Census Bureau staff, and the longer the period between surveys, the more difficult the detective work. At the national level, the AHS data are collected every 2 years, so it is relatively easy to determine why a unit has been removed from or added to the sample. In the case of Denver, 7 years separate the 2011 sample from the 2004 sample. As a result, explaining the loss or addition of sample units is challenging. This report is part of a series that compares the housing stock in 2011 to the housing stock of 7 metropolitan areas in 1998, 12 metropolitan areas in 2002, 8 metropolitan areas in 2004, and 2 metropolitan areas in 2009. We compared the pattern of changes across the 29 areas studied in these reports to the changes recorded between 2009 and 2011 at the national level. With respect to losses, the patterns are reasonably similar except for the role played by the movement of mobile homes. Mobile home move-outs are much more important in explaining losses at the national level. At both the national and metropolitan levels, the “other” category accounts for one-fifth to one-quarter of the losses. With respect to additions, new construction accounts for 72 percent of all additions at the national level but 94 percent at the metropolitan level. We suspect that data issues downplay the importance of “means other than new construction” at the metropolitan level.

## ***3. Changes to the Housing Stock: 2004–2011***

### **Losses between 2004 and 2011**

One typically thinks of the housing stock evolving through two mechanisms: the construction of new units and the demolition of old units. While new construction and losses through demolition and natural disasters are the primary means by which the housing stock changes, CINCH shows that there are other important engines of change.

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<sup>4</sup> The 2004 AHS surveyed 4,834 units in the Denver metropolitan area; 3,272 of these units were in the 2011 AHS public use file (PUF). Of the 1,562 sample units no longer in the survey, 111 were legitimate temporary or permanent losses to the housing stock and were considered for the analysis. The remaining 1,451 cases are coded as “sample reduction for the current survey year” with no further explanation.



Table 1 reports that, between 2004 and 2011, only 4,600 units left the housing stock.<sup>5</sup> Of these, 1,100 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 1,700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 1,900 units that left the housing stock either permanently or temporarily for “other” reasons, a category that encompasses a wide variety of situations.

**Table 1: Disposition of 2004 Denver Housing Units in 2011<sup>6</sup>**

Present in 2004	949,100
2004 units present in 2011	944,500
<b>Units no longer in the stock</b>	<b>4,600</b>
2004 units lost due to conversion/merger	600
2004 house or mobile home moved out	0
2004 units lost through demolition or disaster	400
<b>Permanent losses</b>	<b>1,100</b>
2004 units changed to nonresidential use	1,700
2004 units badly damaged or condemned	0
<b>Temporary losses</b>	<b>1,700</b>
<b>2004 units lost in other ways</b>	<b>1,900</b>

Demolitions and natural disasters accounted for 400 of the permanent losses, while mergers and conversions contributed another 600 permanent losses. “Conversion” is the terminology used in the AHS for the splitting of a unit into two or more units. The movement of a mobile home or house is considered a permanent loss because a housing unit is the combination of land and capital. While movement preserves the capital, it dissolves the union of capital and land that formed the original unit; therefore, the movement of a mobile home is considered a permanent loss. Unfortunately, the 2011 AHS survey in Denver did not track mobile home move-outs, probably because the long time between surveys makes it difficult to determine whether the current mobile home was the same mobile home as in 2004.

Sometimes houses are used for business purposes. Such commercial use or the use of a house for a group home is considered a change to a nonresidential use. Badly damaged units may be repaired, left in an unusable state, or demolished.

Appendix B contains four forward-looking tables that break the overall stock into more than 100 subgroups, such as single-family detached houses or units occupied by Black householders in 2004. For each subgroup, these tables detail how many of the 2004 units in that subgroup are in the same subgroup in 2011, have moved into another subgroup, or have left the stock and how they left the stock. Section 4 looks across the Appendix B forward-looking tables and focuses on those subgroups that lost an unusually high or an unusually low number of units over the 2004–2011 period.

<sup>5</sup> With the caveats noted in Appendix A, this analysis applies to the area common to both the 2004 and 2011 definitions of the metropolitan area.

<sup>6</sup> Numbers may not add consistently due to rounding. Counts were rounded to the nearest hundred.

## Additions between 2004 and 2011

Table 2, together with the backward-looking Appendix B tables, provides a great deal of information on additions to the housing stock between 2004 and 2011.<sup>7</sup>

**Table 2: Sources for 2011 Denver Housing Stock<sup>8</sup>**

2011 housing stock	1,067,000
2011 units present in 2004	957,700
<b>Total additions to stock</b>	<b>109,300</b>
Units added by new construction	105,300
House or mobile home moved in	1,300
Units added by conversion/merger	400
<b>New or reconstructed units</b>	<b>107,000</b>
Units added from nonresidential use	1,900
Units added from temporary losses	0
<b>Recovered units</b>	<b>1,900</b>
<b>Units added in other ways</b>	<b>400</b>

In the period between the 2004 and the 2011 AHS surveys, 109,300 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Denver, a factor that contributed 1,300 units. Finally, 400 new units were formed from the conversion or merger of 2004 units.

We classified 1,900 units as recovered because these units had been in the housing stock at some point but were classified in 2004 as nonresidential. Finally, 400 units were added in other unclassified ways.

Appendix B contains four backward-looking tables that break the overall stock into more than 100 subgroups. For each subgroup, these tables detail how many of the 2011 units in that subgroup were in the same subgroup in 2011, have moved from another subgroup, or are new additions to the stock. Section 4 looks across the Appendix B backward-looking tables and focuses on those subgroups that gained an unusually high or an unusually low number of units over the 2004–2011 period.

### **4. Components With Atypical Losses or Additions**

The Denver metropolitan area lost 0.5 percent of all 2004 housing units by 2011, but the loss rate varied across sectors of the stock. For example, the occupied housing stock lost 0.3 percent of its units between 2004 and 2011.

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<sup>7</sup> With the caveats noted in Appendix A, this analysis applies to the area common to both the 2004 and 2011 definitions of the metropolitan area. Inconsistencies between Tables 1 and 2 result from a combination of (1) changes in metropolitan boundaries, (2) changes in control housing counts between censuses, and (3) different weights.

<sup>8</sup> Numbers may not add consistently due to rounding. Counts were rounded to the nearest hundred.

We examined all of the components of the 2004 Denver housing stock contained in the four forward-looking tables in Appendix B to identify subgroups with unusual loss rates. Forward-Looking Table A reports information on all units in the stock; Table 3 lists subgroups from Table A with loss rates statistically different than the loss rate of the overall stock. Forward-Looking Tables B, C, and D describe important characteristics of occupied units and their residents; Table 3 lists subgroups from those tables with loss rates statistically different than the loss rate of occupied units. We also employed judgment in selecting among components with statistically different loss rates. In general, we looked for subgroups with loss rates less than half or more than double the benchmark rate, but we listed other subgroups if their inclusion illustrated interesting patterns within loss rates. Finally, Table 3 includes the loss rates for four key segments of the housing market—occupied units, vacant units, owner-occupied units, and renter-occupied units—even if their loss rates are not statistically different.

**Table 3: Sectors Experiencing Atypical Loss Rates in Denver, 2004–2011<sup>9</sup>**

Characteristics	Present in 2004	Total lost	Percent lost
<i>Housing stock</i>	949,100	4,600	0.5%
<i>Occupancy status</i>			
Occupied	855,700	2,900	0.3%
Vacant	91,000	1,200	1.4%
<i>Bedrooms</i>			
4 or more	271,900	400	0.1%*
<i>Tenure</i>			
Owner-occupied	600,600	1,400	0.2%
Renter-occupied	255,100	1,400	0.5%

\*Statistically different from either all units or all occupied units, as appropriate, at the 10-percent level.

\*\*Statistically different from either all units or all occupied units, as appropriate, at the 5-percent level.

\*\*\* Statistically different from either all units or all occupied units, as appropriate, at the 1-percent level.

Only one segment of the 2004 Denver housing market met the criteria for Table 3.

- Units with 4 or more bedrooms experienced a low loss rate.
- Owner-occupied units experienced a low loss rate, but one not statistically different from that of all occupied units.

The 109,300 additions reported in Table 2 represent 10.2 percent of the 2011 housing stock. The rate of addition varied by the characteristics of the housing. Additions represented 9.6 percent of occupied units.

We examined all of the components of the 2004 Denver housing stock contained in the four backward-looking tables in Appendix B to identify subgroups with unusual addition rates. Backward-Looking Table A reports information on all units in the stock; Table 4 lists subgroups from Table A with addition rates statistically different than the addition rate of the overall stock.

<sup>9</sup> Two conditions were necessary for a housing sector to appear in Table 3, one mathematical and one judgmental: (1) the difference between the sector’s loss rate and the benchmark rate had to have been statistically significant at the 10-percent level, and (2) the difference had to be interesting. Counts are rounded to the nearest hundred.

Backward-Looking Tables B, C, and D describe important characteristics of occupied units and their residents; Table 4 lists subgroups from those tables with addition rates statistically different than the addition rate of occupied units. We also employed judgment in selecting among components with statistically different addition rates. In general, we looked for subgroups with addition rates less than half or more than double the benchmark rate, but we listed other subgroups if their inclusion illustrated interesting patterns within addition rates. Finally, Table 4 includes the addition rates for four key segments of the housing market—occupied units, vacant units, owner-occupied units, and renter-occupied units—even if their addition rates are not statistically different.

**Table 4: Sectors Experiencing Atypical Rates of Addition in Denver, 2004–2011<sup>10</sup>**

Characteristics	Present in 2011	Total additions	Percent additions
<i>Housing stock</i>	1,067,000	109,300	10.2%
<i>Occupancy status</i>			
Occupied	983,900	94,256	9.6%
Vacant	78,700	13,649	17.3% ***
Seasonal	4,400	1,395	31.7% *
<i>Units in structure</i>			
1, attached	89,116	12,810	14.4% *
2 to 4	45,382	2,763	6.1% *
10 to 19	72,878	1,405	1.9% ***
50 or more	55,366	12,113	21.9% ***
<i>Rooms</i>			
4	184,236	12,984	7.0% **
9	74,121	10,959	14.8% *
<i>Bedrooms</i>			
2	283,465	23,008	8.1% *
<i>Stories in structure (multifamily)</i>			
1	24,074	1,060	4.4% **
2	85,270	5,525	6.5% **
3	142,014	9,318	6.6% ***
4 to 6	37,315	9,615	25.8% ***
<i>Water</i>			
Well serving 1 to 5 units	26,953	5,431	20.1% **
<i>Sewer</i>			
Septic tank or cesspool	33,190	7,785	23.5% ***
<i>Severe problems</i>	21,518	737	3.4% **
Plumbing	14,194	377	2.7% **
<i>Age of householder</i>		0	
75 or older	69,407	1,878	2.7% ***
<i>Race and ethnicity</i>			
White Hispanic	161,682	9,551	5.9% ***
Asian alone	25,834	5,789	22.4% **
Hispanic or Latino (any race)	177,743	10,228	5.8% ***

<sup>10</sup> Two conditions were necessary for a housing sector to appear in Table 4, one mathematical and one judgmental: (1) the difference between the sector’s addition rate and the benchmark rate had to have been statistically significant at the 10-percent level, and (2) the difference had to be interesting. Counts are rounded to the nearest hundred.

Characteristics	Present in 2011	Total additions	Percent additions
<i>Income sources of families and primary individuals</i>			
Public assistance or public welfare	34,923	785	2.2%***
<i>Tenure</i>			
Owner-occupied	622,900	67,630	10.9%
Renter-occupied	361,000	26,627	7.4%**
<i>Renter monthly housing costs</i>			
Less than \$350	20,015	411	2.1%***
\$350 to \$599	34,560	741	2.1%***
\$600 to \$799	69,054	1,468	2.1%***
<i>Renter household income</i>			
Less than \$15,000	70,806	3,018	4.3%***
\$15,000 to \$29,999	98,102	3,699	3.8%***
<i>Owner monthly housing costs</i>			
\$350 to \$599	74,585	3,041	4.1%***
\$800 to \$1,249	101,513	6,059	6.0%**
\$1,250 or more	376,338	51,654	13.7%***
<i>Owner household income</i>			
\$15,000 to \$29,999	62,403	2,669	4.3%***
\$30,000 to \$49,999	99,722	6,426	6.4%*
\$100,000 or more	221,896	34,898	15.7%***

\*Statistically different from either all units or all occupied units, as appropriate, at the 10-percent level.

\*\*Statistically different from either all units or all occupied units, as appropriate, at the 5-percent level.

\*\*\* Statistically different from either all units or all occupied units, as appropriate, at the 1-percent level.

The results reported in Table 4 tell an interesting story about changes in the Denver metropolitan area.

- The rate of addition was particularly high among seasonal units. Rates of addition were also high among units using wells and septic tanks.
- Small multifamily structures (2–4 units, 10–19 units, 1–3 stories) had lower-than-average rates of addition, while single-family attached units and units in multifamily buildings with 4 to 6 floors had higher-than-average rates of addition.
- Small units (4 rooms or 2 bedrooms) had low rates of addition, while one large unit category (9 rooms) experienced a high rate.
- As separate groups, households in 2011 with Hispanic, White Hispanic, and old (75+) householders had low rates of addition, whereas those with Asian householders had a higher-than-average rate. The rate of addition was lower than average among households on public assistance.
- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those occupied by households earning less than \$30,000 and those with low rents (less than \$800 per month). The rate of addition was higher than normal among high-cost rentals (over \$1,250 per month).

- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. Among owner-occupied units, those occupied by lower income owners (\$15,000–\$49,999) and those with lower housing costs (\$350–\$599 and \$800–\$1,249) had lower rates of addition, while those occupied by high-income owners (\$100,000 or more) and those with high housing costs (\$1,250 per month or more) had higher-than-average rates of addition.

## **5. Rental Market Dynamics: 2004–2011**

Rental market dynamics focuses on the supply of rental housing and how that supply changes over time. Rental dynamics analysis has many of the features of CINCH analysis. A key step in rental dynamics analysis is to separate the rental stock into classes or strata based on how affordable the units are. This paper uses eight categories:

- Non-market: Either no cash rent or a subsidized rent.
- Extremely low rent: Affordable to renters with incomes less than or equal to 30 percent of local area median income.
- Very low rent: Affordable to renters with incomes greater than 30 percent but less than or equal to 50 percent of local area median income.
- Low rent: Affordable to renters with incomes greater than 50 percent but less than or equal to 60 percent of local area median income.
- Moderate rent: Affordable to renters with incomes greater than 60 percent but less than or equal to 80 percent of local area median income.
- High rent: Affordable to renters with incomes greater than 80 percent but less than or equal to 100 percent of local area median income.
- Very high rent: Affordable to renters with incomes greater than 100 percent but less than or equal to 120 percent of local area median income.
- Extremely high rent: Affordable to renters with incomes greater than 120 percent of local area median income.

For each category, “affordable” is defined as a gross-rent-to-income ratio of 30 percent or less for the higher of the incomes that define the boundaries for that category.<sup>11</sup> The categories are defined relative to area median income; therefore, the boundaries of the categories will change as area median income changes.

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<sup>11</sup> Gross rent is equal to rent plus utilities.

Table 5 summarizes what happened to the 2004 rental units by how affordable they were in 2004. It is based on Forward-Looking Rental Dynamics Table 1 in Appendix B, which traces in more detail where these units wound up in 2011.

**Table 5: Summary of Forward-Looking Rental Dynamics for Denver**

Affordability categories	2004 rental units	To more affordable categories in 2011	In same affordability category in both years	To less affordable categories in 2011	2004 rental units non-rental in 2011
Non-market	69,300	NA	29.4%	61.4%	9.2%
Extremely low rent	14,400	14.3%	12.0%	64.8%	8.9%
Very low rent	136,800	7.0%	46.1%	37.4%	9.6%
Low rent	48,200	20.3%	18.8%	44.8%	16.1%
Moderate rent	38,900	19.7%	39.2%	19.5%	21.6%
High rent	5,900	38.2%	16.5%	21.2%	24.1%
Very high rent	1,100	33.2%	31.7%	35.1%	0.0%
Extremely high rent	2,700	0.0%	0.0%	NA	0.0%
Total	317,300	10.4%	35.2%	42.2%	12.2%

The 2004 rental stock in Denver was affordable. Of the 317,300 rental units in 2004, 151,200 were extremely low rent or very low rent units. In addition, 69,300 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 69.5 percent of the 2004 rental stock. The three highest rent categories comprised only 3 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2004 units compared to 10.4 percent.

By 2011, 12.2 percent of the 317,300 rental units in 2004 were no longer in the rental stock (44,800 units). The largest proportion of these losses was due to changes in tenure, with 28,500 rental units becoming owner-occupied or vacant for sale in 2011. Another 7,900 units became seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 2,400 rental units were no longer in the housing stock in 2011. Some of these losses were permanent; that is, the units were demolished or destroyed. Some losses were potentially reversible, such as units being used for nonresidential purposes. Forward-Looking Rental Dynamics Table 2 shows how the movement out of the rental stock varied across the affordability categories.

Table 6 summarizes where the 2011 rental units came from, with respect to 2004, by how affordable they were in 2011. It is based on Backward-Looking Rental Dynamics Table 1 in Appendix B, which traces in more detail the origin of these units.

The rental stock in Denver was less affordable in 2011 than in 2004. Of the 401,600 rental units in 2011, 128,600 were extremely low rent or very low rent units. In addition, 42,500 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 42.6 percent of the 2011 rental stock. The three highest rent categories comprised 13.9 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—34.6 percent of all 2011 units compared to 8.7 percent.

**Table 6: Summary of Backward-Looking Rental Dynamics for Denver**

Affordability categories	2011 rental units	From more affordable categories in 2004	In same affordability category in both years	From less affordable categories in 2004	2011 rental units non-rental in 2004
Non-market	42,500	NA	48.9%	29.6%	21.5%
Extremely low rent	15,600	13.5%	11.6%	45.3%	29.6%
Very low rent	113,000	17.8%	58.8%	7.6%	15.7%
Low rent	70,200	61.9%	14.0%	5.1%	19.0%
Moderate rent	104,500	49.5%	15.5%	1.7%	33.3%
High rent	39,000	42.3%	2.7%	1.8%	53.1%
Very high rent	10,500	27.3%	3.7%	7.1%	61.9%
Extremely high rent	6,300	34.6%	16.9%	NA	48.5%
Total	401,600	34.6%	29.3%	8.7%	27.4%

Of the 401,600 rental units in 2011, 27.4 percent were not rental in 2004 (110,000 units). The largest proportion of these gains was due to changes in tenure, with 73,500 rental units having been owner-occupied or vacant for sale in 2004. Another 3,400 units had been seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 33,100 rental units had not been in the housing stock in 2004. Of these, 30,200 were added by new construction and 2,900 by other means. Backward-Looking Rental Dynamics Table 2 shows how the movement into the rental varied stock across the affordability categories.

## **6. Summary of Housing Market Changes: Denver Metropolitan Area, 2004–2011**

In 2004 the Denver metropolitan area contained 949,100 housing units, including vacant units. By 2011 the number of housing units had increased to 1,067,000. Part of this increase was due to a redefinition of the metropolitan area that added five counties (Broomfield, Clear Creek, Elbert, Gilpin, and Park). Using the American Community Survey (2011, 5-year data) at the county level, we estimate that the 2011 count of housing units for the metropolitan area as defined in 2004 would be 1,021,200. This represents an overall increase of 7.6 percent, which translates to an average annual increase of 1.1 percent over the 7-year period.

The change in the geographical definition of Denver affects the interpretation of the information presented in this report. Our analysis applies only to that portion of the metropolitan area that was common to the Denver metropolitan area as defined in both 2004 and 2011.

Between 2004 and 2011, only 4,600 units left the housing stock. Of these, 1,100 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 1,700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 1,900 units that left the housing stock either permanently or temporarily for “other” reasons, a category that encompasses a wide variety of situations.



Demolitions and natural disasters accounted for 400 of the permanent losses, while mergers and conversions contributed another 600 permanent losses. Unfortunately, the 2011 AHS survey in Denver did not track mobile home move-outs, probably because the long time between surveys makes it difficult to determine whether the current mobile home was the same mobile home as in 2004.

In the period between the 2004 and the 2011 AHS surveys, 109,300 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Denver, a factor that contributed 1,300 units. Finally, 400 new units were formed from the conversion or merger of 2004 units. We classified 1,900 units as recovered because these units had been in the housing stock at some point but were classified in 2004 as nonresidential. Finally, 400 units were added in other unclassified ways.

The Denver metropolitan area lost 0.5 percent of all 2004 housing units by 2011, but the loss rate varied across sectors of the stock. For example, the occupied housing stock lost 0.3 percent of its units between 2004 and 2011.

Only one segment of the 2004 Denver housing market had a loss rate statistically different from the overall loss rate.

- Units with 4 or more bedrooms experienced a low loss rate.

In the 2004–2011 period, 109,300 units were added to the Denver housing stock, 10.2 percent of the 2011 stock. The rate of addition varied by the characteristics of the housing. Additions represented 9.6 percent of occupied units.

- The rate of addition was particularly high among seasonal units. Rates of addition were also high among units using wells and septic tanks.
- Small multifamily structures (2–4 units, 10–19 units, 1–3 stories) had lower-than-average rates of addition, while single-family attached units and units in multifamily buildings with 4 to 6 floors had higher-than-average rates of addition.
- Small units (4 rooms or 2 bedrooms) had low rates of addition, while one large unit category (9 rooms) experienced a high rate.
- New additions to the stock were underrepresented among units with severe physical problems.
- As separate groups, households in 2011 with Hispanic, White Hispanic, and old (75+) householders had low rates of addition, whereas those with Asian householders had a higher-than-average rate. The rate of addition was lower than average among households on public assistance.

- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those occupied by households earning less than \$30,000 and those with low rents (less than \$800 per month). The rate of addition was higher than normal among high-cost rentals (over \$1,250 per month).
- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. Among owner-occupied units, those occupied by lower income owners (\$15,000–\$49,999) and those with lower housing costs (\$350–\$599 and \$800–\$1,249) had lower rates of addition, while those occupied by high-income owners (\$100,000 or more) and those with high housing costs (\$1,250 per month or more) had higher-than-average rates of addition.

The 2004 rental stock in Denver was affordable. Of the 317,300 rental units in 2004, 151,200 were extremely low rent or very low rent units. In addition, 69,300 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 69.5 percent of the 2004 rental stock. The three highest rent categories comprised only 3 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2004 units compared to 10.4 percent.

By 2011, 12.2 percent of the 317,300 rental units in 2004 were no longer in the rental stock (44,800 units). The largest proportion of these losses was due to changes in tenure, with 28,500 rental units becoming owner-occupied or vacant for sale in 2011. Another 7,900 units became seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 2,400 rental units were no longer in the housing stock in 2011.

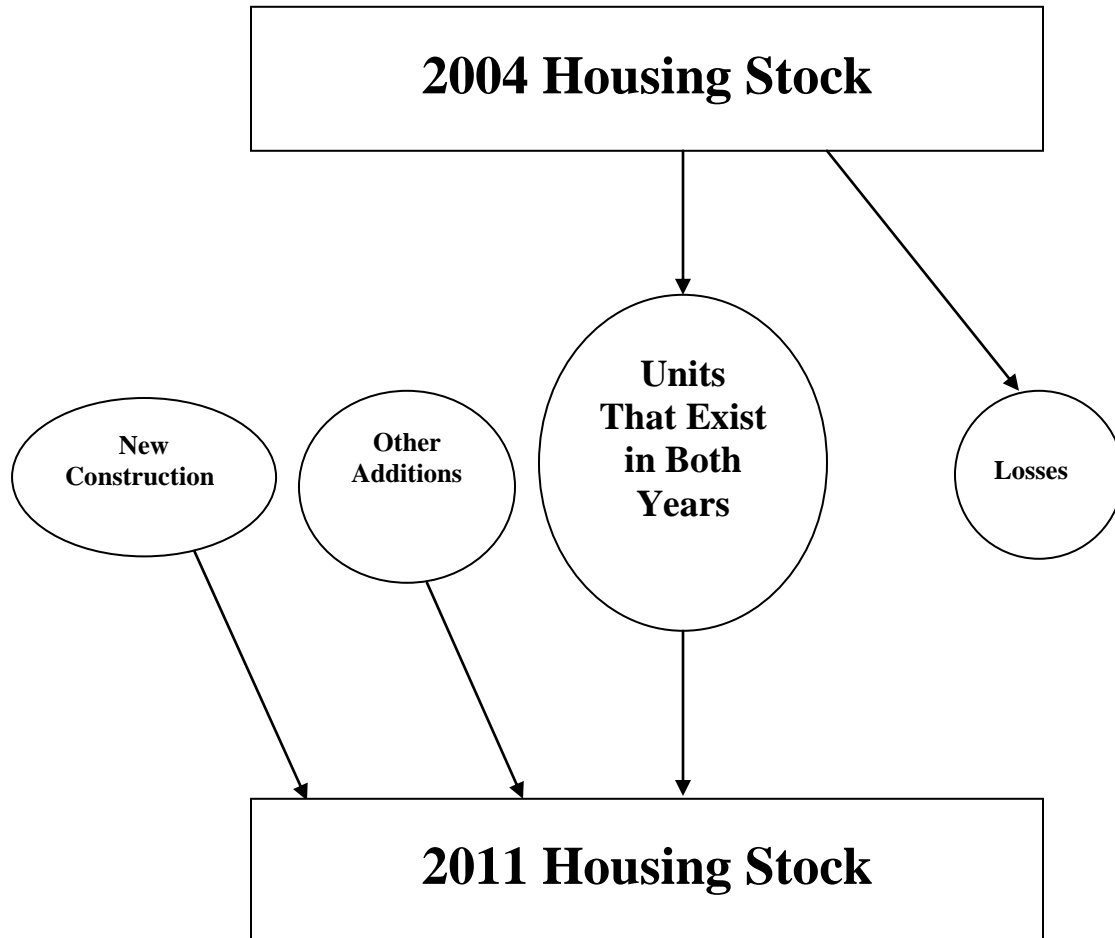
The rental stock in Denver was less affordable in 2011 than in 2004. Of the 401,600 rental units in 2011, 128,600 were extremely low rent or very low rent units. In addition, 42,500 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 42.6 percent of the 2011 rental stock. The three highest rent categories comprised 13.9 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—34.6 percent of all 2011 units compared to 8.7 percent. Of the 401,600 rental units in 2011, 27.4 percent were not rental in 2004 (110,000 units). The largest proportion of these gains was due to changes in tenure, with 73,500 rental units having been owner-occupied or vacant for sale in 2004.

## Appendix A: CINCH and Rental Dynamics Methodology

### Overview

Components of Inventory Change (CINCH) is a tool used by housing analysts to study how the housing inventory changes over time. Figure 1 illustrates how the inventory evolves.

**Figure A-1: How the Housing Inventory Changes**



In the context of Figure A-1, the U.S. Census Bureau provides estimates for both rectangles (the 2004 and 2011 housing stocks) and one oval (units added through new construction between 2004 and 2011). No one estimates the other three ovals: the number of units that belong to both the 2004 and 2011 housing stock, units lost to the housing stock between 2004 and 2011, and other additions to the housing stock between 2004 and 2011.

While losses and other additions are small relative to the overall stock, they encompass important features of how housing markets evolve. Housing units are “clumps” of physical capital associated with specific plots of land, and the housing inventory is the aggregation of these capital-land combinations. New construction creates new clumps, and—like all capital—

some “clumps” depreciate and disappear. However, housing units undergo other interesting changes. Losses can be either permanent or temporary. Units destroyed by natural disasters or intentionally demolished are permanent losses. Temporary losses include units that are used for nonresidential purposes and units that are uninhabitable because of structural defects that can be repaired. Additions can result from restoring units that were uninhabitable or converting nonresidential structures into residential structures.

In addition to determining the size of each oval, housing analysts find information about the characteristics of the units in the different ovals useful. Interesting characteristics include structure type, age of the unit, size of the unit, location by region, location by metropolitan status, tenure, household size and composition, resident income, and resident race and ethnicity.

CINCH analysis has three goals:<sup>12</sup>

- To provide an estimate for all six components of Figure A-1.
- To disaggregate losses and other additions into relevant component parts.
- To characterize the units that survive from one period to the next and the units that are added or lost between periods.

The AHS has four features that make CINCH analysis possible:

- Each unit has weights that can be used to estimate its share of the overall stock.
- The AHS tracks new construction and the various types of losses and other additions.
- The AHS has detailed information about the characteristics of each unit and its occupants.
- The AHS tracks the same unit from one period to the next so that changes in status and characteristics can be observed directly.

Housing analysts and policymakers are particularly interested in what happens to affordable rental housing units. Rental dynamics is a form of CINCH analysis that classifies the rental housing stock by affordability level and tracks the evolution of the rental housing stock by affordability class.

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<sup>12</sup> Previous CINCH analyses have distinguished between the “status” of a unit with respect to the housing stock (e.g., existing as a nonresidential structure) and the “characteristics” of the unit or its occupants (e.g., rental vs. owner-occupied, or race of householder). This report uses this same distinction. Also adopting previous CINCH terminology, Appendix A will refer to the more recent AHS survey year, 2011, as the current year and the previous AHS survey year, 2004, as the base year.

## Why the analysis needs to be separated into two components

It would be possible to list for every AHS sample unit its status and characteristics in both 2004 and 2011. In some cases, there may be no status, (e.g., not yet constructed in 2004) or no characteristics (e.g., no race of householder for vacant units), but with this understanding such a listing would still be possible. From the listing, one could construct an exact accounting of the movement of units among the various statuses and characteristics between 2004 and 2011.

The exact accounting would apply only to AHS sample observations, roughly a 1-in-500 picture of the housing stock at the metropolitan level. To obtain estimates of the magnitude of actual changes in the housing stock, one needs to apply weights to the sampled units. When weights are applied, the accounting will no longer be exact because units have different weights in different years.<sup>13</sup> For example, the exact accounting might show that 2,500 sample units that were rental in 2004 became owner-occupied or vacant for sale in 2011. To estimate the number of units in the national housing stock that were rental in 2004 and became owner-occupied in 2011, one would need to apply weights. However, using 2004 weights would produce a different estimate than using 2011 weights. There is no conceptual reason to favor the answer using 2004 weights over the answer using 2011 weights. The choice of weights depends upon how the intended analysis will be used.

For this reason, previous CINCH analyses have distinguished between:

1. *Forward-looking analysis*; that is, starting with the base-year stock (2004) and determining the status and characteristics of *those* units in the current year (2011). The goal is to explain what happened to the units comprising the housing stock in the base year. Forward-looking analysis takes the housing stock as given in the base year and looks at the destination of these units in the current year.
2. *Backward-looking analysis*; that is, starting from the current year (2011) stock and determining the status and characteristics of *those* units in the base year (2004). The goal here is to explain where the units comprising the current year housing stock came from. Backward-looking analysis takes the current-year housing stock as given and looks at the source of these units, either in the base year or in new construction or other additions.

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<sup>13</sup> The Census Bureau assigns both a pure weight (the inverse of the probability of selection) and a final weight to each AHS observation. The final weights are designed to sum up to independent estimates of the total housing stock. The pure weights will vary over observations within a given AHS survey because of stratification in drawing the sample. Generally, pure weights do not vary across survey years. The final weights will differ over observations within a given AHS because the Census Bureau makes adjustments for various factors affecting the sample. The final weights of a given observation will also vary between AHS surveys because of changes in the housing stock.

## Why changes in geography boundaries affect CINCH analysis

The analysis in this report applies only to that portion of the metropolitan area that was common to the metropolitan area as defined in both 2004 and 2011, and the application to the common area is not precise for the following reasons:

- For forward-looking analysis (2004 to 2011), we observe only those sample units in the geography common to both 2004 and 2011. Thus the observed changes correctly apply only to the common area. However, the forward-looking weights are based by necessity on the entire 2004 geography. Since the common area is smaller than the 2004 geography, the counts are overestimates for the common area.
- For the backward-looking analysis (2011 from 2004), we observe (a) sample units that were in the common area in 2004 and are still in the stock in 2011, (b) sample units representing additions to the stock throughout the metropolitan area as newly defined, and (c) sample units that represent housing existing in 2004 in the added portion of the metropolitan area. We can eliminate (c) and try to focus the analysis on the common area, but there are two problems. The backward-looking weights are based by necessity on the entire 2011 geography. Since the common area is smaller than the 2011 geography, the counts are overestimates for the common area. Moreover, we cannot determine which newly added sample units in (b) represent the common area and which represent the added portion of the metropolitan area. Therefore, additions are overestimated with respect to the common area.

## ***Appendix B: CINCH and Rental Dynamics Tables***

### **Contents**

This appendix contains 12 detailed CINCH and rental dynamics tables that have been featured in previous reports. There are:

- Four forward-looking CINCH tables that track changes to the 2004 housing stock in 2011 by various characteristics of the units or their occupants.
- Four backward-looking CINCH tables that track where the 2011 housing stock originated by various characteristics of the units or their occupants.
- Two forward-looking rental dynamics tables (one with counts and one with percentages) that track by affordability category what happened to the 2004 rental stock by 2011.
- Two backward-looking rental dynamics tables (one with counts and one with percentages) that track by affordability category where the 2011 rental stock came from with respect to 2004.

Appendix B begins with an explanation of how to read the tables.

### **How to read CINCH tables**

Rows and columns serve different purposes in CINCH tables. The rows identify classes of units to be analyzed. The columns trace those units either forward or backward. All counts are rounded to the nearest hundred.

The forward-looking tables report what happened to the 2004 housing stock by 2011. There are three possible dispositions of 2004 units:

- Units that continue to exist in 2011 with the same characteristics (or serving the same market).
- Units that continue to exist in 2011 but with different characteristics (or serving a different market).
- Units that were lost to the stock in 2011.

The backward-looking tables report where the 2011 housing stock came from in reference to 2004. There are three possible sources of 2011 units:

- Units that existed in 2004 with the same characteristics (or serving the same market).

- Units that existed in 2004 but with different characteristics (or serving a different market).
- Units that are additions to the housing stock between 2004 and 2011.

Since the essence of the CINCH analysis is in the columns, we will explain the columns in detail.

### ***Columns Common to Both Forward-Looking and Backward-Looking Tables***

The first and last columns contain the row numbers, which are identical for the same tables in the forward-looking and backward-looking sets. Columns A through D set up the analysis and track units that exist in both periods.

- Column A specifies the characteristic that defines the subset of the stock that is being tracked forward or backward in a particular row, for example, occupied units or units built from 1990 through 1994.
- Column B gives the CINCH estimate of the number of units that satisfy two conditions: (a) being part of the housing stock in the relevant year (2004 for the forward-looking tables and 2011 for the backward-looking tables) and (b) satisfying the condition in column A.
- Column C is the CINCH estimate of the number of units from column B that (a) are also part of the housing stock in the other year and (b) continue to belong to the subset defined by column A.
- Column D is the CINCH estimate of the number of units from column B that (a) are also part of the housing stock in the other year but (b) no longer belong to the subset defined by column A. In some cases, the analysis will not allow a unit to change characteristics between the base year and the other year. Examples include type of structure, year built, and number of stories; these characteristics are considered impossible or unlikely to change.

### ***Columns Unique to Forward-Looking Tables***

In the forward-looking tables, columns E through J track what happened to units that were lost from 2004 to 2011.

- Column E is the CINCH estimate of the number of units from column B that are not in the 2011 housing stock because they were merged with other units or converted into multiple units.
- Column F is the CINCH estimate of the number of houses or manufactured homes from column B that were moved out during the period. In most cases, these units were relocated rather than destroyed. The AHS considers them “losses” because a housing unit is a combination of land and capital, and a move breaks that specific combination to



create a new combination at a different location. For this reason, manufactured houses that move from one lot to another are treated as both losses and additions.<sup>14</sup>

- Column G is the CINCH estimate of the number of units from column B that became nonresidential at the end of the period. For example, a real estate firm, a tax preparation office, a palm reader, or some other business might buy or rent a house to use for business rather than residential purposes.<sup>15</sup>
- Column H is the CINCH estimate of the number of units from column B that were demolished or were destroyed by fires or natural disasters by 2011.
- Column I is the CINCH estimate of the number of units from column B that in 2011 were condemned or were no longer usable for housing because of extensive damage.
- Column J is the CINCH estimate of the number of units from column B that were lost by 2011 for other reasons.

The columns form a closed system. Column B counts the number of units tracked; columns C through J account for all the possible outcomes. Therefore, column B minus the sum of columns C through J always equals zero, except for rounding.

### ***Columns Unique to Backward-Looking Tables***

In backward-looking tables, columns E through J track where units came from that are part of the housing stock in 2011 but were not part of the 2004 housing stock.

- Column E is the CINCH estimate of the number of units from column B that were created by the merger or conversion of other units.
- Column F estimates the number of houses or mobile homes from column B that were moved in during the period. For many of the metropolitan areas in the 2011 AHS survey, information on movements was not collected.
- Column G is the CINCH estimate of the number of units from column B that had been nonresidential in 2004.
- Column H is the CINCH estimate of the number of units from column B that were newly constructed between 2004 and 2011. Note: Generally, in Backward-Looking Table A, there will be units in column H with year-built data substantially earlier than the survey year. There are three explanations for this apparent inconsistency. (1) With the exception of manufactured houses, presence in column H is determined by information from the

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<sup>14</sup> The AHS does not track what happens to a house or mobile home that is moved off of a lot that is part of the AHS sample, and does not inquire about the previous history of a unit that is moved on to a lot that is part of the AHS sample.

<sup>15</sup> If the owner or tenant both lives in a unit and conducts business out of the unit, the AHS considers the unit to be residential. Nonresidential, therefore, means strictly no residential use.

Census Bureau indicating that the unit entered the sample from a listing of new construction; the Census Bureau may be mistaken. (2) Year built is based on information from the respondent; the respondent may be mistaken. (3) An older unit may have undergone substitution renovation that required a new construction permit, but the respondent may have given the original construction date rather than the renovation date. The extent of major renovation occurring in many established neighborhoods throughout the country makes (3) a likely possibility.

- Column I is the CINCH estimate of the number of units from column B that were added by 2011 from units that were structurally unsound in 2004.<sup>16</sup>
- Column J is the CINCH estimate of the number of units from column B that were added by 2011 from units that had been temporarily lost to the stock in 2004 for reasons “not classified” or were newly added by “other” means.

In some metropolitan areas, the AHS surveys do not report data for all the rows in the tables in this appendix. The columns for those rows are left blank.

### **How to read rental dynamics tables**

Forward-Looking Rental Dynamics Table 1 details by affordability category how the rental units in the 2004 housing stock relate to the 2011 housing stock. Column A estimates the number of units in each affordability category in 2004. Columns B through L explain where the 2004 rental units fit into the 2011 housing stock.

- If the units are still rental in 2011, they will be counted in columns B through I, depending upon how affordable they are in 2011.
- If the units have become owner-occupied or for vacant for sale, they will be counted in column J.
- Seasonal units, units that are not the primary residence of their occupants, units used for migratory workers, and units that are vacant but not for rent or sale are counted in column K.
- Column L counts 2004 units that are not in the 2011 housing stock; these can be either temporary or permanent losses to the stock.

The sum of columns B through L equals column A, except for rounding.

Forward-Looking Rental Dynamics Table 2 presents the same information as Table 1, but columns B through L are now percentages of column A. Columns B through L sum to 100 percent in each row.

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<sup>16</sup> These units had codes that identified them as “occupancy prohibited” or “interior exposed to the elements.”

Backward-Looking Rental Dynamics Table 1 details by affordability category where the rental units in the 2011 housing stock came from with respect to the 2004 housing stock. Column A estimates the number of units in each affordability category in 2011. Columns B through L explain where the 2011 rental units originated.

- If the units were rental in 2004, they will be counted in columns B through I, depending upon how affordable they are in 2004.
- If the units were owner-occupied or for vacant for sale, they will be counted in column J.
- Seasonal units, units that are not the primary residence of their occupants, units used for migratory workers, and units that are vacant but not for rent or sale in 2004 are counted in column K.
- Column L counts rental units that were newly constructed between 2004 and 2011.
- Column M counts rental units that were added to the housing stock after 2004 by other means.

The sum of columns B through M equals column A, except for rounding.

Backward-Looking Rental Dynamics Table 2 presents the same information as Table 1, but columns B through M are now percentages of column A. Columns B through M sum to 100 percent in each row.

These four Rental Dynamics Tables look only at the endpoints of the 7-year period; for example, a unit that is low rent in 2004 and moderate rent in 2011 might have been high rent, owned, or out of the stock at points in between the two surveys. These tables do not track the path of rental units between 2004 and 2011.

**Forward-Looking Table A: Housing Characteristics, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
1	Housing stock	949,100	944,500	0	600	0	1,700	400	0	1,900	1
	Occupancy status										
2	Occupied	855,700	799,700	53,000	400	0	1,500	400	0	600	2
3	Vacant	91,000	12,700	77,100	200	0	0	0	0	1,100	3
4	Seasonal	2,400	1,000	1,000	0	0	200	0	0	200	4
	Units in structure										
5	1, detached	573,000	570,300	0	600	0	1,500	200	0	400	5
6	1, attached	93,200	92,800	0	0	0	0	200	0	200	6
7	2 to 4	35,000	34,500	0	0	0	0	0	0	500	7
8	5 to 9	41,700	41,600	0	0	0	0	0	0	200	8
9	10 to 19	65,700	65,300	0	0	0	0	0	0	400	9
10	20 to 49	77,300	77,300	0	0	0	0	0	0	0	10
11	50 or more	43,100	42,700	0	0	0	200	0	0	200	11
12	Manufactured/mobile home	20,000	20,000	0	0	0	0	0	0	0	12

Row	A	B	C	D	E	F	G	H	I	J	Row
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
	Year built										
15	2000–2004	105,300	104,000	0	0	0	600	0	0	700	15
16	1995–1999	83,700	83,500	0	0	0	0	0	0	200	16
17	1990–1994	56,200	56,200	0	0	0	0	0	0	0	17
18	1985–1989	61,400	61,000	0	0	0	200	200	0	0	18
19	1980–1984	84,900	84,900	0	0	0	0	0	0	0	19
20	1975–1979	109,900	109,700	0	0	0	0	0	0	200	20
21	1970–1974	118,500	117,900	0	0	0	0	0	0	600	21
22	1960–1969	109,900	109,900	0	0	0	0	0	0	0	22
23	1950–1959	108,600	108,400	0	200	0	0	0	0	0	23
24	1940–1949	38,700	38,100	0	200	0	200	0	0	200	24
25	1930–1939	14,100	14,100	0	0	0	0	0	0	0	25
26	1920–1929	22,400	22,000	0	200	0	200	0	0	0	26
27	1919 or earlier	35,300	34,700	0	0	0	400	200	0	0	27
	Rooms										
28	1	3,100	1,000	2,100	0	0	0	0	0	0	28
29	2	4,000	1,800	2,300	0	0	0	0	0	0	29
30	3	89,400	68,400	20,500	0	0	200	0	0	400	30
31	4	158,900	101,100	56,200	0	0	400	0	0	1,100	31
32	5	145,800	68,200	76,800	200	0	0	400	0	200	32
33	6	133,000	56,200	76,600	0	0	200	0	0	0	33
34	7	133,300	53,000	79,800	0	0	400	0	0	200	34
35	8	104,500	40,500	63,600	400	0	0	0	0	0	35
36	9	69,500	23,900	45,500	0	0	0	0	0	0	36
37	10 or more	107,500	40,600	66,500	0	0	400	0	0	0	37

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
	Bedrooms										
38	None	5,000	3,500	1,400	0	0	200	0	0	0	38
39	1	127,600	111,400	15,500	0	0	200	0	0	500	39
40	2	251,900	213,300	37,200	0	0	200	200	0	900	40
41	3	292,700	224,200	66,600	600	0	700	200	0	400	41
42	4 or more	271,900	222,800	48,800	0	0	400	0	0	0	42
43	Multiunit structures	262,900	261,400	0	0	0	200	0	0	1,300	43
	Stories in structure										
44	1	19,900	19,900	0	0	0	0	0	0	0	44
45	2	71,300	70,800	0	0	0	0	0	0	500	45
46	3	122,100	121,500	0	0	0	0	0	0	500	46
47	4 to 6	26,800	26,600	0	0	0	0	0	0	200	47
48	7 or more	22,800	22,600	0	0	0	200	0	0	0	48

**Forward-Looking Table B: Unit Quality, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
1	Occupied units	855,700	799,700	53,000	400	0	1,500	400	0	600	1
2	With complete kitchen	836,300	767,900	65,500	400	0	1,500	400	0	600	2
3	Lacking complete kitchen facilities	19,400	1,400	18,000	0	0	0	0	0	0	3
4	With complete plumbing	847,400	780,900	63,600	400	0	1,500	400	0	600	4
5	Lack some plumbing	8,300	400	7,900	0	0	0	0	0	0	5
6	No hot piped water	400	400	0	0	0	0	0	0	0	6
7	No bathtub/shower	400	400	0	0	0	0	0	0	0	7
8	No flush toilet	400	400	0	0	0	0	0	0	0	8
9	No exclusive use	7,900	0	7,900	0	0	0	0	0	0	9
	Water										
10	Public/private water	831,800	777,000	51,900	400	0	1,500	400	0	600	10
11	Well serving 1 to 5 units	23,100	21,300	1,800	0	0	0	0	0	0	11
12	Other water source	700	0	700	0	0	0	0	0	0	12
	Sewer										
13	Public sewer	825,500	771,000	51,500	400	0	1,500	400	0	600	13
14	Septic tank/cesspool	30,200	24,900	5,300	0	0	0	0	0	0	14
15	Other										15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
16	Severe problems	14,100	700	13,000	0	0	0	200	0	200	16
17	Plumbing	8,300	400	7,900	0	0	0	0	0	0	17
18	Heating	5,400	400	4,700	0	0	0	200	0	200	18
19	Electric	400	0	400	0	0	0	0	0	0	19
20	Upkeep										20
21	Moderate problems	25,600	1,700	23,800	0	0	0	0	0	0	21
22	Plumbing	1,100	0	1,100	0	0	0	0	0	0	22
23	Heating	19,400	1,400	18,000	0	0	0	0	0	0	23
24	Kitchen										24
25	Upkeep	9,000	400	8,700	0	0	0	0	0	0	25



**Forward-Looking Table C: Occupant Characteristics, Denver**

Row	A	B	C	D	E	F	G	H	I	J	Row
	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	
1	Occupied units	855,700	799,700	53,000	400	0	1,500	400	0	600	1
	Age of householder										
2	Under 65	726,300	600,900	122,700	400	0	1,300	400	0	600	2
3	65 to 74	68,500	17,900	50,600	0	0	0	0	0	0	3
4	75 or older	60,800	30,400	30,300	0	0	200	0	0	0	4
	Children in household										
5	Some	322,500	172,900	148,100	200	0	600	200	0	400	5
6	None	533,200	402,000	129,800	200	0	900	200	0	200	6
	Race and ethnicity										
7	White alone	756,000	671,500	82,000	400	0	1,500	400	0	200	7
8	Hispanic	127,500	71,600	54,800	400	0	200	200	0	200	8
9	Non-Hispanic	628,500	526,100	101,000	0	0	1,200	200	0	0	9
10	Black alone	46,400	24,200	22,200	0	0	0	0	0	0	10
11	Hispanic	4,400	1,100	3,200	0	0	0	0	0	0	11
12	Non-Hispanic	42,100	22,400	19,700	0	0	0	0	0	0	12
13	American Indian or Alaska Native alone	9,900	2,500	7,200	0	0	0	0	0	200	13
14	Asian alone	18,900	6,700	12,300	0	0	0	0	0	0	14
15	Pacific Islander alone	1,500	400	1,100	0	0	0	0	0	0	15
16	Two or more races	23,000	5,900	16,900	0	0	0	0	0	200	16
17	Hispanic or Latino (any race)	146,900	87,600	58,000	400	0	200	200	0	400	17

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	
<b>Row</b>	<b>Characteristics</b>	<b>Present in 2004</b>	<b>2004 units present in 2011</b>	<b>Change in characteristics</b>	<b>2004 units lost due to conversion/merger</b>	<b>2004 house or mobile home moved out</b>	<b>2004 units changed to nonresidential use</b>	<b>2004 units lost through demolition or disaster</b>	<b>2004 units badly damaged or condemned</b>	<b>2004 units lost in other ways</b>	<b>Row</b>
	Income sources of families and primary individuals										
18	Wages and salaries	715,700	548,400	164,600	400	0	1,300	400	0	600	18
20	Dividends, interest, or rent	309,600	132,900	175,500	200	0	1,000	0	0	0	20
21	Public assistance or public welfare	13,600	400	13,200	0	0	0	0	0	0	21

**Forward-Looking Table D: Income and Housing Cost, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
1	Occupied units	855,700	799,700	53,000	400	0	1,500	400	0	600	1
	Tenure										
2	Owner-occupied	600,600	512,800	86,300	400	0	1,000	0	0	0	2
3	Homeownership rate	70.20%									3
4	Renter-occupied	255,100	205,400	48,300	0	0	400	400	0	600	4
	Renter monthly housing costs										
5	No cash rent	4,600	1,100	3,300	0	0	0	0	0	200	5
6	Less than \$350	25,400	8,800	16,600	0	0	0	0	0	0	6
7	\$350 to \$599	45,000	11,900	32,700	0	0	200	0	0	200	7
8	\$600 to \$799	73,900	19,700	54,000	0	0	0	0	0	200	8
9	\$800 to \$1,249	73,700	33,700	39,300	0	0	200	400	0	0	9
10	\$1,250 or more	32,500	18,600	13,900	0	0	0	0	0	0	10
	Renter household income										
11	Less than \$15,000	62,600	21,100	41,100	0	0	200	0	0	200	11
12	\$15,000 to \$29,999	60,000	17,300	42,600	0	0	0	200	0	0	12
13	\$30,000 to \$49,999	62,500	14,800	47,500	0	0	0	0	0	200	13
14	\$50,000 to \$99,999	56,400	16,400	39,600	0	0	200	0	0	200	14
15	\$100,000 or more	13,600	2,600	10,800	0	0	0	200	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2004	2004 units present in 2011	Change in characteristics	2004 units lost due to conversion/merger	2004 house or mobile home moved out	2004 units changed to nonresidential use	2004 units lost through demolition or disaster	2004 units badly damaged or condemned	2004 units lost in other ways	Row
	Owner monthly housing costs										
16	Less than \$350	61,300	7,900	53,200	200	0	0	0	0	0	16
17	\$350 to \$599	78,600	20,600	57,600	200	0	200	0	0	0	17
18	\$600 to \$799	37,900	7,100	30,800	0	0	0	0	0	0	18
19	\$800 to \$1,249	125,700	36,200	89,500	0	0	0	0	0	0	19
20	\$1,250 or more	297,100	212,800	83,500	0	0	800	0	0	0	20
	Owner household income										
21	Less than \$15,000	43,600	8,600	35,100	0	0	0	0	0	0	21
22	\$15,000 to \$29,999	60,600	12,000	48,400	200	0	0	0	0	0	22
23	\$30,000 to \$49,999	94,600	24,400	70,200	0	0	0	0	0	0	23
24	\$50,000 to \$99,999	233,900	83,400	150,000	200	0	200	0	0	0	24
25	\$100,000 or more	167,900	96,000	71,000	0	0	800	0	0	0	25

**Backward-Looking Table A: Housing Characteristics, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
1	Housing stock	1,067,000	957,700	0	400	1,300	1,900	105,300	0	400	1
	Occupancy status										
2	Occupied	983,900	800,800	88,900	0	1,300	1,100	91,400	0	400	2
3	Vacant	78,700	14,200	50,800	400	0	700	12,500	0	0	3
4	Seasonal	4,400	800	2,200	0	0	0	1,400	0	0	4
	Units in structure										
5	1, detached	648,300	580,700	0	0	0	800	66,300	0	400	5
6	1, attached	89,100	76,300	0	0	0	400	12,400	0	0	6
7	2 to 4	45,400	42,600	0	400	0	0	2,300	0	0	7
8	5 to 9	56,600	52,300	0	0	0	0	4,200	0	0	8
9	10 to 19	72,900	71,500	0	0	0	300	1,100	0	0	9
10	20 to 49	81,800	74,700	0	0	0	0	7,200	0	0	10
11	50 or more	55,400	43,300	0	0	0	400	11,700	0	0	11
12	Manufactured/mobile home	17,600	16,300	0	0	1,300	0	0	0	0	12

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
	Year built										
13	2010–2014	7,400	0	0	0	0	0	7,400	0	0	13
14	2005–2009	81,900	0	0	0	0	0	81,900	0	0	14
15	2000–2004	122,200	105,800	0	0	300	400	15,300	0	400	15
16	1995–1999	85,600	85,200	0	0	0	0	400	0	0	16
17	1990–1994	56,900	56,900	0	0	0	0	0	0	0	17
18	1985–1989	58,400	58,400	0	0	0	0	0	0	0	18
19	1980–1984	86,900	86,500	0	0	0	400	0	0	0	19
20	1975–1979	110,300	109,900	0	0	0	400	0	0	0	20
21	1970–1974	121,500	120,100	0	400	1,000	0	0	0	0	21
22	1960–1969	112,400	112,000	0	0	0	300	0	0	0	22
23	1950–1959	112,600	111,800	0	0	0	400	400	0	0	23
24	1940–1949	38,700	38,700	0	0	0	0	0	0	0	24
25	1930–1939	15,200	15,200	0	0	0	0	0	0	0	25
26	1920–1929	22,400	22,400	0	0	0	0	0	0	0	26
27	1919 or earlier	34,600	34,600	0	0	0	0	0	0	0	27

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
	Rooms										
28	1	2,000	1,000	1,100	0	0	0	0	0	0	28
29	2	8,800	1,800	6,300	0	0	300	300	0	0	29
30	3	108,100	70,200	27,200	0	0	1,100	9,600	0	0	30
31	4	184,200	104,100	67,100	400	0	0	12,600	0	0	31
32	5	161,300	67,800	74,300	0	1,000	0	18,300	0	0	32
33	6	170,600	56,700	93,200	0	0	0	20,300	0	400	33
34	7	161,900	52,900	95,400	0	0	0	13,700	0	0	34
35	8	123,200	40,800	69,900	0	300	0	12,200	0	0	35
36	9	74,100	24,000	39,200	0	0	400	10,600	0	0	36
37	10 or more	72,600	40,900	23,900	0	0	0	7,800	0	0	37
	Bedrooms										
38	None	8,400	3,400	4,600	0	0	300	0	0	0	38
39	1	138,700	115,200	9,600	400	0	1,100	12,400	0	0	39
40	2	283,500	216,600	43,900	0	0	0	23,000	0	0	40
41	3	332,800	224,900	67,200	0	1,000	0	39,400	0	400	41
42	4 or more	303,600	225,100	47,300	0	300	400	30,600	0	0	42
43	Multiunit structures	312,000	284,400	0	400	0	700	26,500	0	0	43
	Stories in structure										
44	1	24,100	23,000	0	0	0	0	1,100	0	0	44
45	2	85,300	79,700	0	400	0	300	4,800	0	0	45
46	3	142,000	132,700	0	0	0	400	9,000	0	0	46
47	4 to 6	37,300	27,700	0	0	0	0	9,600	0	0	47
48	7 or more	23,300	21,200	0	0	0	0	2,100	0	0	48

**Backward-Looking Table B: Unit Quality, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
1	Occupied units	983,900	800,800	88,900	0	1,300	1,100	91,400	0	400	1
2	With complete kitchen	963,100	768,500	102,500	0	1,300	1,100	89,200	0	400	2
3	Lacking complete kitchen facilities	20,800	1,400	17,200	0	0	0	2,200	0	0	3
4	With complete plumbing	969,700	781,900	93,900	0	1,300	1,100	91,000	0	400	4
5	Lack some plumbing	14,200	400	13,500	0	0	0	400	0	0	5
6	No hot piped water	700	400	400	0	0	0	0	0	0	6
7	No bathtub/shower	700	400	400	0	0	0	0	0	0	7
8	No flush toilet	700	400	400	0	0	0	0	0	0	8
9	No exclusive use	13,400	0	13,100	0	0	0	400	0	0	9
	Water										
10	Public/private water	955,800	778,600	89,500	0	1,000	1,100	85,100	0	400	10
11	Well serving 1 to 5 units	27,000	20,800	800	0	300	0	5,100	0	0	11
12	Other water source	1,200	0	0	0	0	0	1,200	0	0	12
	Sewer										
13	Public sewer	950,700	772,600	91,700	0	1,000	1,100	83,900	0	400	13
14	Septic tank/cesspool	33,200	24,300	1,100	0	300	0	7,500	0	0	14
15	Other										15



	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
16	Severe problems	21,500	700	20,100	0	0	0	700	0	0	16
17	Plumbing	14,200	400	13,500	0	0	0	400	0	0	17
18	Heating	7,700	400	7,000	0	0	0	400	0	0	18
19	Electric	400	0	400	0	0	0	0	0	0	19
20	Upkeep										20
21	Moderate problems	30,600	1,800	26,600	0	0	0	2,200	0	0	21
22	Plumbing	1,900	0	1,900	0	0	0	0	0	0	22
23	Heating										23
24	Kitchen	20,800	1,400	17,200	0	0	0	2,200	0	0	24
25	Upkeep	10,100	400	9,700	0	0	0	0	0	0	25

**Backward-Looking Table C: Occupant Characteristics, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
1	Occupied units	983,900	800,800	88,900	0	1,300	1,100	91,400	0	400	1
	Age of householder										
2	Under 65	810,300	603,100	122,900	0	1,300	800	81,900	0	400	2
3	65 to 74	104,200	17,800	78,300	0	0	0	8,100	0	0	3
4	75 or older	69,400	30,200	37,300	0	0	400	1,500	0	0	4
	Children in household										
5	Some	338,100	173,600	124,600	0	1,300	400	38,200	0	0	5
6	None	645,800	400,700	190,800	0	0	700	53,200	0	400	6
	Race and ethnicity										
7	White alone	877,400	671,500	123,100	0	1,000	700	81,100	0	0	7
8	Hispanic	161,700	72,100	80,100	0	0	0	9,600	0	0	8
9	Non-Hispanic	715,700	525,400	117,000	0	1,000	700	71,600	0	0	9
10	Black alone	54,800	24,500	26,900	0	0	0	3,400	0	0	10
11	Hispanic	5,200	1,100	4,000	0	0	0	0	0	0	11
12	Non-Hispanic	49,600	22,600	23,600	0	0	0	3,400	0	0	12
13	American Indian or Alaska Native alone	11,400	2,500	7,800	0	0	0	1,100	0	0	13
14	Asian alone	25,800	6,700	13,300	0	0	400	5,400	0	0	14
15	Pacific Islander alone										15
16	Two or more races	13,100	5,600	6,700	0	0	0	400	0	400	16
17	Hispanic or Latino (any race)	177,700	88,200	79,300	0	300	0	9,900	0	0	17

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
	Income sources of families and primary individuals										
18	Wages and salaries	750,000	549,400	124,000	0	1,000	800	74,400	0	400	18
20	Dividends, interest, or rent	268,900	132,500	107,300	0	0	800	28,400	0	0	20
21	Public assistance or public welfare	10,900	400	10,600	0	0	0	0	0	0	21

**Backward-Looking Table D: Income and Housing Cost, Denver**

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
1	Occupied units	983,900	800,800	88,900	0	1,300	1,100	91,400	0	400	1
	Tenure										
2	Owner-occupied	622,900	506,000	49,200	0	300	400	66,500	0	400	2
3	Homeownership rate	63.3%									3
4	Renter-occupied	361,000	210,400	124,000	0	1,000	700	24,900	0	0	4
	Renter monthly housing costs										
5	No cash rent	8,400	1,200	6,800	0	0	0	400	0	0	5
6	Less than \$350	20,000	8,800	10,800	0	0	0	400	0	0	6
7	\$350 to \$599	34,600	12,100	21,700	0	0	0	700	0	0	7
8	\$600 to \$799	69,100	20,200	47,300	0	0	400	1,100	0	0	8
9	\$800 to \$1,249	135,900	34,400	91,700	0	1,000	400	8,400	0	0	9
10	\$1,250 or more	93,100	19,400	59,800	0	0	0	13,800	0	0	10
	Renter household income										
11	Less than \$15,000	70,800	21,400	46,400	0	0	400	2,600	0	0	11
12	\$15,000 to \$29,999	98,100	17,700	76,700	0	0	400	3,300	0	0	12
13	\$30,000 to \$49,999	80,700	15,100	60,100	0	1,000	0	4,500	0	0	13
14	\$50,000 to \$99,999	80,100	16,800	53,900	0	0	0	9,400	0	0	14
15	\$100,000 or more	31,300	2,700	23,600	0	0	0	5,000	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2004	Change in characteristics	2011 units added by conversion/merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 2004 stock	2011 units added in other ways	Row
	Owner monthly housing costs										
16	Less than \$350	24,300	7,900	14,100	0	0	0	2,300	0	0	16
17	\$350 to \$599	74,600	20,300	51,200	0	0	0	3,000	0	0	17
18	\$600 to \$799	46,200	6,900	34,700	0	0	0	4,600	0	0	18
19	\$800 to \$1,249	101,500	35,300	60,100	0	0	0	6,100	0	0	19
20	\$1,250 or more	376,300	211,000	113,700	0	300	400	50,600	0	400	20
	Owner household income										
21	Less than \$15,000	39,000	8,400	26,900	0	300	0	3,400	0	0	21
22	\$15,000 to \$29,999	62,400	11,700	48,100	0	0	0	2,700	0	0	22
23	\$30,000 to \$49,999	99,700	24,000	69,300	0	0	0	6,000	0	400	23
24	\$50,000 to \$99,999	199,900	82,900	97,100	0	0	400	19,500	0	0	24
25	\$100,000 or more	221,900	95,900	91,100	0	0	0	34,900	0	0	25

**Forward-Looking Rental Dynamics Table 1: Counts, 2004–2011, Denver**

Affordability categories	A Total in 2004	B Non-market in 2011	C Extremely low rent in 2011	D Very low rent in 2011	E Low rent in 2011	F Moderate rent in 2011	G High rent in 2011	H Very high rent in 2011	I Extremely high rent in 2011	J Owner- occupied in 2011	K Seasonal or related vacant in 2011	L Lost to stock in 2011
Non-market	69,300	20,400	2,100	14,000	11,100	11,700	2,500	300	700	4,000	2,200	200
Extremely low rent	14,400	2,100	1,700	5,900	1,000	1,400	1,100	0	0	700	400	200
Very low rent	136,800	7,300	2,300	63,000	29,400	19,600	1,000	700	400	9,500	2,600	1,000
Low rent	48,200	2,500	3,100	4,200	9,000	17,100	4,200	300	0	5,700	1,700	400
Moderate rent	38,900	400	600	3,300	3,300	15,300	6,900	400	400	6,800	1,000	600
High rent	5,900	0	400	300	0	1,600	1,000	1,000	300	1,400	0	0
Very high rent	1,100	0	400	0	0	0	0	300	400	0	0	0
Extremely high rent	2,700	0	0	0	0	0	700	700	1,000	400	0	0
Total	317,300	32,700	10,600	90,700	53,800	66,700	17,400	3,700	3,200	28,500	7,900	2,400

**Forward-Looking Rental Dynamics Table 2: Row Percentages, 2004–2011, Denver**

Affordability categories	A Total in 2004	B Non-market in 2011	C Extremely low rent in 2011	D Very low rent in 2011	E Low rent in 2011	F Moderate rent in 2011	G High rent in 2011	H Very high rent in 2011	I Extremely high rent in 2011	J Owner- occupied in 2011	K Seasonal or related vacant in 2011	L Lost to stock in 2011
Non-market	69,300	29.4%	3.1%	20.3%	16.0%	16.9%	3.6%	0.5%	1.0%	5.8%	3.1%	0.3%
Extremely low rent	14,400	14.3%	12.0%	40.7%	6.7%	9.7%	7.6%	0.0%	0.0%	4.9%	2.6%	1.5%
Very low rent	136,800	5.3%	1.7%	46.1%	21.5%	14.3%	0.7%	0.5%	0.3%	6.9%	1.9%	0.7%
Low rent	48,200	5.2%	6.3%	8.7%	18.8%	35.4%	8.7%	0.7%	0.0%	11.8%	3.5%	0.8%
Moderate rent	38,900	1.0%	1.6%	8.6%	8.5%	39.2%	17.7%	0.9%	0.9%	17.4%	2.7%	1.5%
High rent	5,900	0.0%	5.9%	5.6%	0.0%	26.7%	16.5%	16.1%	5.1%	24.1%	0.0%	0.0%
Very high rent	1,100	0.0%	33.2%	0.0%	0.0%	0.0%	0.0%	31.7%	35.1%	0.0%	0.0%	0.0%
Extremely high rent	2,700	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	317,300	10.3%	3.3%	28.6%	17.0%	21.0%	5.5%	1.2%	1.0%	9.0%	2.5%	0.7%

**Backward-Looking Rental Dynamics Table 1: Counts, 2004–2011, Denver**

Affordability categories	A Total in 2011	B Non- market in 2004	C Extremely low rent in 2004	D Very low rent in 2004	E Low rent in 2004	F Moderate rent in 2004	G High rent in 2004	H Very high rent in 2004	I Extremely high rent in 2004	J Owner- occupied in 2004	K Seasonal or related vacant in 2004	L New construction	M Added in other ways
Non-market	42,500	20,800	2,200	7,900	2,100	400	0	0	0	6,500	400	1,900	300
Extremely low rent	15,600	2,100	1,800	2,500	3,200	700	400	400	0	4,200	0	400	0
Very low rent	113,000	14,100	6,000	66,400	4,400	3,800	400	0	0	12,900	1,500	2,200	1,200
Low rent	70,200	11,200	1,100	31,100	9,800	3,600	0	0	0	12,300	400	700	0
Moderate rent	104,500	11,900	1,400	20,700	17,700	16,200	1,800	0	0	21,500	1,200	10,800	1,400
High rent	39,000	2,600	1,100	1,100	4,400	7,300	1,100	0	700	11,700	0	9,000	0
Very high rent	10,500	400	0	700	400	400	1,000	400	700	3,500	0	3,000	0
Extremely high rent	6,300	700	0	300	0	400	300	400	1,100	800	0	2,200	0
Total	401,600	63,800	13,700	130,700	42,100	32,700	5,000	1,100	2,500	73,500	3,400	30,200	2,900

**Backward-Looking Rental Dynamics Table 2: Row Percentages, 2004–2011, Denver**

Affordability categories	A Total in 2011	B Non- market in 2004	C Extremely low rent in 2004	D Very low rent in 2004	E Low rent in 2004	F Moderate rent in 2004	G High rent in 2004	H Very high rent in 2004	I Extremely high rent in 2004	J Owner- occupied in 2004	K Seasonal or related vacant in 2004	L New construction	M Added in other ways
Non-market	42,500	48.9%	5.2%	18.5%	5.0%	0.9%	0.0%	0.0%	0.0%	15.4%	0.8%	4.5%	0.8%
Extremely low rent	15,600	13.5%	11.6%	15.8%	20.2%	4.8%	2.3%	2.3%	0.0%	27.2%	0.0%	2.4%	0.0%
Very low rent	113,000	12.5%	5.3%	58.8%	3.9%	3.4%	0.3%	0.0%	0.0%	11.4%	1.3%	1.9%	1.0%
Low rent	70,200	16.0%	1.6%	44.3%	14.0%	5.1%	0.0%	0.0%	0.0%	17.5%	0.5%	1.0%	0.0%
Moderate rent	104,500	11.4%	1.4%	19.8%	17.0%	15.5%	1.7%	0.0%	0.0%	20.6%	1.1%	10.3%	1.3%
High rent	39,000	6.6%	2.9%	2.9%	11.3%	18.6%	2.7%	0.0%	1.8%	30.0%	0.0%	23.2%	0.0%
Very high rent	10,500	3.5%	0.0%	6.8%	3.7%	3.5%	9.9%	3.7%	7.1%	33.6%	0.0%	28.3%	0.0%
Extremely high rent	6,300	12.0%	0.0%	5.4%	0.0%	5.6%	5.4%	6.3%	16.9%	12.7%	0.0%	35.8%	0.0%
Total	401,600	15.9%	3.4%	32.6%	10.5%	8.1%	1.2%	0.3%	0.6%	18.3%	0.8%	7.5%	0.7%