Manufactured Housing Survey Public Use File
Technical Documentation

**INTRODUCTION**

The Manufactured Homes Survey (MHS) is conducted by the U.S. Census Bureau and sponsored by the Department of Housing and Urban Development (HUD). Monthly MHS produces estimates of the average sales price for new manufactured homes placed/sold or intended for sale by geographical region and size of home (Total, Single, Double). Additionally, MHS produces estimates of total shipments on a monthly basis at a national level for homes sold and for-sale for residential use, and nonresidential or other uses. On an annual basis, MHS produces more detailed estimates for placed/sold homes by, size of home, including selected characteristics at a regional level. Average sales price is estimated at the state level. Estimates of average and median square feet at the region level are also produced.

This document describes the Public Use File (PUF) created from data collected monthly for MHS. It provides a brief description of the MHS and the differences between the MHS data and the records available in the PUF. This document also explains how to determine unit-level characteristics from the PUF and how to create estimates and measures of sampling variability from the PUF data. The PUF allows data users greater access to these data than standard tabulations and provides data users the ability to create a wider variety of tables tailored specifically to their data needs.

**SAMPLE DESIGN**

The monthly sample for MHS is selected from a list of HUD-inspected manufactured home shipments provided to the Census Bureau by the Institute for Building Technology and Safety (IBTS). Due to missing dealer information, not all home sections shipped in a given month may be eligible for sampling. These sections are removed from the frame until the required dealer information is obtained. An adjustment factor is applied to the weighting to account for these cases in the monthly estimates of total homes shipped by status. The list of eligible sections is stratified by dealer region and then a systematic sample of fixed size is taken within each region. A total of 405 home sections are selected monthly and matched to a dealer. Occasionally two sections from the same home are selected and may cause the sample size to be less than 405 when the duplicate is removed. Home sections shipped to FEMA only dealers are selected into the sample with certainty in addition to the 405 sampled each month. Receiving dealers are contacted four months after shipment to determine the placement status and other characteristics of the selected homes.

**MHS PUF CONTENTS**

The 2021 MHS PUF contains a total of 4,928 records, which include a record for each of the 4,858 manufactured homes sampled in 2021 and 70 homes shipped to FEMA only dealers.

The 2020 MHS PUF contains a total of 4,860 records, which include a record for each of the 4,860 manufactured homes sampled in 2020 and 0 homes shipped to FEMA only dealers.

The 2019 MHS PUF contains a total of 4,916 records, which include a record for each of the 4,860 manufactured homes sampled in 2019 and 56 homes shipped to FEMA only dealers.

The 2018 MHS PUF contains a total of 6,188 records, which include a record for each of the 4,860 manufactured homes sampled in 2018 and 1,328 homes shipped to FEMA only dealers.

The 2017 MHS PUF contains a total of 9,520 records, which include a record for each of the 4,859 manufactured homes sampled in 2017 and 4,661 homes shipped to FEMA only dealers.

The 2016 MHS PUF contains a total of 7,915 records, which include a record for each of the 4,860 manufactured homes sampled in 2016 and 3,055 homes shipped to FEMA only dealers.

The 2015 MHS PUF contains a total of 5,018 records, which include a record for each of the 4,860 manufactured homes sampled in 2015 and 158 homes shipped to FEMA only dealers.

For each record there are six administrative variables and eight variables reflecting relevant responses to MHS questionnaire items.

The form for the MHS can be found at: [Manufactured Housing Survey (MHS) Questionnaire (census.gov)](https://census.gov)

The MHS PUF includes the following information for each record:

- **CONTROL:** An identification variable which includes the shipment month and a random number
- **REGION:** Four Census regions and a fifth code that represents the national level for three or more section homes
- **SHIPMONTH**: Shipment month
- **SECTIONS**:  The size of the home with three or more section homes collapsed
- **WEIGHT**: Tabulation weight
- **WGTADJ**: Weight adjustment to account for frame undercoverage

  The MHS PUF includes the following respondent-reported variables for each record:

- **STATUS**: The status of the home four months after shipment.  Nonresidential placements and other have been collapsed together.
- **SQFT**: The square footage of the home.  Top and bottom 5% within each region is top coded using the average. Rounded to the nearest 100 sq. ft. The average square footage of all values that lie above or below the cutoff is used as the top and bottom code, respectively.
- **PRICE:** (rounded on a sliding scale) this is the sales price if home is placed/sold and the intended sales price if the home is intended for sale.  For homes with 2 or less sections, the top and bottom 5% within each region is top coded. For 3 or more sections, the top and bottom 10% are top coded. The average price of all values that lie above or below the cutoff is used as the top and bottom code, respectively.
- **BEDROOMS:** Number of bedrooms, collapsed to two or fewer and three or more
- **LEASE:** Whether or not the home is leased (NEW in 2021)
- **FINALDEST:** Whether or not the home is placed at its final destination. (NEW in 2021)

- Characteristics of sold residential placements in 2014-2020: **TITLED**, **LOCATION**, **FOUNDATION**, and **SECURED**
- Characteristics of placements starting in 2021: **TITLED, LOCATION, FOOTINGS, PIERS,** and **SECURED**. Note: Secured is different from prior years. Refer to Appendix A for details.

The MHS PUF also contains eleven "j" variables (one for each respondent-reported variable) indicating whether a respondent-reported variable is reported (R), imputed (I), or not applicable (9). These variables all have a prefix of "j" in the variable name.

Additional information on all the variables can be found in Appendix A.

## NON-RESPONSE AND IMPUTATION

Due to non-response, the MHS PUF contains imputed values for respondent-reported variables, if necessary. Below are the rules used for imputation:

- All records missing a status code have an imputed value for **STATUS**.
- If **STATUS** is *"intended for sale/lease"* or "sold/leased" then **SQFT**, **BEDROOMS**, and **PRICE** are imputed monthly.
- **TITLED**, **LOCATION**, **FOOTINGS, PIERS**, and **SECURED** are imputed annually for **STATUS** ="placed/sold". **(2014-2020)**
- **TITLED, LOCATION, FOOTINGS, PIERS,** and **SECURED** are imputed annually for all **residential placements** (STATUS = "sold or leased" and "intended for sale or lease") and FINALDEST =1 (Yes) **(Starting in 2021)**
- All variables except **PRICE** are imputed using a hot-deck method. Collapsed dealer state and home size (single, multi section) are used to define the imputation cells.
- **PRICE** is imputed using a regression model fit to the reported data based on region if more than ten reported records are available in each region; otherwise the model is estimated at the national level. The independent variables in the model are **SQFT** and **SECTIONS** (single, multi section).

## PRODUCING ESTIMATES AND THEIR MEASURES OF SAMPLING VARIABILITY FROM THE MHS PUF

Individuals who create estimates using the MHS PUF as input should cite the Census Bureau and the Department of Housing and Urban Development (HUD) as the source of only the input to these estimates. So that weighted estimates and their associated measures of sampling variability may be produced, the MHS PUF contains two weighting components:

1) the inverse probability of selection for a home section divided by the number of sections in the home (WEIGHT)

2) ratio adjustment factor ; $\dfrac{\#\ homes\ shipped\ in\ month\ m\ of\ size\ i}{weighted\ sum\ of\ sampled\ homes\ in\ month\ m\ of\ size\ i}$ (WGTADJ)

(Size is either single unit or multi-unit)

Estimates created from the PUF are likely to differ from the results of a complete census of all manufactured home shipments. Each monthly sample is one of many probability samples that could have been selected under identical circumstances. Each of the possible samples would yield a different set of results. The standard error associated with a given estimate is a measure of the variation of all the possible sample estimates around the result from a complete census. Low standard errors indicate estimates that are more accurate. In addition to sampling errors, estimates created from the MHS PUF are subject to various response and operational errors: reporting, coding, nonresponse, etc. These nonsampling errors would also occur if a complete census of all shipped homes was conducted under conditions identical to the survey.

To calculate a count estimate of placed homes with a select characteristic, simply sum the product of the sample weight (WEIGHT) and the weight adjustment (WGTADJ) for all eligible homes (FINALDEST=1) that have that characteristic. Estimates of average sales price or square feet can be determined by multiplying the item value by just the sample weight (WEIGHT), finding the sum and then dividing by the sum of the sample weights (for eligible records, i.e. those that are placed/sold or intended for sale in 2014-2020, or those that are sold/leased or intended for sale/lease in 2021). The variance of the weighted count estimates may be obtained using the following formula:

$$\frac{n}{n-1}\sum_{i=1}^{n}(w_i I - \overline{w_i I})^2$$

Where $I = \begin{cases} 1, & \text{home } i \text{ has characteristic} \\ 0, & \text{home } i \text{ does not have characteristic} \end{cases}$ and $w_i$= WEIGHT$_i$*WGTADJ$_i$

The variance of the average sales price or square feet estimates can be obtained using the following formula:

$$\frac{n}{n-1}\sum_{i=1}^{n}\frac{[w_i(y_i - \bar{y})]^2}{\sum w_i} \Big/ \sum w_i$$

Where $\bar{y} = \sum w_i y_i \Big/ \sum w_i$ , $y_i$ is the value of the variable, and $w_i$= WEIGHT$_i$

## CONFIDENTIALITY AND DISCLOSURE AVOIDANCE TECHNIQUES

In accordance with federal law governing census reports (Title 13 of the United States Code), no data are published that would disclose the identity of an individual manufactured home. This applies to both the records on the MHS PUF and tabulations produced from the PUF.

Methods for preventing the disclosure of reported data in the MHS PUF include an extensive review and analysis of internal tabulations produced from the PUF. The internal tabulations were used to

determine the level of detail that could be shown for variables included in the MHS PUF.  All homes placed for residential use, with the exception of larger homes comprised of three or more sections, include geographic detail at the region level. Top-/bottom-coding and rounding of continuous variables square feet and price and collapsing of some levels of characteristic variables (bedrooms, location) were the methods used to prevent data disclosures.

The Census Bureau has reviewed the Manufactured Housing Survey public use file for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied.  (Approval ID: CBDRB-FY22-270).

**Appendix A:** MHS PUF File Contents

| Variable Name | Variable Description | Values/ Format | Details | Notes |
|---|---|---|---|---|
| CONTROL | Random ID # for home | YYMMNNNN | | |
| REGION | Region (dealer region if not placed; otherwise, placement region) | 1,2,3,4,5 | 1= Northeast 2=Midwest 3=South 4=West 5=United States | US level "5" only used for 3 or more section homes and homes with a Status of Non-res/Other (3) |
| SHIPMONTH | Shipment month | YYYYMM | YYYY=year, MM=month | |
| SECTIONS | Size of home | 1,2,3 | 1= Single 2=Double 3=3 or more sections | |
| WEIGHT | Sample weight | XX.XXXX | Probability of selection/ # of sections | |
| WGTADJ | Weight adjustment | XX.XXXX | Ratio adjustment of sample weight | Use for estimation of shipment totals |
| STATUS (2014-2020) | Status of home four months after shipment | 1,2,3 | 1= Intended for Sale for residential use 2=Placed/Sold for residential use 3=Non-res/Other | Prior to 2021 use 2 to identify placements |
| STATUS (2021- ) | Status of home four months after shipment | 1,2,3 | 1=Intended for Sale or lease for residential use 2= Sold/Leased for residential use 3=Non-res/Other | Starting in 2021 use 1 and 2 combined with FINALDEST =1 to identify placements |
| LEASE (2021- ) | Whether home is leased or for lease | 1,2,9 | 1=Yes 2=No | 9 is for Nonapplicable cases |
| FINALDEST (2021- ) | Whether home is placed at final destination | 1,2,9 | 1=Yes 2=No | 9 is for Nonapplicable cases |

| Variable Name | Variable Description | Values/ Format | Details | Notes |
|---|---|---|---|---|
| PRICE | Sales price or intended sales price | $XX0,000 $XX,X00 | Rounded on a sliding scale. 9 is for Nonapplicable cases | Top and bottom 5% are coded to the average of those records to preserve distribution |
| SQFT | Square footage of home | X,X00 | Rounded on a sliding scale. 9 is for Nonapplicable cases | Top and bottom 5% are coded to the average of those records to preserve distribution |
| BEDROOMS | Number of bedrooms | 1,3,9 | 1= 2 or less 3= 3 or more | 9 is for Nonapplicable cases or for disclosure purposes |
| TITLED | How a home is titled | 1,2,3,9 | 1= Real Estate 2= Personal Prop 3= Not titled | 9 is for Nonapplicable cases or for disclosure purposes |
| LOCATION | Where a home is placed | 1,3,9 | 1 = Inside manuf. home communities 3 = Outside manuf. home communities | 9 is for Nonapplicable cases or for disclosure purposes |
| FOUNDATION (2014-2020) | Type of foundation for home, if any. | 1,2,3,9 | 1= Masonry/Concrete 2= Steel or Other 3= Blocks | 9 is for Nonapplicable cases or for disclosure purposes |
| FOOTINGS (2021- ) | Type of footings | 1,2,3,4,5,9 | 1= monolithic-slab foundation 2= basement/crawl space 3= concrete footings 4= pressure treated wood or ABS footings 5 = other | 9 is for Nonapplicable cases |
| PIERS (2021- ) | Type of piers | 0,1,2,3,4,9 | 1= concrete block 2= pressure treated wood blocks 3= manufactured steel or concrete stands 4= other type 0 = Concrete/Slab Foundation (set based on footings =1 or 2) | 9 is for Nonapplicable cases |

| Variable Name | Variable Description | Values/ Format | Details | Notes |
|---|---|---|---|---|
| SECURED (2014-2020) | How a home is secured (if not on permanent masonry/concrete) | 1,3,9 | 1= Tie down straps or other<br>3=Not secured | 9 is for Nonapplicable cases or for disclosure purposes |
| SECURED (2021- ) | How a home is secured (if not on permanent masonry/concrete) | 0,1,2,3,9 | 1=Anchors and Tie down straps<br>2= Anchors and Alternative Foundation<br>3= Other)<br>0 = Concrete/Slab Foundation (set based on footings =1 or 2) | 9 is for Nonapplicable cases |
| JSTATUS | Imputed indicator for status code | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JPRICE | Imputed indicator for price | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JSQFT | Imputed indicator for square feet | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JBEDROOM | Imputed indicator for bedrooms | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JTITLE | Imputed indicator for titled | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JLOCATION | Imputed indicator for location | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JFOUNDATION (2014-2020) | Imputed indicator for foundation | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JFOOTINGS (2021- ) | Imputed indicator for footings | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JPIERS (2021- ) | Imputed indicator for piers | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JSECURED | Imputed indicator for secured | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JLEASE (2021- ) | Imputed indicator for lease | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |
| JFINALDEST (2021- ) | Imputed indicator for finaldest | R,I,9 | R= Reported<br>I=Imputed | 9 is for Nonapplicable cases |