



# Honey Bee Colony Methodology

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**Scope and Purpose:** The Quarterly Colony Loss Survey that provides the data necessary to produce the Honey Bee Colonies report is conducted in all 50 States. The target population consists of all known producers with five or more honey bee colonies. Data are collected on the beginning of quarter and end of quarter inventories and which State the colonies are located in. If honey bee colonies were present in more than one State during the quarterly period, then the colonies are included in the total for each State. The number of colonies lost, requeened, received nucleus colonies or package bees, added, or sold or given away is also collected. In addition, respondents are asked to report the number of colonies affected by Colony Collapse Disorder symptoms, Varroa mites, other pests and parasites, diseases, pesticides, other stressors, and unknown stressors.

Estimates are published for 44 States, Other States (which includes six States with low levels of inventory), and the United States for beginning of quarter inventory and during the quarter estimates for maximum number of colonies, colonies lost, colonies added, and colonies renovated. The percent of colonies affected by various health stressors are estimated and published for the same 44 States, Other States, and the U.S. including Varroa mites, other pests and parasites, diseases, pesticides, other stressors, and unknown stressors. Finally, the number of colonies lost with Colony Collapse Disorder symptoms is published at the U.S. level only.

**Survey Timeline:** For the Quarterly Colony Loss Survey, data collection begins at the beginning of each quarter for the following months: January, April, July, and October using the current year as the reference period. Questionnaires are mailed around the first of the referenced month. Telephone follow-up is conducted for nonresponse records beginning approximately a week later. Enumerators at National Agricultural Statistics Service (NASS) data collection centers collect data for a period of approximately two weeks. Assigned Regional Field Offices (RFOs) have approximately two weeks from the end of data collection each quarter to complete editing and analysis, execute the summary, interpret the survey results, and submit recommendations for estimates. A National review is then completed, and National estimates are established. Estimates are released to the public in early August for the preceding six quarters as specified by the Agricultural Statistics Board (ASB) on its annual publications calendar.

**Sampling:** The target population for the Quarterly Colony Loss Survey is all operations with five or more honey bee colonies. It is a follow-on survey to the [Bee and Honey Inquiry](#) as the sample is drawn from those that respond to that survey with 5 or more honey bee colonies. All records from the higher strata (i.e., operations with large number of colonies and/or operating in multiple states) are included in the Quarterly Colony Loss sample while a simple random sample is drawn from records from the lower strata (i.e., operations with fewer colonies). Strata boundaries vary by State, depending on the distribution and size of operations.

**Data Collection:** All federal data collections require approval by the Office of Management and Budget (OMB). NASS must document the public need for the data, apply sound statistical practice, prove the data does not already exist elsewhere, and ensure the public is not excessively burdened. The questionnaire must display an active OMB number that gives NASS the authority to conduct the survey, a statement of the purpose of the survey and the use of the data being collected, a response burden statement that gives an estimate of the time required to complete the form, a confidentiality statement that the respondent's information will only be used for statistical purposes in combination with other producers, and a statement saying that response to the survey is voluntary and not required by law.

All Regional Field Offices (RFO) use the same standardized questionnaire for data collection. For consistency across modes, the paper version is considered the master questionnaire and the Computer Assisted Self Interview (CASI), mobile

Computer Assisted Telephone Interview (mCATI), and Computer Assisted Telephone Interview (CATI) instruments are built to model the paper questionnaire. The questionnaire content and format are evaluated annually through a specification process where requests for changes are evaluated and approved or disapproved. Input may vary from question wording or formatting to a program change involving the deletion or modification of current questions or addition of new ones. If there are significant changes to either the content or format proposed, a NASS survey methodologist will pre-test the changes for usability. Prior to the start of data collection, all modes of instruments are reviewed, and CASI, mCATI, and CATI instruments are thoroughly tested.

Sampled operations receive a pre-survey letter explaining the purpose and importance of the survey and that they are being contacted for survey purposes only. Attached to the letter is a complete copy of the paper questionnaire and a pass code, which can be used to complete the survey securely online. RFOs are responsible for their data collection strategy, but RFOs must include provisions for respondents to report securely online. If response is not received by mail or online, respondents are contacted by CATI. Limited personal interviewing may be conducted, generally for large operations or those with special handling arrangements.

**Survey Edit:** As survey data are collected and captured, they are edited for consistency and reasonableness using automated systems. Relationships between data items on the current survey are verified and in certain situations those items may be compared to data from earlier surveys to make sure certain relationships are logical. The edit will determine the status of each record to be either “dirty” or “clean”. Dirty records must be updated and reedited or certified by an analyst to be clean. If updates are needed, they are reedited interactively. Only clean records are eligible for analysis and summary.

**Analysis Tools:** Edited data are processed through an interactive analysis tool which displays data for all reports by item. The tool provides scatterplots, tables, charts, and special tabulations that allow the analyst to compare an individual record to similar records. Outliers and unusual data relationships become evident and assigned RFO staff review them to determine if they are correct. The tool allows comparison to an operation’s previously reported data to detect large changes in the operation. Data found to be in error are corrected, while data found to be correct are retained.

**Nonsampling Errors:** Nonsampling errors are present in every survey process. These errors include reporting, recording, and editing errors. Steps are taken to minimize these errors, such as comprehensive interviewer training, validation, and verification of processing systems, application of detailed computer edits, and evaluation of the data via the analysis tools.

**Estimators:** Each operation in the sample has an initial weight based on the final nonresponse adjusted weights from the Bee and Honey Inquiry and any additional sampling. Response to the survey is voluntary. Some producers refuse to participate in the survey. Others cannot be located during the data collection period, and some submit incomplete reports. In the Quarterly Colony Loss Survey, nonresponse is accounted for in one of two ways. For operations in strata made up of large and often unique operations, some data items must be manually imputed. Nonrespondents in all other strata are accounted for by adjusting the weights of the complete responses to account for responses that are not complete. The adjustment occurs at the stratum level and is performed for each individual item because sometimes only a partial report is obtained.

Point estimates, called direct expansions, are calculated by multiplying the reported value by the combined nonresponse weight and sampling weight and summing to a stratum total. A variance estimate is also computed at the stratum level. Totals and variances are additive across strata to form a State estimate, and State estimates are additive to a National estimate.

Ratio estimates are also computed for many items. Ratio estimates use the reweighted estimator described above for the numerator and denominator direct expansions. Both the numerator and denominator must be complete for that record to be included in the ratio estimate.

**Estimation:** When all samples are accounted for, all responses fully edited, and the analysis material is reviewed, each assigned RFO executes a summary to evaluate and analyze the data under its responsibility. When all assigned RFOs have run summaries, Headquarters receives all State files and pools the data. Since identical surveys are conducted in each State, the samples can be pooled, and National survey results computed. The summary results provide multiple indications

and their standard errors. It also provides information to assess the performance of the current survey and evaluate the quality of survey indications, such as response rates and strata level expansions. RFOs are responsible for performing a detailed review of their survey results. Any irregularities revealed by the summary must be investigated and, if necessary, resolved. Assigned RFOs interpret the survey results and submit a recommended estimate to Headquarters for beginning of quarter inventory and during the quarter estimates for maximum number of colonies, colonies lost, colonies added, colonies renovated, the percent of colonies affected by Varroa mites, other pests and parasites, diseases, pesticides, other stressors and unknown stressors and the number of colonies lost with Colony Collapse Disorder symptoms. The survey indications used in State summaries are produced by the National summary. All these estimates are set at the State level and the U.S. estimates are a sum of the States.

The Quarterly Colony Loss survey and estimation periods are conducted quarterly. The estimates are published in an annual report which includes the four quarters of the previous year and the first two quarters of the current year. Prior to the annual report, the previous six quarters are subject to revision. Revisions are the result of late reports or corrected data. Every five years, NASS conducts the Census of Agriculture, which is an exhaustive data collection effort for all known farm operations across the United States. Estimates are thoroughly reviewed for possible revision after data from the Census of Agriculture are available. The information gathered from the Census of Agriculture is used to establish benchmark levels by which the survey estimates can be compared, and bias determined.

## Quality Metrics for Honey Bee Colonies

**Purpose and Definitions:** Under the guidance of the Statistical Policy Office of the Office of Management and Budget (OMB), the United States Department of Agriculture's National Agricultural Statistics Service (NASS) provides data users with quality metrics for its published data series. The metrics table below describe the performance data for all surveys contributing to the publication. The accuracy of data products may be evaluated through sampling and non-sampling error. The CVs measure the error due to sampling as well as some nonsampling error. Nonsampling error is also evaluated by examining response rates and the weighted item response rates.

**Sample size** is the number of observations selected from the population to represent a characteristic of the population. Operations that did not have the item of interest or were out of business at the time of data collection have been excluded.

**Response rate** is the proportion of the above sample that responds to the survey.

**Weighted item response rate** is a ratio of reported survey data expanded by the original sampling weight compared to final nonresponse adjusted summary totals.

**Coefficient of variation** provides a measure of the size for the standard error relative to the point estimate and is used to measure the precision of the results of a survey estimator.

**Quarterly Colony Loss Survey Sample Size and Response Rates:** To assist in evaluating the performance of the estimates in the Honey Bee Colonies report, the sample size and response rates are displayed. Response rates overall for 2022 and 2023 are displayed.

**Quality Metrics for Quarterly Colony Loss Survey - States and United States: January 1, 2022 and January 1, 2023**

| State                           | First of quarter inventory |          |               |           |                             |           |                          |           |
|---------------------------------|----------------------------|----------|---------------|-----------|-----------------------------|-----------|--------------------------|-----------|
|                                 | Sample size                |          | Response rate |           | Weighted item response rate |           | Coefficient of variation |           |
|                                 | 2022                       | 2023     | 2022          | 2023      | 2022                        | 2023      | 2022                     | 2023      |
|                                 | (number)                   | (number) | (percent)     | (percent) | (percent)                   | (percent) | (percent)                | (percent) |
| Alabama .....                   | 63                         | 98       | 74.6          | 61.2      | 72.8                        | 74.9      | 7.9                      | 5.8       |
| Arizona .....                   | 23                         | 28       | 56.5          | 53.6      | 60.4                        | 47.2      | 1.2                      | 3.1       |
| Arkansas .....                  | 45                         | 44       | 73.3          | 70.5      | 34.7                        | 70.5      | 1.9                      | 16.0      |
| California .....                | 238                        | 288      | 41.2          | 31.6      | 26.4                        | 25.7      | 1.0                      | 0.9       |
| Colorado .....                  | 43                         | 42       | 46.5          | 42.9      | 57.6                        | 32.4      | 3.0                      | 2.7       |
| Connecticut .....               | 29                         | 27       | 62.1          | 48.1      | 65.8                        | 54.7      | 2.6                      | 3.0       |
| Florida .....                   | 230                        | 212      | 47.0          | 49.1      | 37.0                        | 40.1      | 2.7                      | 3.4       |
| Georgia .....                   | 124                        | 140      | 54.0          | 42.1      | 56.3                        | 46.3      | 2.9                      | 2.0       |
| Idaho .....                     | 60                         | 53       | 60.0          | 49.1      | 67.4                        | 53.0      | 1.2                      | 0.1       |
| Illinois .....                  | 104                        | 87       | 69.2          | 58.6      | 54.3                        | 47.6      | 9.2                      | 8.4       |
| Indiana .....                   | 64                         | 49       | 48.4          | 44.9      | 49.0                        | 57.1      | 6.0                      | 8.1       |
| Iowa .....                      | 67                         | 62       | 55.2          | 53.2      | 25.1                        | 22.1      | 1.5                      | 1.1       |
| Kansas .....                    | 37                         | 46       | 67.6          | 56.5      | 74.2                        | 69.3      | 18.2                     | 10.5      |
| Kentucky .....                  | 100                        | 42       | 59.0          | 52.4      | 53.3                        | 59.4      | 5.2                      | 15.3      |
| Louisiana .....                 | 47                         | 43       | 53.2          | 67.4      | 35.1                        | 67.0      | 8.4                      | 9.5       |
| Maine .....                     | 22                         | 24       | 54.5          | 62.5      | 80.2                        | 27.5      | 2.4                      | 1.9       |
| Maryland .....                  | 36                         | 40       | 50.0          | 55.0      | 36.8                        | 47.6      | 5.9                      | 4.0       |
| Massachusetts .....             | 36                         | 30       | 50.0          | 43.3      | 14.7                        | 18.5      | 2.0                      | 1.1       |
| Michigan .....                  | 97                         | 116      | 36.1          | 55.2      | 24.0                        | 49.0      | 1.1                      | 2.0       |
| Minnesota .....                 | 91                         | 93       | 58.2          | 50.5      | 32.7                        | 30.5      | 1.5                      | 1.3       |
| Mississippi .....               | 41                         | 45       | 61.0          | 77.8      | 68.2                        | 89.6      | 6.8                      | 3.9       |
| Missouri .....                  | 48                         | 70       | 79.2          | 58.6      | 72.2                        | 40.7      | 17.9                     | 7.9       |
| Montana .....                   | 39                         | 37       | 46.2          | 45.9      | 41.1                        | 51.3      | 0.9                      | 0.0       |
| Nebraska .....                  | 38                         | 39       | 60.5          | 56.4      | 60.0                        | 36.5      | 5.2                      | 5.6       |
| New Jersey .....                | 34                         | 36       | 32.4          | 50.0      | 5.1                         | 11.3      | 3.3                      | 3.3       |
| New Mexico .....                | 14                         | 21       | 64.3          | 61.9      | 90.0                        | 25.9      | 2.4                      | 25.7      |
| New York .....                  | 109                        | 119      | 52.3          | 44.5      | 39.1                        | 29.8      | 6.3                      | 4.3       |
| North Carolina .....            | 110                        | 87       | 72.7          | 72.4      | 76.7                        | 64.9      | 4.8                      | 6.9       |
| North Dakota .....              | 83                         | 83       | 45.8          | 51.8      | 30.4                        | 45.6      | 1.6                      | 0.8       |
| Ohio .....                      | 97                         | 60       | 55.7          | 56.7      | 64.1                        | 51.3      | 11.0                     | 9.9       |
| Oklahoma .....                  | 31                         | 32       | 61.3          | 56.3      | 45.6                        | 31.4      | 25.0                     | 12.8      |
| Oregon .....                    | 68                         | 60       | 52.9          | 60.0      | 68.0                        | 60.8      | 2.0                      | 2.5       |
| Pennsylvania .....              | 143                        | 143      | 50.3          | 51.0      | 20.0                        | 34.0      | 2.1                      | 3.0       |
| South Carolina .....            | 59                         | 43       | 55.9          | 55.8      | 32.5                        | 33.0      | 4.9                      | 5.4       |
| South Dakota .....              | 59                         | 63       | 66.1          | 58.7      | 52.8                        | 70.5      | 0.7                      | 0.1       |
| Tennessee .....                 | 82                         | 90       | 63.4          | 52.2      | 65.3                        | 56.1      | 13.1                     | 7.8       |
| Texas .....                     | 90                         | 166      | 55.6          | 43.4      | 31.1                        | 11.2      | 31.3                     | 5.9       |
| Utah .....                      | 48                         | 38       | 77.1          | 63.2      | 76.3                        | 42.5      | 4.2                      | 0.7       |
| Vermont .....                   | 24                         | 27       | 54.2          | 48.1      | 14.7                        | 10.3      | 0.6                      | 5.6       |
| Virginia .....                  | 79                         | 63       | 72.2          | 63.5      | 74.8                        | 55.3      | 8.4                      | 11.4      |
| Washington .....                | 68                         | 68       | 45.6          | 32.4      | 39.0                        | 24.6      | 0.6                      | 1.1       |
| West Virginia .....             | 53                         | 36       | 64.2          | 66.7      | 46.7                        | 85.1      | 4.2                      | 8.8       |
| Wisconsin .....                 | 93                         | 109      | 57.0          | 60.6      | 33.0                        | 43.7      | 4.7                      | 0.7       |
| Wyoming .....                   | 20                         | 21       | 65.0          | 66.7      | 87.7                        | 89.8      | -                        | 0.2       |
| Other States <sup>1</sup> ..... | 56                         | 57       | 42.9          | 49.1      | 65.2                        | 63.3      | 4.7                      | 4.2       |
| United States .....             | 3,142                      | 3,177    | 55.4          | 51.6      | 39.9                        | 40.7      | 1.8                      | 0.5       |

- Represents zero.

<sup>1</sup> Includes data for States not published in this table.

**Quality Metrics for Quarterly Colony Loss Survey - States and United States: April 1, 2022 and April 1, 2023**

| State                           | First of quarter inventory |          |               |           |                             |           |                          |           |
|---------------------------------|----------------------------|----------|---------------|-----------|-----------------------------|-----------|--------------------------|-----------|
|                                 | Sample size                |          | Response rate |           | Weighted item response rate |           | Coefficient of variation |           |
|                                 | 2022                       | 2023     | 2022          | 2023      | 2022                        | 2023      | 2022                     | 2023      |
|                                 | (number)                   | (number) | (percent)     | (percent) | (percent)                   | (percent) | (percent)                | (percent) |
| Alabama .....                   | 61                         | 96       | 67.2          | 64.6      | 60.0                        | 52.5      | 7.9                      | 5.6       |
| Arizona .....                   | 22                         | 28       | 59.1          | 21.4      | 38.3                        | 6.1       | 1.1                      | 4.5       |
| Arkansas .....                  | 45                         | 43       | 55.6          | 67.4      | 31.5                        | 31.4      | 4.2                      | 15.8      |
| California .....                | 230                        | 282      | 46.1          | 40.4      | 32.0                        | 36.7      | 1.0                      | 0.7       |
| Colorado .....                  | 43                         | 39       | 65.1          | 48.7      | 62.1                        | 22.9      | 2.6                      | 1.5       |
| Connecticut .....               | 26                         | 26       | 73.1          | 50.0      | 70.7                        | 12.6      | 5.0                      | 2.3       |
| Florida .....                   | 226                        | 209      | 45.1          | 47.4      | 33.1                        | 27.1      | 2.7                      | 3.3       |
| Georgia .....                   | 122                        | 137      | 57.4          | 42.3      | 57.8                        | 22.9      | 2.0                      | 1.1       |
| Idaho .....                     | 55                         | 50       | 63.6          | 62.0      | 62.0                        | 74.2      | 1.3                      | 4.0       |
| Illinois .....                  | 98                         | 85       | 70.4          | 63.5      | 53.7                        | 55.4      | 9.3                      | 7.8       |
| Indiana .....                   | 60                         | 47       | 53.3          | 51.1      | 53.0                        | 69.4      | 4.1                      | 5.6       |
| Iowa .....                      | 65                         | 60       | 70.8          | 53.3      | 32.9                        | 25.8      | 1.2                      | 1.2       |
| Kansas .....                    | 34                         | 41       | 70.6          | 61.0      | 80.1                        | 54.6      | 23.0                     | 10.4      |
| Kentucky .....                  | 98                         | 42       | 58.2          | 57.1      | 35.8                        | 43.3      | 4.7                      | 8.1       |
| Louisiana .....                 | 45                         | 42       | 53.3          | 64.3      | 21.0                        | 85.0      | 6.6                      | 9.8       |
| Maine .....                     | 21                         | 24       | 76.2          | 58.3      | 82.7                        | 19.7      | 4.4                      | 1.9       |
| Maryland .....                  | 33                         | 40       | 69.7          | 47.5      | 42.6                        | 26.5      | 4.9                      | 2.9       |
| Massachusetts .....             | 36                         | 30       | 72.2          | 56.7      | 28.2                        | 20.1      | 1.6                      | 0.8       |
| Michigan .....                  | 92                         | 112      | 50.0          | 48.2      | 43.3                        | 27.4      | 2.4                      | 1.9       |
| Minnesota .....                 | 81                         | 90       | 54.3          | 50.0      | 30.6                        | 43.5      | 1.7                      | 1.2       |
| Mississippi .....               | 40                         | 46       | 52.5          | 67.4      | 61.1                        | 47.1      | 7.8                      | 3.9       |
| Missouri .....                  | 45                         | 68       | 68.9          | 58.8      | 65.5                        | 40.6      | 13.5                     | 9.0       |
| Montana .....                   | 39                         | 34       | 48.7          | 47.1      | 50.4                        | 57.5      | 0.9                      | 0.1       |
| Nebraska .....                  | 37                         | 39       | 35.1          | 53.8      | 11.6                        | 50.7      | 6.3                      | 5.8       |
| New Jersey .....                | 33                         | 36       | 45.5          | 47.2      | 21.1                        | 33.9      | 10.8                     | 3.7       |
| New Mexico .....                | 14                         | 18       | 50.0          | 66.7      | 53.6                        | 93.0      | 0.6                      | 28.6      |
| New York .....                  | 109                        | 113      | 62.4          | 45.1      | 36.0                        | 36.7      | 5.5                      | 3.7       |
| North Carolina .....            | 104                        | 86       | 80.8          | 72.1      | 69.9                        | 69.3      | 7.4                      | 6.0       |
| North Dakota .....              | 79                         | 79       | 50.6          | 43.0      | 58.7                        | 40.5      | 0.5                      | 0.8       |
| Ohio .....                      | 89                         | 59       | 64.0          | 52.5      | 45.5                        | 58.3      | 10.7                     | 16.9      |
| Oklahoma .....                  | 31                         | 33       | 54.8          | 54.5      | 24.7                        | 32.8      | 26.4                     | 14.6      |
| Oregon .....                    | 64                         | 57       | 59.4          | 54.4      | 45.2                        | 66.9      | 3.2                      | 3.1       |
| Pennsylvania .....              | 139                        | 141      | 56.8          | 64.5      | 44.9                        | 51.8      | 2.2                      | 3.6       |
| South Carolina .....            | 56                         | 42       | 58.9          | 50.0      | 39.0                        | 38.2      | 3.1                      | 6.6       |
| South Dakota .....              | 59                         | 60       | 47.5          | 51.7      | 38.7                        | 40.7      | 0.6                      | 0.1       |
| Tennessee .....                 | 80                         | 83       | 51.3          | 63.9      | 44.6                        | 61.6      | 9.0                      | 10.6      |
| Texas .....                     | 83                         | 162      | 56.6          | 51.2      | 72.7                        | 62.6      | 32.6                     | 6.4       |
| Utah .....                      | 48                         | 36       | 68.8          | 50.0      | 83.3                        | 58.7      | 4.2                      | 1.0       |
| Vermont .....                   | 27                         | 27       | 48.1          | 55.6      | 8.5                         | 8.3       | 1.5                      | 5.9       |
| Virginia .....                  | 76                         | 61       | 69.7          | 72.1      | 62.2                        | 65.2      | 8.8                      | 10.1      |
| Washington .....                | 65                         | 66       | 40.0          | 51.5      | 38.6                        | 55.1      | 1.6                      | 1.9       |
| West Virginia .....             | 50                         | 35       | 68.0          | 74.3      | 58.8                        | 64.3      | 5.5                      | 6.9       |
| Wisconsin .....                 | 86                         | 104      | 61.6          | 55.8      | 34.8                        | 39.8      | 4.8                      | 0.9       |
| Wyoming .....                   | 19                         | 18       | 57.9          | 55.6      | 63.9                        | 47.2      | -                        | -         |
| Other States <sup>1</sup> ..... | 51                         | 56       | 43.1          | 60.7      | 57.9                        | 69.4      | 2.5                      | 3.5       |
| United States .....             | 3,016                      | 3,082    | 57.3          | 53.5      | 44.0                        | 42.4      | 1.9                      | 0.6       |

- Represents zero.

<sup>1</sup> Includes data for States not published in this table.

**Quality Metrics for Quarterly Colony Loss Survey - States and United States: July 1, 2022 and July 1, 2023**

| State                           | First of quarter inventory |          |               |           |                             |           |                          |           |
|---------------------------------|----------------------------|----------|---------------|-----------|-----------------------------|-----------|--------------------------|-----------|
|                                 | Sample size                |          | Response rate |           | Weighted item response rate |           | Coefficient of variation |           |
|                                 | 2022                       | 2023     | 2022          | 2023      | 2022                        | 2023      | 2022                     | 2023      |
|                                 | (number)                   | (number) | (percent)     | (percent) | (percent)                   | (percent) | (percent)                | (percent) |
| Alabama .....                   | 99                         | 87       | 67.7          | 64.4      | 69.0                        | 62.1      | 11.8                     | 5.0       |
| Arizona .....                   | 29                         | 23       | 44.8          | 43.5      | 37.0                        | 68.0      | 5.4                      | 5.0       |
| Arkansas .....                  | 45                         | 37       | 75.6          | 73.0      | 41.1                        | 46.8      | 16.8                     | 5.2       |
| California .....                | 301                        | 262      | 44.2          | 44.7      | 28.2                        | 26.9      | 0.7                      | 2.3       |
| Colorado .....                  | 45                         | 46       | 51.1          | 58.7      | 57.7                        | 38.4      | 2.9                      | 5.2       |
| Connecticut .....               | 24                         | 25       | 45.8          | 72.0      | 32.1                        | 56.2      | 3.1                      | 4.4       |
| Florida .....                   | 214                        | 258      | 43.9          | 53.5      | 35.9                        | 45.2      | 5.0                      | 2.6       |
| Georgia .....                   | 147                        | 132      | 53.1          | 53.8      | 52.5                        | 54.7      | 1.6                      | 3.2       |
| Idaho .....                     | 56                         | 54       | 51.8          | 64.8      | 45.0                        | 53.5      | 2.3                      | 1.8       |
| Illinois .....                  | 92                         | 98       | 64.1          | 63.3      | 67.4                        | 44.5      | 6.2                      | 6.5       |
| Indiana .....                   | 49                         | 70       | 44.9          | 55.7      | 68.4                        | 59.6      | 5.1                      | 6.8       |
| Iowa .....                      | 64                         | 56       | 59.4          | 76.8      | 24.6                        | 28.9      | 0.8                      | 39.1      |
| Kansas .....                    | 47                         | 31       | 78.7          | 74.2      | 81.6                        | 75.5      | 6.3                      | 7.4       |
| Kentucky .....                  | 42                         | 75       | 35.7          | 62.7      | 33.3                        | 34.1      | 8.0                      | 6.2       |
| Louisiana .....                 | 45                         | 45       | 64.4          | 66.7      | 85.1                        | 57.5      | 7.1                      | 3.4       |
| Maine .....                     | 27                         | 19       | 66.7          | 63.2      | 80.1                        | 17.3      | 3.4                      | 1.1       |
| Maryland .....                  | 41                         | 36       | 46.3          | 47.2      | 29.6                        | 42.6      | 4.6                      | 4.4       |
| Massachusetts .....             | 28                         | 32       | 60.7          | 59.4      | 15.9                        | 42.8      | 0.8                      | 1.6       |
| Michigan .....                  | 126                        | 119      | 57.1          | 58.0      | 33.4                        | 38.8      | 2.9                      | 3.5       |
| Minnesota .....                 | 94                         | 72       | 51.1          | 36.1      | 29.4                        | 33.0      | 2.0                      | 15.5      |
| Mississippi .....               | 49                         | 42       | 67.3          | 61.9      | 79.8                        | 73.3      | 4.4                      | 7.3       |
| Missouri .....                  | 78                         | 64       | 59.0          | 68.8      | 36.8                        | 42.7      | 28.4                     | 6.0       |
| Montana .....                   | 41                         | 37       | 53.7          | 54.1      | 37.1                        | 50.6      | -                        | -         |
| Nebraska .....                  | 41                         | 37       | 58.5          | 56.8      | 25.9                        | 49.8      | 6.0                      | 5.0       |
| New Jersey .....                | 39                         | 41       | 25.6          | 48.8      | 5.0                         | 10.5      | 12.8                     | 3.9       |
| New Mexico .....                | 21                         | 21       | 66.7          | 47.6      | 66.6                        | 9.7       | 21.6                     | 4.1       |
| New York .....                  | 122                        | 113      | 44.3          | 54.0      | 40.0                        | 25.1      | 5.6                      | 3.2       |
| North Carolina .....            | 93                         | 148      | 78.5          | 70.9      | 64.9                        | 71.5      | 7.6                      | 4.5       |
| North Dakota .....              | 84                         | 79       | 41.7          | 41.8      | 40.2                        | 35.0      | 0.8                      | 2.1       |
| Ohio .....                      | 61                         | 110      | 39.3          | 70.0      | 50.1                        | 63.9      | 10.8                     | 15.7      |
| Oklahoma .....                  | 34                         | 20       | 55.9          | 40.0      | 21.8                        | 17.7      | 11.5                     | 17.1      |
| Oregon .....                    | 66                         | 72       | 51.5          | 55.6      | 46.1                        | 40.8      | 2.8                      | 4.8       |
| Pennsylvania .....              | 144                        | 143      | 62.5          | 61.5      | 30.6                        | 50.2      | 2.4                      | 9.9       |
| South Carolina .....            | 45                         | 50       | 60.0          | 66.0      | 42.6                        | 49.0      | 5.2                      | 3.9       |
| South Dakota .....              | 64                         | 59       | 54.7          | 39.0      | 44.5                        | 38.6      | 0.1                      | -         |
| Tennessee .....                 | 97                         | 99       | 43.3          | 68.7      | 42.9                        | 71.6      | 7.2                      | 10.8      |
| Texas .....                     | 171                        | 130      | 67.3          | 62.3      | 73.7                        | 38.8      | 6.0                      | 12.3      |
| Utah .....                      | 40                         | 45       | 65.0          | 57.8      | 67.7                        | 48.4      | 0.3                      | 3.3       |
| Vermont .....                   | 24                         | 27       | 66.7          | 55.6      | 25.3                        | 10.7      | 6.3                      | 1.0       |
| Virginia .....                  | 66                         | 101      | 62.1          | 65.3      | 56.0                        | 55.1      | 14.5                     | 6.6       |
| Washington .....                | 74                         | 73       | 45.9          | 49.3      | 52.8                        | 42.8      | 0.7                      | 1.4       |
| West Virginia .....             | 41                         | 56       | 58.5          | 76.8      | 73.4                        | 69.0      | 13.0                     | 11.3      |
| Wisconsin .....                 | 109                        | 82       | 64.2          | 51.2      | 25.6                        | 63.3      | 1.9                      | 13.3      |
| Wyoming .....                   | 21                         | 24       | 47.6          | 79.2      | 60.4                        | 80.4      | 0.1                      | 0.8       |
| Other States <sup>1</sup> ..... | 60                         | 62       | 48.3          | 58.1      | 63.6                        | 57.5      | 2.8                      | 8.8       |
| United States .....             | 3,300                      | 3,312    | 54.6          | 58.2      | 40.8                        | 40.3      | 0.6                      | 1.5       |

- Represents zero.

<sup>1</sup> Includes data for States not published in this table.

**Quality Metrics for Quarterly Colony Loss Survey - States and United States: October 1, 2022 and October 1, 2023**

| State                           | First of quarter inventory |          |               |           |                             |           |                          |           |
|---------------------------------|----------------------------|----------|---------------|-----------|-----------------------------|-----------|--------------------------|-----------|
|                                 | Sample size                |          | Response rate |           | Weighted item response rate |           | Coefficient of variation |           |
|                                 | 2022                       | 2023     | 2022          | 2023      | 2022                        | 2023      | 2022                     | 2023      |
|                                 | (number)                   | (number) | (percent)     | (percent) | (percent)                   | (percent) | (percent)                | (percent) |
| Alabama .....                   | 100                        | 81       | 63.0          | 72.8      | 66.1                        | 75.1      | 9.2                      | 5.7       |
| Arizona .....                   | 29                         | 22       | 48.3          | 59.1      | 47.6                        | 48.9      | 4.5                      | 3.6       |
| Arkansas .....                  | 44                         | 32       | 84.1          | 40.6      | 90.2                        | 31.4      | 15.9                     | 5.7       |
| California .....                | 295                        | 254      | 36.6          | 39.8      | 26.1                        | 29.0      | 0.9                      | 2.5       |
| Colorado .....                  | 43                         | 40       | 48.8          | 52.5      | 54.3                        | 42.4      | 3.3                      | 3.8       |
| Connecticut .....               | 27                         | 24       | 55.6          | 79.2      | 41.7                        | 69.1      | 3.0                      | 4.8       |
| Florida .....                   | 212                        | 243      | 38.2          | 58.0      | 36.4                        | 45.7      | 2.4                      | 1.7       |
| Georgia .....                   | 144                        | 127      | 47.9          | 57.5      | 46.4                        | 46.7      | 1.5                      | 3.0       |
| Idaho .....                     | 53                         | 54       | 52.8          | 51.9      | 48.6                        | 54.2      | 4.3                      | 1.5       |
| Illinois .....                  | 88                         | 97       | 61.4          | 69.1      | 58.0                        | 59.9      | 7.2                      | 7.6       |
| Indiana .....                   | 49                         | 65       | 46.9          | 43.1      | 59.2                        | 59.5      | 6.8                      | 6.9       |
| Iowa .....                      | 64                         | 48       | 56.3          | 62.5      | 26.5                        | 21.6      | 1.2                      | 39.9      |
| Kansas .....                    | 45                         | 28       | 75.6          | 85.7      | 86.8                        | 84.8      | 5.7                      | 13.9      |
| Kentucky .....                  | 42                         | 74       | 52.4          | 66.2      | 62.4                        | 53.8      | 13.3                     | 6.8       |
| Louisiana .....                 | 44                         | 44       | 63.6          | 56.8      | 72.6                        | 56.7      | 7.6                      | 5.2       |
| Maine .....                     | 25                         | 14       | 76.0          | 92.9      | 84.6                        | 95.6      | 7.3                      | 2.2       |
| Maryland .....                  | 40                         | 34       | 70.0          | 35.3      | 79.2                        | 31.9      | 9.8                      | 8.0       |
| Massachusetts .....             | 28                         | 31       | 67.9          | 64.5      | 62.2                        | 53.3      | 0.8                      | 2.0       |
| Michigan .....                  | 120                        | 113      | 56.7          | 53.1      | 42.9                        | 29.1      | 2.7                      | 2.2       |
| Minnesota .....                 | 92                         | 66       | 54.3          | 57.6      | 42.8                        | 53.1      | 1.9                      | 15.0      |
| Mississippi .....               | 47                         | 42       | 61.7          | 59.5      | 65.5                        | 41.3      | 4.4                      | 7.2       |
| Missouri .....                  | 73                         | 61       | 53.4          | 62.3      | 42.5                        | 50.1      | 14.4                     | 28.3      |
| Montana .....                   | 38                         | 37       | 57.9          | 48.6      | 31.9                        | 52.5      | 0.1                      | 0.0       |
| Nebraska .....                  | 40                         | 35       | 57.5          | 62.9      | 54.5                        | 46.1      | 5.8                      | 5.2       |
| New Jersey .....                | 37                         | 40       | 51.4          | 42.5      | 14.7                        | 22.7      | 5.2                      | 3.6       |
| New Mexico .....                | 21                         | 20       | 61.9          | 55.0      | 62.7                        | 25.0      | 26.1                     | 3.6       |
| New York .....                  | 120                        | 105      | 39.2          | 48.6      | 18.8                        | 22.4      | 3.5                      | 3.7       |
| North Carolina .....            | 88                         | 132      | 76.1          | 75.8      | 64.9                        | 75.7      | 6.8                      | 5.4       |
| North Dakota .....              | 85                         | 77       | 48.2          | 57.1      | 49.0                        | 59.3      | 0.7                      | 2.2       |
| Ohio .....                      | 60                         | 104      | 55.0          | 64.4      | 63.4                        | 47.4      | 9.1                      | 16.5      |
| Oklahoma .....                  | 32                         | 18       | 56.3          | 61.1      | 37.4                        | 35.4      | 13.4                     | 15.6      |
| Oregon .....                    | 63                         | 71       | 49.2          | 45.1      | 61.8                        | 49.6      | 2.6                      | 3.9       |
| Pennsylvania .....              | 147                        | 125      | 58.5          | 52.0      | 22.8                        | 29.1      | 2.3                      | 14.3      |
| South Carolina .....            | 44                         | 47       | 59.1          | 59.6      | 44.8                        | 49.1      | 5.0                      | 4.8       |
| South Dakota .....              | 63                         | 57       | 58.7          | 40.4      | 77.3                        | 43.4      | 0.1                      | 0.2       |
| Tennessee .....                 | 93                         | 87       | 46.2          | 62.1      | 56.4                        | 63.3      | 7.5                      | 8.7       |
| Texas .....                     | 168                        | 126      | 48.8          | 57.9      | 32.8                        | 13.4      | 6.1                      | 12.6      |
| Utah .....                      | 39                         | 43       | 69.2          | 74.4      | 80.8                        | 75.6      | 0.3                      | 2.9       |
| Vermont .....                   | 26                         | 24       | 65.4          | 54.2      | 52.7                        | 47.5      | 6.5                      | 0.7       |
| Virginia .....                  | 64                         | 89       | 60.9          | 60.7      | 53.5                        | 61.1      | 8.8                      | 10.8      |
| Washington .....                | 72                         | 68       | 34.7          | 55.9      | 29.0                        | 40.7      | 0.8                      | 1.3       |
| West Virginia .....             | 38                         | 53       | 73.7          | 79.2      | 86.9                        | 72.2      | 9.4                      | 10.6      |
| Wisconsin .....                 | 109                        | 79       | 50.5          | 75.9      | 59.3                        | 62.7      | 0.8                      | 8.4       |
| Wyoming .....                   | 21                         | 23       | 81.0          | 82.6      | 81.5                        | 90.1      | 0.1                      | 0.6       |
| Other States <sup>1</sup> ..... | 58                         | 59       | 56.9          | 59.3      | 69.6                        | 53.8      | 3.0                      | 8.6       |
| United States .....             | 3,230                      | 3,113    | 53.1          | 58.0      | 43.5                        | 42.8      | 0.5                      | 1.4       |

<sup>1</sup> Includes data for States not published in this table.

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