Cattle Methodology and Quality Measures

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Scope and Purpose: The January Cattle Survey targets cattle and calf producers in the U.S. The January survey collects data for total cattle inventory and the components of that total, including beef cows, milk cows, bulls, replacement heifers, other heifers and steers, calves, and cattle on feed. In addition, the January survey collects calf crop (calves born from the previous year), death loss from the previous year, slaughter for consumption, breeding animal values, and grazing fees data. Data are also collected for total cattle grazing on small grain pastures in Kansas, Oklahoma, and Texas. A federal program survey is conducted every five years for Cattle and Calf Predator and Non-Predator Loss and is incorporated as part of the January Cattle Survey.

Survey Timeline: The reference date for the January Cattle Survey is January 1 with a data collection period of 15 days, beginning one day prior to the reference date. Regional Field Offices (RFOs) may begin data collection one day prior to the reference date. Data collection continues until a scheduled ending date and RFOs have 4 to 5 business days to complete editing and analysis, execute the summary, and interpret the survey results. The Agricultural Statistics Board (ASB) must perform the National review, reconcile state estimates to the National estimates, and prepare the official estimates for release in 5 to 6 business days. The estimates are released to the public on the last business day in January.

Sampling: The target population for the January Cattle Survey is all agricultural establishments with one or more head of cattle on the land operated. A lower boundary, such as 20 head is used in a few states to establish the list frame population. NASS uses a dual frame approach, consisting of list frame and area frame components to provide complete coverage of this target population. The January Cattle Survey is conducted in every state.

The list frame includes all known agricultural establishments. Livestock inventory of each establishment is maintained on the list frame to allow NASS to define list frame sampling populations for specific surveys and to employ efficient sampling designs. Only list frame records with positive cattle inventory are included in the list frame population for the cattle sample. The list frame cattle population covers approximately 88 percent of January cattle inventory in the U.S.

The area frame contains all land in the United States and as such, is complete. The land is stratified according to intensity of agriculture using satellite imagery. The land in each stratum is divided into segments of roughly one square mile. Segments are optimally allocated and sampled to effectively measure crops and livestock. The sampled segments are fully enumerated in June. All farms and ranches found operating tracts in these segments are checked to see if they are included in the list frame cattle population. The farms and ranches that are not included in the list frame cattle population, called nonoverlap tracts are sampled for the January Cattle survey so that the target population is completely represented. The area frame component of the January Cattle survey covers approximately 12 percent of the January cattle inventory in the U.S.

The January Cattle Survey list frame sample is selected using a hierarchical stratified sampling design with strata defined by total cattle and calves, milk cows, and cattle on feed. The sample is designed to achieve a U.S. standard error of 1 percent of the point estimate for total cattle and calves, 2 percent for milk cows, and 2 percent for cattle on feed. The January Cattle Survey nonoverlap sample is a subset of the June Area Survey. The sample (or subsample) uses a stratified sample design based on the cattle data collected from the June Area Survey. Each sampling unit from the list and area frames is assigned a sampling weight which is used to create the survey estimates.

Data Collection and Editing: For consistency across modes, the paper version is considered the master questionnaire and the Computer Assisted Telephone Interview (CATI), Computed Assisted Self Interview (CASI), and Mobile Computer Assisted Personal Interview (mCAPI) instruments are built to model the paper instrument. Questionnaire content and

format are evaluated annually through a specifications 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 the paper, mCAPI, CASI and CATI instruments are thoroughly tested.

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 cattle 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. Also, 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 must be on the questionnaire.

In addition to asking the specific cattle items, all instruments collect information to verify the sampled unit, determine any changes in the name or address, identify any partners to detect possible duplication, verify the farm still qualifies for the target population, and identify any additional operations operated by the sampled operator.

Sampled farms and ranches receive a presurvey letter explaining the survey and that they will be contacted for survey purposes only. The letter provides the questions to be asked to allow respondents to prepare in advance and also provides a pass code they can use to complete the survey on the internet (CASI). All modes of data collection are utilized for cattle surveys. RFOs are given the option of conducting a mail out/mail back phase. While mail is the least costly mode of collection, the short data collection period and the uncertainty of postal delivery times limit its effectiveness. Most of the data are collected by CATI by individual RFOs and Data Collection Centers. A program is run to determine if any sampled farms are in multiple on-going surveys, so data collection can be coordinated.

Survey Edit: As survey data are collected and captured, they are edited for consistency and reasonableness using automated systems. The edit logic ensures the coding of administrative data follows the methodological rules associated with the survey design. 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 scatter plots, tables, charts, and special tabulations that allow the analyst to compare an individual record to other similar records within their state. Outliers and unusual data relationships become evident and RFO staff will review them to determine if they are correct. The tool also allows comparison to previously reported data to detect large changes in the operation. Suspect data found to be in error are corrected, while data found to be correct are kept.

Nonsampling Errors: Nonsampling errors are present in any survey process. These errors include reporting, recording, editing, and imputation errors. Steps are taken to minimize the impact of these errors, such as questionnaire testing, comprehensive interviewer training, validation and verification of processing systems, detailed computer edits, and the analysis tool.

Estimators: Each farm and ranch in the sample has an initial sampling weight. This is the inverse of the sampling fraction. For example, if a stratum has 1,000 farms in the population and 200 are sampled for this survey, each sampled farm has a weight of 5. In other words, each sampled farm represents 5 farms. The nonoverlap tracts sampled to measure the cattle not accounted for by the list have a weight determined by adjusting their original area frame weight by any second stage sampling weight.

Response to the January Cattle 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. These nonrespondents must be accounted for if accurate estimates of cattle are to be made. For the Cattle survey, nonrespondents are accounted for by adjusting the

weights of the respondents. The adjustment occurs by stratum as the bounded strata represent homogeneous groupings of similar sized farms. The adjustment is also performed for each individual item (total cattle, beef cows, calf crop) because sometimes only a partial report is obtained. Using the previous example, if 180 of the original 200 respond, the weights of the 180 will be adjusted to 1,000 divided by 180, or 5.56. The largest stratum is unbounded and is made up of large and, often unique, farms. Nonrespondents in this stratum and the nonoverlap tracts must be manually imputed by RFO statisticians, and their weights are not adjusted.

Two estimators are used to compute direct measures of the cattle items. The "reweighted" estimator and the "adjusted" estimator are computationally identical except in how the nonresponse adjustments are made. The reweighted estimator uses a global weight adjustment across all reported and estimated reports. The nonresponse weight adjustment for the adjusted estimator uses an additional piece of information. When a sampled farm refuses to cooperate, interviewers will probe to determine the presence of cattle even though the number is not known. This presence/absence indicator is used in the weight adjustment.

Point estimates, called direct expansions, for both estimators are calculated by multiplying the reported value by the nonresponse adjusted weight and summing to a stratum total. A variance estimate is also computed at the stratum level. The nonoverlap tracts are treated as an additional stratum. Totals and variances are additive across strata to form a state estimate and states are additive to a National estimate.

Ratio estimates are also computed for many items. For example, beef cows can be estimated as a percent of total inventory. Ratio estimates use the reweighted estimator described above for the numerator and denominator. Both the numerator and denominator must be complete for that record to be included in the ratio estimator.

Estimation: When all samples are accounted for, all responses fully edited, and the analysis material is reviewed, each RFO executes the summary for their state. When all RFOs have run summaries, Headquarters executes the National summary. Since all states conduct identical surveys, the samples can be pooled, and National survey results computed. The summary results provide multiple point estimates and their standard errors for each data series being estimated. It also provides information used to assess the performance of the current survey and evaluate the quality of the survey estimates, such as strata level expansions, response rates, and percent of the expansion from usable reports.

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. Using the historical relationship of the survey estimates to the official estimate, RFOs interpret the survey results and submit a recommended estimate to Headquarters. The data are viewed in tabular and graphical form and a consensus estimate is established. RFOs see their survey results only and do not have access to other states' results. For some data series, information from other sources is also utilized in the process of establishing estimates.

For the National estimates, NASS assembles a panel of statisticians to serve as the Agricultural Statistics Board which reviews the National results and establishes the National estimates. Since larger sample sizes yield more precise results, NASS employs the "top-down" approach by determining the National estimates first and reconciling the state estimates to the National number for total cattle and the cattle classes. The ASB has the advantage of being able to examine results across stats, compare the state recommendations, and utilize administrative data available only at the United States level. The same estimators used in the state summaries are produced by the National summary. The ASB follows the same approach the states do in determining the National estimate. The historical relationship of the survey estimates to the official estimate is evaluated over time to determine accuracy and bias using tables and graphs. Every five years NASS conducts the Census of Agriculture, which is an exhaustive data collection effort for all known farm operations across the U.S. The information gathered from the Census of Agriculture is used to establish bench-mark levels by which the survey estimators can be compared, and bias determined. Survey based estimators can also be impacted by outliers – individual reports that have "excessive influence" on the results due to either improper classification or extremely unusual data for a given operation (i.e., operation is not representative of other operations). NASS thoroughly reviews the survey data to identify these situations and consider their impact on the survey results when establishing the official estimates.

External information (administrative data) is also utilized in the process of setting estimates. To be considered, these data must be deemed to be reliable and come from unbiased sources. The most common administrative data is commercial

slaughter. NASS employs a balance sheet approach whenever possible to ensure that estimates are as accurate as possible. This approach typically is limited to National level estimates. A balance sheet and its components are reviewed when the inventory numbers are established. Commercial slaughter is an important element of the balance sheet at the National level since its high degree of reliability is based on a near-actual count of animals slaughtered. Live U.S. imports and exports to other countries are also considered.

Subtracting the disposition components of the balance sheet from supply components should, theoretically, give the current inventory. However, each component of the balance sheet has varying degrees of possible estimation error. To be most useful as an indication of inventory, therefore, each component is estimated based on all available information. The supply components of the U.S. balance sheet are the beginning inventory, births, and imports (inshipments for State balance sheets). From this supply, the disposition components – commercial slaughter (marketings at State level), farm slaughter, deaths, and exports – are subtracted. The result is the indicated number on hand at the end of the period or year.

Quality Metrics for Cattle

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 tables below describe the performance data for all surveys contributing to the publication. The accuracy of data products may be evaluated through sampling and nonsampling error. The measurement of error due to sampling in the current period is irrelevant for a fully enumerated data series. Nonsampling error is evaluated by 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 completed 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.

Cattle Survey Sample Size and Response Rate: To assist in evaluating the performance of the estimates in the cattle report, the sample size and response rates are displayed.

Cattle Survey Sample Size and Response Rate - United States: January 1, 2025-2026

State	Sample size		Response rate	
	2025	2026	2025	2026
	(number)	(number)	(percent)	(percent)
United States	38,856	37,779	51.0	39.6

Quality Metrics for Cattle by Class - United States: January 1, 2025-2026

Class	Weighted item response rate		Coefficient of variation	
	2025	2026	2025	2026
	(percent)	(percent)	(percent)	(percent)
Cattle and calves	44.3	35.5	1.2	1.1
Cows and heifers that have calved	39.8	31.1	1.4	1.2
Beef cows	39.2	29.7	1.3	1.5
Milk cows	42.1	36.1	4.8	1.5
Cattle on feed	66.3	58.9	1.5	1.3
Calf crop	40.8	31.4	1.1	1.2

Quality Metrics for Cattle Survey - States and United States: January 1, 2025-2026

State	Sample size		Response rate		All cattle and calves			
					Weighted item response rate		Coefficient of variation	
	2025	2026	2025	2026	2025	2026	2025	2026
	(number)	(number)	(percent)	(percent)	(percent)	(percent)	(percent)	(percent)
Alabama	762	737	51.2	43.4	35.5	35.8	5.8	9.2
Alaska	70	62	51.4	54.8	13.3	81.2	3.7	3.7
Arizona	277	247	58.8	43.3	71.8	66.9	2.6	3.2
Arkansas	874	850	47.7	40.6	38.9	32.9	6.0	6.6
California	1,408	1,404	53.2	43.4	46.6	36.4	2.0	2.5
Colorado	896	868	60.6	34.6	68.0	44.2	2.3	5.4
Connecticut	157	153	57.3	50.3	51.7	44.7	8.7	6.7
Delaware	79	78	24.1	43.6	14.4	16.7	29.4	31.9
Florida	812	775	36.9	40.1	23.1	30.3	7.1	8.0
Georgia	817	765	48.7	49.3	41.4	46.0	5.7	7.1
Hawaii	181	175	59.1	22.9	50.2	16.2	2.3	3.7
Idaho	926	906	54.3	38.4	39.1	30.7	2.4	1.9
Illinois	839	840	47.8	36.2	41.6	31.5	17.8	7.5
Indiana	893	895	41.2	30.8	28.0	28.8	5.8	8.1
Iowa	1,685	1,712	44.5	44.0	37.0	36.4	3.5	4.0
Kansas	1,515	1,471	45.3	31.1	45.9	37.6	3.0	2.8
Kentucky	1,244	1,198	57.7	41.9	49.3	37.4	4.6	5.8
Louisiana	506	489	48.2	42.5	35.9	34.0	11.0	7.8
Maine	209	191	42.6	49.7	40.3	39.2	6.5	9.0
Maryland	264	266	48.5	38.3	38.6	28.9	6.9	9.2
Massachusetts	168	169	70.2	38.5	71.5	43.5	6.8	12.4
Michigan	666	673	45.2	30.3	35.0	22.5	6.3	6.4
Minnesota	1,254	1,266	41.2	42.9	34.3	36.3	4.6	5.2
Mississippi	589	554	40.9	41.0	31.5	33.4	7.3	9.0
Missouri	1,460	1,397	43.3	33.4	36.3	28.8	3.8	4.7
Montana	830	770	58.6	39.0	50.1	34.3	4.0	4.5
Nebraska	1,853	1,816	52.7	39.0	52.5	41.3	2.4	3.5
Nevada	213	204	48.4	38.2	34.9	24.9	6.1	8.4
New Hampshire	111	112	49.5	33.9	41.3	26.0	9.1	13.6
New Jersey	154	159	48.7	38.4	35.3	29.2	12.9	16.3
New Mexico	550	509	49.8	30.1	40.8	32.5	11.6	4.8
New York	700	681	40.9	33.2	25.7	32.7	33.8	4.6
North Carolina	484	485	63.2	39.4	54.3	39.8	6.6	6.9
North Dakota	959	947	47.7	30.0	35.0	21.1	6.6	7.1
Ohio	894	888	39.7	38.6	30.6	29.9	9.4	10.4
Oklahoma	2,745	2,557	60.3	41.6	52.3	32.5	3.6	5.7
Oregon	581	556	53.9	41.4	40.2	36.7	4.5	6.2
Pennsylvania	1,377	1,344	50.0	44.9	39.6	37.6	4.9	6.1
Rhode Island	60	59	38.3	39.0	29.2	32.0	16.3	13.2
South Carolina	290	275	57.2	42.9	49.1	39.7	10.1	8.3
South Dakota	1,199	1,193	50.3	35.1	41.2	26.2	3.9	5.1
Tennessee	958	914	53.0	47.5	42.3	40.3	4.4	5.6
Texas	1,912	1,884	55.4	36.6	47.8	35.7	3.2	4.8
Utah	463	413	80.1	49.4	71.2	47.7	4.4	6.1
Vermont	233	220	60.9	54.5	63.6	56.1	7.2	6.4
Virginia	827	812	56.3	43.5	46.4	36.0	3.9	5.1
Washington	493	488	51.7	34.4	47.0	34.0	3.0	4.6
West Virginia	384	368	72.1	47.6	57.6	42.3	8.0	8.5
Wisconsin	1,305	1,291	46.0	48.8	40.4	41.4	3.2	4.1
Wyoming	730	693	57.9	33.2	50.6	33.5	5.0	5.5
United States	38,856	37,779	51.0	39.6	44.3	35.5	1.2	1.1

Information Contacts

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Estimation	Livestock Branch	(202) 720-3570	HQ_SD_LB@usda.gov
Data Collection	Survey Administration Branch	(202) 720-3895	HQ_CSD_SAB@usda.gov
Questionnaires	Data Collection Branch	(202) 720-6201	HQ_CSD_DCB@usda.gov
Sampling and Editing	Sampling Editing and Imputation Methodology Branch	(202) 690-8141	HQ_CSD_SB@usda.gov
Summary and Estimators	Summary Estimation and Disclosure Methodology Branch	(202) 690-8141	HQ_SD_SMB@usda.gov
Dissemination	Data Dissemination Office	(202) 720-3869	HQSDOD@usda.gov
Media Contact and Webmaster	Public Affairs Office	(202) 720-2639	HQOAPAO@usda.gov

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- Economics, Statistics, and Market Information (ESMIS) – National Agricultural Library (NAL) website houses NASS's and other agency archived reports at https://esmis.nal.usda.gov. All email subscriptions containing reports will be sent from https://esmis.nal.usda.gov. To receive the reports via e-mail, you will have to go to the website, create a new account and subscribe to the reports. You should whitelist notifications@esmis.nal.usda.gov in your email client to avoid the emails going into spam/junk folders.

For more information on NASS surveys and reports, call the NASS Agricultural Statistics Hotline at (800) 727-9540, 7:30 a.m. to 4:00 p.m. ET, or e-mail: nass@usda.gov.

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