

B. Collections of Information Employing Statistical Methods

1. Describe the potential respondent universe and any sampling or other respondent selection methods to be used.

The potential respondent universe of the Cervid 2014 Study is all producers with deer and/or elk that responded to the 2012 US Census of Agriculture. Based on the 2007 US Census of Agriculture, there were 5,654 deer operations and 1,917 elk operations that met this criterion (Appendix A). The preliminary sample estimation was based on the 2007 Census of Agriculture. Based on previous NAHMS studies, approximately 70percent of the sample is useable and approximately 50percent is complete (Appendix B, Table 1a).

2. Describe the procedures for the collection of information including:

- Statistical methodology for stratification and sample selection:

A total of 3,000 operations with deer or elk will be selected from NASS' list frame from a population of approximately 7,500 operations (based on the 2007 Census of Agriculture).

The list frame will be stratified by region (West, South, and Northeast) and by type of operation (deer only, elk only, both deer and elk). Within each stratum, the list frame will be sorted by state (to ensure geographic representation), and a systematic random sample will be selected within each stratum as follows:

Number of operations that will be sampled, by type of operation and region

Type of operation	Region		
	West	South	Northeast
Deer only	101	868	852
Elk only	239	83	306
Both deer and elk	52	305	194

Because the final allocation will be based on the 2012 Census of Agriculture, these numbers are likely to change somewhat.

- Estimation procedure:

The sampling design is a stratified random sample with unequal probabilities of selection between strata (Appendix C, Table 1). The statistical estimation will be undertaken using either SAS survey procedures or SUDAAN. Both software packages use a Taylor series expansion to estimate appropriate variances for the stratified, weighted data.

- **Degree of accuracy needed for the purpose described in the justification:**

The overall NAHMS program goal is to develop descriptive statistics with a coefficient of variation (CV) less than 20 percent. Analytical studies are designed with a goal of 80 percent power to detect odds ratios of greater than 2 for the factors identified as most important by the industry. Appendix C (Sample size estimates for three levels of prevalence using 95percent confidence) shows sample size estimates for a 50percent response rate without adjusting for design effect.

For example, for the sample of 1,352 operations in the Northeast region, we can expect approximately 676 good NASS responses (50percent response rate). Assuming no design effect, this would allow estimates for the Northeast region of approximately 50percent +/- 3.4percent, 20percent +/- 2.7percent, 10percent +/- 2.0percent.

Similarly, for the sample of 1,821 operations that have only deer, we expect about 910 good NASS responses. Without a design effect, this would allow estimates for the deer-only operations of approximately 50percent +/- 2.9percent, 20percent +/- 2.4percent, 10percent +/- 1.8percent.

However, the complex survey design typically will result in variances that are inflated, resulting in a design effect. Judging from previous NAHMS studies, we typically expect a design effect of around 2. Thus, for the Northeast region, we could have an effective sample size of $676/2 = 338$. The precision of estimates for the Northeast region would increase to 50percent +/- 5.1percent, 20percent +/- 4.1percent, 10percent +/- 3.1percent. However, even with the design effect, the CV's would generally still be in the desired range of precision.

- **Unusual problems requiring specialized sampling procedures and data collection cycles:**

There are no unusual problems requiring specialized sampling procedures and data collection cycles.

3. *Describe methods to maximize response rates and to deal with issues of non-response:*

Study Design:

- Minimizing collection of data to that which is absolutely necessary.
- Numerous contacts and collaborative efforts have been made to identify the information needs and how best to ask for that information via the Cervid 2014 questionnaire.

- Mailing the questionnaire, the second request mailing, and telephone follow up will boost the response rate to the estimated 50 percent. The estimated 50 percent response rate is based upon consultation with NASS and previous experience using U.S. Mail with a telephone follow-up for data collection. Several previous NAHMS studies have used this procedure, and obtained response rates for survey completion ranging from 32.5percent to 69.3percent (Appendix B). Although at least 60percent of operations gave useable inventory data in each of these previous studies, a considerable percentage reported zero inventory on hand for the species of interest, and therefore did not complete the questionnaire. We expect a higher completion rate for this study than for the General Goat Management Report (GGMR CATI). The GGMR targeted very small operations with less than 10 goats, a population that is expected to be more likely to go in or out of business than the population targeted for the Cervid 2014 Study.
- NAHMS will develop training information for NASS enumerators that explains the purpose of the study and addresses anticipated difficulties with questions.

Non-response:

- The study is supported by industry representatives who have contributed to the study development.
- The study will be announced in industry publications.
- The questionnaire will be sent out via U.S. Mail with a cover letter and information sheet announcing the study to give respondents more information on the study and why participation is important.
- The questionnaire and cover letter will be sent out again, stamped as a “Second Request”, two weeks after the initial questionnaire is sent out if a response is not received.
- If no response is received one month after the initial questionnaire is mailed out (two weeks after the second request) a NASS enumerator will contact the producer via telephone and attempt to get the producer to complete the questionnaire or schedule a convenient time to complete the questionnaire.
- Producers will be called up to 7 times before they are listed as inaccessible.

Non-response adjustment:

- Response rates, given the methods described above, are expected to be approximately 50percent for this study. If the respondents differ substantially from the non-respondents there will be the potential for bias. There are two approaches that we will use to examine for potential bias. First, NASS’ list frame control data will be available for both respondents and non-respondents to allow for examination of potential differences in the types of responding and non-responding producers. The information will include number of animals owned as well as the number of animals

on the land operated, operation type, and State. Secondly, we can compare estimates from the study with available indicators from other sources. For example, although we do not publish estimates of animal inventory, the study results will allow us to make estimates that we can use to compare against NASS' inventory estimates. We will compare our results to values available from the scientific literature. We believe there will be limited opportunities for comparison because little national data exist for the type of information that is to be collected.

- The sampling design necessitates the use of weights which reflect the initial sample selection probabilities (the inverse of the selection interval). Weights of non-respondents will be transferred to responding operations that are most similar based on available data. Within categories, the sum of weights of the non-respondents and respondents will be divided by the sum of the weights of the respondents only. This factor will be used to adjust the weights of the respondents within the category. All weights for non-respondents will be set to zero.

4. Describe any tests of procedures or methods to be undertaken.

The proposed questionnaires will be pretested on less than 10 respondents. Results of these pretests will be utilized to refine the information collection in order to reduce respondent burden and improve the usefulness of the information.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and /or analyze the information for the agency.

The statistical aspects of the design were coordinated by Ms. Christine Koprak, Statistician, USDA: APHIS, Veterinary Services, CEAH, Fort Collins, CO, (970) 494-7325. The actual data collection will be conducted by NASS. Contact persons for data collection are:

Ms. Barbara Rater-, Chief, Survey Administration Branch, Mail Stop 2024, 1400 Independence Ave., S.W., Washington, D.C. 20250, (202) 720-3895.

Dr. John Clifford, Deputy Administrator, USDA: APHIS, Veterinary Services, Washington, DC (202) 447-6835.

Analysis of the data will be accomplished by NAHMS veterinarians, epidemiologists, and statisticians under the direction of:

Dr. Bruce Wagner, Center Leader, National Animal Health Monitoring Systems, USDA: APHIS, VS, CEAH, 2150 Centre Avenue, Building B MS2E7, Fort Collins, CO 80526-8117 (970) 494-7256.

Appendix A: U.S. Cervid Operations

Table 1: Number of deer and elk operations (Source: 2007 US Census of Agriculture)

Number of Farms*	
Deer	Elk
5,654	1,917

*Note: The Cervid 2014 Study will use updated data from the 2012 US Census of Agriculture.

Appendix B: Predicted Response Rate

A questionnaire, requiring approximately 30 minutes to complete, will be mailed to producers selected from the NASS list frame for this study. If a response is not received after two weeks, a second questionnaire will be mailed. If a response is still not received two weeks after the second mailing (one month after the initial mailing), enumerators from the NASS will call producers and administer the questionnaire via Computer Assisted Telephone Interview (CATI). Up to seven calls will be made in an effort to complete an interview before coding the respondent as unavailable. There will not be any attempt to convert refusals other than a clear explanation, during the phone call, of the importance of their voluntary participation. The response rate to the questionnaire using this combination of data collection techniques is predicted to be 50percent.

1. Review of Previous NAHMS Response Rates for Studies Conducted Using Mailing and CATI

a. Questionnaire response rates:

Year	Questionnaire	Collection dates	Sample	Useable ¹	Useable percent	Complete ²	Complete percent
2004	Small-Enterprise Swine (NASS CATI)	8/2/04-9/18/04	2,567	2,050	79.9	1,778	69.3
2007	Small Enterprise Chicken Report (NASS CATI)	8/1/07 – 9/30/07	2,511	1,789	71.2	1,191	47.4
2009	General Goat Management Report (NASS CATI)	7/1/09 - 8/17/09	2,000	1,429	71.5	649	32.5
2011	Small-Scale US	4/1/11 –	16,000	9,515	59.5	8,186	51.2

	Livestock Operations	5/18/11					
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¹Respondent was contacted and provided at least inventory information. Includes operations with zero inventory on hand.

²Respondent provided answers to all or nearly all questions.

Appendix C: Sample Calculation-Sample Size Unadjusted for Sampling Design

To estimate a sample size, we estimated the number of farms in each stratum based on the 2007 Census of Agriculture.

The strata for sample selection will be based on operation-type/region combinations; however, reporting of estimates will be done either by operation-type or by region, not by the combination. So for this purpose, we will call these the reporting classes (to distinguish from selection strata).

Table 1. Number of farms that will be sampled, by reporting class.

Reporting class	Total Population (N)	Allocation (n)	Sampling interval	n expected at 50percent response rate
West	616	392	1.6	196
South	2,646	1,256	2.1	628
Northeast	3,712	1,352	2.7	676
Deer only	5,057	1,821	2.8	910
Elk only	1,320	628	2.1	314
Both deer and elk	597	551	1.1	276
Total	6,974	3,000	2.3	1,500

Table 2. Accuracy of estimates based on sample sizes and expected number of responses outlined in Table 1.

Prevalence (percent)	West	South	Northeast	All farms
50	± 5.8percent	± 3.4percent	± 3.4percent	± 2.2percent
20	± 4.6percent	± 2.7percent	± 2.7percent	± 1.8percent
10	± 3.5percent	± 2.0percent	± 2.0percent	± 1.3percent
	Deer only	Elk only	Both deer & elk	
50	± 2.9percent	± 4.8percent	± 4.3percent	
20	± 2.4percent	± 3.9percent	± 3.5percent	
10	± 1.8percent	± 2.9percent	± 2.6percent	

Note: These calculations were done in SAS, Version 9.3, using finite population corrections.

