

## **B. Collections of Information Employing Statistical Methods**

**1. Describe the potential respondent universe and any sampling or other respondent selection methods to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved during the last collection.**

The respondent universe will be all operations in the United States that meet the USDA APHIS Agricultural Census criteria to qualify as a “farm” and that have one or more equids. Examination of the National Agricultural Statistics Service’s (NASS) 2012 Census of Agriculture summary information (the last publication of all State-level farm and inventory information) shows 3,621,348 equids<sup>1</sup> on 504,795 operations in the United States.<sup>2</sup> A sample of equine operations will be selected by NASS using results from the 2012 Census of Agriculture. All operations in the selected States<sup>3</sup> that meet the USDA NASS 2012 Agricultural Census criteria to qualify as a farm or ranch<sup>4</sup> and have one or more equids will be eligible to be in the sample. The Equine 2015 study will consist of two phases with questionnaires administered via on-farm interview during each phase. The first phase of the study will be administered by National Association of State Department of Agriculture enumerators under the oversight of NASS officials (these enumerators will be referred to as NASS enumerators for the remainder of the document). The second questionnaire, with biologic sampling, will be administered by USDA APHIS VS-designated data collectors (VS data collectors).

The goal of NAHMS national studies is to include States that account for at least 70 percent of the animal and producer populations in the United States. The initial review of States with at least 2 percent of the U.S. total of either the number of equids or the number of farms with equids identified 21 States. Another criterion that was considered was equine population density. This criteria method identified an additional six States that did not have at least 2 percent of the U.S. total of either the number of equids or the number of operations with equids, but had the highest density of equids. Oregon was added for geographic representation and Indiana was replaced with Alabama due to resource availability. The 28 States to be included in the study account for 71.50 percent of equine inventory and 71.72 percent of equine operations. A list of the selected States is shown in Appendix A.

The study will have two phases. Phase I will be a NASS administered on-farm questionnaire and Phase II will be an on-farm questionnaire and biologic sampling administered by VS data collectors.

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<sup>1</sup> Equids are defined as horses, ponies, donkeys, and mules.

<sup>2</sup> USDA NASS 2012 Census of Agriculture

<sup>3</sup> The states selected for inclusion in the Equine 2015 study are: AL, AR, AZ, CA, CO, CT, DE, FL, KS, KY, MA, MD, MI, MO, MT, NC, NJ, NY, OH, OK, OR, PA, RI, TN, TX, VA, WI, WY. See Appendix A for more information on the states selected to participate.

<sup>4</sup> USDA NASS Census of Agriculture Methodology. Accessed July 25, 2014.

[http://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_US/usappxa.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_US/usappxa.pdf)

Based on data from the Equine 1998 study, the expected response rate for the NASS on-farm component of the Equine 2015 study is expected to be about 64 percent (Appendix A).

All farms participating in Phase I will be eligible to participate in Phase II. The response rate for Part II of Equine 1998 was approximately 46 percent of the eligible Part I participants. NAHMS estimates a similar response rate for Equine 2015.

APHIS adjusts weights for non-response within region and size strata. Other than that, we have not addressed non-response. NAHMS equine studies typically receive the highest response rate of all the commodities surveyed. Industry representatives have been involved in the development of the questionnaire and have agreed to promote the study. Questionnaires have been designed to minimize respondent burden. We also have engaged regional VS point of contacts that have been more involved in the planning and pretesting questionnaires for the study. They are being encouraged to share information with local industry representatives and owners as well as other VS personnel in their district.

## **2. Describe the procedures for the collection of information including**

### **Statistical methodology for stratification and sample selection:**

Sampling methodology: The NASS list frame of equine operations (from the 2012 Ag Census) will be used to select the sample. The list frame will initially be stratified by State. The State-level allocation will be based on a weighted proportion of the number of equine operations and the equine inventory in the State relative to the total in the 28 States. The percentage of operations in the State will get a weight of 0.4 and the percentage of equids will get a weight of 0.6. For example, since Texas has 15.29 percent of the equids and 17.71 percent of operations in the 28 selected States, it will initially be assigned 16.25 percent ( $15.29 \times 0.6 + 17.71 \times 0.4 = 16.25$ ) of the sample of 4,000. The allocation will be smoothed to reduce the burden on the NASS enumerators in States with large equine populations. Within States the sample will then be allocated within size strata (number of equids on operation). This allows an oversampling of operations with large equine inventories to capture more of the equine inventory.

Within each state/size category stratum, a simple random sample is selected by NASS from their list frame. NAHMS does not have access to the list frame; the final dataset only includes records in the sample.

- **Estimation procedures:**

The sample design will be a stratified random sample with unequal probabilities of selection. 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 purposes described in the justification:**

One NAHMS goal is to develop descriptive statistics with coefficients of variation (CV) less than 20 percent. If the goal is to achieve this level of precision for Phase II of the study (VS component), then response rates and design effect must be taken into account. Appendix A shows estimates of precision for Phase II estimates of 10 percent, 20 percent, and 50 percent, with a starting sample of 4,000.

For example, with a starting sample of 4,000 for the Phase I (NASS component), APHIS expects that about 64 percent (2,640 operations) of the sample will complete Phase I, 70 percent (1,792 operations) of the Phase I respondents will agree to have their name turned over to VS to participate in Phase II, and 75 percent (1,344 operations) of the turnovers will complete Phase II of the study.

However, since APHIS expects a design effect of about 2.0 (based on previous NAHMS surveys), the effective sample size is only about half that, or 672 operations nationally. If APHIS presents regional estimates, and assuming 4 regions, the effective sample size per region would be 168 operations. With these sample sizes, APHIS can expect regional estimates of 10%  $\pm$  4.5% (CV=23.0%), 20%  $\pm$  6.0% (CV=15.3%), and 50%  $\pm$  7.5% (CV=7.6%). National estimates would have smaller CVs.

Note: As an example of power expected to support planned comparisons, briefly, the parasite-related goal is to measure degree of resistance to 2 different anthelmintics (anti-parasitics) at the operation level (any resistance vs none). Assuming we obtain a sample of 800 operations for part II of the study, pyrantel is expected to be used on about 200 operations, and the expected percent of operations that are resistant (i.e., have any horses that are resistant) is 50%. The other anthelmintic, fenbendazole, is also expected to be used on about 200 operations, and the expected percent of operations that are resistant is 80%.

Under these assumptions, we calculated that an estimate of 50% would have a half-width of +/- 7% nationally and +/- 14% regionally. These correspond to CV's of 7% and 14%, respectively (not a mistake); so this meets our goal of CVs of 20% or less. The CV for an estimate of 80% also falls well within this range.

We will not compare the percent of operations that have resistant parasites to pyrantel vs fenbendazole, so we do not need to detect a difference between the 2 anthelmintics.

The lameness objective is similar. We will not compare the effectiveness of treatments for lameness; thus, there is no need to detect a difference between treatments.

The estimated timeline for the study is initial data collection by NASS in July 2015 with name turnover for phase 2 participants anticipated in September 2015.

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

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

- **Data Collection:**

- a. Phase I will be an on-farm questionnaire administered by NASS enumerators. For the Phase I NASS component (4,000 operations), up to 5 telephone calls will be made by the NASS enumerator to set up a convenient time to introduce and explain the study. If the enumerator cannot contact the potential participant via phone, the enumerator will drive to the equine operation to initiate contact and will either complete the interview at that time or establish another time for the interview. If the equine operation's location cannot be established, the selected unit will be coded as inaccessible. Once contact is made, the NASS enumerator will administer NAHMS-331. Upon completion of the interview, the respondent will be asked to sign a consent form allowing NASS to turn his/her name over to APHIS for continuation in the study; this will complete Phase I of the study. Approximately 48 percent of the 4,000 operations are expected to sign the consent form. NASS will provide the list of producers willing to participate in the second phase of the study (additional questionnaire and biologic sampling) to NAHMS coordinators in each State immediately following Phase I. Once all the information on NAHMS-331 has been entered and validated, NASS will send the validated dataset to NAHMS along with completed questionnaires without personal identifiers via mail.
- b. To meet the study objectives, Phase II will consist of an on-farm questionnaire administered by VS data collectors (typically a Veterinary Medical Officer) and the collection of biologic samples. Phase II of the study consists of an on-farm interview of the person on the operation most familiar with the equine health and management. The VS data collector will contact the equine operation to set up a time to administer the study questionnaire, drop off fecal sampling kits, and collect biological samples. Upon arrival on the premises, the VS data collector will present NAHMS-332 (Participant Agreement) to the participant which allows the participant to indicate what portion(s) of the Equine 2015 study he/she agrees to participate in. Once NAHMS-332 is completed and signed, the VS data collector will administer NAHMS-333 (VS Visit Questionnaire) to the equine operator. If the equine operator has consented to allow biologic samples to be taken, these may be collected after completing NAHMS-333.
- c. Biologic sampling will be voluntary and all equine operations participating in Phase II of the study are eligible to participate. NAHMS forms 334-339 will be completed for the corresponding biologic samples that are collected on the operation. NAHMS estimates that approximately 950 operations will participate in the Equine Fecal Collection Record (NAHMS 339) and Equine Blood Collection Record (NAHMS 336) components. NAHMS estimates that approximately 800 operations will submit Pre and Post deworming fecal samples for parasite testing (NAHMS 334 and NAHMS 335) and allow the VS data collector to examine horses for ticks and provide tick samples (NAHMS 337). The VS data collector may set up separate times to return to the farm to complete the biological sampling. The completed questionnaires will be returned to NAHMS in batches via U.S. mail.

Participating producers will be offered a copy of the summary reports for all collected data.

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

#### **Study Design:**

- ❑ Many proven questions from previous NAHMS equine studies conducted in 1998 and 2005 will be included in the questionnaires.
- ❑ The study minimizes collection of data to that which is absolutely necessary to meet the stated objectives.
- ❑ Numerous contacts and collaborative efforts have been made to identify the information needs of the industry and the best way to ask for that information via questionnaire.
- ❑ The two study questionnaires will be administered on-farm. The first questionnaire will be administered by NASS enumerators and the second questionnaire with biologic sampling will be administered by VS data collectors.

Some information, such as vaccine or financial information may not be readily available at the time of the Phase II VS data collector interview. In this situation, a questionnaire will be left with the participant and the VS data collector will follow up with the respondent in one week to complete the interview.

#### **Non-response:**

- The study is supported by industry representatives, who have contributed to the study development. Industry representatives will promote the study among equine operations.

#### **Non-response Adjustment:**

Response rates are expected to be approximately 64-75 percent for each phase this study. If the respondents differ substantially from the non-respondents there will be the potential for bias. There are two approaches that APHIS 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, at a minimum, number of equids per operation and per State. Secondly, APHIS can compare estimates from the study with available indicators from other sources. For example, although APHIS does not publish estimates of inventory, the study results will allow APHIS to make estimates that it can use to compare with NASS' inventory estimates of equids and operations with equids. APHIS will compare its results with values available from the scientific literature.

- The sampling design necessitates the use of weights that 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, i.e., within strata. Within strata, 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 strata. All weights for non-respondents will be set to zero.

#### **4. Data Analysis Steps**

Data from the Phase I questionnaire will be received from NASS and will be cleaned and validated by NAHMS staff. Data from the Phase II questionnaire will be entered into an SAS dataset by NAHMS staff. The data will then be cleaned and validated. Descriptive statistics (proportions, ratios, and means) will be estimated from data collected during Phase I and Phase II of the study using standard SAS or SUDAAN procedures.

- **Describe any tests of procedures or methods to be undertaken.**

The questionnaires will be reviewed by a variety of experts, including academic researchers, industry representatives, extension agents, veterinarians, health specialists, and epidemiologists. The proposed questionnaires will be tested during the pretest phase involving fewer than 10 respondents. Results of the pretests and expert review will be used to refine the information collected in order to reduce respondent burden and improve the usefulness of the information collected.

Post-sampling regional strata will be constructed. Regional estimates will be accompanied by standard errors, so that regional differences can be evaluated. Similarly, estimates may also be reported by operation size categories.

#### **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 Kopral, Statistician, USDA: APHIS, Veterinary Services, CEAH, Fort Collins, CO, (970) 494-7125.

The contact person for data collection is:

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