

## **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 respondent universe will be all operations in the United States that have at least one bison and that responded to the National Agricultural Statistics Service (NASS) 2012 U.S. Census of Agriculture. Examination of the NASS 2007 Census of Agriculture summary information (the last publication of all State-level farm and inventory information) shows 198,234 bison on 4,500 operations in the United States.<sup>1</sup>

The goal of the study is to gain insight about the population of bison producers rather than to create precise population estimates. This information will be used to meet the following objectives:

- Provide a baseline description of the U.S. bison industry, including basic characteristics of operations, such as inventory, size, and type.
- Describe current U.S. bison industry production practices and challenges, including identification, confinement and handling, animal care, and disease testing.
- Describe health management and biosecurity practices important for the productivity and health of ranched bison.
- Describe producer-reported occurrence of select health problems and evaluate potentially associated risk factors.

A sample of bison producers will be selected by NASS using a sampling frame updated from the 2012 Census of Agriculture. All producers with at least one bison will be eligible to be in the sample. NASS will mail a hardcopy questionnaire, along with a cover letter and information sheet, to the selected bison producers. Respondents will send the questionnaire back to NAHMS in a pre-paid envelope. If a response is not received by NAHMS within three weeks, NASS will mail a second questionnaire and cover letter, marked “Second Request,” to the respondent.

### **2. Describe the procedures for the collection of information including: Statistical methodology for stratification and sample selection:**

A total of 3,000 operations with bison will be selected from NASS’ list frame from a population of about 4,500 operations (based on the 2007 Census of Agriculture).

**Stratification** – The list frame of bison producers will be stratified by state and size category, where size categories are based on the number of bison: 1-19, 20-79, 80 or more. This will allow different sampling rates among strata; large producers will be sampled at a higher rate than small producers to capture more of the U.S. bison inventory.

**Sampling methodology** – NASS will stratify the list frame as described. A random sample will be selected within each state/size stratum.

### **3. Estimation procedures:**

The sample design will be a stratified random sample, and appropriate estimation methods will be used to account for clustering of units within strata. The sample will be weighted to account for the selection probability and for nonresponse.

The statistical estimation will be done using either SAS or SUDAAN. Both software packages use a Taylor series expansion to estimate variances.

**a. Degree of accuracy needed:**

With a total of 600 respondents who complete the questionnaire, we can achieve national proportion estimates of 50 percent  $\pm 4$  percent, 20 percent  $\pm 3$  percent, and 10 percent  $\pm 2$  percent, assuming no design effect. Minimal design effect is expected because any increase in variance due to clustering will be offset by the expected decrease in variance due to stratification. Assuming that 20 percent of producers who receive a questionnaire will complete and return it, about 3,000 producers will need to be sampled in order to achieve the desired 600 bison operation responses.

**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-responses:**

**Study Design:**

- ☐ Many proven questions from previous NAHMS studies will be included in the questionnaire.
- ☐ 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 the Bison 2014 questionnaire.
- ☐ The questionnaire will be mailed to producers along with a cover letter and information sheet describing the study and explaining why it is important. A second cover letter and questionnaire marked "Second Request" will be sent to those who do not return their questionnaire within three weeks of the initial request. It is expected that the two mailings will boost the response rate to the estimated 20 percent, based on NASS' experience with this collection mode.

**Non-response:**

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

- 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 cover letter and questionnaire will be sent out again, stamped as a “Second Request,” three weeks after the initial questionnaire is sent out if a response is not received.

Non-response adjustment:

- ❓ Response rates, given the methods described above, are expected to be approximately 20% 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, at a minimum, number of bison on the operation 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 with NASS’ inventory estimates. We will compare our results with values available from the scientific literature. We believe there will be limited opportunities for comparison because few national data exist for the type of information that is to be collected.
- 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.

**Contacting Respondents:**

About one week before questionnaires are mailed out, producers in the sample will receive a pre-survey postcard informing them that they will be receiving the questionnaire. All survey correspondence will be via the U.S. Postal Service.

**Data Collection Steps:**

- Data will be collected through a self-administered questionnaire.
- ❓ Participating producers will be offered a copy of the summary reports for all collected data; the cover letter will describe contact methods for producers to use to request the report from NAHMS.

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

Data from the hardcopy questionnaires will be entered into a SAS dataset by NAHMS staff. The data will then be cleaned and validated. Descriptive statistics (proportions, ratios, and means) will be estimated using standard SAS or SUDAAN procedures

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

The study might use questions revised from previous NAHMS studies. The questionnaire has been reviewed by a variety of experts, including academic researchers, industry representatives, extension agents, veterinarians, health specialists, and epidemiologists. The proposed questionnaire has been tested during the pretest phase involving fewer than 10 respondents. Results of these pretests were used to refine the information collection in order to reduce respondent burden and improve the usefulness of the information collected

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

USDA-NASS. 2007. 2007 Census of Agriculture Quick Stats. Accessed May 2012. Available at [http://quickstats.nass.usda.gov/?source\\_desc=CENSUS](http://quickstats.nass.usda.gov/?source_desc=CENSUS)