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 Small Enterprise Chicken Study is all chicken producers with 1,000 to 19,999 chickens on their operations who are on the NASS list frame. Based on the 2002 Census of Agriculture estimates and NASS control data, there are approximately 4,850 operations that meet this criterion. Based on previous NAHMS studies, the estimated response rate for the Small Enterprise Chicken Study is 70 percent (See Appendix B for detailed sampling information).

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

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

A total of 2,500 chicken operations with 1,000 to 19,999 chickens will be selected from NASS' list frame from a population of approximately 4,850 operations. The sample will be selected as a stratified random sample within two operation size strata, and within broiler and layer type operations. The two size strata are operations with 1,000 to 9,999 chickens and 10,000 to 19,999 chickens. Operation size is based on total inventory from control data available on NASS' list frame. There are approximately 1,550 operations with 1,000 to 9,999 chickens. Due to the small population size within the small broiler stratum and increased interest in this size group for biosecurity reasons, all of the approximately 450 operations will be selected. The remaining 550 operations will be sampled from the small layer stratum. In the larger size group of 10,000 to 19,999 chickens, both broilers and layers, there are approximately 3,300 flocks on the NASS list frame. Within this larger size group, approximately 1,500 will be selected. Due to the relatively small population size and high sampling rate, no regional sampling specifications are needed.

- Estimation procedure**:**

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 less than 20 percent. In order to obtain an estimate of 10% +/- 2.0% (cv=20.0%) a sample size of 734 is needed when a simple random sample is taken, assuming a large population. Similarly, to obtain a prevalence/proportion estimate of 50%+/-10% (cv=20%) would require a simple random sample of only 94. However, the

complex survey design typically will result in variances that are inflated. In previous NAHMS studies, design effects ranged from less than one up to almost 6 for the selected variables. If we assume a design affect of 2, we would need a sample size of 1,468. Given an expected response rate of 70%, the initial sample should result in an adequate number of completed surveys to attain the desired confidence intervals. Additional sample size calculations, applying finite population corrections, are shown in Appendix C.

- 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.

- The poultry specialists for NAHMS and poultry disease modeling epidemiologists have made numerous contacts and collaborative efforts to identify the information needs and how best to ask for that information via the small producer questionnaire.

- Mailing the questionnaire, the second request mailing, and telephone follow up will boost the response rate to the estimated 70 percent. The estimated 70 percent response rate is based upon consultation with NASS and their experience using U.S. Mail with a telephone follow-up for data collection. Only one previous NAHMS study, livestock identification, used this procedure and the study was conducted via NASS across multiple commodities and was impacted by hurricane conditions. As a result the response rate was lower; however, NASS feels the target rate of 70 percent for this study should be used. Previous NAHMS studies of the poultry industry used data collection methods that are not comparable to this study to help in projecting the response rate.

Non-response:

- The study has been announced and is supported by several agricultural extension professionals, and poultry health specialists. As operations in this category are not part of a unified industry, there is no specific entity from which to seek industry support.

- The questionnaire will be sent out via U.S. Mail with a cover letter and brochure 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 70% 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' control data on their list frame 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 chickens owned as well as the number of chickens 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 chicken 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 exists 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 Mr. George Hill, Statistician, USDA: APHIS, Veterinary Services, CEAH, Fort Collins, CO, (970) 494-7250. The actual data collection will be conducted by NASS. Contact persons for data collection are:

-Norm Bennett, Chief, Survey Administration Branch, Mail Stop 2024, 1400 Independence Ave., S.W., Washington, D.C. 20250, (202) 720-2248.

- 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. Nora Wineland, Center Leader, National Animal Health Monitoring Systems, USDA: APHIS, VS, CEAH, 2150 Centre Avenue, Building B MS2E7, Fort Collins, CO 80526-8117 (970) 494-7230.

Appendix A: Use of Disease Simulation Models for Poultry Disease
North American Animal Disease Spread Model

Introduction

The North American Animal Disease Spread Model (NAADSM) is a stochastic, state-transition simulation model that can be applied during emergency preparedness for exercise design, training, and scientific discussion. The model estimates how a contagious disease may spread in an animal population depending on the population data and parameters entered to simulate an outbreak. NAADSM has been developed by personnel from the U.S. Department of Agriculture, the Canadian Food Inspection Agency, the Ontario Ministry of Agriculture, Food and Rural Affairs, Colorado State University and the University of Guelph.

Using NAADSM

In order to use NAADSM, a population data set and series of simulation parameters must be entered into the model. The data gathered from the proposed study addresses disease transmission parameters.

Population data set – The population data set includes basic information regarding a group of animal premises, including: the production type (commercial layers, broilers or turkeys, free range broilers, cage free layers, backyard flocks, etc.), the geographic coordinates of each premises (latitude and longitude), and the number of birds on each premises.

Disease manifestation parameters – During a simulation a flock can transition through disease states according to the parameters entered by the user. The disease states include: susceptible, latent, infectious subclinical, infectious clinical and immune.

Disease transmission parameters – Disease can be transmitted by direct contact, indirect contact, and/or aerosol transmission. Consequently, the frequency of contact, distance associated with contact, and biosecurity practices must be characterized in order to simulate disease spread among flocks.

Disease detection and surveillance parameters – NAADSM allows users to simulate both passive and active disease surveillance. Passive surveillance is a function of the length of time since the outbreak began and the length of time that a given flock has been infected. Active surveillance targets contacts from infected flocks.

Disease control parameters – There are three control methods that can be simulated using NAADSM: ring vaccination, movement restriction, and destruction. For each production type, the user defines the conditions under which each of these disease control strategies will be applied.

Direct cost parameters – NAADSM can be used to estimate the direct costs associated with each simulated outbreak.

NAADSM Output

NAADSM will produce a daily summary, summary statistics for the entire outbreak, epidemic curves, and costs associated with the outbreak. This information can be used to reconstruct and analyze the course of the outbreak. Geographical information produced by NAADSM can be used to produce maps as visual aids to understand the distribution characteristics of a simulated outbreak.

NAADSM as an Analysis and Policy Making Tool

To be able to understand how different actions may influence the course of an outbreak, the detection and mitigation features can be turned on or off and the parameters can be modified. This way NAADSM can let the user test decisions that may be made during an outbreak to find the most efficient control methods and help estimate the resources needed during an outbreak.

For more information, please visit www. naadsm.org

Appendix B: Desired Mode of Collection and Predicted Response Rate

A questionnaire totaling 37 questions and requiring approximately 30 minutes to fill out, 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 70%.

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

To estimate a sample size, we estimated the number of farms with 1,000-19,999 chickens (layers or broilers) based on the 2002 Census of Agriculture and input from additional NASS administrative data. The approximate numbers of operations in each size class and type is listed below. The approximate numbers are presented to maintain confidentiality.

Table 1. Approximate number of layer and broiler farms with 1,000 – 19,999 chickens in the United States by size category.

Farm Type	Number of farms with 1,000-9,999 chickens	Number of farms with 10,000-19,999 chickens	Total number of farms
Layer	1,100	2,250	3,350
Broiler	450	1,050	1,500
Total	1,550	3,300	4,850

The total number of farms (2,500) to be surveyed will consist of:

- All broiler farms with 1,000 – 9,999 chickens;
- Approximately half of all broiler farms with 10,000 – 19,999 chickens;
- Approximately half of all layer farms with 1,000 – 9,999 chickens; and
- Approximately half of all layer farms with 10,000 – 19,999 chickens.

Table 2. Number of layer and broiler farms that will be sampled by size category.

	Number of farms with 1,000-9,999 chickens	Number of farms with10,000-19,999 chickens	Total number of farms
N (Total from Table 1)	1,550	3,300	4,850
N (selected)	1,000	1,500	2,500
n (expected @ 70% response)	700	1,050	1,750

Table 3. Accuracy of estimates based on sample sizes outlined in Table 2.

Prevalence (%)	Number of farms with 1,000-9,999 chickens	Number of farms with 10,000-19,999 chickens	Total number of farms
50	± 1.8 %	± 1.9 %	± 1.9 %
20	± 1.5 %	± 1.5 %	± 1.5 %
10	± 1.1 %	± 1.1 %	± 1.1 %

Note: These calculations were done in EpiInfo, Version 3.3.2 using finite population corrections.

Appendix D: Sample of the NAHMS Chickens CATI Introduction:

Hello, this is insert name calling on behalf of the insert state Field Office of USDA's National Agricultural Statistics Service. We are conducting the SMALL ENTERPRISE CHICKEN survey, and this operation was selected from a sample of farms/ranchers. Your cooperation is extremely important to the accuracy of the survey and your individual report will be kept confidential. Response is voluntary.

1. Continue with interview
2. Out of Business