

**SUPPORTING STATEMENT FOR INFORMATION COLLECTION
PART B**

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)

VETERINARY SERVICES (VS)

THE CENTERS FOR EPIDEMIOLOGY AND ANIMAL HEALTH (CEAH),

NATIONAL ANIMAL HEALTH MONITORING SYSTEM (NAHMS)

NAHMS SWINE 2012 STUDY

B. Collections of Information Employing Statistical Methods

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

LARGE OPERATION COMPONENT

The potential respondent universe of the Swine 2012 large operation component study is all swine producers with 100 or more pigs in their operations that are on the NASS swine list frame, in 13 States¹. These 13 States are a subset of the 16 States which NASS publishes state-level estimates on a quarterly basis (CO, MI and UT were excluded). The advantage of using these States is that the NASS list frame is more complete and up to date. The February 2011 “Farms, Land in Farms, and Livestock Operations 2010 Summary” shows this size of operation in the US accounts for only 29.5 % of the hog operations but includes 99.2% of the inventory.

Examination of the 2007 Census of Agriculture summary information (the last publication of all State-level by size farm and inventory information) shows that these 13 States account for 89.0% of swine farms with 100 or more pigs in the US and 90.8% of hogs and pigs on swine farms with 100 or more pigs in the US (Appendix A, pg 23). The target population of producers with 100 or more pigs is consistent with the previous NAHMS studies conducted in 1995, 2000 and 2006 which facilitates the analysis of trends. An in-depth evaluation of different size cut off levels and associated impact on state inclusion/exclusion along with an analysis of overall coverage for farms and inventories is provided in Appendix A.

Unlike the previous NAHMS swine studies of this population of producers the sample of 4600 will be drawn via NASS in replicates to facilitate mixed mode data collection. Details are discussed later in this document. Based on previous NAHMS swine surveys (Appendix B), the estimated response rate of replicates to be used for the NASS mail-in questionnaire with phone interview follow-up to the mail nonrespondents is 70 percent of which some will have zero inventory. The estimated response rate of replicates to be used for the NASS enumerator personal interview is 65 percent, which will include some zero inventory responses (Appendix E).

The descriptive reports from the Swine 2012 Study will include a methodology Section explaining the study processes – information needs assessment, sample selection, data collection, validation and editing, estimation, and response rates. In addition, the report appendix will include a table identifying the specific reference population in terms of the number of operations with pigs and the number of pigs.

SMALL OPERATION COMPONENT

The potential respondent universe of the small operation component of the Swine 2012 Study is all swine farms with fewer than 100 pigs on their operations as control data on the NASS swine list frame, in 31 States². These 31 States are primarily selected based on results from assessments of risk pathways for the two diseases of interest (Classical Swine Fever (CSF) and Pseudorabies,

¹ Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Ohio, Oklahoma, Pennsylvania, South Dakota and Texas.

Appendix A, pgs. 18-20 and Appendix D & F). Thirteen of the 31 States (IA, OH, MO, IN, TX, PA, MN, IL, OK, KS, NE, NC and SD) are also in the large operation component of the study. Five of the States (WI, PA, MI, CO and SD) were selected to improve coverage. These 31 States account for 82.7% of swine farms with less than 100 hogs and 91.5% of the hogs on farms with less than 100 hogs in the US (Appendix D) according to the 2007 Census of Agriculture. Based on the previous NAHMS Small Enterprise Swine 2007 Study, the estimated response rate for the **small** operation component of the Swine 2006 study is 80 percent including 20 percent zero pigs on hand at the time of the interview (Appendix E).

2. Describe the procedures for the collection of information.

LARGE OPERATION COMPONENT

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

Stratification – A total of 13 States for the large operation component were selected for inclusion in the study based on resident populations of swine producers and swine. The States were selected based upon each State’s contribution to the US total number of operations with swine and the number of swine (Appendix A).

Sampling methodology — Swine 2012 large component of the study: 4,600 swine farms will be selected from NASS’ swine list frame. The sample will be drawn in replicates with 2,000 samples being used for the CATI sample and 2,600 samples used for the personal interview sample. The sample will be selected as a stratified random sample with the strata being both state and operation size. Operation size is based on total hog inventory on the NASS list frame. The state-level allocation will be based on a weighted proportion of the number of operations in the state and the hog inventory relative to the U.S. levels for swine farms with 1,000 or more hogs (Appendix A). The percentage of the 13 State total for the population of 100+ swine farms in the State will get a weight of 0.4 and the percentage of hogs will get a weight of 0.6. For example, Iowa has 31.6% of the hogs and 34.2% of farms. Iowa will initially be assigned 32.6% ($31.6*0.6+34.2*0.4=32.6$) of the sample of 4,600 drawn in replicates. The allocation will be adjusted to move some of the sample from States with a large amount of samples to other States with fewer samples. Within States the state-level sample will be allocated within size strata using the same strategy as for the state-level allocation.

There are two methods that will be used to collect information for this component: first a short telephone questionnaire will be completed via CATI for the sample of 2,000 and the second collection method is via the NASS enumerator on-farm visits to the sample of 2,600 producers. For the former, respondents may fill a shorter version of the on-farm interview questionnaire and mail it back to NASS state offices. Those that do not mail back the questionnaire will have the opportunity for NASS telephone enumerators to administer the questionnaire via CATI. Approximately 5-10 calls will be placed by the CATI enumerator to the producer to attempt to

² AL, AZ, AR, CA, CO, FL, GA, HI, IL, IN, IA, KS, LA, MI, MN, MS, MO, NE, NJ, NM, NY, NC, OH, OK, PA, SC, SD, TN, TX, WA, and WI.

complete the questionnaire. For those producers selected for an on-farm visit, three to five telephone calls will be made by the NASS enumerator to set up a convenient time to introduce the study. If the producer is unable to be contacted via phone, the enumerator will drive to the farm to initiate contact and will either complete the interview at that time or establish another time for the interview. Once contact is made, the NASS enumerator will administer NAHMS-288 (Large Operation General Farm Questionnaire). If the farm location cannot be established, the selected unit will be coded inaccessible.

Upon completion of the interview (for both CATI and personal interview samples), if the respondent had 100 or more hogs they will be asked to sign a consent form allowing NASS to turn their name over to APHIS for further consideration in the study. This completes Phase I of the study. NASS will provide the list of producers willing to participate in the second phase of the study (NAHMS 291 - VS Initial Visit Questionnaire) to NAHMS coordinators in each State. Once all the information on NAHMS-291 has been entered and validated, NASS will send a cleaned dataset to NAHMS along with completed questionnaires via mail. The estimated response rate based on previous NAHMS swine studies for complete questionnaires with positive swine inventory is 55% for the Phase I CATI and 50% for the Phase I Enumerator visit (Appendix E).

Phase II of the study for the large operation component consists of an on-farm interview administered by an APHIS designated data collector (typically a veterinary medical officer (VMO)). The data collector will make three to five telephone calls in order to contact the producer to set up a time to administer the study questionnaire(s) and potentially take biologic samples. Upon arrival on the premises, the data collector will present NAHMS-290 (Producer Agreement) to the producer which allows the producer to indicate what portion(s) of the Swine 2012 study they agree to participate in. Once NAHMS-290 is completed and signed, the data collector will administer NAHMS 291 (VS Initial Visit questionnaire) to the producer. Once NAHMS-291 has been completed, a separate time may be set up for the data collector to come back and take biologic samples (NAHMS-292 (blood), NAHMS-293 (fecal), NAHMS-294 (saliva), and NAHMS-295 (nasal)) depending on what the producer indicates on the producer agreement. The data collector may set up one to two separate times to come back to the farm to complete the biological sampling. Once the VS Initial Visit Questionnaire is completed, and all of the samples indicated on the producer agreement have been taken, Phase II of the study is complete. The completed questionnaires will be returned to NAHMS via U.S. mail. The response rate for previous NAHMS swine studies is shown in Appendix B and the estimated response rates for Swine 2012 are shown in Appendix E.

- **Estimation procedure:**

The sampling design is 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:**

The overall NAHMS program goal is to develop descriptive statistics with a coefficient of variation less than 20%. With a population size of 15,000 (for the largest region), in order to obtain an estimate of 10% +/- 2.0% (cv = 10.0%) a sample size of 817 is needed when a simple random sample is taken. Similarly, to obtain a prevalence/proportion estimate of 50% +/- 10% (cv = 10%) would require a simple random sample of only 95 (Appendix C). However, the complex survey design typically will result in variances that are inflated. The design effect from the Swine 2006 study indicates the magnitude of the variance inflation that can be expected (Appendix G). Design effects ranged from 1.1 to 2.2 for the selected variables. Assuming a design effect of 2, a sample size of 1,634 would be required to obtain the desired precision when the estimate is 10%. The sample size required for a similar precision goal when the estimate is 50% is only 288.

The design of the Swine 2006 study was very similar to the proposed design for the large operation component of the Swine 2012 study. Estimates, standard errors and coefficients of variation (based on 2,079 completed operation level questionnaires) presented in Appendix G indicate that the minimum degree of precision that was desired was attained and, in all cases, exceeded for the NASS component. Similarly, the estimates, standard errors, and coefficients of variation for the VMO component (based on 665 completed operation level questionnaires) met the desired accuracy goals (Appendix G)).

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

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

SMALL OPERATION COMPONENT

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

Sampling methodology — Swine 2012 small component of the study: 2,000 swine farms will be selected from NASS' swine list frame for screening. The sample will be selected as a stratified random sample with both State and operation size strata. Operation size is once again based on total inventory from NASS' list frame. The State-level allocation will be based, similar to the large operation component, on a weighted proportion of the number of operations in the State and the hog inventory relative to the U.S. levels for swine farms with less than 100 hogs. The percentage of swine farms in the State, relative to the 31-State total, will get a weight of 0.4 and the percentage of hogs will get a weight of 0.6. For example, Ohio has 6.0% of the hogs and 6.2% of the farms. Ohio will initially be assigned 6.1% ($6.0 \times 0.6 + 6.2 \times 0.4 = 6.1\%$) of the sample of 2,000. The allocation may be adjusted to move some of the sample from States with large samples to other States with fewer samples. Within States, the State-level sample will be allocated within size strata. Allocation will follow the same strategy as the State-level allocation since proportions of operations and proportions (ratios) of hogs will be estimated using the data obtained from this study.

This component will also involve a mail-in questionnaire with a follow-up of non respondents via CATI. The CATI interview will take approximately 20 minutes to complete (NAHMS 287 - Small Operation Questionnaire (CATI)). Approximately two weeks after the mail out, NASS will call producers on the mailing list that did not return the mail survey. A total of approximately 5 to 10 calls will be made to attempt to complete an interview before coding the respondent as inaccessible. There will not be a letter or any attempt to convert refusals other than a clear explanation of the importance of their voluntary participation in the initial phone call. Once all the information on NAHMS-288 has been entered and validated, NASS will send a clean dataset to NAHMS. The estimated response rate for the small component is based on the previous NAHMS Swine 2007 Small Enterprise study is 80% (Appendix E).

- **Estimation procedure:**

The sampling design is 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:**

The overall NAHMS program goal is to develop descriptive statistics with a coefficient of variation less than 20 percent. With a population size of 16,000 (for the largest region), in order to obtain an estimate of 10% +/- 2.0% ($cv = 10.0\%$) a sample size of 820 is needed when a simple random sample is taken. Similarly, to obtain a prevalence/proportion estimate of 50% +/- 10%

($cv = 10\%$) would require a simple random sample of only 95 (Appendix C). However, the complex survey design typically will result in variances that are inflated. The design effect from the 2007 Small Enterprise Swine Study, which focused on small hog operations, indicates the magnitude of the variance inflation that can be expected. Design effects had a small range of 1.3 to 1.4 for the selected variables (Appendix H). Assuming a typical design effect of 1.4, a sample size of 1,148 would be required to obtain the desired precision when the estimate is 10%. The sample size required for a similar precision goal when the estimate is only 192.

- **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.

LARGE OPERATION COMPONENT

Study Design:

- Many previously used and proven questions have been repeated from previous NAHMS swine studies in 1990, 1995, 2000, 2006 and 2007.
- The study minimizes collection of data to that which is absolutely necessary.
- NAHMS will develop training materials for NASS enumerators that explain the purpose of the study and addresses anticipated difficulties with questions, including proper pronunciation of diseases. Each enumerator will receive the material.
- After participating in a telephone training session with NAHMS staff, the NAHMS coordinator (VMO, one per State) will help train NASS enumerators that will go on-farm in their home State.
- The NAHMS' coordinator conducting training will acquaint the NASS enumerators with NAHMS, their role in the information collection, and the type of information to be reported resulting from the data collected.
- Similarly, for the on-farm component, each NAHMS coordinator will in return train the APHIS field data collectors in their State.
- The Swine specialist for NAHMS has made numerous contacts and collaborative efforts to identify the information needs of the industry and the best way to ask for that information via questionnaire.
- A pre-survey letter will be sent along with the brochure. Upon personal contact by the enumerator, the brochure will again be presented to the personal interview sample.

Contacting Respondents:

- The study has been announced and is supported by the National Pork Board, National Pork Producers Council and the American Association of Swine Veterinarians (AASV).
- A pre-survey letter and brochure announcing the study will give respondents more information on the study and why participation is important.

- Producers will be called by the NASS enumerator 5 to 10 times and APHIS personnel 3 to 5 times followed by an on-farm visit before they are listed as refused or inaccessible.
- The APHIS designated data collector will contact farms that have consented to have their name turned over to APHIS and set up a convenient time for the producer to complete the questionnaire.
- Data collectors will arrive at the premises at the agreed time or in the case of a CATI call at a mutually agreed upon time.

Data Analysis Steps:

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's 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 hogs as of the NASS March 2012 visit or list sampling frame hog control inventory. For the VMO phase (Phase II), data from the completed initial survey will be available for comparing respondents versus non respondents as well as the control data from the NASS' list frame. Secondly, estimates can be compared from the study with available indicators from other sources. For example, although APHIS does not publish estimates of hogs, the survey results will allow NAHMS to make estimates that can be used to compare against NASS' inventory estimates. This study is the fifth swine study that NAHMS has conducted involving larger producers and APHIS can compare current estimates with results from previous studies (1990, 1995, 2000 and 2006).

The complex 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. This data will be available from the NASS list frame for the NASS component of the study. The VMO phase weight adjustments will be based on data available from both the NASS list frame and the NASS component questionnaire results. Within categories, the sum of weights of the respondents and non-respondents will be divided by only the sum of the weights of the respondents. This factor will be used to adjust the weights of the respondents with the category. All weights for non-respondents will be set to zero.

SMALL OPERATION COMPONENT

Study Design:

- Many questions have been repeated from the previous NAHMS Small Enterprise Swine Study conducted in 2007.
- Minimizing collection of data to that which is absolutely necessary.

- The swine specialist for NAHMS has made numerous contacts and collaborative efforts to identify the information needs of the industry for the small component questionnaire.
- A sample of 2,000 swine producers with 1-99 head on the NASS list sampling frame will be drawn from NASS' producer list.
- A mail out questionnaire and telephone follow-up will boost the response rate to the estimated 80 percent.

Contacting Respondents:

- The study has been announced and is supported by the National Pork Board, National Pork Producers Council and the American Association of Swine Practitioners.
- 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.
- If no response is received two weeks after the initial questionnaire is mailed out a NASS CATI enumerator will contact the producer and attempt to get the producer to complete the questionnaire.
- Producers will be called by the NASS enumerator 5 to 10 times followed by an on-farm visit before they are listed as refused or inaccessible.
- Data collectors will call at the best time of day to reach producers in this population. a mutually agreed upon time.

Data Analysis Steps:

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's 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 types of hogs owned as of the most current NASS list frame. Secondly, APHIS can compare estimates from the study with available indicators from other sources. For example, although APHIS does not publish estimates of hogs, the survey results will allow APHIS to make estimates that it can use to compare against NASS' inventory estimates. When possible, results from this study will be compared to results from the 2007 Small Enterprise Swine Study. Also, APHIS will compare its results to values available from the scientific literature.

The complex 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 with the category. All weights for non-respondents will be set to zero.

4. Describe any test procedures or methods to be undertaken.

The proposed questionnaires will be tested during the pretest phase involving less than 10 respondents. Results from 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, contact(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 APHIS designated data collectors. Contact persons for data collection are:

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

Appendix A: Swine 2012 State Selection (9/20/11)

Purpose of document:

To arrive at a general agreement on States to be included in the NAHMS Swine 2012 Study and to document the selection process.

Swine 2012 Cutoff Level Considerations

The swine industry is characterized by many small producers who account for a very small percentage of the US inventory. The relatively large producers have most of the inventory. These small producers are not necessarily located in the States which have a lot of swine production.

Historically NAHMS has used 100+ for the previous two studies conducted in 2000 and 2006 for the population of interest. In 2007 a Small Swine Enterprise Study was conducted covering those operations with 1-99 total inventory.

Shown below is a distribution of hog production in the US from the 75,442 farms with 67.8 million hogs and pigs as of the 2007 Census of Ag.

	<u>% farms</u>	<u>% inventory</u>
1-99	69.6	0.9
100-499	9.4	2.7
500-999	4.8	3.7
1,000-1,999	5.3	8.2
2,000-4,999	7.1	24.4
5,000+	3.8	60.2
Total	100.0	100.0

Three cut off options were considered:

1. 100+

1-99	69.6	0.9	Coverage needed or not?
100+	30.4	99.1	Personal interviews by NASS and VMOs
Total	100.0	100.0	

2. 500+

1-99	69.6	0.9	Coverage needed or not?
100-499	9.4	2.7	CATI data collection.
500+	21.0	96.4	Personal interviews by NASS and VMOs
Total	100.0	100.0	

3. 1,000+

1-99	69.6	0.9	Coverage needed or not?
100-999	14.2	6.4	CATI data collection.
1,000+	16.2	92.7	Personal interviews by NASS and VMOs
Total	100.0	100.0	

What are the information needs and associated publication considerations?

If APHIS chose States on cutoff levels APHIS would probably choose 14 for the 1+ level and as the cutoff increases APHIS could reduce the number of States. See the following tables which suggest that if APHIS used a cutoff level of 1,000+ head APHIS would only need maybe 10-12 States. Similarly if APHIS were only to study the smallest hog operations say 1-99 APHIS would need maybe 25-30 States like APHIS did in the 2007 study.

From a publication standpoint, would it be most desirable to publish results for 1+ operations in maybe core pig States, maybe 14, or would APHIS choose to publish comparable results for 100+ operations? If APHIS chose to publish comparable results to previous reports APHIS would choose to publish 100+ only in that report and then use a separate report to publish the very smallest group of pig producers (1-99) in another separate report. However, is there a need to publish 1+ results for the core States in one report (which implies that any small producer study of the 1-99 group would need to include coverage in those States that are in the large size group study.

Data presented in the following tables helped to make the appropriate decisions.

Final decision:

For the 1-99 population, a CATI study will be conducted to replicate the 2007 Small Swine Enterprise study conducted in 31 States.

For the larger size operations, NASS enumerators will contact those operations with 100 or more head which replicates the NAHMS 2006 Swine Study.

I. Process for 1+ all hogs and pigs—individual State contribution (2007 Census of Agriculture):

1. Identify States with 2 percent or more of the U.S. total for both number of all hogs and pigs and number of farms for either 2007 or December 1, 2010, inventory.

State	2007 Census of Agriculture					NASS Quarterly Hogs & Pigs, Dec. 2010			
	All Hogs & Pigs		Farms		Wtd. %	All Hogs & Pigs (12/1/10)		Farms	
	Number	%	Number	%			Number	%	
U.S.	67,786,318	100.00	75,442	100.00	100.00	64,325,000	100.00		100.00
IL* Q	4,298,716	6.34	2,864	3.80	5.32	4,300,000	6.68		5.53
IN* Q	3,669,057	5.41	3,420	4.53	5.06	3,650,000	5.67		5.22
IA* Q	19,295,092	28.46	8,330	11.04	21.50	18,900,000	29.38		22.05
MN* Q	7,652,284	11.29	4,382	5.81	9.10	7,700,000	11.97	Used farm numbers from 2007 Census of Agriculture (at left)	9.51
MO* Q	3,101,469	4.58	2,999	3.98	4.34	2,900,000	4.51		4.30
NE* Q	3,268,544	4.82	2,213	2.93	4.07	3,100,000	4.82		4.06
NC* Q	10,134,004	14.95	2,836	3.76	10.47	8,800,000	13.68		9.71
OH* Q	1,831,084	2.70	3,718	4.93	3.59	2,030,000	3.16		3.86
OK* Q	2,398,372	3.54	2,702	3.58	3.56	2,330,000	3.62		3.61
9-State total	55,648,622	82.09	33,464	44.36	67.01	53,710,000	83.49		67.85

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

2. Identify remaining States with 2 percent or more of either number of all hogs and pigs or number of farms for either 2007 or December 1, 2010, inventory.

State	2007 Census of Agriculture					NASS Hogs & Pigs, Dec. 2010			
	All Hogs & Pigs		Farms		Wtd. %	All Hogs & Pigs (12/1/10)		Farms	Wtd. %
	Number	%	Number	%		Number	%		
FL	19,937	0.03	1,906	2.53	1.03	15,000	0.02		1.02
KS* Q	1,885,252	2.78	1,454	1.93	2.44	1,810,000	2.81		2.46
MI* Q	1,032,054	1.52	2,691	3.57	2.34	1,040,000	1.62		2.40
NY	85,741	0.13	1,871	2.48	1.07	108,000	0.17		1.09
PA* Q	1,167,449	1.72	3,637	4.82	2.96	1,110,000	1.73	Used farm numbers from 2007 Census of Agriculture (at left)	2.96
SD* Q	1,490,034	2.20	959	1.27	1.83	1,290,000	2.01		1.71
TN	138,207	0.20	1,566	2.08	0.95	170,000	0.26		0.99
TX* Q	1,155,790	1.71	4,471	5.93	3.39	660,000	1.03		2.99
WI*	436,814	0.64	3,188	4.23	2.08	340,000	0.53		2.01
9-State total	7,411,278	10.93	21,743	28.84	18.09	6,543,000	10.18		17.63
18-State total	63,059,900	93.02	55,207	73.20	85.10	60,253,000	93.67		85.48

3. Identify remaining States roughly close to the 2-percent cutoff level either period.

State	2007 Census of Agriculture					NASS Hogs & Pigs, Dec. 2010			
	All Hogs & Pigs		Farms		Wtd. %	All Hogs & Pigs (12/1/10)		Farms	Wtd. %
	Number	%	Number	%		Number	%		
CA	153,983	0.23	1,389	1.84	0.87	105,000	0.16	Used farm numbers from 2007 Census of Agriculture (at left)	0.83
KY	348,023	0.51	1,498	1.99	1.10	325,000	0.51		1.10
WA	28,545	0.04	1,463	1.94	0.80	(D)			
3-State total	530,551	0.78	4,350	5.77	2.77	(D)			
21-	63,590,400	93.8	59,557	78.97	87.8	(D)	(D)		(D)

State total

51

0

7

7

4. Identify those States with ± 20 percent or more change from 2002 to 2007 Census for all hogs and pigs and for farms.

All Hogs & Pigs				Farms			
State	2002	2007	% Change 2007/2002	State	2002	2007	% Change 2007/2002
AK	1,201	757	63.03	AL	576	753	130.7
DE	11,775	8,955	76.05	AZ	208	378	181.7
FL	33,479	19,937	59.55	AR*	846	1,142	134.9
HI	23,364	14,933	63.91	CT	157	344	155.4
ID	23,352	32,794	140.43	FL	1,471	1,906	129.5
IA	15,486,531	19,295,092	124.59	ID	841	657	78.12
KS	1,520,996	1,885,252	123.95	IL	3,929	2,864	72.89
LA	18,262	10,615	58.13	ME	328	437	133.2
NJ	14,162	8,551	60.38	MA	273	453	165.9
NM	3,489	1,972	56.52	MI	2,180	2,691	123.4
ND	138,838	181,679	130.86	MN	5,628	4,382	77.86
OH	1,422,966	1,831,084	128.68	NE	3,075	2,213	71.97
TN	230,532	138,207	59.95	NH	208	266	127.8
TX	953,290	1,155,790	121.24	NJ	357	271	75.91
VT	2,019	2,701	133.78	NY	1,527	1,871	122.5
WV	12,773	8,948	70.05	RI	64	103	160.9
				SD	1,506	959	63.68
							120.8
				VT	206	249	7
				VA	855	1,240	145.0

			3
			152.2
WA	961	1,463	4
			147.8
WY	184	272	3

5. Discussion of State selection based upon all hog and pig data presented in above tables 1-4.

Most of the 17 States in the previous NAHMS swine study conducted in 2006 are still important States based upon the 2007 Census and the December 1, 2010, inventories. However, Arkansas was included in 2006 study due to special State interests but will not be included in the 2012 study due to the small number of farms and inventory. Also Colorado was in the previous study but current number of farms and inventory do not qualify them for inclusion in 2012.

All nine States listed in the previous table with 2 percent or more of farms and inventory were in the previous study and currently are in the quarterly NASS program. The quarterly program includes the publication of State-level estimates for the 16 States with the largest hog and pig inventories in the United States.

The States listed in the previous table with the criteria of 2 percent or more of either farms or inventory should receive consideration for inclusion in the 2012 study. Three States that met the criteria based upon number of farms have very small inventories—FL, NY, and TN—so are not to be included in the study. Five of the six remaining States are in the quarterly NASS program and also were in the previous NAHMS swine study so these should be included—KS, MI, PA, SD, and TX. WI is the remaining State for consideration. From 2002 to 2007 WI inventory numbers dropped 18 percent and the number of farms increased 7 percent. A 3-percent decrease in inventory was seen more recently between December 2009 and December 2010. WI is no longer in the NASS quarterly program and the size of their inventory is less than CO and UT who are in the quarterly program, but do not meet the table 2 or 3 criteria. Therefore, as a first look at the States for the program, WI should be excluded. This would leave 14 States to be included in the study. These States represent 92.69 percent of all hog and pig inventory on December 1, 2010, and 79.97 percent of farms with hogs and pigs in the 2007 Census of Agriculture.

6. Discussion of State selection relevant to regional representation.

The 2006 Swine study reported estimates via four regions. Due to the reduction in the number of States, possibly new regional boundaries maybe for two or three regions should be developed.

7. Recommended hogs and pigs study States for further discussion.

State	2007 Census of Agriculture					NASS Hogs & Pigs, Dec. 2010				
	Hogs & Pigs		Farms		Wtd. %	Hogs & Pigs (12/1/10)		Farms		Wtd. %
Number	%	Number	%	Number		%	Number	%		
U.S.	67,786,318	100.00	75,442	100.00	100.00	64,325,000	100.00			
IL	4,298,716	6.34	2,864	3.80	5.32	4,300,000	6.68			5.53
IN	3,669,057	5.41	3,420	4.53	5.06	3,650,000	5.67			5.22
IA	19,295,092	28.46	8,330	11.04	21.50	18,900,000	29.38			22.05
KS	1,885,252	2.78	1,454	1.93	2.44	1,810,000	2.81			2.46
MI	1,032,054	1.52	2,691	3.57	2.34	1,040,000	1.62			2.40
MN	7,652,284	11.29	4,382	5.81	9.10	7,700,000	11.97	Used farm numbers from 2007 Census of Agriculture (at left)		9.51
MO	3,101,469	4.58	2,999	3.98	4.34	2,900,000	4.51			4.30
NE	3,268,544	4.82	2,213	2.93	4.07	3,100,000	4.82			4.06
NC	10,134,004	14.95	2,836	3.76	10.47	8,800,000	13.68			9.71
OH	1,831,084	2.70	3,718	4.93	3.59	2,030,000	3.16			3.86
OK	2,398,372	3.54	2,702	3.58	3.56	2,330,000	3.62			3.61
PA	1,167,449	1.72	3,637	4.82	2.96	1,110,000	1.73			2.96
SD	1,490,034	2.20	959	1.27	1.83	1,290,000	2.01		1.71	
TX	1,155,790	1.71	4,471	5.93	3.39	660,000	1.03		2.99	
14-State total	62,379,201	92.02	46,676	61.88	79.97	59,620,000	92.69			80.37

8. State selection based upon additional discussion with NAHMS staff.

Additional information is needed specifically for the population of producers with 100 or more total hogs and pigs, as this was the criterion used in the previous two swine studies.

II. Process for 1-99 hogs and pigs—individual State contribution (2007 Census of Agriculture):

The purpose of this evaluation is to identify those States with smaller size operations that might be included in a CATI study similar to the one previously conducted in 2007.

1. Identify States with 2 percent or more of the U.S. total for both number of hogs and pigs (1-99) and number of farms for 2007 inventory.

2007 Census of Agriculture								
State	1-99 Hogs & Pigs		Farms		Wtd. %			
	Number	%	Number	%				
U.S.	622,032	100.00	52,521	100.00	100.00			
IL ^{1,2} Q	25,219	4.05	1,203	2.29	3.35			
IN ^{1,2} Q	31,903	5.13	1,839	3.50	4.48			
IA ^{1,2} Q	38,935	6.26	1,365	2.60	4.80			
MI ^{1,2} Q	28,199	4.53	2,138	4.07	4.35			
MN ^{1,2} Q	28,886	4.64	1,490	2.84	3.92			
MO ^{1,2} Q	33,955	5.46	2,034	3.87	4.82			
NC ^{1,2} Q	12,849	2.07	1,095	2.08	2.07			
OH ^{1,2} Q	34,112	5.48	2,686	5.11	5.34			
OK ^{1,2} Q	22,720	3.65	2,551	4.86	4.13			
PA ^{1,2} Q	31,487	5.06	2,907	5.53	5.25			
TX ^{1,2} Q	31,759	5.11	4,369	8.32	6.39			
VA	12,984	2.09	1,143	2.18	2.12			
WI ^{1,2}	39,300	6.32	2,698	5.14	5.85			
13-State total	372,308	59.85	27,518	52.39	56.87			

¹ One of 17 States in the 2006 Swine Study.

² One of 30 States in the 2007 Small-Enterprise Swine Study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

2. Identify remaining States with 2 percent or more of either number of hogs and pigs (1-99) or number of farms for 2007.

2007 Census of Agriculture					
State	1-99 Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	622,032	100.00	52,521	100.00	100.00
AR ^{1,2}	9,017	1.45	995	1.89	1.63
CO ^{1,2} Q	10,184	1.64	1,106	2.11	1.82
KS ^{1,2} Q	18,224	2.93	988	1.88	2.51
GA ²	9,401	1.51	1,008	1.92	1.67
KY	12,053	1.94	1,318	2.51	2.17
MS ²	33,955	5.46	622	1.18	3.75
NE ^{1,2} Q	17,765	2.86	696	1.33	2.24
7-State total	110,599	17.79	6,733	12.82	15.79
20-State total	482,907	77.64	34,251	65.21	72.66

3. Identify remaining States roughly close to the 2-percent cutoff level either period.

2007 Census of Agriculture					
State	1-99 Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	622,032	100.00	52,521	100.00	100.00
SC ²	6,754	1.09	729	1.39	1.21
SD ^{1,2} Q	9,355	1.50	377	.72	1.19
2-State total	16,109	2.59	1,106	2.11	2.40
22-State	499,016	80.2	35,35	67.3	75.0

total | 3 | 7 | 2 | 6 |

4. Discussion of State Selection based upon 1-99

Twenty-two States would bring coverage close to the NAHMS standard of covering 70% of both producers and animals for the population of interest, although farm coverage here of 67.3% is slightly on the low side. Discussions within NAHMS and other units within the Centers for Epidemiology and Animal Health centered on the desire to replicate the 2007 Small Enterprise Swine Study which included in addition many coastal States for a total of 31 States. Therefore, 31 States will be included in the study for the 1-99 population.

III. Process for 100+ all hogs and pigs—individual State contribution (2007 Census of Agriculture):

The previous NAHMS swine study conducted in 2006 focused on operations with 100 or more total hogs and pigs.

1. Identify States with 2 percent or more of the U.S. total for both number of 100+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture						
State	100+ Hogs & Pigs			Farms		Wtd. %
	Number	%	Number	%		
U.S.	67,164,286	100.00	22,921	100.00	100.00	
IL* Q	4,273,497	6.36	1,661	7.25	6.72	
IN* Q	3,637,154	5.42	1,581	6.90	6.01	
IA* Q	19,256,157	28.67	6,965	30.39	29.36	
KS* Q	1,867,028	2.78	466	2.03	2.48	
MN* Q	7,623,398	11.35	2,892	12.62	11.86	
MO* Q	3,067,514	4.57	965	4.21	4.42	
NE* Q	3,250,779	4.84	1,517	6.62	5.55	
NC* Q	10,121,155	15.07	1,741	7.60	12.08	
OH* Q	1,796,972	2.68	1,032	4.50	3.41	
SD* Q	1,480,679	2.20	582	2.54	2.34	
10-State	56,374,3	83.9	19,40	84.6	84.2	

total | 33 6 | 2 6 | 3 || | |

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

- Identify remaining States with 2 percent or more of either number of 100+ hogs and pigs or number of farms for 2007 inventory.

2007 Census of Agriculture					
State	100+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
MI* Q	1,003,855	1.49	553	2.41	1.86
OK Q	2,375,652	3.54	151	0.66	2.39
PA* Q	1,135,962	1.69	730	3.18	2.29
WI*	397,514	0.59	490	2.14	1.21
4-State total	4,912,983	7.31	1,924	8.39	7.75
14-State total	61,287,316	91.27	21,326	93.05	91.98

- Identify remaining States roughly close to the 2-percent cutoff level.

2007 Census of Agriculture					
State	100+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
TX* Q	1,124,031	1.67	102	0.45	1.18
1-State total	1,124,031	1.67	102	0.45	1.18
15-State total	62,411,347	92.94	21,428	93.50	93.16

- Discussion of State Selection based upon 100+ Hog and Pig Data in above tables 1-3.

If the 15 States were considered, the only States missing from the 16 States in the NASS quarterly hog and pig program are CO and UT. Compared to the 17 States in the Swine 2006 study only AR and CO are missing from the above 15 States identified.

Does APHIS really need 15 States in the program? The December 1, 2010, inventory report shows TX at 660,000 head or a little over one-half of what it was in 2007, so it could probably be excluded even though it was in the previous study. The next State that might be eligible for deletion would be WI which is not in the quarterly program and has a December 1, 2010,

inventory of 340,000, or down about 15 percent. MI is the next State which should receive consideration for dropping due to its size and coverage by nearby States so it could be dropped as well (supported also by the evaluation of tables related to a cutoff level of 1,000 head or more. The other two States in table 2 have currently similar inventories as in 2007. Are these two States needed for geographic representation? In Swine 2006 TX was summarized in the South region which included AR, NC, and OK. Certainly swine production in TX can easily be represented by OK; however, it is desirable to include them for representation and the potential for feral pig exposure. The location of WI is such that there are many nearby States which can represent them. The conclusion is therefore to focus on the 13 remaining States for NAHMS staff consideration and discussion.

5. Final swine study States: 13 States based upon contribution to the U.S. total for both number of 100+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture					
State	100+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	67,164,286	100.00	22,921	100.00	100.00
IL* Q	4,273,497	6.36	1,661	7.25	6.72
IN* Q	3,637,154	5.42	1,581	6.90	6.01
IA* Q	19,256,157	28.67	6,965	30.39	29.36
KS* Q	1,867,028	2.78	466	2.03	2.48
MN* Q	7,623,398	11.35	2,892	12.62	11.86
MO* Q	3,067,514	4.57	965	4.21	4.42
NE* Q	3,250,779	4.84	1,517	6.62	5.55
NC* Q	10,121,155	15.07	1,741	7.60	12.08
OH* Q	1,796,972	2.68	1,032	4.50	3.41
OK Q	2,375,652	3.54	151	0.66	2.39
PA* Q	1,135,962	1.69	730	3.18	2.29
SD* Q	1,480,679	2.20	582	2.54	2.34
TX* Q	1,124,031	1.67	102	0.45	1.18
13-State total	61,009,978	90.84	20,385	88.95	90.09

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

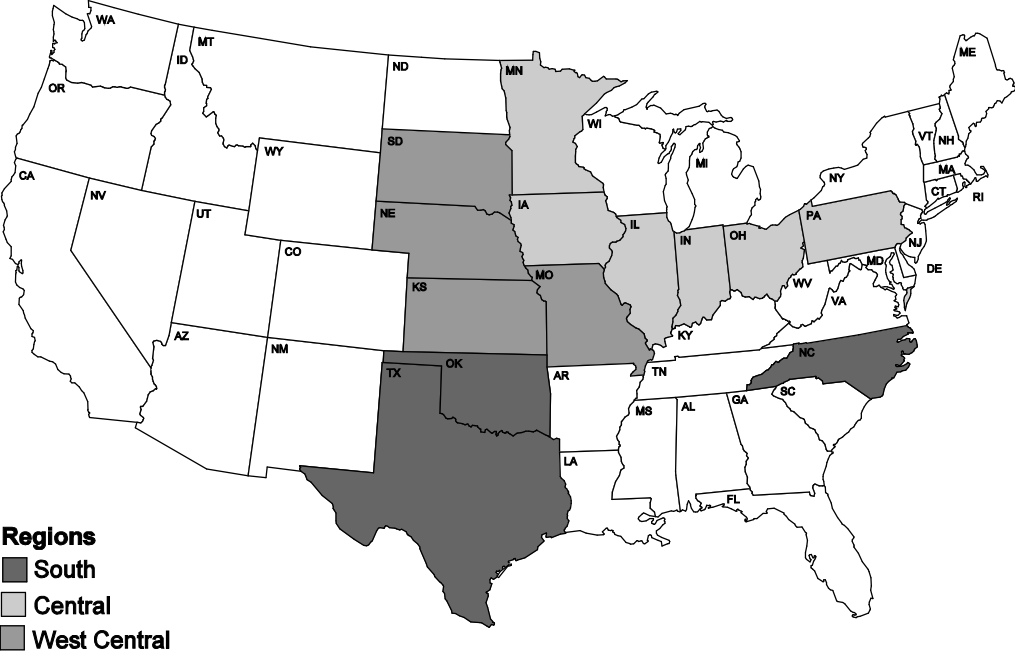
6. Regional breakout for the final swine study States: 13 States based upon contribution to the U.S. total for both number of 100+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture					
State	100+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
South					
NC* Q	10,121,155	15.07	1,741	7.60	12.08
OK Q	2,375,652	3.54	151	0.66	2.39
TX* Q	1,124,031	1.67	102	0.45	1.18
	13,620,838	20.28	1,994	8.71	15.65
Central					
IA* Q	19,256,157	28.67	6,965	30.39	29.36
IL* Q	4,273,497	6.36	1,661	7.25	6.71
IN* Q	3,637,154	5.42	1,581	6.90	6.01
MN* Q	7,623,398	11.35	2,892	12.62	11.86
OH* Q	1,796,972	2.68	1,032	4.50	3.41
PA* Q	1,135,962	1.69	730	3.18	2.28
	37,723,140	56.17	14,861	64.84	59.63
West Central					
KS* Q	1,867,028	2.78	466	2.03	2.48
MO* Q	3,067,514	4.57	965	4.21	4.43
NE* Q	3,250,779	4.84	1,517	6.62	5.55
SD* Q	1,480,679	2.20	582	2.54	2.34
	9,666,000	14.39	3,530	15.40	14.80
13-State total	61,009,978	90.84	20,385	88.95	90.08
U.S.	67,164,286	100.00	22,921	100.00	

* One of 17 States in the 2006 Swine Study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

Swine 2012 State selecton--100+ hogs and pigs



IV. Process for 500+ all hogs and pigs—individual State contribution (2007 Census of Agriculture):

The purpose of this evaluation is to look at the subpopulation of producers which might be an option in place of the lower 100 head or more cutoff level for personal interviews.

1. Identify States with 2 percent or more of the U.S. total for both number of 500+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture					
State	500+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	65,342,700	100.00	15,807	100.00	100.0
IL* Q	4,132,454	6.32	1,136	7.19	6.67
IN* Q	3,492,869	5.35	1,066	6.74	5.90
IA* Q	18,742,923	28.68	5,118	32.38	30.16
MN* Q	7,436,624	11.38	2,214	14.01	12.43
MO* Q	2,963,353	4.54	528	3.34	4.06
NE* Q	3,081,516	4.72	882	5.58	5.06
NC* Q	10,101,567	15.46	1,652	10.45	13.46
OH* Q	1,709,635	2.62	680	4.30	3.29
8-State total	51,660,941	79.07	13,276	83.99	81.03

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

- Identify remaining States with 2 percent or more of either number of 500+ hogs and pigs or number of farms for 2007 inventory.

2007 Census of Agriculture					
State	500+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
KS* Q	1,816,844	2.78	249	1.58	2.30
MI* Q	946,685	1.45	313	1.98	1.66
OK* Q	2,367,660	3.62	111	0.70	2.45
PA* Q	1,077,360	1.65	482	3.05	2.21
SD* Q	1,429,169	2.19	364	2.30	2.23
5-State total	7,637,718	11.69	1,519	9.61	10.85
13-State total	59,298,659	90.76	14,795	93.60	91.88

- Identify remaining States roughly close to the 2-percent cutoff level.

2007 Census of Agriculture					
State	500+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
TX* Q	1,106,919	1.69	20	0.13	1.07
1-State total	1,106,919	1.69	20	0.13	1.07
14-State total	60,405,578	92.45	14,815	93.73	92.95

- Discussion of State Selection based upon 500+ Hog and Pig Data in above tables 1-3.

Based upon the decisions made for the 100+ tables and also the 1,000+ tables which both support the 13 States, the final recommendation table below is based upon those 13 States.

5. Final swine study States: 13 States based upon contribution to the U.S. total for both number of 500+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture					
State	500+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	65,342,700	100.00	15,807	100.00	100.00
IL* Q	4,132,454	6.32	1,136	7.19	6.67
IN* Q	3,492,869	5.35	1,066	6.74	5.90
IA* Q	18,742,923	28.68	5,118	32.38	30.16
KS* Q	1,816,844	2.78	249	1.58	2.30
MN* Q	7,436,624	11.38	2,214	14.01	12.43
MO* Q	2,963,353	4.54	528	3.34	4.06
NE* Q	3,081,516	4.72	882	5.58	5.06
NC* Q	10,101,567	15.46	1,652	10.45	13.46
OH* Q	1,709,635	2.62	680	4.30	3.29
OK* Q	2,367,660	3.62	111	0.70	2.45
PA* Q	1,077,360	1.65	482	3.05	2.21
SD* Q	1,429,169	2.19	364	2.30	2.23
TX* Q	1,106,919	1.69	20	0.13	1.07
13-State total	59,458,893	91.00	14,502	91.75	91.29

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

V. Process for 1,000+ all hogs and pigs—individual State contribution (2007 Census of Agriculture):

The purpose of this evaluation is to look at the subpopulation of producers which might be an option in place of the lower 100 head or more cutoff or even the 500 head or more cutoff level for personal interviews.

1. Identify States with 2 percent or more of the U.S. total for both number of 1,000+ hogs and pigs and number of farms for 2007 inventory.

State	2007 Census of Agriculture 1,000+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	62,854,466	100.00	12,219	100.00	100.00
IL* Q	3,943,260	6.27	867	7.10	6.60
IN* Q	3,281,223	5.22	749	6.13	5.58
IA* Q	17,938,431	28.54	3,947	32.30	30.04
MN* Q	7,114,858	11.32	1,755	14.36	12.54
MO* Q	2,860,211	4.55	382	3.13	3.98
NE* Q	2,861,228	4.55	564	4.62	4.58
NC* Q	10,066,667	16.02	1,604	13.13	14.86
OH* Q	1,608,158	2.56	532	4.35	3.28
SD* Q	1,359,545	2.16	263	2.15	2.16
9-State total	51,033,581	81.19	10,663	87.27	83.62

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

- Identify remaining States with 2 percent or more of either number of 1,000+ hogs and pigs or number of farms for 2007 inventory.

2007 Census of Agriculture					
State	1,000+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
KS* Q	1,763,213	2.81	174	1.42	2.25
OK* Q	2,356,103	3.75	95	0.78	2.56
PA* Q	997,755	1.59	365	2.99	2.15
3-State total	5,117,071	8.15	634	5.19	6.96
12-State total	56,150,652	90.49	11,297	92.46	90.58

- Identify remaining States roughly close to the 2-percent cutoff level.

2007 Census of Agriculture					
State	1,000+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
MI* Q	871,319	1.39	209	1.71	1.52
TX* Q	1,100,460	1.75	11	0.09	1.09
2-State total	1,971,779	3.14	220	1.80	2.61
14-State total	58,122,431	93.66	11,517	94.26	93.19

4. Discussion of State selection based upon 1,000+ hog and pig data in above tables 1-3. The inclusion of TX is important due to their different rearing practices and also their higher potential impact with feral swine. The State of MI could be deleted based upon their small contribution to the US total and coverage of other nearby States geographically. Therefore, 13 States would represent this population of producers.

5. Final swine study States: 13 States based upon contribution to the U.S. total for both number of 1000+ hogs and pigs and number of farms for 2007 inventory.

2007 Census of Agriculture					
State	1,000+ Hogs & Pigs		Farms		Wtd. %
	Number	%	Number	%	
U.S.	62,854,466	100.00	12,219	100.00	100.00
IL* Q	3,943,260	6.27	867	7.10	6.60
IN* Q	3,281,223	5.22	749	6.13	5.58
IA* Q	17,938,431	28.54	3,947	32.30	30.04
KS* Q	1,763,213	2.81	174	1.42	2.25
MN* Q	7,114,858	11.32	1,755	14.36	12.54
MO* Q	2,860,211	4.55	382	3.13	3.98
NE* Q	2,861,228	4.55	564	4.62	4.58
NC* Q	10,066,667	16.02	1,604	13.13	14.86
OH* Q	1,608,158	2.56	532	4.35	3.28
OK* Q	2,356,103	3.75	95	0.78	2.56
PA* Q	997,755	1.59	365	2.99	2.15
SD* Q	1,359,545	2.16	263	2.15	2.16
TX* Q	1,100,460	1.75	11	0.09	1.09
13-State total	57,251,112	91.09	11,308	92.55	91.67

* One of 17 States in the 2006 Swine study.

Q = One of 16 States in the NASS quarterly hog and pig estimation program.

VI. Process for 100-999 all hogs and pigs—individual State contribution (2007 Census of Agriculture):

The purpose of this evaluation is to look at the subpopulation of producers which might be covered via an optional less expensive data collection mode such as CATI in place of the lower 100 head or more cutoff level for personal interviews.

1. Identify individual State contribution for those 13 States previously important for the 1,000+ category.

2007 Census of Agriculture						
		100-999 Hogs & Pigs		Farms		
State		Number	%	Number	%	Wtd. %
U.S.		4,309,820	100.00	10,702	100.00	100.00
IL*	Q	330,237	7.66	794	7.42	7.57
IN*	Q	355,931	8.26	832	7.77	8.06
IA*	Q	1,317,726	30.57	3,018	28.20	29.63
KS*	Q	103,815	2.41	292	2.73	2.25
MN*	Q	508,540	11.80	1,137	10.62	11.33
MO*	Q	207,303	4.81	583	5.45	5.07
NE*	Q	389,551	9.04	953	8.90	8.99
NC*	Q	54,488	1.26	137	1.28	1.27
OH*	Q	188,814	4.38	500	4.67	4.50
OK*	Q	19,549	0.45	56	0.52	0.48
PA*	Q	138,207	3.21	365	3.41	3.29
SD*	Q	121,134	2.81	319	2.98	2.88
TX*	Q	23,571	0.55	91	0.85	0.67
13-State total		3,758,866	87.21	9,077	84.80	85.99

2. The initial sampling plan called for a survey of this population via CATI. Subsequent discussions including swine industry representatives suggested a desire for a complete data file for all producers in the sample selected with 100 head or more.

Appendix B: Review of Previous Response Rates

1. Historic Sample Performance Recent Studies - Detail

a. NASS Enumerator response rates for recent studies:

Response category	Sheep 2010		Goat 2009		Beef 2008		Dairy 2007	
	No. Ops.	%	No. Ops.	%	No. Ops.	%	No. Ops.	%
Complete & VMO consent	1,241	35.0	1,438	41.1	1,033	25.8	1,077	30.3
Complete & refused cons.	1,128	31.8	397	11.3	1,126	28.1	1,117	31.4
No inventory	212	6.0	797	22.8	469	11.7	214	6.0
Out of business	81	2.3	241	6.9	244	6.1	111	3.1
Out of scope	17	0.5	9	0.3	7	0.2	6	0.2
Refusal	530	15.0	316	9.0	776	19.4	785	22.1
Office hold	69	1.9	19	0.5	46	1.2	126	3.6
Inaccessible	264	7.5	284	8.1	300	7.5	118	3.3
	3,542	100.0	3,501	100.0	4,001	100.0	3,554	100.0

Note: Sheep all complete questionnaires = 2,079; 43.9% consented for turn over to VS.
 Goat all complete questionnaires = 1,835; 78.4% consented for turn over to VS.
 Beef all complete questionnaires = 2,159; 47.8% consented for turn over to VS.
 Dairy all complete questionnaires = 2,194; 49.1% consented for turn over to VS.

2. Swine Historic Sample Performance Overview

Small Enterprise Swine 2007

Questionnaire	Collection dates	Sample	Compl.	Compl. %	Good*	% Good
Screener(NASS) mail and telephone	5/14-5/31/07	8,038	2,567	31.9		
General Swine Farm Report (NASS) mail and telephone	8/2-9/18/07	2,567	1,778	69.3	2,050	79.9

*Complete data including out of business and zero inventory.

Swine 2006

Questionnaire	Collection dates	Sample	Compl.	Compl. %	Good*	% Good
General Swine Farm Report (NASS) enumerator	7/17-9/15/06	5,157	2,230	43.2	3,222	62.5
Initial VS	9/5/06-	1,005	514	51.1		

Visit	3/15/07					
Second VS Visit	12/4/06-3/15/07	514	435	84.6		

*Complete data including out of business and zero inventory.

Swine 2000

Questionnaire	Collection dates	Sample	Compl.	Compl. %	Good*	% Good
Screener (NASS) mail and telephone	4/1-5/31/00	12,988	7,156	55.1		
General Swine Farm (NASS) enumerator	6/1-7/14/00	4,749	2,328	49.0	2,576	54.2
Initial VS Visit	8/21-11/3/00	1,316	895	68.0		
Second VS Visit	12/1/00-2/28/01	895	799	89.3		

*Complete data including out of business and zero inventory.

2. Swine 2006 Sample Performance - Detail

No screening samples were drawn as in Swine 2000. The same 17 States were included as in Swine 2000.

a. General Swine Farm Report (NASS) response rates compared to Dairy 2007:

Response category	No. Ops.	% of total	No. Sites	% of total	Dairy 2007	
					No. Ops.	%
Complete & VMO consent	912	18.2	1,005	19.5	1,077	30.3
Complete & refused cons.	1,167	23.3	1,225	23.8	1,117	31.4
No pigs on 6/1/2006	696	13.9	696	13.5	214	6.0
Out of business	296	5.9	296	5.7	111	3.1
Out of scope	13	0.3	13	0.3	6	0.2
Refusal	1,327	26.5	1,327	25.7	785	22.1
Office hold	315	6.3	315	6.1	126	3.6
Inaccessible	280	5.6	280	5.4	118	3.3
	5,006	100.0	5,157	100.0	3,554	100.0

Note: Swine all complete questionnaires = 2,079; 43.9% consented for turn over to VS.

Dairy all complete questionnaires = 2,194; 49.1% consented for turn over to VS.

b. VMO response rates:

<u>Response category</u>	<u>Initial VMO Visit</u>		<u>Dairy In. Visit</u>		<u>Second VMO Visit</u>	
	<u>No. Ops.</u>	<u>% of total</u>	<u>No. Ops.</u>	<u>%</u>	<u>No. Ops.</u>	<u>% of total</u>
Complete	514	51.1	582	54.0	435	84.6
Refusal			380	35.3		
Ineligible			4	0.4		
Inaccessible			111	10.3		
	1,005	100.0	1,077	100.0	514	100.0

3. Swine 2000 Sample Performance - Detail

Screening sample drawn in 17 NASS quarterly hog and pig States.

a. Screening response rates:

<u>Response category</u>	<u>No. Ops.</u>	<u>% of total</u>
Eligible (100+inventory)	7,156	55.1
Not eligible	3,189	24.6
Out of business	537	4.1
Out of scope	256	2.0
Refusal	1,040	8.0
Inaccessible	810	6.2
	12,988	100.0

Out of the 7,156 eligible operations with 100 head or more total inventory, 4,749 were randomly selected for the on-farm study.

b. General Swine Farm Report (NASS) response rates compared to Dairy 2002:

<u>Response category</u>	<u>No. Ops.</u>	<u>% of total</u>	<u>No. Sites</u>	<u>% of total</u>	<u>Dairy 2007</u>	
					<u>No. Ops.</u>	<u>%</u>
Complete & VMO consent	1,208	25.4	1,316	26.7	1,556	40.2
Complete & refused cons.	1,120	23.6	1,183	24.0	905	23.3
No pigs on 6/1/2000	181	3.8	181	3.7	227	5.9
Out of business	67	1.4	67	1.4	183	4.7
Out of scope	29	0.6	29	0.6	45	1.2
Refusal	1,736	36.6	1,736	35.3	821	21.2
Inaccessible	408	8.6	408	8.3	139	3.5
	4,749	100.0	4,920	100.0	3,876	100.0

Note: Swine all complete questionnaires = 2,328; 51.9% consented for turn over to VS.

Dairy all complete questionnaires = 2,461; 63.2% consented for turn over to VS.

Consent for further participation in the Swine study was asked on June 1 of those with 100+ head. There were 2,499 sites with good, positive, complete data or 50.8% (63.4 % for Dairy 2002) of the total sample (56.4 % if zeroes, out of business and out of scope are included – compares to 75.2% for Dairy 2002).

The summarized complete data included 2,499 sites of which 1,316 consented (52.7% compared to a consent rate for Dairy 2002 of 61.4%). For the dairy 2002 study 3.0% completed the survey but were ineligible for the VMO phase – this should be a coding requirement for Swine 2006 since there will be a greater chance of being ineligible than in Swine 2000, due to the screening sample used. The comparison of swine and dairy illustrates the need for better response rates for the 3 opportunities: - the enumerator phase (49.0 % of sample was complete for good data), consent phase, and the VMO phase (shown below).

c. VMO response rates:

<u>Response category</u>	<u>Initial VMO Visit</u>		<u>Dairy '02</u>		<u>Second VMO Visit</u>	
	<u>No. Ops.</u>	<u>% of total</u>	<u>No. Ops.</u>	<u>%</u>	<u>No. Ops.</u>	<u>% of total</u>
Complete	895	68.0	1,013	70.4	799	89.3
Refusal	292	22.2	335	23.3	91	10.1
Ineligible	25	1.9	14	1.0	NA	NA
Inaccessible	104	7.9	76	5.3	5	0.6
	1,316	100.0	1,438	100.0	895	100.0

Appendix C: Total Sample Size and Allocation of Samples to States and Strata

Setting Total Sample Size for Swine 2012

Large operator component

As shown in Appendix B, the Swine 2000 selected sample of 4,749 provided 2,499 good useable data from enumerator interviews but came up a little short of good data from our VMO visit of only 895. Note: that for both of these the number of inaccessible reports seems on the high side and should be reduced.

For Swine 2006, a selected sample of 5,006 provided 2,230 good useable enumerator interviews but really fell short with only 514 complete questionnaires from the VMO visits. As a rough goal APHIS should target for 2012 APHIS want about 2,600 good useable (positive) questionnaires from the enumerator interview plus CATI and 860 good useable questionnaires from the VMO visit. Based upon these considerations, APHIS need a total sample size between 4000 and 5000. Further consideration of sample size is shown below and also in Appendix D and of course budget constraints are a major factor as well.

The 13 selected States represent 88.9% of farms (U.S. = 22,921) with 100 or more pigs and 90.8% of pigs (U.S. = 67,164,286) on farms with 100 or more pigs. In these 13 States, the total number of farms with 100 or more pigs is 20,385 and the total number pigs on these farms is 61,009,978 (NASS 2007 Census of Agriculture).

Region	States	# farms	# pigs
Central	IL,IN,IA,MN,OH,PA	14,861	37,723,140
APHISst	KS,MO,NE,SD	3,530	9,666,000
South	NC,OK,TX	1,994	13,620,838

To obtain estimates at the regional level with CVs similar to the ones APHIS had in past studies (NASS portion), APHIS would need the following half-widths and sample sizes with a SRS and population sizes of 15,000 (Central) and 2,000 (South) (at 95% confidence):

Percent +/- half-width	n N=15,000	n N=2,000	SE	CV
1 +/- 0.5	1,381	864	0.3	25.5
5 +/- 1	1,627	954	0.5	10.2
10 +/- 2	817	603	1.0	10.2
25 +/- 3	760	572	1.5	6.1
50 +/- 5	375	322	2.5	5.1
75 +/- 5	283	252	2.5	3.4
90 +/- 10	34	34	5.1	5.7

If APHIS is satisfied with a CV of ~5% for estimates around 50% and CVs of 10% or greater for estimates below 50%, then it can take a sample of about 400 from the Central region, and about 300 each from the West and South regions. Assuming a design effect of 2 and a response rate of 65%, APHIS would need a sample of about $((400+300+300)*2)/0.65 = 4,000$ total.

List sampling frame counts have not been provided yet by NASS as of this submission to provide a sample allocation to States and strata within States.

Small operator component

Satisfactory results were obtained from the Swine 2007 Small Enterprise Study using a sample size of 2,500 which is the primary factor is using the same size for 2012.

The 31 selected States represent 82.7% of farms (U.S.=52,520) with 1–99 pigs and 91.5% of pigs (U.S.=622,032) on farms with 1–99 pigs. In these 31 States, the total number of farms with 1–99 pigs is 43,434 and the total number of pigs* on these farms is 568,855 (NASS 2007 Census of Agriculture).

*The number of pigs was not published for some States.

Region	States	# farms	# pigs
Northeast	IL,IN,MI,NJ,NY,OH,PA,WI	15,535	210,164
Central	IA,KS,MN,MO,NE,SD	6,950	147,120
West	AZ,CA,CO,HI,NM,WA	4,836	39,695
South	AL,AR,FL,GA,LA,MS,NC,OK,SC,TN,TX	16,113	171,876

To obtain estimates at the regional level with CVs similar to the ones APHIS had in past studies (NASS portion), APHIS would need the following half-widths and sample sizes with an SRS and population sizes of 16,000 (South) and 5,000 (West) (at 95% confidence):

Percent +/- half-width	n N=16,000	n N=5,000	SE	CV
1 +/- 0.5	1,389	1,166	0.3	25.5
5 +/- 1	1,638	1,337	0.5	10.2
10 +/- 2	820	737	1.0	10.2
25 +/- 3	800	690	1.5	6.1
50 +/- 5	375	357	2.5	5.1
50 +/- 10	96	94	5.1	10.2
75 +/- 5	283	272	2.5	3.4
90 +/- 10	34	34	5.0	5.7

If APHIS is satisfied with a CV of ~5% for estimates around 50% and CVs of 10% or greater for estimates below 50%, then APHIS can take a sample of about 400 each from the Northeast and South regions, and 350 each from the Central and West regions. Assuming a design effect of 2 and a response rate of 65%, APHIS would need a sample of about $((400+400+350+350)*2)/0.65 = 4,600$ total.

List sampling frame counts have not been provided yet by NASS as of this submission to provide a sample allocation to States and strata within States. However, the table below does show the relative contribution of each state to the total.

Appendix D: Small Component (1-99 head) States

Total U.S. Farm and Pig Inventory for Farms with 1-99 Hogs and Pigs, 2007 and the selection category (classical swine fever (CSF), pseudorabies (PRV), either of the 2 reasons).

State	Total Farms*	Percent of U.S. Total	All Hogs & Pigs Inventory*	Percent of U.S. Total	Weighted Percent	CSF	PRV	EITHER
WI	2,698	5.14	39,300	6.32	5.85			O
IA**	1,365	2.60	38,935	6.26	4.80	X		X
OH**	2,686	5.11	34,112	5.48	5.34		X	X
MO**	2,034	3.87	33,955	5.46	4.82		X	X
MS	622	1.18	33,955	5.46	3.75		X	X
IN**	1,839	3.50	31,903	5.13	4.48	X		X
TX**	4,369	8.32	31,759	5.11	6.39	X	X	X
PA**	2,907	5.53	31,487	5.06	5.25			O
MN**	1,490	2.84	28,886	4.64	3.92	X		X
MI	2,138	4.07	28,199	4.53	4.35			O
IL**	1,203	2.29	25,219	4.05	3.35	X		X
OK**	2,551	4.86	22,720	3.65	4.13	X	X	X
KS**	988	1.88	18,224	2.93	2.51	X		X
NE**	696	1.33	17,765	2.86	2.24	X		X
NY	1,810	3.45	17,468	2.81	3.06	X		X
TN	1,469	2.80	15,495	2.49	2.61		X	X
NC**	1,095	2.08	14,995	2.41	2.28	X	X	X
FL	1,881	3.58	13,289	2.14	2.71	X	X	X
CA	1,332	2.54	11,635	1.87	2.14	X	X	X
WA	1,439	2.74	10,899	1.75	2.15	X		X
CO	1,106	2.11	10,184	1.64	1.82			O
GA	1,008	1.92	9,401	1.51	1.67	X	X	X
SD**	377	0.72	9,355	1.50	1.19			O
AR	995	1.89	9,017	1.45	1.63		X	X
AL***	693	1.32	7,284	1.17	1.23		X	X
LA	701	1.33	7,207	1.16	1.23		X	X
SC	729	1.39	6,754	1.09	1.21		X	X
HI***	196	0.37	2,740	0.44	0.41	X	X	X
AZ	369	0.70	2,479	0.40	0.52	X	X	X
NJ***	254	0.48	2,476	0.40	0.43	X		X
NM***	394	0.75	1,758	0.28	0.47	X	X	X
31-State total	43,434	82.70	568,855	91.45	87.95			
US total	52,521	100.00	622,032	100.00	100.00			
*NASS 2007 Census of Agriculture--State data.								
**Also in the large and medium component								
***Approximated from 2002 data								

Appendix E: NAHMS Swine 2012 Estimated Response Rates

Phase	Response category	Percentage in phase	Expected counts
Small operation questionnaire (1-99)			
	Zero on hand	20.0	400
	Complete	60.0	1,200
	Refusal	20.0	400
	Total	100.0	2,000
Phase I Large ops – CATI (100+)			
	Zero on hand	13.0	260
	Hogs, but ineligible	1.0	20
	Complete & consent	15.0	300
	Complete & no consent	40.0	800
	Complete Phase I	55.0	1,100
	Out of scope	1.0	20
	Refusal	30.0	600
	Total	100.0	2,000
Phase I Large ops – Enumerator (100+)			
	Zero on hand	13.0	338
	Hogs, but ineligible	1.0	26
	Complete & consent	25.0	650
	Complete & no consent	25.0	650
	Complete Phase I	50.0	1,300
	Out of Scope	1.0	26
	Refusal	35.0	910
	Total	100.0	2,600
Phase I Large ops – overall/combined CATI + Enum.			
	Zero on hand	13.0	(260+338) 598
	Hogs, but ineligible	1.0	(20+26) 46
	Complete & consent	20.0	(300+650) 950
	Complete & no consent	31.5	(800+650) 1,450

	Out of scope	1.0	(20+26) 46
	Refusal	32.8	(600+910) 1,510)
	Total	100.0	4,600
Phase II Large ops - VMO			
	Complete	70.0	665
	Refusal	30.0	285
	Total	100.0	950
	Ineligible from Phase I		
Phase II Large ops – VMO Reflected “True Rates”			
	Complete	14.5	665
	Refusal	6.2	285
	Subtotal	20.7	950
	Ineligible but had hogs	1.0	46
	Ineligible from Phase I – zero on hand	13.0	598
	Ineligible from Phase I – out of scope	1.0	46
	Refused consent from Phase I	31.5	1,450
	Refusal from Phase I	32.8	1,510
	Total	100.0	4,600

Appendix F: Risk Factors associated with Classical Swine Fever (CSF) and Pseudorabies in Swine for Small Operations (< 100 pigs on-site)

- Densities of pigs per pen.
- Numbers of pig herds in a municipality.
- Frequencies of the contact rate between swine herds.
- Outside housing or access to the outside for pigs raised and integrity of fencing to prevent wild visitors.
- Vaccination protocols.
- Frequency of replacement animals (gilts and boars) used and quarantine methods used.
- Pig flow management within farms.
- Disease status and preventative disease measures in the herd.
- Transport vehicle hygiene and non-farm personnel entry.
- Reproductive management, primarily use of high health technologies to introduce new genetic stock (AI, MMEW, SEW, or Embryo Transfer).
- Veterinary monitoring of herd health status.
- Building biosecurity protocols.
- Garbage feeding to swine.

Appendix G: Selected Estimates from Swine 2006 with Associated Standard Errors, Coefficients of Variation (CV), and Design Effects

Phase I: NASS enumerator portion				
Variable	Point estimate	Standard Error	CV	Design effect
Percent of operations that use local veterinary practitioners	49.5	1.4	2.8	1.6
Percent of operations that regularly vaccinate hogs and pigs for porcine reproductive and respiratory syndrome (PRRS)	19.2	1.1	5.7	1.9
Percent of breeding-age females that died between Dec.1, 2005 and May 31, 2006 (ratio estimate)	4.3	0.3	7.0	1.1
Phase II: Veterinary medical officer visit				
Percent of operations that were suspected to have PRRS cause sickness or mortality in one or more breeding females in the past 12 months	27.3	4.3	15.8	2.2
Percent of operations that obtain replacement gilts from PRRS-negative source specifically to control or prevent PRRS in breeding females	33.0	4.0	12.1	1.7
Percent of operations that in the last 12 months noticed Postweaning Mortality and Wasting Syndrome (PMWS aka PCVD) was present in one or more weaned pigs in the herd	34.2	3.2	9.4	1.8

Appendix H: Selected Estimates from Swine 2007 with Associated Standard Errors, Coefficients of Variation, and Design Effects

NASS enumerator portion				
Variable	Point estimate	Standard Error	Coefficient of variation	Design effect
Percentage of operations with sows and gilts for breeding on hand July 1, 2007	38.9	1.3	3.3	1.3
Percentage of all operations that had at least one farrowing from July 1, 2006,through June 30, 2007	34.0	1.3	3.8	1.3
Percentage of operations that were 5 or more miles the nearest known operation with pigs	34.7	1.4	4.0	1.4
Percentage of operations that were visited by a local practitioner veterinarian at least once during the previous 12 months	29.0	1.3	4.5	1.4