

**COST of POLLINATION SURVEY**

OMB No. 0535-NEW

**B. COLLECTION OF INFORMATION EMPLOYING STATISTICAL METHODS**

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

NASS's list frame is a roster of known farmers and ranchers and includes a profile of each operation indicating the size of the operation and the commodities they produce. NASS continually works to keep the list frame as complete as possible by obtaining records for new or omitted operations from other USDA lists, producer association lists, and many other sources. A special effort is made to ensure that larger producers are included on the list. Nevertheless, a list frame can never provide complete coverage of all farms, since farming arrangements are constantly changing. Moreover, there will always be some farms on the list that are out of business. Despite these limitations, the list frame is an efficient method to select samples and data can be collected using less expensive methods such as mail, telephone, or internet. The Pollinator Cost Sampling Frame (population) consists of farm operators in all 50 states with positive list frame data for 33 specific commodities (Table 1) on NASS's List Frame.

The Multivariate Probability Proportional to Size (MPPS) sampling design<sup>1</sup> will be used to select a sample from the Pollinator Cost Sampling Frame for the Pollinator Cost Survey. The MPPS uses multiple auxiliary variables in the sample allocation to achieve the sampling efficiency of a Probability Proportional to Size (PPS) design in the estimation of multiple variables. The target sample size for each commodity was derived using a simple random sample size formula that accounts for power. The resulting sample size was rounded to 53,000 after adjusting for historic response rates.

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<sup>1</sup> Bailey, Jeff and Kott, Phillip (1997), An Application of Multipurpose List Frame Sampling For Multi-Purpose Surveys, Proceedings of the Section on Survey Research Methods, American Statistical Association, pp. 496-500.

The probability of selection for an MPPS design is:

$$\pi_j = \min \left\{ 1, \max \left( n_{j1} \times \frac{x_{ij1}^{0.75}}{\sum_{i=1}^{N_{j1}} x_{ij1}^{0.75}}, \dots, n_{jH} \times \frac{x_{ijH}^{0.75}}{\sum_{i=1}^{N_{jH}} x_{ijH}^{0.75}} \right) \right\}$$

Where:

$\pi_{ij}$  is the maximum probability of selection for farm operator  $i$  in state  $j$ .

$i$  is the farm operator.

$h$  is the target commodity ( $h=1, \dots, H$ ).

$j$  is the state.

$N_h$  is the number of farm operators in the sampling frame for target commodity  $h$ , and

$x_{ijh}$  is the value of target commodity  $h$  for the  $i^{\text{th}}$  farm operator in state  $j$ .

The target sample size for each targeted commodity is:

$$n_{jh} = \frac{1}{\left( \frac{1}{1 + \frac{Z_{1-\beta}}{Z_{1-\frac{\alpha}{2}}}} \right)^2 \left( \frac{((CV_{jh})T_{jh})^2}{100(N_{jh}S_{jh}^2)} \right) + \frac{1}{N_{jh}}}$$

Where:

$n_{jh}$  is the sample size for target commodity  $h$  in state  $j$ ,

$N_{jh}$  is the population for target commodity  $h$  in state  $j$ ,

$S_{jh}$  is the standard deviation for target commodity  $h$  in state  $j$ ,

$\alpha$ : Type I error.

$\beta$ : Type II error

$CV_{jh}$  is the coefficient of variation for target commodity  $h$  in state  $j$ , and

$T_{jh}$  is the total for target commodity  $h$  in state  $j$ .

An alpha of .05 and beta of 0.20 were used to generate sample sizes for all state commodity combinations. The resulting sample sizes were used to derive the maximum probability of selection,  $\pi$ . A sample is chosen by sorting the sampling frame by the sum of targeted crop acres, generating a uniform random number (RN), calculating the cumulative probability for unit  $i$  as  $\text{Cumulative}_i = \text{Cumulative}_{i+1} + \pi_i$ , and selecting unit  $i$  if  $\text{Cumulative}_{i+1} < \text{RN} + k < \text{Cumulative}_i$  for any  $k = 0, 1, 2, \dots, n$  where  $n$  is the total number of units selected for the sample<sup>a</sup>. The final sample size was adjusted to 53,000 using the historical response rate of 0.73.

<sup>a</sup> Hicks, Susan, Amrhein, John and Kott, Phil (1996), Methods to Meet Target Sample Sizes Under a Multivariate PPS Sampling Strategy, Proceedings of the Section on Survey Research Methods, American Statistical Association, pp. 234-238.

Table 1 Pollinator Cost Survey Targeted Commodities

<u>Seq_n</u>	<u>Commodity</u>
1	alfalfa seed
2	almonds
3	apples
4	apricots
5	avocados
6	blueberries
7	boysenberries
8	buckwheat
9	caneberries
10	canola
11	cantaloupes
12	cherries
13	clover seed
14	cranberries
15	cucumber
16	grapes
17	honeydew melon
18	kiwifruit
19	macadamia nuts
20	mangos
21	nectarines
22	oranges
23	peaches
24	pears
25	plums
26	prunes
27	pumpkins
28	raspberries
29	squash
30	strawberries
31	sunflowers
32	turnips
33	watermelons

2. Describe the procedures for the collection of information including:
- statistical methodology for stratification and sample selection,
  - estimation procedure,
  - degree of accuracy needed for the purpose described in the justification,

- **unusual problems requiring specialized sampling procedures**

The sample design associated with the Cost of Pollination Survey is a Multivariate Probability Proportional to Size (MPPS) sampling design. The survey will be conducted in all 50 States.

Questionnaires are scheduled to be mailed at the end of November to the target sample. Respondents will be able to respond by mail or by internet. Non-respondents will be attempted by either phone or field enumeration. The telephone enumerators will conduct the interviews using computer assisted telephone interviews. In-person contacts are used if requested by the operator or if there were reporting difficulties such as with cross-State producers. Headquarters acts as the clearing house for multi-State data between Field Offices.

All Regional Field Offices (RFOs) will review the data for reasonableness prior to it being run through an electronic edit. RFOs will execute a summary that was prepared by NASS Headquarters. Review of summary results and preparation of estimates by RFOs will be completed and sent to Headquarters following the completion of the survey.

Summary procedures will account for nonresponse by strata, each strata being reweighted to reflect populations characteristics. Past NASS designs for bee, honey, and expenditure type surveys have successfully produced coefficients of variations (CVs) under five for program states and under ten for non-program states. Disclosure problems will be grouped and published as "Other States".

- 3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.**

Through the vegetable surveys conducted under OMB # 0535-0037 and the fruit, nut, and specialty crop surveys conducted under OMB # 0535-0039, NASS has built a good relationship with many of these producers. Honey bees and other pollinators are vital to these producers. Through the use of publicity materials and trained enumerators NASS will convey the importance of the respondent's data and their cooperation in this data collection effort.

NASS will provide the respondents with a variety of modes for completing the survey: internet, US Postal Service, telephone or personal interview, fax or email. If the respondents have any questions, NASS has included our Customer Service phone number at the top of each questionnaire.

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

NASS conducted five cognitive interviews earlier this year and several minor changes were made to the final version of the questionnaire as a result of the testing. With this being a new data collection effort, NASS will also do internal testing of the edit and summary programs before any publications will be generated to ensure accuracy.

**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), or other person(s) who will actually collect and/or analyze the information for the agency.**

The sample size for each State is determined by the Sampling and Frame Development Section, Methodology Division; Section Head is Peter Quan, (202)720-5269.

Data collection is carried out by NASS Field Offices; Western Field Operation's Director is Kevin Barnes (202) 720-8220 and Eastern Field Operations Director is Jay Johnson (202) 720-3638.

The NASS commodity statistician in Headquarters for the bee and honey survey is Joshua O'Rear, (202) 690-3676, in the Poultry and Specialty Commodities Section of the Livestock Branch, Statistics Division. The Livestock Branch Chief is Dan Kerestes (202)720-3570. Commodity statisticians are responsible for national and regional summaries, analysis, presentations to the Agricultural Statistics Board for final estimates, publication, and the Estimation Manual.

The NASS Survey Administrative Statistician in Headquarters for the Cost of Pollination Survey is Shareefah Jackson (202) 690-3692 in the Environmental and Economic Survey Section of the Survey Administration Branch, Census and Survey Division; Branch Chief is Gerald Tillman, (202) 720-3895. The Survey Administrator is responsible for coordination of sampling, questionnaires, data collection, training, Interviewers Manual, Survey Administration Manual, data processing, and other Field Office support.

The national summary is the responsibility of the Summary, Estimation and Disclosure Methodology Branch, Methodology Division; Branch Chief is Jeff Bailey (202)720-4008.

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