Supporting Statement for Paperwork Reduction Act Submission:
Part B

USERS, USES, AND VALUE OF LANDSAT SATELLITE IMAGERY

Revision of a Currently Approved Collection
OMB Control Number 1028 – 0091
Expiration Date: September 30, 2010

Collections 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 had been conducted previously, include the actual response rate achieved during the last collection.**

Potential Respondent Universe and Sampling Selection Method

The first potential respondent universe or population consists of all users of Landsat imagery who have procured the imagery from the USGS Earth Resources and Observation Science (EROS) Center since October 2007, the point at which EROS began collecting email addresses. Initially the annual number of users was relatively small, but since the data became available at no cost in 2009, the annual number of users visiting EROS has jumped dramatically. From 2008 to 2009, the number of people who downloaded imagery from EROS increased from 4,643 to 23,610. All users are required to enter an email address when they initially register with EROS so contact information is available for all the users. The total number is 40,366 based on total number of e-mail addresses collected from 2007-through 2010.

The second population consists of all Landsat users who have not procured imagery from EROS. This population is an unknown population in that the extent of the population is very difficult to determine. Sampling an unknown population requires a different approach than sampling a known population. This sample will be collected by using a non-probability sampling method called snowball sampling to contact users outside of the EROS population. Following snowball sampling procedures, EROS users will serve as the seed population and be asked to provide the contact information (email address) for up to three other Landsat users. These users will constitute the first wave in the sampling. They will be contacted (if they are not a member of the EROS population already) and asked to complete the survey including providing contact information for up to three other users. These users will constitute the second wave. This process will be repeated until less than 100 new contacts are collected from a wave. We estimate that around 3,028 additional users will be reached using this method.

All users in both the EROS population and outside of it will be contacted via email and asked to respond to the survey. Because the survey will be administered online, there are few barriers to collecting data from as many members of the population as possible. Because there is no effective way to stratify the sample of EROS users, collecting data from as many members of the population as possible is also a necessity.

Expected Response Rate

The response rate for the initial collection was 53%, which is comparable to typical response rates for online surveys (Couper, 2000). Because the individuals in the sample are highly engaged in the survey topic, we anticipate a similar response rate for this survey among U.S.-based users. Additionally, we will adhere to follow-up procedures for web surveys outlined in Dillman's Total Design Method (2007) which has been shown to increase response rates. However, there are many international users who may have difficulty with an English language survey, which may lower the response rate. As a result, we anticipate a 40% response rate for both samples. Though this response rate is low, the sample obtained will still be greater than that needed to provide sufficient statistical power to generalize to the population of EROS users and to the sample of other Landsat users collected during snowball sampling.

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, and**
   * **Any use of periodic (less frequent than annual) data collection cycles to reduce burden.**

Statistical methodology for sample selection:

The first sample will be comprised of the entire population of EROS users. Because EROS does not track individual users from year to year, it is not known which users are established and which are new in the population. Only the number of users total is known, so useful stratification is not possible and therefore, all users will need to be sampled. The second sample will be comprised of all Landsat users identified through the snowball sampling process. Because this sample will not be representative of the population of non-EROS users, all users will be contacted to gather the broadest range of users possible.

Estimation procedure and degree of accuracy:

The results of the survey from the first sample will be generalized to the population of EROS users. The non-response survey will be used to ensure that the respondents accurately represent the entire population. A 40% response rate from the population will be a sufficient degree of accuracy to represent this population of EROS users of Landsat imagery.

The results of the survey from the second sample will not be generalized to any population, but will represent a broad sample of Landsat users who do not download data from EROS.

Reporting of these results will carefully describe the interpretive limits of this data. A 40% response rate from this sample of users will be a sufficient degree of accuracy to represent this sample of users.

Unusual problems:

There are no unusual problems with the first sample in this collection.

Because the population of Landsat imagery users outside of EROS is essentially unknown, a non-probability sampling method, in this case snowball sampling, must be used to identify members of the population. The results of the snowball sampling for the initial collection provided a breadth of users across a variety of application areas and sectors. Based on those results, we feel snowball sampling will provide a diverse, though not generalizable, sample from this population.

Periodic data collection cycles:

No periodic data collection will occur.

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.**

Using the web as an alternative to other survey modes such as mail or telephone is becoming increasingly accepted (Couper, 2000). Web based surveys are often used as a strategy to decrease costs, increase the speed of data collection, and increase response rates with the hope of decreasing the amount of non-response error (Dillman, 2007; Schaefer and Dillman, 1998). To maximize the response rate, Dillman's methods for web-based surveys will be followed with some modifications. Four emails will be sent, the first of which will contain a link to the survey. Email reminders will be sent out 4, 8, and 16 days later to all non-respondents, excluding those who request to be removed from the list. In this case we have a list of confirmed users of Landsat imagery from EROS, as well as non-EROS users identified by other users, so we consider this to be a very attentive audience. We feel that due to the highly technical nature of the respondents, they will be more likely to respond to a web-version versus a paper survey option. We predict that the response rate of 40% will be met for both samples. Unless the response rate is above 70% for each sample, we will employ intensive methods (described by Dillman) to conduct a follow-up survey of non-respondents for either or both samples. The non-respondent survey will be e-mailed to all of the non-respondents from both samples who have not responded to the web survey.

The second sample will not represent all Landsat users outside of the EROS population and thus will not be generalizable to that population. In all reporting we intend to fully explain the limitations of generalizing the data from this sample to the population of Landsat users as a whole. Results will be presented in terms of only the respondents as counts or percentages of the sample, as opposed to percentages of the entire population. Though the sample will

not be generalizable, the success of the snowball sampling undertaken in the initial collection indicates that a very diverse group of users can be reached using this methodology. By starting with a large seed population (40,366 EROS users), the variety of users contacted outside of the EROS population will be maximized. The results from the initial survey show that not all Landsat users procure imagery from EROS and it is probable that the EROS population does not represent the population of Landsat users as a whole. The second sample will allow the identification of uses and benefits that may exist outside of the EROS population. While many of these were captured in the initial collection, the influx of new users (who were not included in the original sample) may further add to the known uses and benefits. Since not all new users can be expected to be part of the EROS population, the snowball sampling process is designed to identify some of those users, as well as established users who may be obtaining their imagery elsewhere.

4. **Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of tests may be submitted for approval separately or in combination with the main collection of information.**

   No testing of the revised survey instrument is planned because the revisions are minimal. Extensive peer review and pre-testing was conducted with the original instrument, as was documented in the supporting statement for the initial collection.

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.**

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