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The Results of Testing Three Imputation Procedures on Agricultural Land Value Data From the 1994 June Agricultural Survey

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ABSTRACT

For many years the National Agricultural Statistics Service (NASS) has collected farm real estate market value and cash rent information for the Economic Research Service, another agency in the U.S. Department of Agriculture (USDA). Beginning in 1994, the collection of these data was integrated into NASS' June Agricultural Survey (JAS). This report discusses a comparison of three alternative imputation methods for nonresponse in agricultural land values collected during the 1994 June Agricultural Survey. These three methods were all mean-based and tested with modified versions of the computer program used operationally to impute for other missing survey items in the Agricultural Survey Program. The primary differences in the methods were in the levels at which imputation cells were formed and the criteria for usability of a cell mean. The methods studied ranged from one that could be easily implemented operationally to one that would be difficult to implement in real-time processing, but more fully exploit the spatial aspects of farm real estate v

This report points out the problems with nonresponse adjustment procedures where nonresponse rates are high and data are extremely volatile. It discusses the pros and cons of each of the alternative imputation methods and the issues involved in selecting an imputation procedure. To obtain satisfactory summary results from the 1994 JAS agricultural land value data, substantial post-survey data "cleaning" was required. Whether this type of cleaning can be done in real time is one of a number of issues that must be resolved prior to deciding upon an ultimate nonresponse adjustment strategy.

The evaluation contained in this report is highly empirical and graphical in nature, is intended to be painless to read for a wide audience, and hopefully provides some insights on problems inherent in real survey data and their implications in nonresponse adjustment.

KEY WORDS

Nonresponse, Imputation, Problematic Data.

This report contains summary results on agricultural land values that are considered administratively confidential. Therefore, it should only be distributed within the National Agricultural Statistics Service and the Economic Research Service.

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SUMMARY

For many years the National Agricultural Statistics Service (NASS) has collected farm real estate market value and cash rent information for the Economic Research Service (ERS), another agency in the U.S. Department of Agriculture (USDA). These data are used in setting USDA's official land value estimates and support various cost of production and financial analyses for the farm sector. Through January 1994 they were collected in an annual Agricultural Land Values Survey (ALVS).

Over the past several years there have been discussions between the two agencies about how these data can be obtained most effectively, in view of budgetary pressures and data quality and respondent burden concerns. ALVS data quality concerns have focused mostly on incomplete sampling frame coverage and high nonresponse rates.

To address these concerns, the Agricultural Land Values Working Group was formed. This group consisted of NASS and ERS personnel and outside consultants Paul Biemer of Research Triangle Institute and Charlie Palit of the University of Wisconsin's Survey Research Laboratory. It was charged with formulating an improved plan for collecting the agricultural land value data. The plan that evolved was to collect the data as part of NASS' area frame based June Agricultural Survey (JAS).

This change in the data collection vehicle was implemented in 1994 and puts the survey effort for agricultural land values on a sound statistical basis. However, while response rates for market value and cash rent data showed some improvement with the JAS collection (and is expected to improve further in future surveys), nonresponse is still an important issue. This study explored three possible options for nonresponse adjustment. The goals of the paper are 1) to document nonresponse statistics and nonresponse adjustment method results, 2) to document experiences and lessons learned while working with the data and 3) to make recommendations related to nonresponse adjustment in future surveys.

Since the relationship between location and market value is very strong, agricultural land value data collected from an area frame survey is ideally suited to a spatially-oriented imputation procedure. This analysis shows, however, how damaging the combination of volatile data and high nonresponse rates can be in imputation, regardless of how reasonable the underlying nonresponse model is.

Three alternative mean-based imputation methods were compared in this report. The differences among the three methods lie in the geographic compactness of the primary and secondary level imputation cells and the sample size requirement for usability of an imputation mean. Two of the methods used imputation cells identical or very similar to those used operationally to impute for area frame nonresponse in other JAS items. These two also required that imputation means be based on at least two usable reports of a survey item to be used to impute for missing values of that item. The third method used the smallest available

geographical area, the segment or sampling unit, as the primary imputation cell and used imputation means from cells with at least one usable report.

In the absence of reporting and data handling errors, the segment level method should work best, since it fully exploits spatial relationships by minimizing the chances of averaging inappropriate values from value-diverse areas. In selecting an imputation strategy, though, there are several differences among the methods that should be considered.

First, the three methods differ significantly in terms of implementation strategy. Modules to implement two of the methods could be added to the mainframe imputation program used for other JAS items, allowing the imputations to be run as part of the normal survey processing. By contrast, the segment level imputation method uses an entirely different sequence of primary and secondary imputation levels which could not be integrated with the current survey processing, unless it were determined that these levels were also appropriate for imputing all other JAS items. Therefore, implementing this method would likely necessitate running the agricultural land value imputations as a side activity, after operational imputations and summaries are completed.

There are also differences in the error structures of the imputation means from the three methods. The two methods utilizing operational imputation levels generally impute means based on larger sample sizes. These methods tend to produce estimates of lower variance but higher bias than those of segment level imputation. By comparison, segment level imputation generally produces less biased imputations that are more sensitive to local differences in values. But all three methods are subject to the vagaries of survey data. Land values, even when accurately reported and recorded, are extremely variable, often due to very local conditions (such as highway frontage) that is difficult to capture in an editing or imputation model. The problem is compounded when high nonresponse and volatile data are combined with reporting or data handling errors. When this occurs, values generated from problematic data can be replicated over and over.

One issue in deciding on a nonresponse adjustment strategy for agricultural land values is cost/benefit. Is segment level imputation (or any other non-real-time procedure) enough better to warrant the logistical difficulties of handling it as a separate activity year after year? If so, who will do it? On the other hand, is it even possible to do a quality job of preparing these data for summarization in real-time? If not, then the operational benefits of the two real-time methods are meaningless.

There is the further issue of whether any of the methods tested in this study are good enough. If the resource commitment to a non-real-time imputation procedure is made, then perhaps some form of regression and/or cross-year modeling approach is preferable. This type of procedure can directly incorporate other value-related information (i.e., land parcel size and, for cropland, the type of crop grown) that can not be reflected in a mean-based procedure.

This type of approach was planned by the working group and used on 1995 agricultural land value data.

The ultimate decision on an imputation strategy should hinge more heavily on the 1995 agricultural land values than on the 1994 data. Collecting agricultural land values data in our June Agricultural Survey was a major change, requiring staff familiarity and process refinement time in order to achieve as high a quality product as possible. In 1994, field enumerators had no experience collecting these data with a tract-specific frame of reference. We didn't know what to expect from respondents, and the uncertainties involved in initiating a new process were, not surprisingly, reflected in less-than-perfect data. Considerable post-survey data "repair" was needed after the 1994 JAS to get satisfactory results from any of the imputation methods tested in this study.

Analyzing the results of the 1995 survey data should give us a better indication of how much of the data clean-up can be done in real-time. With a previous year's data available, the machine edit for the 1995 survey was enhanced to provide cross-year editing that appears to have improved the resulting data quality. This strengthening of data quality should translate into better, more representative imputation results, regardless of the ultimate imputation method used. Minimizing the "noise" in the system will put us in much better position to make a decision on a nonresponse adjustment strategy for agricultural land values in future surveys.

BACKGROUND

Since early 1993 the National Agricultural Statistics Service (NASS), the Economic Research Service (ERS), and two outside consultants, Paul Biemer of the Research Triangle Institute and Charlie Palit of the University of Wisconsin's Survey Research Laboratory, have worked together to improve the quality of survey data on farm real estate market values and cash rents. The Agricultural Land Values Working Group, formed of representatives from NASS and ERS and the two consultants, met often during 1993, discussed quality improvement options, and ultimately decided on a restructure of the survey effort for these data. The restructure resulted in collecting the data as part of NASS' area-based June Agricultural Survey (JAS). This change in the survey vehicle for agricultural land value data was implemented in June 1994. Previously the information had been collected in an annual January Agricultural Land Values Survey (ALVS) conducted by NASS for ERS.

The ALVS was an opinion survey of farm operators that utilized a list frame sample design. Respondents were asked to estimate average market values and cash rents for the cropland, pasture land, and woodland of farms in their locality. However, nonresponse and coverage biases associated with the ALVS were a significant concern. In January 1994, only 12,049 questionnaires (56%) of the 21,405 ALVS sampling units provided at least one market value or cash rent. Additional uncertainty in the survey results was introduced by the ambiguous reporting concept of "in your locality." The combined effect on data quality of low response, frame inadequacies and lack of specificity in the reporting unit is unknown, seriously weakening any attempt to assess survey error in the ALVS estimates.

Because of these concerns NASS and ERS decided to discontinue the ALVS in 1995 and instead to ask questions on agricultural land values and cash rents in the JAS.

The JAS has an area frame sample design providing 100 percent coverage of all U.S. agricultural land. Using it for agricultural land values eliminates the frame incompleteness concerns associated with the list sample-based ALVS. Also, the JAS reporting unit (of all land in the segment operated under one operating arrangement) is much more specific than "in your locality." Finally, unlike the ALVS which was completed by mail and telephone, the JAS is completed through face-to-face interviews. As a result, higher response, better data quality and stronger statistical defensibility are anticipated from collecting agricultural land values in the JAS.

Agricultural land values were collected on the January ALVS *and* the June Agricultural Survey in 1994. These data were collected in both surveys for the one "bridge" year to enable NASS and ERS to assess the impact of the new design on survey estimates. This report will focus on the data collected in the 1994 JAS.

SURVEY RESULTS

As anticipated, the response rates for agricultural land values from the JAS were improved over that which had been obtained from the ALVS. In 1994 the

ALVS response rate was 56 percent as compared to a 71 percent rate in the JAS.

There's also reason to believe that the JAS response rate for these data will increase in future surveys. Because 1994 was the first year of collecting the data through the JAS, there were certain startup problems that may have depressed response rates somewhat. Statisticians and enumerators alike may have been especially wary of collecting these data during the first year, resulting in their not getting quite the emphasis and effort in probing that more familiar items in the questionnaire received. Additional familiarity and comfort with the agricultural land value questions in future surveys should result in improved response rates.

Also, reporting problems were encountered with some of the questions as worded for the 1994 JAS, which also depressed response rates. After the survey a redesign of the section was undertaken to eliminate these problems, and response rates were indeed higher in June 1995.

First year problems were also obvious in the quality of the data from the 1994 survey. In general, the quality was good with fairly consistent reports within geographical areas. However, there were enough "wild" values sprinkled throughout the survey data (some of which appear to have been misplaced decimal problems) to make imputation and summary somewhat treacherous. Editing options for the first year were necessarily rather limited, and the volume of data quality problems appears to have been reduced in the June 1995 survey with the implementation of cross-year editing.

Table 1 shows the response rates and usable counts for selected items from the "Tract Land Values and Rents" Section of the June 1994 questionnaire. The overall response rate represents the percentage of farm tracts that reported a market value or cash rent for at least one of the items, of those qualifying to do so. This is the response rate from the table that is most comparable to the 1994 ALVS response rate of 56 percent.

The good news was that we achieved a higher response rate for agricultural land values in the JAS than we did in the ALVS. This improved rate also applied to a higher sampling base (50,241 agricultural tracts in the JAS versus 21,405 list samples in the ALVS). The bad news was that we still had a substantial amount of nonresponse to account for, especially for individual items.

From the table we can see that individual item response rates varied from a low of 25 percent (for the market value of "other" land) to a high of 69 percent (for the market value of cropland). The corresponding State level response rates are indicated in Table A of Appendix A. It's important to consider the number of samples involved in individual response rates, especially at the State level. These are shown in Table B of Appendix A.

While there was an achieved improvement in response rates over the ALVS, the need to adjust for nonresponse persists, and the choice of a nonresponse adjustment procedure is important.

Table 1: U.S. Response Rates and Counts for 1994 JAS Market Values								
State	Overall Response[1]	Cropland[2]	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
Response Rate (%)	71.0	68.8	59.6	66.9	61.1	63.3	25.1	60.8
Usable Count	35,656	14,180	8,178	4,783	12,079	8,068	6,633	12,124

In general, area sample nonresponse in the JAS is accounted for through a combination of manual and automated imputation. An automated imputation procedure is used to adjust for nonresponse in grain storage items, while nonresponse in crop acreage and livestock inventories is accounted for through manual imputation.

Because of its potential for capturing the spatial aspects of agricultural land values, automated imputation was selected by the Agricultural Land Values Working Group as the nonresponse adjustment procedure of choice for these data. The question then became, "What form of automated imputation is most appropriate?"

After some discussion of alternatives the group decided to evaluate a segment level imputation approach vs. one similar to the procedures used operationally for other Agricultural Survey items (Atkinson,1988). This report is intended to document the experience and the lessons learned, through an exploration of agricultural land values obtained from the 1994 JAS. Recommendations are made for developing a strategy for processing agricultural land value data from future surveys.

WHAT POTENTIAL IS THERE IN A SPATIAL IMPUTATION MODEL?

Having indicated the degree of nonresponse, the next question is whether we can devise a procedure that will adequately compensate for our missing data. Nonresponse adjustment essentially comes in two flavors: 1) reweighting, in which design stratum expansion factors for the usable samples are adjusted to represent the nonrespondents; and 2) imputation, in which either raw or aggregated data from respondents are physically attached to nonrespondents. If most of the variability in the data is accounted for solely by the design strata, then reweighting works well. However, if there are other significant factors affecting the data that are not adequately captured in the design strata, then imputation can be the better choice.

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

[2] For States in which the irrigated/non-irrigated breakdown is not asked.

Location is one such factor for real estate values, since fairly small geographical distances can have a significant impact on value. Since imputation is probably the best way to capture geographic information in nonresponse adjustments, this study was limited to studying alternative imputation procedures.

The following paragraphs and referenced charts are meant to provide the reader a flavor of the types of problematic situations encountered in the 1994 JAS data. They are not meant to suggest a preference of one imputation method over another. The brief references to the effect of the data on one of the tested methods are included only to emphasize the sensitivity of imputation in general to problematic data. Comparisons of the relative strengths and weaknesses of the individual imputation methods tested will be discussed later.

Also, the States' data selected for illustration in this section were chosen to represent a diversity of geographic and agricultural characteristics. Relative data quality was not a selection criterion. A State's selection is no indication that its data were worse (or better) than those of other States.

Chart 1 in Appendix B illustrates the within-segment variability in reported values for cropland in Iowa. In this chart the segments are sorted by increasing mean value within substratum, making it easier to identify individual substrata and to compare the range of reported data within a segment to the range at the substratum level. The x-axis labels are the substrata of the segments. As we move from left to right on the x-scale, segments displayed are less and less highly cultivated. The most intensively cultivated land is on the left, with the ag-urban and range type segments on the right. Notice that in general the within-segment variability is substantially less than the stratum or substratum level variability. This type of data structure bodes well for the effectiveness of a segment level imputation scheme.

Certain segments in Chart 1 stand out as potentially troublesome, however. The segment in substratum 1305, the one in 1307, and one in 2005 (not explicitly labeled on the chart) are especially interesting, since they are all in intensively or extensively cultivated substrata. This illustrates the fact that outlier problems are not confined to the ag-urban strata.

Situations like these can cause problems in mean-based imputation, regardless of the level at which imputation cells are formed. Whether they cause more or less of a problem for imputing with smaller vs. larger imputation cells (for example, segment vs. substratum level) is largely dependent on the quality of respondent data, the amount of nonresponse, where it falls and the appropriateness of the model. In any case they make nonresponse adjustment problematic. One (at least partially) reassuring feature of the segment in substratum 1305 is that even the minimum reported value in that segment is higher than anything else around, indicating that there may be some justification for high market values in that location.

With the exception of these situations, the Iowa data appear to be well behaved. The response rate for cropland market value in Iowa was a relatively high 75.2 percent and all the imputation procedures performed fairly consistently.

Moving east to New Jersey we see in Chart 2 the results of smaller sample sizes, more variability in land use and more extensive market value speculation. In general there is substantially more reporting variability, though again the within-substratum variability is considerably higher than the within-segment variability.

The segment in the center of this chart is somewhat disturbing, even without the graphical enhancement. This segment has an extremely large range in its two reported values for cropland of $10,000 per acre for 20 acres and $150,000 per acre for 9 acres. Situations like this can be especially troublesome in places like New Jersey where sample sizes are relatively small and nonresponse rates are high.

Finally, Chart 3 shows the same graphic using California data on irrigated cropland values. There are a couple of segments here that dwarf the rest of them, both of which are in intensively cultivated strata. The segment in substratum 1103 had reported values of $3,000 per acre for 155 acres and $350,000 per acre for 240 acres. Ranges in reported values of this size within a small geographical area can often result in poor imputation results.

One segment in substratum 2103 (annotated with a circle to distinguish it from a fly-speck) had two reports of $350,000 per acre on 52 and 102 acres. Based on the results of the subsequent 1995 survey, these appear to have been misplaced decimal errors. These particular data errors were more damaging to the larger-area-based operational type methods (where the high values were spread over a wider area) than to the more locally-based segment-level method which confined the effect of these reports to the segment, in which there was only one nonrespondent (with only half an acre of irrigated cropland).

The only other large reports were in separate segments in ag-urban substratum 3103, with reported values of $400,000 per acre and $500,000 per acre on 1.8 and 0.1 acres, respectively. These two small acreage reports resulted in a nonresponse tract with 14.1 acres of irrigated cropland (in a segment with no usable reports) receiving an imputed value of $405,263 per acre. Situations like these caused problems for all the imputation methods, where large values based on small acreages were applied to larger acreages with a missing value.

These charts provide some indication of how volatile the data were. To help understand the magnitude of the task confronting the imputation procedures, it's instructive to look also at the pattern of nonresponse. Chart 4 shows this pattern for irrigated cropland values in California, indicating the numbers of good responses and missing values in each segment. For example, the circled point on the chart represents a segment in which there were 20 usable reports of market value for irrigated cropland and 8 positive but missing ones. Ideally we would like to see all the data points above the one-to-one line on this scatter plot. However, there were quite a few segments for which the nonrespondents outnumbered the respondents. In one segment there were only two responses but twenty-six tracts with missing data! This instance resulted in a segment-level imputed value of $136,765 per acre for each of these 26 tracts (totaling 289.3 acres) based on two usable reports with only 8.5 acres, clearly pivoting the success or failure of the imputation squarely on the quality of these two responses.

EVALUATION STEPS

Prior to beginning this evaluation, a "data repair" step was undertaken to eliminate data of dubious quality that had survived the survey's editing process. Chris Cadwallader in the NASS Survey Administration Branch identified several pages of these, which the Agricultural Land Values Working Group agreed should be removed prior to final summarization. These are included as Exhibit A in Appendix A. Note that the removed values included both excessively large *and small* values that were thought to be data errors.

The largest segment level ranges of the repaired data (ordered from largest to smallest) for the each of the market values collected in the 1994 JAS are shown in Table C of Appendix A. Notice that for each market value there is still a substantial number of segments with extremely high variability in the repaired data, showing that a very conservative approach to data removal was taken. The objective of the data repair was to obtain improved summary results under all scenarios, without wholesale elimination of problematic data.

In order to isolate the effects of this preparatory step from those of imputation, the unimputed data were summarized before and after the identified data values were eliminated. In summarization tables included in Appendix C, the data set after this process is referred to as "repaired."

The next phase of the evaluation process involved imputing the repaired data set by three different methods. These methods, all mean-based, differed only in how imputation cells were formed and the minimum number of usable reports required for a cell mean to be usable for imputing for nonresponse. All three methods imputed weighted means, calculated by weighting usable reports of market value and cash rent by their associated acreages.

Method 1 calculated imputation means using the current operational cells for area frame data. The primary level of imputation was land use stratum type (agricultural vs. non-ag) within Agricultural Statistics District (ASD). If an imputation mean at the primary (or any backup) level was based on fewer than two usable reports, a secondary or backup level mean was used. The secondary levels for Method 1 were ASD (across stratum types) and State.

Method 2 was simply a further refinement of Method 1, in which the primary level was lowered to land use stratum within stratum type and ASD. For example, whereas the primary level of imputation for Method 1 pooled samples across strata to a common stratum type level (i.e., to the agricultural type stratum level, consisting of land use strata 11, 12, 21 and 22) within ASD, the imputation cells for Method 2 were defined as the individual land use strata themselves, again within ASD. The secondary levels for Method 2 in priority order were stratum type within ASD (the primary level for Method 1), ASD (across stratum types) and finally State. The "at least two usable reports" criterion applied for Method 2 imputation.

Method 3 used an entirely different sequence of imputation levels designed to exploit more effectively the spatial aspects of real estate values. The primary level of imputation was segment, with prioritized secondary levels of substratum, land use stratum, and finally State. To maximize the number of times imputation was performed at the segment level the "at least two usable reports" criterion was waived for Method 3. Therefore any time only one usable response for an item was available in a segment, that value was imputed for all nonresponse for that item in the segment.

The only exception to the usability criteria indicated above was for the total market value of all buildings and capital improvements. Since reported values for this item were extremely variable and less highly correlated with location, a usability criterion of "at least five usable reports" was used for this item with all three methods.

The biggest problems of enumeration during the June 1994 survey were with the questions on 1) the market value of "other" land and 2) the market value of buildings and capital improvements, excluding the land they were on. While these problems were reflected in the data, they will not be dwelt upon in this report, since the questions were redesigned for 1995.

IMPUTATION RESULTS

Chart 5 in Appendix B shows the percentage of times that the various imputation levels produced the imputed mean. To take maximal advantage of the spatial correlations in the data, the primary levels should be used most of the time. This chart demonstrates that for cropland all three imputation methods imputed means from primary imputation levels the vast majority of the time, even Method 3 where the primary level was segment. This success was largely attributable to the pervasiveness of cropland reports and to the relatively high response rates for cropland market values.

For rarer items with lower response rates, the rates of imputing at the primary level were correspondingly lower. Table 2 provides a comparison of the rates for cropland, pasture land, woodland and other land. The Method 1 percentages of imputed means generated at the primary level (land use stratum type within ASD) were very high, even for "Other Land" which had only a 25.1 percent response rate. Interestingly, the Method 2 rate was also high for all items. The high success rate for Method 2 in imputing at the stratum level within ASD (without strata being collapsed to a stratum type) suggests that perhaps Method 2 could be a viable alternative for operational use for other pervasive items imputed from the Agricultural Survey.

Table 2: The Percentages of Times Samples Were Imputed at the Primary Imputation Cell Level by the Three Methods for June 1994				
Land Type	Response Rate	% of Method 1 Imputations at the Primary Level	% of Method 2 Imputations at the Primary Level	% of Method 3 Imputations at the Primary Level
Cropland [1]	68.8	99.0	96.8	77.5
Irrigated Cropland	59.6	97.0	92.9	69.7
Non-Irr. Cropland	66.9	97.6	93.6	56.2
Pasture Land	61.1	98.9	95.6	61.0
Woodland	63.3	97.2	94.2	54.2
Other Land	25.1	94.7	86.3	30.1

Method 3 shows a sharper decrease in the percentage of times imputations were performed at the primary level (in this case segment), with increasing nonresponse rates. However, most of the Method 3 values imputed at other than the segment level were generated at the first backup level, substratum. Since substrata are a geographical subdivision of land use strata in our area frame design, imputation means at this level should still provide a reasonable reflection of the location differences in real estate values.

Table 3 indicates the number of usable samples contributing to the imputed means from the three methods. Methods 1 and 2 which average over larger areas naturally use imputed means generated on larger sample sizes. For these methods, 83.4 and 70.0 percent of the imputed means were based on ten or more samples. The twenty-two imputations based on one sample were instances where there was only one usable report for that type of land in the whole State, the final backup level.

By contrast, only 25.6 percent of the Method 3 means were based on ten or more samples. Almost an equal number of the imputations were based on one sample. This type of shifting of imputed means to a more local, smaller sample size basis can be either beneficial or damaging depending on the quality of the data for usable reports. By calculating imputation means at the most local level, imputation biases are reduced since we are not averaging in reports from dissimilar areas. On the other hand, with the local based means, individual reported values have a larger impact in a smaller area. Whether or not this is worse at the State level depends upon the concentration of nonresponse and

[1] For States in which the irrigated/non-irrigated breakdown is not asked.

Table 3: Numbers (and Percentages) of Imputed Means for All Items, Categorized by the Number of Samples on Which They Were Based					
Imputation Method	1	2-3	4-6	7-9	10 or More
1	22 (0.0)	2382 (3.6)	4043 (6.2)	4433 (6.8)	54,643 (83.4)
2	22 (0.0)	5410 (8.3)	7691 (11.7)	6545 (10.0)	45,855 (70.0)
3	16,030 (24.5)	16259 (24.8)	10,542 (16.1)	5947 (9.1)	16,745 (25.6)

the relationship of nonresponse and "bad" data.

Chart 6 (in Appendix B) shows all the imputed values per acre for pasture land (across all States) that were based on three or fewer reports and that exceeded $20,000 per acre. The only instance of an imputed value greater than $20,000 per acre for pasture that is not represented in this chart was one based on five samples.

This chart shows four dimensions of information: 1) the imputed mean value, 2) the number of times it was used, 3) the number of samples on which it was based and 4) the imputation level at which it was generated. It helps to illustrate the point made previously on the impact of individual reported values. In several cases we imputed large mean values per acre based on very thin data. Some of these large imputed values were the result of incorrectly recording and keying values to cents, as verified with matched 1995 reports.

While most of the data concerns discussed in this report have been illustrated by their impact on segment level imputation (Method 3), the reader should not take this as an indictment of this method in favor of Methods 1 and 2. The problems are just easier to identify and demonstrate for the more locally-based Method 3.

Problematic data with Methods 1 and 2 generally resulted in less ominous looking, but still inappropriate, imputation means which were applied to larger numbers of nonresponse tracts. As a result, the Method 1 and 2 imputations were often more damaging to aggregate estimates than those from Method 3. The wide-spread propagation of common imputation means for Methods 1 and 2 also resulted in understated estimates of sampling variability.

The worst summary bust from Methods 1 and 2 (and perhaps the worst bust under any scenario) occurred in ASD 10 in New Mexico. There was a high nonresponse rate in this ASD, much of which occurred in the Native American stratum, where there were no responses for the value of either irrigated or non-irrigated cropland. With no usable responses at the stratum level, both Methods 1 and 2 used ASD level imputation means for non-irrigated and irrigated cropland. Based on four records totaling *15 acres*, a weighted average of *$15,800 per acre* was calculated for non-irrigated cropland. This value was then applied to 38 tracts (22 of which were in the Native American stratum), accounting for *732,618 acres*.

The situation was no better for irrigated cropland, where an ASD weighted average value of *$34,211 per acre* based on three reports and *9.5 acres* was applied to 25 nonresponse tracts (24 of which were in the Native American stratum) accounting for *68,782 acres*.

These summary busts were largely a result of one report of $40,000 per acre for both irrigated and non-irrigated cropland (on 4 acres of non-irrigated cropland and 6 acres of irrigated cropland). The problem was avoided in Method 3 in which the backup level to stratum (where there were no responses) was State rather than ASD.

SUMMARY RESULTS

The summary results for market values prior to imputation (before and after data repair) and for all three imputation methods are shown in Appendix C. Quantitative comparisons of alternative imputation methods are difficult without knowing what the correct values are. In the statistical literature such evaluations are often done through simulation studies, but such studies are less than perfect, especially with highly skewed data such as those dealt with here. They're also beyond the scope of this evaluation. In lieu of such an approach (or a validation study to determine the "true" values), we are basically limited to comparing the summary results on "reasonableness."

Based on this criterion and with the level of "noise" in the 1994 data set, the results of comparing the three methods were fairly inconclusive. Significant (and often questionable) volatility of market values in a few reports here and there played havoc with all the imputation methods tested. For some items one imputation procedure appears to have performed better, while for others a different one produced more reasonable results. Each method failed badly in certain (often differing) circumstances. In some cases the simple unimputed summaries produced more reasonable results than any of the imputation methods. All summary scenarios were subject to various idiosyncrasies of the data that in any particular situation might affect one more than the others.

An additional problem of mean value imputation in general, and Method 1 and 2 imputation in particular, is that sampling errors (i.e., coefficients of variation) are underestimated. The problem (which is reflected in the summary tables) is minimized with Method 3, which uses more location-specific imputation means. This problem of underestimating sampling errors exists for operationally imputing other Agricultural Survey items, but for these we substitute a coefficient of variation computed without the imputed data. A similar approach could be used for agricultural land values, if an operational-type imputation procedure were implemented.

One disturbing feature of the summaries was that market value means from all of the imputation methods were consistently higher than those from the unimputed data.

This fact seems to suggest that the missing data are not "missing at random," and that nonrespondents are in some sense different than respondents.

In reviewing the data, it appears that the higher mean values from the imputed data were primarily attributable to three factors:

1) appropriately adjusting for disproportionate nonresponse in high land value areas,
2) probably over-adjusting in specific instances where (sometimes questionable) outlier values are present and
3) over-adjusting by imputing a value reported on a small acreage to a much larger acreage for a nonrespondent.

In regard to factor 3 (above), there is a definite economy of scale in the valuation of land. Smaller acreages tend to have a higher per acre value than larger acreages. Often very small acreages have a specialty use value that is well above that of larger acreages of the same land use type.

A good example of this was in California's substratum 3103 where the weighted average value ($405,263) of two small tracts of 1.8 and 0.1 acres were imputed for 14.1 acres of irrigated cropland in a nonresponse tract.

Another example of this occurred for woodland value per acre in Connecticut. A usable report of $50,000 per acre on 7 acres was used to impute for 409 acres of woodland in a nonresponse tract in the same segment. Because of this imputed value the State level coefficient of variation for the Method 3 value per acre of woodland ballooned to 55.2, compared to 20.6 from the "repaired" summary.

The above example also illustrates the problem of artificially low coefficients of variation being produced by Methods 1 and 2. There were only 13 reported market values of woodland for Connecticut, out of 40 woodland tracts. Methods 1 and 2 avoided the State-level summary bust indicated above by repeatedly imputing wide-area averages for the nonrespondents. However, this repeated imputation of constant values artificially deflated the coefficients of variation for these two methods to 3.8 !

The "economy of scale" problem could only be eliminated by controlling on size of acreage parcels in creating imputation cells. This would have the positive effect of imputing for nonrespondents with average values based on parcels of land of more comparable size, but would have the negative effect of forcing imputation cells to be less location specific. One solution might be to use a procedure that focuses mostly on location but that implements some rudimentary size controls.

A more sophisticated possibility is to develop regression models or imputation cells in which parcel size is directly modeled. A discussion of this approach, which was used with the 1995 survey data, can be found in Fecso (1995).

DISCUSSION AND RECOMMENDATIONS

Many questions remain on how to optimally adjust for nonresponse in survey reported agricultural land values. Among these are whether resources are available to achieve the fine-tuning necessary to optimize the nonresponse adjustment process. Other logistical questions include who will be responsible for the imputation and summarization of agricultural land value data for future surveys, how much staff time will be allotted to this activity, and whether through experience and editing enhancements we can adequately improve the quality of these data to the point that post-survey "data repair" is unnecessary.

What can we expect from imputation of agricultural land values from future surveys? As response rates increase and cross-year editing improves data quality, imputation results will naturally improve, regardless of the imputation method selected. Can we improve upon the imputation methods, themselves? Probably. To minimize the number of times imputation resorted to a wider area imputation cell, the suggestion was made to modify the backup levels for Method 3 from substratum and stratum to county and ASD. This should improve most individual record imputations where backup levels are used (although with these backup levels Method 3 would also have crashed in the New Mexico example). The effect of changing backup levels on aggregate estimates would be limited by the frequency of backup level imputation. A re-engineering of imputation cells may reduce the number of imputation "busts" but again, these will probably become less of a problem anyway as initial data quality improves.

What imputation strategy should be adopted? This is a decision that should factor in the relative performance of the alternatives and the resources required to administer them. The segment-level approach uses a stronger methodological model and should produce better results, especially with a cleaner data file. A key issue, though, is whether Method 3 is enough better to warrant its additional resource requirements. Ignoring a relatively small percentage of problematic situations that differentially caused problems with the various methods, all three seemed to perform similarly.

With the level of "noise" present in the 1994 data it's impossible to know how much improvement in survey estimates additional nonresponse adjustment "tweaking" would accomplish. Some of the 1994 JAS agricultural land value data appear to have a misplaced decimal point. With sporadic data problems of this magnitude, the simple average of the positives (with no imputation) often performed as well or better than any of the tested imputation procedures. However, with the future emphases on year-to-year change estimation and the expectation of differential nonresponse in the high vs. low value areas, summarization without imputation is not a preferred option.

A decision will have to be made on the level of staff time that can be devoted to the imputation effort for agricultural land value data. If the resource commitment to a non-real-time strategy is made, a more customized modeling approach that incorporates important value-related information such as parcel size and type of crop (for cropland value) might provide a better return for the resources committed.

It is premature at this time to select an imputation strategy for agricultural land values from the JAS. Efforts for the 1995 JAS rightly focused on improving data quality, in part by improving the automated edit. The 1994 edit flagged too many records, probably resulting in real data problems being overlooked. For 1995 the machine edit was refined to identify only a small proportion of the data having unusual values.

In selecting an imputation strategy, methodology, resource availability, usefulness of estimates and timing must be considered. Only after we can achieve a cleaner data set and determine how much of the cleaning can be done in real-time, should we seriously consider making a selection.

Also, the current imputation procedures for the Agricultural Survey Program have now been in place for more than eight years, with little more than routine maintenance. Considering all the changes our survey processes have undergone during this period, it might be time to take another look at our imputation modules to see if they're still meeting our needs.

With these thoughts in mind the following recommendations are presented:

Recommendation 1: *The planned imputation schemes for agricultural land value data, which involve regression modeling, should be explored using June 1995 data.*

Note: This approach was used on the June 1995 data. The Agricultural Land Values Working Group considered it a more promising endeavor than applying the imputation methods explored in this study.

Recommendation 2: *Research Division and the Statistical Methods Branch should work together to study the effects of imputation on other key Agricultural Survey items.*

REFERENCES

Atkinson, Dale (February 1988), The Scope and Effect of Imputation in Quarterly Agricultural Surveys. NASS Staff Report No. SSB8804, U.S. Department of Agriculture, Washington, D.C.

Fecso, Ron (1995 Pending Draft), "Estimating Agricultural Land and Buildings Values Using Area Frame Sampling."

APPENDIX A: RESPONSE RATES AND DATA REPAIR EFFORTS

Table A: Response Rates for Market Values Asked in the 1994 JAS								
State	Overall Response Rate [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
AL	85.7	78.4	--	--	87.0	81.4	31.7	78.3
AZ	49.5	41.5	--	--	44.7	100.0	21.4	46.6
AR	73.8	--	50.7	78.4	72.0	57.9	14.1	52.6
CA	65.9	--	26.1	62.1	47.1	46.7	28.7	54.3
CO	59.7	--	55.3	46.0	56.8	78.6	13.9	46.5
CT	49.5	34.3	--	--	33.3	32.5	7.8	31.8
DE	66.7	59.3	--	--	54.2	45.7	15.4	59.0
FL	73.2	--	55.6	71.0	62.4	63.8	37.3	69.5
GA	78.6	--	69.7	79.8	74.4	73.8	31.0	67.8
ID	71.0	--	58.5	72.4	62.4	54.3	19.2	61.5
IL	87.8	86.4	--	--	77.6	74.3	26.3	78.8
IN	71.7	70.3	--	--	60.3	70.3	27.4	58.4
IA	75.8	75.2	--	--	59.9	71.4	34.4	63.1
KS	74.5	--	69.7	72.9	71.6	70.3	29.2	64.5
KY	70.0	67.2	--	--	62.6	60.1	15.2	65.4
LA	87.1	--	78.8	88.7	82.7	58.7	27.5	78.3
ME	55.8	47.3	--	--	25.8	49.5	23.3	44.0
MD	56.4	47.5	--	--	47.9	42.2	21.0	42.8
MA	63.1	57.7	--	--	63.0	47.5	43.0	69.3
MI	77.9	75.7	--	--	69.9	62.4	24.9	70.3
MN	79.0	76.5	--	--	68.5	68.0	42.3	70.9

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Table A: Response Rates for Market Values Asked in the 1994 JAS (Cont.)								
State	Overall Response Rate [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
MS	84.8	--	76.1	88.1	78.4	75.3	40.3	78.5
MO	63.0	--	60.1	65.7	55.7	64.2	17.9	59.1
MT	78.7	--	74.2	74.8	71.5	40.0	25.3	75.4
NE	63.8	--	54.8	70.9	54.9	45.2	16.2	49.5
NV	35.1	--	30.0	34.2	26.1	--	15.6	34.9
NH	71.0	65.1	--	--	68.0	73.1	7.7	65.6
NJ	54.6	40.6	--	--	30.5	33.5	19.2	32.4
NM	60.2	--	40.6	53.7	52.1	82.4	21.0	48.5
NY	75.8	70.7	--	--	68.0	65.7	22.8	64.7
NC	79.8	70.8	--	--	65.2	69.2	31.1	70.1
ND	78.3	76.4	--	--	69.5	45.3	16.6	66.3
OH	75.3	72.5	--	--	63.2	65.6	30.0	63.7
OK	70.3	--	62.0	83.0	63.8	51.9	10.5	53.8
OR	70.5	--	56.9	73.5	59.1	62.8	21.9	64.4
PA	67.9	55.4	--	--	53.1	52.0	20.6	52.2
RI	22.0	7.5	--	--	14.3	15.8	18.8	25.9
SC	88.1	84.1	--	--	76.4	85.4	26.9	81.1
SD	63.0	--	59.1	42.9	52.8	42.0	20.9	51.3
TN	70.2	65.5	--	--	64.3	69.8	33.9	68.2
TX	69.4	--	53.6	69.7	61.9	55.7	25.5	59.2

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Table A: Response Rates for Market Values Asked in the 1994 JAS (Cont.)								
State	Overall Response Rate [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
UT	69.7	--	47.2	71.2	59.7	91.7	26.4	67.4
VT	70.3	62.1	--	--	64.0	58.3	20.8	55.1
VA	64.8	60.6	--	--	50.0	56.4	24.0	48.8
WA	75.7	--	69.5	75.0	60.6	51.1	29.3	68.3
WV	50.4	40.1	--	--	38.4	35.8	19.2	40.6
WI	79.5	76.6	--	--	73.9	68.7	38.3	70.4
WY	51.9	--	35.1	53.8	49.2	88.9	10.8	41.7

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Table B: Usable Response Counts for Market Values Asked in the 1994 JAS								
State	Overall Usable Counts [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
AL	874	514	--	--	401	499	123	375
AZ	237	171	--	--	34	1	60	75
AR	853	--	343	326	247	231	97	249
CA	1878	--	123	1307	277	35	451	753
CO	624	--	233	139	332	22	55	140
CT	54	35	--	--	8	13	4	14
DE	146	112	--	--	13	37	12	46
FL	981	--	214	330	373	282	260	455
GA	815	--	499	75	279	525	137	278
ID	778	--	254	390	251	38	117	243
IL	1682	1570	--	--	242	318	313	493
IN	1130	1025	--	--	164	296	168	313
IA	1687	1523	--	--	352	120	395	590
KS	1182	--	889	70	565	109	189	220
KY	921	758	--	--	393	516	109	481
LA	728	--	471	125	225	128	126	209
ME	134	104	--	--	16	54	31	48
MD	484	367	--	--	123	129	94	176
MA	89	75	--	--	29	29	34	52
MI	819	762	--	--	95	284	170	303
MN	1065	941	--	--	183	204	383	376

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Table B: Usable Response Counts for Market Values Asked in the 1994 JAS (Con't)								
State	Overall Usable Counts [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
MS	776	--	455	59	280	371	164	288
MO	1105	--	802	44	447	285	168	403
MT	583	--	362	80	308	2	76	104
NE	943	--	542	290	418	61	118	220
NV	39	--	6	26	18	--	12	22
NH	49	41	--	--	17	19	3	21
NJ	434	276	--	--	71	75	91	144
NM	512	--	117	205	239	14	97	194
NY	620	509	--	--	191	218	115	224
NC	867	656	--	--	195	459	205	286
ND	975	869	--	--	219	24	132	183
OH	954	835	--	--	203	336	245	359
OK	1194	--	668	39	785	200	120	308
OR	761	--	257	236	327	54	147	322
PA	749	555	--	--	232	224	115	288
RI	13	4	--	--	2	3	6	7
SC	513	390	--	--	113	334	90	184
SD	668	--	507	9	297	29	77	115
TN	786	521	--	--	364	434	206	374
TX	2019	--	911	214	1186	201	277	696

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Table B: Usable Response Counts for Market Values Asked in the 1994 JAS (Con't)								
State	Overall Usable Counts [1]	Cropland	Irrigated Cropland	Non-Irr. Cropland	Pasture	Woodland	Other Land	Buildings
UT	831	--	135	494	346	44	178	329
VT	161	126	--	--	80	49	25	59
VA	490	339	--	--	185	203	100	158
WA	639	--	324	198	172	48	142	274
WV	379	230	--	--	190	152	94	187
WI	994	872	--	--	263	351	265	373
WY	441	--	66	127	329	8	37	113

[1] A record was counted as usable if it contained at least one usable market value or cash rent.

Exhibit A: Data Cleaning Performed Prior to the Imputation Evaluation.

1994 JAS AGRICULTURAL LAND DATA VALUES SET TO MISSING

ARIZONA

STR	SEGMENT/TRACT	ITEM	DATA
2001	414906	PASTURE	1
1301	305711	CROPLAND RENT/ACRE	4,300
1301	404912	CROPLAND RENT/ACRE	.01
1304	002096	PASTURE RENT/ACRE	1,140

ARKANSAS

STR	SEGMENT/TRACT	ITEM	DATA
1107	400704	OTHER LAND	192,800 (3 Acres)
1113	209102	OTHER LAND	360,000 (2 Acres)
1113	218203	OTHER LAND	150,000 (8 Acres)
2106	221702	OTHER LAND	100,000 (6 Acres)
2108	221910	OTHER LAND	110,000 (4.5 Acres)
4203	337910	OTHER LAND	234,000 (14 Acres)
4211	426102	OTHER LAND	294,600 (10 Acres)
4211	002289	PASTURE RENT/ACRE	150
1106	305801	RENTED NON-IRR VALUE/AC	65,000
1106	305803	RENTED NON-IRR VALUE/AC	40,000

CALIFORNIA

STR	SEGMENT/TRACT	ITEM	DATA
1901	443402	IRRIGATED CRP	40
2101	457201	PASTURE	5
1112	405001	OTHER LAND	2,272,500 (4 Acres)
1710	441005	OTHER LAND	1 (2 Acres)
1113	416502	IRR CRP RENT/ACRE	1.50
2103	452904	IRR CRP RENT/ACRE	1

CALIFORNIA (CONT.)

STR	SEGMENT/TRACT	ITEM	DATA
2703	458908	IRR CRP RENT/ACRE	.05
3103	461301	IRR CRP RENT/ACRE	12,000
1112	004012	PASTURE RENT/ACRE	1,200
1708	004418	PASTURE RENT/ACRE	2,400
2109	004553	PASTURE RENT/ACRE	2,500
4109	004718	PASTURE RENT/ACRE	1,000
2706	461009	IRR CRP RENT/ACRE	3,000
3103	463701	IRRIGATED CRP	871,200

COLORADO

STR	SEGMENT/TRACT	ITEM	DATA
4401	436102	OTHER LAND	764,000 (5 Acres)
3402	427407	OTHER LAND	1,656,000 (10 Acres)
4301	235917	OTHER LAND	272,000 (3 Acres)

CONNECTICUT

STR	SEGMENT/TRACT	ITEM	DATA
1401	300901	RENTED CRP VALUE/AC	250,000

DELAWARE

STR	SEGMENT/TRACT	ITEM	DATA
1303	002107	RENTED CRP VALUE/ACRE	30
1303	400314	RENTED CRP VALUE/ACRE	45

FLORIDA

STR	SEGMENT/TRACT	ITEM	DATA
4006	135314	NON-IRRIGATED CRP	20
4203	337202	NON-IRR CRP RENT/ACRE	3
4202	438711	NON-IRR CRP RENT/ACRE	1
2702	317454	IRR CRP RENT/ACRE	1,000
4004	229705	IRR CRP RENT/ACRE	3,600
2702	003174	PASTURE RENT/ACRE	500
1301	001036	PASTURE RENT/ACRE	500

GEORGIA

STR	SEGMENT/TRACT	ITEM	DATA
1302	306515	PASTURE	1
1302	400207	WOODLAND	1

IDAHO

STR	SEGMENT/TRACT	ITEM	DATA
1501	211202	OTHER LAND	750,000 (23.0 Acres)
1501	318401	OTHER LAND	168,000 (6.0 Acres)
2204	000213	PASTURE RENT/ACRE	.80

INDIANA

STR	SEGMENT/TRACT	ITEM	DATA
1209	119407	CROPLAND	24
1206	220101	CROPLAND	6
1209	119401	CROPLAND	1
4002	231817	CROPLAND	16
1107	012802	PASTURE	9
1105	310403	CROPLAND RENT/ACRE	13.50
1111	103314	CROPLAND RENT/ACRE	10
1210	119519	RENTED CRP VALUE/AC	10,000
4002	231814	RENTED CRP VALUE/AC	999,999

IOWA

STR	SEGMENT/TRACT	ITEM	DATA
1305	414504	OTHER LAND	6,006,000 (8.7 Acres)

KANSAS

STR	SEGMENT/TRACT	ITEM	DATA
1101	315406	WOODLAND	25
1101	315405	WOODLAND	15
1101	306905	WOODLAND	10

KENTUCKY

STR	SEGMENT/TRACT	ITEM	DATA
1303	400312	WOODLAND	25
2004	009601	OTHER LAND	100,000 (1 Acre)
3103	322308	OTHER LAND	2,880,000 (3 Acres
1307	307927	CROPLAND RENT/ACRE	550
4003	227608	CROPLAND RENT/ACRE	750
4004	232208	CROPLAND RENT/ACRE	700

LOUISIANA

STR	SEGMENT/TRACT	ITEM	DATA
2005	417015	NON-IRR CRP RENT/ACRE	.40

MARYLAND

STR	SEGMENT/TRACT	ITEM	DATA
2005	419713	CROPLAND	30
2102	024638	CROPLAND	16
1304	316007	CROPLAND RENT/ACRE	2
2001	421819	CROPLAND RENT/ACRE	1
2102	024649	RENTED CRP VALUE/AC	10,004,383

MINNESOTA

STR	SEGMENT/TRACT	ITEM	DATA
3102	427701	CROPLAND	52,857
1108	400801	CROPLAND RENT/ACRE	800

MISSOURI

STR	SEGMENT/TRACT	ITEM	DATA
1104	400401	NON-IRR CRP RENT/ACRE	400
3101	331901	WOODLAND	100,000

MONTANA

STR	SEGMENT/TRACT	ITEM	DATA
2001	454502	PASTURE	10

NEBRASKA

STR	SEGMENT/TRACT	ITEM	DATA
1113	119301	WOODLAND	1
1110	004085	PASTURE RENT/ACRE	150
2005	002396	PASTURE RENT/ACRE	125

NEW JERSEY

STR	SEGMENT/TRACT	ITEM	DATA
1311	305507	CROPLAND	40
2012	216416	CROPLAND	50
1302	006815	OTHER LAND	660,000 (2 Acres)
1305	304902	OTHER LAND	1,200,000 (2.4 Acres
2003	012706	OTHER LAND	400,000 (1 Acre)
2007	215924	OTHER LAND	300,000 (1 Acre)
3102	418201	OTHER LAND	1,300,000 (2.3 Acres
3103	119711	OTHER LAND	1,000,000 (1 Acre)
1305	003049	PASTURE RENT/ACRE	437
2006	004116	PASTURE RENT/ACRE	1666
1305	304901	WOODLAND	350,000

NEW MEXICO

STR	SEGMENT/TRACT	ITEM	DATA
1202	301420	OTHER LAND	1,440,000 (10 Acres
1307	313401	IRR CRP RENT/ACRE	800

NEW YORK

STR	SEGMENT/TRACT	ITEM	DATA
4002	335705	CROPLAND	20

NORTH CAROLINA

STR	SEGMENT/TRACT	ITEM	DATA
2011	316701	CROPLAND RENT/ACRE	1
2011	005516	CROPLAND RENT/ACRE	.30
4007	233919	CROPLAND RENT/ACRE	300

NORTH DAKOTA

STR	SEGMENT/TRACT	ITEM	DATA
1201	004391	PASTURE RENT/ACRE	80

OKLAHOMA

STR	SEGMENT/TRACT	ITEM	DATA
2007	323004	PASTURE	11
1204	313607	NON-IRR CRP RENT/AC	167
2006	416603	NON-IRR CRP RENT/AC	1

OREGON

STR	SEGMENT/TRACT	ITEM	DATA
1310	013205	OTHER LAND	120,000 (1 Acre)
1310	013214	OTHER LAND	150,000 (1 Acre)
1312	406206	OTHER LAND	240,000 (3 Acres)
2007	120104	OTHER LAND	386,000 (.5 Acres)
2010	221604	OTHER LAND	238,000 (2 Acres)
3101	325109	OTHER LAND	200,000 (3 Acres)
3103	423306	OTHER LAND	100,000 (.5 Acre)

PENNSYLVANIA

STR	SEGMENT/TRACT	ITEM	DATA
1301	209705	OTHER LAND	300,000 (1 Acre)
1309	305702	OTHER LAND	650,000 (15 Acres)
2004	412406	OTHER LAND	95,000 (1.3 Acres)
2004	412409	OTHER LAND	100,000 (2 Acres)
2004	418401	OTHER LAND	475,000 (4 Acres)
1303	311103	CROPLAND RENT/ACRE	1
1308	109201	CROPLAND RENT/ACRE	1
2002	019418	CROPLAND RENT/ACRE	1.23
2012	318001	CROPLAND RENT/ACRE	.80
2010	014209	CROPLAND RENT/ACRE	.50
1306	204203	RENTED CRP VALUE/AC	1

SOUTH CAROLINA

STR	SEGMENT/TRACT	ITEM	DATA
2007	108409	CROPLAND	22
2005	116223	CROPLAND	5
2001	404617	CROPLAND RENT/ACRE	1
2006	014712	CROPLAND RENT/ACRE	.20

TEXAS

STR	SEGMENT/TRACT	ITEM	DATA
1004	110901	OTHER LAND	112,000 (2 Acre)
1006	103603	OTHER LAND	152,150 (2 Acres)
1007	082202	OTHER LAND	477,400 (4 Acres)
1401	117301	OTHER LAND	522,000 (15 Acres
1401	483109	OTHER LAND	128,000 (1 Acre)
2004	041701	OTHER LAND	80,000 (1 Acre)
2004	050704	OTHER LAND	101,000 (1 Acre)
2004	050721	OTHER LAND	69,600 (1 Acre)
2010	042307	OTHER LAND	350,000 (5 Acres
3207	464201	OTHER LAND	189,000 (1 Acre)
3403	467301	OTHER LAND	76,000 (1 Acre)
2003	000506	RENTED PASTURE VALUE/AC	10
4105	002722	RENTED PASTURE VALUE/AC	5

UTAH

STR	SEGMENT/TRACT	ITEM	DATA
2007	217709	IRR CROPLAND	100,000
1310	408044	PASTURE	1
2008	419801	PASTURE	1
1305	204702	OTHER LAND	180,000 (2 Acres)
1311	002508	OTHER LAND	600,000 (3 Acres)
2003	116321	OTHER LAND	100,000 (.5 Acre)
2006	020605	OTHER LAND	350,000 (2 Acres)
2007	217709	IRR CRP RENT/ACRE	1,000
2009	419902	IRR CRP RENT/ACRE	1.46
1302	002044	PASTURE RENT/ACRE	800
1302	204412	IRR CRP RENT/ACRE	500

VERMONT

STR	SEGMENT/TRACT	ITEM	DATA
4004	164906	WOODLAND	25
1401	003625	PASTURE RENT/ACRE	360
1401	161305	CROPLAND RENT/ACRE	600
1404	061005	OTHER LAND	6,000,000 (8 Acres
4004	463911	OTHER LAND	550,000 (4 Acres

WASHINGTON

STR	SEGMENT/TRACT	ITEM	DATA
1304	211904	OTHER LAND	1,000,000 (13 Acres)
1304	211910	OTHER LAND	130,000 (1 Acre)
1304	408901	OTHER LAND	140,000 (.1 Acre)
1304	408901	OTHER LAND	890,000 (10 Acres)
1309	313401	OTHER LAND	486,000 (1.5 Acres)
1303	009817	IRR CRP RENT/ACRE	1,200
1301	408602	IRR CRP RENT/ACRE	1,000
1307	217203	IRR CRP RENT/ACRE	1.50
1305	318001	IRR CRP RENT/ACRE	1
1301	003126	PASTURE RENT/ACRE	550

WEST VIRGINIA

STR	SEGMENT/TRACT	ITEM	DATA
4010	315326	PASTURE	10
2003	305601	OTHER LAND	372,600 (28.5 Acres)
4015	315824	OTHER LAND	200,000 (17.5 Acres)
4017	002143	PASTURE RENT/ACRE	278

WISCONSIN

STR	SEGMENT/TRACT	ITEM	DATA
2003	017701	CROPLAND	1
2003	017702	CROPLAND	1
2002	320305	RENTED CRP VALUE/ACRE	-16
2001	013005	RENTED CRP VALUE/ACRE	50,000

Table C: Ranges of Land Values in the "Repaired" Data from the 1994 JAS

1994 JAS Segments with the Largest Ranges for Cropland Value/Acre						
State	Substratum	Segment	No. of Reports	Minimum Value	Maximum Value	Range
DE	1302	3029	3	1,700	250,000	248,300
NJ	1308	1085	2	10,000	150,000	140,000
CT	1401	4001	3	9,000	125,000	116,000
DE	1302	2011	2	1,200	100,000	98,800
NJ	1310	3054	6	2,000	60,000	58,000
MD	2102	2250	7	1,000	52,000	51,000
NH	1401	403	2	1,500	50,000	48,500
AZ	1302	3118	8	2,000	50,000	48,000
NJ	1303	2091	6	4,500	50,000	45,500
ME	4003	186	3	5,000	50,000	45,000
MA	4001	334	8	5,000	50,000	45,000
MA	4004	3361	3	1,000	40,000	39,000
MD	2001	4218	5	1,500	40,000	38,500
MD	2005	1207	4	1,500	40,000	38,500
DE	1302	1008	3	1,000	30,000	29,000
AZ	3102	3203	7	2,000	30,000	28,000
MA	1402	2308	2	2,000	30,000	28,000
NJ	1310	4010	4	2,500	30,000	27,500
MD	1304	142	4	3,000	30,000	27,000
OH	1106	2351	3	3,000	30,000	27,000
MA	4008	1349	2	350	25,000	24,650
PA	2009	1153	3	2,000	25,000	23,000
NJ	1310	1032	6	600	20,000	19,400
NJ	1304	3048	3	1,000	20,000	19,000
NJ	1311	4066	11	1,000	20,000	19,000

1994 JAS Segments with the Largest Ranges for Non-Irrigated Cropland Value/Acre						
State	Substratum	Segment	No. of Reports	Minimum Value	Maximum Value	Range
FL	2703	1154	6	2,000	100,000	98,000
OR	1303	4053	3	1,500	24,500	23,000
TX	1006	21	2	1,000	20,000	19,000
UT	2002	3232	4	700	12,000	11,300
FL	2702	3174	2	1,000	12,000	11,000
SD	1110	2043	3	500	10,000	9,500
TX	1708	1331	3	800	10,000	9,200
WA	1302	2167	6	1,000	10,000	9,000
OK	1103	3027	5	300	7,000	6,700
OR	1306	2152	5	200	4,000	3,800
WA	4104	3320	2	100	3,000	2,900
MT	1306	4056	2	100	2,000	1,900
OR	1312	1086	2	50	1,500	1,450
OR	1312	2158	2	100	1,100	1,000
OR	1002	1022	2	65	1,000	935
GA	4002	2250	5	100	1,000	900
TX	1002	4002	7	40	500	460

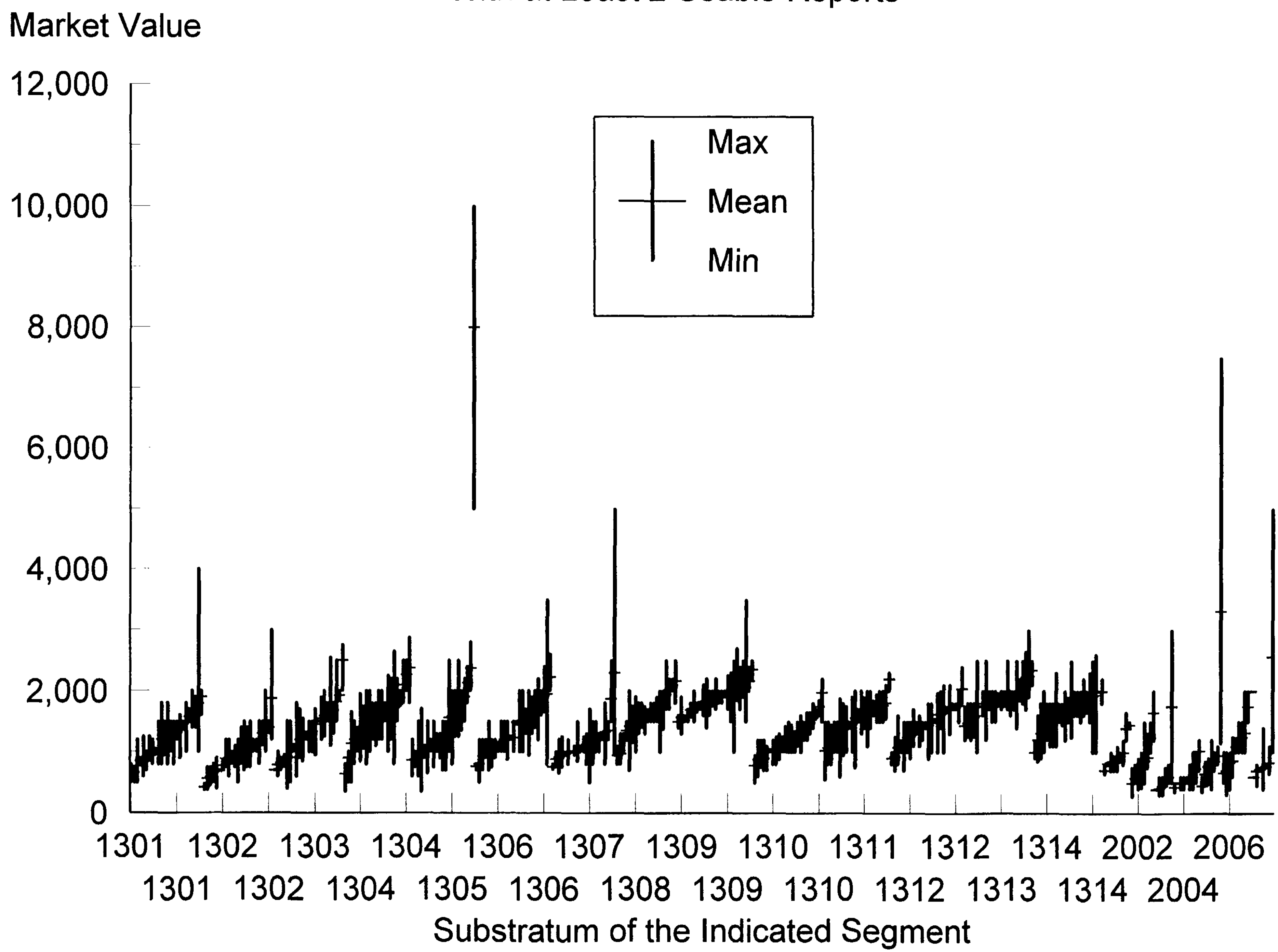
1994 JAS Segments with the Largest Ranges for Irrigated Cropland Value/Acre						
State	Substratum	Segment	No. of Reports	Minimum Value	Maximum Value	Range
CA	1103	4060	2	3,000	350,000	347,000
CA	1109	4104	2	1,000	200,000	199,000
CA	2706	4598	24	1,800	60,100	58,300
CA	1117	4112	4	3,000	50,000	47,000
CA	2106	4514	4	3,000	40,000	37,000
FL	1305	4005	8	3,000	40,000	37,000
UT	1309	3135	7	300	30,000	29,700
CA	1102	4021	3	1,800	30,000	28,200
CA	1115	4205	5	1,500	25,000	23,500
CA	1117	4378	5	2,000	25,000	23,000
OR	1303	3101	3	1,500	20,000	18,500
CA	1710	4420	15	2,000	20,000	18,000
CO	3402	4264	2	1,000	15,000	14,000
UT	1302	2044	9	1,200	15,000	13,800
FL	4203	3404	13	1,500	15,000	13,500
FL	2702	4162	11	1,000	12,000	11,000
NM	1307	4102	7	800	11,000	10,200
CA	1112	4278	5	600	10,000	9,400
NM	1203	5009	4	1,000	10,000	9,000
CA	1113	4317	4	450	8,000	7,550
ID	2001	4196	9	375	7,500	7,125
UT	1313	2125	6	200	5,000	4,800
FL	2702	2171	4	300	5,000	4,700
OR	1306	2152	3	500	5,000	4,500
OR	1307	129	8	500	5,000	4,500

1994 JAS Segments with the Largest Ranges for Pasture Land Value/Acre						
State	Substratum	Segment	No. of Reports	Minimum Value	Maximum Value	Range
WA	4101	290	4	5,000	100,000	95,000
OR	1303	4053	7	1,500	80,000	78,500
UT	2007	3187	12	300	55,000	54,700
NJ	1304	1081	4	1,000	50,000	49,000
CA	2108	4534	9	1,950	50,000	48,050
WA	1302	4137	3	5,000	53,000	48,000
MD	1306	1150	6	1,000	45,000	44,000
NJ	1305	3049	3	3,000	40,000	37,000
CA	4109	4772	2	600	35,714	35,114
OR	2002	4172	4	1,000	35,000	34,000
MA	4001	334	5	1,000	30,000	29,000
CA	4109	4790	4	300	20,000	19,700
VT	4003	2653	3	400	20,000	19,600
CA	4108	4663	14	500	20,000	19,500
FL	2702	3174	8	1,000	20,000	19,000
FL	2703	2172	4	600	19,000	18,400
MD	2005	1207	3	2,000	20,000	18,000
FL	4202	4387	10	1,000	17,200	16,200
PA	1303	15	3	1,000	17,000	16,000
AZ	4901	346	2	500	15,000	14,500
VT	1406	3630	2	500	15,000	14,500
CO	3502	4292	2	1,000	15,000	14,000
NM	1203	5009	6	1,000	15,000	14,000
OR	1301	4111	8	1,000	15,000	14,000
KY	2003	3191	6	500	12,000	11,500

1994 JAS Segments with the Largest Ranges for Woodland Value/Acre						
State	Substratum	Segment	No. of Reports	Minimum Value	Maximum Value	Range
NJ	1303	2091	3	2,000	50,000	48,000
MD	1304	142	4	3,000	30,000	27,000
FL	2203	3121	4	1,000	22,000	21,000
DE	1301	1022	2	500	20,000	19,500
MD	2101	245	3	500	19,800	19,300
MA	4001	334	5	1,000	20,000	19,000
CA	1103	4022	2	1,000	15,000	14,000
IN	1201	2196	5	600	14,400	13,800
FL	4005	4280	3	1,500	15,000	13,500
PA	2004	4124	3	1,000	13,000	12,000
OH	1105	4329	2	250	10,000	9,750
TN	4002	2337	2	300	10,000	9,700
FL	2102	2107	7	500	10,000	9,500
FL	4006	1353	2	500	10,000	9,500
IN	1202	4167	2	500	10,000	9,500
FL	1702	4052	2	1,000	10,000	9,000
NJ	1310	1032	2	1,000	10,000	9,000
WA	2002	2223	2	1,000	10,000	9,000
WA	4102	4282	3	1,000	10,000	9,000
FL	4003	1290	3	900	9,000	8,100
IN	1104	3158	3	300	8,000	7,700
CT	4002	2037	4	500	8,000	7,500
ME	4006	1157	2	600	7,000	6,400
TN	2012	4162	5	500	6,666	6,166
AL	1311	1037	6	600	6,100	5,500

APPENDIX B: IMPUTATION EVALUATION CHARTS.

Chart 1: Range of Reported Cropland Values for Iowa Segments With at Least 2 Usable Reports



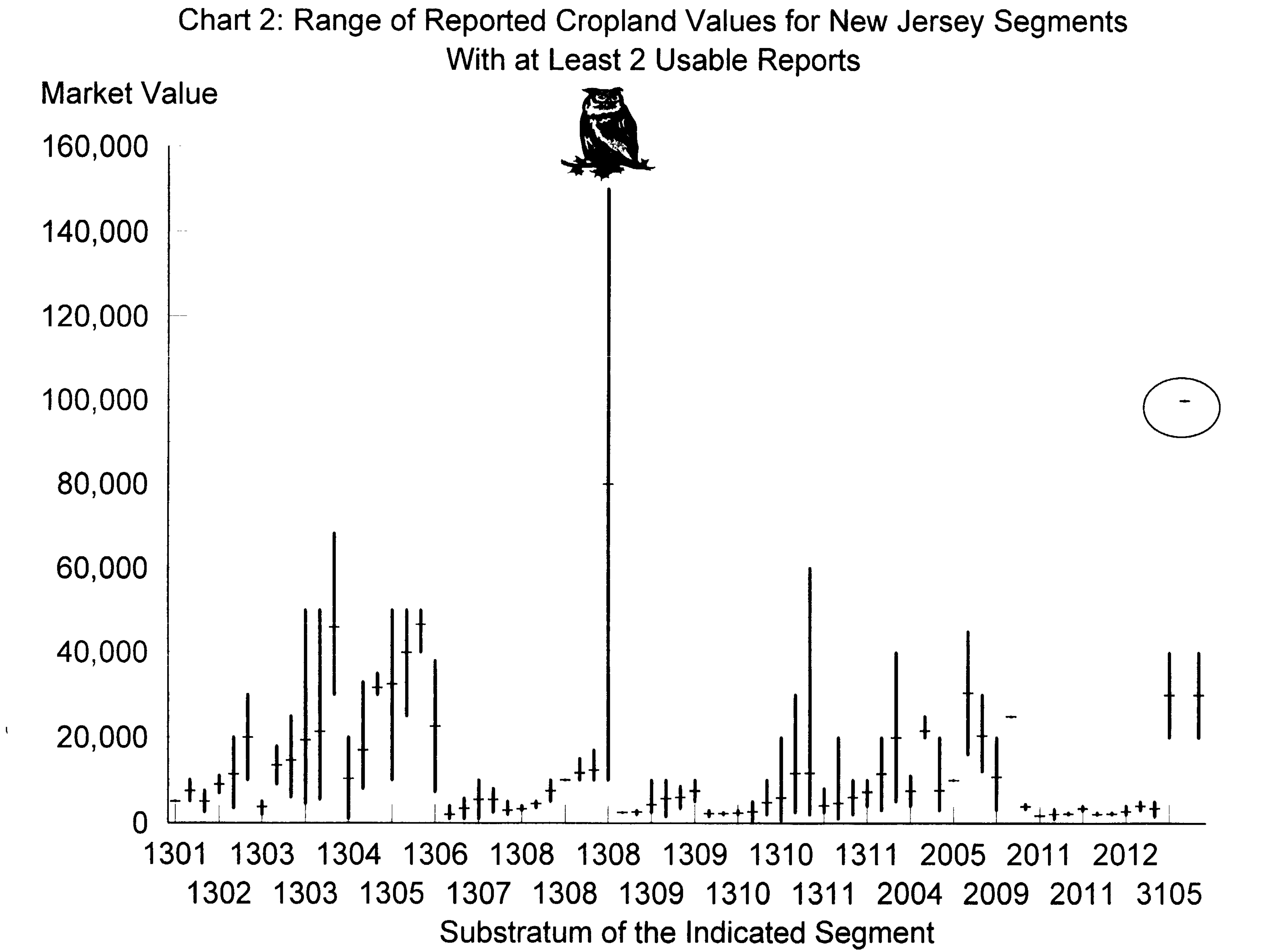


Chart 2: Range of Reported Cropland Values for New Jersey Segments
With at Least 2 Usable Reports
Market Value
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1301
1302
1303
1303
1304
1305
1306
1307
1308
1308
1308
1309
1309
1310
1310
1311
1311
2004
2005
2009
2011
2011
2012
3105
Substratum of the Indicated Segment

Chart 3: Range of Reported Irrigated Cropland Values for California Segments With at Least 2 Usable Reports

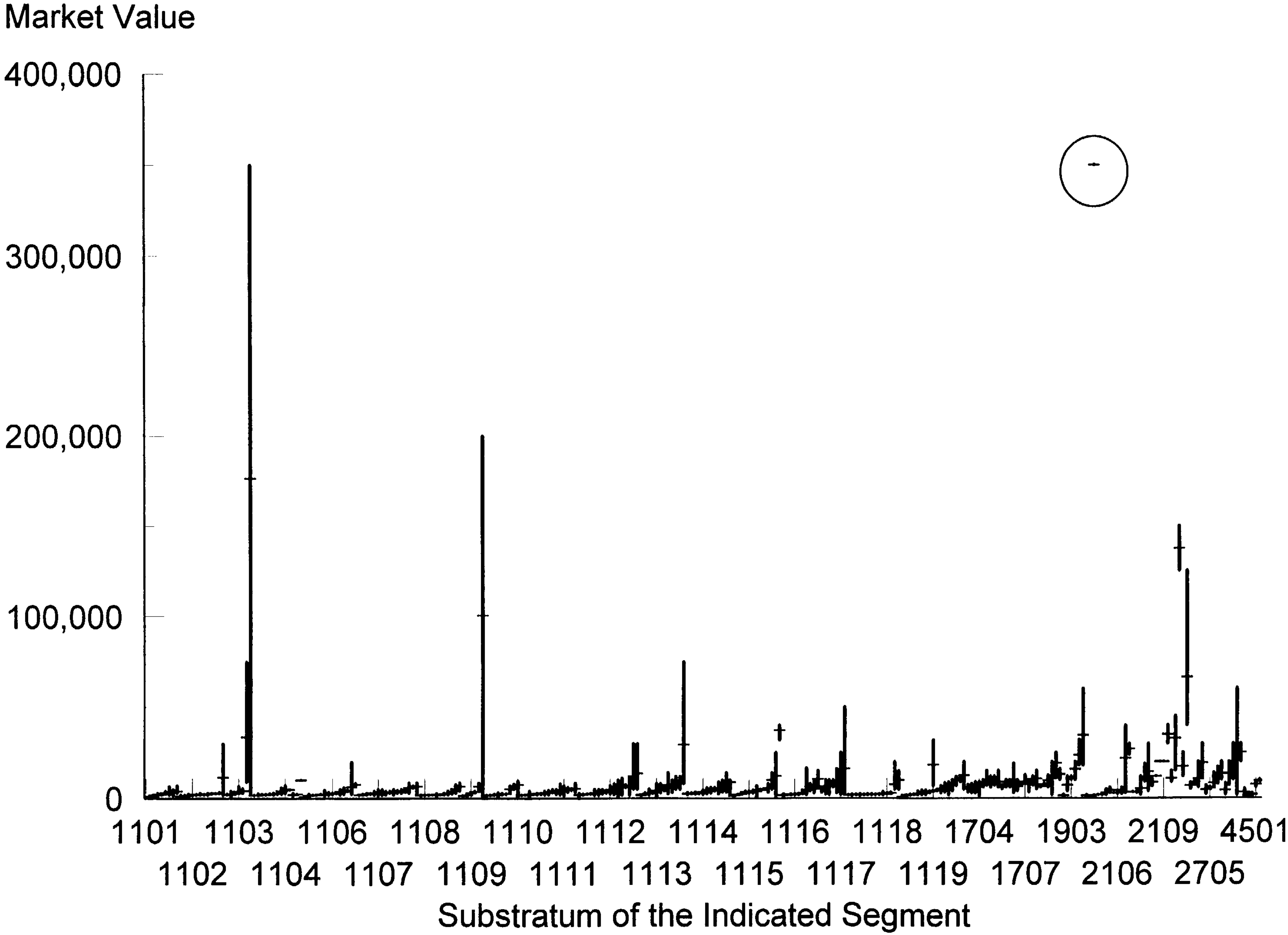


Chart 4: Segment Level Counts of Usable vs. Missing But Positive Reports Of Market Value For Irrigated Cropland in California

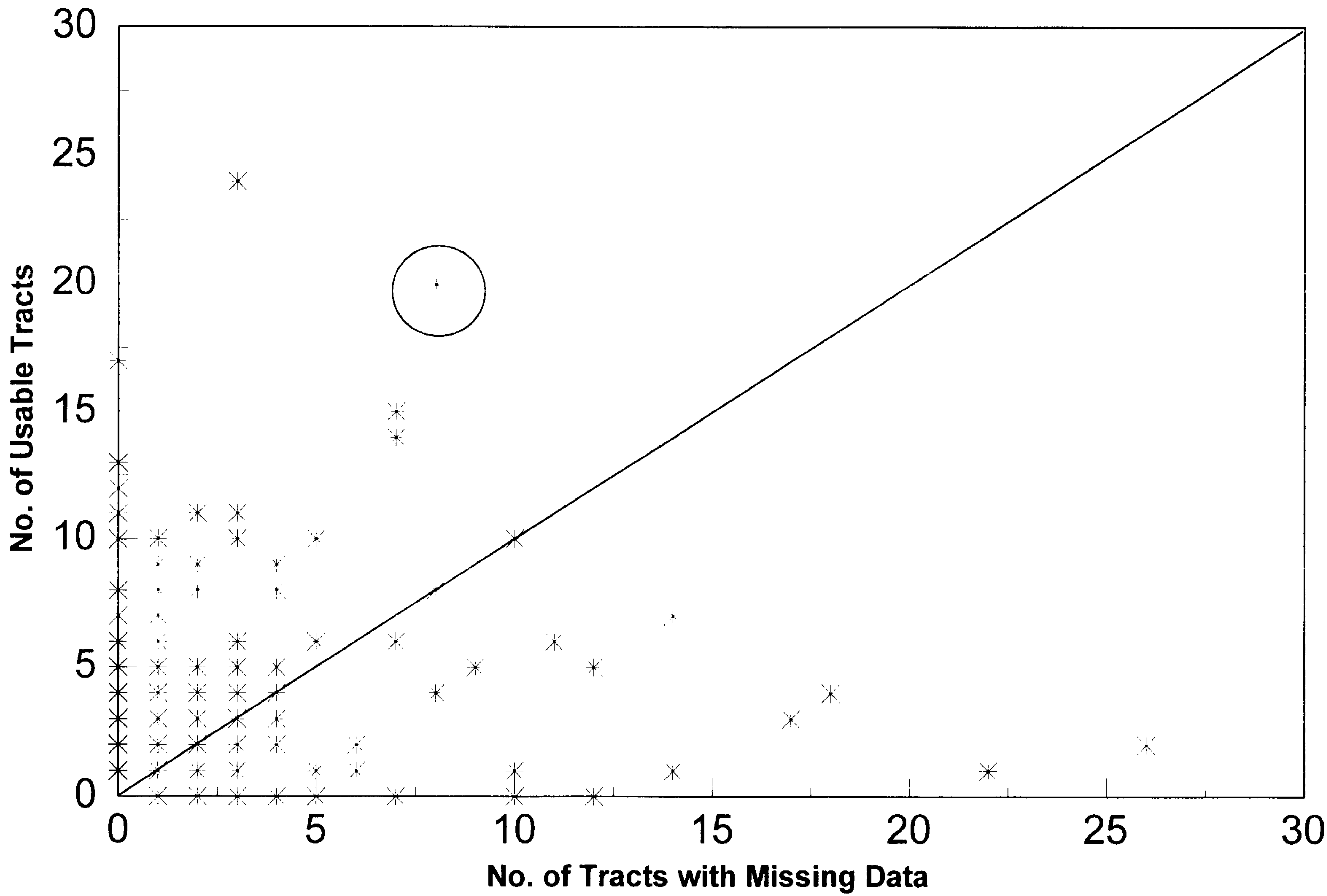
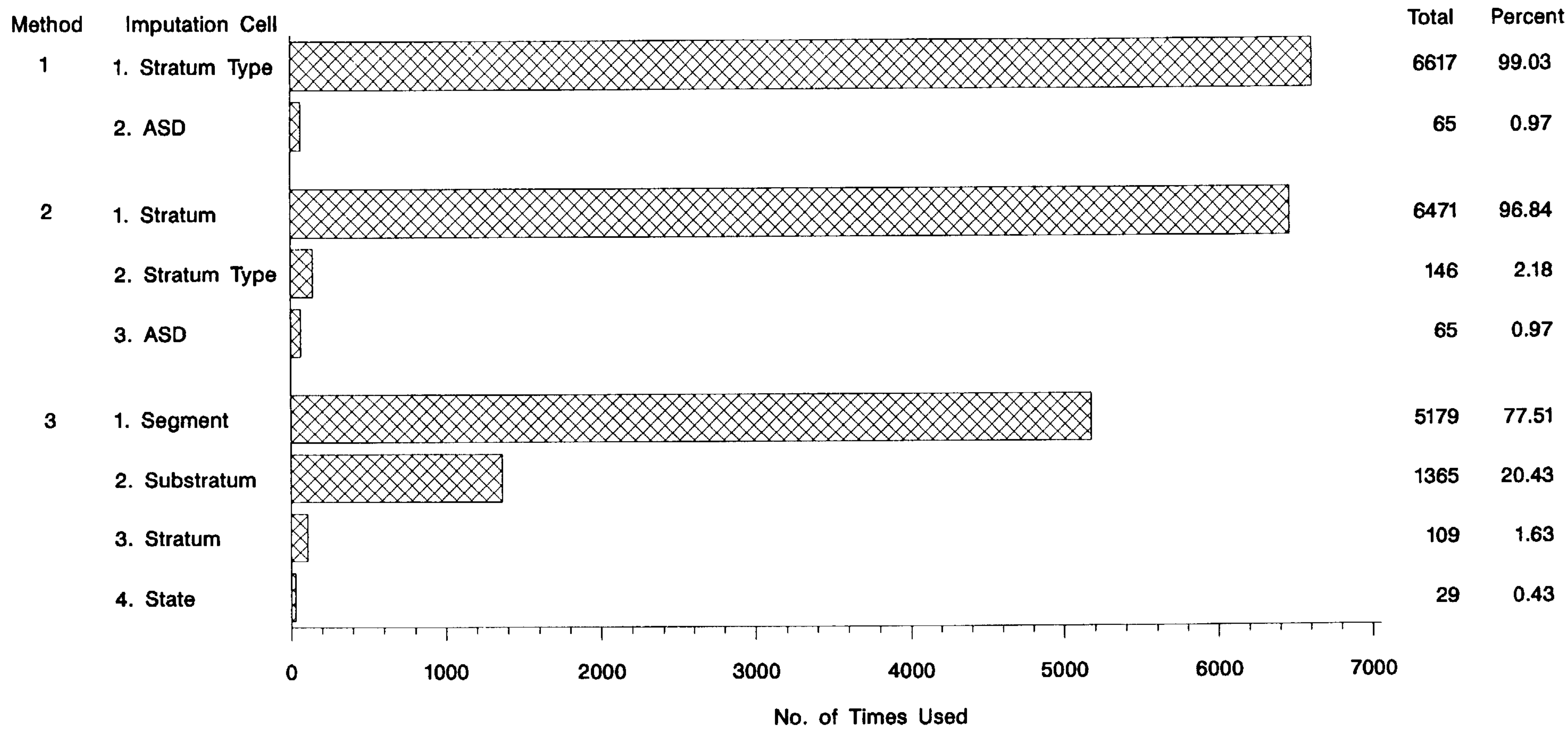
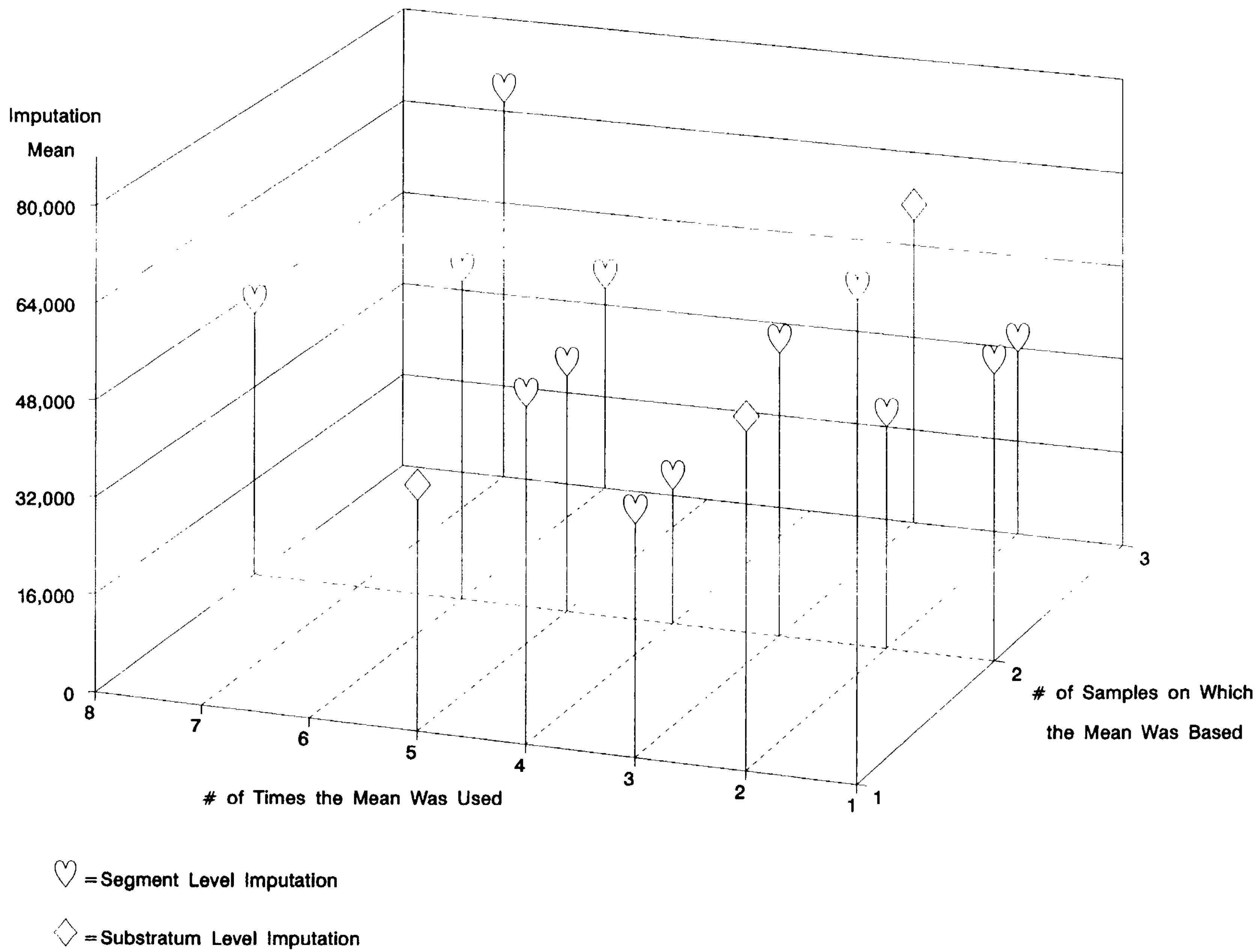


Chart 5: The U.S. Level Frequency of Use of Imputation Means for Cropland 1/ At the Various Imputation Levels for the Three Imputation Methods



1/ Includes survey items 410, 411 and 412

Chart 6: Imputed Pasture Land Values Exceeding $20,000 Per Acre Which Were Based on 3 or Fewer Samples (Imputation Method 3)



APPENDIX C: COMPARATIVE SUMMARY RESULTS.

For the Value of All Land & Buildings / Acre

NUMERATOR VARNAME=CLVALALL DENOMINATOR VARNAME=FTRACTAC

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
1	Alabama	57.5	587	1,100.65	13.3	1,100.65	13.3	1,309.38	8.0	1,299.50	8.0	1,352.31	7.8
4	Arizona	27.6	132	1,019.59	37.1	1,019.59	37.1	1,273.52	31.5	1,273.15	31.5	722.93	21.2
5	Arkansas	28.1	325	993.21	7.1	974.69	6.1	1,243.24	5.0	1,244.39	5.0	1,272.96	5.0
6	California	35.9	1017	5,194.23	17.8	4,628.38	15.3	4,416.76	8.3	4,938.68	8.9	5,012.05	8.9
8	Colorado	39.4	412	361.78	9.9	356.58	10.1	538.09	5.2	644.84	8.5	1,416.99	18.8
9	Connecticut	21.1	23	25,889.16	49.5	25,889.16	49.5	42,669.50	10.9	42,136.36	10.9	37,071.43	12.0
10	Delaware	37.6	82	15,470.89	59.5	15,470.89	59.5	20,938.78	20.5	21,729.81	21.3	14,858.20	31.2
12	Florida	44.3	593	3,515.57	11.5	3,515.57	11.5	3,277.53	5.5	3,322.01	5.6	3,553.79	7.0
13	Georgia	50.2	521	1,158.60	6.8	1,158.98	6.8	1,380.99	4.6	1,382.37	4.6	1,422.24	4.9
16	Idaho	36.9	404	1,072.55	17.9	1,072.55	17.9	1,166.58	7.8	1,153.68	8.5	1,147.41	8.9
17	Illinois	46.2	885	2,115.67	8.8	2,115.67	8.8	2,012.65	3.8	1,991.15	3.8	1,950.19	4.3
18	Indiana	51.8	815	1,560.76	3.0	1,572.61	2.9	1,687.17	1.9	1,689.43	2.0	1,683.40	2.1
19	Iowa	50.9	1131	1,516.33	2.1	1,516.33	2.1	1,556.87	1.3	1,551.72	1.3	1,546.95	1.6
20	Kansas	50.0	793	462.43	3.2	459.98	3.1	501.87	2.1	511.31	2.3	506.22	2.3
21	Kentucky	33.8	445	1,351.52	19.6	1,098.29	5.8	1,439.92	4.6	1,449.92	4.7	1,485.86	4.8
22	Louisiana	44.0	368	1,407.91	17.5	1,407.91	17.5	1,482.64	7.5	1,499.65	7.6	1,454.29	7.7
23	Maine	32.9	79	1,375.17	34.8	1,375.17	34.8	2,195.59	16.3	2,193.55	16.3	3,414.87	21.7
24	Maryland	30.0	257	5,515.95	11.4	5,515.95	11.4	5,787.79	5.7	5,863.00	5.7	6,173.10	7.2
25	Massachusetts	41.1	58	7,708.74	21.6	7,708.74	21.6	10,410.88	15.3	10,411.81	15.3	11,916.45	15.9
26	Michigan	37.6	395	1,248.05	5.6	1,248.05	5.6	1,429.52	2.9	1,442.61	3.1	1,528.08	3.5
27	Minnesota	51.4	693	1,114.19	3.5	1,111.98	3.5	1,089.97	2.3	1,087.29	2.3	1,099.09	2.6
28	Mississippi	55.3	506	896.27	3.7	896.27	3.7	1,000.18	2.8	1,002.69	2.9	1,198.41	8.3
29	Missouri	34.9	612	868.48	6.7	868.48	6.7	1,015.33	4.8	978.18	4.4	984.31	5.0
30	Montana	52.1	386	235.84	12.3	235.84	12.3	273.98	7.3	273.05	7.4	275.15	7.7
31	Nebraska	34.1	504	472.50	5.9	472.50	5.9	577.06	2.3	577.18	2.3	580.34	2.4
32	Nevada	18.0	20	2,191.23	47.9	2,191.23	47.9	3,220.01	29.9	3,239.72	29.7	2,426.18	17.8
33	New Hampshire	33.3	23	4,136.67	22.6	4,136.67	22.6	3,186.43	15.1	3,182.37	15.1	2,890.50	22.5
34	New Jersey	25.4	202	20,303.97	22.1	17,779.09	23.6	18,255.69	9.2	18,710.20	8.9	19,663.68	11.1

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of All Land & Buildings / Acre

NUMERATOR VARNAME=CLVALALL DENOMINATOR VARNAME=FTRACTAC
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
35	New Mexico	31.4	267	163.38	22.9	161.18	23.2	762.84	28.5	758.89	28.6	266.71	15.8
36	New York	39.6	324	1,410.29	9.8	1,410.29	9.8	1,961.42	6.6	1,963.55	7.8	2,121.61	8.4
37	North Carolina	41.9	455	2,242.70	7.1	2,242.70	7.1	2,092.29	4.6	2,088.85	4.6	2,298.95	6.5
38	North Dakota	36.0	448	360.72	5.0	360.72	5.0	367.09	2.0	365.26	2.0	368.77	2.3
39	Ohio	42.8	542	1,977.68	6.7	1,977.68	6.7	1,983.94	3.7	1,965.88	3.7	2,065.15	4.6
40	Oklahoma	25.3	429	431.44	5.5	431.44	5.5	579.17	2.8	576.65	2.8	578.61	3.3
41	Oregon	35.3	381	791.17	14.1	783.32	14.1	1,174.99	9.4	1,194.28	8.9	1,446.11	10.5
42	Pennsylvania	35.3	389	2,263.97	7.0	2,197.76	7.0	3,211.96	4.7	3,321.74	4.7	3,576.71	5.1
44	Rhode Island	3.4	2	7,470.63	67.4	7,470.63	67.4	9,701.12	14.0	9,086.93	15.4	25,370.83	27.4
45	South Carolina	47.8	278	1,129.21	5.3	1,130.29	5.3	1,224.97	3.9	1,223.84	3.9	1,288.97	4.4
46	South Dakota	41.4	439	313.65	6.0	313.65	6.0	315.81	2.1	314.51	2.1	322.35	2.4
47	Tennessee	45.6	510	1,733.20	6.0	1,733.20	6.0	1,857.31	3.5	1,848.94	3.5	1,902.14	5.0
48	Texas	42.8	1243	542.80	6.3	529.19	6.3	639.92	3.8	640.96	3.8	737.24	8.5
49	Utah	37.5	447	1,450.85	20.6	1,446.00	20.8	1,926.16	21.8	1,937.30	21.7	1,286.37	15.7
50	Vermont	35.4	81	2,597.10	23.1	2,597.10	23.1	2,672.27	8.4	2,673.63	8.4	2,635.31	10.2
51	Virginia	38.8	293	1,894.69	9.0	1,894.69	9.0	2,352.63	4.3	2,396.21	4.4	2,584.08	4.6
53	Washington	43.2	365	1,160.64	9.9	1,139.12	10.0	1,634.98	5.9	1,606.94	6.3	1,667.66	7.4
54	West Virginia	23.5	177	1,472.14	20.6	1,472.14	20.6	1,305.50	5.6	1,308.25	5.6	1,671.66	12.3
55	Wisconsin	53.0	662	1,023.69	4.3	1,025.36	4.3	1,141.63	2.9	1,149.34	3.0	1,154.48	3.1
56	Wyoming	30.7	261	130.60	12.0	130.60	12.0	227.93	7.4	229.42	7.4	237.04	8.2
59	Northeast	32.8	1520	3,351.04	10.4	3,255.18	10.6	4,652.09	4.4	4,722.81	4.5	4,797.82	4.6
62	Appalachian	37.4	1880	1,747.37	5.3	1,677.07	3.5	1,823.47	2.0	1,830.91	2.1	1,958.58	2.6
64	Lake	48.0	1750	1,104.79	2.5	1,104.07	2.5	1,166.12	1.6	1,169.35	1.6	1,192.36	1.7
67	Cornbelt	45.6	3985	1,593.09	3.0	1,595.04	3.0	1,605.64	1.5	1,588.30	1.5	1,590.03	1.7
68	Delta	41.2	1199	1,039.04	6.0	1,034.34	5.9	1,212.77	3.1	1,218.14	3.2	1,289.01	4.0
69	Northern Plains	40.7	2184	412.08	2.5	411.20	2.5	447.37	1.1	449.27	1.2	451.34	1.2
70	Southern Plains	36.3	1672	528.49	5.6	516.57	5.6	626.83	3.1	627.10	3.1	703.06	7.0

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of All Land & Buildings / Acre

NUMERATOR VARNAME=CLVALALL DENOMINATOR VARNAME=FTRACTAC
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
75	Mountain	36.6	2329	327.34	6.8	325.22	6.8	715.55	10.0	733.08	9.8	641.44	8.1
82	Southeast	49.7	1979	1,685.48	6.5	1,685.97	6.5	1,906.58	3.4	1,917.56	3.4	2,021.53	4.1
83	Pacific	37.0	1763	2,726.07	13.8	2,478.72	11.6	2,825.07	5.6	3,070.97	6.2	3,191.12	6.2
191	Region 1	33.1	1181	2,784.63	8.4	2,676.29	8.3	4,034.16	4.6	4,082.47	4.6	4,343.64	4.5
192	Region 2	44.6	7919	953.97	2.2	953.93	2.2	958.71	1.0	954.21	1.0	959.48	1.1
193	Region 3	40.2	7069	978.52	3.8	961.82	3.7	1,153.65	1.7	1,159.37	1.8	1,234.73	2.8
194	Region 4	36.8	4092	857.26	10.1	801.31	8.5	1,164.56	5.8	1,230.69	5.8	1,184.12	5.5
999	Total	40.5	20261	971.17	2.8	949.74	2.4	1,142.74	1.7	1,161.56	1.8	1,180.91	1.8

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

NUMERATOR VARNAME=CLVALCRP DENOMINATOR VARNAME=CLANDERS

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
1	Alabama	78.4	514	1,130.60	11.3	1,130.60	11.3	1,105.61	8.8	1,082.47	9.0	1,085.93	9.0
4	Arizona	41.5	171	3,292.46	23.5	3,292.46	23.5	3,741.40	10.3	3,706.01	10.5	3,390.55	12.6
5	Arkansas	57.2	514	884.29	2.0	884.29	2.0	873.89	1.4	872.15	1.4	872.58	1.4
6	California	54.5	1248	7,326.15	16.8	6,385.38	12.5	6,460.44	7.8	7,009.90	8.3	6,905.47	8.1
8	Colorado	52.2	341	477.43	6.4	477.43	6.4	590.21	4.3	598.95	4.5	609.51	5.0
9	Connecticut	34.3	35	16,607.79	29.4	16,607.79	29.4	17,420.29	10.4	17,415.33	10.4	17,261.53	14.6
10	Delaware	59.3	112	15,882.57	48.8	15,882.57	48.8	21,680.04	23.8	22,724.34	24.4	12,533.95	43.2
12	Florida	63.8	522	5,206.77	5.8	5,209.23	5.8	5,194.79	4.4	5,299.15	4.1	5,920.38	9.3
13	Georgia	69.4	525	865.12	4.2	865.12	4.2	871.73	3.4	872.73	3.4	897.24	4.2
16	Idaho	65.0	577	997.98	4.3	997.98	4.3	972.86	3.7	977.56	3.6	989.74	4.1
17	Illinois	86.4	1570	1,909.38	5.0	1,909.38	5.0	1,936.77	4.3	1,914.11	4.3	1,903.19	5.0
18	Indiana	70.6	1029	1,455.06	1.9	1,461.52	1.9	1,447.34	1.4	1,448.21	1.4	1,432.11	1.7
19	Iowa	75.2	1523	1,438.46	1.6	1,438.46	1.6	1,428.32	1.2	1,421.53	1.2	1,415.31	1.6
20	Kansas	69.4	902	509.72	2.5	509.72	2.5	503.24	1.8	501.31	1.8	503.53	2.0
21	Kentucky	67.2	758	1,247.60	10.5	1,247.60	10.5	1,233.17	7.9	1,245.84	8.1	1,227.24	8.1
22	Louisiana	78.8	503	1,065.42	9.7	1,065.42	9.7	1,042.17	7.6	1,041.94	8.2	1,087.53	8.2
23	Maine	47.3	104	1,491.53	32.1	1,491.53	32.1	1,756.34	17.8	1,756.34	17.8	2,413.91	30.0
24	Maryland	47.7	369	3,933.11	10.2	3,945.05	10.2	3,988.70	7.1	4,049.83	7.1	4,238.71	10.6
25	Massachusetts	57.7	75	16,019.95	13.6	16,019.95	13.6	15,591.40	8.3	15,591.40	8.3	16,541.80	10.4
26	Michigan	75.7	762	973.78	3.6	973.78	3.6	973.05	2.9	977.74	3.0	977.88	3.3
27	Minnesota	76.6	942	954.95	2.3	954.75	2.3	942.04	1.9	937.78	1.9	940.30	2.2
28	Mississippi	76.6	478	802.74	3.7	802.74	3.7	801.22	3.1	804.30	3.1	806.97	3.8
29	Missouri	60.5	830	1,043.13	9.7	1,043.13	9.7	1,066.53	7.1	988.93	6.5	974.73	7.0
30	Montana	74.1	424	374.38	6.7	374.38	6.7	372.85	5.6	368.31	5.6	384.06	6.2
31	Nebraska	56.7	636	870.42	3.1	870.42	3.1	875.34	2.0	881.31	2.0	886.41	2.2
32	Nevada	29.6	24	4,194.87	48.7	4,194.87	48.7	3,234.18	13.9	3,229.05	13.9	4,242.57	12.2
33	New Hampshire	65.1	41	3,057.75	21.2	3,057.75	21.2	2,964.38	15.5	2,953.66	15.5	2,868.95	20.0
34	New Jersey	40.9	278	11,512.53	12.8	11,589.14	12.8	11,929.17	5.9	11,876.27	5.9	12,398.10	9.8

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of Cropland / Acre

NUMERATOR VARNAME=CLVALCRP DENOMINATOR VARNAME=CLANDERS

(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
35	New Mexico	47.0	263	1,147.38	20.4	1,147.38	20.4	5,392.48	25.4	5,370.23	25.6	1,035.17	14.7
36	New York	70.8	510	1,286.50	9.6	1,287.31	9.6	1,266.66	8.5	1,262.30	8.5	1,283.91	8.7
37	North Carolina	70.8	656	1,489.01	7.5	1,489.01	7.5	1,545.64	5.8	1,542.84	5.9	1,533.58	7.1
38	North Dakota	76.4	869	389.97	2.4	389.97	2.4	384.77	1.8	383.08	1.8	386.88	2.2
39	Ohio	72.5	835	1,615.24	5.2	1,615.24	5.2	1,618.64	4.0	1,596.49	4.1	1,650.82	5.5
40	Oklahoma	62.0	677	554.19	3.1	554.19	3.1	568.60	2.2	561.87	2.2	561.48	2.6
41	Oregon	62.2	435	1,145.92	6.3	1,145.92	6.3	1,250.54	4.7	1,222.30	4.6	1,237.39	5.1
42	Pennsylvania	55.4	555	2,218.04	6.2	2,218.04	6.2	2,266.61	4.8	2,272.49	4.9	2,441.45	5.7
44	Rhode Island	7.5	4	8,258.87	85.4	8,258.87	85.4	4,467.21	15.5	3,409.10	22.5	3,632.94	22.1
45	South Carolina	84.5	392	953.20	3.7	954.60	3.7	968.96	3.4	969.83	3.4	981.53	3.8
46	South Dakota	58.9	512	414.43	2.7	414.43	2.7	389.17	2.1	384.39	2.0	387.56	2.1
47	Tennessee	65.5	521	1,278.70	4.0	1,278.70	4.0	1,325.13	2.7	1,301.71	2.7	1,318.59	3.8
48	Texas	54.2	979	631.88	4.2	631.88	4.2	644.80	2.9	649.42	2.9	646.47	3.4
49	Utah	62.5	543	1,479.95	17.3	1,423.77	17.2	1,315.95	12.4	1,316.13	12.4	1,440.42	13.0
50	Vermont	62.1	126	1,900.98	23.2	1,900.98	23.2	1,928.37	15.8	1,931.43	15.8	1,863.05	20.3
51	Virginia	60.6	339	1,598.29	8.8	1,598.29	8.8	1,801.30	5.2	1,827.65	4.6	1,990.17	6.2
53	Washington	70.9	492	1,148.83	6.9	1,148.83	6.9	1,203.90	5.3	1,200.43	5.3	1,205.43	5.7
54	West Virginia	40.1	230	1,228.54	12.4	1,228.54	12.4	1,154.55	5.3	1,159.36	5.3	1,170.61	8.3
55	Wisconsin	76.7	874	823.28	3.2	824.49	3.2	813.37	2.6	814.20	2.6	808.19	3.0
56	Wyoming	44.8	174	536.83	7.6	536.83	7.6	503.56	5.9	498.68	5.9	523.25	5.5
59	Northeast	53.4	2209	3,041.16	10.0	3,043.31	10.0	3,625.33	6.1	3,668.90	6.5	3,426.52	7.0
62	Appalachian	62.9	2504	1,358.87	4.3	1,358.87	4.3	1,401.24	3.0	1,401.97	3.0	1,419.10	3.3
64	Lake	76.4	2578	924.73	1.7	924.98	1.7	915.17	1.3	913.93	1.4	913.82	1.5
67	Cornbelt	74.0	5787	1,549.59	2.2	1,550.52	2.2	1,528.59	1.8	1,504.96	1.8	1,502.12	2.0
68	Delta	69.2	1495	908.24	3.6	908.24	3.6	897.59	2.6	897.74	2.8	911.19	3.0
69	Northern Plains	65.9	2919	521.29	1.5	521.29	1.5	522.65	1.1	521.86	1.1	525.32	1.2
70	Southern Plains	57.1	1656	607.09	3.2	607.09	3.2	623.53	2.3	624.98	2.3	622.75	2.7

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of Cropland / Acre

--- NUMERATOR VARNAME=CLVALCRP DENOMINATOR VARNAME=CLANDERS ---
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
75	Mountain	56.9	2517	682.98	5.1	680.39	5.1	1,096.72	12.1	1,094.71	12.1	813.30	4.7
82	Southeast	72.5	1953	1,888.09	6.7	1,888.87	6.7	1,907.74	5.2	1,925.76	5.2	2,075.59	7.4
83	Pacific	59.0	2175	3,299.28	13.2	2,968.25	9.7	3,506.72	6.5	3,739.60	7.1	3,698.85	6.7
191	Region 1	54.5	1728	2,436.14	5.6	2,437.37	5.6	2,759.41	3.6	2,755.32	3.6	2,904.89	4.4
192	Region 2	72.2	11284	1,028.43	1.5	1,028.74	1.5	993.58	1.2	983.67	1.1	983.98	1.3
193	Region 3	63.7	8089	1,132.83	3.8	1,132.94	3.8	1,166.71	2.8	1,175.95	2.9	1,153.60	3.3
194	Region 4	57.9	4692	1,600.86	9.7	1,482.54	7.0	1,921.93	6.0	2,000.35	6.2	1,801.35	5.0
999	Total	65.1	25793	1,172.50	2.3	1,155.37	1.8	1,234.74	1.8	1,244.07	1.9	1,210.44	1.6

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of Irrigated Cropland / Acre

NUMERATOR VARNAME=CLVALIRC DENOMINATOR VARNAME=CLANDIRC

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
5	Arkansas	78.4	326	976.80	1.5	976.80	1.5	970.00	1.2	969.89	1.2	966.94	1.3
6	California	62.3	1309	7,367.01	16.5	6,439.24	12.4	6,405.29	8.0	7,077.99	8.7	7,483.40	8.7
8	Colorado	46.0	139	1,241.58	10.6	1,241.58	10.6	1,481.81	5.2	1,518.91	5.2	1,542.86	6.5
12	Florida	71.0	330	6,304.91	5.2	6,304.91	5.2	6,388.35	3.9	6,391.16	3.6	7,169.33	10.4
13	Georgia	79.8	75	1,064.84	4.2	1,064.84	4.2	1,057.84	3.2	1,058.30	3.3	1,047.02	3.5
16	Idaho	72.4	390	1,382.00	4.4	1,382.00	4.4	1,383.00	3.6	1,392.56	3.6	1,422.59	4.3
20	Kansas	72.9	70	786.33	5.3	786.33	5.3	759.97	4.1	754.09	4.2	758.38	4.5
22	Louisiana	88.7	125	1,073.40	8.1	1,073.40	8.1	1,065.72	6.7	1,064.56	6.7	1,064.56	6.8
28	Mississippi	88.1	59	904.66	6.1	904.66	6.1	903.14	5.4	914.12	5.5	898.63	5.7
29	Missouri	65.7	44	1,308.21	3.8	1,308.21	3.8	1,314.69	2.3	1,314.69	2.3	1,322.14	2.9
30	Montana	74.8	80	902.61	10.7	902.61	10.7	925.89	9.6	906.30	9.7	1,016.34	12.1
31	Nebraska	70.9	290	1,242.00	2.7	1,242.00	2.7	1,243.22	2.0	1,253.81	2.0	1,264.75	2.7
32	Nevada	34.2	26	4,645.06	40.6	4,645.06	40.6	3,562.30	12.4	3,556.53	12.5	4,698.04	10.0
35	New Mexico	53.7	205	1,929.22	6.9	1,929.22	6.9	4,048.26	33.2	3,974.46	33.9	2,122.93	10.7
40	Oklahoma	83.0	39	871.15	11.9	871.15	11.9	857.51	11.0	858.33	11.0	857.15	11.0
41	Oregon	73.5	236	1,889.23	8.7	1,889.23	8.7	1,941.35	6.6	1,866.52	6.9	1,859.10	7.1
46	South Dakota	42.9	9	436.14	15.7	436.14	15.7	397.34	8.5	397.34	8.5	426.78	9.7
48	Texas	69.7	214	780.57	5.6	780.57	5.6	769.53	4.2	772.04	4.2	802.41	5.3
49	Utah	71.3	494	2,242.56	14.6	2,152.91	14.5	2,143.28	11.2	2,134.83	11.2	2,295.81	11.8
53	Washington	75.0	198	2,789.27	11.0	2,789.27	11.0	2,820.83	8.5	2,815.37	8.6	2,812.40	9.3
56	Wyoming	53.8	127	785.78	5.5	785.78	5.5	802.30	3.7	793.63	3.7	826.16	4.3
67	Cornbelt	65.7	44	1,308.21	3.8	1,308.21	3.8	1,314.69	2.3	1,314.69	2.3	1,322.14	2.9
68	Delta	81.7	510	981.52	2.2	981.52	2.2	976.82	1.8	978.37	1.8	973.87	1.9
69	Northern Plains	70.2	369	1,117.17	2.8	1,117.17	2.8	1,096.58	2.3	1,102.91	2.3	1,113.05	2.7
70	Southern Plains	71.5	253	789.61	5.2	789.61	5.2	776.69	4.0	779.06	4.0	806.87	4.9
75	Mountain	62.6	1461	1,435.84	5.3	1,426.73	5.3	1,787.17	8.2	1,784.61	8.2	1,734.34	5.9
82	Southeast	72.5	405	4,935.69	6.2	4,935.69	6.2	5,002.62	5.1	5,004.81	4.9	5,577.75	10.4
83	Pacific	64.9	1743	5,804.71	14.5	5,165.27	10.8	5,307.94	7.1	5,785.44	7.9	6,078.09	7.9

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of Irrigated Cropland / Acre

NUMERATOR VARNAME=CLVALIRC DENOMINATOR VARNAME=CLANDIRC

(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
192	Region 2	69.6	413	1,131.86	2.6	1,131.86	2.6	1,115.55	2.1	1,121.33	2.1	1,131.24	2.5
193	Region 3	76.0	1168	1,606.31	6.5	1,606.31	6.5	1,622.01	5.3	1,624.03	5.3	1,737.68	7.6
194	Region 4	63.8	3204	3,604.32	11.9	3,280.60	8.7	3,484.84	5.8	3,713.76	6.4	3,828.84	6.3
999	Total	66.9	4785	2,381.25	8.0	2,238.57	5.8	2,388.87	4.1	2,498.39	4.6	2,590.38	4.7

1/ Imputation Method 1 is the operational area frame procedure, imputing by stratum type (ag vs. non-ag) within ASD.
Imputation Method 2 adds a level to the operational procedure to allow imputation at the stratum level within ASD.
Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of All Land Excl. Buildings / Acre

NUMERATOR VARNAME=CLVALLND DENOMINATOR VARNAME=FTRACTAC

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
1	Alabama	57.5	586	764.34	5.0	764.34	5.0	848.89	5.0	841.85	5.0	863.49	5.2
4	Arizona	27.6	132	866.31	37.8	866.31	37.8	1,241.38	31.6	1,240.67	31.6	694.03	20.5
5	Arkansas	28.1	325	872.60	7.3	855.91	6.2	891.90	2.5	892.15	2.5	917.96	2.8
6	California	35.8	1015	4,624.76	19.4	4,054.62	16.6	3,796.24	8.7	4,336.66	9.4	4,409.49	9.3
8	Colorado	39.4	412	341.49	10.2	336.64	10.3	467.89	5.4	573.53	9.3	1,346.93	19.7
9	Connecticut	21.1	23	15,026.45	23.6	15,026.45	23.6	37,653.42	10.8	37,651.02	10.8	32,586.09	12.5
10	Delaware	37.6	82	15,113.39	60.9	15,113.39	60.9	19,891.42	21.7	20,667.76	22.5	13,785.27	33.7
12	Florida	44.3	593	3,162.38	11.9	3,162.38	11.9	2,977.04	5.6	3,019.89	5.7	3,244.64	7.4
13	Georgia	50.2	521	961.23	6.4	961.43	6.4	1,089.87	4.6	1,090.59	4.6	1,131.36	4.9
16	Idaho	36.9	404	961.26	19.4	961.26	19.4	932.88	9.3	920.04	9.6	912.17	9.9
17	Illinois	46.2	885	1,888.02	9.8	1,888.02	9.8	1,772.42	4.1	1,751.52	4.2	1,713.59	4.8
18	Indiana	51.8	813	1,374.05	2.5	1,384.48	2.4	1,346.62	1.6	1,348.89	1.6	1,337.99	2.0
19	Iowa	50.9	1131	1,330.13	2.2	1,330.13	2.2	1,310.78	1.4	1,307.78	1.4	1,305.08	1.8
20	Kansas	50.0	793	408.91	2.8	408.29	2.8	431.93	2.0	441.93	2.1	435.38	2.2
21	Kentucky	33.8	445	1,183.81	22.0	930.89	5.0	1,072.86	5.6	1,079.29	5.8	1,123.72	5.8
22	Louisiana	44.0	368	1,258.47	19.0	1,258.47	19.0	1,277.72	7.9	1,294.43	8.1	1,248.53	8.2
23	Maine	32.6	78	1,131.85	38.5	1,131.85	38.5	1,607.14	17.9	1,606.74	17.9	2,852.93	24.7
24	Maryland	30.0	257	4,143.54	12.1	4,143.54	12.1	4,321.65	6.6	4,389.46	6.6	4,692.31	8.6
25	Massachusetts	41.1	58	6,438.04	23.3	6,438.04	23.3	8,843.89	16.1	8,843.89	16.1	10,344.51	17.0
26	Michigan	37.6	395	934.51	5.8	934.51	5.8	979.67	2.8	988.73	3.0	1,076.66	4.1
27	Minnesota	51.4	693	848.23	3.4	847.18	3.4	834.89	2.0	831.93	2.0	847.20	2.5
28	Mississippi	55.3	506	746.84	3.9	746.84	3.9	772.87	2.5	774.72	2.6	974.25	9.9
29	Missouri	34.9	612	758.94	6.7	758.94	6.7	816.31	5.5	778.51	5.0	787.49	5.7
30	Montana	52.1	386	218.06	12.1	218.06	12.1	236.52	7.0	235.01	7.0	237.36	7.4
31	Nebraska	34.1	504	444.97	5.7	444.97	5.7	477.54	2.2	479.79	2.1	484.01	2.3
32	Nevada	18.0	20	1,712.45	55.5	1,712.45	55.5	3,040.91	31.3	3,054.53	31.2	2,256.52	18.2
33	New Hampshire	33.3	23	3,691.22	21.6	3,691.22	21.6	2,047.88	14.4	2,043.82	14.4	1,727.93	25.4
34	New Jersey	25.4	202	17,593.25	23.9	15,167.59	25.5	14,312.74	8.5	14,724.69	8.2	15,581.05	10.6

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For the Value of All Land Excl. Buildings / Acre

NUMERATOR VARNAME=CLVALLND DENOMINATOR VARNAME=FTRACTAC

(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
35	New Mexico	31.4	267	150.50	24.2	148.45	24.4	738.33	29.4	734.79	29.5	242.88	17.0
36	New York	39.6	324	972.43	8.8	972.43	8.8	1,277.42	8.0	1,292.88	10.1	1,446.24	10.7
37	North Carolina	41.9	455	1,596.75	8.3	1,596.75	8.3	1,479.76	4.8	1,470.92	4.8	1,661.44	7.8
38	North Dakota	36.0	448	314.45	4.8	314.45	4.8	317.95	1.9	316.56	1.9	319.92	2.2
39	Ohio	42.8	542	1,539.17	7.4	1,539.17	7.4	1,499.21	4.0	1,481.89	4.0	1,554.24	5.4
40	Oklahoma	25.3	429	379.18	5.1	379.18	5.1	463.28	2.0	460.40	2.0	465.97	2.6
41	Oregon	35.3	381	608.09	12.0	601.70	12.1	817.01	8.5	848.23	8.0	1,107.57	11.0
42	Pennsylvania	35.2	388	1,725.95	7.3	1,672.26	7.3	2,055.04	4.5	2,157.60	4.4	2,415.74	5.6
44	Rhode Island	3.4	2	3,978.57	34.1	3,978.57	34.1	5,850.70	8.4	5,236.52	11.2	21,520.41	31.9
45	South Carolina	47.8	278	866.87	4.0	867.68	4.0	861.56	2.9	860.35	2.9	932.98	4.2
46	South Dakota	41.4	439	275.78	5.2	275.78	5.2	265.80	1.6	264.64	1.6	274.09	2.0
47	Tennessee	45.6	510	1,270.81	4.7	1,270.81	4.7	1,394.59	3.6	1,385.53	3.6	1,437.65	5.8
48	Texas	42.8	1243	480.25	5.5	469.85	5.5	525.15	3.4	523.83	3.4	614.42	9.7
49	Utah	37.5	447	1,082.09	19.4	1,076.56	19.5	1,626.11	24.9	1,637.63	24.8	978.87	13.0
50	Vermont	35.4	81	1,890.13	28.9	1,890.13	28.9	1,732.16	12.6	1,733.52	12.6	1,688.59	15.4
51	Virginia	38.8	293	1,185.86	9.5	1,185.86	9.5	1,574.37	4.1	1,616.28	4.2	1,871.60	5.1
53	Washington	43.2	365	905.44	9.2	882.33	9.2	1,241.46	6.2	1,217.48	6.9	1,281.39	8.4
54	West Virginia	23.5	177	1,003.78	20.8	1,003.78	20.8	877.93	5.9	880.15	5.9	1,202.52	16.3
55	Wisconsin	53.0	662	722.46	4.1	723.63	4.1	697.27	3.4	706.02	3.4	706.92	3.7
56	Wyoming	30.7	261	123.22	12.4	123.22	12.4	178.24	6.8	180.37	6.7	181.44	8.0
59	Northeast	32.7	1518	2,648.35	12.2	2,560.22	12.4	3,519.19	5.3	3,597.62	5.4	3,668.66	5.5
62	Appalachian	37.4	1880	1,292.42	6.4	1,221.81	3.4	1,307.86	2.2	1,312.62	2.3	1,446.20	3.1
64	Lake	48.0	1750	821.91	2.4	821.72	2.4	820.01	1.5	822.68	1.5	846.70	1.9
67	Cornbelt	45.6	3983	1,380.77	3.4	1,382.45	3.4	1,330.75	1.7	1,314.07	1.7	1,313.83	2.0
68	Delta	41.2	1199	897.03	6.6	892.78	6.6	940.20	2.8	944.89	2.9	1,015.87	4.3
69	Northern Plains	40.7	2184	369.39	2.3	369.15	2.3	379.03	1.0	381.78	1.1	384.08	1.2
70	Southern Plains	36.3	1672	467.26	4.9	458.14	4.9	511.82	2.8	510.17	2.7	582.44	8.0

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Imputation Method 3 imputes at the segment level, backing up to substratum and then stratum if necessary.

2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

For the Value of All Land Excl. Buildings / Acre

---------- NUMERATOR VARNAME=CLVALLND DENOMINATOR VARNAME=FTRACTAC ----------

(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
75	Mountain	36.6	2329	294.38	7.0	292.33	7.0	653.32	10.9	670.55	10.7	578.84	8.8
82	Southeast	49.7	1978	1,397.39	6.7	1,397.76	6.7	1,558.80	3.6	1,569.81	3.7	1,664.93	4.6
83	Pacific	37.0	1761	2,361.59	15.5	2,112.84	13.0	2,333.88	6.2	2,592.89	6.8	2,715.66	6.6
191	Region 1	33.1	1179	2,128.23	8.6	2,028.62	8.4	2,934.50	5.4	2,992.83	5.4	3,250.60	5.3
192	Region 2	44.6	7917	807.70	2.3	807.99	2.3	775.53	1.1	771.59	1.1	776.46	1.2
193	Region 3	40.2	7068	811.76	3.9	796.52	3.8	908.21	1.8	912.24	1.9	985.25	3.3
194	Region 4	36.8	4090	751.06	11.1	694.80	9.3	1,011.02	6.4	1,079.71	6.4	1,033.65	5.8
999	Total	40.5	20254	818.73	3.1	797.97	2.6	927.73	2.0	947.12	2.1	965.63	2.0

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---------- NUMERATOR VARNAME=CLVALNIC DENOMINATOR VARNAME=CLANDNIC ----------

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
5	Arkansas	50.7	343	788.65	3.7	788.65	3.7	785.97	2.3	782.74	2.3	786.26	2.5
6	California	26.1	123	5,324.29	22.7	5,324.29	22.7	6,690.66	20.4	6,725.65	21.9	4,492.95	13.2
8	Colorado	55.3	233	322.45	4.2	322.45	4.2	327.29	2.9	327.68	3.3	334.28	3.3
12	Florida	55.8	215	2,360.98	19.7	2,365.14	19.7	2,537.05	11.8	2,867.56	12.6	3,139.31	17.4
13	Georgia	69.7	499	830.20	4.9	830.20	4.9	838.77	3.9	839.87	3.9	870.71	5.0
16	Idaho	58.5	254	588.00	6.1	588.00	6.1	553.58	4.6	553.32	4.6	547.23	5.1
20	Kansas	69.7	889	492.48	2.5	492.48	2.5	482.23	1.8	480.62	1.8	482.68	2.0
22	Louisiana	78.8	471	1,055.77	11.6	1,055.77	11.6	1,035.68	9.5	1,035.71	10.2	1,093.85	10.2
28	Mississippi	76.1	455	786.67	4.2	786.67	4.2	780.11	3.5	781.55	3.5	787.99	4.4
29	Missouri	60.1	802	1,028.41	10.4	1,028.41	10.4	1,050.75	7.7	968.21	7.0	952.63	7.6
30	Montana	74.2	362	310.33	6.5	310.33	6.5	304.54	5.0	301.86	5.0	305.97	4.9
31	Nebraska	54.8	542	661.38	4.5	661.38	4.5	676.57	2.8	680.04	2.8	681.98	3.0
32	Nevada	30.0	6	560.39	16.4	560.39	16.4	595.48	5.0	595.48	5.0	579.81	5.2
35	New Mexico	40.6	117	269.67	4.5	269.67	4.5	6,233.49	29.5	6,243.49	29.4	354.62	8.8
40	Oklahoma	62.0	668	537.98	3.0	537.98	3.0	555.92	2.1	548.85	2.1	548.50	2.5
41	Oregon	56.9	257	866.59	6.7	866.59	6.7	934.98	5.4	928.02	5.4	953.39	6.7
46	South Dakota	59.1	507	413.94	2.7	413.94	2.7	389.00	2.2	384.12	2.1	386.74	2.1
48	Texas	53.6	911	597.06	4.8	597.06	4.8	616.73	3.5	621.82	3.5	611.38	4.1
49	Utah	47.2	135	376.01	19.1	376.01	19.1	384.90	11.9	394.80	12.5	477.79	19.9
53	Washington	69.5	324	777.37	5.4	777.37	5.4	812.69	4.8	809.69	4.5	816.63	5.0
56	Wyoming	35.1	66	223.16	9.2	223.16	9.2	224.05	4.5	222.72	4.7	239.83	9.7
67	Cornbelt	60.1	802	1,028.41	10.4	1,028.41	10.4	1,050.75	7.7	968.21	7.0	952.63	7.6
68	Delta	67.8	1269	877.64	5.1	877.64	5.1	861.58	3.8	861.09	4.1	882.70	4.3
69	Northern Plains	62.1	1938	505.68	1.9	505.68	1.9	495.61	1.4	494.09	1.4	496.29	1.5
70	Southern Plains	56.8	1579	577.15	3.4	577.15	3.4	597.73	2.6	599.02	2.6	591.73	3.0
75	Mountain	55.2	1173	339.83	3.7	339.83	3.7	714.34	25.8	713.98	25.8	344.23	2.6
82	Southeast	64.9	714	1,096.95	8.3	1,097.29	8.3	1,152.30	6.0	1,214.21	6.9	1,289.53	9.3
83	Pacific	50.6	704	1,181.21	9.3	1,181.21	9.3	1,808.08	14.0	1,810.27	15.1	1,455.12	8.1

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2/ For inclusion in the usable response rate and no. of positive reports, a positive response for both the numerator and denominator variables was required.

NUMERATOR VARNAME=CLVALNIC DENOMINATOR VARNAME=CLANDNIC

(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
192	Region 2	61.5	2740	607.20	3.7	607.20	3.7	604.81	2.8	587.35	2.5	586.06	2.7
193	Region 3	61.9	3562	701.39	2.7	701.41	2.7	709.33	2.0	715.54	2.2	722.40	2.6
194	Region 4	53.4	1877	586.53	5.8	586.53	5.8	1,017.62	14.7	1,017.96	14.9	652.27	5.6
999	Total	59.6	8179	633.43	2.3	633.44	2.3	740.76	5.2	735.49	5.3	647.28	2.0

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For the Value of Pasture Land / Acre

NUMERATOR VARNAME=CLVALPAU DENOMINATOR VARNAME=CLANDPAU

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
1	Alabama	86.8	394	804.45	5.7	804.45	5.7	799.17	5.2	797.59	5.2	813.40	5.8
4	Arizona	46.1	35	342.95	37.6	343.20	37.7	759.75	29.1	758.22	29.1	409.67	3.0
5	Arkansas	71.8	244	841.09	9.0	841.09	9.0	829.08	6.5	829.08	6.5	826.72	7.0
6	California	47.4	278	1,700.67	34.2	1,711.15	34.3	1,454.06	19.2	1,576.48	18.3	1,706.20	19.0
8	Colorado	56.9	331	297.41	13.8	297.41	13.8	323.83	8.6	326.58	10.7	329.89	11.2
9	Connecticut	33.3	8	9,494.91	18.3	9,494.91	18.3	9,301.89	7.9	9,301.89	7.9	8,809.51	19.9
10	Delaware	54.2	13	22,081.57	77.4	22,081.57	77.4	15,614.75	68.3	15,611.65	68.3	13,690.10	79.6
12	Florida	62.4	372	2,151.98	15.9	2,151.98	15.9	2,109.56	6.4	2,065.78	6.8	2,258.35	10.0
13	Georgia	74.5	278	1,286.17	9.1	1,294.20	9.0	1,369.09	8.0	1,369.85	8.0	1,371.01	8.4
16	Idaho	62.5	250	713.44	36.9	713.44	36.9	862.67	27.6	704.29	32.7	719.21	32.9
17	Illinois	77.5	241	698.73	6.2	698.73	6.2	720.96	5.1	714.15	5.4	689.52	5.7
18	Indiana	60.7	165	976.60	10.2	978.28	10.2	973.54	7.0	983.56	7.1	912.49	6.9
19	Iowa	60.0	350	576.93	6.6	576.93	6.6	583.72	4.2	579.45	4.3	554.15	5.0
20	Kansas	71.6	565	306.24	5.1	306.24	5.1	303.87	4.1	304.92	4.1	304.56	4.2
21	Kentucky	60.5	351	858.79	6.8	858.79	6.8	870.17	4.5	863.31	4.5	879.70	5.1
22	Louisiana	82.6	223	1,507.81	23.8	1,507.81	23.8	1,427.27	20.4	1,500.58	20.1	1,442.70	20.2
23	Maine	25.8	16	2,197.71	52.1	2,197.71	52.1	3,559.60	16.8	3,559.60	16.8	3,982.05	25.7
24	Maryland	47.9	123	3,734.34	16.8	3,734.34	16.8	3,855.02	12.4	3,881.89	13.3	3,418.05	13.1
25	Massachusetts	62.8	27	7,322.75	25.7	7,322.75	25.7	7,873.39	15.3	7,873.39	15.3	10,913.72	20.6
26	Michigan	69.4	93	796.75	26.9	796.75	26.9	824.58	18.8	812.64	19.1	767.18	19.6
27	Minnesota	69.3	181	335.66	7.5	335.66	7.5	332.03	5.9	330.06	6.2	355.25	8.4
28	Mississippi	78.6	279	658.35	4.8	658.35	4.8	651.92	3.9	651.87	3.9	650.22	4.3
29	Missouri	55.6	444	578.11	8.9	578.11	8.9	586.99	5.4	586.24	5.4	603.45	7.1
30	Montana	71.6	307	155.57	18.1	155.57	18.1	145.65	13.7	145.72	13.7	144.31	14.0
31	Nebraska	55.0	418	188.49	4.1	188.49	4.1	191.50	3.1	191.88	3.1	195.02	3.9
32	Nevada	25.4	16	1,223.32	53.3	1,223.32	53.3	2,954.97	40.7	2,955.08	40.7	1,559.71	22.2
33	New Hampshire	66.7	16	1,726.37	26.5	1,726.37	26.5	1,591.07	26.2	1,591.07	26.2	1,550.35	27.3
34	New Jersey	30.6	71	17,132.97	27.1	17,132.97	27.1	18,018.86	10.9	20,288.15	10.7	18,704.96	13.0

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NUMERATOR VARNAME=CLVALPAU DENOMINATOR VARNAME=CLANDPAU
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
35	New Mexico	52.3	239	132.38	21.4	132.38	21.4	133.46	11.1	131.84	11.2	165.33	23.5
36	New York	68.1	190	843.08	18.2	843.08	18.2	741.94	13.5	738.19	14.1	748.10	14.2
37	North Carolina	64.7	187	1,525.05	9.2	1,525.05	9.2	1,573.57	6.8	1,584.01	7.0	1,637.65	8.1
38	North Dakota	69.3	217	136.83	3.2	136.83	3.2	136.51	2.3	136.12	2.3	137.02	3.1
39	Ohio	63.4	203	1,125.99	27.8	1,125.99	27.8	1,073.04	19.4	1,074.16	19.4	1,321.01	22.4
40	Oklahoma	63.7	781	313.22	3.7	313.22	3.7	328.43	2.5	328.98	2.5	336.25	3.1
41	Oregon	59.2	325	360.40	17.6	360.40	17.6	481.68	14.0	485.08	12.1	493.10	13.4
42	Pennsylvania	53.2	231	1,233.00	10.6	1,233.00	10.6	1,358.54	7.7	1,397.58	8.0	1,341.46	8.6
44	Rhode Island	14.3	2	5,467.34	37.9	5,467.34	37.9	7,631.96	0.6	7,631.96	0.6	4,129.38	14.3
45	South Carolina	76.4	113	1,090.70	6.1	1,090.70	6.1	1,127.87	5.1	1,121.53	5.2	1,273.30	12.1
46	South Dakota	52.8	295	151.52	5.3	151.52	5.3	136.50	2.5	135.23	2.4	146.64	2.9
47	Tennessee	64.6	356	1,225.73	6.5	1,225.73	6.5	1,225.84	4.7	1,248.70	4.7	1,223.35	5.3
48	Texas	61.8	1177	435.16	5.9	435.16	5.9	438.84	4.7	439.81	4.7	453.34	5.3
49	Utah	60.0	348	638.77	19.0	639.94	19.0	1,617.44	37.7	1,624.48	37.6	607.25	15.7
50	Vermont	63.7	79	1,691.49	15.4	1,691.49	15.4	1,722.38	9.4	1,722.38	9.4	1,658.98	12.8
51	Virginia	50.0	185	1,137.42	9.0	1,137.42	9.0	1,217.73	5.6	1,306.04	7.1	1,374.70	9.6
53	Washington	60.3	170	675.36	28.2	675.36	28.2	867.78	20.4	659.11	19.5	717.54	19.2
54	West Virginia	38.6	191	884.38	13.6	891.25	13.6	838.41	7.4	841.11	7.4	844.11	10.8
55	Wisconsin	73.6	259	444.86	9.1	444.86	9.1	427.79	7.0	430.58	7.0	440.09	8.0
56	Wyoming	49.3	329	113.21	12.9	113.21	12.9	120.73	11.0	120.68	11.0	122.30	12.8
59	Northeast	51.2	776	1,749.95	8.8	1,749.95	8.8	2,039.97	6.0	2,108.20	6.2	2,067.96	6.9
62	Appalachian	55.6	1270	1,101.49	3.8	1,102.26	3.8	1,109.93	2.6	1,134.18	2.8	1,151.77	3.5
64	Lake	71.4	533	419.79	6.8	419.79	6.8	409.67	5.1	408.79	5.2	422.07	5.9
67	Cornbelt	61.4	1403	663.01	6.2	663.07	6.2	663.55	4.0	662.30	4.0	681.13	5.3
68	Delta	77.3	746	933.47	9.4	933.47	9.4	900.82	7.3	916.49	7.4	902.47	7.3
69	Northern Plains	61.8	1495	207.08	3.0	207.08	3.0	194.57	2.0	194.51	2.0	198.99	2.2
70	Southern Plains	62.6	1958	412.32	5.0	412.32	5.0	418.27	4.0	419.16	4.0	431.52	4.5

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NUMERATOR VARNAME=CLVALPAU DENOMINATOR VARNAME=CLANDPAU
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
75	Mountain	57.0	1855	207.61	10.2	207.62	10.2	360.94	13.2	357.75	13.4	265.17	8.0
82	Southeast	73.6	1157	1,407.36	8.8	1,409.26	8.8	1,612.44	4.9	1,588.55	5.1	1,703.59	7.5
83	Pacific	54.5	773	1,016.88	26.5	1,019.68	26.5	1,035.92	14.3	1,070.17	14.1	1,147.85	14.8
191	Region 1	51.8	640	1,582.27	9.3	1,582.27	9.3	1,871.85	6.4	1,943.25	6.6	1,938.66	7.4
192	Region 2	62.9	3431	302.67	3.3	302.67	3.3	290.19	2.1	289.87	2.1	297.39	2.6
193	Region 3	64.0	5267	574.25	3.7	574.33	3.7	608.57	2.8	610.47	2.8	629.17	3.3
194	Region 4	56.3	2628	331.63	13.8	331.78	13.8	460.60	9.7	462.93	9.7	395.50	7.7
999	Total	61.1	11966	434.23	4.2	434.33	4.2	485.18	3.9	487.25	3.9	468.68	3.1

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For the Value of Woodland / Acre

NUMERATOR VARNAME=CLVALWOD DENOMINATOR VARNAME=CLAND414

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
1	Alabama	81.4	499	550.06	5.1	550.06	5.1	549.40	4.5	550.38	4.5	567.30	5.7
4	Arizona	100.0	1	20,000.00	0.0	20,000.00	0.0	20,000.00	0.0	20,000.00	0.0	20,000.00	0.0
5	Arkansas	57.9	231	630.08	9.2	630.08	9.2	682.94	5.7	685.82	5.7	721.74	8.6
6	California	46.7	35	1,978.19	31.1	1,978.19	31.1	1,754.67	17.9	1,761.83	18.0	1,526.43	26.3
8	Colorado	78.6	22	207.56	34.8	207.56	34.8	197.62	31.2	194.13	31.4	206.64	31.6
9	Connecticut	32.5	13	7,477.99	20.6	7,477.99	20.6	6,536.70	3.8	6,536.70	3.8	16,155.50	55.2
10	Delaware	45.7	37	2,927.89	36.7	2,927.89	36.7	2,294.69	22.8	2,033.52	26.7	2,065.17	27.1
12	Florida	63.8	282	1,850.00	23.7	1,850.00	23.7	1,752.28	15.5	1,914.71	15.4	1,819.43	16.3
13	Georgia	74.0	526	818.41	5.5	818.43	5.5	856.60	4.5	855.37	4.5	845.31	5.2
16	Idaho	54.3	38	1,661.04	56.4	1,661.04	56.4	1,488.56	45.9	1,419.35	48.0	1,393.35	49.1
17	Illinois	74.3	318	746.87	19.9	746.87	19.9	792.27	14.4	838.51	18.4	685.68	15.4
18	Indiana	70.3	296	824.62	10.6	824.62	10.6	858.25	7.8	848.22	7.8	959.77	14.5
19	Iowa	71.4	120	422.07	11.1	422.07	11.1	404.05	9.2	402.95	9.2	417.28	9.2
20	Kansas	72.3	112	322.06	32.4	327.14	32.5	302.81	25.6	296.31	26.2	300.50	26.5
21	Kentucky	60.2	517	513.37	5.9	513.59	5.9	520.47	4.0	524.30	4.1	565.01	7.7
22	Louisiana	58.7	128	1,122.25	16.1	1,122.25	16.1	1,040.39	13.3	1,037.38	13.3	1,083.51	11.8
23	Maine	49.5	54	817.99	43.9	817.99	43.9	1,102.36	27.3	1,102.36	27.3	1,133.97	29.7
24	Maryland	42.2	129	3,706.15	28.2	3,706.15	28.2	4,640.64	11.6	4,821.89	11.1	5,660.65	17.7
25	Massachusetts	47.5	29	2,966.37	30.3	2,966.37	30.3	2,996.06	20.3	2,996.06	20.3	4,582.62	22.3
26	Michigan	62.4	284	572.81	13.9	572.81	13.9	604.79	9.7	618.79	10.5	750.81	12.8
27	Minnesota	68.0	204	349.22	13.6	349.22	13.6	336.01	10.2	341.43	10.2	350.99	12.1
28	Mississippi	75.3	371	662.97	5.4	662.97	5.4	654.86	4.4	657.95	4.5	636.33	4.8
29	Missouri	64.4	286	916.61	57.5	394.46	7.8	390.75	5.0	381.24	4.9	428.94	6.4
30	Montana	40.0	2	407.69	25.1	407.69	25.1	407.86	11.4	407.86	11.4	407.86	11.4
31	Nebraska	45.9	62	179.30	23.2	180.09	23.2	230.79	21.7	207.23	20.3	177.43	19.1
32	Nevada	.	0	.	.	.	.	.	.	.	.	.	.
33	New Hampshire	73.1	19	1,122.18	17.7	1,122.18	17.7	1,177.18	6.3	1,177.18	6.3	718.86	33.1
34	New Jersey	33.9	76	18,728.14	44.1	17,507.85	46.5	12,439.47	21.8	12,634.84	21.6	16,204.30	28.6

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-- NUMERATOR VARNAME=CLVALWOD DENOMINATOR VARNAME=CLAND414 --
(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
35	New Mexico	82.4	14	487.26	74.9	487.26	74.9	480.11	72.2	480.11	72.2	475.54	73.2
36	New York	65.7	218	826.04	29.8	826.04	29.8	797.64	21.6	804.39	21.5	868.85	21.9
37	North Carolina	69.2	459	1,049.19	9.5	1,049.19	9.5	1,084.19	7.3	1,084.84	7.2	1,074.27	8.0
38	North Dakota	45.3	24	237.30	63.8	237.30	63.8	199.75	47.9	194.95	50.3	188.12	54.8
39	Ohio	65.6	336	906.99	11.1	906.99	11.1	889.87	7.0	897.75	7.2	882.91	9.1
40	Oklahoma	51.9	200	282.97	8.7	282.97	8.7	298.31	5.8	298.72	5.8	273.71	6.9
41	Oregon	62.8	54	1,227.85	21.4	1,227.85	21.4	1,288.57	22.9	1,377.89	25.1	1,487.95	25.8
42	Pennsylvania	52.0	224	1,050.30	9.8	1,050.30	9.8	1,075.47	5.3	1,372.65	10.7	1,178.65	6.9
44	Rhode Island	15.8	3	3,004.16	8.2	3,004.16	8.2	2,643.25	2.3	2,643.25	2.3	3,113.39	4.3
45	South Carolina	85.4	334	671.75	6.0	671.75	6.0	693.36	4.8	691.47	4.8	716.34	5.6
46	South Dakota	42.0	29	275.09	13.9	275.09	13.9	277.63	5.4	276.17	5.4	294.57	8.0
47	Tennessee	69.8	434	904.82	16.9	904.82	16.9	1,003.34	12.5	999.18	12.7	945.12	12.0
48	Texas	55.7	201	867.33	11.6	867.33	11.6	833.36	7.7	834.87	7.7	912.94	7.8
49	Utah	91.7	44	223.23	30.5	223.23	30.5	214.55	28.0	217.67	27.6	219.62	27.6
50	Vermont	59.5	50	889.51	23.2	933.80	21.0	921.61	13.8	921.61	13.8	897.72	18.0
51	Virginia	56.4	203	1,124.69	15.9	1,124.69	15.9	1,271.04	8.3	1,288.78	8.3	1,336.06	9.6
53	Washington	51.1	48	2,785.63	33.0	2,785.63	33.0	2,885.51	17.1	2,905.99	17.1	4,282.44	21.8
54	West Virginia	35.8	152	570.31	21.0	570.31	21.0	602.80	8.4	602.10	8.4	1,004.35	36.9
55	Wisconsin	68.7	351	401.01	7.8	401.01	7.8	386.26	5.6	389.86	5.5	377.16	5.8
56	Wyoming	88.9	8	436.61	75.0	436.61	75.0	436.76	74.9	436.76	74.9	436.70	74.9
59	Northeast	49.7	852	1,373.87	12.4	1,365.63	12.5	1,654.96	7.1	1,753.74	7.2	2,119.43	15.6
62	Appalachian	60.3	1765	847.79	6.5	847.90	6.5	905.52	4.5	908.49	4.5	947.95	5.6
64	Lake	66.3	839	415.54	6.7	415.54	6.7	411.00	4.9	417.27	5.0	440.65	6.3
67	Cornbelt	68.7	1356	813.70	19.8	660.89	7.3	656.92	5.1	664.81	6.3	657.86	5.8
68	Delta	65.8	730	700.72	4.9	700.72	4.9	713.23	3.9	715.48	3.9	722.25	4.6
69	Northern Plains	55.1	227	283.84	25.1	287.06	25.1	269.96	17.4	259.58	17.9	254.63	18.7
70	Southern Plains	53.8	401	642.81	9.6	642.81	9.6	613.67	6.4	614.73	6.4	650.48	6.7

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(continued)

FIPS No.	Description	Usable Response Rate 2/	No. of Positive Reports	Original Data Est. w/o Imp.	C.V.	Repaired Data Est. w/o Imp.	C.V.	Estimate Using Imp. Method 1	C.V.	Estimate Using Imp. Method 2	C.V.	Estimate Using Imp. Method 3	C.V.
75	Mountain	72.5	129	809.26	42.3	809.26	42.3	808.52	36.5	782.48	37.6	772.51	38.2
82	Southeast	76.1	1641	842.39	7.6	842.40	7.6	880.30	5.6	905.57	5.8	895.72	5.9
83	Pacific	53.7	137	1,921.00	18.6	1,921.00	18.6	2,050.68	13.6	2,094.30	13.7	2,660.60	20.9
191	Region 1	51.7	686	1,244.91	13.6	1,235.62	13.7	1,424.99	8.1	1,523.55	8.2	1,859.87	18.8
192	Region 2	66.3	2422	626.92	14.3	542.63	5.4	537.49	3.8	543.46	4.6	547.95	4.4
193	Region 3	64.2	4703	814.18	4.0	814.22	4.0	862.23	2.8	873.22	2.9	897.09	3.3
194	Region 4	61.4	266	1,360.97	18.3	1,360.97	18.3	1,549.14	13.7	1,564.63	13.7	1,898.26	19.8
999	Total	63.4	8077	813.32	4.1	791.92	3.3	840.74	2.3	856.68	2.4	907.08	3.8

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