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# RESPONSE BIAS IN A MAIL SURVEY: AN EXAMPLE FROM A LAND USE STUDY

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Researchers are well aware that each technique for administering surveys has its own advantages and disadvantages. Direct interviews, either by telephone or in person, have a relatively high cost per contact but usually result in a higher percentage of questionnaire completions and greater control of the response quality. Mail surveys can be conducted at a lower per unit cost but are often characterized by lower response rates and an overall poorer quality of completed questionnaires. Even with follow-up mailings, recent studies at the University of Maine suggest that response rates of 35 to 45 percent can be expected on general land use surveys or recreation studies.

When research budgets fail to keep pace with inflationary cost increases, researchers are often forced to adopt the least cost method of questionnaire administration or forego the entire data collection effort. In situations where researchers rely entirely on a mail survey, they are often forced to assume that data supplied by respondents adequately reflect true population characteristics. This assumption implies that the characteristics of the portion of the sample population who completed the mail survey are identical to those who chose not to respond.

On a recent land use survey an effort was made to determine the degree to which non-respondents to the initial mail survey exhibited different characteristics from that portion of the sample population which did respond by mail. Specifically, the null hypothesis that there were no differences between the portion of the sample who responded to the mail questionnaire and the portion who did not was formally tested.

## DESCRIPTION OF THE STUDY

The research reported here was conducted in conjunction with Maine's contribution to the regional project, "Socio-economic Factors and Rural Land Use," (NE-125). A questionnaire for use by all participating states was designed to collect information in three general areas:

1. parcel and owner characteristics;
2. values and attitudes held by owners toward the sampled parcels of land; and
3. attitudes toward land use controls.

A sample size and structure for participating states were selected for the regional project. Based upon this it was determined that Maine should contribute 227 completed questionnaires in a certain proportion from designated counties. Towns within those counties were then ranked according to their growth and density characteristics. A listing of all owners of rural parcels of five acres or larger was obtained from tax lists from each town according to the priority list until a minimum of 500 parcels was obtained. A mail questionnaire was sent to all owners of record except where such owners were corporate, public, or institutional. Three weeks later a second questionnaire was sent to all non-respondents for whom a valid address apparently existed.

Of the 515 questionnaires mailed, 229 were returned and usable, 177 were not usable, not deliverable, or refused. The remaining 109 were apparently received but not returned.

The Social Science Research Institute at the University of Maine at Orono, under contract with the Department of Agricultural and Resource Economics, contacted as many of the 109 non-respondents as possible by telephone and administered a questionnaire identical to the one administered by mail. Property owners for whom phone numbers were not available were sent a personal letter emphasizing the importance of their cooperation and asking them to call a toll free number at the Institute. Table 1 indicates the final disposition of the 109 non-respondents to the mail questionnaire.

Table 1.

Disposition of Mail Non-Respondents After Follow-Up Process

Status	Number
Completed Contacts:	
Completions	67
Refusals	12
Terminations	1
Refused phone, but sent mail questionnaire	2
Owner deceased	1
Ineligible ownership type	1
<b>Subtotal</b>	<b>84</b>
Uncompleted Contacts:	
No telephone number available	14
Property transferred, contact not possible	4
Efforts terminated after nine (9) unsuccessful contact attempts	7
<b>Subtotal</b>	<b>25</b>
<b>Total</b>	<b>109</b>

## ANALYSIS OF RESULTS

The analysis was performed using the SPSS statistical program. It considered 55 separate variables with respect to whether the responses by the two groups of respondents were significantly different. Variables which consisted of continuous data, such as parcel size and age of respondent, were analyzed by t-test while those coded by a discrete, non-continuous format, such as current land use and occupation, were tested using  $\chi^2$ . The results are organized according to the various focal areas of the survey and are summarized in Table 2. These results are described below in more detail.

### Owner Population Characteristics

It is apparent from Table 2 that for most variables which reflect respondent characteristics there were no significant differences between the two groups. Only spouse's occupation and type of area where respondents grew up tested at significant levels.

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**Table 2.**  
Summary of Differences Between Mail Respondents and  
Non-Respondents by Survey Area and Selected Variables

Survey Area and Variable	Significance	Survey Area and Variable	Significance
<b>A. Owner Population Characteristics</b>		<b>D. Reasons for Owning the Parcel</b>	
Respondent's Age	N.S.	As a Primary Residence	**
Respondent's Sex	N.S.	Preference for Rural Living	N.S.
Respondent's Educational Level	N.S.	For Minerals or Oil	*
Marital Status	N.S.	Full Time Commercial Farming	N.S.
Respondent's Occupation	N.S.	Food & Resources for Family Consumption	*
Spouse's Occupation	**	As a Second Home	*
Number Household Members	N.S.	For Recreational Purposes	**
Number Household Members > 18 Years Old	N.S.	For Conservational Purposes	**
Household Income	N.S.	For Investment Purposes	**
Type of Area Where Respondent Grew Up	**	As a Place To Retire to	**
<b>B. Parcel Characteristics</b>		To Increase Production Efficiency	N.S.
Acreage of Sample Parcel	N.S.	Good Returns for the Cost	*
Total Acres Managed	N.S.	<b>E. Regulation and Use of Rural Land</b>	
Existence of Zoning	**	Foreign Ownership Should Be Restricted	**
Zoning Classification	N.S.	Allow Change to Highest and Best Use	*
Application of Special Property Tax Program	**	Farm Land Should Be Preferentially Taxed	**
Type of Road Frontage	*	Speculative Profits Should Be Taxed More	N.S.
Length of Road Frontage	N.S.	Better Farm Land Should Be Preserved	*
Type of Water Frontage	**	Restrict Environmentally Harmful Uses	*
Length of Water Frontage	*	Restrict Development to Non-Agricultural Lands	N.S.
Town in which Parcel Was Located	N.S.	Regulate to Minimize Destruction of Natural Beauty	**
<b>C. Parcel Use</b>		Land Should Be Conserved for the Future	*
Form of Parcel Title	N.S.	Owners Should Use Land as They Wish	N.S.
Rights Held by Others	N.S.	Zoning Is Needed in Rural Areas	N.S.
Technique of Parcel Acquisition	N.S.	Subdivision Regulations Are Needed in Rural Areas	N.S.
Previous Parcel Owner	N.S.	Building Codes Are Needed in Rural Areas	N.S.
Current Primary Land Use	N.S.	Local Regulation of Land Similar to the Parcel	**
Previous Primary Land Use	N.S.		
Expected Use Within Next 5 Years	N.S.		
Percent of Income Derived from Land Management	N.S.		
Current Lease or Rental to Others	N.S.		

N.S. = Not Significant

\*Significance  $\geq .05$

\*Significance  $\geq .01$

Spouse's occupation was significant at the 0.01 level (see Table 3). The data indicate the 49.4 percent of the mail respondents' spouses were homemakers while the figure for phone respondents was only 28.8 percent. Since there was no significant difference between respondent's sex, it would appear appropriate to assume that the latter group had a higher proportion of working wives. Apparently those families in which both husband and wife are employed are more likely to decide not to fill out a questionnaire than families where only one partner provides the family income.

Table 4 indicates that non-respondents to the mail questionnaire were, to a larger extent, raised in a rural farm environment. Mail respondents were more likely to have grown up in rural non-farm or suburban environments.

#### Parcel Characteristics

Variables reflecting parcel characteristics are evenly split with respect to significant differences between mail survey respondents and non-respondents. Parcel size, total acres managed by the respondent, and the response rate from various communities are important variables because they are often used to "test" the

representativeness of the response group to the original sample design. For each of these there was not a significant difference. In other words, there was proportionate representation from each of the six sampled communities and neither group varied significantly from the parcel size mean of 56.6 acres or the total acres managed mean of 211.8.

One of the variables for which the two groups did differ is related to whether a parcel was assessed under a special program (see Table 5). More mail respondents were enrolled in a use value assessment program while the land of more non-respondents was not associated with any preferential tax program.<sup>1</sup>

Table 6 presents the analyses of another significant variable. Parcels were classified according to the highest category of road type along which there was frontage. A larger proportion of non-respondents to the mail survey owned sample parcels with frontage on paved town or country roads or had no road frontage at all. Mail

<sup>1</sup>Maine has two statewide use value assessment programs: the Tree Growth Taxation law and the Farm and Open Space Land Taxation law.

**Table 3.**  
Comparison of Spouse's Primary Occupation

Occupation	Mail	Telephone
Professional and Technical	22 ( 12.5)	9 ( 15.3)
Manager/ Administrator	8 ( 4.5)	5 ( 8.5)
Salesworker	2 ( 1.1)	0 ( 0.0)
Clerical	13 ( 7.4)	8 ( 13.6)
Craft and Kindred Workers	5 ( 2.8)	3 ( 5.1)
Operatives	0 ( 0.0)	3 ( 5.1)
Transportation Equipment Operator	0 ( 0.0)	3 ( 5.1)
Non-Farm Labor	3 ( 1.7)	2 ( 3.4)
Service Worker	10 ( 5.7)	1 ( 1.7)
Farm Worker	3 ( 1.7)	1 ( 1.7)
Retired	23 ( 13.1)	7 ( 11.9)
Unemployed	0 ( 0.0)	0 ( 0.0)
Homemaker	87 ( 49.4)	17 ( 28.8)
Total	176 (100.0)	59 (100.0)

( ) indicate percent.  
 $\chi^2 = 28.98$   
Significance  $\geq 0.01$

respondents had a slightly larger percentage of parcels on unpaved roads. It would be difficult to make any conclusions about the apparent rurality of non-respondents' parcels based solely on this variable.

The length of parcel frontage on a body of water was significant at the 0.05 level. Mail respondents who had water frontage (36 cases) had an average of 2,248 feet, while non-respondents (12 cases) had 1,218 feet.

**Parcel Use**

None of the variables indicative of the nature of the parcel title, property rights, or past, present or expected use were significantly different. The mail survey responses adequately represented the sample population on all these aspects.

**Reasons for Owning the Parcel**

The questionnaire listed 12 potential reasons for owning land. Respondents were asked to indicate how important each reason was to them for owning the sample parcel. When the two respondent groups were compared, three-fourths of the reasons had significantly different response patterns. These are presented in Table 7.

According to the  $\chi^2$  value, the reasons which elicited the greatest degree of difference between respondents and non-respondents

**Table 4.**  
Comparison by Type of Area Where Respondent Grew Up

Area	Mail	Telephone
Rural: Farm	75 ( 33.6)	37 ( 54.4)
Rural: Non-Farm	77 ( 34.5)	13 ( 19.1)
Large City	18 ( 8.1)	5 ( 7.4)
Suburb	29 ( 13.0)	1 ( 1.5)
Small City	24 ( 10.8)	11 ( 16.2)
Other or Don't Know	0 ( 0.0)	1 ( 1.5)
Total	223 (100.0)	68 (100.0)

( ) indicate percent.  
 $\chi^2 = 21.16$   
Significance  $\geq 0.01$

**Table 5.**  
Comparison by Assessment Under a Special Tax Program

Program	Mail	Telephone
Use Value Assessment	67 ( 29.6)	8 ( 11.6)
Veteran's Exemption	1 ( 0.4)	0 ( 0.0)
No	129 ( 57.1)	56 ( 81.2)
Don't Know	29 ( 12.8)	5 ( 7.2)
Total	226 (100.0)	69 (100.0)

( ) indicate percent.  
 $\chi^2 = 13.46$   
Significance  $\geq 0.01$

**Table 6.**  
Comparison by Type of Road Frontage for the Sample Parcel

Road Type	Mail	Telephone
Federal Aid Highway	8 ( 5.1)	1 ( 1.8)
State Aid Highway	78 ( 49.4)	23 (41.1)
Paved Town or Country Road	52 ( 32.9)	25 ( 44.6)
Unpaved Town or Country Road	20 ( 12.7)	4 ( 7.1)
No Road Frontage	0 ( 0.0)	3 ( 5.4)
Total	158 (100.0)	56 (100.0)

( ) indicate percent.  
 $\chi^2 = 12.83$   
Significance  $\geq 0.05$

**Table 7.**  
Comparison by Various Reasons For Owning the Sample Parcel

Importance to Respondent	<i>As A Primary Residence</i>		<i>For Minerals Or Oil</i>		<i>Food &amp; Resources For Family Use</i>		<i>As A Second Home Site</i>		<i>For Recreational Use</i>	
	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone
Very Important	94 ( 52.2)	25 ( 37.3)	1 ( 0.6)	2 ( 2.9)	60 ( 34.7)	22 ( 32.8)	18 ( 11.3)	11 ( 16.2)	29 ( 17.9)	13 ( 19.1)
Some Importance	24 ( 13.3)	1 ( 1.5)	6 ( 3.8)	6 ( 8.8)	53 ( 30.6)	17 ( 25.4)	41 ( 25.8)	10 ( 14.7)	68 ( 42.0)	24 ( 35.3)
No Importance	24 ( 13.3)	4 ( 6.0)	42 ( 26.6)	26 ( 38.2)	24 ( 13.9)	20 ( 29.9)	37 ( 23.3)	27 ( 39.7)	25 ( 15.4)	27 ( 39.7)
Not Applicable	38 ( 21.1)	37 ( 55.2)	109 ( 69.0)	34 ( 50.0)	36 ( 20.8)	8 ( 11.9)	63 ( 39.6)	20 ( 29.4)	40 ( 24.7)	4 ( 5.9)
Total	180 (100.0)	67 (100.0)	158 (100.0)	68 (100.0)	173 (100.0)	67 (100.0)	159 (100.0)	68 (100.0)	162 (100.0)	68 (100.0)
	$\chi^2 = 30.06$ Sig. $\geq 0.01$		$\chi^2 = 9.02$ Sig. $\geq 0.05$		$\chi^2 = 9.30$ Sig. $\geq 0.05$		$\chi^2 = 9.40$ Sig. $\geq 0.05$		$\chi^2 = 21.91$ Sig. $\geq 0.01$	

**Table 7 (continued).**  
Comparison by Various Reasons For Owning the Sample Parcel

Importance to Respondent	<i>For Conservation Purposes</i>		<i>For Investment Purposes</i>		<i>As A Place To Retire To</i>		<i>Good Returns For The Cost</i>	
	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone
Very Important	39 ( 23.8)	16 ( 23.9)	59 ( 34.5)	15 ( 22.1)	60 ( 35.7)	28 ( 41.8)	35 ( 21.5)	17 ( 25.8)
Some Importance	83 ( 50.6)	21 ( 31.3)	75 ( 43.9)	23 ( 33.8)	42 ( 25.0)	14 ( 20.9)	52 ( 31.9)	21 ( 31.8)
No Importance	16 ( 9.8)	25 ( 37.3)	20 ( 11.7)	26 ( 38.2)	32 ( 19.0)	23 ( 34.3)	32 ( 19.6)	21 ( 31.8)
Not Applicable	26 ( 15.9)	5 ( 7.5)	17 ( 9.9)	4 ( 5.9)	34 ( 20.2)	2 ( 3.0)	44 ( 27.0)	7 ( 10.6)
Total	164 (100.0)	67 (100.0)	171 (100.0)	68 (100.0)	168 (100.0)	67 (100.0)	163 (100.0)	66 (100.0)
	$\chi^2 = 26.77$ Sig. $\geq 0.01$		$\chi^2 = 22.35$ Sig. $\geq 0.01$		$\chi^2 = 14.90$ Sig. $\geq 0.01$		$\chi^2 = 9.06$ Sig. $\geq 0.05$	

were those associated with primary residence, conservation, investment, and recreational use. In each of these cases, a greater proportion of the mail respondents indicated the reason was important (i.e., either very important or of some importance) than did non-respondents.

Non-respondents indicated that three reasons were important in greater proportion than mail respondents. They were: ownership for minerals or oil, as a place to retire to, and because the parcel exhibited good returns for the cost.

#### Regulation and Use of Rural Land

Respondents were also asked the degree to which they agreed or disagreed with a series of 13 statements about the use and regulation of rural land. A difference occurred with respect to seven of these statements (see Table 8). There was wide variation among the statements with respect to degree of specificity (e.g., "Subdivision regulations are needed in rural areas" versus "Restrict environmentally harmful uses") and the extent to which the

respondent might potentially see himself targeted by the statement (e.g., "Foreign ownership should be restricted" versus "Allow change to highest and best use").

Of the three statements which identified specific land use control techniques (i.e., zoning, subdivision regulations, and building codes) there was no significant difference in the responses of the two groups. The responses for two of these statements appear in Table 8. It should be noted that in both these cases slightly more people agreed with the statement than disagreed, but fewer respondents strongly agreed than with any other statements. A larger proportion of respondents also expressed some level of disagreement with each of these specific controls than for any of the other more general statements.

Many of the statements for which there was a significant difference in response patterns are those which are less specific with respect to how they might actually be implemented. They address general concerns such as foreign ownership, rights of landowners, and environmental protection, but they do not mention specific control techniques.



**Table 8.**  
Comparison by Various Statements on the Regulation and Use of Rural Land\*

	<i>Restrict Foreign Ownership</i>		<i>Allow Highest &amp; Best Use</i>		<i>Preferential Tax For Farms</i>		<i>Preserve Farms For Agriculture</i>		<i>Restrict Uses That Harm Environment</i>	
	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone
Strongly Agree	123 ( 57.5)	20 ( 30.3)	45 ( 21.6)	15 ( 23.4)	71 ( 33.5)	18 ( 27.3)	106 ( 49.5)	23 ( 34.8)	93 ( 45.4)	23 ( 35.4)
Agree	45 ( 21.0)	22 ( 33.3)	56 ( 26.9)	25 ( 39.1)	76 ( 35.8)	22 ( 33.3)	71 ( 33.2)	35 ( 53.0)	77 ( 37.6)	34 ( 52.3)
Neutral	25 ( 11.7)	3 ( 4.5)	41 ( 19.7)	3 ( 4.7)	37 ( 17.5)	4 ( 6.1)	25 ( 11.7)	3 ( 4.3)	20 ( 9.8)	3 ( 4.6)
Disagree	13 ( 6.1)	13 ( 19.7)	38 ( 18.3)	16 ( 25.0)	19 ( 9.0)	13 ( 19.7)	8 ( 3.7)	2 ( 3.0)	7 ( 3.4)	5 ( 7.7)
Strongly Disagree	8 ( 3.7)	8 ( 12.1)	28 ( 13.5)	5 ( 7.8)	9 ( 4.2)	9 ( 13.6)	4 ( 1.9)	3 ( 4.5)	8 ( 3.9)	0 ( 0.0)
Total	214 (100.0)	66 (100.0)	208 (100.0)	64 (100.0)	212 (100.0)	66 (100.0)	214 (100.0)	66 (100.0)	205 (100.0)	65 (100.0)
$\chi^2 = 29.34$ Sig. $\geq 0.01$		$\chi^2 = 11.73$ Sig. $\geq 0.05$		$\chi^2 = 17.02$ Sig. $\geq 0.01$		$\chi^2 = 11.70$ Sig. $\geq 0.05$		$\chi^2 = 9.85$ Sig. $\geq 0.05$		

\*The exact wording of the statements used in the survey is as presented in Table 2.

**Table 8 (continued).**  
Comparison by Various Statements on the Regulation and Use of Rural Land\*

	<i>Minimum Destruction of Natural Beauty</i>		<i>Owners Should Conserve Land</i>		<i>Rural Areas Need Subdivision Regulations</i>		<i>Rural Areas Need Zoning</i>		<i>Higher Taxes For Speculative Profits</i>	
	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone	Mail	Telephone
Strongly Agree	77 ( 36.5)	13 ( 20.6)	108 ( 50.0)	24 ( 37.5)	36 ( 17.2)	8 ( 13.8)	31 ( 14.8)	7 ( 11.3)	41 ( 19.4)	11 ( 18.6)
Agree	84 ( 39.8)	31 ( 49.2)	84 ( 38.9)	37 ( 57.8)	66 ( 31.6)	22 ( 37.9)	60 ( 28.7)	22 ( 35.5)	33 ( 15.6)	8 ( 13.6)
Neutral	33 ( 15.6)	5 ( 7.9)	18 ( 8.3)	0 ( 0.0)	33 ( 15.8)	8 ( 13.8)	40 ( 19.1)	7 ( 11.3)	48 ( 22.7)	8 ( 13.6)
Disagree	12 ( 5.7)	12 ( 19.0)	3 ( 1.4)	2 ( 3.1)	56 ( 26.8)	17 ( 29.3)	49 ( 23.4)	21 ( 33.9)	63 ( 29.9)	23 ( 39.0)
Strongly Disagree	5 ( 2.4)	2 ( 3.2)	3 ( 1.4)	1 ( 1.6)	18 ( 8.6)	3 ( 5.2)	29 ( 13.9)	5 ( 8.1)	26 ( 12.3)	9 ( 15.3)
Total	211 (100.0)	63 (100.0)	216 (100.0)	64 (100.0)	209 (100.0)	58 (100.0)	209 (100.0)	62 (100.0)	211 (100.0)	59 (100.0)
$\chi^2 = 16.82$ Sig. $\geq 0.01$		$\chi^2 = 11.90$ Sig. $\geq 0.05$		$\chi^2 = 1.79$ Not Significant		$\chi^2 = 6.15$ Not Significant		$\chi^2 = 3.53$ Not Significant		

\*The exact wording of the statements used in the survey is as presented in Table 2.

It also appears that mail survey respondents consistently gave stronger support to statements which reflected public good aspects of private land. In four of the seven statements for which there was a difference between respondent groups (i.e., foreign ownership, preserve farms, protect the environment, and conserve land), at least 45 percent indicated they strongly agreed while in none of these cases did more than 38 percent of the non-respondents strongly agree. Each of these statements reflects a significant public good component. The statement that land should be allowed to change to the highest and best use better reflects strong private

ownership rights than public good aspects, and it received stronger general agreement from the non-respondent group.

A separate variable which has been included in this section relates to a question as to whether the amount of land use regulation affecting land such as the sample parcel was too much, too little, or sufficient. These results appear in Table 9. While 20 percent of both groups felt there was too much regulation on land like theirs, almost twice as many (59.4% vs. 31.8%) non-respondents to the mail questionnaire felt the current level of regulation was sufficient.

**Table 9.**  
Comparison of the Perception of the Level of  
Regulations Affecting Land Similar to the Parcel

Level of Regulation	Mail	Telephone
Too much	44 ( 20.9)	14 ( 20.3)
Too little	29 ( 13.7)	2 ( 2.9)
Sufficient	67 ( 31.8)	41 ( 59.4)
Too much of some types and too little of others	7 ( 3.3)	0 ( 0.0)
Don't Know	64 ( 30.3)	12 ( 17.4)
Total	211 (100.0)	69 (100.0)

$\chi^2 = 21.35$

Significance  $\geq 0.01$

### SUMMARY

Most land use related surveys collect data on a core of common variables such as the owner's socio-economic profile and parcel characteristics and use. The survey associated with this study also contained many attitudinal variables. The sample population of rural landowners was sent an initial and follow-up mailing of the questionnaire. As many non-respondents as possible were then contacted by a telephone interviewer who succeeded in completing questionnaires for over 60 percent of the group who elected to ignore the mail survey. Responses of the two groups were compared to determine whether bias would have been introduced into the study had the mail non-respondents been ignored.

Results indicate that data given by respondents to the mail survey were not significantly different from the responses by the mail non-respondents for approximately 75 percent of the variables reflecting the socio-economic profile of the respondents, parcel characteristics, and land use. Failure to incorporate data from the non-respondent group would not have critically biased survey results in these broad areas.

Differences in responses of the two reporting groups are more predominant on questions which addressed the relative importance of various reasons for the respondents to own the sample parcels and their attitudes toward the use and regulation of rural land. Mail respondents assigned a higher level of importance to the ownership of the parcel for primary residence, investment, conservation, and recreational use, while non-respondents gave greater weight to ownership for minerals or oil, as a place to retire to, and because the parcel exhibited good returns for the cost.

With respect to the regulation and use of rural land, mail respondents indicated a stronger degree of agreement with statements which promoted controls over the use of private property in a non-specific way. The group interviewed by telephone generally indicated greater disagreement with such statements. Statements which advocated the application of various specific land use controls received less strong support than the more general statements, and did not significantly differ between respondent groups. This indicates that the need for land use controls shares more widespread support than do the specific traditional tools for implementation. Failure to consider the attitudes of the mail survey non-respondents would have biased the characterization of the need for controls to a greater extent than was appropriate for the sample.

Researchers who rely solely on mail surveys for land use studies may be reasonably confident that reported data reflect the socio-economic profile of owners and parcel characteristics with respect to the original sample design. They should, however, be cautious of assuming that responses to attitudinal variables reflect those of the sample population with the same degree of confidence. Surveys incorporating attitudinal variables with policy implications should receive more intense efforts to obtain responses from the entire sample population than follow-up mailings can guarantee.