TRAFFIC CONGESTION AND TOURISM DISPLACEMENT IN THE NH ROUTE 1A/1B CORRIDOR: DOES SAMPLING METHOD MATTER?

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Abstract: Traffic congestion along coastal highways and beach access roads represents a serious threat to the quality of visitor experiences while visiting coastal resort areas. This paper investigates the extent that visitors have altered their use of New Hampshire's scenic coastal Route 1A/1B corridor as a result of traffic congestion. Data collected from alternative research designs were analyzed and compared to determine if responses to a series of eight questions regarding visitation and changes in use patterns due to traffic congestion in the Seacoast differ across alternative research designs. The results suggest that the two sample populations reduced their use of the corridor at the same rate. The data did suggest, however, that there were differences between across the samples with respect to the extent that visitors reported changing when they visited the corridor.

Introduction

Traffic congestion along coastal highways and beach access roads represents a serious threat to the quality of tourist experiences while visiting coastal resort areas. Nobody likes to be stuck in a traffic jam on the way to the beach. As a result, many tourists may chose to change the amount they visit the coastal resort areas or change when they visit in the future, in order to avoid the crowds, and some will abstain from visiting a particular coastal region all together. This behavioral adjustment to traffic congestion will be examined through the conceptual framework of recreational displacement.

Recreational/tourist displacement has been defined as an adjustment in behavior to maintain satisfaction in response to changes in the social or environmental attributes of a destination. Displacement has the potential to impact both the quantity of recreation opportunities, as well as the quality of those opportunities provided. This in turn can have a substantial impact on coastal and regional economies (i.e., if tourist don't visit, they don't spend money).

Recreational or tourist displacement research has primarily examined the relationship between changes in social conditions and the various forms of displacement. Few studies have examined the relationship between displacement and overall satisfaction and no studies have used alternative methodologies to measure displacement from the same location. A brief review of some of the previous research methodologies for understanding recreation displacement suggest inherent difficulties in studying the behaviors and attitudes of recreationists who are not present at a displaced area (Nielsen & Endo, 1977). Early researchers mailed surveys to summer-season permit holders for a specific wilderness area (Anderson & Brown, 1984; Shelby, et al., 1988), and conducted on-site interviews (Becker, 1981; Dekker, 1976; Hammitt & Patterson, 1991; Nielson & Endo, 1977). Current users of the setting were questioned about their cognitive or behavioral reactions to changes in the recreation setting. This research only offers a qualified documentation of the displacement process (Kuentzel & Heberlein, 1992), and does not provide empirical evidence for the inverse relationship between displacement and overall satisfaction.

Recent displacement investigations have used panel studies to document the behavioral and attitudinal consequences of changes in the social conditions of a recreation setting (Kuentzel & Heberlein, 1992; Shindler& Shelby, 1992). These studies contacted respondents on-site initially (1975 and 1977 respectively), with mail questionnaire follow-ups (1985 and 1991). Panel studies can more accurately determine the relationship between crowding and the various coping mechanisms (e.g. displacement). Panel studies are a preferred

technique for investigating recreation displacement, but replication tends to be difficult, costly and time consuming.

Robertson & Regula (1994) used an alternative research design to investigate displacement by drawing a random sample of recreational users within a given radius of a specific resource that is being stressed. Random sampling of a specific population of interest allow researchers to distinguish between those who have never used a recreation setting, those who continue to use it and those who have discontinued their use as a result of social or environmental conditions of the area. This design is more efficient than on-site sampling, and avoids the cost and time constraints of panel studies. This method was able to document an inverse relationship between satisfaction and displacement, but it was unable to verify if off-site random sampling produced higher displacement estimates than on-site random sampling (Robertson and Regula, 1994). There is a need for comparative research that allows for an understanding of the potential impact of alternative data collection strategies on displacement.

This research addresses research need identified above through a comparison of two data sets collected from alternative sample populations. One data set was collected through on-site sampling of visitors to New Hampshire's seacoast. The other data set was collected through a random sample of New Hampshire residents. Both data sets included a common set of questions focused on displacement from NH seacoast. This approach allows for a more complete understanding of the extent research designs influence estimates of displacement rates. More specifically, this study had three primary objectives. First, to determine the extent to which recreation displacement has occurred in the Seacoast corridor for each sample. Second objective is to determine if people who were displaced were less satisfied with the conditions of NH seacoast area than people who were not displaced for each sample. Finally, the third objective of this study is to compare the two data sets, a on-site contact will a mail survey and a random sample of the general population, to determine if displacement behaviors hold constant across the two different methods of collecting data.

Research Methods

The Research Setting

Route 1A/1B runs along New Hampshire's scenic coastline from Seabrook to Portsmouth. This "Seacoast" route was designated as a "Scenic and Cultural Byway" by the New Hampshire State Legislature in 1992. Due to spectacular views of the Atlantic Ocean, numerous state parks, and beautiful old estates, thousands of people are attracted each year to visit this corridor. Recently, traffic congestion has become a serious threat to the quality of these tourists' experiences and a number of agencies have a broad mandate to decrease the use of passenger vehicles in this coastal zone.

Data Collection-1996 On-site Survey

The 1996 study included an inventory of tourism resources (i.e. restaurants, lodging, and tourist attractions) along the 18-mile seacoast route. Also, data on traffic counts and visitation patterns was documented. Then, University of New Hampshire students and faculty conducted a mini-survey of on-site visitors (n =1807) to nine tourist attractions in the corridor (a one-page questionnaire was administered by a student interviewer). A follow-up mail survey was sent to willing participants of the on-site survey. Approximately sixty-six percent of the on-site sample agreed to provide their names and addresses. Of those, 51% (n = 620) returned the survey. The mail survey was eight pages long. One section (a series of eight questions) of the survey sought to measure tourists' displacement levels and change of use patterns from visiting the Seacoast due to traffic congestion and related issues.

Data Collection-1997 Outdoor Recreation General Population Survey

In 1997, the University of New Hampshire conducted an Assessment of Outdoor Recreation in New Hampshire. The objective of this research was to collect information from a random sample of New Hampshire Residents to help improve the outdoor recreation and resource management programs in New Hampshire. A sample of 3000 households was randomly drawn from a listing of

Table 1. — Overall Satisfaction Scale and Tourist displacement from NH Rte. 1A/1B corridor

Change in Use Statements	Yes		No		F-Value	Chi-Sq.
	%	Mean	%	Mean		* < 6.63
I have not changed the amount I visit the corridor	58%	3.92	42%	3.83	3.285 NS	12.01
I have not changed the amount I visit the Seacoast	48%	4.13	52%	3.88	16.89**	reject null
I will visit the corridor more than I used to	24%	4.06	76%	3.82	10.125**	33.14
I will visit more than I have in the past	14%	4.55	86%	3.91	55.10**	reject null
I visit less in responses to changes in environmental conditions	2%	3.45	98%	3.89	7.299**	16.19
I visit less in response to conditions other than traffic	7%	3.37	93%	4.05	34.8**	reject null
I visit less because of traffic congestion	25%	3.72	75%	3.94	15.494**	2.92*
I visit less in response to crowding or congestion	29%	3.61	71%	4.16	74.41**	accept null
I now visit the corridor in the off-season to avoid traffic	27%	3.89	73%	3.88	.001 NS	13.85
I change the time of year I visit to avoid crowds	18%	3.93	82%	4.02	1.16 NS	reject null
I now visit the corridor in the morning instead of afternoon	31%	3.89	69%	3.88	.001 NS	32.13
I change the time of day I visit to avoid crowds	18%	4.02	82%	4	.08 NS	reject null
I visit the corridor on the weekdays rather than weekends	49%	3.94	51%	3.82	6.199**	87.63
I change the day of the week I visit to avoid crowds	25%	4.04	75%	3.98	1.07NS	reject null
I will not visit the corridor again due to traffic congestion	3%	3.12	97%	3.9	23.527**	3.97*
I no longer visit the Seacoast due to crowding/congestion	6%	3.09	94%	4.05	54.08**	accept null

(*The calculated value of $X^2=\sum$ (fo - fe)/fe : fo-Observed Frequency; fe-Expected Frequency).

persons licensed to drive in New Hampshire. About 31% or 928 completed questionnaires were returned. Only respondents who had been to the seacoast were counted in this study. A section of this survey was designated to ask the same sort of eight questions about tourists' displacement and change of use patterns due to traffic congestion on the1A/1B corridor as the 1996 on-site/mail survey.

Measurement of Key Study Variables

Again the primary goal of this paper is to compare these two different survey techniques (on-site/mail questionnaire and random sampling of the general population) and determine if there are differences in levels of satisfaction and displacement across the data sets.

Dependent Variable—The surveys' eight statements that related to the corridor use. Respondents were asked to circle yes or no to each statement. See Table 1 for precise wording. Example:

I change the day of the week I visit the corridor to avoid traffic congestion.
Yes or No

A limitation to this comparison is that the eight questions that were asked about displacement and change of use were not exactly the same. Although, the main idea of the question was the same, the wording was not identical. Table 1 lists the eight questions from each survey side by side when presenting the results, so comparisons in the wording can easily be made.

Independent Variable—Overall satisfaction was used as the independent variable in each case.

How would you rate your last visit to the Seacoast?
Very Poor Poor Fair Good Excellent

Statistical Methods

The frequencies of the dependent and independent variables were document the extent that recreational displacement occurred and the level of overall satisfaction. Next, one-way analysis of variance was used to examine the bivariate relationships between dependent and independent variables. A one-way analysis of variance was done for both the on-site/mail survey responses and the mail-in survey responses. In each case, overall satisfaction was used as the independent variable.

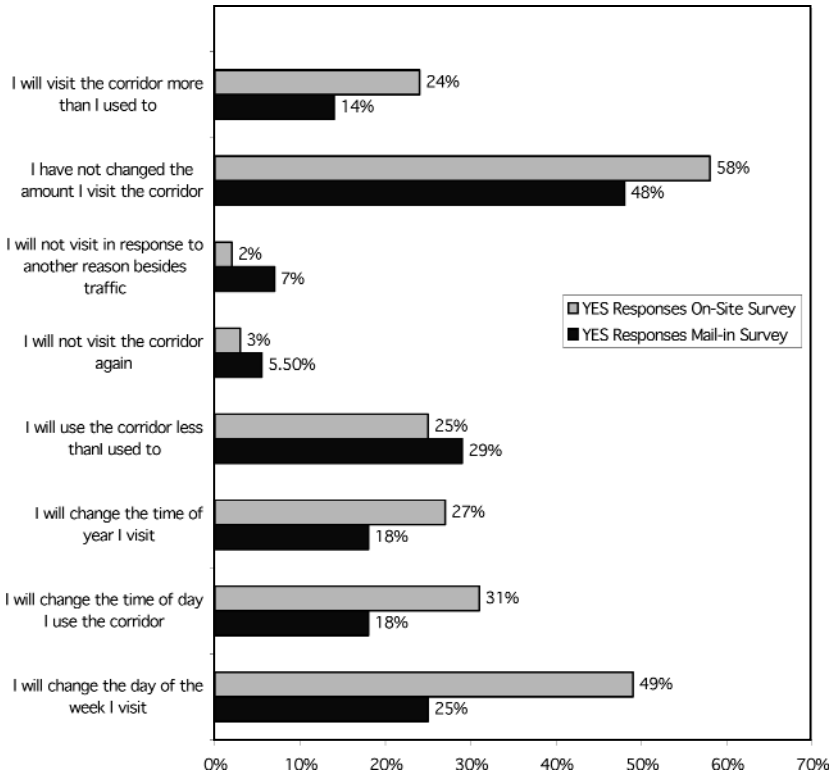

Figure 1. Displacement rates and change in use rates in response to traffic congestion on-site and general population samples

The list of eight yes or no questions were used as the dependent variable at an Alpha =.05 level.

Chi-Square Test for Independence

Finally, the Chi-Square Test of Independence was done to compare the two sets of data (on-site data/mail-in data) to determine if the two sample groups are significantly different from one another across each of the eight statements.

The Chi-Squared distribution is used to test if observed frequencies differ significantly from expected frequencies when more than two outcomes are possible. The Chi-Square test is a useful tool in determining whether or not the two sets of data differ significantly from one another. The two hypotheses for this test are as follows:

H_0-*There is no significant difference between the two samples.*

H_1-*There is a significant difference between the two samples.*

(Alpha= .10, Degree of Freedom: 1, X^2 tabular value=6.63)

In order for the H_0 to be rejected, the calculated value of X^2 must be greater than 6.63.

Results & Analysis

The results of the one-way analysis test for variance between the independent variable (satisfaction) and the dependent variables (eight yes or no survey questions) is shown in Table 1. Table 1 represents data from the 1996 on-site panel study and the 1998 mail-in random sample survey side by side so comparisons can be more easily made between the two. The top question in each pair was asked in the 1996 on-site panel study, while the bottom italicized question was asked in the 1998 mail-in random sample survey. Also, the Chi-squared value, which determines the significant difference between the two samples, is listed at the end of each set of questions. A double star (**) denotes that the particular analysis is statistically significant at the Alpha =.05 level. A (*) denotes that we cannot reject the null hypothesis that there is no significant difference between the two sample methods.

Figure 1 presents the percentage of each sample that answered yes to each particular question they were asked. The top bars next to each question represent data from the mail-in survey, while the bottom bars represent data from the on-site survey. We rejected the null hypothesis H0 in every case except for the two questions about displacement: ** I will not visit the corridor again because of the traffic congestion and **I use the corridor less than I use to because of traffic congestion. This implies that the two sample groups are being displaced at the same rate. However, there is a significant difference in the two samples when it comes to questions about changing ways to use the corridor. The on-site sample seemed to be more willing to change the way they use the corridor in response to traffic, and overall had a higher level of satisfaction with this resource.

Nearly 60 percent of the on-site sample indicated that they did not change the amount they visit the corridor. Whereas just less than 50 percent of random sample indicated that they have not changed the amount of use. There was a significant Chi-square meaning that the two samples were different. There was not a significant difference in level of satisfaction for the on-site sample. There was a significant difference in satisfaction for the random sample, with persons who have changed the amount the use the corridor having a lower level of satisfaction than those who have changed their level of use. The one-way analysis of variance and the Chi-square statistic suggest that the random sample was more able to identify people who have changed the amount that they use the corridor.

With respect to the questions that asked the respondents if they plan to visit the corridor more than they have in the past, the on-site sample was more likely to respond yes, while the on site sample had a higher level of satisfaction with their most recent experience. There was a significant relationship between both the samples across for both statements related to the amount of use and traffic congestion the statement "I visit less because of traffic congestion" and "I will not visit again because of congestion and crowding" and the level of satisfaction. There was not a significant difference in the rate of displacement across the samples. Respondents from the on-site sample were more satisfied with their tourist experience if they "visited the corridor on weekdays rather than weekends", while there was no significant difference for the general population sample. The on-site sample appears to be better able to identify persons who are more likely to change when they use the corridor as opposed to changing the amount that they visit the corridor. The two methodologies produced significantly different results from one another, except for the two questions about displacement. However, four of the five questions found to be significantly related to satisfaction were the same for each sample. The means all appear to be heading in the right direction and the inverse relationship between overall satisfaction and displacement holds true. For example, those people who responded "yes" to changing the way they use the corridor had a higher mean value, and therefore a higher level of satisfaction. Likewise, those people who responded that they would not visit the corridor again had a lower level of satisfaction with the resource.

Conclusions and Recommendation

The two survey methodologies produced significantly different results on the questions regarding change of use. The on-site sample group had a higher level of satisfaction overall, and also indicated that they would be more willing to change the way they use the corridor in order to maintain their level of satisfaction. Using two sampling techniques has raised some important questions about why the on-site group seemed to be more satisfied with the Seacoast than the mail-in group. One reason for this may be that the people who were surveyed on-site had more in-depth knowledge as to how better change their behavior to maximize their enjoyment of this resource. The general population, although displaced at the same rate, is not as willing to change their use pattern probably because they are not aware of the best ways to do this. The state should targeting in-state residents about specific sites, and ways in which they can change their use pattern to avoid the traffic congestion enjoy the beautiful Seacoast again. Some preliminary suggestions include posting the times of day, days

of week, and weeks of the year in which the Seacoast area experiences the most traffic congestion on the Seacoast website. Another way of promoting this information could be to distribute pamphlets at visitor information centers, local restaurants and shops, or toll booths.

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Pages 157-162 in:

Murdy, James, comp., ed. 2004. **Proceedings of the 2003 Northeastern Recreation Research Symposium**. Gen. Tech. Rep. NE-317. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 459 p.

Contains articles presented at the 2003 Northeastern Recreation Research Symposium. Contents cover planning issues, communications and information, management presentations, service quality and outdoor recreation, recreation behavior, founders' forum, featured posters, tourism and the community, specialized recreation, recreation and the community, management issues in outdoor recreation, meanings and places, constraints, modeling, recreation users, water-based recreation, and recreation marketing.

Published by:

USDA FOREST SERVICE
11 CAMPUS BLVD SUITE 200
NEWTOWN SQUARE PA 19073-3294

July 2004

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