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Attitudes of Property Owners to Climate Change Considerations and Their Effects on Future Property Values in Coastal Communities

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Abstract

The purpose of this study is to examine property owners' attitudes regarding the impacts of climate and weather on property ownership and future property values in Currituck County, North Carolina, and determine whether their attitudes vary according to property owner groupings. The study profiles the segments using a factor-cluster grouping approach that identifies three property owner clusters. These clusters represent various perceptions of property owners toward the effects of climate on property ownership and future property values. A comparative analysis is then conducted among these three property groups, resulting in significant differences being found between them in terms of both attitudinal and demographical variables. Group One respondents believe climate and weather affect property ownership and property value, are moderately educated, practice sustainable actions, and there is an equal frequency of second home owners and full time residents in this group. Group Two respondents believe climate and weather do not affect property ownership but do affect property value, are highly educated, practice sustainable actions, and there is a larger proportion of second home owners. Finally, Group Three respondents believe climate and weather do not affect property ownership or property value, have very little education, practice sustainable actions to a lesser degree than the other groups, and there is a larger proportion of full time residents. This information is useful for Currituck County to better communicate with and educate its high-risk and high-end, property owners.

Keywords: coastal property ownership and value, impacts of climate and weather, property owners' attitude, cluster analysis.

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1. Introduction

The social value of a location ranges from the tacit, including sense of place, to the pragmatic, such as property values (Anthony et al. 2009). Weather and climate play an important role across this spectrum. For example, the psychological concept of a place and one's attachment to it are intimately linked to its climate (Knez 2005). Thus, climate change has the potential to both affect property values and the appreciation of place.

Coastal areas are highly vulnerable to environmental change, in particular through sea level rise, air and ocean temperatures, precipitation, and hurricanes and nor'easters. There also exists an underlying tension between long-term residents with their local customs and the often more wealthy part-time residents with second homes. These environmental and social issues affect sense of place and its management. Burley et al. (2007) found that both full-time and temporary coastal residents of Louisiana have a constant and heightened sense of place due to the fragility of their environment, and that "attachment to places, perceiving them as under threat, and perceptions that fellow members are willing to engage in environmentally sustainable behaviors, means that residents are more likely to act and demand a greater say in place management".

With regards to climate change, the North Carolina lagoon system is vulnerable to barrier island loss and increased salinity from sea level rise and storm surge. Links between these environmental impacts and the economy of North Carolina (tourism, fisheries, agriculture) has been studied (Bin et al. 2007), but little work has been done in North Carolina or elsewhere relating sense of place to climate change (Adger et al. 2011). This is problematic as Adger and co-authors contend that cultural impacts of climate change are equal to economic impacts, have growing importance, and can induce action. Because of this lack of attention and the fact that economic values are easier to quantify, coastal management strategies do not normally include tacit social values (Anthony et al. 2009). Anthony et al. conclude that "tools that articulate and quantify tacit values are needed to provide a more balanced data set to coastal managers, and an appeal to tacit values may better engage society as managers strive to develop and implement mitigation or adaptation strategies".

Second home owners are a substantial stakeholder group in coastal counties. Their spending is recognized by local officials as important to the economy. Thus, land use and economic policies often capitalize on this market group. Understanding the thinking of both the resident and non-resident (second home) property owner groups about climate effects can be used to set the stage for communication and education activities with these groups. Limited research has been conducted to examine how climate and weather affects property ownership and property values in coastal areas. This study fills the gap by investigating property owners' attitudes toward climate change and how it may impact future property ownership and values in a high-risk, high end coastal community with a second home vacation economy.

Specifically, the purpose of this study is: 1) to identify comparatively homogeneous property owner categories using their perceptions of impacts of climate and weather on property ownership and property values; 2) to profile and describe property owner groupings using a factor-cluster approach; and, 3) to examine whether there are any differences between the clusters in terms of their socioeconomic, demographic and other attitudinal characteristics.

2. Study Area

Often, the impacts of tourism and second home development, both positive and negative, dominate decisions regarding the economy, environment and community culture of amenity-rich destinations. At the forefront of such a tourism-oriented economic structure can be issues relating to land use, real estate prices, cost of living, transportation, business, workforce, housing, water and the general natural environment, among others. Currituck County, a significant part of North Carolina's Outer Banks tourism destination region, is just such a place. It is located in northeastern North Carolina adjacent to the Atlantic Ocean (Figure 1) and is bordered by Virginia to the north and Dare and Camden counties to the south and west respectively. Currituck County is well known for its beaches, nature and recreational activities including kayaking, fishing and boating. Almost 50 percent of the total land area of Currituck County is surface water (Currituck County, NC Community Profile 2012). The County's population is 23,547 people (Census, 2010), but increases three

fold during the summer due the influx of vacationers. The county has recently experienced substantial growth as indicated by an approximately 30% increase in population between the 2000 and 2010, censuses. The North Carolina Department of Commerce, Division of Tourism, Film and Sports Development, reported that in 2010 domestic tourism generated $117.12 million of economic impact with 1,380 jobs directly attributable to tourism. Additionally, tourism in Currituck County resulted in $21.84 million in employee payroll and $11.37 million in state and local tax revenue. Forty-three (43%) percent of the single family housing stock is considered second home property.

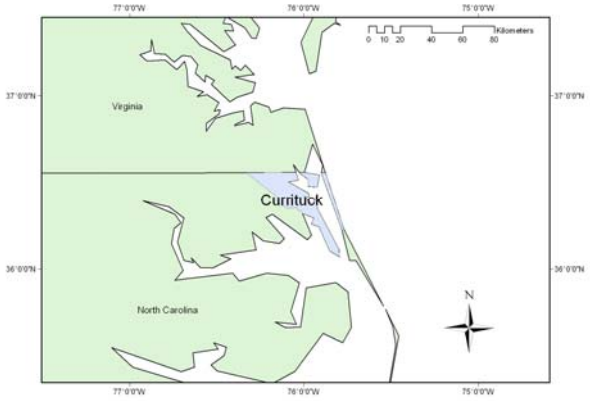

Fig. 1. Currituck County, North Carolina, USA.

3. Methodology

The Geographic Information System (GIS) Tax Records of Currituck County provided a list of the county's housing stock from which a random sample was selected from both resident and second home property owners. Members of this sample were then sent a cover letter inviting them to visit the study's website, insert a participant code number and complete a questionnaire. Participants were also offered the option of a paper copy or a telephone interview. The questionnaire sought to assess the attitudes and perceptions of these property owners regarding: 1) the importance of sustainable actions on future economic success; 2) the impacts of climate and weather on their property ownership and property value/use and on recreational choice; and 3) degree of community attachment. The sample includes 2,350 second home property owners and 2,408 full time / permanent property owners. Four hundred and fifty-nine (459) useable questionnaires were completed and used for this paper (62% were second home owners and 38% full time / permanent property owners).

The degree to which the response from full time residents from Currituck County is representative of the general resident population was investigated using the census demographic categories of the overall population. The median age for Currituck County reported by the U.S. Census was 41 years in 2010. Among the full-time resident respondents, 13.3% fall in the age range of 35-44 and slightly over fifty percent (55.4%) fall within the age range of 45 to 64 years. Approximately thirteen percent (12.9%) of the population in Currituck County was 65 years and older according to the 2010 US Census while over eighteen percent (18.5%) of the full time respondents for this study in Currituck County are 65 years and over. Percent male population in Currituck County in 2010 was 49.6%; 55.1% of the full time resident response category for this study is male. The median household income for Currituck County in 2010 was $55,376 (US Census, 2010). Twenty-seven (27%) of the full time resident respondents fall within the household income range of $50,000 to $74,999 while 18% fall within the household income range of $75,000 to $99,999. Approximately seventeen percent (17.2%) of the population in Currituck County has a Bachelor's or higher degree whereas in this study, thirty-nine percent (39.4%) of the full time resident sample has a Bachelor's degree or higher.

Although the demographic characteristics of the resident sample are similar to those of the full time resident population in Currituck County, the sample for full time property owners was older, with a higher level of male representation, as well as a higher education and income level than the Currituck County population in general.

It is difficult to investigate the representative level of the sample for second home property owners compared to the general second home property owners' population in Currituck County due to the lack of demographic information from the U.S. Census or other state and local agencies for this widely geographically distributed group of "residents". However, according to the National Association of Realtors' (NAR) 2011 Investment and Vacation Home Buyers Survey, the typical vacation home buyer in 2010 was 49 years old and had a median household income of $99,500 (National Association of Realtors, 2011, "Vacation- and

Investment-Home Shares Hold Even in 2010," para. 7 and 8).

Among the second home property owner respondents, approximately 68% fall in the age range of 45-64 years and almost seventy percent (69.7%) of them have household income $75,000 and over. The NAR's survey results also showed that nearly half of the vacation-home buyers indicated they were seeking an investment opportunity, while sixty-three percent of the respondents in this study indicated they purchased second home property in Currituck County for investment value.

Study participants were asked to indicate their level of agreement on how climate and weather affects their property ownership in Currituck County using a five point Likert Scale (1 = strongly disagree, 2 = disagree, 3 = neither agree or disagree, 4 = agree, 5 = strongly agree). Principal component analysis was performed on the seven items that measure property owners' perceptions of the impact of climate on their property ownership. Four out of seven items loaded highly on one factor (loadings range from .591 to .860) named "climate and weather affect property ownership" (Table 1), which explained 38% of the variance. The Kaiser-Meyer-Oklin (KMO) statistic was .757 and the Bartlett's test was significant (p=.000), suggesting that the principal component analysis was necessary and appropriate. A summed scale was then created for this "climate and weather affect property ownership" factor.

Property owners' perceptions of the impact of climate change on their future property values were measured by five items using a five point Likert Scale (1 = not at all, 2 = to s small extent, 3 = somewhat, 4 = to a great extent, 5 = to a very great extent). They were asked to what extent changes in precipitation and temperature, availability of freshwater, number and intensity of coastal storms, as well as sea level rise and coastal flooding affect their future property values. Principal component analysis was performed on the five items. All of the five items loaded highly on one factor as shown in Table 1 (loadings range from .756 to .872) named "climate and weather affect property values", which explained 69% of the variance. The Kaiser-Meyer-Oklin (KMO) statistic was .789 and the Bartlett's test was significant (p=.000), suggesting that the principal component analysis was necessary and appropriate. A summed scale was then created for this "climate and weather affect property values" factor.

Sustainable tourism development places great emphasis on identifying, analyzing and enhancing the characteristics and processes that give destinations a unique character—a sense of place and attachment. In this series of questions, respondents were asked to indicate their level of agreement with the items regarding their attachment to Currituck County. Principal component analysis was performed on the five items. Three out of the five variables had high loading scores (>.5) for one factor named "community sense of place", which explained 48% of the variance. The Kaiser-Meyer-Oklin (KMO) statistic was .716 and the Bartlett's test was significant (p=.000), suggesting that the principal component analysis was necessary and appropriate. A summed scale was then created for a "community sense of place" factor (See Table 1).

Knowing the rapidly growing importance of integrating sustainability within the tourism industry as well as the propensity of increasing numbers of individuals to do the same within everyday life, survey participants were asked their opinion of the importance of fifteen sustainable actions to the future economic success of the County's tourism industry. Principal component analysis was performed on the 15 sustainable action items. Fourteen out of fifteen variables had high loading scores (>.5) for one factor named "sustainable actions", which explained 50% of the variance. One variable, providing economic benefits from tourism to locals, had a loading score of .43, but this loading score was considered close enough to .5 for this item to be included in the factor. The Kaiser-Meyer-Oklin (KMO) statistic was .918 and the Bartlett's test was significant (p=.000), suggesting that the principal component analysis was necessary and appropriate.

4. Results and Discussion

In order to identify groups of respondents based on similar perceptions of the impacts of climate and weather on property ownership and property values, the summed constructual scores from the factor analyses were used to group the respondents using cluster analysis. Three clusters were identified and they each contained an adequate number of cases with the most interpretable outcome. There are 185 respondents in

Table 1. Factor loadings of four dimensions of community living.

Dimension and Factored Items	Factor Loadings
Factor: Climate and Weather Affect Property Ownership	
Weather conditions have changed enough in Currituck County that I would NOT consider buying property here in the future	0.744
Climate change will have a noticeably negative impact on my property values in the next 25 years	0.840
Changing climate conditions will make Currituck County NO longer attractive to new residents	0.860
Impacts of climate change are evident in Currituck County	0.808
Factor: Climate and Weather Affect Property Value	
Changes in precipitation	0.833
Changes in temperature and/or humidity	0.838
Availability of freshwater	0.756
Number and intensity of coastal storms	0.872
Sea level rise and coastal flooding	0.849
Factor: Community Sense of Place	
I feel that I can really be myself here	0.777
I really miss it when I am away too long	0.868
This is the best place to do the things I enjoy	0.845
Factor: Sustainable Actions	
Reducing and managing greenhouse gas emissions	0.758
Managing, reducing and recycling solid waste	0.753
Reducing consumption of freshwater	0.690
Managing wastewater	0.650
Being energy efficient	0.798
Conserving the natural environment	0.738
Protecting our community's natural environment for future generations	0.757
Protecting air quality	0.786
Protecting water quality	0.761
Reducing noise	0.607
Preserving culture and heritage	0.666
Providing economic benefits from tourism to locals	0.430
Purchasing from companies with certified green practices	0.772
Training and educating employees on sustainability practices	0.748
Full access for everyone in the community to participate in tourism development decisions	0.557

Table 2. Clusters of respondents based on similar perceptions of the impacts of climate and weather on property ownership and property values.

Clusters	Climate affect on property ownership		Climate affect on property value		N
	Mean	SD	Mean	SD	
1 (YesPO-YesPV)	3.11	0.467	3.79	0.591	185
2 (NoPO-YesPV	1.93	0.398	3.26	0.553	147
3 (NoPO-NoPV)	1.95	0.762	1.63	0.493	120

cluster 1, 147 respondents in cluster 2, and 120 respondents in cluster 3 as shown in Table 2. People in cluster 1 felt climate and weather affected both their property ownership and property values. This cluster will be referred to as YesPO-YesPV. Property owners in cluster 2 responded that climate and weather did not affect their property ownership but still affected their property values. This cluster will be referred to as NoPO-YesPV. Respondents in cluster 3 neither believed climate and weather would affect their property ownership nor their property values. This cluster will be referred to as NoPO-NoPV.

In order to profile the three clusters in terms of their demographic characteristics, cross-tabulation analysis was conducted. The chi-square statistic in cross-tabulation analysis was employed to assess whether there were statistical differences among the clusters for categorical level measurements and dichotomy variables such as gender, residential status, and if employed in tourism-related organizations. One-way ANOVA tests were also carried out to evaluate the differences of the respondents in three clusters on continuous variables such as age, education (less than high school = 1; high school or GED = 2; 2-year college/Technical school = 3; Some college but no degree = 4; 4-year college = 5; Post graduate = 6), sustainable actions (1 = not at all important, 2 = not important, 3 = neither important nor unimportant, 4 = important, 5 = very important), and community sense of place. The chi-square statistics and ANOVA tests revealed that the three clusters were statistically different from each other based on the following variables: residential status, education level, and sustainable action factor as shown in Table 3. Tables 4 and 5 also illustrate the results of mean difference tests on these three variables. There were statistically significant differences between the three clusters in terms of their residential status, education level and perceptions on the sustainable action factor.

Table 3. Statistically significant differences among three clusters based on demographics and sustainable actions and sense of place.

Variables	F	Sig.
Residential status	13.431	0.001*
Education	5.011	0.007*
Sustainable actions	40.56	0.000*

Table 4. Numbers and percentages of second home owners and full time residents that fell in 3 clusters.

Residential Status	**YesPO-YesPV**	**NoPO-YesPV**	**NoPO-NoPV**
Second home owners	118 (64%)	104 (71%)	59 (49%)
Full time residents	67 (36%)	43 (29%)	61 (51%)

Table 5. Mean score for education and sustainable actions for the three clusters.

Clusters	Education (mean)	Sustainable actions (mean)
YesPO-YesPV	4.33	4.04
NoPO-YesPV	4.99	4.33
NoPO-NoPV	1.02	3.7

YesPO-YesPV has the most second home property owners (118) and full time residents (67). However, the ratio of second home owners to full time residents (64% to 36%) is lower than NoPO-YesPV (71% to 29%), and higher than NoPO-NoPV (49% to 51%). Property owners in YesPO-YesPV are more educated than those in NoPO-NoPV but less educated than those in NoPO-YesPV. They also feel sustainable actions are more important to the success of their county's tourism economy than people in NoPO-NoPV do.

NoPO-YesPV is dominated by second home property owners. Respondents in this cluster are more educated and perceive sustainable actions are more important to the success of local economy than those in YesPO-YesPV and NoPO-NoPV.

NoPO-NoPV is made up of equal numbers of second home owners and full time residents. Property owners in NoPO-NoPV have the lowest level of education among the three clusters. This group of people did not feel sustainable actions are as important as those in the two other clusters perceived.

5. Conclusion

This study investigated the attitudes of property owners, both full time residents and second home property owners, toward the impact of climate on their property ownership and future property values and determined whether their attitudes vary according to property owner groupings. Typologies were determined based upon responses to questions related to property ownership,

such as whether climate change was evident, whether such change would affect the desirability of the destination, and to what extent it would affect future decisions to retain or purchase property. Other climate-related considerations explored perceived impact on property values from changes to precipitation and temperature, availability of freshwater, the number and intensity of storms, and sea level rise and coastal flooding. The study profiled the segments using a factor-cluster grouping approach that identified three property owner clusters. There were statistically significant differences among the three clusters in terms of their residential status, education level and perceptions on the sustainable action factor.

First, people who perceived that climate and weather affect both their property ownership and property values have a comparatively high level of education and feel sustainable actions are relatively important to the success of the tourism economy in their community. Forty-two percent (42%) of second home owners and 39% of full time residents surveyed fall into this group. Second, property owners who perceived climate and weather does not affect their property ownership but still affects their property values are the most educated among three clusters, and also perceive sustainable actions to be very important to the success of the future tourism economy in Currituck County. Thirty-seven percent (37%) of second home owners and 25% of full time residents surveyed fall into this group. Finally, respondents who perceived climate and weather neither affect their property ownership nor their future property values has by far the lowest level of education and places the least amount of importance on sustainable actions. Twenty-one percent (21%) of second home owners and 36% of full time residents surveyed fall into this group.

This information will allow the decision-making entities in Currituck County to adjust their current property ownership practices, recognize their vulnerabilities to the future impacts of climate change, and develop adaptation strategies as necessary, particularly as it relates to investment in home ownership. Mitigation of climate change is everyone's responsibility and policies should be adopted to reduce the carbon footprint of second homes and their respective destinations. There is a pressing need for further discussion among developers, tourism industry leaders, scientists, planners, investors and policy makers on both mitigation and adaptation in second home intensive locations.

Note

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