

# The Natural Environment as a Spiritual Resource: A Theory of Regional Variation in Religious Adherence

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*A region's natural environment has profound social effects for an area. Previous work has connected the environment to tourism, migration rates, community attachment, and economic outcomes. In this article, we explore how nature may impact the religious structuring of a region. Specifically, we investigate if beautiful landscapes and good weather—what scholars call “natural amenities”—could be spiritual resources used by the population to connect with the sacred. We hypothesize that the environment, as a spiritual resource, would compete with more traditional religious organizations. Thus, we expect that regions with higher levels of natural amenities would experience lower rates of religious adherence. To test our hypothesis, we use spatial econometric modeling techniques to analyze data from the Religious Congregations and Membership Study, United States Department of Agriculture, the U.S. County Business Patterns, and the Census. Results show that counties with higher levels of natural amenities have lower rates of adherence to traditional religious organizations.*

**Key words:** demography and ecology; environment; spirituality; USA.

## INTRODUCTION

John Lionberger had a profound spiritual experience in the wilderness. He was skiing in the northern Minnesota woods at twilight, when he said he was “ambushed by God.” He writes in his memoir, “A sense of peace that’s bone-true and javelin-straight floods me, dwarfing any similar sensation I’ve ever had . . . I feel utterly cared for” (Lionberger 2007:17). As an atheist, this incident was unexpected for Lionberger. However, he interpreted it as a spiritual experience with the divine that evening in the forest. Lionberger’s account is not unusual. Many individuals report connecting to the sacred through nature (Ammerman

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2013; Bratton 2008; Crosby 2002; Fuller 2001; Mercadante 2014). Because an area's natural features of weather and topography—its natural amenities—can be experienced by any individual in the area, it should stand that the relationship between the sacred and nature may be seen on a larger scale. That is, an area's level of natural amenities may shape how its population structures itself religiously. Thus, the purpose of this article is to move beyond the individual experience and to examine if a region's natural surroundings can impact *aggregate* religious behavior.

The resources of an area's land and climate are its natural amenities. Mountains, hills, lakes, beaches, and pleasant weather all contribute to the look and feel of a region. Although they are a part of the physical landscape, natural amenities have profound social impacts on a region. They attract population growth, generate tourism, and increase economic development. In this article, we continue the research of examining how topography and climate interact with social behavior and explore two seemingly unrelated topics: the natural environment and the religion. Specifically, we conceptualize the natural environment as a *spiritual* resource, which meets the spiritual needs for a portion of a region's population. As such, a region's natural amenities may compete with traditional local religious organizations and lead to lower religious adherence rates.

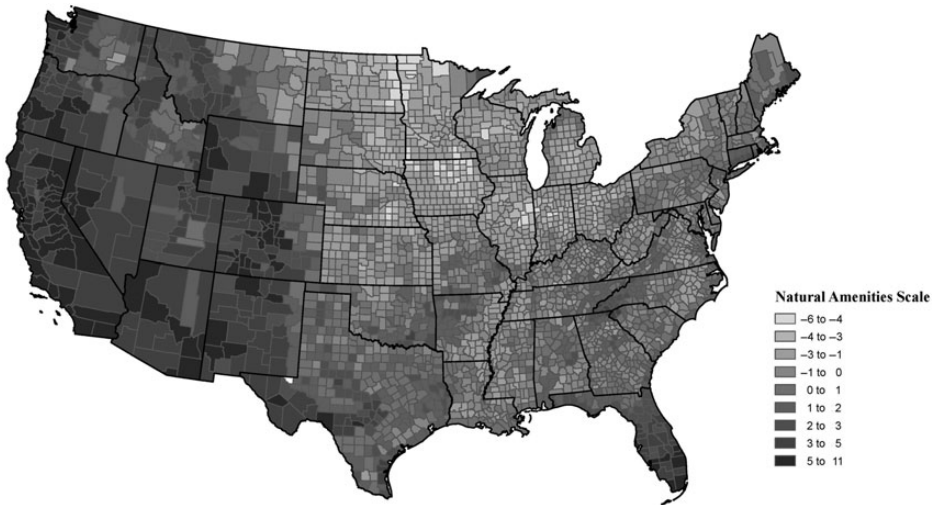
## NATURAL AMENITIES AS A RESOURCE

Natural amenities are valuable resources for an area. Coastlines, lakes, forests, and good weather add value to a region. As scarce and nontransferable resources, natural amenities are unevenly distributed across the country (see Figure 1), and they have powerful effects on social behavior. Previous research on natural amenities has largely focused on their socioeconomic effects in rural areas. In order to generate economic activity, many rural areas have begun to view their lakes, mountains, forests, coasts, and good climates as valuable commodities to generate tourism and attract new residents. Regions with these characteristics attract new residents, who are often wealthy enough to be able to relocate to resource-rich areas. Thus, areas with a lot of natural amenities have higher growth rates, per capita income, costs of living, and levels of quality of life (Deller *et al.* 2001; Hansen *et al.* 2002; Hunter *et al.* 2005; McGranahan 1999; Poudyal *et al.* 2008). However, amenity-rich areas also experience lower employment rates, higher rates of female-headed households, and higher poverty rates (Albrecht 2004).

## NATURAL AMENITIES AS A SPIRITUAL RESOURCE

Natural amenities may be more than an economic resource for a region. Beautiful weather, water, and mountains may also be a resource that meets the spiritual needs for a portion of the population. To help understand the connection between the natural environment and the spirituality, we construct a

FIGURE 1. Natural Amenities. Source: USDA.



theoretical framework from [James' \(1999\)](#) understanding of religion, [Sewell's \(1992\)](#) use of resources, and [Durkheim's \(1995\)](#) concept of sacred. First, our understanding of religion and spirituality must be defined. Here, William [James \(1999:36\)](#) is helpful. He defines religion as “the feelings, acts, and experiences of individual men in their solitude, so far as they apprehend themselves to stand in relation to whatever they may consider the divine.” This, of course, is a much more individualistic understanding of religion than [Durkheim \(1995:44\)](#), who thought of religion as a property of the collective group with a “unified system of beliefs,” and a single moral community called a Church. Essentially, James’ definition of religion from the early twentieth century reflects the twenty-first century’s popular understanding of *spirituality*. Although the terms “religion” and “spirituality” are not mutually exclusive ([Dougherty and Jang 2008](#); [Zinnbauer et al. 1997](#)), “religion” may be thought of as institutional, mediated, and communal, while “spirituality” points to the personal, subjective, non-institutionalized, and unmediated experience with the sacred ([Fuller 2001](#); [Mercadante 2014](#)).

Using James’ definition as the cornerstone of our understanding of spirituality, the natural environment may be a resource that could be used for facilitating these spiritual “feelings, acts, and experiences.” This follows [Sewell's \(1992:9\)](#) concept of nonhuman resources, which are “objects, animate or inanimate, naturally occurring or manufactured, that can be used to enhance or maintain power.” The power, of course, is spiritual power and energy. [Durkheim \(1995:211\)](#) wrote of the power-inducing character that comes from contact with the sacred: “The man who has obeyed his god, and who for this reason thinks he has his god with him, approaches the world with confidence and a sense of heightened energy” (see [Collins 2005](#)). Nature has the ability to be imbued with spiritual power and significance. Forests, lakes, and mountains often invoke a feeling of the divine or

inspire a sense of awe. They are a resource that people may use to connect to the sacred and to generate spiritual feelings.

This idea, of course, is not new. Native Americans have been nature-centric in their religious expression for centuries (Albanese 1991), and both Emerson (1909) and Thoreau (2013) speak of the spiritual connection to nature. Contemporary individuals are likely to see nature as an instrument of self-expression, especially since the natural environment is no longer viewed as a threat to survival (Inglehart 2008). Furthermore, people often operate within a moral schema that imagines the environment as sacred, either because it is a divine creation or because it is inherently holy (Farrell 2013). Many qualitative sociological studies report that individuals often use nature as a source of spirituality in their everyday lives. In their survey of how Americans view the divine, Froese and Bader (2010) describe one interview with a woman named "Becca." She says, "I feel God most vividly when I am close to nature. When I am sitting on the porch and hear the birds singing and see the flowers and feel the wind, that is God's presence to me" (Froese and Bader 2010:23). Nature is what Nancy Ammerman (2013:82, 84) calls a "place of devotion," where "the barriers between [people] and the divine [are] lowered." She reports how one of her interviewees, "Rebecca," spoke about her connection to nature:

*Sam and I will ride our bikes on Sunday morning, and I feel really lucky to live where I live because it's the most beautiful place. And, like, the birds are right outside my window all the time. I don't take it for granted. I live right by the beach and it's amazing. Every night we hear the ocean and it puts us to sleep and it's quite something. It is spiritual. (Ammerman 2013:36)*

Other research corroborates that nature can be a spiritual resource. The wildernesses found in the U.S. National Parks have been described as spiritually sacred places (Ross-Bryant 2005, 2013). There are small, but growing, new earth-centric religious movements (Taylor 2001a, 2001b). Additionally, scholars are beginning to explore how activities that use natural amenities, such as surfing, backpacking, or SCUBA diving, may be viewed as religious experiences (Bratton 2012; Heintzman 2003, 2009; Marsh 2008; Marsh and Bobilya 2013; Taylor 2007). Finally, the Pacific Northwest has received special attention in the connection between religion and nature. This area has high levels of natural amenities (see Figure 1). Wellman (2008) notes that one of the major religious subcultures in the Pacific Northwest sacralizes nature. Shibley (2004:165) goes even further to note that "reverence for nature is an important feature of civil religion in the Pacific Northwest." Therefore, natural amenities can be considered as a resource for spirituality that has the power to satisfy some people's need for inspiration, awe, and divine connection.

## NATURAL AMENITIES AS A SPIRITUAL COMPETITOR

If the natural environment were a spiritual resource, it would necessarily compete within the religio-spiritual marketplace with other, more traditional religious resources (Stark and Finke 2000). In the United States, the most popular

generator of spiritual and religious resources is the congregation (Chaves 2004; Putnam and Campbell 2010). Many people meet their spiritual needs through their local religious congregation, and so natural amenities may be competing with congregations as a supplier for spirituality. A region that has a low level of natural amenities is one with relatively fewer suppliers, and its population is more likely to coalesce into its religious congregations. Conversely, a region with higher levels of natural amenities has additional providers for spiritual resources. The population in this resource-rich area has more choices in spirituality, and so it is less likely to be clustered in traditional religious organizations.

There is evidence that religious groups do compete with the natural environment, although previous research only explores individual religious behavior and not an area's religious structuring. Iannaccone and Everton (2004) tracked individual congregational attendance over many years and found that fewer people attended worship services when there were other substitutes. Weather, especially good weather, dramatically lowered worship service attendance. But good weather, mountains, and coastlines may do more than just keep people from attending their individual congregations. They may draw a portion of the population away from religious organizations altogether. When a person hikes in a forest to connect with the sacred, she or he may not feel the need to affiliate with a religious organization because her or his spiritual demands are met.

Of course, the natural environment is qualitatively different from other traditional suppliers of spirituality in the religious marketplace. A region's natural resources do not have the ability to place constraints on individuals to prevent them from frequenting other suppliers, as religious organizations are often able to do through their cultures. Similarly, traditional religious groups are not likely to prohibit adherents from using the surrounding environment for spiritual expression. They are likely to encourage it. Many religious congregations also meet during specific hours each week, particularly during the weekend. Natural resources, however, do not have these time restrictions, and individuals may use them whenever they please. Therefore, natural amenities are not really competitors with traditional religious organizations for the population's time. Instead, because they have the ability to satisfy a portion of the population's desire for spiritual fulfillment, they compete for allegiance.

Because the natural environment may offer a spiritual substitute for traditional religious groups, it may be a supplier of spiritual goods to the religiously unaffiliated, or "nones." Religious "nones" are people who do not identify with any religious tradition (Baker and Smith 2009b). This does not mean that this group is irreligious. While a "none" can be atheist or agnostic, most merely do not affiliate with a traditional organized religion (Baker and Smith 2009a; Funk and Smith 2012; Stark *et al.* 2005). Indeed, scholars have noted that nature-based spirituality may be drawing unaffiliated individuals away from traditional religious institutions. In her research on individuals who are "Spiritual But Not Religious" (SBNR), Mercadante (2014:88) states, "Nature spirituality is behind the archetypal claim many SBNRs make when they assert that they can find plenty of spirituality in a

sunset and do not need organized religion.” Religious “nones” have been a growing percentage of the population, and recent estimates state they are around 20% of all Americans (Funk and Smith 2012; Kosmin *et al.* 2008). “Nones” are more likely to be male and young (Baker and Smith 2009b; Funk and Smith 2012). Most pertinent to this research, “nones” are more likely to be from the West region of the United States, an area rich in natural amenities (Baker and Smith 2009b; Kosmin *et al.* 2008). Killen and Silk (2004) even call the Pacific Northwest the “None Zone” for the area’s abundance of religious “nones.”

A region’s natural environment could be a spiritual resource that supplies spiritual goods to portions of the population, especially the “nones,” thus decreasing the number of people who are affiliated with traditional religious organizations. Conversely, areas with lower levels of natural amenities could be lacking a substantial spiritual resource, and this drives more people into traditional religious organizations to meet their spiritual needs. Therefore, we offer the following hypothesis: *A region’s level of natural amenities will be negatively associated with its level of religious adherence.*

## DATA AND METHODS

### *Dependent Variable: Religious Adherence*

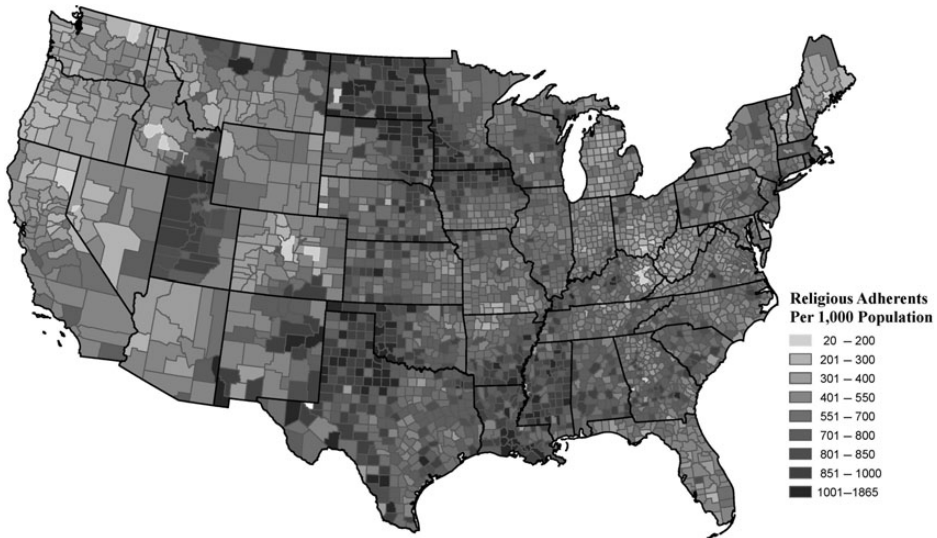
Our analysis examines cross-sectional differences in religious adherence rates among 3,107 US counties. This includes all counties within the contiguous United States, except those missing data on the dependent variable.<sup>1</sup> Religious adherence is defined as “all members, including full members, their children, and the estimated number of other participants who are not considered members; for example, the ‘baptized,’ ‘those not confirmed,’ ‘those not eligible for communion,’ ‘those regularly attending services’ and the like” (Jones *et al.* 2002).

In order to test our hypothesis, we use county-level rates of the total number of religious adherents per 1,000 people from the 2,000 Religious Congregations and Membership Study (RCMS). Figure 2 shows how religious adherence is distributed across the contiguous United States. Downloaded from the Association of Religious Data Archives ([www.theARDA.com](http://www.theARDA.com)), these data are published by the Association of Statisticians of American Religious Bodies (ASARB). The ASARB invited 285 denominations to participate, and 149 (52.2%) provided information about religious membership in every county in the United States. To account for sampling errors within the data, as outlined by Finke and Scheitle (2005), we utilize the adjusted total rates of adherence included within the dataset. This measure includes corrections that account for under-sampling, especially related to racial and ethnic undercounts, and effectively change the total adherence rate for the nation from 53.0% to 62.8%, which is more in line with other studies (cf. Putnam and

<sup>1</sup>The adjusted rates of adherence were not included in the 2,000 RCMS for Loving County, Texas or Washington, DC.



FIGURE 2. Religious Adherents per 1,000 Population. Source: RCMS, 2000.



Campbell 2010; Stark 1987).<sup>2</sup> For our sample, which excludes Alaskan and Hawaiian counties, the mean adherence rate within counties is 63.12%. It should also be noted that due to the sampling methodology of the RCMS, commuting patterns of congregational membership, and the reliance on Census data to calculate adherence rates, several counties report more adherents than their total population. While it is not a perfect measure, this dataset provides the best county-level estimates of religious adherence rates across the country.

### *Independent Variable: Natural Amenities Scale*

In order to measure a county's lakes, hills, water features, and climate, we use the 1999 Natural Amenities Scale downloaded from the United States Department of Agriculture's (USDA) Economic Research Service ([www.ers.usda.gov](http://www.ers.usda.gov)). The USDA constructs this scale by combining a county's measures of warm winter, winter sun, temperate summer, low summer humidity, topographical variation, and water area. The USDA chose these six measures because they are the environmental qualities that most people prefer (McGranahan 1999). Warm winter is measured by the average January temperature, and winter sun is the average days of sun in January. Southern areas generally have the warmest winters, while the Southwest has the sunniest Januaries. Temperate summers are defined as a low January to July temperature gap. The West coast and mountainous areas have the most temperate summers, while the central and Southern plains have the least temperate. Summer

<sup>2</sup>Normality of the distribution of adherence rates was tested. With a Kolmogorov-Smirnov value of .028 ( $D < .01$ ), the present analyses are regressed on the measure without log-transformation.

humidity is the measure of average percent of humidity in July. This measure is low in the West and high along the Southeast. To measure topography, the USDA drew upon maps in *The National Atlas of the United States of America* (United States Department of the Interior 1970). Topography indicates whether the region has (and to what degree) hills, plains, mountains, or tablelands. Water area is the logarithm of the percentage of county area in water.

The USDA created Z-scores for each of the six measures and added them together to create an amenities score for each county in the contiguous United States. The range for the nation is  $-6.40$  to  $11.17$ , and the average is  $.05$ . McGranahan (1999) offers the full methodology for the construction of the USDA's natural amenities scale. The amenities scale is inversely correlated with county-level adherence rates with a Pearson correlation coefficient of  $-.24$ . We acknowledge that the USDA's natural amenities scale neither is objective nor does it measure "beauty." Instead, it is a scale that measures access to natural environments that people prefer (McGranahan 1999).

### **Competition Control Variables**

It might be argued that natural amenities solely function as a time competitor rather than a spiritual competitor—that residents may attend less often when they have alternative ways to spend their time. To assess whether natural amenities are truly functioning as a spiritual competitor, rather than simply a time competitor, we utilize two county-level controls for other types of establishments. Taken from the U.S. Census Bureau's County Business Patterns (CBP) project, we control for the number of recreation establishments and civic organizations, per 1,000 population, within a given county. While the CBP contains data for only establishments with employees, thereby excluding the smaller less-funded establishments, it exists as the most expansive and reliable census of businesses within the public domain.

We include any establishment that is identified by the Census Bureau as "Arts, Entertainment, and Recreation" (NAICS = 71///) as recreation establishments. Because a number of these types of establishments are dependent on factors associated with the natural amenities scale, these establishments were removed from our county-level counts.<sup>3</sup> Counties within our sample have, on average, .35 establishments per 1,000 population. Civic organizations are any establishment that is identified as "civic and social organizations" (NAICS = 813,410). As interval variables, these measures were log-transformed for our analyses. Counties within our sample have, on average, .14 civic organizations per 1,000 population. This measure of civic organizations is positively, though very weakly, correlated with the total adherence rate in each county.

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<sup>3</sup>These classifications include "Nature Parks and Other Similar Institutions" (7,12,190), "Skiing Facilities" (7,13,920), and "Marinas" (7,13,930). Because these types of organizations are necessarily dependent on environmental conditions measured in the natural amenities scale, they are not included here to reduce the effects of multicollinearity.



### **Other Control Variables**

In addition to these controls for alternative competition to religious organizations, we include a number of county-level ecological controls to our models, as indicated by previous research on regional religious adherence rates (Finke 1989). Taken from the 2,000 RCMS, we control for the number of congregations within a county. From the 2,000 Decennial Census, we control for county-level measures of percent female, percent white, percent with a bachelor's degree or higher, percent age 65 or older, median household income, non-migration rates (or "residential stability"), and metropolitan status of the county. In addition, we include a measure of the proportion of each county that voted for George W. Bush in the 2,000 election, as compiled by the U.S. Census Bureau for the USA counties database, to control for local political culture, a commonly cited covariate of religious identification and practices (e.g., Putnam and Campbell 2010).

We also control for the region of the country in which a county is located. The West has higher levels of natural amenities and lower levels of religiosity than other regions, the South has higher rates of religious adherence, and the Midwest has lower levels of natural amenities (Iannaccone and Makowsky 2007; Kanagy *et al.* 1994; Putnam and Campbell 2010).

We additionally adjust for spatial autocorrelation among counties. Spatial autocorrelation exists when interdependence is present among adjacent observations (counties), impacting the measure of outcomes in a local observation. In the present analysis, we expect that the county-level adherence rate in a particular county is, in part, a function of conditions in nearby counties. As such, we use GeoDaSpace software (Anselin *et al.* 2006) to create a first-order queen contiguity weight matrix to specify adjacencies. With this weight matrix, we test for the clustering effects of county-level adherence rates. With a Moran's  $I$  of .541, we find sufficient evidence of interrelations among adherence rates in proximate counties—that is, spatial autocorrelation—and utilize spatial modeling techniques. As these methods are more nuanced than standard estimation techniques, and the particular estimation technique that we use has only recently become available, we provide a more developed explanation of their function in the following section.

### **ANALYTIC STRATEGY**

Using GeoDaSpace software, we construct preliminary models (not shown) to conduct diagnostic tests for spatial dependence. Robust Lagrange multipliers (LM) indicate that models show significant evidence of autocorrelation in both the response variable (spatial lag) and in the error term (spatial error) at  $p < .001$ . With the recent release of GeoDaSpace software and its improvement of modeling capabilities, we are able to control for both spatial lag and spatial error simultaneously in our models using a spatial two-stage least squares (S2SLS)

approach with a general method of moments estimation in GeoDaSpace 1.0 (Anselin and Rey 2014; Chi 2010; Snowden and Freiburger 2015).<sup>4</sup>

Model 1 tests for the main effects of regional differences of religious adherence, controlling for spatial autocorrelation. Model 2 adds our predictor of interest, the USDA natural amenities scale. Model 3 tests the robustness of the effect of amenities on adherence by controlling for a number of population and cultural characteristics. Model 4 again tests robustness in light of alternative explanations for the presence of the amenities effect via the presence of congregations and other forms of business and establishments.

## RESULTS

### *Descriptive Results*

Table 1 outlines both descriptive statistics for the sample and correlation coefficients for each independent variable with the religious adherence rate. The average religious adherence rate is 631.19 per 1,000 people. The natural amenities measure ranges from  $-6.40$  to  $11.17$ , with an average of  $.05$ . This is negatively correlated with the adherence rate ( $r = -.24$ ). Counties have on average  $.35$  and  $.14$  recreation establishments and civic organizations per 1,000 people, respectively. While recreation establishments are not correlated with a county's religious adherence rate, civic organizations are positively correlated ( $r = .07$ ). Counties have on average just over 85 religious congregations.

Table 2 shows how the Census regions differ in average levels of religious adherence rates and natural amenities. The South and Midwest have the highest rates of religious adherence with 664.5 and 646.5, respectively. The West has the lowest rates with 505.9 adherents per 1,000 people. The West has the highest average level of natural amenities, however, with a mean score of 3.598 out of 11.17. The South has the second highest with  $.371$ , and the Northeast has the lowest with  $-.006$ .

### *Multivariate Results*

Table 3 offers four models predicting the county-level religious adherence rates—that is, the reported number of religious adherents per 1,000 total county population. Model 1 includes only region, spatial lag, and spatial error as predictors. Consistent with previous literature on regional variation in religious

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<sup>4</sup>As a test of robustness for these models, we replicated all models using a multilevel modeling framework controlling only for spatial lag and spatial error independently. In these ancillary models, the effects remain consistent. Tables of these ancillary models are available upon request. In addition, we tested for the role of Census regions as “spatial regimes” within the S2SLS model, in attempt to maintain a multilevel framework. However, the Chow tests suggest that effect differences, once controlling for spatial lag and error, are not sufficient to justify the multilevel approach.

TABLE 1 Descriptive Statistics and Bivariate Correlations

Measures	Mean	Std. dev.	Min.	Max.	Corr. with religious adherence rate	
Religious adherence rate	631.19	213.66	20.15	1,861.47	—	
Natural amenities	.05	2.28	−6.40	11.17	−.24	***
Recreation establishments/1,000 Pop.	.35	0.35	.00	5.38	−.03	
Civic organizations/1,000 Pop	.14	.16	.00	2.25	.07	***
Number of congregations	85.64	143.41	1	4,044	−.01	
Percent female	50.48	1.91	32.70	57.40	.21	***
Percent white	84.79	16.03	4.50	99.70	−.19	***
Percent bachelors or higher	16.50	7.79	5.00	63.80	−.09	***
Percent 65 or older	14.81	4.11	1.90	34.70	.27	***
Percent non-migration	19.83	4.88	1.10	35.70	.01	
Metropolitan area	.27	—	0	1	−.12	***
Median household income (in thousands)	35.26	8.84	12.69	82.93	−.17	***
Percent voted Republican in 2,000 Election	56.96	11.93	11.80	92.50	.06	***
<i>Region</i>						
West	.23	—	0	1	−.23	***
South	.33	—	0	1	.14	***
Midwest	.25	—	0	1	.05	***
Northeast	.19	—	0	1	−.07	***

Sources: RCMS, 2000; USDA Natural Amenities, 1999; US CBP, 2000; US Census, 2000.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

adherence, counties in the South are estimated to have the highest proportions of religious adherence, while counties in the West have the lowest. Counties in the Midwest and Northeast fall in between the other two. Likewise, the coefficients of spatial autocorrelation indicate, as expected, a clustering of religious (and non-religious) counties.

Model 2 adds our primary independent variable, natural amenities. In support of our hypothesis, this model is consistent with our expectations that we have outlined above. An area's natural amenities are associated with a decreased level of religious adherence, with an unstandardized coefficient of  $-17.95$ . As the USDA amenities scale has a range of 17.57, this model estimates a difference of 315 religious adherents per 1,000 population (or a 31.5% difference in religious adherence) between counties with the highest-level of natural amenities and those with the lowest. In this model, the regional effects largely disappear, with the South evidencing the only, albeit large, difference from the West. In

TABLE 2 County Mean Religious Adherence and Natural Amenities Across Regions

	N	Mean		Std. dev.	95% CL	mean
<i>Religious adherents (per 1,000 population)</i>						
Northeast	217	576.8	a	171.2	553.9	599.7
Midwest	1,055	646.5	b	201.4	634.3	658.6
South	1,422	664.5	b	212.2	653.5	675.6
West	413	505.9	c	219.1	484.8	527.1
<i>Natural amenities</i>						
Northeast	217	-.006	w	1.044	-.146	.133
Midwest	1,055	-1.749	x	1.390	-1.833	-1.665
South	1,422	.371	y	1.372	.300	.443
West	413	3.598	z	2.426	3.363	3.832

Note: Means with different subscripts differ ( $p < .001$ ) according to a Scheffe test.

Model 2, we see a drop in the pseudo  $R^2$  and a corresponding increase in the spatial pseudo  $R^2$ . This suggests, in accordance with our hypothesis, that a degree of the regional variation in religious adherence rates is due to the natural amenities present in that region.

Model 3 tests for the robustness of this effect, in light of county-level demographic measures. In this model, the effect of natural amenities on adherence rates remains robust and, in fact, increases in strength. Of the county-level ecological controls introduced in this model, all variables are shown to be statistically influential on adherence rates. We find positive effects from the percent of the population that is female, college-educated, elderly, residentially stable, and Republican. Median household income has a strong positive effect in this model, while having a metro status and the percent of the population that is white both have negative effects. Here, counties in the South are no longer predicted to have higher adherence rates than counties elsewhere, net of the effects of the covariates.

Model 4 specifies measures of alternative competition to religious organizations as well as a count of the congregations in the county. Controlling for these added measures, the impact of natural amenities on religious adherence rates remains robust. The county-level ecological controls specified in Model 3 remain consistent and save the loss of significance of the effect of education. In addition, both the alternative competition measures are indicated as significant and positive, while the presence of additional congregations appears to have no statistical effect on adherence rates. Areas with more recreation establishments and civic organizations are independently shown to have higher religious adherence rates. Once controlling for these measures, counties in the South are predicted to have higher adherence rates, although to a much lesser extent than predicted in the simplified models.

TABLE 3 Spatially Weighted Two-Stage Least Square Regression Analyses Predicting County-Level Religious Adherence Rates

Measures <sup>a</sup>	Model 1: Regional differences in religious adherence			Model 2: Effect of natural amenities			Model 3: Demographic controls specified			Model 4: Full conditional model		
	Estimate	SE	p	Estimate	SE	p	Estimate	SE	p	Estimate	SE	p
Intercept	431.77	131.38	**	528.23	154.14	***	425.76	44.31	***	410.61	42.32	***
Natural amenities	—	—		−17.95	3.36	***	−19.48	2.78	***	−19.27	2.76	***
Percent female	—	—		—	—		9.27	1.64	***	9.67	1.63	***
Percent white	—	—		—	—		−3.81	.38	***	−3.82	.37	***
Percent bachelors or higher	—	—		—	—		1.69	.61	**	.66	.63	
Percent 65 or older	—	—		—	—		17.84	1.26	***	15.94	1.28	***
Percent non-migration	—	—		—	—		5.51	.87	***	3.52	1.06	***
Metropolitan area	—	—		—	—		−34.18	7.79	***	−33.98	8.07	***
Median household income (ln)	—	—		—	—		90.74	27.60	**	78.43	27.71	**
Percent voted Republican in 2,000 Election	—	—		—	—		1.81	.47	***	1.93	.46	***
Recreation establishments/1,000 Pop. (ln)	—	—		—	—		—	—		21.84	5.79	***
Civic organizations/1,000 Pop (ln)	—	—		—	—		—	—		15.90	5.71	**
Number of congregations (ln)	—	—		—	—		—	—		12.77	6.73	

*Continued*

TABLE 3 *Continued*

Measures <sup>a</sup>	Model 1: Regional differences in religious adherence			Model 2: Effect of natural amenities			Model 3: Demographic controls specified			Model 4: Full conditional model		
	Estimate	SE	<i>p</i>	Estimate	SE	<i>p</i>	Estimate	SE	<i>p</i>	Estimate	SE	<i>p</i>
Region <sup>b</sup>												
South	142.53	37.01	***	103.62	38.14	**	39.33	20.56		44.25	20.27	*
Midwest	112.86	36.08	**	30.25	38.30		−16.67	23.68		−23.04	22.81	
Northeast	66.55	32.14	*	16.11	46.39		−4.45	26.50		−14.92	25.90	
Spatial lag	.15	.24		.08	.26		.33	.07	***	.35	.07	***
Spatial error	.65	.05	***	.82	.04	***	.51	.06	***	.48	.06	***
Pseudo <i>R</i> <sup>2</sup>	.24			.17			.48			.49		
Spatial pseudo <i>R</i> <sup>2</sup>	.06			.09			.27			.27		

\**p* < .05, \*\**p* < .01, \*\*\**p* < .001.

*N* = 3,107 counties.

<sup>a</sup>All continuous predictor variables are centered on the grand mean.

<sup>b</sup>West is the reference category.



## DISCUSSION

The purpose of this research is to examine if a region's natural environment may be a spiritual resource that supplies a portion of the population's spiritual needs, which reduces the number of people within the population who have traditional religious affiliations. We have done so by showing that counties with higher levels of natural amenities are associated with lower rates of religious adherence even when controlling for other competitors, such as civic organizations and recreational opportunities. Our evidence supports the hypothesis that a region's topography and weather affect its religious composition. Beautiful weather, mountains, and waterfronts are not so much competitors for *time* with religious affiliations but suppliers for *connections to the sacred*.

Our study provides evidence that regions with more beautiful weather and scenery have lower rates of religious adherence. Some may argue that our finding is statistically spurious. For example, the connection between higher natural amenities and lower religious adherence rates in the West could be a remnant of the "frontier" culture in the West. Although settled for over a century, the West was the American frontier for many years. One defining aspect of frontiers is their high sex ratios (more males per females), which is a demographic covariate to lower religious adherence rates (Finke 1989; Finke and Stark 1992). Thus, the West could have begun as a region with lower rates of religious adherence, which remain today as an echo of its frontier culture even after sex ratios have equalized. Yet our models show that the West's exceptionality in religious adherence rates is mediated by natural amenities. Once a region's natural environment is taken into account, the West's distinctiveness disappears when compared with the Midwest and the East.

Our findings could also be conceptually misinterpreted. Regions with higher levels of natural amenities may have lower religious adherence rates just because enjoying nature and being affiliated with a religious organization may compete with each other for a population's time. However, we do not think we are only capturing a time competition effect. First, our dependent variable of religious affiliation is not necessarily measuring a behavior (as would religious service attendance). Instead, the measure is one of affiliation, membership, and identity. The evidence supports our hypothesis that beautiful regions have lower rates of *membership and affiliation*, not just lower rates of religious behavior. Second, we have accounted for other time competitors such as recreational outlets and civic organizations. Therefore, between two counties with the same levels of recreational opportunities and civic organizations, the county with the greater amounts of coastlines, mountains, and good weather will have lower religious adherence rates. Third, the relationship between these time competitors and religious adherence rates is *positive* for counties. Thus, counties with many outlets for the population's time see an increase in religious adherence rates. Our measure for natural amenities is therefore capturing something other than time. Natural amenities are a spiritual resource for a region and not just a resource to occupy a population's time.

We acknowledge that some may claim this study comes close to committing the ecological fallacy, where one uses aggregate data to explain individual behavior (Robinson 1950). However, we are not attempting to explain individual data, only county-level patterns. We find that county-level natural amenities are associated with how a county is structured religiously. Yet, our macro-level findings do support micro-level qualitative work done by scholars exploring how individual religion and spirituality extend beyond traditional institutions (e.g., Ammerman 2013; Fuller 2001; Mercadante 2014).

This research opens up other possibilities for future studies. Scholars need to explore if the negative relationship between natural amenities and religious adherence rates is an American phenomenon. Would this relationship continue in areas that have lower rates of religious adherence, such as Western Europe? Do natural amenities affect adherence rates in countries that are predominantly Hindu or Buddhist, as these religious traditions are not congregationally based? Future research is needed to help clarify these questions.

This study extends research on the exploration of region, the environment, and religion. First, it helps explain regional variation in religious adherence rates, specifically for the West. The West has historically had lower rates of adherence in traditional religious organizations than the rest of the nation (Iannaccone and Makowsky 2007; Putnam and Campbell 2010; Stark 1996). This is *not* because residents of the West are less religious than the rest of the nation. Instead, Americans in the West have another supplier of spiritual goods—the natural environment—to meet their demands for the sacred.

Second, this study opens up our understanding about the relationship between religious behaviors and “place,” a concept that is important in natural resources research (see Cheng *et al.* 2003) and increasingly in religion (Neitz 2005; Wellman and Corcoran 2013). The locality where one lives and the surrounding environment can profoundly affect social structure. As the evidence supports from this study, the presence of mountains, coastlines, or beautiful weather can influence how residents within a place structure themselves religiously. The environment can be a “site” where spirituality is practiced and enacted (Guhin 2014). Yet this evidence generates more questions, such as how do natural amenities impact other social structures other than the economy or religion?

Third, we expand our understanding of religion and spirituality. This research furthers the research agenda set forth by Ammerman (2006, 2013, 2014) and others (Heintzman 2003; Marsh 2008; Mercadante 2014; Taylor 2001a, 2001b, 2007) who explore “everyday religion,” that is, religion and spirituality located outside traditional institutions. As William James aptly put it, there are “varieties of religious experience.” These experiences with the sacred do not all occur within traditional religious structures. Indeed, this research supports what Ammerman (2014:189) says: “Religion is neither an all-or-nothing category nor a phenomenon that is confined to a single institutional sphere.” Whereas Ammerman’s work is narrative and qualitative, we approach “everyday religion” from a macro and quantitative perspective to show how an entire area’s traditional

religious institutions may be altered because of the presence of another supplier of spirituality. We are not claiming that residents in areas richer with natural amenities are more likely to create a “Church of nature.” To modify Durkheim’s (1995:43) famous phrase on magic, “There is no Church of nature.” Instead, residents in these areas are not joining conventional religious organizations at the same rate because they have an additional supply of the sacred. Scholars of religion—both those employing micro or macro perspectives—therefore need to consider the multiple sources that humans use to construct their spiritual and religious lives.

Finally, we further our understanding of how the Earth can be a powerful force that interacts with society. Humans are social beings, and we are shaped by the environment around us. The natural environment affects more than tourism and economic development. It also influences religious affiliation, which means the land, air, and water that surround us are more than natural forces. They are powerful *social* forces.

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